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Hepatitis C in Montana Hospitalizations, 2000-2011¹

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Hepatitis A, B, and C are distinct viruses that infect the liver. Hepatitis B and C infections often become chronic and are leading causes of chronic liver disease including cirrhosis and hepatocellular carcinoma. Individuals infected at older ages, those who also abuse alcohol, or who have concurrent infections with more than one hepatitis virus or with HIV are at greatest risk for progression to cirrhosis and hepatocellular carcinoma.² Vaccines for hepatitis A and B have been available since 1995 and 1981, respectively. Routine vaccination of children has been recommended by the Centers for Disease Control and Prevention (CDC) since 1999 for hepatitis A and since 1991 for hepatitis B.³ As a result, their incidence and prevalence have declined dramatically nationwide.

Many people newly infected with hepatitis C remain asymptomatic and between 15% and 25% spontaneously clear the virus.⁴ Approximately half of patients who develop hepatitis C symptoms are hospitalized as a result of it although many patients are hospitalized for other reasons and have acute or chronic hepatitis C as a secondary diagnosis.⁵ We tabulated all hospitalizations in which acute (ICD-9-CM codes 070.41 or 070.51),⁶ chronic (070.44, 070.54), or unspecified (070.70, 070.71) hepatitis C appeared as primary or secondary diagnoses in the Montana Hospital Discharge Data System (MHDDS). In the aggregate, we refer to these as patients *hospitalized with hepatitis C* in this report. Case ascertainment was based solely on the ICD-9-CM codes provided in the discharge records; these lack the detail of current case definition standards, which changed several times between 2000 and 2011.⁷ In general, the changes tended to reclassify some cases from acute to chronic, which is now usually referred to as *Hepatitis C Infection/Past or Present*. This renders time-trend analysis for acute vs. chronic cases difficult so this analysis is based primarily on total number of hospitalizations with hepatitis C.

Hepatitis C is a reportable condition in Montana.⁸ Differences in the number of acute hepatitis C cases between MHDDS and the Communicable Disease Epidemiology Program (CD Epi) database may be attributed to differences in how clinicians and public health surveillance systems define an “acute” case. In addition, because the MHDDS dataset lacks personal identifiers, repeated admissions of the same

¹ The Montana Hospital Discharge Data System (MHDDS) receives annual de-identified hospital discharge data sets through a Memorandum of Agreement with the Montana Hospital Association and the Montana State Hospital at Warm Springs. Most hospitals in Montana participate in voluntary reporting of discharge data from their Uniform Billing Forms, version 2004 (UB-04). The MHDDS receives information on more than 95% of the inpatient admissions in the state. It does not receive data on Emergency Department visits at this time.

² NIH Consensus Statement of Management of Hepatitis C: 2002. *NIH Consensus State Sci Statements* 10:1-46.

³ CDC Advisory Committee on Immunization Practices, <http://cdc.gov/vaccines/recs/acip/default.htm>

⁴ <http://www.cdc.gov/hepatitis/HCV/HCVfaq.htm#section1>

⁵ <http://www.cdc.gov/hepatitis/Statistics/2010Surveillance/index.htm>

⁶ <http://www.icd9data.com>

⁷ http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/hepatitiscacutecurrent.htm

⁸ <http://data.opi.mt.gov/bills/mca/50/1/50-1-202.htm> and <http://www.mtrules.org/gateway/RuleNo.asp?RN=37.114.203>

patient in a given year will be counted more than once. In 2011, nine cases of acute hepatitis C were reported to CD Epi, compared to 15 reported to MHDDS. Cases coded as acute hepatitis C in the MHDDS may not meet the formal criteria of an acute infection (defined as confirmatory laboratory test for hepatitis C, clinical symptoms of acute viral hepatitis, jaundice or dark urine, or serum alanine aminotransferase (ALT) levels above 400 IU/L).⁹ Some cases in MHDDS may actually be attributable to exacerbations of symptoms in patients with chronic hepatitis C. CD Epi follows the CDC case definition when reporting acute hepatitis C cases. If the CDC criteria are not met, CD Epi will classify the case as chronic hepatitis C. Some cases reported to CD Epi as acute hepatitis C are found on investigation to be chronic.

There are slightly fewer than 100,000 hospitalizations reported to the MHDDS each year. Hepatitis C appeared as a primary or secondary diagnosis in 0.5% of them in 2000, increasing linearly to 1.4% in 2011. The absolute number of hospitalizations with hepatitis C increased almost three-fold between 2000 and 2011 (Table 1).

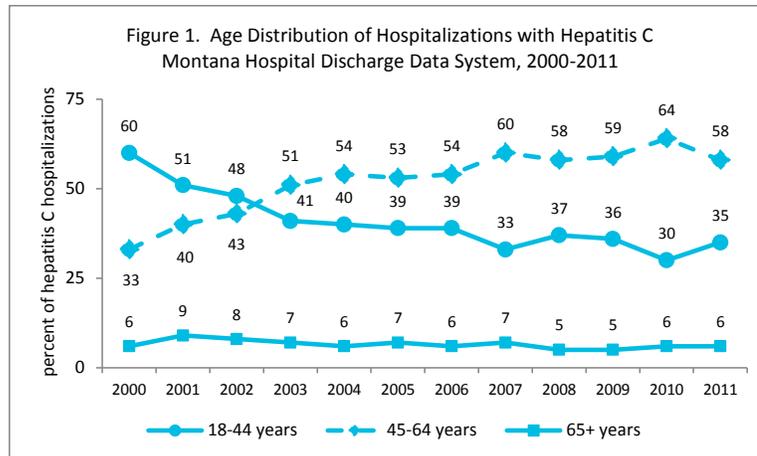
Year	Primary Diagnosis			Secondary Diagnosis			TOTAL
	Acute	Chronic	Unspecified†	Acute	Chronic	Unspecified†	
2000	5	1		170	290		466
2001	6	8		270	327		611
2002	8	6		332	411		757
2003	9	9		357	462		837
2004	6	16	1	360	579	111	1,073
2005	6	13	2	25	650	526	1,222
2006	4	10	4	12	492	556	1,078
2007	8	11	3	19	564	638	1,243
2008	10	16	18	12	440	558	1,054
2009	7	21	17	11	396	704	1,156
2010	4	24	30	7	386	712	1,163
2011	4	18	23	11	435	774	1,265

Bold = years in which case definitions of acute, chronic, and unspecified hepatitis C infection changed

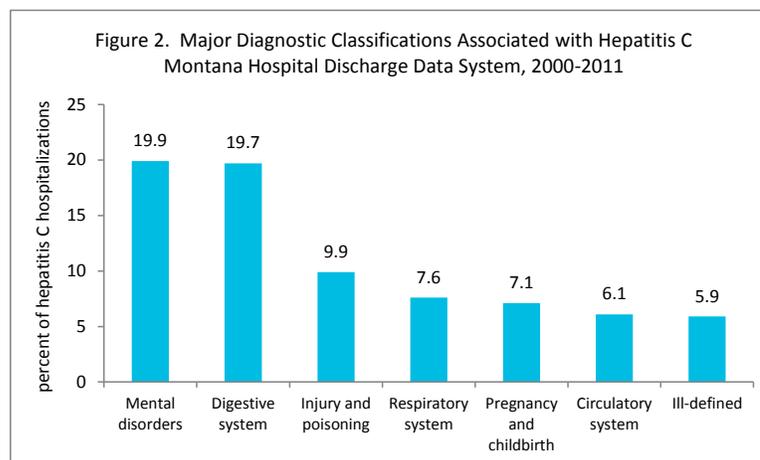
† Unspecified category was introduced on October 1, 2004

The sex ratio of hospitalizations with hepatitis C was slightly skewed toward males (53%). Almost all patients hospitalized with hepatitis C were age 18 years or older (Figure 1, page 3). Children under the age of 17 years consistently accounted for 1% or less of the cases each year. There was an increase in the proportion of hospitalizations with hepatitis C among patients between the ages of 45 and 64 years between 2000 and 2011, and a corresponding decline in the proportion between the ages of 18 and 44 years. Patients age 65 years and older consistently accounted for less than 10% of these hospitalizations.

⁹ http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/hepatitiscacutecurrent.htm



The most common primary diagnoses associated with hepatitis C were mental disorders (ICD-9-CM 290.0-319.9) and diseases of the digestive system (ICD-9-CM 520.0-579.9), which together accounted for nearly 40% of all hospitalizations with hepatitis C (Figure 2). The remaining major diagnostic classifications each accounted for less than 10% of hospitalizations with hepatitis C, and those not shown in Figure 2 accounted for less than 5%. Mental disorders include abuse of and dependence on both drugs and alcohol. Diseases of the digestive system include cirrhosis and other chronic liver diseases. The disproportionate association of hospitalizations with hepatitis C with these two categories may arise in part from injection drug use being the primary risk factor for acquiring hepatitis C,¹⁰ and in part from liver disease being a consequence of hepatitis C infection, which is exacerbated by alcohol abuse.¹¹ One third of the digestive diseases were specifically liver disease, notably cirrhosis.

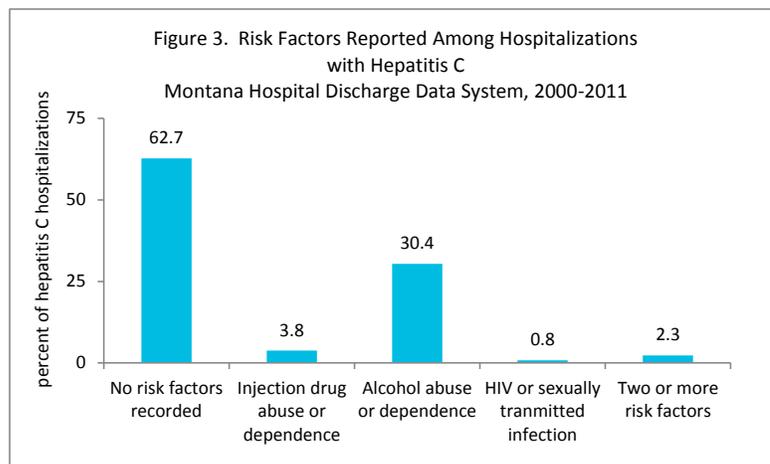


As far as we can determine from MHDDS data, most patients who were hospitalized with hepatitis C did not fit a high-risk profile of drug or alcohol abuse or high prevalence of sexually transmitted infections. Only about a third of patients with hepatitis C had concurrent codes for drug (ICD-9-CM 304.0, 304.7, or 305.5.) or alcohol (ICD-9-CM 303.0-303.9, 305.0) abuse or dependence or

¹⁰ http://www.cdc.gov/idu/hepatitis/viral_hep_drug_use.pdf

¹¹ Schiff ER, Ozden N. 2004. Hepatitis C and Alcohol. <http://pubs.niaaa.nih.gov/publications/arh27-3/232-239.htm>

sexually transmitted infections (ICD-9-CM 042, 091.0-099.9) in their discharge records (Figure 3). This is, however, an underestimate of these associations because comorbidities may not be coded in the discharge record if they do not affect care and treatment during hospitalization.



Discussion and Conclusion

Although there is currently no vaccine for hepatitis C, the national incidence declined during the 1990s and plateaued in 2003.¹² The reasons for the decline are not clear; it may have been associated in part with a variety of personal practices and public health initiatives, such as safe-sex practices for HIV control and needle exchange programs for injection drug users.² Before 1992, hepatitis C was also transmitted by organ transplants and blood products, but donor screening and improved testing and processing of blood products have nearly eliminated these routes of transmission.^{2,13}

Infection control in health care settings remains important. In 2007, 20% of patients with newly diagnosed hepatitis C reported recent surgery and 2% reported occupational exposure to blood.¹⁰ There have also been increasing numbers of reports of hepatitis C associated with exposure in outpatient health care settings such as clinics and dialysis and endoscopy centers.¹⁰ There are few treatment options for hepatitis C at this time and 75% or more of infections become chronic,² suggesting that there will continue to be a pool of individuals able to transmit the infection, and who will remain at risk of developing cirrhosis and hepatocellular carcinoma 20 to 40 years after initial exposure.¹⁴

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Please visit our website at <http://www.dphhs.mt.gov/publichealth/epidemiology/mthdds/index.shtml>

¹² CDC. Surveillance for acute viral hepatitis -- United States, 2009. *MMWR* 58(SS03):1-27.

¹³ CDC. Recommendations for the prevention and control of hepatitis C virus (HCV) infection and HCV-related chronic disease. *MMWR* 1998; 47(#RR-19).

¹⁴ El-Serag HB. 2004. Hepatocellular carcinoma: recent trends in the United States. *Gastroenterology* 127(suppl 5):S27-S34.