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Commentary

Differences in Uptake of Risk Reduction Strategies Among Underserved Populations

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The identification of germline *BRCA1* and *BRCA2* (*BRCA1/2*) mutations creates a unique opportunity to reduce the incidence of breast and ovarian cancer by providing appropriate screening and risk reducing prophylactic surgery options. Such downstream reductions in cancer incidence will only be successful if identification of a deleterious mutation is followed by prophylactic mastectomy and bilateral salpingo-oophorectomy. The NCCN guidelines (v.2.2015) (National Comprehensive Cancer Network inc., 2015) recommend that women with deleterious *BRCA1/2* mutations undergo breast screening with annual breast MRI starting at the age 25, risk reducing salpingo-oophorectomy (RRSO), typically between 35 and 40 years and upon completion of child bearing, and discussion of risk-reducing mastectomy (RRM). Evaluation of the efficacy of the prophylactic surgical strategies has confirmed a reduction in breast cancer with RRM of approximately 90%, a reduction in ovarian cancer risk with RRSO of 85–90% and a reduction in breast cancer risk of 50% with premenopausal RRSO. Additionally RRSO has been shown to reduce cancer specific and all cause mortality in *BRCA1/2* mutation carriers (Marchetti et al., 2014). Thus, these prophylactic measures appear to reduce cancer associated morbidity and mortality in *BRCA1/2* mutation carriers, although it is unclear whether the benefit of RRSO is the same in *BRCA1* and in *BRCA2* mutation carriers (Domcheck et al., 2010).

In this issue of *EBioMedicine*, Robinson et al. (Robinson et al., 2015) are to be commended for addressing interesting and important questions in clinical genetics that include population-level screening in underserved populations and the rate of adherence to risk reducing surgery recommendations. Using a predictive model of cancer reduction in patients with hereditary breast and ovarian cancer (HBOC) the authors estimated an 8.8% reduction in breast and ovarian cancer in the underserved group of mutation carriers compared to a 57% reduction in breast cancer and 51% reduction in ovarian cancer in an insured reference population with similar genetic risk. These results certainly add to the already available information on lower rates of adherence to prophylactic measures in minority populations (Bradbury et al., 2008; Grimmer et al., 2015; Lynce et al., 2015) but extend prior work by estimating reduction in cancer incidence. Understanding the downstream effects of genetic testing among underserved women is of paramount importance in an era where population-wide screening for germline *BRCA1/2* mutations is being actively discussed and advocated (King et al., 2014).

The findings by Robinson et al. provide an initial understanding of the impact of population screening for HBOC through use of family history assessment, navigation through genetic services and the offer of genetic testing. Future work can expand upon the results of Robinson et al. by extending the length of follow-up beyond 44 months (mean 21 months) as prior work with primarily non-Hispanic White *BRCA1/2* carriers has demonstrated uptake of RRSO up to 7 years after receipt of a positive *BRCA* result (Schwartz et al., 2012). Women of child-bearing age may wait longer to undergo RRSO, while prophylactic mastectomies—again documented primarily in non-Hispanic White women—appear to occur largely within the first year or two following testing (Schwartz et al., 2012). The timing of prophylactic surgery among underserved women is as yet unknown, and thus the results by Robinson et al. begin to shed light on behavioral responses to genetic risk information among populations underrepresented in genetics research.

Expanding our awareness of additional factors that may influence use of genetic services and adherence to NCCN recommendations among underserved women at high risk for HBOC is a critical next step. Even with navigation for genetic services, half of the women from the safety net hospitals did not attend a scheduled appointment (Robinson et al., 2015). Prior research denotes potential cultural, historical and attitudinal concerns as patient deterrents to genetic testing. As uptake of genetic counseling and genetic testing is a personal and value-based decision, it will be important to undertake future studies with awareness that not all women at high risk may want to know or act on this information (Halbert et al., 2012). Prominent issues such as costs, lack of insurance, competing time or family demands may contribute. As the Robinson study used predictive models to estimate cancer risk reduction, individual level concerns like cost, fear or lack of information could not be directly assessed.

In summary, Robinson et al. draw the attention to an important theme of the use of genetic services and uptake of prophylactic strategies in underserved populations. Future research can focus on

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identifying barriers for such prophylactic strategies to develop effective interventional trials. Additionally, better characterization of the patterns of identification and uptake of prophylactic approaches by unaffected individuals with deleterious *BRCA1/2* from underserved and underrepresented populations is also urgently needed. With significant attention directed to precision medicine efforts, we must continue to focus efforts on ways to identify, support and appropriately manage cancer risk among the racially, ethnically and socioeconomically diverse women with HBOC.

Disclosure

The authors declared no conflicts of interest.

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