Biopsychosocial Health Outcomes and Experienced Intersectional Stigma in a Mixed HIV Serostatus Longitudinal Cohort of Aging Sexual Minority Men, United States, 2008–2019

M. Reuel Friedman, PhD, MPH, Qimin Liu, MS, Steven Meanley, PhD, MPH, Sabina A. Haberlen, PhD, Andre L. Brown, PhD, MPH, Bulent Turan, PhD, Janet M. Turan, PhD, MPH, Mark Brennan-Ing, PhD, Valentina Stosor, MD, Matthew J. Mimiaga, ScD, MPH, MA, Deanna Ware, MS, James E. Egan, PhD, MPH, and Michael W. Plankey, PhD

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Objectives. To determine whether intersectional stigma is longitudinally associated with biopsychosocial outcomes.

Methods. We measured experienced intersectional stigma (EIS; ≥ 2 identity-related attributions) among sexual minority men (SMM) in the United States participating in the Multicenter AIDS Cohort Study. We assessed longitudinal associations between EIS (2008–2009) and concurrent and future hypertension, diabetes, dyslipidemia, antiretroviral therapy adherence, HIV viremia, health care underutilization, and depression symptoms (2008–2019). We conducted causal mediation to assess the contribution of intersectional stigma to the relationship between self-identified Black race and persistently uncontrolled outcomes.

Results. The mean age (n = 1806) was 51.8 years (range = 22–84 years). Of participants, 23.1% self-identified as Black; 48.3% were living with HIV. Participants reporting EIS (30.8%) had higher odds of hypertension, dyslipidemia, diabetes, depression symptoms, health care underutilization, and suboptimal antiretroviral therapy adherence compared with participants who did not report EIS. EIS mediated the relationship between self-identified Black race and uncontrolled outcomes.

Conclusions. Our findings demonstrate that EIS is a durable driver of biopsychosocial health outcomes over the life course.

Public Health Implications. There is a critical need for interventions to reduce intersectional stigma, help SMM cope with intersectional stigma, and enact policies protecting minoritized people from discriminatory acts. (*Am J Public Health*. 2022;112(S4):S452–S462. https://doi.org/10.2105/AJPH.2022.306735)

The burden of chronic comorbidities is increasing as people with HIV (PWH) in the United States age, presenting key challenges to effective HIV care.[1,2] The largest proportions of PWH in the United States are aged 45 years or older,[3] the majority of whom are sexual minority men (SMM).[4] Among aging PWH, noncommunicable diseases (NCDs) such as diabetes, hypertension, and dyslipidemia are common, complicating clinical care and contributing to poor HIV outcomes.[2,5,6] Studies estimate that, by 2030, 84% of PWH will have at least 1 NCD, with 28% predicted

to have 3 or more NCDs, and 40% of PWH predicted to experience HIV treatment complications because of multimorbidity polypharmacy concerns.[1,7]

Domestically, there exist profound ethnoracial and socioeconomic disparities in the incidence, prevalence, and control of HIV and NCDs.[8–13] These disparities are attributed to structural inequities, like racism, embedded in different aspects of society (e.g., employment, housing, and health care) that trickle down at the policy level and minimize the political power and access to resources that marginalized individuals require to maintain wellness.[14–18] Compared with SMM who identify as White, SMM who identify as Black or Latinx experience higher HIV prevalence and incidence and lower rates of viral suppression.[13,17,18] Populations who identify as Black experience higher prevalence of hypertension and lower rates of hypertension control compared with White populations.[8,9,19] Populations who identify as Black or Latinx experience higher prevalence and incidence of diabetes and higher diabetes-related mortality rates compared with White populations.[20,21]

Lower socioeconomic status has been associated with higher diabetes-related mortality in models adjusted for ethnoracial identity,[21] suggesting that class-based structural inequalities (e.g., lack of universal health care in the United States, absence of universal basic income) contribute to effective NCD management and help explain underlying social gradients of health. Lower rates of dyslipidemia treatment and control have been found in populations who identify as Black relative to those who identify as White, and higher rates of dyslipidemia have been observed among populations who are low-income and those who identify as Latinx.[22–24] Given that race is a social construct, ethnoracial inequities in HIV and NCD incidence, prevalence, and control are not biologically intrinsic. Therefore, sociocultural and structural inequities caused by interlinked systems of oppression such as racism, classism, and heterosexism have been hypothesized as fundamental drivers of health inequities.[25]

Intersectional stigma offers a key framework for understanding pathways between systemic oppression and health inequities in multiply marginalized populations (e.g., SMM of color living with HIV).[26] Stigma (the process in which groups of people are devalued, negatively stereotyped, and discriminated against)[27,28] is a multidimensional construct inclusive of anticipated, internalized, perceived, and enacted or experienced domains; in stigma frameworks, active discrimination can be viewed as a specific form of experienced stigma.[26,29] Linking the stigma framework with intersectionality,[30] which conceptualizes how social identities overlap to engender different modalities of privilege and discrimination, intersectional stigma as coined by Berger "represents the total synchronistic influence of various forms of oppression, which combine and overlap to form a distinct *positionality*."[26(p.4)] Intersectional stigma research elucidates relationships between multiple intersecting identities at both the microlevel of minoritized social status (e.g., race, sexuality, and HIV status) and the macrolevel of systemic oppression (e.g., racism, heterosexism, and HIV stigma), the multiple dimensions of stigmatization, and consequent mental, physical, and behavioral health inequities on individual and population levels.[29–34]

Research has begun to demonstrate associations between stigma and biological outcomes. Anticipated and experienced stigma have been shown to be associated with higher odds of hypertension among adults who identify as Black[35,36]; discrimination has been associated with greater allostatic load among Puerto Rican adults.[37] Intersectional stigma has been associated with adverse psychosocial conditions, such as depression and substance use, among SMM, increasing failure risk along the HIV care continuum.[38,39] This can cause minoritized people (i.e., people who are marginalized by systems of oppression beyond their control, such as racism and heterosexism) to avoid situations, such as health care environments, where they perceive that stigmatization occurs. Intersectional stigma has been associated with health care underutilization and antiretroviral therapy (ART) nonadherence. Because diabetes, dyslipidemia, and hypertension are, like HIV, chronic conditions requiring ongoing health care engagement, effective management of NCDs may also be affected by intersectional stigma.

Understanding the longitudinal pathways between minoritized populations, intersectional stigma, psychosocial health, and HIV and NCD outcomes remains limited. The aims of this study were threefold. First, we assessed the prevalence and correlates of experienced intersectional stigma (EIS) in adulthood in a mixed-serostatus cohort of aging SMM. Second, we prospectively assessed relationships between EIS and biopsychosocial health outcomes over 11 years. Third, we assessed mediation by EIS of the relationships between Black identity and persistently uncontrolled biopsychosocial conditions. Ongoing imbalances in social power and privilege are reflected in the US health care infrastructure and disproportionately affect people from historically excluded and often intersecting groups, heightening minoritized

communities' vulnerabilities to social adversity. Therefore, we hypothesized that (1) participants from minoritized subgroups would report higher rates of EIS than their nonminoritized counterparts, (2) EIS would be associated with higher odds of biopsychosocial health outcomes, and (3) EIS would mediate relationships between Black ethnoracial identity and persistently uncontrolled biopsychosocial outcomes.

METHODS

The Multicenter AIDS Cohort Study (MACS) is an observational, community-based cohort that examines the natural and treated history of HIV/AIDS among SMM in Baltimore, Maryland/Washington, DC; Chicago, Illinois; Los Angeles, California; and Pittsburgh, Pennsylvania. Data and specimens collected at biannual study visits include sociodemographic and psychosocial characteristics, medications, hematology (HIV RNA quantification, lipid profile, glucose metabolism), health care utilization, and blood pressure. Biologically validated outcomes assessed include dyslipidemia, hypertension, diabetes, and HIV viral load.[7,40] Additional methodology is available at https://statepi.jhsph.edu/mwccs.[40,41]

Measures

We assessed EIS via audio computer-assisted self-interviewing (ACASI) surveys conducted in 2008–2009 (n = 1806). For participants completing surveys at both timepoints, only initial responses were used. Using the 2-stage version of the Major Experiences of Discrimination Scale,[42] participants reported EIS in adulthood (age ≥ 18 years) from any of 6 sectors (employment, education, community, housing, health care, or law enforcement). For each sector in which participants reported stigmatization, they were prompted to indicate identity-related (age, gender, race, ethnicity, religion, appearance, body shape, disability, HIV status, or sexual orientation) attributions that represented the top 3 reasons for stigmatization.[43] Data were operationalized to reflect any experienced stigmatization in adulthood in each sector, then aggregated across sectors to reflect all identity-related attributions. For primary analyses, we defined EIS as having reported 2 or more identity-related attributions (e.g., race and sexuality) for stigmatization across all sectors. For secondary analyses, we used the sum (0–10) of identity-related attributions.

Biological outcomes were assessed by using plasma collected after fasting. Among PWH, HIV viremia was defined as having a viral load of 200 copies per milliliter or more.[44] Diabetes was defined as glucose greater than 125 milligrams per deciliter (mg/dL) or self-reported diabetes with medication, concomitant with hemoglobin A1c of 7.5% or higher. Dyslipidemia was defined as total cholesterol 200 mg/dL or higher, low-density lipoprotein cholesterol of 130 mg/dL or higher, high-density lipoprotein cholesterol less than 40 mg/dL, triglycerides 150 mg/dL or higher, or use of lipid-lowering medications concomitant with a clinical diagnosis. Hypertension was defined as blood pressure 140/90 millimeters of mercury or higher or use of blood pressure–lowering medications concomitant with a clinical diagnosis.[45] Secondary analyses defined persistently uncontrolled outcomes as at least 2 occurrences of blood pressure 140/90 millimeters of mercury or higher (uncontrolled hypertension), fasting low-density lipoprotein cholesterol of 130 mg/dL (uncontrolled cholesterol), and fasting hemoglobin A1c of 7.5% or higher (uncontrolled diabetes) between 2008 and 2019.

Behavioral outcomes were assessed at each visit via ACASI. Health care underutilization was assessed with a 1-item measure ("Since your last visit, was there a time when you did not receive medical care, dental care, or prescription drugs when you thought you needed to?") consistent with other brief measures.[46] Among PWH, self-reported ART adherence was dichotomized to reflect 100% adherence versus less than 100% adherence over the previous 4 days.[47–49] Secondary analyses defined persistently suboptimal ART adherence and persistent health care underutilization as 2 or more reports of each behavior between 2008 and 2019.

Depression symptoms in the past 7 days were measured via ACASI, using the Center for Epidemiologic Studies Depression scale.[50] A cut-off of 20 was used to delineate depression symptoms.[51] Secondary analyses defined persistently uncontrolled depression symptoms as 2 or more occurrences of scores of 20 or higher between 2008 and 2019.

Ethnoracial variables were collected at the baseline study visit using the following questions: "Are you of Hispanic (Spanish) or Latino origin?"; and "What is your race? Do you consider yourself (check all that apply) White, Black, Native Hawaiian/Pacific Islander, Native American, Alaskan native, Other?" Low-income status (gross annual income < $20 000/year) was collected at each study visit via ACASI and treated as time-varying. Sexual behavior was defined using behavior questions for the 6 years before 2008–2009 and treated as fixed.[52] HIV status was assessed at each study visit via enzyme-linked immunosorbent assay for HIV-negative individuals and

western blot to confirm seroconversion, and treated in analyses as time-varying for HIV-negative men to delineate seroconversions. Time (study visit) was treated as time-varying and specified as a random effect. Models adjusted for sociodemographics, site, and age (10-year increments).

Statistical Analysis

We used descriptive statistics to explore sociodemographics and frequency of settings and attributions for intersectional stigma. We used χ^2 and *t* tests to analyze differences in EIS by sociodemographics. We constructed a series of generalized linear mixed models (GLMM) with repeated measures to assess associations between EIS (2008–2009) and biopsychosocial outcomes, comprising a maximum of 22 potential visits. Analyses were conducted in SAS version 9.4 (SAS Institute, Cary, NC), with specifications for mixed effects (between-subjects and within-subject). We reported least-squares means estimates of outcomes at a given observation and adjusted odds ratios (AORs) by intersectional stigma group with corresponding 95% confidence intervals (CIs) and *P* values using the observed margins specification, which includes all nonmissing observations and averts listwise and pairwise deletion for observations where dependent variables are missing, maximizing the utility of the full observed data set. We constructed post hoc models with an interaction term (EIS*visit), to assess whether outcome trajectories differed by EIS. Results from post hoc models display regressed least-squares means estimates of outcomes by visit and EIS group.

To assess whether EIS mediated relationships between Black ethnoracial identity and persistently uncontrolled outcomes, we conducted secondary analyses using the 4-way decomposition approach for causal mediation.[53,54] To include both PWH and seronegative participants, we created a variable summing non-HIV outcomes (total: 0–5 of persistently uncontrolled diabetes, hypertension, dyslipidemia, depression symptoms, and persistent health care underutilization occurring at least twice between 2008 and 2019) and used this as the outcome in a cross-sectional Poisson model. Black ethnoracial identity was the main predictor, and EIS (treated continuously) was the mediator. These models allowed us to assess decompositions including a pure direct effect (the expected inequality in outcomes attributable to Black ethnoracial identity) and a pure indirect effect (the mediating effect of intersectional stigma on persistently uncontrolled outcomes). Using established procedures for causal mediation,[53,55–57] we reported the proportion of the effect mediated, and the proportion of the effect of Black ethnoracial identity on persistently uncontrolled outcomes that would be eliminated if EIS levels among participants who identified as Black were reduced to levels reported by participants who did not identify as Black. GLMM and causal mediation analyses adjusted for covariates. Because of low numbers of participants identifying as Native American, Asian, Native Hawaiian/Pacific Islander, and multiracial, these categories were aggregated into "Other ethnoracial identity" for GLMM analyses.

RESULTS

Table 1 describes the sample using baseline data from 2008–2009. Overall, 1806 participants responded to stigma-related questions and were included in analyses. The majority of participants identified as White (71.7%), 23.1% identified as Black, and 10.1% identified as Hispanic/Latinx. At the index visit, participants' mean age was 51.8 years (range = 22–84 years). Around half (48.3%) of participants were PWH. Table 1 shows that EIS rates varied significantly by race ($\chi^2 = 50.8$; $P < .01$), with higher proportions of Black (42.7%) and multiracial (54.3%) respondents reporting EIS than White respondents (26.6%); by HIV status ($\chi^2 = 8.6$; $P < .01$), with higher proportions of PWH (34.1%) reporting EIS than HIV-negative participants (27.8%); by low-income status ($\chi^2 = 14.7$; $P < .01$), with higher proportions of low-income participants reporting EIS (38.1%) than higher-income participants (28.4%); and by age: the mean age of intersectionally stigmatized participants was 50.9 years, compared with 52.9 years for their counterparts ($t = 3.0$; $P < .01$).

Table A (available as a supplement to the online version of this article at http://www.ajph.org) describes frequencies of settings and identity-related attributions for stigmatization. The majority of participants (50.7%) reported experiencing stigmatization in adulthood. Law enforcement (29.3%), employment (hiring and promotion: each 19.2%; being fired: 13.5%), and health care sectors (10.4%) were the most common settings for stigmatization. A large minority (49.3%) attributed stigmatization to specific identities: sexuality (35.2%), race (17.2%), and age (11.6%) were the most common attributions. A minority (30.8%; n = 577) reported 2 or more identity-related attributions for stigmatization. Among this subsample, the most common discrete intersections were sexuality- and

TABLE 1— Sociodemographics of Study Participants at Substudy Baseline Visit by the Presence of Experienced Intersectional Stigma (EIS): Multicenter AIDS Cohort Study (MACS), United States, 2008–2009

Sociodemographics	Total (n = 1806), No. (%) or Mean (Range)	No EIS (n = 1249), No. (%) or Mean (Range)	EIS (n = 557), No. (%) or Mean (Range)	χ^2 or *t* Test Value
Racial self-identification				50.84***
White	1295 (71.7)	950 (73.4)	345 (26.6)	
Asian	6 (< 1)	5 (83.3)	1 (16.7)	
Native Hawaiian/Pacific Islander	3 (< 1)	1 (33.3)	2 (66.7)	
Black	417 (23.1)	239 (57.3)	178 (42.7)	
American Indian/Alaska Native	40 (2.2)	31 (77.5)	9 (22.5)	
Other	10 (< 1)	7 (70.0)	3 (30.0)	
Multiracial	35 (1.9)	16 (45.7)	19 (54.3)	
Ethnicity self-identification				1.77
Hispanic/Latino	182 (10.1)	118 (64.8)	64 (35.2)	
Not Hispanic/Latino	1624 (89.9)	1131 (69.6)	493 (30.4)	
MACS site				28.75***
Pittsburgh, PA	462 (25.6)	332 (71.9)	130 (28.1)	
Chicago, IL	327 (18.1)	201 (61.5)	126 (38.5)	
Baltimore, MD/Washington, DC	434 (24.0)	336 (77.4)	98 (22.6)	
Los Angeles, CA	581 (32.2)	379 (65.2)	202 (34.8)	
HIV status				8.59**
HIV-negative	933 (51.7)	674 (72.2)	259 (27.8)	
HIV-positive	873 (48.3)	575 (65.9)	298 (34.1)	
Age, y	51.8 (22–84)	52.3	50.9	*t* = 2.96**
Sexual behavior over previous 6 y				0.31
Men only	1502 (83.2)	1036 (69.0)	466 (31.0)	
Men and women	108 (6.0)	76 (70.4)	32 (29.6)	
Women only	102 (5.6)	70 (68.6)	32 (31.4)	
No sexual activity	94 (5.2)	67 (71.3)	27 (28.7)	
Annual income, $				14.68***
≥ 20 000	1129 (62.5)	808 (71.6)	321 (28.4)	
< 20 000	483 (37.5)	299 (61.9)	184 (38.1)	

Note. EIS defined by ≥ 2 intersecting attributions for enacted stigmatization in adulthood.

*$P < .05$; **$P < .01$; ***$P < .001$.

HIV-related stigma (n = 42; 7.5%), sexuality- and appearance-related stigma (n = 33; 5.9%), and sexuality- and ethnoracial-related stigma (n = 29; 5.2%). Figure 1 shows a Venn diagram of identity-based intersections, classed into sexuality-, ethnoracial-, HIV-, and other-related stigma (remaining attributions, collapsed for interpretability) among intersectionally stigmatized participants. This figure illustrates the diversity of identity-based attributions: 58.3% (n = 325) of intersectionally stigmatized participants reported at least sexuality- and other-related stigma; 7.4% reported at least race- and HIV-related stigma (n = 41).

Table 2 (and Table B, available as a supplement to the online version of this article at http://www.ajph.org) shows results from adjusted GLMM with repeated measures constructed for each outcome, representing a maximum of 27 762 person-observations.

Participants who reported EIS had higher odds of health care underutilization at a given observation than those who did not (13.0% vs 7.8%; AOR = 1.76; 95% CI = 1.61, 1.93). Compared with participants who identified as White, those who identified as Black or other non-White had respectively lower odds of health care underutilization in

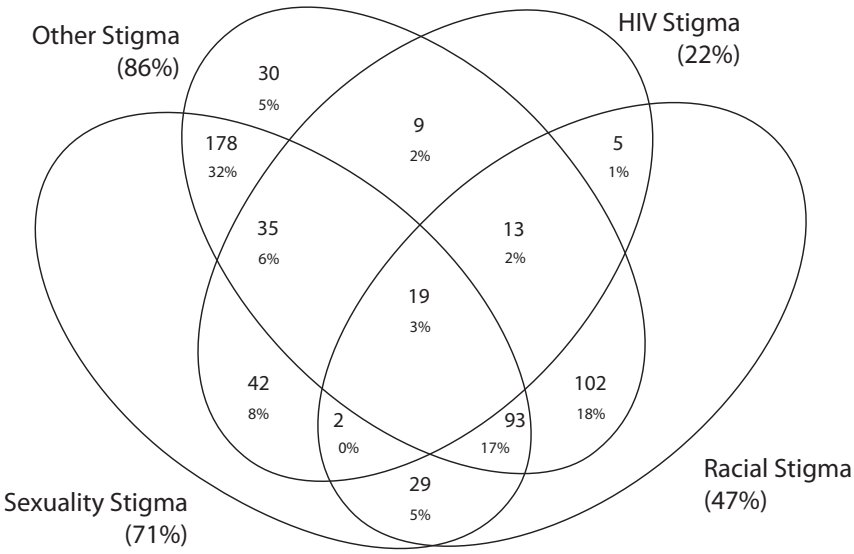

FIGURE 1— Venn Diagram of Intersections of Identity-Related Attributions for Stigma Experienced in Adulthood Among Multicenter AIDS Cohort Study Participants Reporting Intersectional Stigma (n=557): 2008–2009

adjusted models. Low-income participants had higher adjusted odds of health care underutilization than higher-income participants.

Participants who reported EIS had higher odds of depression symptoms than those who did not (18.7% vs 13.4%; AOR = 1.48; 95% CI = 1.38, 1.59). Compared with White participants, those who identified as other non-White had higher adjusted odds of depression symptoms; low-income participants had higher adjusted odds of depression symptoms than higher-income participants.

PWH using ART who reported EIS had higher odds of suboptimal ART adherence than those who did not (13.4% vs 9.9%; AOR = 1.41; 95% CI = 1.26, 1.59). Compared with higher-income PWH, low-income PWH had higher adjusted odds of reporting suboptimal ART adherence.

PWH who reported EIS had lower adjusted odds of HIV viremia than those who did not (7.2% vs 9.0%; AOR = 0.79; 95% CI = 0.69, 0.89). PWH who identified as Black or other non-

TABLE 2— Effects of Experienced Intersectional Stigma (EIS) on Biopsychosocial Outcomes: Multicenter AIDS Cohort Study (MACS), United States, 2008–2019

Outcome	EIS, LSME (95% CI)	No EIS, LSME (95% CI)	AOR (95% CI)
Health care underutilization	0.13 (0.12, 0.14)	0.08 (0.07, 0.08)	1.76 (1.61, 1.93)
Depression symptoms	0.19 (0.18, 0.20)	0.13 (0.13, 0.14)	1.48 (1.38, 1.59)
Suboptimal ART adherence (PWH on ART)	0.13 (0.12, 0.15)	0.10 (0.09, 0.11)	1.41 (1.26, 1.59)
HIV viremia (PWH)	0.07 (0.07, 0.08)	0.09 (0.08, 0.10)	0.79 (0.69, 0.89)
Dyslipidemia	0.82 (0.81, 0.83)	0.80 (0.80, 0.81)	1.11 (1.03, 1.19)
Diabetes	0.12 (0.11, 0.13)	0.09 (0.09, 0.10)	1.40 (1.27, 1.53)
Hypertension	0.59 (0.57, 0.60)	0.52 (0.51, 0.53)	1.30 (1.23, 1.38)

Note. AOR = adjusted odds ratio; ART = antiretroviral therapy; CI = confidence interval; LSME = least-squares means estimates; PWH = people with HIV. Results from generalized linear mixed models with repeated measures. The sample size was n = 1806. There was a maximum of 27 762 person-observations. EIS defined as ≥ 2 identity-related attributions. Models additionally controlled for racial identification, ethnicity identification, low-income status, HIV status (for non-HIV outcomes), age, site, recent sexual behavior, and visit; results for these covariates have been suppressed in Table 2 for ease of interpretability and are available in Table B (available as a supplement to the online version of this article at http://www.ajph.org). AOR values for the "no EIS" group are the referents for each model (AOR = 1.00).

White had higher adjusted odds of HIV viremia than White PWH. Low-income PWH had higher odds of HIV viremia than higher-income PWH.

Participants who reported EIS had higher odds of dyslipidemia than those who did not (81.9% vs 80.3%; AOR = 1.11; 95% CI = 1.03, 1.19). HIV-negative participants had lower odds of dyslipidemia than PWH. Compared with White participants, those who identified as Black had lower odds of dyslipidemia.

Participants who reported EIS had higher odds of diabetes than those who did not (12.2% vs 9.1%; AOR = 1.40; 95% CI = 1.27, 1.53). Compared with White participants, those who identified as Black or other non-White had higher adjusted odds of diabetes; Latinx participants had higher odds of diabetes than non-Latinx participants, and low-income participants had higher odds of diabetes than higher-income participants.

Participants who reported EIS had higher odds of hypertension than those who did not (58.6% vs 52.1%; AOR = 1.30; 95% CI = 1.23, 1.38). Compared with participants who identified as White, those who identified as Black had higher odds of hypertension. Participants who identified as Latinx had lower adjusted odds of hypertension than non-Latinx participants.

In post hoc models constructed to assess outcome by time interactions, we found no significant differences in slope of each of the 7 outcomes over time by EIS (data not shown). Figure A (available as a supplement to the online version of this article at http://www.ajph.org) shows plots of regressed least-squares means estimates of outcomes over time by EIS group, highlighting mean differences in outcomes, but similarity in trajectories, between groups.

TABLE 3— Effects of Relationships Between Black Ethnoracial Identity (Predictor), Experienced Intersectional Stigma (Mediator), and Persistently Uncontrolled Outcomes (Outcome): Multicenter AIDS Cohort Study (MACS), United States, 2008–2019

Excess Mean Ratio	B (Wald 95% CI)	% (95% CI)
NDE+NIE		
Natural direct	0.13 (0.002, 0.26)	80.86 (60.87, 100.86)
Natural indirect	0.03 (0.01, 0.06)	19.14 (−0.86, 39.13)
CDE+PE		
Controlled direct	0.13 (−0.003, 0.26)	77.23 (56.45, 98.01)
Portion eliminated	0.04 (0.02, 0.06)	22.77 (1.99, 43.55)
TDE+PIE		
Total direct	0.11 (−0.02, 0.24)	65.27 (33.34, 97.20)
Pure indirect	0.06 (0.02, 0.09)	34.73 (2.80, 66.66)
NDE+PIE+IMD		
Natural direct	0.13 (0.002, 0.26)	80.86 (60.87, 100.86)
Pure indirect	0.06 (0.02, 0.09)	34.73 (2.80, 66.66)
Mediated interaction	−0.03 (−0.06, 0.01)	−15.60 (−39.92, 8.73)
CDE+PIE+PAI		
Controlled direct	0.13 (−0.003, 0.26)	77.23 (56.45, 98.01)
Pure indirect	0.06 (0.02, 0.09)	34.73 (2.80, 66.66)
Portion attributable to interaction	−0.02 (−0.05, 0.01)	−11.96 (−30.54, 6.62)
4-way		
Controlled direct	0.13 (−0.003, 0.26)	77.23 (56.45, 98.01)
Reference interaction	0.01 (−0.004, 0.02)	3.63 (−2.94, 10.21)
Mediated interaction	−0.03 (−0.06, 0.01)	−15.60 (−39.92, 8.73)
Pure indirect	0.06 (0.02, 0.09)	34.73 (2.80, 66.66)
Total	0.17 (0.03, 0.30)	. . .

Note. CDE = controlled direct effect; CI = confidence interval; IMD = mediated interaction (component effect attributable to both interaction and mediation); NDE = natural direct effect; NIE = natural indirect effect; PAI = portion attributed to interaction; PE = portion eliminated; PIE = pure indirect effect; TDE = total direct effect. Results from a causal mediation model (Poisson distribution) using 4-way decomposition to assess total, direct, indirect, and interaction effects. The sample size was n = 1633. EIS is composed of the sum of identity-related attributions. Persistently uncontrolled outcomes is composed of the sum of uncontrolled diabetes, dyslipidemia, hypertension, health care underutilization, and significant depression symptoms that occurred at least twice, respectively, between 2008 and 2019. The model is adjusted for sociodemographics (low-income status, self-identified Hispanic/Latinx ethnicity, bisexual behavior, study site, age, and HIV status).

Table 3 shows results from causal mediation analyses, demonstrating a positive association between Black ethnoracial identity and persistently uncontrolled biopsychosocial outcomes (natural direct effect = 0.133; 95% CI = 0.002, 0.264). The pure indirect effect (mediation by intersectional stigma of the relationship between Black ethnoracial identity and persistently uncontrolled biopsychosocial outcomes, attributable to mediation but not interaction) was significant (0.057; 95% CI = 0.022, 0.092). More than one third (34.7%) of the effect of Black ethnoracial identity on persistently uncontrolled biopsychosocial outcomes was attributable to EIS. Estimates of the portion

eliminated indicate that 22.8% (95% CI = 2.0%, 43.6%) of the effect of Black ethnoracial identity on persistently biopsychosocial uncontrolled outcomes would be eliminated if EIS levels among SMM who identified as Black in this sample were reduced to levels reported by SMM who did not identify as Black.

DISCUSSION

This study extends empirical evidence for the effects of intersectional stigma on health by analyzing associations with NCDs, including diabetes, dyslipidemia, and hypertension, which are increasingly prevalent among PWH. We found that, in a mixed HIV serostatus sample of SMM, the majority experienced stigma in adulthood; a substantial minority reported intersecting identity-related attributions for stigmatization (EIS). These intersections were diverse, with a plurality radiating from sexuality-based stigma. Our results demonstrate that EIS was associated with higher likelihood of future health care underutilization, depression symptoms, suboptimal ART adherence (among PWH), and dyslipidemia, diabetes, and hypertension. Differences in these outcomes were persistent and robust after we adjusted for minoritized statuses. We found that higher rates of persistently uncontrolled biopsychosocial outcomes among participants who identified as Black were substantially attributable to higher levels of EIS, suggesting that efficacious intersectional stigma reduction interventions tailored to the lived experiences of SMM of color, including PWH, are likely to be impactful. Efficacious interventions focused on helping SMM of color cope with EIS have begun to show efficacy on outcomes including ART adherence.[58–60] Our results provide further evidence that larger structural changes are necessary to support wider deployment of these interventions, research on new interventions reducing EIS in discrete settings (such as health care environments), and—most importantly—local, state, and federal antidiscrimination policies and enforcement frameworks that work to eliminate EIS in our communities at large. Future research should evaluate how changes in policies intending to minimize EIS inflect population health outcomes.

While intersectionally stigmatized PWH reported higher odds of suboptimal ART adherence, their odds of HIV viremia were lower than those of their counterparts. This counterintuitive finding has not been seen, to our knowledge, in previous literature and may reflect the low prevalence of HIV viremia in the study sample overall, limitations of ART adherence measures, adjustments for minoritized statuses, and efficacy of ART regimens when adherence is suboptimal.[61] Otherwise, results from this prospective study are consistent with findings on relationships between EIS and mental health, health care underutilization, and ART adherence,[62–64] and with emergent findings showing associations between experienced stigma and hypertension in Black-identifying adults[65] and experienced stigma and allostatic load among Puerto Rican adults.[37] Experienced stigma in non-HIV health care settings has also been associated with health care underutilization and lower non-HIV medication adherence.[46,66] Results provide additional support for research identifying intersectional stigma as a key mediator of relationships between minoritized status and distress,[54] indicating that minority stressors may inflect myriad biopsychosocial outcomes over the life course.

Limitations

This study contains limitations, and findings should be interpreted cautiously. The MACS is not nationally representative. However, as the most longstanding community-based cohort of SMM in the United States, the MACS provides a well-characterized sample of aging PWH and HIV-negative SMM living with diagnostically validated NCDs, while minimizing the potential selection bias and limited variance that clinic-based cohorts confer on biological outcomes. MACS recruitment efforts historically targeted gay and bisexual men[67]; gender identity was not assessed at baseline, limiting our ability to assess differential experiences of intersectional stigma among transgender and nonbinary people, including those who underwent gender transition after enrollment.

While the intersectional stigma measure relied on the validated, 2-stage process developed by the Major Experiences of Discrimination Scale creators,[68] it was only operationalized for 1 timepoint; analyses cannot account for EIS after the index visit. By accounting for retrospective experiences of experienced stigma, the measure was subject to recall bias; it does not encompass internalized and anticipated stigma or structural stigma, restricting findings to a limited form of experienced stigma (active discrimination) and limiting our ability to assess societal-level conditions, like stable housing, that contribute to outcome disparities.[69] Experienced stigma may not be easily identified or may go unnoticed by minoritized people as they occur; for these reasons, intercategorical measures may be more suitable.[70,71] Other identity-related attributions for stigma (e.g., sex work, substance use, or

write-in options) were not elicited, limiting available options; furthermore, participants could choose only the top 3 identity-related attributions for each stigmatization by setting. Self-reported ART adherence and health care underutilization were subject to recall and social desirability biases. The income measure used increments of $10 000 and did not assess household size, limiting our ability to characterize whether participants met federal poverty level criteria.

Public Health Implications

Pathways between intersectional stigma and biopsychosocial outcomes are only beginning to be empirically elucidated, particularly within SMM assessed prospectively.[2,25] Our findings demonstrate that intersectional stigma is a powerful and durable driver of health disparities among SMM over the life course and suggest that mechanisms by which intersectional stigma affects HIV care continuum outcomes may operate similarly for SMM along the NCD care continua. Future work should build on new research quantifying both intersectional stigma[71,72] and the NCD continua of care[73–75] to assess pathways between social position, intersectional stigma, psychosocial health, and NCD outcomes among PWH. Our results estimating that almost one quarter of the disparity in persistently uncontrolled biopsychosocial outcomes among participants with Black ethnoracial identities could be eliminated if intersectional stigma levels in this group were reduced to levels reported by their counterparts reveals a critical need for intersectional stigma reduction interventions targeting comorbidity management among SMM, particularly SMM of color. AJPH

ABOUT THE AUTHORS

M. Reuel Friedman is with the Department of Infectious Diseases and Microbiology, School of Public Health, University of Pittsburgh, Pittsburgh, PA. Qimin Liu is with the Department of Human Development and Psychology, Vanderbilt University, Nashville, TN. Steven Meanley is with the Department of Family and Community Health, School of Nursing, University of Pennsylvania, Philadelphia. Sabina A. Haberlen is with the Department of Epidemiology, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD. Andre L. Brown and James E. Egan are with the Department of Behavioral and Community Health Sciences, School of Public Health, University of Pittsburgh. Bulent Turan is with the Department of Psychology, Koc University, Istanbul, Turkey. Janet M. Turan is with the Department of Health Policy and Organization, School of Public Health, University of Alabama at Birmingham. Mark Brennan-Ing is with the Brookdale Center for Healthy Aging, Hunter College, City University of New York, New York, NY. Valentina Stosor is with the Divisions of Infectious Diseases and Organ Transplantation, Feinberg School of Medicine, Northwestern University, Chicago, IL. Matthew J. Mimiaga is with the Department of Epidemiology, Fielding School of Public Health, David Geffen School of Medicine, at the University of California–Los Angeles. Deanna Ware and Michael W. Plankey are with the Department of Medicine, Division of General Internal Medicine, Georgetown University Medical Center, Washington, DC.

CORRESPONDENCE

Correspondence should be addressed to M. Reuel Friedman, PhD, MPH, 3520 Fifth Ave, Suite 400, Pittsburgh, PA 15213 (e-mail: mrf9@pitt.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link..

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