



# Intersectionality and Survey Measures: Beyond Identity Categories

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A vertical decorative graphic on the left side of the slide, consisting of a black outline of a stylized figure or shape. It features a maroon circle at the top, a yellow triangle in the middle, and two blue triangles at the bottom, all set against a white background.

American Academy of Health Behavior  
13 March, 2023

## A Black feminist theoretical framework

- Intellectual tradition credited to legal scholar **Kimberlé Crenshaw** (published the term, 1989) and sociologist **Dr. Patricia Hill Collins**

## A focus on specificity of experiences at social intersections

- Social identities, positions, processes, structures

## An analytic framework for research

- Not a hypothesis
- No power, no intersectionality - emphasize on structural inequity and societal power dynamics

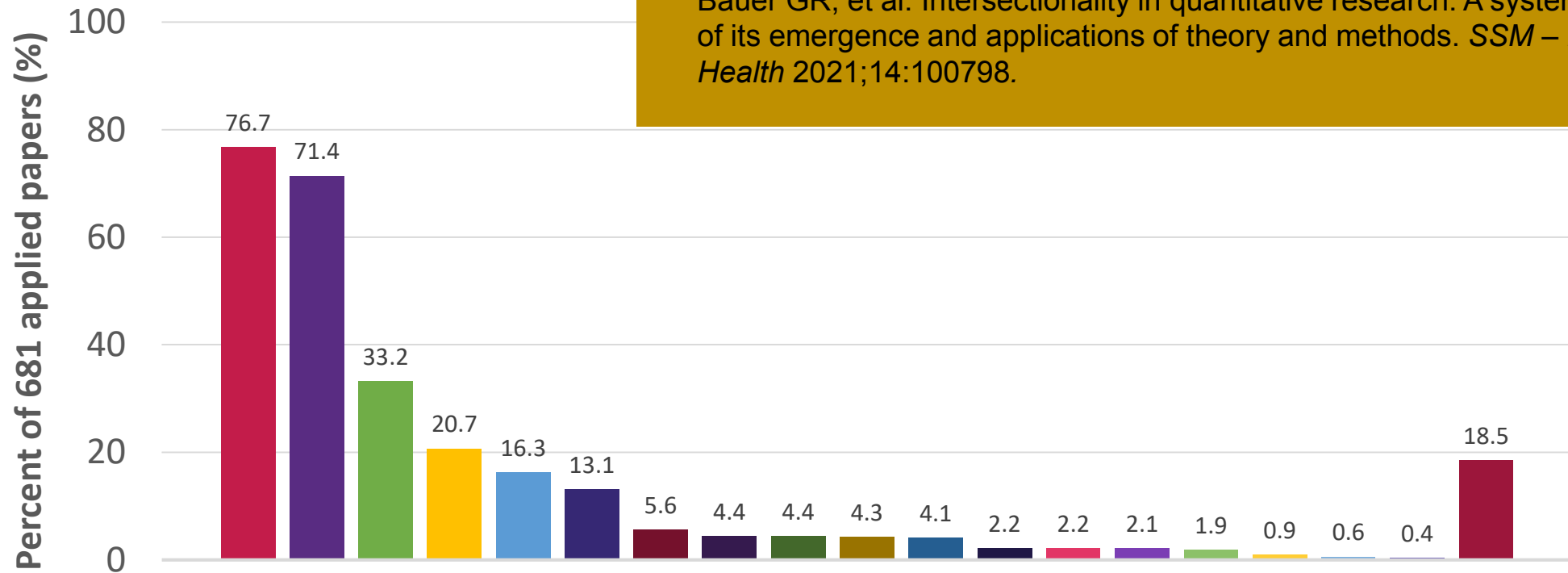
# What is intersectionality?



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Bauer GR, et al. Intersectionality in quantitative research: A systematic review of its emergence and applications of theory and methods. *SSM – Population Health* 2021;14:100798.



- Sex/gender
- Race/ethnicity
- SES/income/education
- Sexual orientation
- Age/generation
- Immigration status
- Disability
- Geography
- Discrimination
- Family status
- Religion/religiosity
- Language
- Disease/health
- Gender ideology
- Caste
- Political view/identity
- Indigeneity
- Weight/BMI
- Other



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## Practice of Epidemiology

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### Sex and Gender Multidimensionality in Epidemiologic Research

**Greta R. Bauer\***

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Along with age and race, sex has historically been a core stratification and control variable in epidemiologic research. While in recent decades research guidelines and institutionalized requirements have incorporated an approach differentiating biological sex from social gender, neither sex nor gender is itself a unidimensional construct. The conflation of dimensions within and between sex and gender presents a validity issue wherein proxy measures are used for dimensions of interest, often without explicit acknowledgement or evaluation. Here, individual-level dimensions of sex and gender are outlined as a guide for epidemiologists, and 2 case studies are presented. The first case study demonstrates how unacknowledged use of a sex/gender proxy for a sexed dimension of interest (uterine status) resulted in decades of cancer research misestimating risks, racial disparities, and age trends. The second illustrates how a multidimensional sex and gender framework may be applied to strengthen research on coronavirus disease 2019 incidence, diagnosis, morbidity, and mortality. Considerations are outlined, including: 1) addressing the match between measures and theory, and explicitly acknowledging and evaluating proxy use; 2) improving measurement across dimensions and social ecological levels; 3) incorporating multidimensionality into research objectives; and 4) interpreting sex, gender, and their effects as biopsychosocial.

biopsychosocial; gender identity; gender role; methods; misclassification; sex characteristics; validity

# Collapsing multidimensionality into “identity” can lead to construct validity issues

Are you a...?

Man

Woman

- have a uterus
- have testosterone levels in the female reference range
- were the receptive partner if having anal or vaginal sex
- serve in women’s ceremonial or religious roles
- were socialized as girls
- have always lived as girls or women, and will grow old as women
- are the birth parent to their children
- are not at risk of prostate cancer
- typically play women’s roles within the family or household

HEALTH  
BEHAVIORS  
&  
HEALTH  
OUTCOMES



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# Cisnormativity

“the assumption that all dimensions of sex and gender are concordant within individuals, and consistent over the life course”



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# Sex and gender multidimensionality at the individual level

cisnormativity

## Sex

- Chromosomal sex
- Sex assigned at birth
- Hormonal milieu
- Reproductive sex
- Organ-specific sex
- Sexed physiology
- Intersex status
- Pregnancy

## Gender

- Gender identity
- Intersex identity
- Lived gender
- Gender role
- Metaperceived gender
- Masculinity and/or femininity
- Internalized gender stigma
- Enacted gender stigma
- Gender ideology



# Sex and gender multidimensionality and information validity



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# Sex and gender multidimensionality at the individual level

## Sex

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- Gender identity
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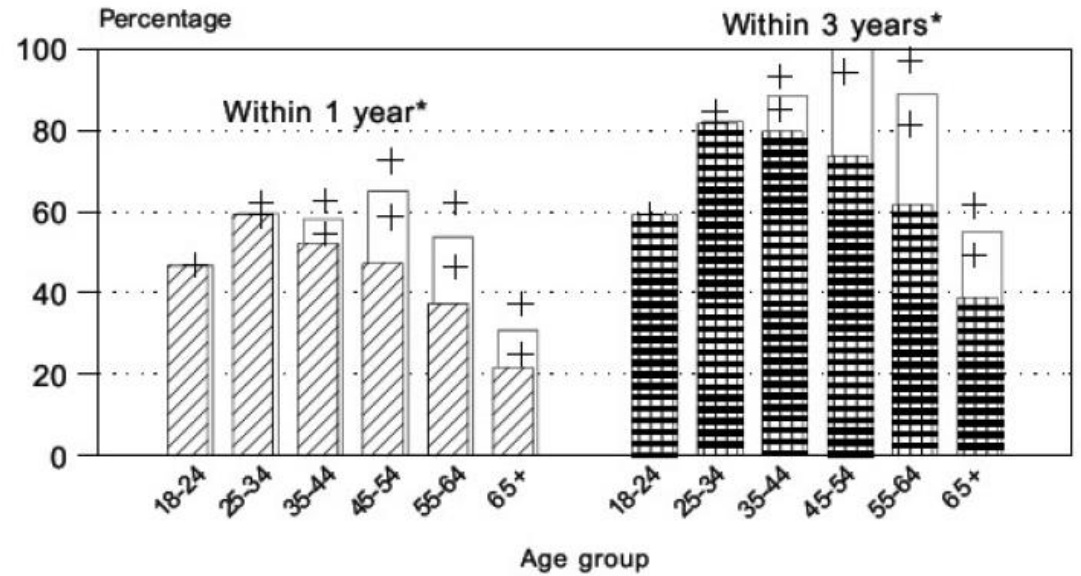
## Undifferentiated Sex/Gender

- Administrative sex
- **Undifferentiated survey sex/gender**
- Computer (AI)-classified sex/gender
- Researcher-perceived sex/gender

Snider & Beauvais. Pap smear utilization in Canada: Estimates after adjusting the eligible population for hysterectomy status. *Chronic Diseases in Canada*. 1998; 19(1): 19-24.

# Example of validity issue with unacknowledged proxy

**FIGURE 2**  
Proportion of women reporting a Pap smear, by age group, unadjusted and adjusted for hysterectomy, Canada



Legend:  
▨ Paps within 1 year\*    □ Adj. Paps w/in 1 yr\*    ▩ Paps within 3 yrs\*  
□ Adj. Paps w/in 3 yrs\*    + 95% confidence limits

\* Prior to National Population Health Survey (NPHS)



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# 2014 onward

Editorial

## Racial Disparities in Cervical Cancer: Worse Than We Thought

Heather J. Dalton, MD<sup>1</sup> and John H. Farley, MD<sup>2</sup>

Beavis et al's investigation<sup>1</sup> into corrected cervical cancer mortality rates after hysterectomy adds to the body of literature regarding racial disparities in cervical cancer and provides new insights and some glimmer of hope. Because of the longstanding failure of prior studies to account for hysterectomy, the incidence of cervical cancer has been grossly underestimated. This is especially important in the black population, in which hysterectomy rates are higher.<sup>2,3</sup> In the current study, the prevalence of hysterectomy was greatest in white and black women aged 65 to 69 years, but the peak was significantly higher in black women (58% vs 43% for white women). Without correction, the black mortality rate was 10.1 per 100,000 (5.7 per 100,000 without correction).<sup>1</sup> Without correction, the disparity in mortality between the races was underestimated by a starting 44%. The oldest black women had the highest corrected mortality rate at 37.2 deaths per 100,000, a rate that rivals the rates of undeveloped countries.<sup>1,6</sup>

Despite overall improvements in cancer screening and decreases in mortality, there remain significant racial and ethnic disparities. Blacks have higher rates and worse overall survival across almost all cancer types in the United States.<sup>7</sup> This remains true for cervical cancer. The disparity is elusive but is felt to be multifactorial, with factors ranging from differences in access to screening programs and cultural differences.

As Beavis et al<sup>1</sup> discuss, the incidence of cervical cancer is declining in black women, although the incidence of adenocarcinoma is increasing. There are a number of reasons for this, including a 50% lower odds of undetected disease.<sup>11,12</sup> There are a number of reasons for this, including a 50% lower odds of undetected disease.<sup>11,12</sup> There are a number of reasons for this, including a 50% lower odds of undetected disease.<sup>11,12</sup>



Original article

## Hysterectomy-corrected incidence rates of cervical and uterine cancers in Massachusetts, 1995 to 2010

Andreas Stang MD<sup>a,b,\*</sup>, Helen Hawk PhD<sup>c</sup>, Richard Knowlton MS<sup>c</sup>, Susan T. Gershman PhD<sup>c</sup>, Oliver Kuss PhD<sup>d,e</sup>

<sup>a</sup>Institute of Clinical Epidemiology, Medical Faculty, Martin-Luther-University of Halle-Wittenberg, Halle, Germany; <sup>b</sup>Institute of Epidemiology, Boston University, Boston, MA; <sup>c</sup>Department of Health Information, Statistics, Research and Evaluation, Boston University, Boston, MA; <sup>d</sup>Department of Health Information, Statistics, Research and Evaluation, Boston University, Boston, MA; <sup>e</sup>Department of Health Information, Statistics, Research and Evaluation, Boston University, Boston, MA

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Original Article

## Hysterectomy-Corrected Cervical Cancer Mortality Rates Reveal a Larger Racial Disparity in the United States

Anna L. Beavis, MD, MPH<sup>1</sup>; Patti E. Gravitt, PhD<sup>2</sup>; and Anne F. Rositch, PhD, MSPH<sup>3</sup>

**BACKGROUND:** The objectives of this study were to determine the age-standardized and age-specific annual US cervical cancer mortality rates after correction for the prevalence of hysterectomy and to evaluate disparities by age and race. **METHODS:** Estimates for deaths due to cervical cancer stratified by age, state, year, and race were derived from the National Center for Health Statistics county mortality data (2000–2012). Equivalently stratified data on the prevalence of hysterectomy for women 20 years old or older from the Behavioral Risk Factor Surveillance System survey were computed, and trends in mortality rates were analyzed with Joinpoint regression. Age-specific and age-standardized mortality rates were computed, and trends in mortality rates were analyzed with Joinpoint regression. **RESULTS:** Age-standardized mortality rates were higher for both races after correction. For black women, the corrected mortality rate was 10.1 per 100,000 (95% confidence interval [CI], 9.6–10.6), whereas the uncorrected rate was 5.7 per 100,000 (95% CI, 5.5–6.0). The corrected rate for white women was 4.7 per 100,000 (95% CI, 4.6–4.8), whereas the uncorrected rate was 3.2 per 100,000 (95% CI, 3.1–3.2). Without the correction, the disparity in mortality between races was underestimated by 44%. Black women who were 85 years old or older had the highest corrected rate: 37.2 deaths per 100,000. A trend analysis of corrected rates demonstrated that white women's rates decreased at 0.8% per year, whereas the annual decrease for black women was 3.6% ( $P < .05$ ). **CONCLUSIONS:** A correction for hysterectomy has revealed that cervical cancer mortality rates are underestimated, particularly in black women. The highest rates are seen in the oldest black women, and public health efforts should focus on appropriate screening and adequate treatment in this population. **Cancer** 2017;000:000–000. © 2017 American Cancer Society.

Key words

Cervical cancer, cervical cancer screening, epidemiology, hysterectomy incidence

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of interest

received a non-restricted grant from the Danish Medical Research Council, Copenhagen, Denmark. The authors have nothing to disclose.

Abstract

**Introduction.** Hysterectomy is a common gynecological procedure; however, the incidence of total and subtotal hysterectomy varies across countries, by age, and over time. As only women with an intact cervix are at risk of developing cervical cancer, failing to remove hysterectomized women from the denominator may underestimate the cervical cancer incidence. **Methods.** We used age-dependent patterns of hysterectomy incidence to correct for hysterectomy in the national registry of hysterectomy in Denmark. **Results.** The incidence of cervical cancer after correction for hysterectomy was 10.1 per 100,000 for black women and 4.7 per 100,000 for white women. The disparity in mortality between the races was underestimated by 44%. Black women who were 85 years old or older had the highest corrected rate: 37.2 deaths per 100,000. A trend analysis of corrected rates demonstrated that white women's rates decreased at 0.8% per year, whereas the annual decrease for black women was 3.6% ( $P < .05$ ). **Conclusions.** A correction for hysterectomy has revealed that cervical cancer mortality rates are underestimated, particularly in black women. The highest rates are seen in the oldest black women, and public health efforts should focus on appropriate screening and adequate treatment in this population. **Cancer** 2017;000:000–000. © 2017 American Cancer Society.

## Global epidemiology of hysterectomy: possible impact on gynecological cancer rates

Anne Hammer, MD; Anne F. Rositch, PhD; Johnny Kahlert, PhD; Patti E. Gravitt, PhD; Jan Blaakaer, DMSc; Mette Sogaard, PhD

Hysterectomy is one of the most common surgical procedures in gynecology worldwide. Not removing the proportion of women no longer at risk of gynecological cancer (ie, women who have undergone hysterectomy or oophorectomy) from the population-at-risk denominator may therefore underestimate the incidence rates of gynecological cancers. Because hysterectomy incidence has been reported to change over time, it may vary considerably across countries and over time.

Despite the fact that hysterectomy is the most common surgical procedure worldwide in gynecology, national reporting of the incidence rate of gynecological cancers rarely removes the proportion no longer at risk of the disease from the population-at-risk denominator (ie, women who have had a hysterectomy). The incidence of gynecological cancers is thus likely underestimated. Because hysterectomy incidence varies across countries and over time, accurate estimates of gynecological cancer incidence require adjustment for hysterectomy.

Original Article

## Increased Age and Race-Specific Incidence of Cervical Cancer After Correction for Hysterectomy Prevalence in the United States From 2000 to 2009

Anne F. Rositch, PhD, MSPH<sup>1,2</sup>, Rebecca G. Nowak, PhD, MPH<sup>3</sup>; and Patti E. Gravitt, PhD, MS<sup>1,4</sup>

**BACKGROUND:** Invasive cervical cancer is thought to decline in women over 65 years old, the age at which cessation of routine cervical cancer screening is recommended. However, national cervical cancer incidence rates do not account for the high prevalence of hysterectomy in the United States. **METHODS:** Using estimates of hysterectomy prevalence from the Behavioral Risk Factor Surveillance System (BRFSS), hysterectomy-corrected age-standardized and age-specific incidence rates of cervical cancer were calculated using Joinpoint regression. **RESULTS:** Unlike the relative decline in uncorrected incidence to older women, and an increasing trend in incidence after age 35–39 (APC<sub>corrected</sub> = 10.43) but at a slower rate than in 20–34 years (APC<sub>corrected</sub> = 10.43). **CONCLUSIONS:** Correction for hysterectomy prevalence revealed an increasing trend in incidence after age 35–39 (APC<sub>corrected</sub> = 10.43) but at a slower rate than in 20–34 years (APC<sub>corrected</sub> = 10.43). **CONCLUSIONS:** Correction for hysterectomy prevalence revealed an increasing trend in incidence after age 35–39 (APC<sub>corrected</sub> = 10.43) but at a slower rate than in 20–34 years (APC<sub>corrected</sub> = 10.43).

## OGS ORIGINAL RESEARCH ARTICLE

## The temporal and age-dependent patterns of hysterectomy-corrected cervical cancer incidence rates in Denmark: a population-based cohort study

ANNE HAMMER<sup>1,2</sup>, JAN BLAAKAER<sup>1,2</sup>, JOHNNY KAHLERT<sup>2,3</sup>, ANNE ROSITCH<sup>4</sup>, LARS PEDERSEN<sup>2,3</sup>, PATTI GRAVITT<sup>5</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Aarhus University Hospital, Aarhus, Denmark; <sup>2</sup>Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark; <sup>3</sup>Department of Clinical Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; and <sup>4</sup>Department of Global Health, George Washington University, Washington, DC, USA

Key words

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Abstract

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States have undergone a hysterectomy, cervical cancer incidence rates does not increase in age-standardized cervical cancer incidence rates (1.0% for blacks).<sup>2</sup> Although hysterectomy correction on the impact of hysterectomy correction on the age from 2000 to 2009 in the United States of hysterectomy. In addition, corrected and women of other and mixed races.





What would happen if we treated multidimensional “identity” measurements just as we treat measurement of other survey variables?



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**Table A1. 2x2 table for estimating sensitivity and specificity of database-encoded sex/gender as a proxy for uterine status in each stratum within illustrative example**

		True Value		
		Uterus +	No Uterus -	
Measure (test result)	Database-encoded Woman +	$P_W [ (1 - P_T)(1 - P_{H CW}) ]$	$P_W [ (1 - P_T)(P_{H CW}) + P_T ]$	$P_W$
	Database-encoded Man -	$P_M [ (P_T)(1 - P_{H TM}) ]$	$P_M [ (1 - P_T) + (P_T)(P_{H TM}) ]$	$P_M$
		$P_W [ (1 - P_T)(1 - P_{H CW}) ] + P_M [ (P_T)(1 - P_{H TM}) ]$	$P_W [ (1 - P_T)(P_{H CW}) + P_T ] + P_M [ (1 - P_T) + (P_T)(P_{H TM}) ]$	$P_W + P_M$

Here the data coding takes two categories for women and men, with  $P_W + P_M = 1.0000$ .

#### Stratum-specific estimates

$P_W$  = proportion database-encoded women

$P_M$  = proportion database-encoded men

$P_{H|CW}$  = proportion of cisgender women who have had hysterectomies

$P_{H|TM}$  = proportion of trans men who have had hysterectomies

$P_T$  = proportion transgender (assumed same, but can adjust if different among women and men)

$$A = P_W [ (1 - P_T)(1 - P_{H|CW}) ]$$

$$B = P_W [ (1 - P_T)(P_{H|CW}) + P_T ]$$

$$C = P_M [ (P_T)(1 - P_{H|TM}) ]$$

$$D = P_M [ (1 - P_T) + (P_T)(P_{H|TM}) ]$$

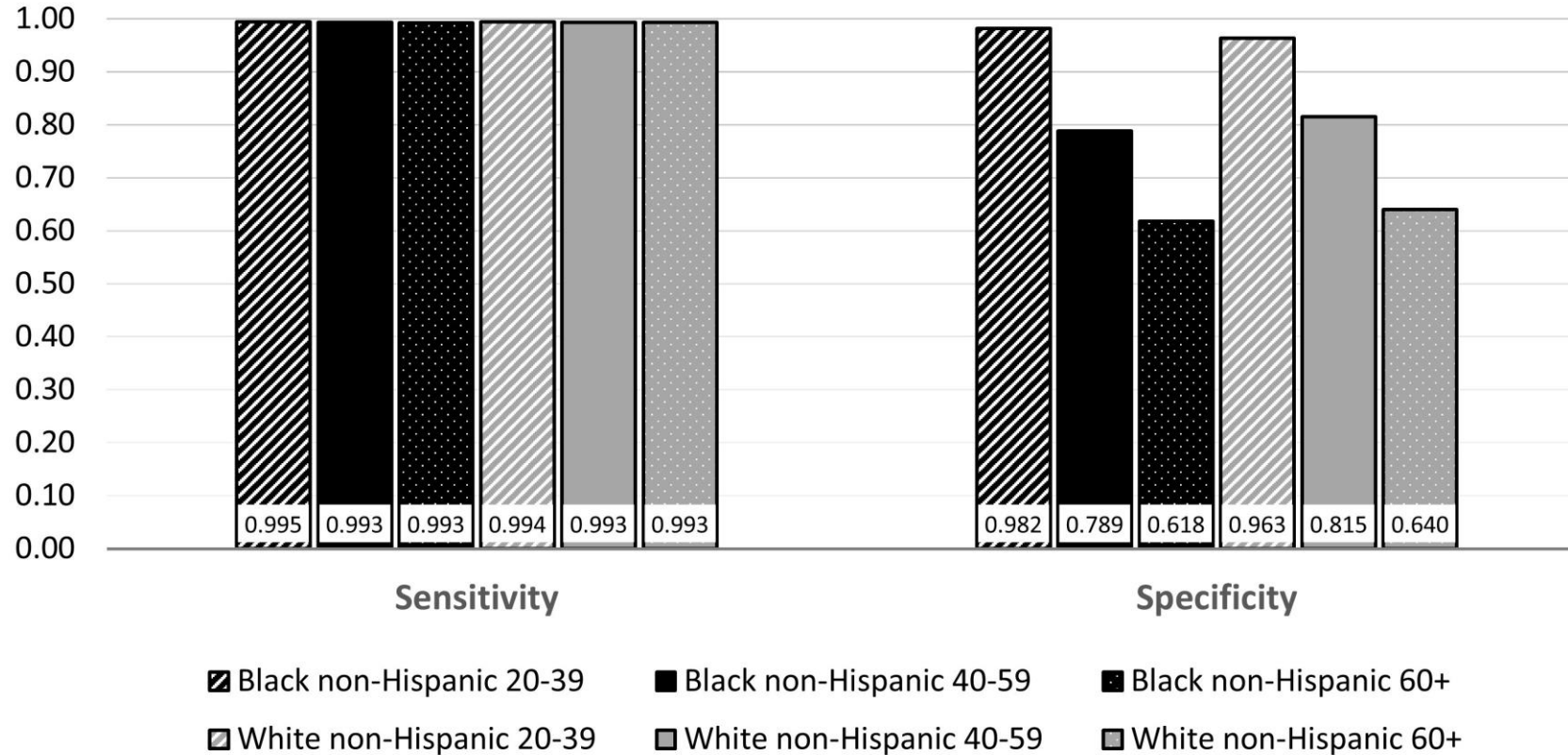
A = cisgender women without hysterectomy (no trans women with uteri)

B = cisgender women who have had hysterectomy + trans women

C = trans men with uteri

D = cisgender men and trans men without uteri

# Database sex/gender as a proxy for uterine status in U.S.



# What has been the impact of corrections on US cancer statistics?

## DECREASED

- Estimates of unmet need for Pap smears

Racial differences in white-predominant outcomes:

- Incidence of endometrial or uterine cancers

## INCREASED

- Incidence of cervical, endometrial and uterine corpus cancers
- Cervical cancer mortality
- Racial differences in Black-predominant outcomes:
  - Incidence of cervical cancer
  - Cervical cancer mortality



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Patricia Hill  
Collins

# Social power and interlocking systems of oppression

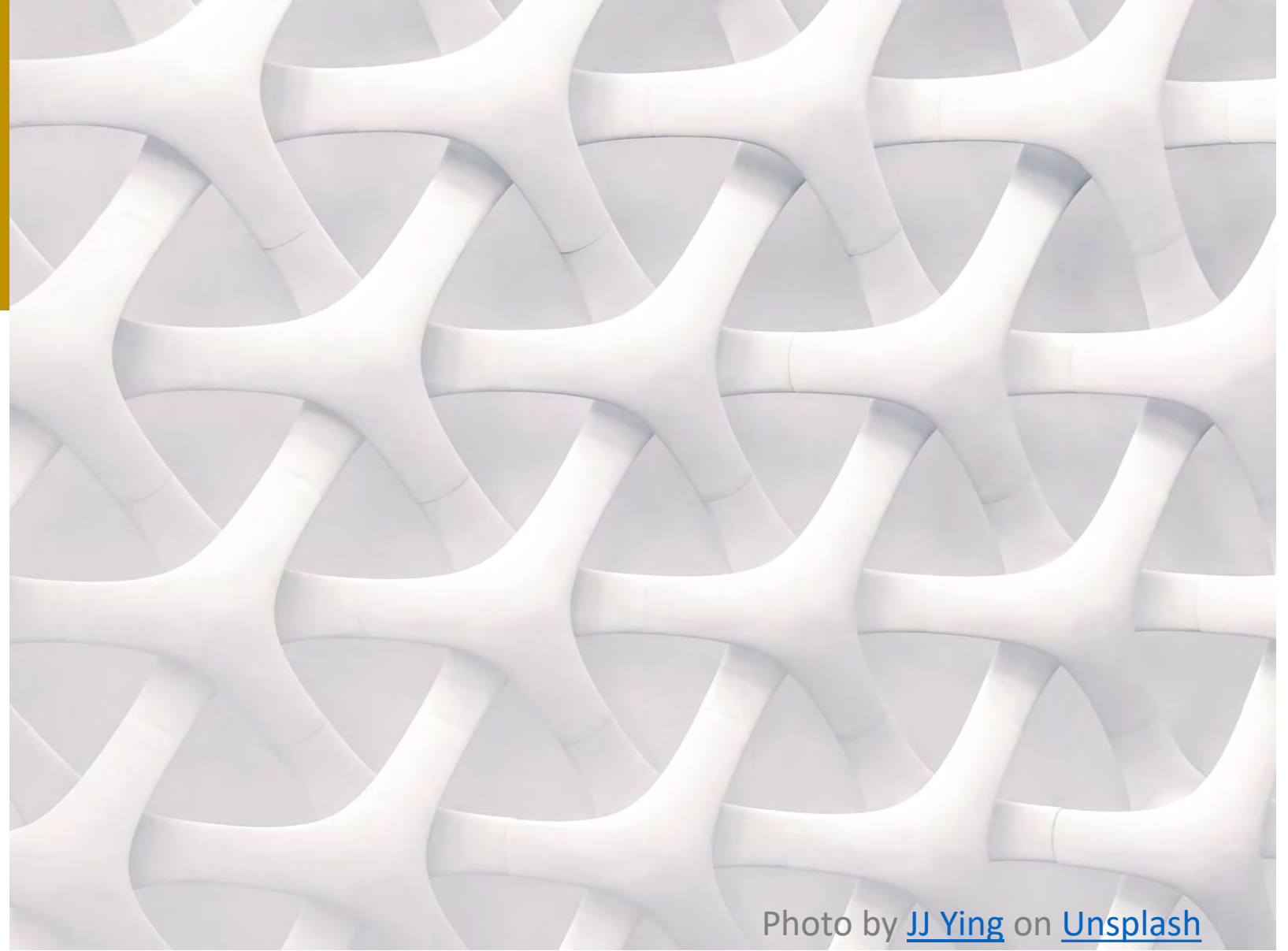


Photo by [JJ Ying](#) on [Unsplash](#)



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## Lisa Bowleg

Bowleg L. “Once you’ve blended the cake, you can’t take the parts back to the main ingredients”: Black gay and bisexual men’s descriptions and experiences of intersectionality. *Sex Roles* 2013;68:754-767.

“Well it’s hard for me to separate [my identities]. ... once you’ve blended the cake, you can’t take the parts back to the main ingredients.”



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# Sex and gender multidimensionality at the individual level: A conceptual tool for epidemiologists

Sex	Gender	Undifferentiated Sex/Gender	Gender minority cross-classifications	Sex- or gender-associated factors
<ul style="list-style-type: none"><li>• Chromosomal sex</li><li>• Sex assigned at birth</li><li>• Hormonal milieu</li><li>• Reproductive sex</li><li>• Organ-specific sex</li><li>• Sexed physiology</li><li>• Intersex status</li><li>• Pregnancy</li></ul>	<ul style="list-style-type: none"><li>• Gender identity</li><li>• Intersex identity</li><li>• Lived gender</li><li>• Gender role</li><li>• Metaperceived gender</li><li>• Masculinity and/or femininity</li><li>• Internalized gender stigma</li><li>• Enacted gender stigma</li><li>• Gender ideology</li></ul>	<ul style="list-style-type: none"><li>• Administrative sex</li><li>• Undifferentiated survey sex/gender</li><li>• Computer (AI)-classified sex/gender</li><li>• Researcher-perceived sex/gender</li></ul>	<ul style="list-style-type: none"><li>• Gender identity <math>\neq</math> birth-assigned sex</li><li>• Lived gender <math>\neq</math> birth-assigned sex</li></ul>	<ul style="list-style-type: none"><li>• Biological factors</li><li>• Psychological factors</li><li>• Behavioural factors</li><li>• Interpersonal factors</li><li>• Social factors</li></ul>



Questions?

