# Loss of Serologic Response in Young People With HIV (PWH) Who Had Undergone HBV Revaccination

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## BACKGROUND

- We previously have shown in a clinical trial that 354 PWH who had achieved virologic and immunologic responses with ART and were randomized to receive three double-dose (40-μg) HBV vaccine (Engerix) achieved a higher seroresponse rate (anti-HBs antibody titer ≥10 mIU/ml) (95.8% vs 91.5%, p=0.111) and high-titer (≥100 mIU/ml) seroresponse rate (91.7% vs 84.3%, p=0.05) than PWH who received three standard-dose (20-μg) HBV vaccine at Wk 28. This study aimed to examine the factors associated with loss of seroprotection during follow-up.

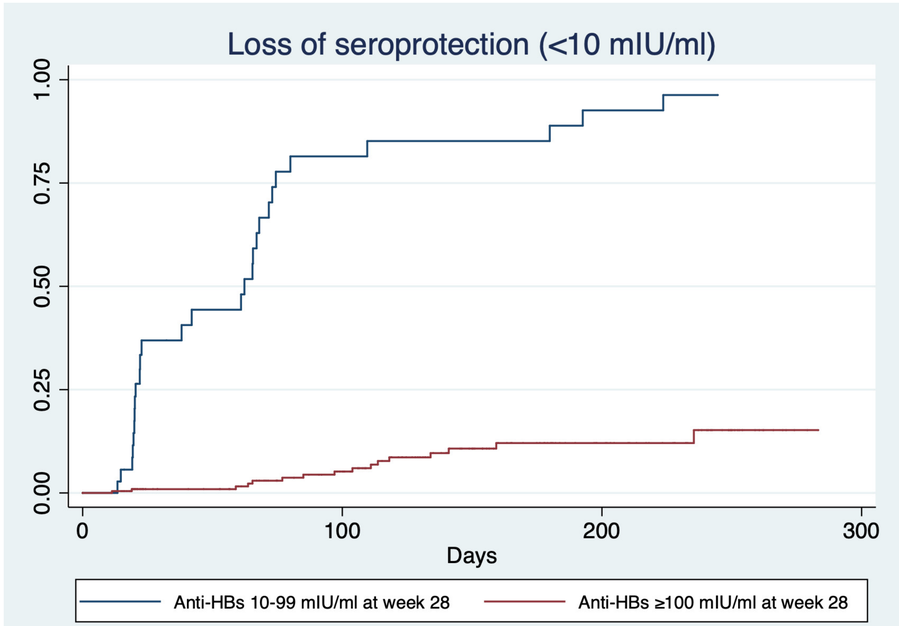
## METHODS

- PWH who were born after 1986 and achieved seroresponses (10 mIU/ml) at Wk 28 following HBV revaccination in the original trial were included in the follow-up. Loss of seroresponse was defined as testing negative for HBsAg and anti-HBc with an anti-HBs titer <10 mIU/ml.
- The clinical characteristics at revaccination and during follow-up were analyzed, including age, sex, smoking status, CD4 count, plasma HIV RNA, and pre-vaccination anti-HBs titer.

**Table 1. Baseline characteristics of the participants**

| | Standard-dose (n=139) | Double-dose (n=144) | p-value |
|---|---|---|---|
| Age, mean (SD), years | 28.4 (3.6) | 28.8 (3.5) | 0.253 |
| Weight at baseline, mean (SD), kilograms | 67.6 (12.6) | 70.6 (14.1) | 0.065 |
| Prior smoker or active smoker, n (%) | 32/122 (26.2) | 33/127 (26.0) | 0.965 |
| Median CD4 counts (IQR), cells/mm$^3$ | 610 (473-755) | 602 (462-750) | 0.818 |
| Plasma HIV RNA load ≥50 copies/mL, n (%) | 9 (6.5) | 9 (6.3) | 0.938 |
| Nadir CD4 counts <200 cells/mm$^3$, n (%) | 41 (29.5) | 47 (32.6) | 0.568 |
| Pre-vaccination anti-HBs titers < 2.5 mIU/ml, n (%) | 95/138 (68.8) | 91/144 (63.2) | 0.317 |

**Figure 1. KM curve for loss of seroresponses during follow-up among PWH having undergone HBV revaccination and achieved anti-HBs titers of 10-99 mIU/ml vs those ≥100 mIU/ml at Wk 28**



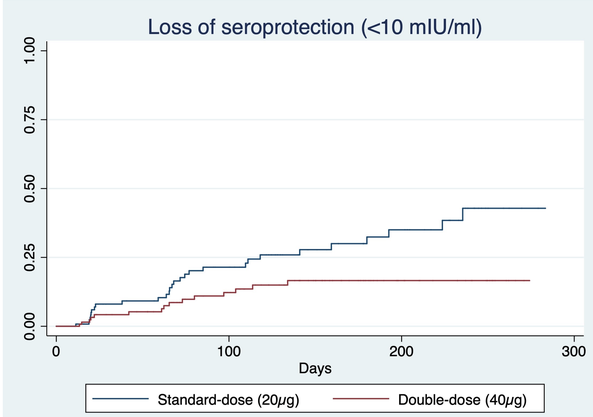

## RESULTS

- 283 seroresponders (mean age, 28.6 years; median CD4, 607 cells/mm$^3$) after HBV revaccination were included: 139 having received standard-dose and 144 double-dose HBV vaccine. The baseline characteristics were balanced between the two groups (Table 1.). The median follow-up duration was 2.0 and 2.1 years for PWH having received standard-dose and PWH having received double-dose HBV vaccine, respectively.
- During the follow-up, more PWH in the standard-dose group lost seroprotection than those in the double-dose group (21.0% vs 10.4%, p=0.014). Loss of high-titer seroresponse was more common for the standard-dose group than the double-dose group (41.7% vs 20.0%, p<0.001).
- Factors associated with loss of seroresponse during follow-up (Table 2) were lower pre-revaccination anti-HBs titer (<2.5 mIU/ml, aHR 14.80 [95% CI, 3.58-61.19], p<0.001) and double-dose HBV vaccine (aHR 0.51 [95% CI, 0.27-0.96], p=0.037).
- People failing to achieve high-titer responses (10-99 mIU/ml) at Wk 28 were more likely to lose seroprotection during follow-up (HR 22.6 [12.0-42.6], p<0.001, Figure 1) with a shorter time to loss of anti-HBs titers (median, 0.8 years) when compared with people achieved high-titer responses (≥100 mIU/ml) at Wk 28 (median, 2.2 years).

**Table 2. Factors associated with loss of seroprotection**

| | Univariable | | Multivariable | |
|---|---|---|---|---|
| | Hazard ratio (95% CI) | p-value | Adjusted HR (95% CI) | p-value |
| Double-dose | 0.47 (0.25-0.88) | 0.018 | 0.51 (0.27-0.96) | 0.037 |
| Age, per 1-year increments | 1.05 (0.95-1.16) | 0.316 | | |
| Weight over 80 kilograms | 1.11 (0.49-2.51) | 0.798 | | |
| Active/past smoker | 1.06 (0.53-2.11) | 0.415 | | |
| Nadir CD4 <200 cells/mm$^3$ | 1.20 (0.66-2.21) | 0.552 | | |
| Viremia ≥50 copies/mL) | 1.74 (0.53-5.54) | 0.368 | | |
| Low pre-vaccination anti-HBs level (<2.5 mIU/ml) | 15.38 (3.72-63.57) | <0.001 | 14.80 (3.58-61.19) | <0.001 |

**Figure 2. KM curve for loss of seroresponses among PWH having undergone 3 standard- or double-dose HBV revaccination**




## CONCLUSIONS

- Three double-dose HBV revaccination leads to more sustained seroprotection than standard-dose revaccination in PWH. For PWH who fail to achieve high-titer seroresponse after revaccination, more frequent follow-up of anti-HBs titers is recommended to detect the loss of seroprotection for HBV revaccination to be administered timely.

## AUTHOR CONTACT INFORMATION

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