Impact of PrEP and TasP on the Incidence of New HIV Diagnoses in the 48 Highest-Burden US Localities

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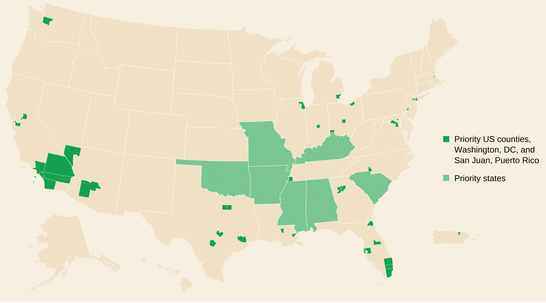
Introduction

48 Highest Burden Counties, 7 States, and Washington, DC



- From 2012 to 2017, HIV incidence has declined faster in the USA and metropolitan statistical areas (MSAs) where the use of emtricitabine/tenofovir disoproxil fumarate (F/TDF) for pre-exposure prophylaxis (PrEP) was the highest
- The statistically significant effect of PrEP on the decline in the HIV incidence rate has been shown to be independent of viral suppression, with a 2.1x greater magnitude of impact
- The "Ending the HIV Epidemic: A Plan for America" initiative (EHE) has targeted for intervention areas with a high HIV burden, including 48 counties, 7 states, and Washington, DC
- >50% of new HIV diagnoses occurred in EHE localities (2012–7)

Objective

- To evaluate the independent impact of PrEP and treatment as prevention (TasP) on HIV diagnosis rates in 48 counties and localities in EHE (48-EHE)

Methods

New HIV Diagnoses Incidence Methodology

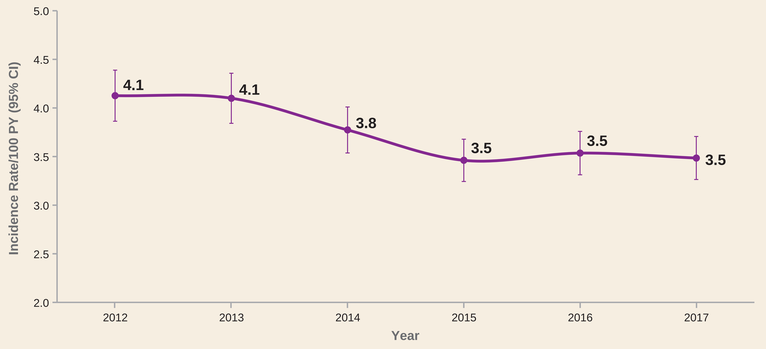
- Data sources:
  - Centers for Disease Control and Prevention (CDC) HIV surveillance data by MSA published annually
  - Estimates of adults with indications for HIV PrEP by jurisdiction, transmission risk group, and race/ethnicity[1]
  - National real-world data source containing >84% of all F/TDF for PrEP prescriptions in the USA; medical claims include procedures and diagnoses: 2012–7
  - US census population estimates for states, MSAs, and counties: 2012–7
  - 48-EHE status in the USA by MSA
- Computation of the incidence rate/100 person-y (PY)
  - Numerator: new HIV diagnoses by locality/y
  - Denominator: (adults with PrEP indication alive at beginning of each period × 1 y) − (new HIV diagnoses × average time exposed) − (persons on PrEP × average time exposed with PrEP)

MSA New HIV Diagnoses Statistical Methodology

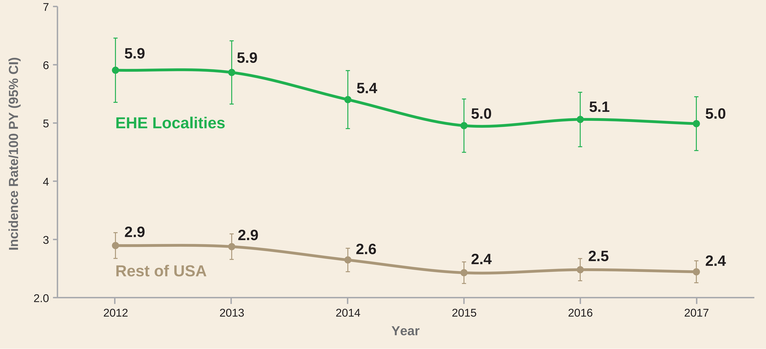
- PrEP utilization by locality was calculated from a national pharmacy and medical claims database, and adjusted per number of people at risk of HIV from the CDC surveillance program, with estimates available at the county, MSA, and state level
  - Calculation of person time at risk excluded people taking PrEP or those who became HIV positive
- New HIV diagnosis incidence utilized published CDC data in 105 MSAs and states: 2012–7
- CDC viral suppression rates from 2012 to 2017 were used as a proxy for TasP; denominator was people with >1 viral load test
  - Viral suppression data were available for 38 US states and Washington, DC; viral load of <200 copies/mL
- Incidence rates, incidence rate ratios, and 95% confidence intervals (CIs) were calculated from a multilevel Poisson regression model that reflected change for each locality over time after adjusting for the effect of PrEP and TasP
- The random intercept of the mixed models was locality, and the interaction between time and PrEP was investigated
- A binary variable identifying the 48-EHE counties and localities (yes/no) was included in the model

Results

HIV Incidence Rate/100 Person-Years: All Localities

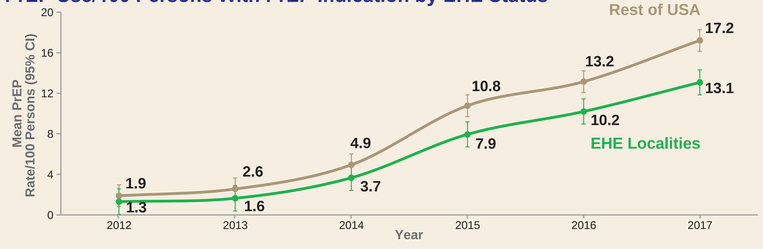


HIV Incidence Rate/100 Person-Years by EHE Status



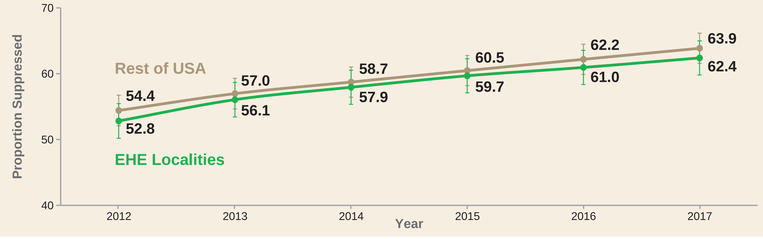
- Over this 6-y analysis, the US rate of HIV diagnoses in the 48-EHE locations decreased at a rate of 7.1%/y (95% CI -6.9%, -7.3%)

PrEP Use/100 Persons With PrEP Indication by EHE Status



- PrEP use in people with a CDC-defined PrEP indication increased 9.9-fold in the same locations from a mean 1.31/100 individuals (95% CI 0.3, 2.3) in 2012 to 13.1/100 (12.1, 14.1) in 2017

Proportion Suppressed Among People Living With HIV by EHE Status



- HIV viral suppression (proportion suppressed) increased by 1.4%/y (95% CI 1.1%, 1.7%) during the same time among people being treated for HIV

Impact of PrEP and TasP on HIV Diagnosis Rates

- A multivariate Poisson model showed that PrEP use was significantly associated with the decline in the incidence of new HIV cases in the EHE localities, independent of a significant TasP effect
- EHE localities with an average PrEP use of 17.4/100 persons at risk could expect a decline of 15.5% in the rate of new HIV diagnoses
- EHE localities had a significantly higher new HIV diagnosis rate than the rest of the US MSAs (incidence rate ratio 2.0; 95% CI 1.6, 2.6)
- EHE localities had significantly lower PrEP use (-2.1/100 persons at risk; 95% CI -0.93, -3.2) and TasP proportion (-1.3%; 95% CI -0.41, -2.2%) than those not selected for intervention

Conclusions

- From 2012 to 2017, HIV diagnoses declined significantly in the 48 counties and localities selected for intervention where PrEP use was the highest
- The effect of PrEP use was significantly associated with this decline and was independent of TasP
- Improvements in PrEP and TasP coverage in these localities would result in important declines in the rate of new HIV diagnoses

Reference: 1. Smith DK, et al. Ann Epidemiol 2018;28:850-7. **Acknowledgment:** This study was funded by Gilead Sciences, Inc.

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