Hepatitis A, hepatitis B and HPV vaccine needs and coverage in MSM initiating HIV PrEP in a sexual health clinic in Paris

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TRANSPARENCY DECLARATION

No competing interest.

CONTRIBUTORS

VB, RP, JD, CK contributed to the study design and developing analysis plan. AF, JD, RA, CK, VB, AE contributed to the analysis and interpretation of data. VB, AE wrote the first draft of the manuscript and subsequent drafts after revisions. CK reviewed all versions of the manuscript; VB, AE,

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Pre-exposure prophylaxis (PrEP) with tenofovir disoproxil/emtricitabine (TDF/FTC) is a powerful tool to prevent HIV acquisition and provides an opportunity to offer comprehensive prevention services, including assessment for sexually transmitted infections and evaluation of immune status towards vaccine-preventable viral infections such those due hepatitis A virus (HAV), hepatitis B virus (HBV) and human papillomavirus (HPV). In addition to the programme in girls aged 11-19, French guidelines recommended HPV vaccination for MSM ≤ 26 years old in February 2016[1] and for all boys aged 11-19 in December 2019[2]. There are no restrictions on HPV vaccine use beyond these age limits, but the cost is not covered by the French Health Service. In real-life settings, suboptimal vaccination coverage against HPV as well as HBV has been reported among European MSM[3,4].

Our objective was to evaluate HAV, HBV and HPV vaccine needs and coverage in individuals initiating PrEP in a sexual health clinic in Paris. In this observational retrospective single-centre study, we reviewed all individuals who initiated PrEP between January 1st, 2016 and December 31st, 2020 with ≥ 1 year of follow-up after PrEP initiation. At baseline, we assessed the presence of HAV and HBV antibodies and HPV vaccination status. Immune protection against HAV and HBV was defined as the presence of anti-HAV IgG index S/CO > 1.00 and anti-HBs IgG >10 International Units/L (IU/L), respectively. HPV vaccination status at baseline was assessed through the participants' recall. Subsequently, we assessed vaccine prescription by physicians for non-immune and unvaccinated participants, followed by a review of completion of vaccination. Vaccination schedules were considered complete after 2 doses for HAV with a time interval of 0 and 6 months, 3 doses for HBV with an interval of 0, 1, 6 months, and 3 doses for HPV with an interval of 0, 2, 6 months. Contrary to HAV and HBV vaccines, HPV vaccine was not accessible in the sexual health center and had to be purchased from a private pharmacy. Finally, we assessed overall HAV, HBV immune status combining immune protection acquired in the past or by vaccination after PrEP initiation and HPV

vaccine coverage. HPV vaccine completion was analysed by ≤ 26 y.o. or > 26 y.o. age groups. If any information was missing, individuals were contacted by phone or email to determine whether vaccination had been performed and if not, the reason why. All clinical, biological and prescription data are routinely documented in an electronic health record (NADIS), for which all patients gave consent for the collection and use of their anonymized data after approval by the CNIL (French Data Protection Authority; CNIL authorisation number: 2085881). Statistical data are presented with total numbers and proportions and compared by a chi-square test. A P-value <0.05 was considered statistically significant.

A total of 591 PrEP users were analysed. All were MSM with a median age of 33 years (IQR 28-41), including 118 participants (20%) aged ≤ 26 y.o.

At baseline (Table 1), 57.7% (341/591) of PrEP users were immune against HAV and 73.4% (434/591) against HBV. Vaccines were prescribed for 93.2% (233/250) of HAV non-immune and 87.2% (137/157) of HBV non-immune participants. Vaccination was completed in 85.8% (200/233) and in 91.2% (125/137) individuals with an HAV and HBV vaccine prescription, respectively. Our results are consistent with other studies where HAV vaccination rates were high, especially among PrEP users[5].

With regards to HPV, only seven of the 591 (1.2%) individuals had been vaccinated before PrEP initiation, including 4/118 (3.4%) individuals aged ≤ 26. The prescription rate by physicians remained low throughout the study period at 26% (152/584) for all ages and 39.5% (45/114) for those ≤ 26 years. These results are in agreement with those of other studies which report infrequent HPV vaccination prescription by physicians[4,6]. Following prescription, the HPV vaccine completion rate was 54.6% (83/152) including 64.4 % (29/45) in participants aged ≤ 26 years. Of 69 individuals who did not complete HPV vaccination despite prescription, 5 (7%) participants did not respond to the questionnaire, 64 (93%) reported the following reasons: forgetting to go to a pharmacy for vaccine delivery (n=29), not feeling at risk (n=20), lost prescription (n=6) and vaccine cost (n=9, all > 26 y.o). Several factors may explain our findings: recentness of the French guidelines, vaccine cost and lack of

77 motivation for HPV vaccination[7], as one third of the participants described not feeling at risk for this
78 viral oncogenic disease.

79 Finally, combining immunity acquired in the past or by vaccination after PrEP initiation, the overall
80 immune protection rate for these 591 MSM initiating PrEP was 91.5% for HAV, 94.6% for HBV and
81 15.2% for HPV, including 28% in the ≤ 26 years age group and 12% in the > 26 years age group.

82 Given the high burden of HPV-attributable lesions in MSM compared to heterosexual men[8], a change
83 in prevention approaches is required. Greater vaccine promotion against sexually transmitted viruses,
84 including vaccination in PrEP guidelines, and expanding the age criteria for HPV vaccination in MSM
85 – as recommended in the UK[9] – would help to improve targeted vaccination campaigns in this at-risk
86 population[6,7,10].

	Non-immune (HAV/HBV) or non-vaccinated (HPV) at PrEP initiation	**Vaccine prescription rate in case** of no prior immunity (HAV, HBV) or vaccination (HPV)	**Vaccine completion rate after prescription at PrEP initiation**	**Overall immune protection (HAV, HBV) * and HPV vaccine coverage**
Hepatitis A	250/591 (42.3%)	233/250 (93.2%)	200/233 (85.8%)	541/591 (91.5%)
Hepatitis B	157/591 (26.6%)	137/157 (87.2%)	125/137 (91.2%)	559/591 (94.6%)
HPV				
All ages	584/591 (98.8%)	152/584 (26.0%)	83/152 (54.6%)	90/591 (15.2%)
≤ 26 y.o.	114/118 (96.6%)	45/114 (39.5%) [p<0.001 vs. hepatitis A, p<0.001 vs. hepatitis B]	29/45 (64.4%) [p<0.001 vs. hepatitis A, p<0.001 vs. hepatitis B]	33/118 (28.0%) [p<0.001 vs. hepatitis A, p<0.001 vs. hepatitis B]
> 26 y.o.	470/473 (99.3%)	107/470 (22.8%) [p<0.001 vs. hepatitis A, p<0.001 vs. hepatitis B]	54/107 (50.4%) [p<0.001 vs. hepatitis A, p<0.001 vs. hepatitis B]	57/473 (12.0%) [p<0.001 vs. hepatitis A, p<0.001 vs. hepatitis B]

y.o.: years old; * combining immune protection acquired in the past (assessed by the presence of antibodies) or by vaccination after PrEP initiation

Table 1. Baseline immune status, vaccine prescription and uptake in PrEP users (n=591)

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