Acknowledgments

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* IIS, also known as immunization registries, are CDC funded, locally administered, confidential, electronic data systems that collect and consolidate vaccination records on persons residing in a defined geographic region (e.g., city or state) from multiple vaccination providers and administrative sources. Additional information regarding IIS is available at http://www.cdc.gov/vaccines/programs/iis/default.htm.
† For the 2008-2012 project period, Arizona, Colorado, Michigan, Minnesota, Oregon, and Wisconsin are using subsets of their state-based IIS as their sentinel sites. North Dakota and New York City are using their entire state/city. All sites represent geographically contiguous counties, census tracts, or postal code areas. For the four states participating in the IIS Sentinel Site Project since 2006 (Arizona, Michigan, Minnesota, and Oregon), both Michigan and Oregon expanded the number of counties included, Minnesota altered which counties participated, and Arizona remained unchanged.
‡ ACIP recommends that the first dose of RV, DTaP, and PCV7 each be given at age 2 months.

Hepatocellular Carcinoma—United States, 2001-2006

MMWR. 2010;59:517-520

1 figure, 2 tables omitted

LIVER CANCER, PRIMARILY HEPATOCELLULAR carcinoma (HCC), is the third leading cause of death from cancer worldwide and the ninth leading cause of cancer deaths in the United States.[1,2] Chronic hepatitis B virus (HBV) and hepatitis C virus (HCV) infections account for an estimated 78% of global HCC cases.[3] To determine trends in HCC incidence in the United States, CDC analyzed data for the period 2001-2006 (the most recent data available) from CDC's National Program of Cancer Registries (NPCR) and the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) surveillance system. This report summarizes the results of that analysis, which determined that the average annual incidence rate of HCC for 2001-2006 was 3.0 per 100,000 persons and increased significantly from 2.7 per 100,000 persons in 2001 to 3.2 in 2006, with an average annual percentage change in incidence rate (APC) of 3.5%. The largest increases in HCC incidence rates were among whites (APC=3.8), blacks (APC=4.8), and persons aged 50-59 years (APC=9.1). Among states, HCC incidence rates varied widely, ranging from 1.4 per 100,000 in South Dakota to 5.5 in Hawaii. The results demonstrate a continuation of long-term increases in HCC incidence and persistent HCC racial/ethnic disparities. Development of viral hepatitis services, including screening with care referral for persons chronically infected with HBV or HCV, full implementation of vaccine-based strategies to eliminate hepatitis B, and improved public health surveillance are needed to help reverse the trend in HCC.

CDC examined all HCC cases diagnosed during 2001-2006 and reported to NPCR or SEER from 45 cancer registries (covering 90.4% of the U.S. population) that met the criteria for data quality and completeness.* Only microscopically confirmed HCC cases (coded to the liver ICD-O-3† site code C22.0 with ICD-O-3 histology codes 8170-8175) were included. Incidence rates per 100,000 persons were age adjusted to the 2000 U.S. standard population. APCs were calculated using least squares regression. Statistical significance was determined at $p<0.05$. Data were analyzed by state, sex, race, ethnicity, and age group. Persons categorized as either non-Hispanic or Hispanic might be of any race.

During 2001-2006, a total of 48,596 HCC cases were reported, with an average annual incidence rate of 3.0 per 100,000 persons. Overall, the HCC rate increased from 2.7 per 100,000 persons in 2001 to 3.2 in 2006, with an APC of 3.5%. The median age for diagnosis of HCC was 64 years overall, 62 years for males, and 69 years for females. The highest incidence rate was among persons aged 70-79 years (13.7), followed by persons aged ≥80 years (10.0), 60-69 years (9.6), 50-59 years (6.8), and 40-49 years (2.1).

The incidence rate for males (5.0 per 100,000 persons) was approximately three times higher than the rate for females (1.3). The HCC rate for males increased from 4.5 in 2001 to 5.4 in 2006, and the rate for females increased from 1.2 to 1.4. During 2001-2006, the APC for males (3.6%) was significantly higher than the APC for females (2.3%).

The HCC incidence rate was highest among Asians/Pacific Islanders (7.8 per 100,000 persons), followed by blacks (4.2), American Indians/Alaska Natives (3.2), and whites (2.6). The incidence rate for Hispanics (5.7 per 100,000 persons) was higher than the rate for non-Hispanics (2.8). From 2001 to 2006, the largest significant increases in HCC incidence rates were among whites (APC=3.8), blacks (APC=4.8), and persons aged 50-59 years (9.1). The HCC incidence rate did not increase among Asians/Pacific Islanders.

What is already known on this topic?

Hepatocellular carcinoma (HCC) is a leading cause of cancer deaths in the United States and worldwide; infection with hepatitis B virus (HBV) or hepatitis C virus (HCV) accounts for an estimated 78% of global HCC cases.

What is added by this report?

During 2001-2006, HCC incidence rates increased in the United States, particularly among whites, blacks, and persons aged 50-59 years.

What are the implications for public health practice?

Development of viral hepatitis services, including screening with care referral for persons chronically infected with HBV or HCV, full implementation of vaccine-based strategies to eliminate hepatitis B, and improved public health surveillance are needed to help reverse the trend in HCC.

Among states, HCC incidence rates ranged from 1.4 per 100,000 persons in South Dakota to 5.5 in Hawaii. Eleven states had significant increases in incidence rates, with the highest APCs reported for Oklahoma (11.7), Iowa (9.0), and Georgia (7.4).

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CDC Editorial Note: This report provides the most recent population-based estimates of HCC incidence rates and trends in the United States and the first state-specific HCC trends. The findings indicate continued increases in HCC incidence, consistent with earlier reports using different methodology.[2,4] However, requiring microscopic confirmation of HCC likely produced more conservative incidence rate estimates than analyses of NPCR/SEER data published previously.[2,4]

Chronic HBV and HCV infections that persist for decades are major risk factors for HCC. Both infections cause chronic inflammation that can progress to fibrosis, cirrhosis, and eventually malignancy.[3] HBV infection also can be directly oncogenic.[3] In addition, alcohol consumption, steatohepatitis, and type II diabetes have been linked to HCC[2]; these risk factors for HCC amplify the effects of viral hepatitis but also might cause HCC in the absence of viral hepatitis.[2]

The age and race profile of persons with HCC reflects the demographic characteristics of persons with chronic viral hepatitis. During 2001-2006, HCC incidence was highest among Asians/Pacific Islanders, Hispanics (compared with non-Hispanics), blacks, persons aged ≥50 years, and males. The largest increases occurred among whites, blacks, persons aged 50-59 years, and males. Rates were highest among persons born during 1946-1964 (who are now aged 46-64 years), particularly black males.[3,4] In the absence of testing and care, the risk for HCC is expected to increase with aging of the cohort of persons with HCV infection.[5]

Asians/Pacific Islanders, black adult males, and persons living in the United States who were born in regions where HBV is endemic (e.g., Asia and sub-Saharan Africa) have high rates of both HBV infection and HCC.[2,5-8] As shown in this analysis, the rate of HCC did not increase among Asians/Pacific Islanders during 2001-2006. Some reasons for this might be early implementation of hepatitis B vaccination programs, changes in immigration patterns, and the impact of hepatitis B therapy on disease progression.[3,4]

The findings in this report are subject to at least three limitations. First, misclassification of race and ethnicity in the registries and multiracial status of patients might underestimate HCC rates in certain populations. Second, although some states collect information on specific Asian subgroups, these data are not available at the national level; published reports from selected geographic areas suggest that certain ethnic Asian/Pacific Islander subgroups have greater risk for HCC than other Asian/Pacific Islander subgroups.[3] Finally, cancer registries do not routinely collect information on etiologic factors for HCC, including chronic viral hepatitis.

Most cases of HCC are preventable. Prevention of HBV and HCV transmission and progression of chronic viral disease leads to declines in HCC incidence.[9] However, new HBV and HCV infections continue to occur.[6,7] Populations at greatest risk for new infection include children born to HBV-infected mothers and adults with sexual and drug use risk behaviors. Of the estimated 3.8-5.3 million persons living with chronic viral hepatitis in the United States, most are unaware of their infection.[5] Early identification of viral hepatitis with referral to prevention and care services can decrease transmission to others. Treatment of viral hepatitis is cost-effective, and medical management can decrease morbidity.[10]

In a recent report on prevention of hepatitis and liver cancer, the Institute of Medicine (IOM) called for a national comprehensive approach comprised of interventions to prevent HBV and HCV transmission and interventions to reduce the morbidity associated with chronic HBV and HCV infections.[5] IOM recommends improved viral hepatitis surveillance, community education to address health disparities, support for vaccine-based strategies to eliminate HBV transmission, and development of prevention and health services that target key populations (i.e., drug users, foreign-born persons, and persons infected with human immunodeficiency virus), including screening for HBV and HCV infections linked to appropriate medical management.

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10 Available.

* Detailed descriptions of the methods used by NCPR and SEER, including data collection and analysis, criteria for data inclusion, and determination of statistical significance are available at http://www.cdc.gov/cancer/npcr and http://seer.cancer.gov.

† *International Classification of Diseases for Oncology, 3rd ed.*