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*Healthcare Cost and Utilization Project 2021 Outstanding Article of the Year Award: Clinical Winner*

# Racial/Ethnic Disparities/Differences in Hysterectomy Route in Women Likely Eligible for Minimally Invasive Surgery

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## Background

- >400,000 hysterectomies for benign gynecologic conditions are performed annually in the United States.[1]
- Minimally invasive gynecologic surgery (MIGS; vaginal, laparoscopic/robot-assisted hysterectomy) is typically preferred over abdominal hysterectomy for benign conditions due to faster return to normal activities, lower complication rates, and shorter hospital stays.[2,3]
- Black women in particular are less likely than White women to undergo MIGS.[1,4–9]
- Previous studies did not exclude women with conditions that predispose them to abdominal hysterectomy (i.e., uterine fibroids, obesity, or prior abdominopelvic surgery).
- Black women have higher prevalence of obesity[10] and larger and more numerous fibroids[11] than White women.
- Failure to exclude women predisposed to abdominal hysterectomy could yield biased estimates of racial disparity in receipt of MIGS.

## Objective

- To evaluate whether hysterectomy rates vary by surgical route and race/ethnicity over time in women likely eligible for MIGS and whether evidence for racial/ethnic disparity in surgical route remained after controlling for patient and hospital characteristics

## Methods

- Hospital discharge data from Colorado, Florida, Maryland, New Jersey, and New York came from the Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) and State Ambulatory Surgery and Services Databases (SASD).
- We included adult women aged ≥18 years who underwent hysterectomy for benign gynecologic conditions between 2010 and 2014, excluding those with diagnoses of obesity, fibroids, or history of prior abdominopelvic surgery.
- Procedures were classified as abdominal, vaginal, or laparoscopic (including robotic) using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) procedure codes (SID) and Current Procedural Terminology (CPT®) codes (SASD).
- To determine the association of hysterectomy surgical route by race/ethnicity in hospitals that serve a higher versus lower proportion of Black patients, hospitals were stratified into quintiles based on the proportion of Black hospitalizations among all hospitalizations at the individual hospitals: quintile 1 (0 to 2% Black), quintile 2 (2 to 5% Black), quintile 3 (5 to 9% Black), quintile 4 (9 to 16% Black), and quintile 5 (>16% Black).
- We calculated hysterectomy rates per 100,000 adult women per year by surgical approach and race/ethnicity. Denominators were adjusted for the proportion of women with prior hysterectomy using survey-weighted hysterectomy prevalence estimates from the Behavioral Risk Factor Surveillance System.
- A marginal structural log binomial regression model was used to estimate adjusted standardized prevalence ratios (aPRs) for vaginal or laparoscopic versus abdominal hysterectomy, controlling for clustering within hospitals.

## Results

- The final analytic cohort included 133,082 adult women who underwent hysterectomy for benign conditions from 2010 to 2014.
- Annual laparoscopic rates increased more slowly for Black women (1.6-fold) than for White (1.8-fold) and Hispanic (1.9-fold) women (Figure 1).
- Hospitals serving a higher proportion of Black women performed more abdominal and fewer vaginal procedures across all groups. More Black, Hispanic, and Asian/Pacific Islander (PI) women sought care at those hospitals than White women (Figure 2).

**Figure 1.** Hysterectomy Rates per 100,000 Adult Women/Year Among Women Likely Eligible for MIGS

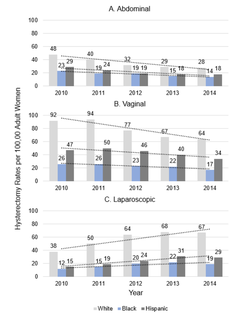
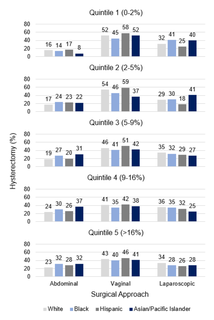



**Figure 2.** Surgical Route for Hysterectomy by Race/Ethnicity in Hospitals That Serve a Higher (Quintile 5) Versus Lower (Quintile 1) Proportion of Black Patients Among Women Likely Eligible for MIGS




- Black, Hispanic, and Asian/PI women had more abdominal and fewer laparoscopic procedures than White women did across all volume categories (Figure 3). Black and Asian/PI women had fewer vaginal procedures than White women did across all volume categories (Figure 3).
- Black and Hispanic women were less likely to undergo vaginal (aPR: 0.93, 95% confidence interval [CI]: 0.90–0.96 and aPR: 0.95, 95% CI: 0.93–0.97, respectively) and laparoscopic (aPR: 0.90, 95% CI: 0.87–0.94 and aPR: 0.95, 95% CI: 0.92–0.98, respectively) hysterectomy than White women. Asian/PI women were less likely to undergo vaginal hysterectomy (aPR: 0.88, 95% CI: 0.81–0.96) (Figure 4).

**Figure 3.** Percentage of Women Likely Eligible for MIGS by Surgical Route, Stratified by Hospital Hysterectomy Procedure Volume (Low, Medium, High) and Race/Ethnicity

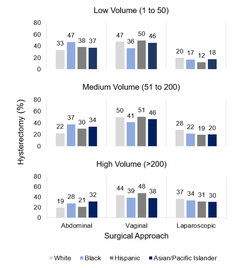



**Figure 4.** aPRs and 95% Bootstrapped CIs for (A) Vaginal Versus Abdominal Hysterectomy and (B) Laparoscopic Versus Abdominal Hysterectomy Among Women Likely Eligible for MIGS

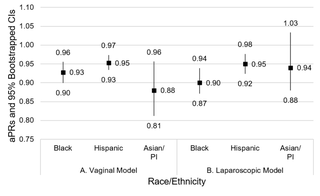



Figure 1–4 abbreviations: aPR, adjusted standardized prevalence ratio; CI, confidence interval; MIGS, minimally invasive gynecologic surgery; PI, Pacific Islander.

## Conclusions

- After adjusting for confounding factors and controlling for clustering of procedures within hospitals, compared with White women, Asian/PI, Black, and Hispanic women eligible for MIGS were less likely to receive vaginal hysterectomy, and Black and Hispanic women were less likely to receive laparoscopic hysterectomy.
- The proportion of all women undergoing abdominal hysterectomy was highest at hospitals serving higher proportions of Black women.
- These differences in treatment type can lead to disparities in outcomes, in part due to their association with complications, exacerbated by increased length of stay in the hospital.
- These analyses can be used to guide changes in practice to reduce disparities and help reduce complications after hysterectomy, shorten stays, and return women to routine activities.

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## References

1. Cohen SL, Vitonis AF, Einarsson JI. Updated hysterectomy surveillance and factors associated with minimally invasive hysterectomy. JSLS. 2014;18(3):e2014.00096.
2. Aarts JW, Nieboer TE, Johnson N, et al. Surgical approach to hysterectomy for benign gynaecological disease. Cochrane Database Syst Rev. 2015(8):CD003677.
3. American College of Obstetricians and Gynecologists. Committee Opinion No 701: Choosing the Route of Hysterectomy for Benign Disease. Obstet Gynecol. 2017;129(6):e155-9.
4. Alexander AL, Strohl AE, Rieder S, Holl J, Barber EL. Examining disparities in route of surgery and postoperative complications in black race and hysterectomy. Obstet Gynecol. 2019;133(1):6-12.
5. Bougie O, Singh SS, Chen I, McCarthy EP. Relationship between race/ethnicity and hysterectomy outcomes for benign gynecologic conditions. J Minim Invasive Gynecol. 2019;26(3):456-62.
6. Sanei-Moghaddam A, Kang C, Edwards RP, et al. Racial and socioeconomic disparities in hysterectomy route for benign conditions. J Racial Ethn Health Disparities. 2018;5(4):758-65.
7. Price JT, Zimmerman LD, Koelper NC, Sammel MD, Lee S, Butts SF. Social determinants of access to minimally invasive hysterectomy: reevaluating the relationship between race and route of hysterectomy for benign disease. Am J Obstet Gynecol. 2017;217(5):572.e1-e10.
8. Ranjit A, Sharma M, Romano A, et al. Does universal insurance mitigate racial differences in minimally invasive hysterectomy? J Minim Invasive Gynecol. 2017;24(5):790-6.
9. Mehta A, Xu T, Hutfless S, et al. Patient, surgeon, and hospital disparities associated with benign hysterectomy approach and perioperative complications. Am J Obstet Gynecol. 2017;216(5):497.e1-e10.
10. Flegal KM, Carroll MD, Ogden CL, Curtin LR. Prevalence and trends in obesity among US adults, 1999-2008. JAMA. 2010;303(3):235-41.
11. Laughlin-Tommaso SK, Jacoby VL, Myers ER. Disparities in fibroid incidence, prognosis, and management. Obstet Gynecol Clin North Am. 2017;44(1):81-94.

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