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Direct-to-Consumer Advertising of Genetic Tests Expands the Role of Obstetrician-Gynecologists

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ABSTRACT

This study characterized women's responses to the direct-to-consumer advertising campaign for BRACAnalysis® hereditary breast and ovarian cancer susceptibility testing. The study assessed women's intent to pursue testing before and after viewing the commercial and identified where women would seek out information. Pre- and post-test questionnaires assessed family history of breast cancer, breast cancer anxiety and risk perception, as well as the likelihood that women would pursue genetic testing for breast cancer risk. After viewing the advertisement, 73% of women reported interest in information about BRACAnalysis®. Overall, 76% of women reported that they would seek information on BRACAnalysis® testing from their OB/GYN and 37% would go to their family doctor. Being that OB/GYNs may soon be faced with an increase in questions about and requests for BRACAnalysis® testing, it is imperative that an educational plan be set in place to train OB/GYNs further about the genetics of breast and ovarian cancer.

Acknowledgments

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Introduction

Of all breast cancer, only 5-10% are hereditary cases [1-3]. BRCA1 and BRCA2 (BRCA1/2) are two genes that account for the majority of hereditary breast and ovarian cancer (HBOC) cases. Mutations in these two genes increase a woman's risk of developing breast cancer (up to 85% lifetime risk[4]) , as well as ovarian cancer (up to 54% lifetime risk[5]). Prior to testing for BRCA1/2 mutations, the National Comprehensive Cancer Network's (NCCN) practice guidelines recommend a counseling session including psychosocial assessment and support, risk counseling, education about HBOC and genetic testing, and discussion of informed consent before testing occurs[6]. In the past, counseling about BRCA1/2 mutation testing has been provided by a variety of healthcare professionals, such as genetic counselors or other specialists, rather than primary care providers. The increasing demand for genetic services creates a challenge for providers to keep pace with the expectations of their patient populations, as the demand for genetic services may soon surpass the supply of genetics specialists[7]. Because the role of OB/GYNs has expanded in recent years into many primary care functions[8], including comprehensive breast care, OB/GYNs will also be increasingly called on by patients to address genetic issues such as HBOC and BRCA1/2 testing.

DNA-based testing for HBOC susceptibility became clinically available in 1996 to detect mutations in BRCA1/2. In 2001 Myriad Genetic Laboratories, Inc. (MGL) was granted a patent on the sequence of these two genes giving MGL the sole rights to clinical testing for BRCA1/2, trade name BRACAnalysis®, and any future related diagnostic and/or therapeutic applications. From September 2002 through February 2003, MGL released a pilot direct-to-consumer (DTC) media campaign for BRACAnalysis® in Atlanta and Denver. This campaign included a television advertisement that was aired on local television stations. The campaign

was targeted at women ages 25-54 years with a personal or family history of breast cancer, and aimed to reach these women an average16.5 times during this six-month time span[9]. The television advertisement features a diverse array of women with the following message:

> "Breast cancer runs in my family. My mother... my grandmother... my dad's sisters... I wondered if it would be... inevitable. I found out that it didn't have to be. I found out my risk through BRCAnalysis®...BRCAnalysis® can help you see the big picture, so that you can take steps to reduce your risk."[10]

These statements are followed by a website link and toll free number (1-866-BRAC-NOW), provided by MGL that viewers could use to obtain more information on testing. Critics cite that the advertisement fails to mention several key factors involved with BRACAnalysis®, including that this blood test is a genetic test with associated limitations. One recent study on this advertising campaign revealed that BRCA1/2 test requests in Denver and Atlanta during the pilot period increased 25 and 30% respectively, and the number of tests ordered increased by almost 20%[11]. With the increase in interest in BRACAnalysis® following DTC advertising, it is important to further characterize women's reactions to the campaign so that health care professionals can prepare for the questions that may arise.

While studies have examined DTC advertising and its effects on a population basis, there is little data on the possible effects of such campaigns on individuals in the target audience. In this study, we examine the impact of MGL's DTC campaign message on individual women's anxiety about breast cancer, breast cancer risk perception, and interest in obtaining BRACAnalysis®. We also explore women's interest in "BRACAnalysis®" as compared to interest in "genetic testing", since genetic testing is not specifically mentioned in the

advertisement. Finally, we assess what sources women would access for additional information after viewing the advertisement and discuss the possible implications for practicing OB/GYNs.

Materials and Methods

This cross-sectional study consisted of pre-test and post-test questionnaires used to measure changes in breast cancer risk perception, anxiety, and intent to pursue genetic testing before and after viewing MGL's television advertisement. Institutional review board (IRB) approval was granted from both the University of Cincinnati and Cincinnati Children's Hospital Medical Center. A sample of 417 women ages 18-84 years participated in this study. To increase the diversity of the sample, women were recruited from various sources, including: graduate school classrooms, workplaces, and a local fitness facility. Women were verbally invited to participate in the study that would involve watching an advertisement about breast cancer. A brief description of their participation requirements was provided and consent was assumed if the woman agreed to participate in the study.

A 32-item pre-test questionnaire assessed demographic characteristics, including age, marital status, education, and income. Breast cancer anxiety, breast cancer risk perception, and ovarian cancer risk perception were measured using visual analog scales. Participants rated their knowledge of and interest in pursuing genetic testing on a four-point Likert scale. After completing the pre-test, participants viewed MGL's 60 second television advertisement for BRACAnalysis®, and then completed the 14-item post-test questionnaire. On the post-test, participants again rated their breast cancer anxiety and breast and ovarian cancer risk perception using visual analog scales. Women's interest in pursuing genetic testing for breast cancer risk, as well as the likelihood that women would pursue BRACAnalysis® testing was assessed using

four-point Likert scales. Both questions were asked in order assess whether or not the interest differed which might suggest that participants did not recognize that BRACAnalysis® is a genetic test for breast cancer risk. Additional post-test questions evaluated women's interest in obtaining more information on BRACAnalysis® testing (yes/no) and where would they go to find more information: 1) Internet, 2) Scientific Journals, 3) Doctor, 4) 800 number (advertised in the commercial), 5) Friends/Family, and 6) Library. In addition, women were asked what type of doctor they would go to for information. The post-test also evaluated personal and family history of breast, ovarian or other cancers, with specific questions about cancer diagnoses and age of diagnosis for the participant's mother, sisters, and daughters. Two additional items asked about breast cancer family history in any other maternal or paternal relatives. Both the pre-test and post-test questionnaires were piloted and reviewed by individuals from the fields of genetic counseling, clinical genetics, molecular genetics, and biostatistics.

Out of the 417 questionnaires collected, 17 lacked ID numbers so that pre and post tests could not be paired or lacked other sufficient data and were excluded from analysis. Data analysis was performed on the remaining 400 participants. The number of respondents varies on individual questions because not all participants answered each question. Descriptive statistics were calculated on all questions. Analysis of data was performed using SPSS 12.0 and StatPac 9.0. Paired t-tests were performed to analyze changes in breast cancer anxiety, risk perception, or interest in genetic testing between the pre-test and post-test questionnaires. Two-sample t-tests were used to compare women with a family history of breast cancer to those without a family history on these variables. We looked at several family history groups including women with only a first degree relative, those with any relative with breast cancer, women with two or more relatives, and women with no breast cancer family history. Chi square analysis was used to

compare women's desire to pursue BRACAnalysis® versus genetic testing on the post-test questionnaire. Two-sample t-tests between proportions were performed to determine whether there was a significant difference between various subgroups in their intent to pursue testing or where they would go to seek more information about BRACAnalysis®.

Results

The sample (n=395 subjects who completed the demographic section) was predominantly Caucasian (83%) and college-educated (61%), and the median age of participants was 37 years. Approximately half (48%) reported an average household income greater than $50,000 per year, and 44% described some family history of breast cancer. (Table I)

Visual analog scores on the pre-test measures were compared with scores on identical post-test measures in order to measure changes in breast and ovarian cancer risk perception and breast cancer worry after participants viewed the television advertisement. Before viewing the commercial, the cumulative average score for breast cancer risk perception was 43.4 mm out of 100 mm, 34.4 mm for ovarian cancer risk perception and 39.0 mm for breast cancer worry. Comparisons between pre and post-test measure of breast cancer risk perception, ovarian cancer risk perception, and breast cancer worry revealed no significant changes were found for participants as a whole after viewing the commercial. Women with any family history of breast cancer did have significantly higher baseline breast cancer risk perception (55mm vs. 34mm) and breast cancer worry scores (48mm vs. 32mm) than women without a family history of cancer pre-test ($p<0.001$). However, there were no significant changes observed in the cancer risk perception or worry of women with a family history of breast cancer in any of our family history groups after viewing the television commercial. Small but statistically significant changes in

breast cancer risk perception were noted in women over 30, divorced women, and women with a post college education; however the breast cancer risk perception increased after viewing the commercial by less than 5mm on the visual analog scale.

When asked prior to viewing the commercial if the participant had heard of BRACAnalysis®, only 10% of participants reported knowing the trade name. However, 62% of participants reported awareness that genetic testing for breast and ovarian cancer susceptibility existed. For analysis we collapsed the 4-point Likert scale measures into two groups, those that were likely to pursue testing and those unlikely to pursue testing. Twenty-nine percent of women reported that they were likely to pursue genetic testing for breast cancer risk prior to viewing the commercial. After viewing the commercial, a significantly higher number of the total participants indicated they were likely to pursue genetic testing (n=400, 29% vs. 40%; χ^2=163.5, p<0.001). The increase in the number of women with a family history who were interested in testing was also significant (46% vs. 54%; χ^2=82.4, p<0.001), however, this increase in the percent of women interested was not significantly different than the increase among women without a family history. A significantly higher percentage of women with only a high school education were likely to pursue testing after viewing the commercial than women with a college or advanced degree (51% change vs. 11% and 7% change; p<0.001). Also, more women with a household income under $25,000 had interest in genetic testing after viewing the commercial, but the change in this interest was significantly less when compared to women with a greater household income (4% change vs. 13% change p=0.0143). After viewing the commercial, the change in the percentage of Caucasian women who were interested in testing increased (11% change; χ2=129.3, p<0.001), but the percentage of African American women interested in testing

declined (-19% change; χ^2=13.3; p<0.001). We also saw a decrease in the percentage of women between the ages of 30-39 who were interested in genetic testing after viewing the commercial (-14% change; χ^2=26.6; p<0.001) [Table II]. The percentage of women with high school education who were interested in genetic testing significantly increased after viewing the commercial (22% vs. 73%, p<0.001); yet the percentage of women who reported post-test interest in BRACAnalysis® was not as high as their reported interested in genetic testing (44% vs. 73%). Other subgroups showed no significant difference in interest in genetic testing versus interest in BRACAnalysis®.

Regardless of women's intent to pursue BRACAnalysis® or "genetic" testing, after viewing the commercial, 73% of participants (n=397) reported that they would like more information on BRACAnalysis® testing. A significantly higher percentage of women who had a family history of breast cancer had a desire for more information than those without a family history of breast cancer (80% vs. 67%, p=0.0044). The percentage of African American women who were interested in getting information on BRACAnalysis® was significantly greater than the percentage of Caucasian women interested in more information (91% vs. 71%, p=0.006). However, variation in income level, education, age and marital status did not yield significant differences in interest for more information on BRACAnalysis®. (Table III)

Women reported that they would seek out this information on BRACAnalysis® from a variety of sources; however the two most frequently chosen sources were the Internet (80%) and a doctor (70%). These preferences were observed across all demographic subgroups and in all subgroups, scientific journals and the library were the least popular primary source of information on testing

(Table IV). Significantly less women with a household income of under $25,000 were likely to see their doctor for information when compared with women having a household income of over $25,000 (67% vs. 78%, p=0.03).

When participants were asked to name the type of doctor they would visit for information on BRACAnalysis®, 75% of women stated that they would go to their OB/GYN and 37% reported that they would go to their family doctor. Women in all age, income, education, and family history subgroups overwhelmingly chose to seek out information from their OB/GYN over any other physician source (Table V). However, a significantly higher percentage of African American women would seek out information from their family doctor than Caucasian women (53% vs. 35%, p=0.02) and conversely, a significantly higher percentage of Caucasian women would seek out information from their OB/GYN than African American women (79% vs. 58%, p=0.002). Married women were significantly more likely to seek out information from their OB/GYN than unmarried and divorced women (83% vs. 65%, p=0.0002). When comparing responses across income levels, a significantly lower percentage of women with a household income under $25,000 would go to their OB/GYN for information than women with a household income over $25,000 (64% vs. 78%, p=0.007). The opposite is seen when looking at which groups would seek out information from their family doctor. The percentage of women with a household income of greater than $25,000 seeking out information from their family doctor was significantly lower than those with a household income of less than $25,000 to seek out information from their family doctor (33% vs.52%, p=0.001). No significant differences were seen between women with a family history of breast cancer and those without in terms of where

they would go for additional information. Only 10% of women would seek information from a genetics specialist and 10% would go to a cancer doctor for information.

Discussion

Recent advancements in the field of genetics and the increasing availability of DNA based testing have created an increase in consumer demand for genetic services[7]. There has not yet been much DTCA related to genetic testing, therefore limited research is available about the possible effects on consumers. However, there has been controversy about how DTCA of genetic tests might affect individuals and the health care community[12,13]. Some believe that these media campaigns can provide information to physicians and consumers about the availability of genetic tests in a market that is rapidly changing and expanding. Yet others are concerned that such campaigns may provide inaccurate information about genetic testing, inflate consumer risk perception, and endorse a deterministic relationship between genes and disease[12, 13]. Specifically, concerns were voiced that MGL's DTCA would unnecessarily frighten women, and in turn will create a unnecessary demand for testing in women of low risk[14]. The Centers for Disease Control and Prevention (CDC) found that during the six-month pilot period of MGL's advertising campaign, physicians in the pilot cities (Atlanta and Denver) received almost twice as many questions about BRACAnalysis® testing than the two control cities (Seattle and Raleigh-Durham). Approximately 10-15% more physicians noticed an increase in requests for BRCA1/2 tests when you compared the pilot cities to the comparison cities[11]. Our findings contradict the idea this increase in demand is due to the commercial causing an increase in women's worry about developing breast cancer. We have shown that regardless of breast cancer family history, watching Myriad's BRACAnalysis® television media campaign did not cause a

significant change in women's worry or risk perception related to breast cancer, but that women with a family history of breast cancer have significantly higher levels of risk perception and worry at baseline.

While this commercial did not contribute to significant changes in breast cancer worry in our sample population, it did increase the percentage of women who were interested in genetic testing in almost all categories. The CDC's data illustrated that 30-40% of all women who know about BRCA1/2 testing are interested in having the test, but that simply more women were aware of the test in the pilot cities[11]. Our data demonstrated that even with their awareness raised, we might not see a higher percentage of women in certain subgroups interested in pursuing testing. In African American women and women between the ages of 30-39 there was actually a significant decrease in the percentage of women who indicated intent to pursue testing after viewing the commercial. These two groups of women are specific demographic targets of the commercial, and our data suggests that this media campaign may not have effectively targeted them. Though there is not a body of literature examining African American women's attitudes and beliefs about DTCA, previous research has shown that educational campaigns related to breast cancer awareness have been less effective at reaching African American women[15]. Studies have shown that African American women have lower levels of knowledge about breast cancer genetics and more misconceptions about breast cancer than Caucasian women[16,17,18,19], including the belief that mammogram will always accurately diagnose breast cancer as well as the belief that a hard blow to the breast may cause a woman to get breast cancer. Nevertheless, African American women still express a high level of interest in pursuing genetic testing for BRCA1/2 mutations[16]. In our study, African American women did have an overwhelming

interest in gaining more information about genetic testing; however they were not as likely to want to pursue testing. African American women have been shown to have more fatalistic attitudes and greater levels of present temporal orientation related to health outcomes[18, 19]. In other words, African American women, though they have expressed an interest in information on genetic testing, may be less likely to follow through with testing as they may believe that the information gained from BRACAnalysis® is unlikely to change their future health outcome or this is something that is not affecting them at the present time and therefore is unnecessary to pursue. Perhaps this commercial's focus on the fact that genetic testing can help women to "Be ready against cancer" and avoid what seems inevitable was a message that did not appeal to African American women, or perhaps they are less trusting of this message and need additional information before deciding about genetic testing.

Though previous research has shown that young women (25-44 years) are more willing than other age groups to undergo DNA-based carrier testing[20], our results showed a decline in the number of women in the age range of 30-39 years interested in genetic testing for HBOC after viewing the advertisement. Being that this is one of the first studies to show this trend, further research is needed to determine if a particular aspect of the advertisement was responsible for this decline in the number of women within this age group interested in testing.

As mentioned above, educational campaigns on breast cancer in the past have also been ineffective at reaching women with low education levels; however a higher percentage of women in this study with the lowest educational levels (high school or below) had a desire for genetic testing after viewing the commercial. Interestingly, there was a lower percentage of these

women who indicated interest in pursuing BRACAnalysis® after viewing the commercial. This discrepancy in likelihood to get "genetic" testing versus BRACAnalysis® is difficult to explain. Though MGL's media campaign repeats the word BRACAnalysis® several times, it is possible that this trade name did not appeal to women of this demographic or that they associated all the commercial's talk about family history of cancer with genetics, but did not realize that genetic testing for HBOC susceptibility and BRACAnalysis® were one and the same.

Overall, women not only reported an interest in pursuing genetic testing, but the majority of women (73%) also expressed interest in obtaining more information about BRACAnalysis® testing after viewing the commercial. Women with a family history of breast cancer were more likely to indicate they would like more information than women without a family history. It has been shown that women with a family history of breast cancer often over-estimate their personal risk for cancer and may view themselves as candidates for genetic testing even when the risk of having a genetic mutation is low[21]. It is likely that MGL's media campaign struck a very personal note with these women with a family history, as intended, and therefore increased their interest in learning about BRACAnalysis®. These requests for information would be directed at a variety of sources including healthcare professionals, creating a need for increasing knowledge on genetic testing.

This potential increase in requests for information and testing brings up the question of where women will seek out information about BRACAnalysis® and will those sources be prepared to answer women's questions. The majority of women reported that they would seek out information from the internet and/or from a physician. When one searches BRACAnalysis® on

the internet the majority of search engines return direct links to the Myriad Genetic Laboratories, Inc.'s website on HBOC and benefits of BRACAnalysis® testing. While it is clear that Myriad is knowledgeable regarding BRACAnalysis® testing, they certainly have a vested financial interest in increasing consumer demand for testing, which might bias the information presented about BRACAnalysis®.

Nearly 75% would seek out additional information on BRACAnalysis® testing from their OB/GYNs if they were going to see a doctor. Given the rapid developments in genetics and complexity of DNA based testing, there is a wide scope of knowledge that OB/GYNs must be familiar with in order to discuss breast cancer genetics with their patients. It is clear from previous studies[22-30] that more education is needed if OB/GYNs or primary care physicians are going to provide comprehensive counseling about genetic testing to patients on a regular basis. In a recent survey of OB/GYNs, 62% of respondents reported feeling knowledgeable enough about genetic issues related to breast and ovarian cancer to order genetic testing[23]. However, they had uncertainty about providing the recommended components of pre-test counseling for genetic testing; 61% were not confident about pedigree construction, 34% were not confident about basic genetic knowledge, and 27% were not confident discussing the psychosocial consequences of testing[23]. With the disconnect between where women would go to seek information and the comfort of those physicians with providing this information, the impact of Myriad's media campaign could be significant. Previous data and the data presented here support the idea that more training for OB/GYNs on familial cancer genetics is needed before these providers can routinely offer comprehensive pre-test counseling for BRCA1/2 testing[23]. However, the increase in demand could result in women not receiving comprehensive counseling

and risk assessment if physicians do not receive additional training or refer interested patients to a specialist.

A significant limitation of this study is the sample bias, as all of our participants were from the Cincinnati area and most were well-educated. Therefore, our sample may not be representative of women on the national level. Also important to note is that participation in the study was voluntary and those that chose to participate may be significantly different from those women who chose not to participate.

This study indicates that release of this commercial could have a major impact on individual women's desire for information about testing and consequently on obstetric and gynecologic practices across the country. Prior to the release of this media campaign there is a need for an educational plan be set in place for OB/GYNs. This should include not only information about the genetics of breast and ovarian cancer, but also other necessary components of a comprehensive counseling session, or guidelines for referring appropriate patients to a specialist. A realistic goal of such an educational campaign should be to train OB/GYNs to integrate this new genetic knowledge as part of their total patient management, not to become genetic specialists. As more DTCA of genetic tests is likely to occur, and this study indicates primary care physicians and OB/GYN's will be the primary sources of information for patients, not only does education need to increase, but other changes will be necessary as well. Stronger affiliations with the genetics community and integrating more genetic counselors into primary care and OB/GYN practice could be essential steps to addressing patients increasing demand for access to genetic services in the future. It is clear that further research is needed to develop

effective educational materials, initiate programs, and institute changes in the relationship between genetics professionals, OB/GYN's, and other healthcare professionals. The healthcare community must begin to take steps to institute such changes to be prepared for this and other genetic testing based DTCA campaigns.

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Table I. Demographic Characteristics and Breast Cancer Personal and Family History of Participants

Variable	No. Subjects	%
Age		
<30	146	37
30-39	70	17
40-49	77	19
50-60	89	23
>60	14	4
Ethnicity		
Asian	11	3
African American	43	11
Ashkenazi Jewish	2	0.5
Caucasian	329	83
Hispanic	4	1
Other	6	1.5
Marital Status		
Unmarried	161	41
Married	185	46.5
Separated	2	0.5
Divorced	38	10
Widowed	9	2
Annual Household Income		
<$25K	96	26
$25K-49,999	97	26
$50K-74,999	71	19
>$75K	109	29
Education		
Grade school	4	1
High school	55	14
Some college	95	24
College degree	143	36
Post college degree	97	25
Cancer Personal History		
Participants with a personal history of breast cancer	8	2
Participants with a personal history of ovarian cancer	1	0.2
Participants with a personal history of another cancer	22	5.5
Breast Cancer Family History		
No relatives with breast cancer	220	56
One first degree relative with breast cancer	50	12
One non-first degree relative with breast cancer	83	21
Two or more relatives with breast cancer	61	10
Any relative with breast cancer	172	44

Table II. Change in women's likelihood to pursue genetic testing before and after viewing the advertisement

	n	Before Commercial	After Commercial	Change
Age				
<30	146	32	43	11
30-39	70	54	40	-14
40-49	77	40	47	7
>50	103	22	33	11
Ethnicity				
Asian	11	36	45	9
African American	43	79	60	-19
Caucasian	323	29	40	11
Marital Status				
Unmarried	161	33	41	8
Married	185	29	41	12
Divorced	38	29	47	18
Annual Household Income				
<$25K	96	30	34	4
$25K-49,999	97	29	43	14
$50K-74,999	71	28	42	14
>$75K	109	33	44	11
Education				
High school	55	22	73	51
Some college	95	34	45	11
College degree	143	29	40	11
Post college degree	97	31	38	7
Breast Cancer Family History				
First degree relative with breast cancer	50	58	68	10
Two or more relatives with breast cancer	61	54	64	10
Any relative with breast cancer	172	46	54	8
No relatives with breast cancer	220	17	30	13

Data are presented as *n* (%).

Table III. Number and Percentage of women wanting more information on BRACAnalysis® after viewing the advertisement

Variable	n	Desire More Info
All Participants	**397**	**73**
Age		
<30	146	77
30-39	70	73
40-49	77	68
>50	103	71
Ethnicity		
Asian	11	82
African American*	43	91
Caucasian*	323	71
Marital Status		
Unmarried	161	73
Married	185	73
Divorced	38	74
Annual Household Income		
<$25K	96	72
$25K-49,999	97	78
$50K-74,999	71	75
>$75K	109	76
Education		
High school	55	69
Some college	95	78
College degree	143	70
Post college degree	97	75
Breast Cancer Family History		
First degree relative with breast cancer†	50	86
Two or more relatives with breast cancer†	61	85
Any relative with breast cancer†	172	80
No relatives with breast cancer	220	67

*) Significantly different from each other; $p<0.05$

†) Indicated those significantly different from women with no relatives with breast cancer; $p< 0.01$ for all groups.

Data are presented as *n* (%).

Table IV. Percentage of women who would seek out information of BRACAnalysis testing from each source*

*Women were able to choose all options that applied to them

Variable	n	Internet	Doctor	Journal	800 Number	Friends/Family	Library
Age							
<30	146	84	74	22	21	23	12
30-39	70	81	67	11	20	13	7
40-49	77	75	78	16	25	16	6
>60	103	71	81	9	27	22	10
Ethnicity							
Asian	11	100	72	45	27	18	9
African American	43	79	77	14	35	9	14
Caucasian	323	79	77	15	20	21	8
Marital Status							
Unmarried	161	86	73	19	22	20	10
Married	185	77	78	12	20	21	8
Divorced	38	61	74	13	37	8	11
Annual Household Income							
<$25K	96	83	67	21	24	15	9
$25K-49,999	97	81	78	19	24	19	15
$50K-74,999	71	79	85	7	25	24	8
>$75K	109	79	77	14	19	25	7
Education							
High school	55	69	69	7	24	20	7
Some college	95	82	76	14	27	21	16
College degree	143	78	83	20	18	22	6
Post college degree	97	82	69	15	24	11	6
Breast Cancer Family History							
First degree relative with breast cancer	50	85	89	12	24	32	10
Two or more relatives with breast cancer	61	80	72	19	24	21	11
Any relative with breast cancer	172	81	78	15	25	20	10
No relatives with breast cancer	220	76	75	15	21	20	9

Data are presented as *n* (%).

Table V. Percentage of women who would seek out information on BRACAnalysis® testing from each type of specialist*

*Women were able to choose all options that applied to them

Variable	n	Family Doctor	OB/GYN	Cancer Doctor	Genetics Specialist
Age					
<30	146	49	71	8	14
30-39	70	30	81	6	10
40-49	77	34	71	16	8
>50	103	28	76	11	4
Ethnicity					
Asian	11	64	36	18	18
African American	43	53	58	21	21
Caucasian	323	35	79	8	8
Marital Status					
Unmarried	161	49	66	11	12
Married	185	28	83	7	8
Divorced	38	32	68	18	5
Annual Household Income					
<$25K	96	52	64	8	14
$25K-49,999	97	40	77	12	8
$50K-74,999	71	38	75	10	6
>$75K	109	25	83	10	9
Education					
High school	55	27	84	9	7
Some college	95	47	66	11	16
College degree	143	37	75	8	7
Post college degree	97	34	77	10	7
Breast Cancer Family History					
First degree relative with breast cancer	50	38	77	10	17
Two or more relatives with breast cancer	61	37	69	11	16
Any relative with breast cancer	172	36	77	10	12
No relatives with breast cancer	220	39	73	10	9

Data are presented as *n* (%).

APPENDIX A: Pre- and post-test questionnaires

See attached.

ID#_____

Pre-Test: Direct-to-Consumer Advertising Questionnaire

Thank you for participating in this study. Your confidentiality will be maintained. By completing this questionnaire, you indicate your consent to participate in the study.

Section 1. *Please complete the following.*

1. On the following line please mark how likely you feel you are to get breast cancer

Not likely at all _____ **Very likely**

2. On the following line please mark how likely you feel you are to get ovarian cancer

Not likely at all_____ **Very likely**

3. Have you ever heard of genetic testing for breast cancer risk genes?

NO YES

4. Have you ever heard of BRACAnalysis®?

NO YES

5. How likely is it that you would have genetic testing for breast cancer risk?

Not likely **Very likely**

1 2 3 4

Section 2*. *Below is a list of comments made by women about breast cancer and breast cancer screening. Please indicate by circling next to each item how frequently these comments were true for you DURING THE LAST THIRTY DAYS ABOUT BREAST CANCER. If it did not occur during that time please circle 0 in the "Not at all" column.*

Not at all=0 Rarely=1 Sometimes=2 Often=3

I tried not to think about breast cancer	0	1	2	3
I thought that if I got breast cancer, I'd rather not know about it	0	1	2	3
Any reference to breast cancer brought up strong feelings in me	0	1	2	3
Even though it's a good idea, I found that doing breast self-examination for cancer scared me	0	1	2	3
Whenever I heard about a friend or public figure with breast cancer, I got more anxious about developing breast cancer	0	1	2	3
I felt that there are so many other things that could happen to me that it was pointless to worry about breast cancer	0	1	2	3
I found myself dreaming about breast cancer	0	1	2	3
When I thought about having a mammogram, I got more anxious about breast cancer	0	1	2	3
I tried not to talk about breast cancer with my family or friends	0	1	2	3
When I saw a news story about breast cancer, I skipped it without reading it	0	1	2	3
I thought that the older I get, the more I think about the possibility of getting breast cancer	0	1	2	3
Other things kept making me think about breast cancer	0	1	2	3

I thought that my health is too good at present to even consider thinking that I might get breast cancer	0	1	2	3
I avoided going for breast cancer screening because I was too anxious about breast cancer	0	1	2	3
I felt kind of numb when I thought about breast cancer	0	1	2	3
I thought about breast cancer even though I didn't mean to	0	1	2	3
I had a lot of feelings about breast cancer, but I didn't want to deal with them	0	1	2	3
When I thought about my family history of breast cancer, I got more anxious	0	1	2	3
I had trouble falling asleep because I couldn't get thoughts of breast cancer out of my mind	0	1	2	3
I was fearful of what I might find during a breast self-examination	0	1	2	3
Just hearing the words "breast cancer" scared me	0	1	2	3

*Questions in section 2 were created by Kathryn Kash, PhD

Section 3. *Please complete the following.*

7. On the following line please mark how worried are you about developing breast cancer

Not worried at all_____**Very worried**

Section 4. *Please complete the following questions regarding your background.*

8. What is your age? _____

9. Ethnic Background: Asian African American Ashkenazi Jewish
Caucasian Hispanic Other: _____

10. Marital Status: single married separated divorced widowed

11. Annual household income: <$25,000 $25-49,999 $50-74,999 >$75,000

12. What is the highest grade level you completed?
grade school high school some college
college degree post college degree

ID#_____

Post-Test: Direct-to-Consumer Advertising Questionnaire

Section 1. *Please complete the following.*

1. How likely is it that you would have BRACAnalysis® testing?

Not likely			**Very likely**
1	2	3	4

2. On the following line please mark how likely you feel you are to get breast cancer

Not likely at all _____ **Very likely**

3. On the following line please mark how likely you feel you are to get ovarian cancer

Not likely at all _____ **Very likely**

4. Would you like more information on BRACAnalysis®?

□□ NO □□ YES

5. Where would you go to find more information (check all that apply)?

Internet	Scientific Journals	Doctor
800 number	Friends/Family	Library

6. What type of doctor would you go to for information?

Family Doctor	Genetics Specialist
Cancer Doctor	OB/GYN

7. On the following line please mark how worried are you about developing breast cancer

Not worried at all _____ **Very Worried**

8. How likely is it that you would have genetic testing for breast cancer risk?

Not likely			**Very likely**
1	2	3	4

Section 2. *Please answer the following questions regarding your cancer family history.*

9. Have you ever been diagnosed with breast cancer?

□□ YES: age at diagnosis _____ □□ NO

10. Have you ever been diagnosed with ovarian cancer?

□□ YES: age at diagnosis _____ □□ NO

11. Have you been diagnosed with any other type of cancer?

□□ YES: □□ NO
Type of cancer _____
Age at diagnosis _____

12. Please mark an "X" in the following table of any of your relatives that have had cancer

	Breast Cancer	**Other Cancer (please list)**	**Age at Diagnosis**
Mother			□<50 years □>50 years
Sister 1			□<50 years □>50 years
Sister 2			□<50 years □>50 years
Sister 3			□<50 years □>50 years
Daughter 1			□<50 years □>50 years
Daughter 2			□<50 years □>50 years
Daughter 3			□<50 years □>50 years

13. Are there other relatives on your mother's side of the family with breast cancer?

□□ YES: how many relatives? _____ □□ NO

14. Are there other relatives on your father's side of the family with breast cancer?

□□ YES: how many relatives? _____ □□ NO