

Estimating the Utilization of Doxycycline Post-Exposure Prophylaxis (DoxyPEP) and the Impact on Syphilis Rates in Colorado

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Key Finding: Prescribing DoxyPEP to 30% of the eligible adults in Colorado would prevent 20% of new syphilis cases in this population.

Background

- There were 207,255 cases of syphilis in the US in 2022; the largest number since 1950 and a 17% increase from 2021.¹
- The Centers for Disease Control and Prevention recently released draft guidelines for the use of doxycycline post-exposure prophylaxis (DoxyPEP).²
- DoxyPEP can reduce the transmission of sexually transmitted infections (STIs), including syphilis, for men who have sex with men (MSM) or transgender women (TGW) who have had an STI in the past year.
- **Objective: Estimate the number syphilis cases averted in Colorado with varying rates of DoxyPEP uptake among MSM and TGW.**

Methods

Model Structure: A Markov model estimated DoxyPEP's impact on preventing syphilis among eligible adults in Colorado (Figure 1).

Scenarios	Inputs
<ul style="list-style-type: none"> • Base case: no DoxyPEP • DoxyPEP: prescribing adherence 15-50% 	<ul style="list-style-type: none"> • Syphilis diagnosis rate • DoxyPEP efficacy • Patient adherence to DoxyPEP • Prescribing adherence (proportion of eligible patients prescribed DoxyPEP)
Outcomes	Details
<ul style="list-style-type: none"> • Individuals prescribed DoxyPEP • Syphilis cases averted 	<ul style="list-style-type: none"> • 1-month cycle • 1-year horizon • Public health perspective

Figure 2. Details of DoxyPEP Markov model.

Results

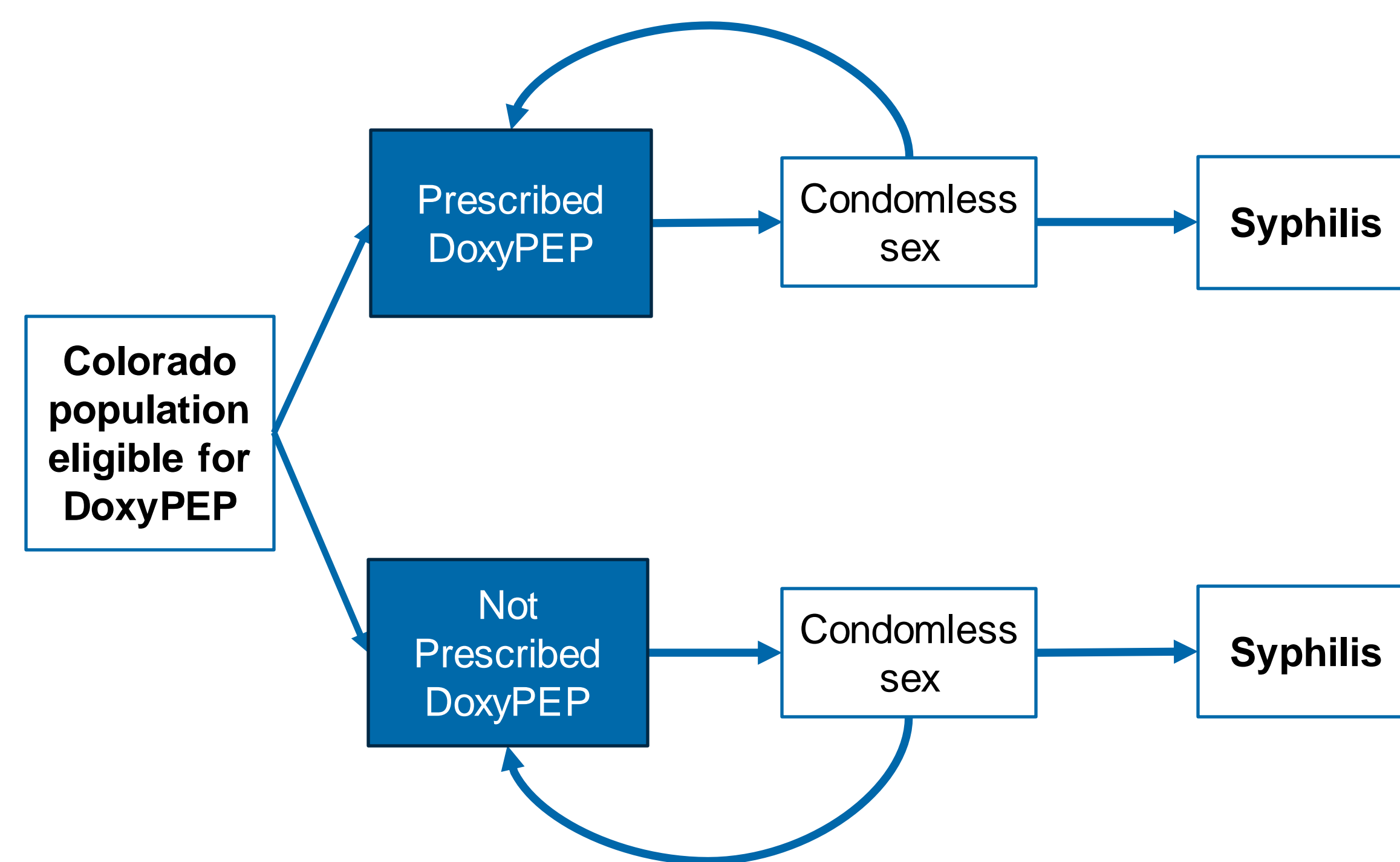


Figure 1. Structure of the DoxyPEP Markov model. The model starts with all individuals eligible for DoxyPEP who may or may not be prescribed DoxyPEP. Individuals are at risk of syphilis transmission at each instance of condomless sex.

Table 1. Inputs for DoxyPEP Markov model.

Input	Estimate	Lower	Upper	Distribution
Colorado males (2021) ¹ , n	2,342,706	2,340,480	2,344,932	-
Transgender females ² , n	6,208	6,202	6,214	-
MSM population	0.030	0.025	0.038	Beta
Proportion with an STI in the prior year	0.15	0.06	0.29	Beta
Population eligible for DoxyPEP, n	11,473	3,818	27,643	-
Syphilis diagnosis rate, per person-year (PY)	0.037	0.010	0.080	-
Probability of syphilis diagnosis, per month	0.0031	0.0008	0.0067	-
DoxyPEP efficacy, risk ratio (RR)	0.21	0.04	0.90	Lognormal
Prescribing adherence	0.30	0.15	0.50	Beta
Patient adherence	0.85	0.70	0.95	Beta

¹ Assigned male at birth; ² Assuming overall transgender population is 0.5%

DoxyPEP Prescriptions and Syphilis Cases Averted

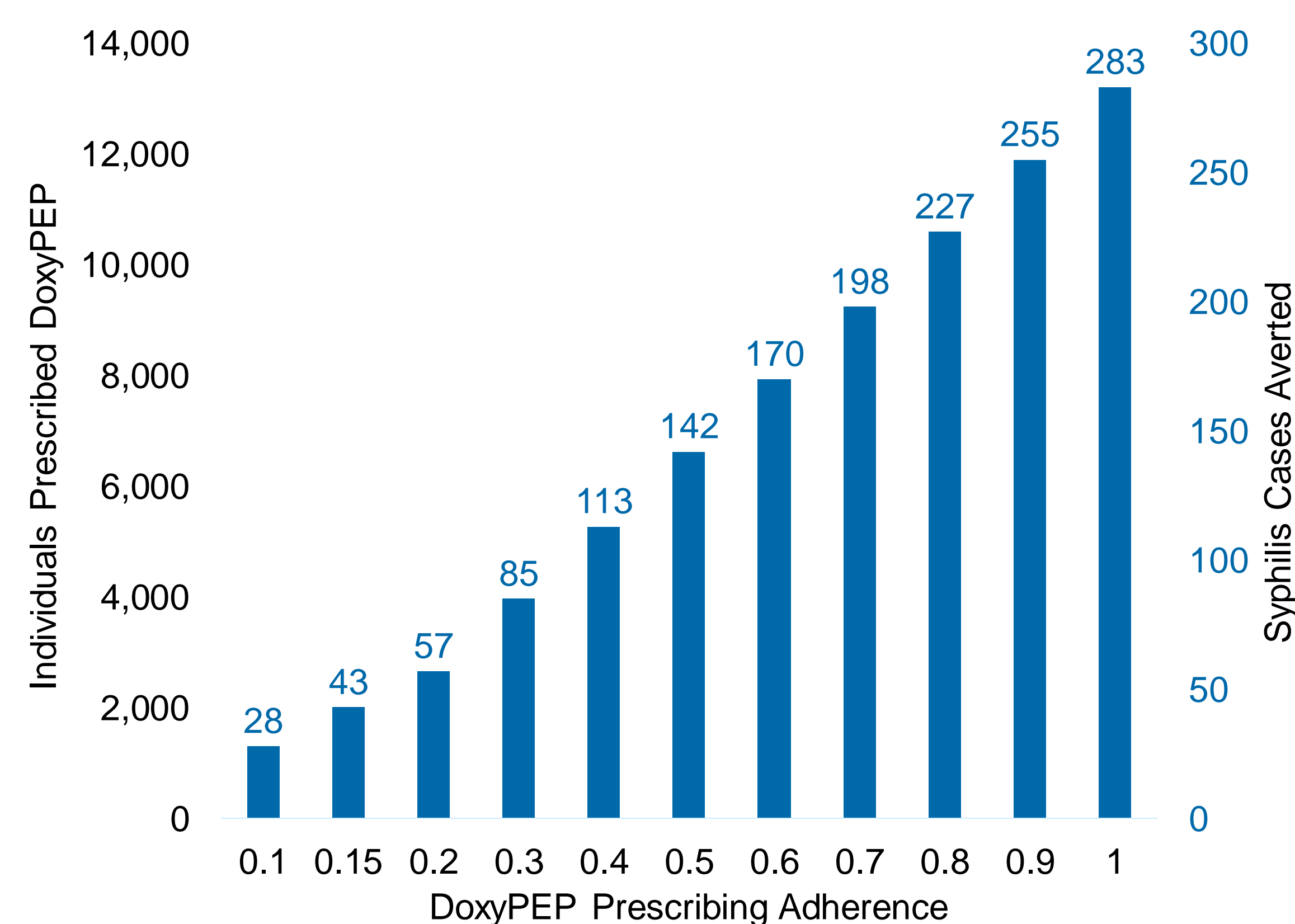


Figure 3. Number of individuals prescribed DoxyPEP and number of syphilis cases averted with varied levels of DoxyPEP prescribing adherence. There were 425 new syphilis cases among this population in the base case scenario.

One-way Sensitivity Analysis

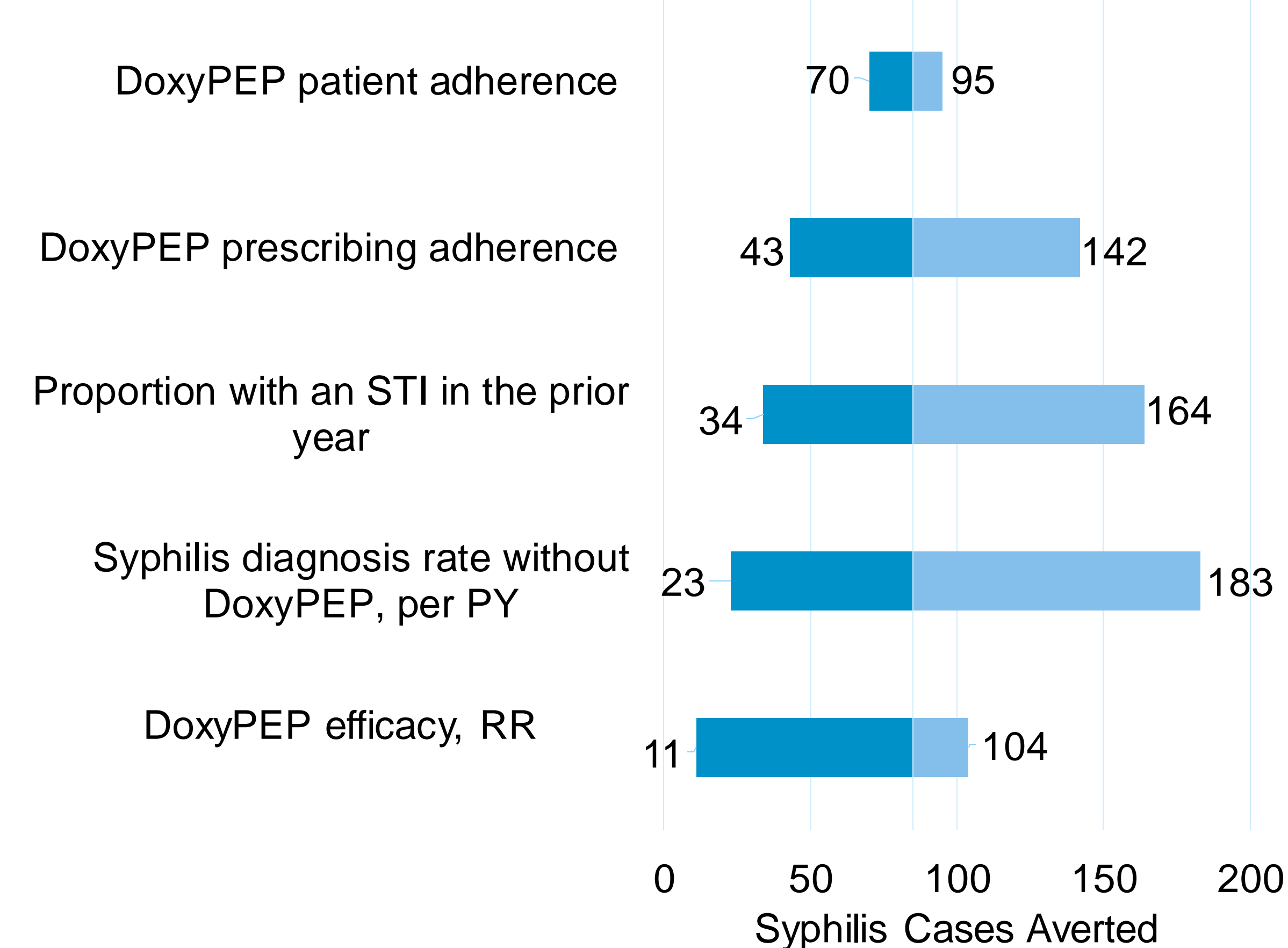


Figure 4. One-way sensitivity analysis of the range of syphilis cases averted using lower and upper input estimates (Table 1). The middle line represents the main inputs.

Conclusions

- Uptake of DoxyPEP by 15%-50% of eligible Coloradans would result in:
 - 1,700-5,700 new DoxyPEP prescriptions annually
 - 10%-33% fewer syphilis infections among MSM and TGW in Colorado annually
- DoxyPEP is a public health intervention that can decrease the number of syphilis cases in Colorado.

Implications

- Provider and patient awareness of DoxyPEP availability and benefits will be crucial to its uptake and potential success.
- Providers and public health should work to ensure equitable uptake of DoxyPEP among all populations.
- Draft CDC guidelines only recommend DoxyPEP for MSM and TGW, so more research is needed to evaluate DoxyPEP efficacy in other populations, including women.

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