Impact of the COVID-19 pandemic on healthcare resource utilization and expenditure in people living with HIV (PLWH) in the United States: A difference-in-difference analysis

EE19

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INTRODUCTION

- Approximately 1.2 million people in the U.S. are living with human immunodeficiency virus (HIV).[1]
- With stable and affordable access to care, PLWH can achieve viral suppression which has been shown to reduce HIV transmission, related morbidity and mortality.[1]
- However, in many patient populations the **COVID-19 pandemic negatively impacted the amount of healthcare resource utilization** (HCRU).[2] Yet the extent to which COVID-19 differentially changed HCRU, the downstream financial burden on PLWH — and whether that burden was absorbed by private insurers, public programmes, or patients themselves — remains poorly quantified.

OBJECTIVES

- Assess the impact of COVID-19 pandemic on healthcare resource utilization and expenditure among PLWH.
- Assess whether the magnitude of impact differed across races and census regions.

METHODS

1. Data acquisition: Medical Expenditure Panel Survey

- Full year consolidated files(2015-2023)
- Medical conditions files (2015-2023)
- Prescribed medicines files (2015-2023)
- Panel 24 (2019-2022)

→ Integrated into a master dataset

2. Cohort identification

- **Control**: no HIV diagnosis or prescribed antiretroviral therapy (ART)
- **PLWH:** Double-pronged strategy, flagging any individual with a HIV diagnosis or on ART

ART

A string-matching algorithm identified individuals prescribed HIV-specific medications

Diagnosis codes

- ICD-10 code: B20", "B21", "B22", "B23", "B24"
- ICD-9 code: "042","043","044"
- CCSR code: "INF006"

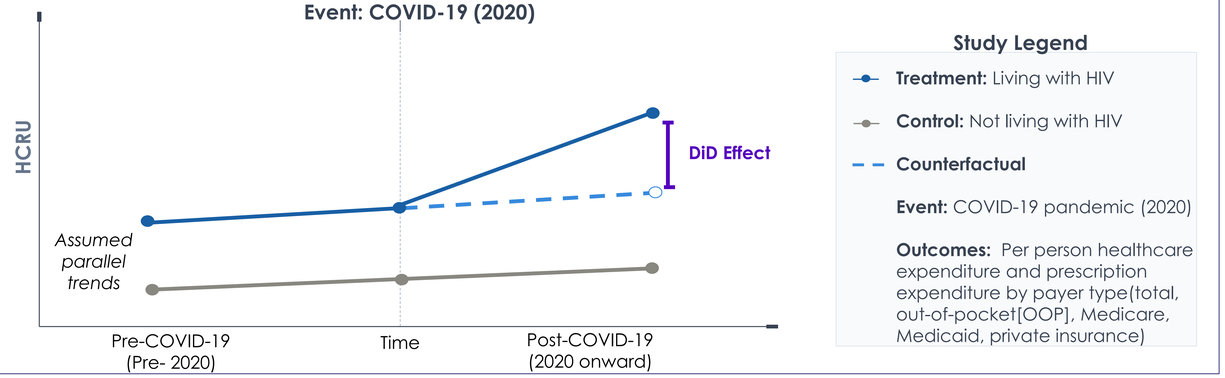
3. Difference-in-difference (DiD) and triple-difference analyses

- **Primary analysis** $Y_{it} = \beta(HIV_i \times Post\text{-}Covid_t) + a_i + \gamma_t + \varepsilon_{it}$
- **Secondary analysis: Census region** $Y_{it} = \Sigma(r \neq NE)\ \delta_r(Region_r \times HIV_i \times Post\text{-}Covid_t) + a_i + \gamma_t + \varepsilon_i$
- **Secondary analysis: Race/ethnicity** $Y_{it} = \Sigma(r \neq NHW)\ \delta_r(Race^g \times HIV_i \times Post\text{-}Covid_t) + a_i + \gamma_t + \varepsilon_{it}$

NE: North-east; NHW: non-hispanic white; a_i : individual fixed effect; γ_t: year fixed effect; ε_{it}: error term

- Costs inflated to 2022 USD (medical care consumer price index)

Figure 1. Primary Analysis: Difference-in-difference framework



RESULTS¥

Key Findings of Primary Analysis | Relative to Control Group

+$7,861	+$6,654	+$1,040	+$6,383	+6.1 units
Total healthcare expenditure	Private insurance coverage of H.E	OOP healthcare expenditure	Private insurance coverage: Rx	Prescription count
p = 0.014*	p = 0.009**	p = 0.003**	p = 0.007 **	p = 0.081

By Census Region | Reference: Northeast

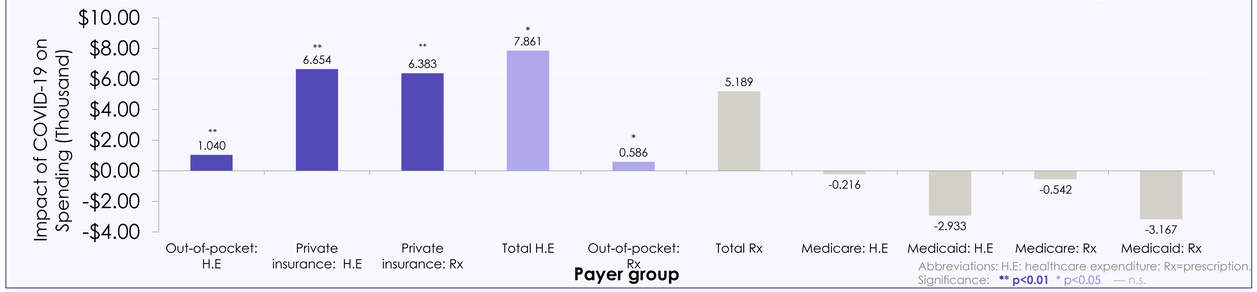
- **Midwest:** Largest effects across all outcomes — total (+$21,802***), private (+$18,895***), Rx total (+$20,141***), Rx private (+$18,135***), Rx OOP (+$2,013***) vs Northeast.
- **West:** Increases in total (+$8,340*), private (+$10,691***), Rx private (+$10,441***), OOP (+$886*).
- **South & Northeast:** No significant effects.

By Race/Ethnicity | Reference: Non-Hispanic (NH) White

- **NH Asian PLWH:** Higher costs vs White across nearly all outcomes — total (+$14,015***), private (+$13,245***), Rx total (+$10,722***), Rx private (+$10,333***), Rx OOP (+$396***).
- **NH Black PLWH:** Only significant result — lower Medicaid (−$4,947*) vs White, suggesting possible public coverage disruption.
- **Hispanic PLWH:** No significant effects.

¥ Descriptive analysis results linked to this analysis can be found on poster EE122.
*Statistical significance : *** p<0.001 ** p<0.01 * p<0.5*

Figure 2.Primary analysis: Payer breakdown – Where the burden falls on PLWH, relative to the control group



Abbreviations: H.E: healthcare expenditure; Rx=prescription.
Significance: ** p<0.01 * p<0.05 — n.s.

DISCUSSION & CONCLUSIONS

- PLWH experienced significantly higher total healthcare expenditure post-COVID relative to individuals without HIV, reflecting a relative **divergence in spending trajectories** rather than a uniform absolute change across the post-pandemic period. The burden fell disproportionately on privately insured PLWH. **Geographic and racial disparities** were pronounced, identifying structural vulnerabilities requiring targeted policy attention.
- Future pandemic preparedness frameworks for HIV care should prioritise: (1) strengthening **out-of-pocket protections** under private insurance plans; (2) **targeted infrastructure investment** in the Midwest; and (3) **equity-focused strategies** to ensure Non-Hispanic Asian and Black PLWH are not disproportionately exposed to financial and access barriers during health system crises.
- A limitation of this analysis is that only one pre-COVID data point (2019) is available using the MEPS Panel 24 longitudinal data, precluding formal parallel trends validation.
- Future research should aim to prove the parallel trends assumption & investigate underlying mechanisms driving results.

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DISCLOSURES

- Authors have no conflicts of interest to declare.

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