# Prevalence of Tetracycline-Resistant Gonorrhea in British Columbia's HIV Treatment and HIV PrEP Programs

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## BACKGROUND

- The British Columbia Centre for Excellence in HIV/AIDS Drug Treatment Programs (BC-CfE DTP), has been providing HIV treatment and HIV Pre-Exposure Prophylaxis (PrEP) at no cost, to eligible BC residents since 1992 and 2018, respectively.
- On 1-Dec-2023, the DTP launched a doxycycline for bacterial sexually transmitted prevention (Doxy-PEP) initiative amongst eligible gay and bisexual and other men who have sex with men (gbMSM) and transgender women (TGW) in the HIV treatment and PrEP programs, enrolling approximately 3500 participants in the first 12 months.
- In light of increasing use of doxycycline for prevention, and its potential impact on antimicrobial resistance (AMR), we examined the prevalence of tetracycline resistance in gonorrhea (GC) cultures in DTP's HIV treatment and PrEP participants during various periods of interest.

## METHODS

- Retrospective observational cohort study.
- Data source: DTP registry, which includes program participant demographic, clinical, and pharmacy dispensing data, and additional linkage to laboratory test results.
- We included all HIV PrEP and HIV treatment participants who were known or presumed gbMSM and transwomen.
- Participants had ≥ 1 DTP prescription dispensed between 1-Jan-2018 and 30-Nov-2024, with follow-up until 31-Jan-2025.
- Participants with GC culture and sensitivities performed between 1-Jan-2017 and 31-Jan-2025 were included. Tests within 30 days (all specimens from any site) were considered one 'testing episode' (TE).
- TE's positive for GC, and tetracycline minimum inhibitory concentrations (MIC) available for GC cultures were described annually and for 5 periods of interest from 1-Jan-2017 through 31-Jan-2025, spanning a year prior to publicly-funded HIV PrEP to Doxy-PEP scale-up.
- Mean MICs were compared between periods of interest, using Wilcoxon Rank Sum test.
- The proportion of positive GC TE's with tetracycline resistance and high level resistance was determined and between group comparisons made using Chi Square test.

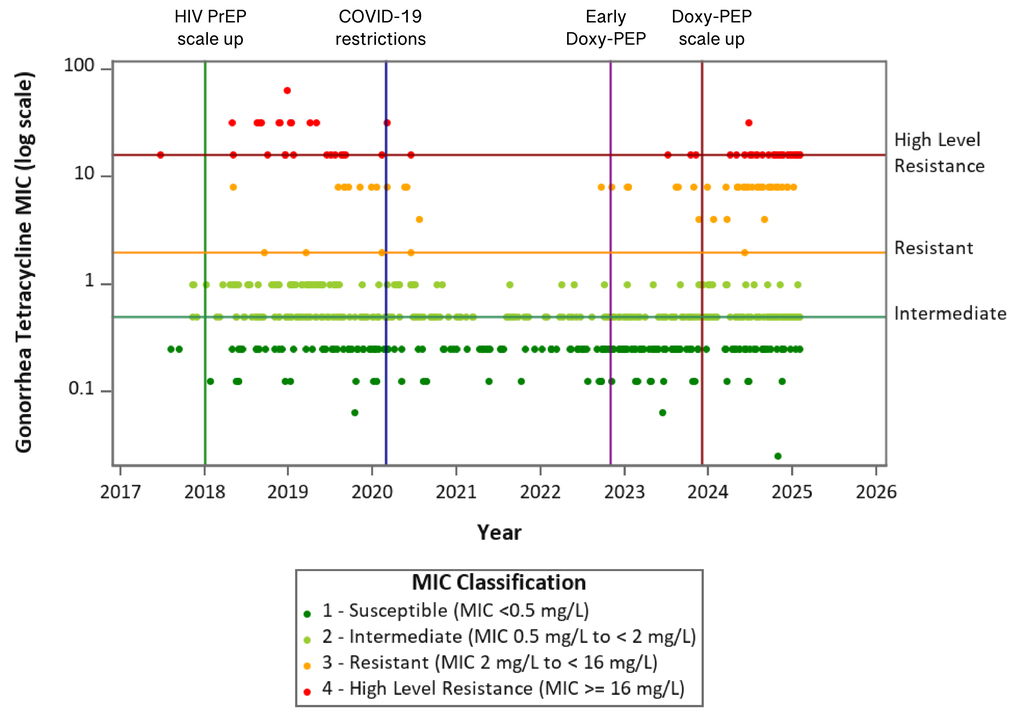



**Figure: Gonorrhea tetracycline resistance minimum inhibitory concentration (MIC) distribution in BC-CfE's HIV Treatment and HIV PrEP cohorts (1-Jan-2017 to 31-Jan-2025)**. Note pandemic decline in resistance (2020-2022) and post-pandemic rebound in resistance (2023-2025).

## RESULTS

*Participant characteristics*

- Overall, 2734 HIV PrEP and treatment participants were included with 94% residing in the Greater Vancouver area. Median age was 36 (Q1-Q3, 31-43) years, and 98% were cismen, 0.9% transwomen, 0.4% transmen, 0.7% other gender identity.
- HIV PrEP comprised 77% (n=2118) of participants, 22% (n=588) were from the HIV treatment program, and 1% (n=28) transitioned from HIV PrEP to HIV treatment.
- Of 2734 participants, 1025 (37%) enrolled in the Doxy-PEP initiative from Dec 2023 to Nov 2024.

*Gonorrhea testing episodes*

- There were 4376 GC TE's (range 123-989 per year), of which 4209 were resulted. A total of 751 TE's (18%) were positive of which 587 (78%) had tetracycline MIC values reported.

## RESULTS, cont.

*Gonorrhea tetracycline minimum inhibitory concentrations*

- The mean (min-max) GC tetracycline MIC was 4.15 mg/L (0.06-64; n=183) during HIV PrEP scale-up. This decreased to 1.07 mg/L (0.13-32; n=131) during the COVID-19 period (p<0.001). See Figure.
- Mean GC tetracycline MIC then increased from 1.42 mg/L (0.06-16; n=100) in the early Doxy period to 4.39 mg/L (0.03-32; n=166) during Doxy-PEP scale-up (p<0.001).
- This elevated mean MIC value for the Doxy-PEP scale up period was comparable to that during HIV PrEP scale up (p=0.26).

*Proportions of GC testing episodes with resistance during program scale up periods*

- Of note, the proportion of GC TE's with tetracycline resistance (MIC ≥2 mg/L) was 19% (n=35/183) during the HIV PrEP scale-up period and 34% (n=56/166) during the first 14 months of Doxy-PEP scale-up (p=0.002)
- However, the proportion of GC TE's with high level resistance (MIC ≥16mg/L) was not significantly different between HIV PrEP and Doxy-PEP scale up periods (13% [n=24/183] and 17% [n=29/166]; p=0.258 respectively).

## CONCLUSIONS

- In this preliminary analysis, a COVID-19 pandemic-related decline in tetracycline resistance rates and levels was observed in GC cultures amongst HIV PrEP and treatment participants.
- Tetracycline resistance rates and levels have appeared to return to pre-pandemic levels coincident with the introduction of public Doxy-PEP and return to pre-pandemic client behaviour patterns.
- Other potential confounding factors include impacts on sexual health and laboratory services, and antibiotic prescribing patterns during the COVID-19 period.
- Close monitoring is warranted, including more routine culture and sensitivity testing for breakthrough cases of GC while on Doxy-PEP, and on the AMR impact on off-target organisms.
- Further research is warranted in our population to clarify the mechanisms of the observed post-pandemic rebound in tetracycline resistance.

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