Cost-Effectiveness of Cabotegravir Long-Acting for Pre-Exposure Prophylaxis Versus Current Use of Daily Oral Tenofovir Disoproxil Fumarate/Emtricitabine or No PrEP to Prevent HIV-1 in Individuals at High Risk in Spain

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Key Takeaways

- **Long-acting cabotegravir (CAB-LA) may reduce new HIV-1 transmissions and is cost-effective compared with daily oral tenofovir disoproxil fumarate/emtricitabine (TDF/FTC) as pre-exposure prophylaxis (PrEP) and dominant versus no PrEP in the Spanish healthcare setting**
- **CAB-LA provides an alternative cost-effective PrEP modality for individuals who are at high risk of HIV-1 acquisition**

Introduction

- Long-acting cabotegravir (CAB-LA) administered every 2 months is the first long-acting injectable pre-exposure prophylaxis (PrEP) option approved in Spain to reduce the risk of HIV-1 acquisition in adults and adolescents[1,2]
  - CAB-LA demonstrated a superior risk reduction in HIV-1 acquisition versus daily oral tenofovir disoproxil fumarate/emtricitabine (TDF/FTC) in men who have sex with men and transgender women in the HPTN 083 study (NCT02720094) and cisgender women in the HPTN 084 study (NCT03164564)[3,4]
- The introduction of a long-acting injectable PrEP modality may benefit individuals who are contraindicated to, suboptimally adherent to, or unable to tolerate or take daily oral TDF/FTC
- A published Markov model[5] was adapted to estimate the cost-effectiveness of CAB-LA compared with TDF/FTC as PrEP or no PrEP for individuals in Spain at high risk of HIV-1 acquisition who are unable or unwilling to take TDF/FTC from a Spanish healthcare payer perspective

Methods

- An economic model based on a cohort-level Markov structure was developed to assess the cost-effectiveness of CAB-LA for PrEP in adults aged ≥18 years at high risk of HIV acquisition in Spain (Figure 1)
- The model estimated HIV lifetime costs, quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios (ICERs) from the Spanish perspective, with costs and outcomes discounted at 3% per year
  - Deterministic and probabilistic sensitivity analyses were performed to assess uncertainty
- Modeled costs included PrEP-related costs and HIV-1 management costs (Table 1)
  - If HIV-1 seroconversion occurred, individuals discontinued PrEP and received lifetime HIV-related care
  - Secondary HIV-1 transmission and PrEP-related breakthrough resistance could occur
  - Utility decrements (associated with HIV-1 transmission) and costs were obtained from published sources
- Background HIV-1 incidence (without PrEP use) was informed by UK epidemiology data[6] and an indirect treatment comparison; an indirect treatment comparison informed CAB-LA effectiveness vs no PrEP based on the HPTN 083 and 084 trials, allowing for exploration of TDF/FTC effectiveness at different levels of adherence

Figure 1. Model Overview

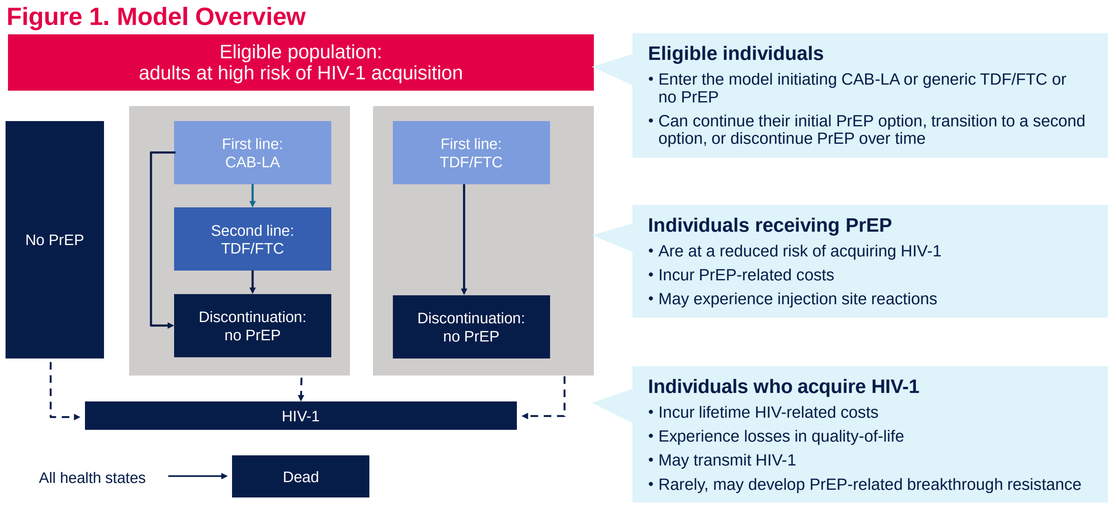


Table 1. Summary of Key Base-Case Model Settings and Inputs

Parameter	Value
Background HIV-1 incidence	• Men who have sex with men and transgender women: 4.9 events per 100 PYs[6] • Cisgender women: 3.6 events per 100PYs[3,a]
Discount rate: costs and outcomes[7]	• Costs and outcomes: 3.0%
CAB-LA effectiveness vs no PrEP[a]	• Men who have sex with men and transgender women: 92% • Cisgender women: 93%
Secondary HIV-1 seroconversions[8,9]	• Men who have sex with men and transgender women: 1.4 • Cisgender women: 0.8
PrEP-related drug acquisition costs	• CAB-LA: €9230 (year 1); €7911 (year 2+)[10,11] • TDF/FTC: €341[10]
Administration costs	
CAB-LA administration[12,13]	Year 1: €51; year 2+: €44
CAB-LA visits[14,15]	Year 1: €472; year 2+: €383
TDF/FTC visits[15]	Year 1: €344; year 2+: €255
Monitoring costs[15]	
CAB-LA	Year 1: €445; year 2+: €344
TDF/FTC	Year 1: €517; year 2+: €417
HIV-1 management costs	Lifetime HIV-1 diagnosis cost: €278,087[16]; cost per cycle: €675[16,17]

CAB-LA, long-acting cabotegravir; PrEP, pre-exposure prophylaxis; PY, person-year; TDF/FTC, tenofovir disoproxil fumarate/emtricitabine. [a]Values obtained by an indirect treatment comparison.

Results

Deterministic Base-Case Analysis

- Over a 5-year duration of risk, the estimated number of primary and secondary HIV-1 seroconversions was lower with CAB-LA (0.27 individuals) than with TDF/FTC (0.34 individuals) or no PrEP (0.48 individuals)
- CAB-LA was cost-effective versus TDF/FTC and dominant (less costly and more effective) versus no PrEP, based on a willingness-to-pay threshold of €30,000 (Table 2)

Table 2. Deterministic Base-Case Analysis Versus TDF/FTC or No PrEP

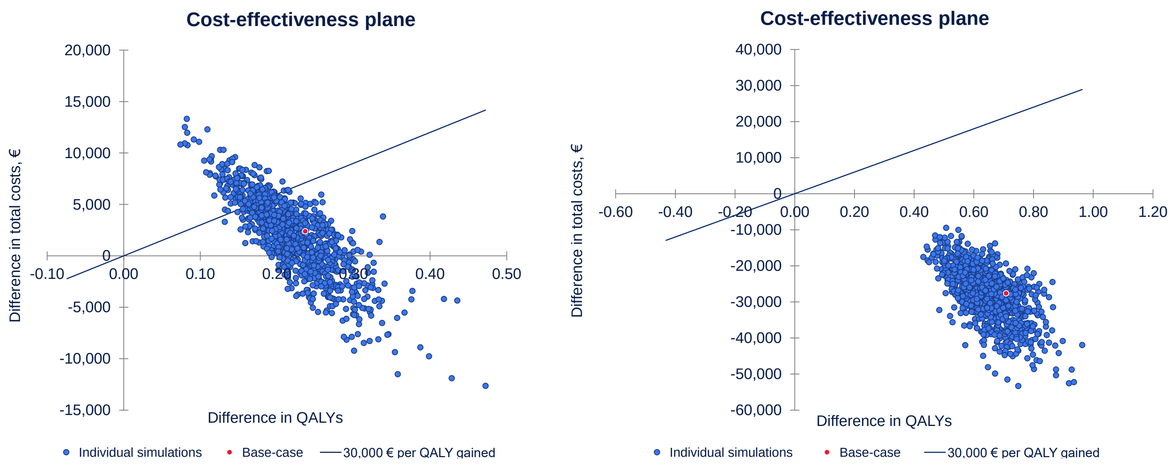
	CAB-LA vs TDF/FTC			CAB-LA vs No PrEP		
Outcome	**CAB-LA**	**TDF/FTC**	**Absolute difference**	**CAB-LA**	**No PrEP**	**Absolute difference**
Cost outcomes, €						
PrEP acquisition costs	18,176.69	411.31	17,765.38	18,176.69	0.00	18,176.69
PrEP administration and visit costs	1046.18	530.92	515.26	1046.18	0.00	1046.18
PrEP-related monitoring costs	898.61	833.08	65.53	898.61	0.00	898.61
ISR management costs	3.30	0.00	3.30	3.30	0.00	3.30
HIV-1 management costs	61,021.37	76,981.17	−15,959.79	61,021.37	108,742.84	−47,721.46
Total costs	**81,146.15**	**78,756.48**	**2389.68**	**81,146.15**	**108,742.84**	**−27,596.68**
Health outcomes						
Primary HIV-1 transmissions	0.11	0.14	−0.03	0.11	0.20	−0.09
Secondary HIV-1 transmissions	0.16	0.20	−0.04	0.16	0.28	−0.12
Total HIV-1 transmissions	0.27	0.34	−0.07	0.27	0.48	−0.21
Life-years	33.02	32.99	0.02	35.42	35.35	0.07
QALYs	**29.77**	**29.54**	**0.24**	**31.98**	**31.27**	**0.71**
ICERs, €						
Incremental cost per life-year gained		98,084			−380,679	
Incremental cost per QALY gained		**10,086**			**−38,969**	
Interpretation	**CAB-LA is cost-effective**			**CAB-LA is dominant**		

CAB-LA, long-acting cabotegravir; ICER, incremental cost-effectiveness ratio; ISR, injection-site reaction; PrEP, pre-exposure prophylaxis; QALY, quality-adjusted life year; TDF/FTC, tenofovir disoproxil fumarate/emtricitabine.

Probabilistic Sensitivity Analysis

- The probabilistic sensitivity analysis showed that CAB-LA was cost-effective compared with TDF/FTC in 78% of the 1000 Monte Carlo simulations
- Across all simulations, CAB-LA was cost-effective or dominant vs TDF/FTC (Figure 2A); CAB-LA was dominant vs no PrEP (Figure 2B)

Figure 2. Probabilistic Sensitivity Analysis. Cost-effectiveness plane of (A) CAB-LA versus TDF/FTC and (B) CAB-LA versus no PrEP



One-Way Sensitivity Analysis

- Model results for CAB-LA versus TDF/FTC were most sensitive to changes in parameters from the meta-regression for oral PrEP relative reduction, HIV-1 incidence for men who have sex with men or transgender women, and monthly HIV-1 care costs
  - For CAB-LA versus no PrEP, model results were most sensitive to change in derived monthly cost of HIV-1

Scenario Analysis

- Scenario analyses of CAB-LA versus TDF/FTC showed consistent results, with ICERs below the commonly accepted €30,000 per QALY willingness-to-pay threshold in Spain in all but 1 scenario (5% discount rate for costs and outcomes; Table 3)
- In all scenarios, CAB-LA was dominant versus no PrEP, with ICERs ranging from −€52,165 to −€70 per QALY

Table 3. Scenario Analysis of CAB-LA Versus TDF/FTC

Scenario	Incremental cost, €	Incremental QALY	ICER, € per QALY	Interpretation
95% men who have sex with men and transgender women	2350	0.24	9859	CAB-LA is cost-effective
90% men who have sex with men and transgender women	2303	0.24	9600	CAB-LA is cost-effective
Men who have sex with men and transgender women only with low adherence[a]	-12,555	0.46	-27,204	CAB-LA is dominant
Cisgender women only with low adherence[a]	603	0.29	2067	CAB-LA is cost-effective
2-year duration of risk[b]	1875	0.16	12,040	CAB-LA is cost-effective
10-year duration of risk[b]	5050	0.23	22,315	CAB-LA is cost-effective
Increase HIV-1 management costs by 20% to capture costs associated with INSTI and NRTI resistance	-803	0.24	-3386	CAB-LA is dominant
Reduce HIV-1 management costs by 20%	5582	0.24	23,558	CAB-LA is cost-effective
0% discount rate for costs and outcomes	-18,162	0.60	-30,492	CAB-LA is dominant
5% discount rate for costs and outcomes Increase monitoring and visits costs by 20%	7265	0.15	47,317	CAB-LA is not dominant or cost-effective
Reduce monitoring and visits costs by 20%	2486	0.24	9681	CAB-LA is cost-effective
Apply societal perspective costs	-4813	0.24	-20,312	CAB-LA is dominant
Base Case	**2390**	**0.24**	**10,086**	

INSTI, integrase strand transfer inhibitor; NRTI, nucleoside reverse transcriptase inhibitor. [a]Defined as 49.9% based on detectable tenofovir. [b]In this scenario, PrEP persistence parameters remained at base-case value; in the scenario with a 10-year duration of HIV-1 risk, individuals received PrEP for a similar average duration as in the base-case analysis but remained at risk of HIV-1 acquisition much longer, diluting the impact of early PrEP and causing the CAB-LA pathway to appear less cost-effective.

Limitations

- As a cohort-level Markov model, not a dynamic transmission model, the impacts associated with reduced onward transmission (ie, secondary seroconversions) had to be estimated; however, the transparency and simplification of a Markov model may be preferred by health technology assessment bodies,[18] and the health-utility estimates used in our analysis have been previously reported and used in several economic analyses[19-22]
- A simplified representation of HIV-1 was modeled, as the focus of this analysis was to model HIV-1 prevention rather than HIV-1 progression
- Long-term and real-world adherence and persistence data for CAB-LA were not available for Spain; the model used assumptions for adherence and included only a modest improvement in persistence for CAB-LA versus TDF/FTC at all time points, with improved persistence of CAB-LA vs oral PrEP being consistent with clinical expert opinion[18,23]

Conclusions

- In our model, CAB-LA provided a greater reduction in HIV-1 transmissions compared with TDF/FTC and no PrEP
- CAB-LA for PrEP is cost-effective versus daily oral TDF/FTC and dominant versus no PrEP in individuals at high risk of HIV-1 acquisition in the Spanish healthcare setting
- CAB-LA may be an important tool to help reduce new HIV-1 transmissions in Spain with potential cost savings compared with daily oral TDF/FTC

Acknowledgments: This study was funded by ViiV Healthcare. Editorial assistance and graphic design support for this poster were provided under the direction of the authors by MedThink SciCom and funded by ViiV Healthcare.

References: 1. ViiV Healthcare. https://viivhealthcare.com/hiv-news-and-media/news/press-releases/2023/september/european-commission-authorises-viiv-healthcare/. Accessed September 13, 2024. **2.** Apretude [prescribing information]. ViiV Healthcare; 2023. **3.** Delany-Moretlwe et al. *Lancet*. 2022;399:1779-1789. **4.** Landovitz et al. *N Engl J Med*. 2021;385:595-608. **5.** Brogan et al. *Pharmacoeconomics.* 2024;42:447-461. **6.** Brady et al. *HIV Med*. 2019;20 Suppl 2:s2-s80. **7.** Lopez Bastida et al. *Gac Sanit.* 2010;24:154-170. **8.** Cambiano et al. *Lancet Infect Dis.* 2018;18:85-94. **9.** Farnham et al. *J Acquir Immune Defic Syndr*. 2013;64:183-189. **10.** BOT PLUS 2024. https://botplusweb.farmaceuticos.com/. Accessed April 5, 2024. **11.** BOE. https://www.boe.es/buscar/act.php?id=BOE-A-2010-8228. Accessed April 29, 2024. **12.** Gisbert and Brosa. http://www.oblikue.com/bddcostes/. Accessed April 4, 2024. **13.** Soler Soneira et al. *Rev Esp Salud Publica*. 2020;94:e1-e12. **14.** López Seguí et al. *PLoS One*. 2023;18:e0277571. **15.** GeSIDA. https://guiasclinicas.gesida-seimc.org/version/?do=show&pk=6. Accessed August 17, 2024. **16.** Moreno et al. *Infect Dis Ther*. 2023;12:2039-2055. **17.** Trickey et al. *Lancet HIV*. 2023;10:e295-e307. **18.** O'Brien et al. ISPOR 2024; Atlanta, GA. Poster EE281. **19.** Miners et al. *Lancet HIV*. 2014;1:e32-e40. **20.** Cambiano et al. *Lancet Infect Dis.* 2018;18:85-94. **21.** Murchu et al. *Value Health.* 2021;24:948-956. **22.** Ong et al. *Euro Surveill.* 2017;22:17-00192. **23.** National Institute for Health and Care Excellence. *Draft Guidance Consultation: Cabotegravir for Preventing HIV-1*. 2024.

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