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The Association Between Race and NCCN Adherent Care Among Patients with Stage 3 and 4 Ovarian Cancer

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Introduction

Racial disparities in US healthcare are well-documented. In particular, Black patients have repeatedly been demonstrated to have worse health outcomes than white patients, both in terms of general life expectancy and in the context of specific diseases[1]. For example, the prevalence of chronic diseases like diabetes and hypertension are greater among blacks than whites.[2,3]. The causes of these disparities are multifactorial and poorly understood. Previous research has identified multiple proximate causes, including but not limited to assess to health insurance[4] and differential exposure to stress[5]. Furthermore, there are growing numbers of studies finding racial differences in receipt of therapeutic procedures for a broad range of health conditions.

A large extant literature describes racial disparities in oncology and in particular ovarian cancer[6,7,8]. Ovarian cancer ranks fifth in cancer deaths among women, accounting for more deaths than any other cancer of the female reproductive system[9,10]. Previous work has shown that relative to their white peers, black patients with ovarian cancer are less likely to undergo BCRA testing[11], are less likely to undergo recommended surgical procedures, and-generally have worse overall survival[11]. Finally, research in older and/or local data assets has identified that black patients may be less likely to receive care that is adherent with the guidelines of the National Comprehensive Cancer Network (NCCN)[12].

The objective of the present study is to determine whether black patients with ovarian cancer are less likely than their white peers to receive care that is NCCN-adherent, using a large, electronic health record (EHR) sample.

Methods

This is a retrospective, observational cohort study, using data from the nationwide Flatiron Health electronic health database. Flatiron data are obtained from the EHRs of over 280 community clinics and academic institutions at over 800 geographically diverse sites of care.[13] The primary outcome will be receipt of NCCN-adherent care, defined as receiving proper surgery and chemotherapy. Patients with newly diagnosed stage III/IV epithelial ovarian, fallopian tube, or primary peritoneal cancer between 2011-2019 are included**(Table.1**).

Exclusion criteria:
1. Patients with stage I/II epithelial ovarian or fallopian tube cancers.
2. Patients with a histology of borderline.
3. Patients under the age of 18.
4. Patients with < 2 separate visits within 3 months of diagnosis date.

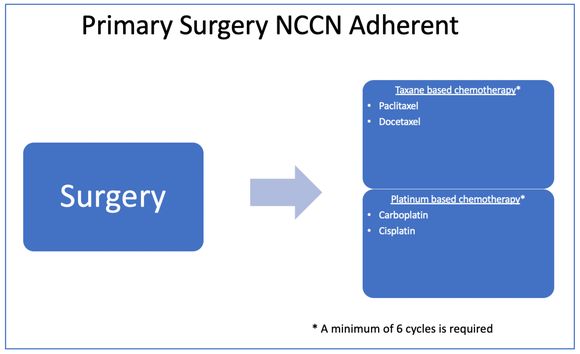
Multivariate logistic regression will be used to assess the association between patient race and receipt of NCCN-adherent care. Specifically, the outcome will be regressed on patient race and a vector of covariates thought to be correlated with race and/or with receipt of NCCN-adherent care. These include patient age, tumor stage and histology, disease comorbidities, region, and year of diagnosis.

Results

Defining NCCN Adherence

At this time, primary results are not available. Instead, we present preliminary results related to outcome definition and study sample characteristics. In general, NCCN adherent care consists of two components**:** Surgery, consisting of bilateral salpingo-oophorectomy AND hysterectomy AND omentectomy, and chemotherapy, consisting of 6 cycles of taxane and 6 cycles of platinum chemotherapy. Both treatment regimens consisting of primary surgery followed by adjuvant chemotherapy **(Fig. 1a)** as well as regimens which begin with neoadjuvant therapy **(Fig. 2a)** are considered adherent. However, NCCN adherence is complex and time-varying with different definitions spanning the years of our study (2011-2019). Some examples of how the NCCN guideline changes over time include modified footnotes and added pathways for residual disease. Doxorubicin containing regimens are not adherent in 2017 and later years.

Figure 1a.



However, individual surgical procedures (e.g. hysterectomy vs. bilateral-salpingo-oophorectomy) are not identified in Flatiron so the surgical components above were reduced to "Yes" or "No", this is one limitation of the study. If a patient previously had a hysterectomy, they would not be able to complete an additional hysterectomy so she would be considered non-adherent.

Figure 1b.

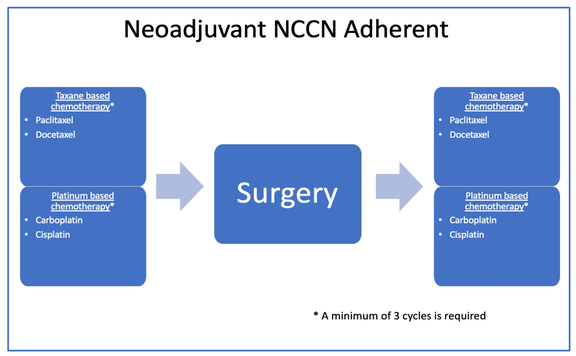


Table 1.

	White		Black		Chi-square p-value
	N	%	N	%	
Total (N, row %)	2037	72.54%	175	6.23%	
Age category at diagnosis, years					**<.0001**
<45y	79	3.88%	12	6.86%	
45-54y	234	11.49%	36	20.57%	
55-64y	481	23.61%	55	31.43%	
65y+	1243	61.02%	72	41.14%	
Year of diagnosis					**0.0394**
2011-2013	577	28.33%	34	19.43%	
2014-2016	743	36.48%	70	40.00%	
2017-2019	717	35.20%	71	40.57%	
Region					**<.0001**
Northeast	250	12.27%	21	12.00%	
Midwest	293	14.38%	19	10.86%	
South	868	42.61%	109	62.29%	
West	310	15.22%	4	2.29%	
Unknown	316	15.51%	22	12.57%	
Practice type					0.2790
Academic	242	11.88%	16	9.14%	
Community	1795	88.12%	159	90.86%	
Tumor stage					0.1927
III	1356	66.57%	108	61.71%	
IV	681	33.43%	67	38.29%	
Histology					**0.0087**
Serous	1544	75.80%	117	66.86%	
Other/unknown	493	24.20%	58	33.14%	

Figure. 2a

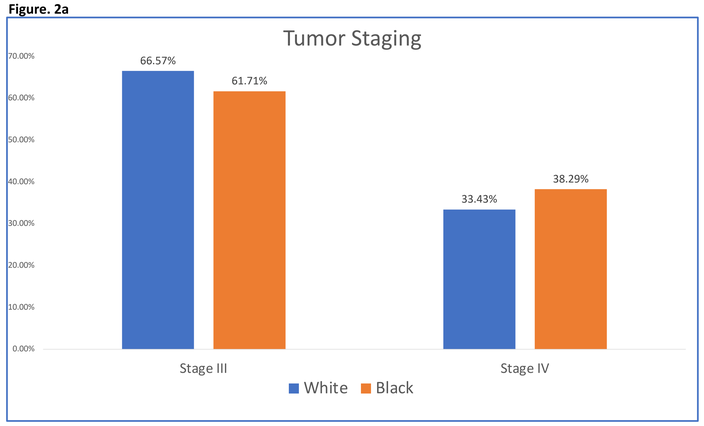
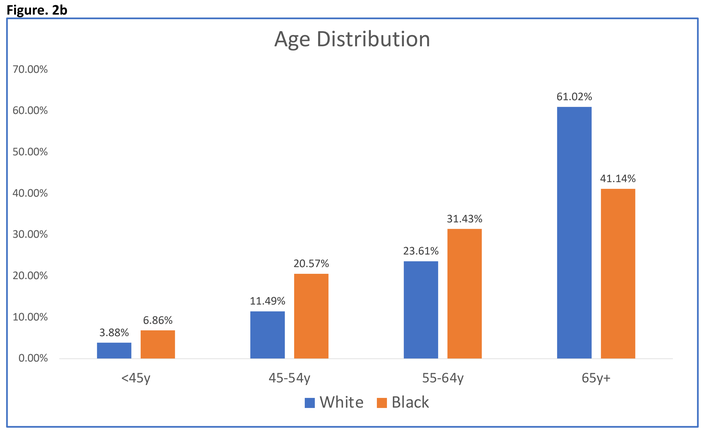


Figure. 2b



Patient Attributes

A total of 2808 (white = 2037; black = 175) patients were identified. Black patients were statistically significantly more likely to present at a younger age, to be from the Southern region of the United States, and to have an other/unknown tumor histology **(Table 1; Fig. 2b).** They were also more likely to present with stage IV tumors, although this difference was not statistically significant. **(Fig.2a)**. There was no major difference between practice type as both groups received similar amounts of care from academic and community health institutions.

Discussion

These preliminary data highlight statistically significant differences in the presentation of ovarian cancer in regards to diagnosis age, region, and histology. More African American patients present with advanced stage IV OC than white patients. Measuring NCCN-adherence is an important aspect of disparities research in oncology, but measurement using real-world data is challenging. In this study, our ability to measure NCCN-adherence was limited because of our inability to observe individual surgical procedures. Other researchers have used the Surveillance, Epidemiology, and End Results Program (SEER) data to try to measure racial disparities in receipt of NCCN-adherent care among ovarian cancer patients[15]. In SEER data, there is great detail on the surgical procedures but limited information on the type of chemotherapy received or the number of cycles completed in chemotherapy. The reverse is true in Flatiron data. Currently, no real-world data asset exists that is nationally representative while simultaneously has a good measurement of both surgical procedure detail and the number of cycles and specific chemotherapy agents received.

At the completion of the study, the evidence generated will contribute to the growing body of research intended to identify and ameliorate the causes of racial disparities in healthcare. If a racial disparity in receipt of NCCN-adherent care is identified, this would suggest that one mechanism that creates racial outcomes disparities in ovarian cancer is that black patients are in fact less likely to receive high quality care. This in turn would suggest the need for additional research to understand the processes leading to this outcome – for example whether or not individual doctors treat their black and white patients differently, or whether white patients are systematically more likely to be treated by patients who are more likely to provide guideline adherent care (e.g. gynecological oncologists vs. other specialties)

Acknowledgements

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References

1. National Center for Health Statistics. Health, United States and, Socioeconomic Status and Health Chartbook Hyattsville, MD. U.S. Department of Health and Human Services; Washington, DC.: 1998

2. Centers for Disease Control and Prevention. *2011 National Diabetes Fact Sheet*. Atlanta, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion Division of Diabetes Translation, 2011

3. Flack JM, Sica DA, Bakris G, et al. International Society on Hypertension in Blacks Management of high blood pressure in blacks: an update of the International Society on Hypertension in Blacks consensus statement. Hypertension. 2010;56:780–80

4. Sohn, Heeju. "Racial and Ethnic Disparities in Health Insurance Coverage: Dynamics of Gaining and Losing Coverage over the Life-Course." *Population research and policy review* vol. 36,2 (2017): 181-201. doi:10.1007/s11113-016-9416-y

5. Dohrenwend Bruce P. Dohrenwend Barbara S. 1969. Social Status and Psychological Disorder: A Casual Inquiry. New York: Wiley.

6. Vickie L. Shavers, Martin L. Brown, Racial and Ethnic Disparities in the Receipt of Cancer Treatment, *JNCI: Journal of the National Cancer Institute*, Volume 94, Issue 5, 6 March 2002, Pages 334–357, https://doi.org/10.1093/jnci/94.5.334

7. Srivastava, Sanjeev K et al. "Racial health disparities in ovarian cancer: not just black and white." Journal of ovarian research vol. 10,1 58. 21 Sep. 2017, doi:10.1186/s13048-017-0355-y

8. Stenzel A.E., Buas M.F., Moysich K.B.Survival disparities among racial/ethnic groups of women with ovarian cancer: An update on data from the Surveillance, Epidemiology and End Results (SEER) registry Cancer Epidemiology, Volume 62, 2019

9. American Cancer Society. Cancer Facts & Figures 2020. Atlanta, Ga: American Cancer Society; 2020.

10. Torre, Lindsey A et al. "Ovarian cancer statistics, 2018." CA: a cancer journal for clinicians vol. 68,4 (2018): 284-296. doi:10.3322/caac.21456

11. Armstrong K, Micco E, Carney A, Stopfer J, Putt M. Racial Differences in the Use of BRCA1/2 Testing
Among Women With a Family History of Breast or Ovarian Cancer. *JAMA*. 2005;293(14):1729–1736. doi:10.1001/jama.293.14.1729

12. Bristow, Robert E et al. "Disparities in ovarian cancer care quality and survival according to race and socioeconomic status." *Journal of the National Cancer Institute* vol. 105,11 (2013): 823-32. doi:10.1093/jnci/djt065

13 .Pfaendler, Krista S et al. "Disparities in Adherence to National Comprehensive Cancer Network Treatment Guidelines and Survival for Stage IB-IIA Cervical Cancer in California." *Obstetrics and gynecology* vol. 131,5 (2018): 899-908. doi:10.1097/AOG.0000000000002591

14. Rosen, B. (2019, April 09). The FDA and Flatiron Health Expand Real-World Data Cancer Research Collaboration. Retrieved September 1, 2020, from https://flatiron.com/press/release/the-fda-and-flatiron-health-expand-real-world-data-cancer-research-collaboration

15. Hodeib, Melissa et al. "Socioeconomic status as a predictor of adherence to treatment guidelines for early-stage ovarian cancer." Gynecologic oncology vol. 138,1 (2015): 121-7. doi:10.1016/j.ygyno.2015.04.011