

# QA/QI on Compliance to CDC Guidelines for Hepatitis B Vaccination in Patients with Diabetes Mellitus among Internal Medicine Residents

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## Background

- ❖ Patients with diabetes mellitus (DM) are at increased risk of acquiring hepatitis B virus (HBV) infection and developing complications compared to non-diabetic patients.
- ❖ This is likely due to an increased use of medical equipment contaminated with blood such as finger stick devices along with inadequate cleaning and equipment upkeep.
- ❖ Patients with DM who acquire HBV are more likely to develop chronic infection, acute complications, and higher case fatality compared to non-diabetic adults.
- ❖ This QA project aims to determine HBV vaccination rates among eligible patients with DM at the outpatient medicine clinic.

**Table 1. CDC Guidelines for hepatitis B vaccination in diabetes mellitus**

Population	Recommendation
Patients with diabetes mellitus ages 19-59	HBV vaccination series as soon as possible after diagnosis of DM

## Methods and Materials

- **Study population:** A convenience sample of patients with DM ages 19-59 treated by residents at the IM clinic.
- **Study period:** The patients' initial visit was obtained from the 10-week interval Sep 16th to Nov 25th, 2019. Patients were followed for next 12 months to track vaccination status.
- **Data collection:** Patients' immunization status and HBV serologies prior to encounter were recorded. Chart review was done for clinic encounters in the following 12 months, and HBV vaccination practices were recorded.
- **Exclusion criteria:** Patients not in the age range or had a "break-the-glass" warning in EMR. Also, data from patients who were already vaccinated or were immune was recorded to estimate immune rate but were not included in the calculation of vaccination estimates.
- **Statistical Analysis:** Continuous variables are presented as means ± standard deviations (SD), categorical variables as absolute values and frequencies, and confidence intervals were calculated at 95%.

## Results

- **Sample size:** 197 patients (57% female, mean age 51 ± 7.2) with DM.
- **Avg HbA1c:** 8.86 ± 4 (95% CI 8.28 - 9.44).

**Table 2. Patients' characteristics**

Mean age (SD) – years	51 (7.2)
Female sex – no. (%)	133 (57.5)
HbA1c – mean (SD)	8.8 (4)
On metformin – no. (%)	154 (78)
On insulin – no. (%)	73 (37)
Documented HepB vaccine at start – no. (%)	12 (6%)
HBsAb – no. (%)	
Positive	36 (18.3)
Negative	92 (46.7)
Not available	69 (35)
HBcAb – no. (%)	
Positive	25 (12.7)
Negative	101 (51.3)
Not available	71 (36)
HBsAg – no. (%)	
Positive	1 (0.5)
Negative	136 (69)
Not available	60 (30.5)

**Table 3. Hepatitis B vaccination data**

Vaccination status – no.	197
Immune at initial visit – no. (%)	36 (18.3)
Not immune/vaccinated by initial visit – no.	161
Vaccinated after 12 months	
Received 1 dose – no. (%)	3 (2)
Received 2 doses – no. (%)	10 (6)
Received 3 doses – no. (%)	3 (2)

- ❖ At the initial encounter, 36 (18.3%) patients were already immune (24/36) or vaccinated (12/36) for HBV.
- ❖ Of the remaining 161 non-immune patients, only 14 (8.7%; 95% CI 4.8% to 14.1%) received at least one vaccine dose during the 1-year follow-up.
- ❖ Six percent (10/161) of the susceptible population received 2 doses, two percent (3/161) received 3 doses, and two percent (3/161) received 1 dose.
- ❖ Of the total 197 patients, 69 (35%) did not have documented HBV serologies.

## Discussion

**Compliance to HBV vaccination guidelines among IM residents' primary care clinical practice can improve.**

- **Key Findings:** Only 8.7% of eligible patients with DM either started or completed HBV vaccination during the 12 months study period. Of these, only 2% completed the 3 dose vaccination series.
- **Outcome:** There is a gap between vaccination guidelines and vaccination rates. With our estimates, the best-case scenario target-population vaccination rate was 14%.
- **Limitations of the study:** (A) Lack of documentation of patients receiving the vaccine elsewhere, (B) possible lack of continuing care with same physician and (C) patients lost to follow-up.
- **Potential QI steps and future directions:** (A) Creating a smart text for HBV vaccination indications, (B) including HBV vaccination in the DM smart text and (C) educational seminars for residents during academic half-day.

## References

- CDC. Use of hepatitis B vaccination for adults with diabetes mellitus: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Morb Mortal Wkly Rep. 2011;60:1709–11.
- Reilly ML, Schillie SF, Smith E, et al. Increased risk of acute hepatitis B among adults with diagnosed diabetes mellitus. J Diabetes Sci Technol 2012;6:858–66.
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