

Physician Reimbursement and Retention in HIV Care: Racial Disparities in the US South

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Background: Retention in HIV care remains a national challenge. Addressing structural barriers to care may improve retention. We examined the association between physician reimbursement and retention in HIV care, including racial differences.

Methods: We integrated person-level administrative claims (Medicaid Analytic eXtract, 2008–2012), state Medicaid-to-Medicare physician fee ratios (Urban Institute, 2008, 2012), and county characteristics for 15 Southern states plus District of Columbia. The fee ratio is a standardized measure of physician reimbursement capturing Medicaid relative to Medicare physician reimbursement across states. Generalized estimating equations assessed the association between the fee ratio and retention (≥ 2 care markers ≥ 90 days apart in a calendar year). Stratified analyses assessed racial differences. We varied definitions of retention, subsamples, and definitions of the fee ratio, including the fee ratio at parity.

Results: The sample included 55,237 adult Medicaid enrollees with HIV (179,002 enrollee years). Enrollees were retained in HIV care for 76.6% of their enrollment years, with retention lower among non-Hispanic Black (76.1%) versus non-Hispanic White enrollees (81.3%, $P < 0.001$). A 10-percentage point increase in physician reimbursement was associated with 4% increased odds of retention

(adjusted odds ratio 1.04, 95% confidence interval: 1.01 to 1.07). In stratified analyses, the positive, significant association occurred among non-Hispanic Black (1.08, 1.05–1.12) but not non-Hispanic White enrollees (0.87, 0.74–1.02). Findings were robust across sensitivity analyses. When the fee ratio reached parity, predicted retention increased significantly overall and for non-Hispanic Black enrollees.

Conclusion: Higher physician reimbursement may improve retention in HIV care, particularly among non-Hispanic Black individuals, and could be a mechanism to promote health equity.

Key Words: HIV, physician reimbursement, retention in care, racial disparities, US South

(*J Acquir Immune Defic Syndr* 2023;92:1–5)

INTRODUCTION

Fewer than 60% of the 1 million Americans diagnosed with HIV are retained in care.¹ Significant racial disparities exist, with retention less likely among non-Hispanic Black compared with non-Hispanic White individuals,² and these disparities are widest in the US South, the epicenter of the US HIV epidemic.²

Patient and provider interventions to increase retention at the individual and interpersonal levels are well-studied,³ but less attention has focused on how changes in structural-level factors influence retention or potential disparities. Structural factors are the economic, social, political, and institutional barriers or facilitators for health care access, delivery, quality, and outcomes.⁴ While structural interventions (eg, providing stable housing and Medicaid expansion) improve HIV testing, access to HIV care, and viral suppression,^{5,6} their impact on the quality of HIV care (eg, retention in care) has not been well-studied. Structural inequities disproportionately impact the health of racial groups,⁷ suggesting that removing structural barriers could differentially impact the quality of care for non-Hispanic Black individuals.

Physician reimbursement is a structural factor that may impact the quality of care and health outcomes. Lower physician reimbursement is associated with worse appointment availability, longer waiting time, and lower probability of receiving care.^{8–11} Clinicians report low reimbursement as a barrier to HIV testing because reimbursement may not fully cover the time and care coordination required when delivering test results.^{12,13} Providing high-quality HIV care may similarly require substantial time investments relative to

Received for publication April 7, 2022; accepted August 17, 2022.

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Supported by the National Institutes of Health [R01 MD011277] and the Blick Scholars Program at Virginia Commonwealth University.

The authors have no conflicts of interest to disclose.

This manuscript was previously posted to medRxiv: DOI: <https://doi.org/10.1101/2021.08.16.21262053>

This work was previously presented in part at the AcademyHealth Annual Research Meeting (abstract number 439, July 28 to August 6, 2020, virtual–online). Z.P. and A.D.K. designed the study. Y.D. and Z.P. analyzed the data, and Z.P., B.D., and A.D.K. aided in data interpretation. Z.P., R.S.B., and A.D.K. drafted the manuscript, and B.D., D.E.N., F.Z.B., L.E.Y., and L.M.S. revised the manuscript for important intellectual content.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.jaids.com).

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reimbursement levels, but the relationship between physician reimbursement and HIV care quality, including retention, has not been examined.

We examined the association between physician reimbursement and retention in HIV care and whether racial differences affected this relationship.

STUDY DATA AND METHODS

Data

We identified the sample of people living with HIV and retention in HIV care using the Medicaid Analytic eXtract (MAX), 2008–2012, for 15 Southern states (Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Texas, Virginia, and West Virginia) plus the District of Columbia. The MAX contains person-level administrative claims with information on eligibility, enrollment, demographics, outpatient visits, and filled prescriptions. We used county-level data on HIV prevalence (AIDSvu, 2018), urbanicity, socioeconomic status, and health care delivery (Area Health Resources Files, 2010)^{11,14,15} as control variables. State-level Medicaid physician reimbursement, the independent variable, was obtained from Medicaid-to-Medicare fee ratio indices (2008, 2012).¹⁶

Study Population

The study population included Medicaid enrollees aged 19–64 years, living with HIV, Medicaid-eligible based on income or disability, and Medicaid-enrolled within a single state over the observation period (see Exhibit S1, Supplemental Digital Content, <http://links.lww.com/QAI/B975>). We excluded enrollees ever eligible for Medicare, ≥ 65 years, or enrolled in third-party insurance; we excluded enrollee years for enrollees not continuously enrolled or with missing gender or county characteristics in a calendar year.

Key Measures

The standard measure of the outcome variable, retention in HIV care¹⁸ (*Any Care Marker*), was ≥ 2 claims for care markers (ie, routine HIV medical visits, antiretroviral prescriptions, and HIV laboratory tests) within a calendar year, ≥ 90 days apart, and was applied to each calendar year. Physician reimbursement was the primary care Medicaid-to-Medicare physician fee ratio,^{19,20} a standardized measure comparing the fee-for-service component of Medicaid with Medicare reimbursement for the same primary care services, by state.¹⁶

Statistical Analysis

We described sample characteristics overall and by race, testing racial differences using χ^2 and *t* tests. When examining the relationship between the fee ratio and retention, we used generalized estimating equations to account for within-person correlation of outcomes over multiple calendar years.²¹ We performed stratified analysis for non-Hispanic

White and non-Hispanic Black enrollees. State and year fixed effects models included individual-level and county-level characteristics as control variables.

Additional Analysis

In sensitivity analysis, we restricted care markers to CD4 cell count or HIV RNA viral load tests only (*laboratory tests*)¹ and routine HIV medical care visits only (*routine visits*).¹⁸ In addition, we considered an extended observation period of 15 months to capture real-world delays in service utilization, restricting the sample to those continuously enrolled in Medicaid for ≥ 2 years. We applied an alternative index—the Medicaid-to-Medicare fee ratio for all services—which captured potential differences in providing specialty care. We also controlled for potential differences in state-level scope of Medicaid service provision.²²

In subgroup analysis, we restricted the sample to enrollees requiring intensive HIV management (*intensive management*) within a calendar year.²³ We evaluated the relationship between the fee ratio and retention by enrollee gender and payment type (fee-for-service and managed care) to capture differences in service utilization patterns. We also examined the relationship among enrollees who re-engaged in HIV care (*re-engaged*) and represent a different risk profile for retention in HIV care.²⁴

Finally, we examined the relationship at parity—ie, a fee ratio of 1, indicating Medicaid and Medicare physician reimbursement are equal. We predicted the percentage retained in HIV care and change in the probability of retention, overall and by race, holding covariates constant at their mean values.

Analyses were conducted with 2-sided tests with a significance threshold of $P < 0.05$ using SAS version 9.4 (SAS Institute, Cary, NC). Further information is in the Supplemental Digital Content, <http://links.lww.com/QAI/B975>.

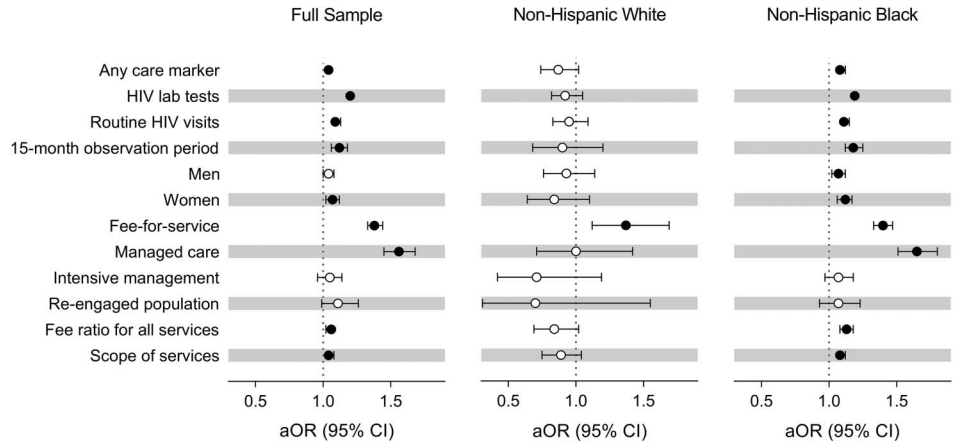
STUDY RESULTS

The sample included 55,237 enrollees living with HIV (179,002 enrollee years). Enrollees were retained in care for over three-quarters of their total enrollment years, with non-Hispanic White retained more than non-Hispanic Black enrollees ($P < 0.001$).

We found a positive and significant relationship between the physician fee ratio and retention in HIV care (Fig. 1). A 10-percentage point increase in the fee ratio was associated with a 4% increase in the likelihood of retention (adjusted odds ratio 1.04; 95% confidence interval 1.01 to 1.07). In stratified analysis, there was an association only among non-Hispanic Black enrollees (1.08; 1.05, 1.12).

Findings were robust when using alternative definitions of retention and the fee index. A 10-percentage point increase in the fee ratio was associated with a 21% (1.17, 1.23) (*laboratory tests* definition of retention) and 9% (1.06, 1.13) (*routine visits*) increase in the likelihood of retention in care. The relationship remained significant when extending the observation period for retention to 15 months. In stratified

FIGURE 1. State-level Medicaid physician reimbursement and retention in HIV care. aOR, adjusted odds ratio; CI, confidence interval. Reported are the adjusted odds and 95% CI of retention in HIV care with a 10-percentage point increase in the primary Medicaid-to-Medicare fee ratio. Filled markers indicate odds ratios that achieved statistical significance; unfilled markers indicate nonsignificance. Retention in care is defined as ≥ 2 markers of care (physician visit, CD4, HIV RNA, or drug resistance tests or antiretroviral prescriptions) within a calendar year, with markers ≥ 90 days apart.



Regressions control for individual characteristics (age, sex, race/ethnicity, coinfections, comorbidities, and history of AIDS-defining illnesses), county characteristics (HIV prevalence, primary care physician supply, internal medicine specialist supply, number of hospital beds, urbanicity, percent with less than a high school education, percent unemployed, and median household income), and state-fixed and time-fixed effects. Complete regression results are in the Supplemental Digital Content, <http://links.lww.com/QAI/B975>. *HIV laboratory tests* refer to ≥ 2 CD4 or HIV RNA tests within a calendar year, with markers ≥ 90 days apart. *Routine HIV visits* refer to ≥ 2 physician visits within a calendar year, with markers ≥ 90 days apart. *15-month observation period* refers to ≥ 2 markers of care (physician visit, CD4, HIV RNA, or drug resistance tests, or antiretroviral prescriptions) within a 15-month period (a calendar year plus the first 3 months in the subsequent calendar year), with markers ≥ 90 days apart. The sample used for this sensitivity analysis is restricted to enrollees continuously enrolled in Medicaid for 2 years. *Men* refer to a subsample of enrollees who are men. *Women* refer to a subsample of enrollees who are women. *Fee-for-service* refers to a subsample of enrollees who have no evidence of managed care enrollment in a given calendar year. *Managed care* refers to a subsample of enrolled in comprehensive care for at least 6 months in a given calendar year. *Intensive management* refers to a subsample of enrollees who have evidence of requiring intensive HIV management (due to pregnancy, HIV-related nephropathy, an AIDS-defining illness, or receipt of sulfamethoxazole/trimethoprim for *Pneumocystis jirovecii* pneumonia) in a given calendar year. *Re-engaged population* refers to a subsample of enrollees continuously enrolled in Medicaid for at least 4 years, not retained in care for at least 1 year and subsequently returned during the observation period. *Fee ratio for all services* represents a sensitivity analysis using the Medicaid-to-Medicare fee ratio for all services instead of for primary care. *Scope of services* represents a sensitivity analysis that includes an index that measures the state-level differences in scope of Medicaid service provision as control variable.

analysis, the relationship was significant only among non-Hispanic Black enrollees and regardless of the definition of retention. When separately using the fee ratio for all services and controlling for state-level differences in scope of Medicaid service provision, the relationship for the full sample and stratified analysis was similar to the main findings.

Findings were mixed in different subsamples. In the *intensive management* and *re-engaged* subsamples, we found no significant relationship. However, for women and for both the *fee-for-service* and the *managed care* subsamples, a 10% point increase in the fee ratio was positively and significantly associated with retention. In stratified analysis, findings were similar for non-Hispanic Black enrollees, including among non-Hispanic Black men. We found no significant relationship among non-Hispanic White enrollees across all sensitivity analyses, with the exception of *fee-for-service* enrollees.

When predicting an increase to parity, retention in HIV care increased overall by 2.3% (0.4%, 4.5%) compared with the main analysis, with enrollees retained in care for 80.9% of their enrollment years. For non-Hispanic Black enrollees, retention increased by 5.1% (2.1%, 8.1%), with 80.3% of their enrollment years retained in HIV care. Results were not significant for non-Hispanic White enrollees.

DISCUSSION

Retention in HIV care, and racial disparities in retention, could be mitigated by addressing structural barriers to care. We find that retention in HIV care is higher among enrollees living in states with higher Medicaid physician reimbursement, regardless of the definition of retention, enrollee payment type, and fee ratio type. Notably, this relationship occurs almost exclusively among non-Hispanic Black enrollees.

Findings suggest that even modest increases in physician reimbursement may improve retention in HIV care. More sizeable increases have been implemented but only in the relative short-term, such as in the Affordable Care Act¹⁶ and during the COVID-19 public health emergency.²⁵ These temporary increases suggest that states recognize the importance of Medicaid reimbursement in supporting access to care but may face constraints that preclude committing to substantial payment changes over the longer term. We consider a more modest 10-percentage point increase in state-level Medicaid physician reimbursement—which may be economically feasible for some state Medicaid programs. This increase was associated with a 4%–56% increase in the odds of retention in HIV care. Increased retention may improve HIV RNA viral suppression,²⁶ thereby reducing morbidity, mortality,²⁷ and HIV transmission.²⁸

Increasing physician reimbursement may reduce racial disparities in retention in HIV care and improve health equity. Increased physician reimbursement was associated with higher retention among non-Hispanic Black—but not non-Hispanic White—enrollees in stratified analyses. One explanation for these racial differences is the manifold structural disparities inherently faced by Black individuals. Reduction in 1 structural barrier might disproportionately and favorably impact non-Hispanic Black than non-Hispanic White individuals living with HIV, who face fewer structural barriers. The removal of 1 structural barrier is likely to have greater weight for groups burdened by many structural barriers. Thus, our results may reflect a ceiling effect among non-Hispanic White enrollees, who had a higher proportion of their enrollment retained in care (81%) than non-Hispanic Black enrollees (76%). Increasing Medicaid physician reimbursement to parity may be a mechanism to narrow the gap in retention in HIV care between non-Hispanic White and non-Hispanic Black individuals living with HIV.

This study is the first to examine the relationship between physician reimbursement and HIV care quality, building on the broader literature on physician reimbursement as a potential system-level barrier to high quality care. This study's findings among non-Hispanic Black Medicaid enrollees living with HIV align with previous work indicating that higher physician reimbursement is associated with more frequent physician visits,^{8,20} increased usual source of care,²⁰ and outpatient department visits.^{8,20} Study findings also parallel the limited research on physician reimbursement for HIV care: over half of general internists reported that higher physician reimbursement for 1 clinical service (counseling time) would facilitate routine HIV screening.²⁹ Finally, our work is among the first to examine the differential impact of physician reimbursement on quality of care by race. Future research should evaluate these relationships over time and in other populations, as disentangling how upstream factors shape disparities in quality of care is critical to undermining structural racism and ending racial disparities in health and health care.

Limitations

First, the fee ratio reflects physician reimbursement for Medicaid fee-for-service versus Medicaid managed care. However, physician reimbursement for managed care approximates fee-for-service reimbursement.³⁰ Second, we used the fee ratio for primary care services, which does not fully align with the care markers used to define retention and may not capture changes in utilization of specialist services.³¹ Third, we may underestimate the association between Medicaid physician reimbursement levels and retention in care due to unobservable participation in the Ryan White HIV/AIDS Program, whose clinics provide comprehensive HIV medical care and support services that improve retention in care.^{32,33}

Fourth, a calendar-year definition of retention in care may underestimate enrollee retention, since administrative claims capture real-world variation in appointment availability and delays in obtaining care. We accounted for this reality when extending the observation period for retention

in HIV care from 12 to 15 months, with similar findings. Fifth, we could not control for variation in provider-level or clinic-level characteristics, as claims data do not allow precise identification of an enrollee's primary provider of record (including primary HIV provider). We also could not control for all relevant social and behavioral barriers to retention in care,³⁴ since the data do not include information on individual social determinants of health (eg, housing insecurity). Finally, we conducted the analysis for a single geographic region, the US South. Since Medicaid physician reimbursement in most Southern states is higher than the national average,¹⁶ we anticipate our findings would generalize beyond the South.

CONCLUSIONS

Increasing Medicaid physician reimbursement may be a feasible policy solution to improve, and promote racial equity in, quality of care for people living with HIV. Addressing structural barriers such as low physician reimbursement may improve retention in HIV care among non-Hispanic Black individuals living with HIV, improve racial equity in retention, and facilitate achievement of national goals to improve health outcomes in this population.

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