Untangling the Black-White mortality gap in endometrial cancer: a cohort simulation

OBJECTIVE: Black women with endometrial cancer (EC) have a long-standing 55% higher mortality rate than white women.[1] There are biological, nonmodifiable differences by race. Black women are twice as likely to have high-risk histology, which carries near double the mortality risk compared to low-risk histology.[1] Black women may also harbor more molecular markers of aggressive disease.[2]

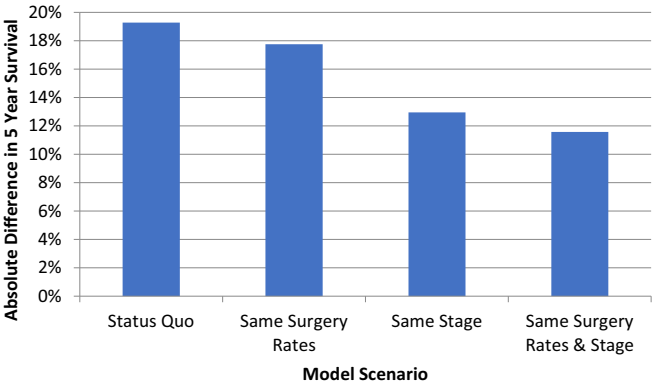
There are also modifiable factors. Black women receive surgery less often, at every stage and grade of disease.[2,3] Black women are also more likely to be diagnosed with advanced-stage disease.[2,3] This racial stage gap narrows significantly in integrated health care settings[4,5] and therefore is, at least in part, modifiable.

Due to the multifactorial nature of the racial mortality disparity in EC, our goal was to quantify the actual contribution of inequity in surgical rates and stage distribution to the overall racial mortality gap using simulation modeling.

STUDY DESIGN: We estimated multivariate models using the Surveillance, Epidemiology, and End Results (SEER) 18 registry data[6] for EC patients diagnosed from 2004 through 2009, and used these results to simulate a series of disparity-reducing scenarios. First, we estimated logistic regression models to predict 5-year survival (multivariable), use of surgery (multivariable), and stage at diagnosis (multinomial), adjusting for race, age, high vs low risk/grade, stage, surgery, and radiation. We stratified histology into low-risk (grade 1 and 2 endometrioid) and high-risk (grade 3 endometrioid and all nonendometrioid types).[3] Using parameters from these regression models we created a 3-part simulation: (1) a patient is assigned a stage based on age, race, and grade/risk of cancer; (2) a patient is assigned as having surgery based on predicted stage, age, race, and grade/risk; and (3) the patients' 5-year survival is determined based on predicted use of surgery, predicted stage, radiation, age, race, and grade/risk. We then simulated a cohort of 200,000 black and 200,000 white women with newly diagnosed EC based on the distribution of characteristics found in the SEER population and simulated their survival at 5 years. We estimated 4 scenarios: (1) status quo, (2) same likelihood of surgery between races, (3) same stage at diagnosis between races, and (4) same likelihood of surgery and stage at diagnosis between races.

RESULTS: With the status quo, 39.1% of black compared to 19.8% of white women died within 5 years: a 19.3% absolute difference. With equal surgery rates by race, the absolute difference in survival was 17.7%. With equal stage distribution, the difference fell to 12.9%. And when both stage and rates of surgery were equal, then the absolute difference in 5-year survival between races was 11.6% (Figure).

FIGURE
Scenarios to reduce Black-White mortality gap in endometrial cancer



Cohort simulation: absolute difference in 5-year survival between newly diagnosed black and white women with endometrial cancer, adjusted for baseline effect of age, race, grade, stage, surgery, and radiation on overall survival.

Doll. Black-white mortality gap in endometrial cancer. Am J Obstet Gynecol 2017.

CONCLUSION: The ability to address racial disparities depends on the relative contribution of modifiable factors. Based on this simulation model, 40% of the black-white mortality gap in EC is due to inequitable surgery rates and stage distribution. Importantly, this model is based on the real outcomes reported in SEER. So, although we cannot quantify the impact of other known mediators of racial disparity (ie, comorbidity, income level), our results represent how the black-white survival disparity would change holding all other factors constant. This analysis lacks the effects of chemotherapy, which is also received less often by black women, likely underestimating our results.[3] The lack of action to improve surgery rates and early diagnosis among black women with EC is an oversight in this cancer with significant racial disparities. ■

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