

# The Use of the International Classification of Diseases, Ninth Revision (ICD-9) Coding in Identifying Chronic Hepatitis B Virus Infection in Health System Data: Implications for Surveillance

Reena Mahajan\*<sup>1</sup>, Anne C. Moorman<sup>1</sup>, Stephen J. Liu<sup>1</sup>, Loralee Rupp<sup>2</sup>, Monina Klevens<sup>1</sup> and (CHeCS) for the Chronic Hepatitis Cohort Investigators<sup>3, 2, 1</sup>

<sup>1</sup>Centers for Disease Control and Prevention, Atlanta, GA, USA; <sup>2</sup>Henry Ford Health System, Detroit, MI, USA; <sup>3</sup>Kaiser Permanente-Hawaii; Geisinger Health System, Pennsylvania; Kaiser Permanente-Northwest, Oregon, Atlanta, GA, USA

## Objective

To evaluate the sensitivity, specificity, positive and negative predictive values of the ICD-9 coding system for surveillance of chronic hepatitis B virus infection (HBV) using data from an observational cohort study in which ICD-9-coded HBV cases were validated by chart review.

## Introduction

In the United States, 800,000- 1.4 million people are chronically infected with hepatitis B virus (HBV); these persons are at increased risk for chronic liver disease and its sequelae (CDC, 2010; Wasley, 2010). Current national viral hepatitis surveillance is a passive laboratory-initiated reporting system to state or local health departments with only 39 health departments reporting chronic HBV infection in the National Notifiable Disease Surveillance System (NNDSS). Since active HBV surveillance can be expensive and labor-intensive, the ICD-9 coding system has been proposed for surveillance of chronic hepatitis B.

## Methods

We examined the electronic health records (EHRs) available as part of an existing cohort study of persons with chronic viral hepatitis. Records from 1.6 million adult patients who had one or more services from 2006-2008 in four integrated health care systems were reviewed. Complex algorithms using laboratory data and/or use of qualifying hepatitis B ICD-9 codes were applied to EHR patient data to create the chronic HBV cohort. Disease status was manually validated by abstractor review of the medical record. Sensitivity, specificity, positive and negative predictive values were calculated based upon presence of either one hepatitis B-specific ICD-9 code or two such ICD-9 codes separated by at least six months.

## Results

Of 1,652,055 adult patients, 2,202 (0.1%) met criteria for inclusion into the chronic HBV cohort. Of the 2,202 confirmed cases, the sensitivity of use of one ICD-9 code was 83.9%, positive predictive value was 61.0%, specificity was 99.9% and the negative predictive value was over 99.9% (Table 1). In comparison, use of two hepatitis B-specific ICD 9 codes separated by six months, resulted in a sensitivity of 58.4%, a positive predictive value of 89.9%, and specificity and negative predictive value similar to use of one ICD 9 code.

## Conclusions

Our findings suggest that use of one or two hepatitis B specific ICD 9 codes can identify cases with chronic HBV infection. For health departments with access to electronic medical records, collection of ICD-9 data may be useful for surveillance and potentially improve reporting of chronic HBV infection.

Measurement of sensitivity, specificity, and predictive values of using one hepatitis B-specific ICD-9 code among persons receiving services from four health care systems from 2006-2008

	Confirmed HBV case	Not a HBV case	Total
One ICD-9 code	1,847	1,182	3,029
No ICD-9 code	355	1,648,671	1,649,026
Total	2,202	1,649,853	1,652,055

Sensitivity=  $1,847/2,202 = 83.9\%$

Specificity=  $1,648,671/1,649,853 = 99.9\%$

Positive predictive value=  $1,847/3,029 = 61.0\%$

Negative predictive value=  $1,648,671/1,649,026 = >99.9\%$

## Keywords

surveillance; hepatitis B virus; ICD-9

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\*Reena Mahajan

E-mail: [rmahajan1120@yahoo.com](mailto:rmahajan1120@yahoo.com)

