

Accuracy of indirect adherence measures among adolescent men who have sex with men (aMSM) and transgender women (aTGW) in Brazil: a longitudinal analysis

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Background

Oral PrEP has been offered free of charge in the health services of the Brazilian National Health System since 2017. In 2022, the updated Brazilian PrEP guidelines included adolescents who are at high HIV risk. Considering that PrEP effectiveness is dependent on adherence, it is crucial to monitor PrEP users, and indirect measures are used during clinical follow-up.

Objective

To assess the accuracy of indirect PrEP adherence measures using longitudinal data and drug concentrations in dried blood spots (DBS).

Methods

PrEP1519 is a prospective, multicenter, open-label PrEP demonstration cohort study conducted with aMSM and aTGW aged 15-19. A diagnostic accuracy analysis was performed comparing a direct measure of adherence - tenofovir diphosphate (TFV-DP) concentrations in DBS- with three indirect measures: medication possession ratio (MPR), pill count, and self-reports.

Statistical analysis

Generalized estimating equations (GEE) were used to assess the accuracy of each indirect measure through the computation of the Area Under The Curve (AUC) and their 95% Confidence Interval (95%CI) using the Receiver Operating Characteristics (ROC) curve analysis. We considered the repeated (longitudinal) measures for the same participants, and we used the threshold of highly protective TFV-DP levels $\geq 800\text{fmol/punch}$ equivalent to the use of 4 pills weekly or more. We also analyze the combination of different index methods.

Results

We analyzed 302 DBS corresponding to 188 participants. Most were aMSM (78.7%), 18-19 years old (80.3%), and non-whites (72.9%).

Table 1. Accuracy of indirect measures of adherence by itself and in combination. PrEP1519 study, February 2019 to December 2020

Adherence measures	n	AUC (95%CI)
MPR	302	0.59 (0.53-0.66)
Pill count	104	0.69 (0.59-0.79)
Self-report	274	0.75 (0.69-0.81)
MPR + Pill Count + Self-report	102	0.72 (0.62-0.82)
Pill Count + Self-report	102	0.73 (0.63-0.83)
MPR + Pill Count	104	0.69 (0.59-0.79)
MPR + Self-report	270	0.77 (0.71-0.82)

AUC, area under the curve; CI. Confidence interval; MPR, medication possession ratio

The AUC results showed that indirect measures were able to discriminate adolescents with concentrations of TFV-DP equivalent to the use of 4 or more pills per week. A higher AUC was observed for self-report, as well as for the combination of indirect measures. Specifically, the combination of MPR and self-report proved to be the best in discriminating adolescents with concentrations of TFV-DP equivalent to the use of 4 or more pills per week.

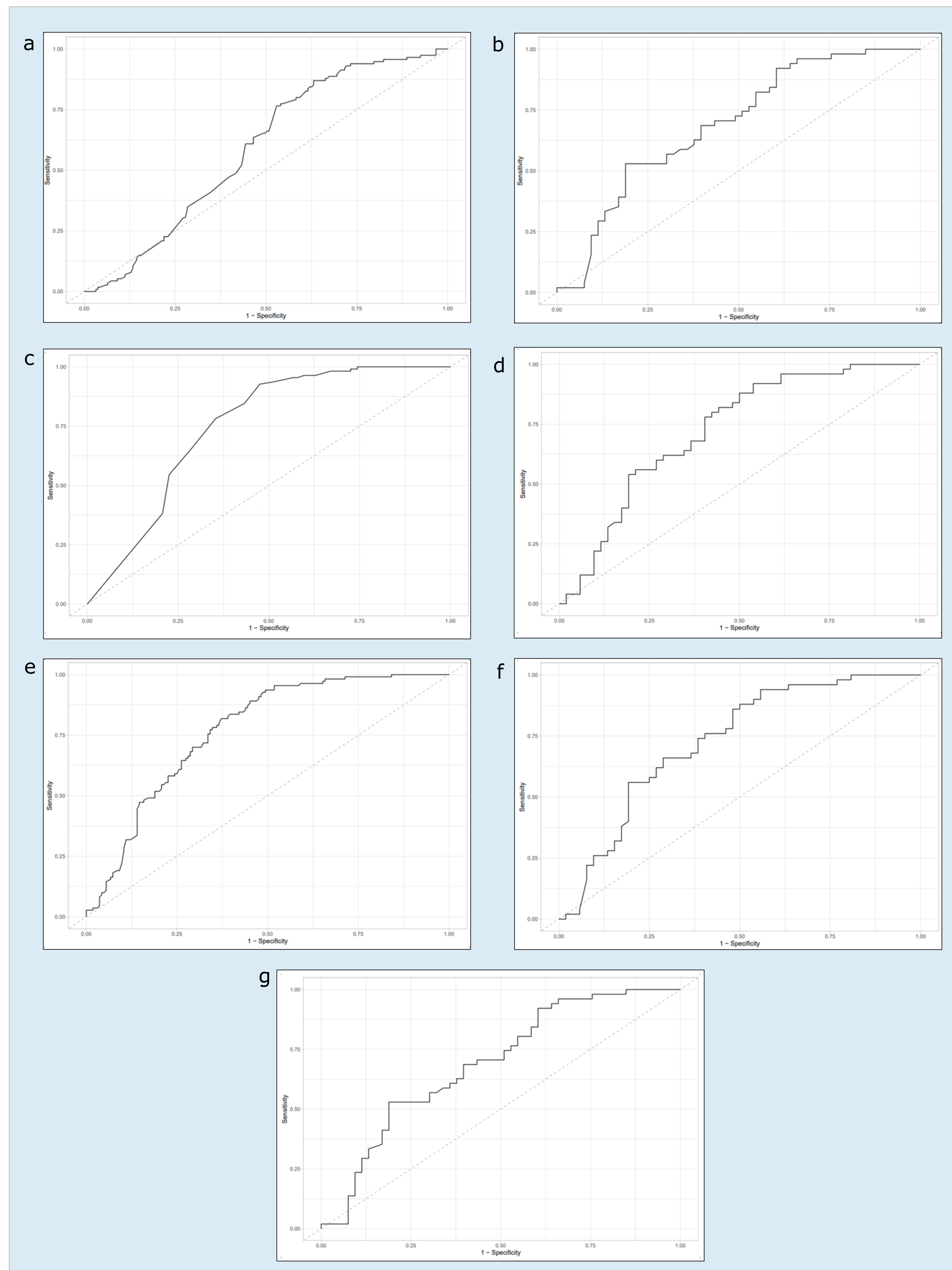


Figure 1. ROC curve and accuracy for indirect measures of adherence **a)** MPR **b)** Pill count **c)** Self-report **d)** MPR + Pill Count + Self-report **e)** MPR + Self-report **f)** Pill Count + Self-report **g)** MPR + Pill Count

Conclusion

The capacity of the three indirect measures in discriminating participants with highly protective levels of PrEP at different time points, indicates that these are valuable methods for monitoring PrEP use. The use of more than one indirect method for assessing adherence yields better patient adherence information.

These results are important for the process of implementing PrEP for adolescents in the Brazilian national health system, as indirect measures, particularly self-report and MPR. These tools can be helpful for identifying adolescents who needs additional support with PrEP adherence.

ADDITIONAL KEY INFORMATION

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