1039

Balancing STI Prevention and Antibiotic Use: Simulated Doxy-PEP Implementation Strategies in the ImPrEP Study

Mayara Secco Torres da Silva[1], Ronaldo Ismério Moreira[1], Iuri Costa Leite[1], Marcelo Cunha[1], Thiago Silva Torres[1], Carolina Coutinho[1], Brenda Hoagland[1], Marcos Benedetti[1], Alessandro Farias[2], Hamid Vega-Ramírez[3], Kelika Konda[4], Carlos F. Caceres[4], Cristina Pimenta[1], Valdiléa Gonçalves Veloso[1], Beatriz Grinsztejn[1]

[1] Instituto Nacional de Infectologia Evandro Chagas, Fundação Oswaldo Cruz, Rio de Janeiro, RJ, Brazil. [2] Centro Estadual Especializado em Diagnóstico, Assistência e Pesquisa (CEDAP) – Secretaria Estadual de Saúde – Salvador, Bahia, Brazil. [3] Instituto Nacional de Psiquiatria Ramon de la Fuente Muñiz, Mexico City, Mexico. [4] Universidad Peruana Cayetano Heredia, Lima, Peru.

BACKGROUND

- Doxycycline post-exposure prophylaxis (doxy-PEP) is an effective strategy for STI prevention, with absent data from Latin America[1].
- ImPrEP study evaluated same-day oral PrEP delivery for men who have sex with men (MSM) and transgender women (TGW) in Brazil, Mexico, and Peru. STI burden was high (31·7 cases per 100 person-years), with nearly one-third of participants accounting for all diagnoses[2,3].
- While doxy-PEP efficacy is established, its optimal prescribing approach in real-world settings remains uncertain. In this analysis, we modeled and compared the potential impact, efficiency, and antibiotic consumption of alternative doxy-PEP prescribing approaches using ImPrEP data.

METHODS

- ImPrEP participants were enrolled between 2018 and 2021, following the elegibility criteria: HIV-negative MSM and TGW aged older than 18 years, under high HIV vulnerability. For this analysis, we included only those with two or more STI assessments.
- Using observed STI diagnoses, (syphilis, chlamydia and gonorrhea), we modeled doxy-PEP use and averted STI diagnoses under three counterfactual prescribing strategies:
  - ⇢ (S1) initiation at baseline regardless of STI test;
  - ⇢ (S2) initiation after any positive STI test during follow-up;
  - ⇢ (S3) initiation after any positive STI test at baseline.
- Averted diagnoses were estimated by multiplying observed incidence by doxycycline efficacy from clinical trials.
- Strategy efficiency was assessed through the number needed to treat (NNT), defined as person-years of doxy-PEP use divided by diagnoses averted.
- Antibiotic consumption was expressed as monthly Defined Daily Doses (mDDD) per WHO standards, accounting for doxy-PEP use, estimated assuming an uptake of 75% and median use of 4 doses/person/month, and averted STI treatments[1,4,5].

CONTACT: mayara.secco@fiocruz.br

RESULTS

- Of 7,529 participants included (95.4%: MSM; 70.9% non-white; median age: 29 years), 100% would receive doxy-PEP under S1, compared to 39.9% under S2 and 23% under S3. Among 3,795 observed incident STIs, S1 was projected to avert 77.6% of diagnoses versus 39.2% with S2 and 25.7% with S3. NNT was consistently higher in S1 than in S2 or S3 across all pathogens (Table).
- Estimated antibiotic consumption corresponded to a net increase of 22,185 mDDD in S1 compared to 8,721 mDDD in S2 and 5,053 mDDD in S3.

In a population highly vulnerable to HIV acquisiton, universal doxy-PEP may maximize STI prevention but with higher antibiotic use, whereas diagnosis-triggered strategies may offer a more rationale prescribing strategy.

Table. Impact of Different Doxy-PEP Strategies on STI Prevention and Antibiotic Use among ImPrEP participants

	Strategy 1 (n=7,529)			Strategy 2 (3,001)			Strategy 3 (n=1,730)		
	Chlamydia	Gonorrhea	Syphilis	Chlamydia	Gonorrhea	Syphilis	Chlamydia	Gonorrhea	Syphilis
Total number of STI diagnoses	1,384	1,156	1,255	770	601	553	487	355	404
Averted STI diagnoses	1,218	636	1,092	678	331	481	429	195	351
Person-years	10,034.6	10,029.3	11,394.1	3,327	3,322	3,721	2,262.7	2,262.1	2,579
Number Needed To Treat (NNT)	9	16	11	5	11	8	6	12	8

CONCLUSIONS

- In a population with high STI vulnerability, universal doxy-PEP under S1 could substantially reduce STI incidence but is associated with higher NNT and greater antibiotic consumption compared to S2 and S3.
- Our results suggest that diagnosis-triggered strategies may offer a more efficient and rational approach to doxy-PEP use.
- From a public health perspective, targeted initiation strategies may optimize impact while minimizing unnecessary antibiotic use, supporting more sustainable implementation of doxy-PEP in resource-constrained settings and antimicrobial resistance–sensitive contexts.

REFERENCES

1. Luetkemeyer AF et al ; DoxyPEP Study Team. Postexposure Doxycycline to Prevent Bacterial Sexually Transmitted Infections. N Engl J Med. 2023 Apr 6;388(14):1296-1306. doi: 10.1056/NEJMoa2211934. PMID: 37018493; PMCID: PMC10140182.
2. Veloso VG et al; ImPrEP Study Group. Same-day initiation of oral pre-exposure prophylaxis among gay, bisexual, and other cisgender men who have sex with men and transgender women in Brazil, Mexico, and Peru (ImPrEP): a prospective, single-arm, open-label, multicentre implementation study. Lancet HIV. 2023 Feb;10(2):e84-e96. doi: 10.1016/S2352-3018(22)00331-9. Epub 2022 Dec 21. PMID: 36565708; PMCID: PMC9889521.
3. Torres Silva MS et al; ImPrEP Study Group. Bacterial sexually transmitted infections among men who have sex with men and transgender women using oral pre-exposure prophylaxis in Latin America (ImPrEP): a secondary analysis of a prospective, open-label, multicentre study. Lancet HIV. 2024 Oct;11(10):e670-e679. doi: 10.1016/S2352-3018(24)00211-X. Epub 2024 Sep 5. PMID: 39243787; PMCID: PMC11442320.
4. Traeger MW et al. Potential impact of doxycycline post-exposure prophylaxis prescribing strategies on incidence of bacterial sexually transmitted infections. Clin Infect Dis. 2023 Aug 18:ciad488. doi: 10.1093/cid/ciad488. Epub ahead of print. PMID: 37595139.
5. Roster KIO, Grad YH. Estimating changes in antibiotic consumption in the USA with the introduction of doxycycline post-exposure prophylaxis. Lancet Microbe. 2024 Jan;5(1):e9. doi: 10.1016/S2666-5247(23)00314-2. Epub 2023 Oct 23. PMID: 37883986.: PMC11877173.