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Factors Associated With Return for Routine Annual Screening in an Ovarian Cancer Screening Program

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Abstract

Objective—To identify clinical, demographic, dispositional and attitudinal variables associated with return for routine, annual transvaginal sonography (TVS) screening for ovarian cancer.

Methods—Asymptomatic, average to high risk, women (n=585) participating in a free university-based ovarian cancer screening program completed a baseline interview prior to undergoing an initial TVS screening test. During the baseline interview, demographic (age, education, partner status, race), clinical (family history of ovarian cancer), dispositional (optimism, health values), and attitudinal (perceptions of personal risk for ovarian cancer and effectiveness of screening, intentions to return for repeat routine screening, discomfort during screening, satisfaction with the screening process, ovarian cancer specific distress) information was obtained. Return for repeat screening was documented from screening program records.

Results—Results from both multivariate proportional hazards and logistic regression analyses indicated that stated intentions to return for a repeat screening test within the next year was the strongest predictor of return for repeat screening. Possessing ≥ 12 years of education was also associated with a greater likelihood of repeat screening in both the proportional hazards and logistic regression analyses.

Conclusions—Results provide further support for low education as a risk factor for suboptimal participation in cancer screening. Results also highlight the critical link between intentions to perform a health-protective behavior and subsequent performance of that behavior and suggest repeat screening could be enhanced by eliciting both an intention to return for annual ovarian cancer screening as well as a specific plan for implementing this intention.

Keywords

cancer detection; cancer screening; adherence; cancer control; transvaginal sonography; ovarian cancer

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Precis: Prospective analyses indicated return for annual ovarian cancer screening was associated with greater education and stronger stated intentions to return for repeat annual screening.

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Ovarian cancer is the fourth leading cause of death due to malignancy in women with an estimated 16,210 deaths in the U.S. due to ovarian cancer anticipated in 2005 [1]. Early diagnosis is critical to prognosis. While the 5-year survival rate for ovarian cancer diagnosed at a local stage is 94%, 5-year survival declines to 69% for regional disease and 19% for distant disease [1]. However, as ovarian cancer is associated with few reliable signs and symptoms, only a small minority of ovarian cancers (19%) are diagnosed in the localized stage when prognosis is excellent [1].

Given early detection is critical to prognosis in ovarian cancer, development of a screening test for ovarian cancer has been an important research goal. CA-125 bioassay and transvaginal ultrasound (TVS) have been tested, alone and in combination, and have shown value in the early detection of ovarian cancer [2–4]. However, while this data is promising, data from prospective, randomized, controlled trials linking ovarian cancer screening to reduced mortality is lacking at this time. While the ongoing Prostatic, Lung, Colorectal, and Ovarian Cancer Screening Trial [5] may clarify the value of ovarian cancer screening, mass screening of asymptomatic women for ovarian cancer is not recommended currently by any professional organization [6]. Nevertheless, preliminary data show promise and participation in ovarian cancer screening trials is appropriate and critical to identification of the risks and benefits associated with ovarian cancer screening [7].

The effectiveness of any approach to cancer screening is predicated upon appropriate uptake of that screening modality. It is important that screening eligible individuals participate in an initial cancer screening test as well as return for routine, repeat screening at recommended intervals. Unfortunately, it is well known that initial uptake of screening as well as appropriate participation in repeat screening is often far less than 100% across all cancer screening modalities [8]. Consequently, understanding of factors that are associated with uptake of cancer screening is important and can inform efforts to improve participation in cancer screening.

In prior research, initial participation in a program offering free annual TVS screening to asymptomatic, average to high risk women was associated with a family history of ovarian cancer, lower dispositional optimism, and greater ovarian-cancer specific distress, with repeat, routine screening associated with greater education [9–11]. Participation in a TVS screening program for women at high risk for ovarian cancer was associated with worry about ovarian cancer in women with an affected relative [12]. Finally, adherence of intermediate and average-risk women to a semiannual screening protocol using CA-125 and TVS was unrelated to age, education, personal or family history of cancer, or perceived ovarian cancer risk [13].

The present study extends our prior research examining factors linked to participation in a free, TVS screening program for asymptomatic, average to high risk woman [9–11]. This earlier work focused on factors linked to participation in an initial TVS screening test [9] or examined a limited range of factors associated with repeat screening [10–11]. The aim of the present study was to identify demographic, clinical, and psychosocial variables associated with return for repeat TVS screening after an initial “normal” baseline TVS screening test. Selection of specific variables for examination as potential predictors of repeat TVS screening was based upon both empirical and theoretical considerations. From an empirical standpoint, a review of the general cancer screening literature [8,14–15] identified age, education, health consciousness, and perceived ovarian cancer risk as potentially associated with screening uptake. Review of the ovarian cancer screening literature (see above) suggested additional candidate variables including ovarian cancer-specific distress, family history of ovarian cancer, dispositional optimism, and knowledge of ovarian cancer risk factors [9–11]. From the standpoint of health behavior theory, the Theory of Planned Behavior [16] would posit that stated intentions to return for screening would be a strong proximal indicator of subsequent

screening uptake. The Health Belief Model [17] would posit uptake of cancer screening would be positively associated with perceived susceptibility to cancer (i.e., perceived cancer risk) and perception of a favorable cost/benefit ratio associated with cancer screening.

Based upon both the empirical evidence and theoretical analysis described above, we hypothesized a greater likelihood of return for a routine, repeat annual TVS screening test would be associated with sociodemographic (older age, greater education), clinical (family history of ovarian cancer), dispositional (lower optimism, greater value placed on health, greater monitoring informational coping style), and cognitive/attitudinal variables (greater perceived risk of ovarian cancer, greater intentions to undergo screening in the future, greater perceptions of the efficacy of ovarian cancer screening, reports of less discomfort associated with screening, greater satisfaction with baseline screening experience, greater ovarian cancer-specific distress).

Method

Sample

The study sample consisted of new participants in a university-based ovarian cancer screening program [4]. This program provides free, annual TVS screening to all asymptomatic women ≥ 50 years of age. Asymptomatic women 25 to 49 years of age can participate in the program if they possess a personal history of breast cancer or a history of ovarian cancer in ≥ 1 primary or secondary relative. Eligibility criteria for the current study included: (a) ≥ 25 years old; (b) no prior TVS screening; and (c) able to read and understand English. Using these criteria, 707 women in a consecutive series were invited to participate between April, 2000 and April, 2002. Of these, 622 (88%) provided informed consent for participation and underwent an initial TVS screening test. Thirty seven women subsequently received an abnormal TVS test result and were excluded from study analyses. The remaining 585 women received a normal TVS test result. Standard clinic procedure for these women included a recommendation to return in one year for a routine, repeat TVS screening test. Before leaving the screening clinic, all women were given a reminder bookmark card on which the date they were due for their annual, routine screening test was written. Women were asked to schedule a follow-up screening test as soon as 6 months prior to the due date of their follow-up test. Women who had not made an appointment for a follow-up screening test by 5–6 weeks prior to their due date were mailed a reminder card. Both the bookmark and reminder card included a toll-free telephone number which was available for women to schedule their annual follow-up screening test. All women who had scheduled a follow-up screening test received a reminder telephone call 1–2 days prior to their follow-up test.

Procedure

Upon arrival at the screening clinic, screening clinic staff provided each woman with information regarding the TVS screening test, including information regarding the importance of annual follow-up, and informed consent for the screening test was obtained. No individualized assessment of ovarian cancer risk was routinely provided. Following this, research staff provided each woman with information about current study procedures and informed consent for study participation was obtained. Women completed a baseline assessment consisting of a set of questionnaires, underwent an initial TVS screening test, and completed the TVS Experience Questionnaire (see below) immediately after their TVS screening test. The study protocol was approved by the University of Kentucky Institutional Review Board.

Study Measures

Demographic and Clinical Information—Information regarding age, race, marital status, education, and whether a woman had a first degree relative previously diagnosed with ovarian cancer was obtained at the baseline assessment.

Psychological Distress—The Impact of Events Scale (IES) [18] was used as a measure of ovarian cancer-specific distress. The IES assesses avoidant and intrusive cognition regarding a specific stressor – in this case “the possibility you will develop ovarian cancer in your lifetime.” Coefficient alpha > 0.85 for baseline scores for the IES Intrusion and Avoidance subscales.

Perceived Ovarian Cancer Risk—Two estimates of perceived, lifetime ovarian cancer risk were obtained. Women estimated *Personal OC Risk* by providing a percentage between 0–100% in response to the question “What are the chances you will develop ovarian cancer some day?” [19]. Women then estimated *Typical OC risk* by providing a percentage between 0–100% in response to the question “What are the chances the average woman your age will develop ovarian cancer some day?” [19]. These two items were combined to form a *Comparative OC Risk* index by subtracting the personal risk estimate from the typical risk estimate. A positive Comparative OC Risk value thus indicated a perception that personal risk of ovarian cancer was greater than a typical woman’s ovarian cancer risk.

Ovarian Cancer Screening Beliefs and Intentions—Participants indicated their extent of agreement with two statements: “A TVS screening test can find ovarian cancer early” and “Ovarian cancer can be cured if found early.” Responses were recorded on identical 4-point Likert scales ranging from strongly disagree to strongly agree. Responses were summed to create a single index of *OC Screening Effectiveness* with higher scores reflecting stronger beliefs in the effectiveness of ovarian cancer screening. Coefficient alpha was 0.57. Intention to return for future routine screening was assessed by the question “How likely is it that you will return for another TVS screening test within 1 year?” Responses were recorded on a 5-point Likert scale with response options ranging from “definitely won’t” to “definitely will.”

Dispositional Variables—Dispositional measures included the Life Orientation Test – (LOT) [20], a measure of dispositional optimism, and the Health Values Scale (HVS) [21] a measure of the value one places on health. Coefficient alphas were 0.75 and 0.61, respectively.

TVS Experience Questionnaire (TEQ)—The 6-item TEQ assessed discomfort and difficulty associated with the TVS screening experience. Responses were made on similar 10-point Likert scales. Three of the six TEQ items were used in the current study. These three items assessed satisfaction with the TVS screening experience, discomfort experienced during the screening test, and pain experienced during the screening test. The latter two items were combined to form an index of discomfort (TEQ-Discomfort) associated with the TVS test. Coefficient alpha for the TEQ-Discomfort index was .80.

Participation in Repeat TVS Screening—Dates of all subsequent TVS screening tests were abstracted from computerized screening clinic records in June, 2004. Consequently, all participants had ≥ 26 months of post-baseline follow-up. Participants who failed to return for a repeat screening test by June 26, 2004 were considered right censored. For all participants who returned for a repeat TVS test during the period of observation, two indices were derived. A first index was the number of days between baseline and any repeat TVS screening test and a second index represented whether a woman returned for a repeat TVS screening test within 24 months of baseline (yes vs. no).

Data Preparation and Analysis—A three-step analytic approach was used. First, the univariate relationships between our set of 15 potential demographic, clinical, dispositional, and attitudinal predictor variables assessed at baseline and our two indices of return for repeat TVS screening were determined. For our time to repeat TVS screening dependent variable, hazard ratios were calculated for all predictor variables using proportional hazards regression (PHREG). For our dichotomous dependent variable of return for screening within 24 months of baseline, odds ratios were calculated for all predictor variables using logistic regression. At step two, all predictor variables with univariate p-values < 0.20 were included in multivariate PHREG and logistic regression analyses. The third step in our analysis involved backward elimination of predictor variables from the full, multivariate PHREG and logistic regression models calculated in step two to identify final, “best fit” PHREG and logistic regression models. The criterion for retention of a variable in a model at step 3 was a p-value < .05.

Results

Sample Characteristics

Demographic and clinical characteristics for the entire study sample as well as the subgroups of women who did or did not return for a repeat TVS test at any time during the period of observation are shown in Table 1. 459 women (78.5% of study sample) returned for a second TVS screening test during the period of observation with mean time to return of 444 days (SD=147; range=330–1190). 126 women (21.5% of sample) failed to return for a second TVS visit. Their return time was right censored with mean 1164 days (SD= 207; range=793–1523). Of the 459 women who returned for a TVS screening test, 429 (73.3% of entire sample) returned for a second screening test within 24 months of baseline. Consequently, 156 women (26.7% of sample), failed to return for a second TVS screening test within 24 months of baseline.

Univariate Relationships Between Predictor Variables and Repeat TVS Screening

Table 2 shows results of univariate analyses of the relationship between a set of 15 demographic, clinical, dispositional, and attitudinal variables and our two repeat TVS screening variables. When repeat TVS screening was indexed by days to return for a TVS screening test, 8 of 15 variables had a hazard ratio with a p-value < 0.20 and were entered as predictor variables in the multivariate PHREG analyses. When repeat TVS screening was indexed by whether a woman returned for a TVS screening test within 24 months of baseline, 7 of 15 variables had an odds ratio with a p-value < 0.20 and were entered as predictor variables in the multivariate logistic regression analyses. There was much overlap between the two sets of predictor variables advancing to the multivariate analyses. Seven predictor variables had a univariate p-value < 0.20 for both repeat TVS screening dependent variables. Only one variable, HVS total score, had a p-value < .20 for one (i.e., days to repeat TVS screen) but not the other dependent variable (i.e., return within 24 months).

Multivariate Relationship Between Predictor Variables and Repeat TVS Screening

Due to sporadic missing data for some predictor variables, 10 cases were excluded from the multivariate analyses leaving a sample size of 575 for both the PHREG and logistic regression models. Table 3 shows the results of the multivariate PHREG analysis using days to repeat screening as the dependent variable. The overall PHREG model was significant (Likelihood Ratio chi-square = 30.22; p < .001). Both TVS screening intentions (hazard ratio=1.29; 95% CI = 1.10 – 1.52; p < .002) and education (hazard ratio=1.40; 95% CI = 1.12 – 2.16; p < .05) were significantly associated with days to repeat TVS screening in the full, PHREG model. Stepwise backward elimination resulted in a significant final PHREG model consisting of two variables (Likelihood Ratio chi-square = 20.37; p < .0001). The two variables retained in the final, best-fit PHREG model were education (hazard ratio=1.55; 95% CI = 1.11 – 2.15; p < .01) and TVS screening intentions (hazard ratio=1.32; 95% CI = 1.12 – 1.55; p < .001). In both

the full and “best fit” PHREG models, a greater risk or hazard of repeat TVS screening was associated with possessing 12 or more years of education and stronger stated intentions at baseline to return for TVS screening within one year.

Table 3 also shows the results of the multivariate logistic regression analysis using return for screening within 24 months of baseline as the dependent variable. The overall logistic regression model was significant (Likelihood Ratio chi-square = 29.57; $p < .001$). Two predictor variables were significantly associated with return for TVS screening within 24 months of baseline in the full logistic regression model: TVS screening intentions (odds ratio=1.63; 95% CI = 1.21 – 2.20; $p < .002$) and education (odds ratio=1.91; 95% CI = 1.08 – 3.36; $p < .05$). Stepwise backward elimination resulted in a significant “best fit” model consisting of three variables (Likelihood Ratio chi-square = 20.20; $p < .001$). The three variables retained in the best fit logistic regression model included TVS screening intentions (odds ratio=1.58; 95% CI = 1.19 – 2.10; $p < .002$), education (odds ratio=2.20; 95% CI = 1.27 – 3.80; $p < .01$), and partner status (odds ratio=1.55; 95% CI = 1.03 – 2.34; $p < .05$). Specifically, a greater probability of repeat TVS screening within 24 months of baseline was associated with stronger stated intentions at baseline to return for TVS screening within 12 months and possessing 12 or more years of education. This was true in both the full and best fit logistic regression models. In addition, having a partner at baseline was associated with a greater probability of repeat TVS screening within 24 months of baseline only in the best fit logistic regression model.

Discussion

Adherence with recommendations to return for annual repeat TVS screening was indexed both as a continuous variable (i.e., number of days to repeat screening) and a dichotomous variable (i.e., repeat screening within 24 months). Importantly, results were very similar for both dependent variables. As hypothesized, both education and stated intentions to return within one year for repeat ovarian cancer screening were significant predictors of return for repeat TVS screening in both the PHREG and logistic regression analyses. (Having a current spouse or partner emerged as an additional significant predictor of return for repeat screening in the logistic regression analysis but only in the final, best fit model.) So no matter how adherence with recommendations for routine, repeat TVS screening was defined, the resultant pattern of predictor variables was very similar.

Stated intentions to return for repeat screening was the variable most strongly associated with repeat TVS screening. As hypothesized, the stronger a woman’s stated intentions to return for TVS screening in one year, the greater the likelihood she returned for screening. In the logistic regression analyses (Table 3), each one point increment on our screening intentions variable was associated with an approximate 60% increase in the odds (odds ratios of 1.63 and 1.58) of returning for a repeat TVS test within 24 months of baseline. In the PHREG analyses (Table 3), each one point increment on our screening intentions variable was associated with an approximate 30% increased hazard or risk (hazard ratios of 1.29 and 1.32) of returning for repeat TVS screening. This link between intentions and subsequent behavior is consistent with research examining the utility of the Theory of Planned Behavior [16]. This theory posits the intention to engage in a behavior is a strong predictor of the subsequent performance of that behavior. Research has generally supported this proposition. Meta-analytic reviews have found behavior intentions account for 20–30% of variance in subsequent behavior [22]. However, while the intention-behavior link is strong, it is not perfect. Research has suggested supplementation of stated intentions by implementation intentions [23], that is specification of when, where, and how one will enact one’s intention to engage in a specific behavior, strengthen the intention-behavior link [24–25]. From a clinical standpoint then, efforts to

encourage repeat screening for ovarian cancer would focus upon elicitation of intentions to return for screening accompanied by specification of an action plan for achieving that intention.

Education was also a consistent predictor of return for repeat TVS screening. In the PHREG analyses (Table 3), women with at least a high school diploma had an approximate 50% increased hazard or risk (hazard ratios of 1.41 and 1.55) of returning for repeat screening relative to women who had not finished high school. In the logistic regression analyses (Table 3), women with at least a high school diploma had approximately 100% higher odds (odds ratios of 1.91 and 2.20) of returning for a repeat TVS screening test within 24 months than women who had not completed high school. Greater education has been linked to greater compliance with ovarian cancer screening recommendations [11,13,26] and recommendations for screening for other cancers [15]. Consequently, our results are consistent with our hypothesis and there is little surprise here. Why greater education is associated with greater likelihood of repeat screening is open to speculation, however. On one hand, greater education might represent greater access to resources that facilitate repeat screening. The actual cost of the screening test did not affect screening uptake in the present setting as all screening tests were furnished free. However, many study participants lived a considerable distance from the screening site [11] and less education may be associated with less access to transportation to the screening site. On the other hand, greater education might be associated with attitudes associated with screening uptake, such as appreciation of the value of early detection of ovarian cancer or health consciousness, in general. Comparison of women with and without a high school diploma revealed no differences in beliefs about the effectiveness of ovarian cancer screening ($t(581) = .097$; n.s.). The groups did differ in the general value they placed on health as reflected in a significant group difference in HVS total scores ($t(582)=2.56$; $p<.05$). However, this variable was not linked to repeat screening in our analyses. So the mechanism linking education to repeat screening in our study is unclear.

Finally, it is important to note variables not associated with repeat ovarian screening in any of our analyses: age, family history of ovarian cancer, ovarian cancer-specific distress, dispositional optimism, perceptions of ovarian cancer risk, general value placed on health, perceptions of ovarian cancer screening effectiveness, discomfort during the TVS screening test, and satisfaction with the initial ovarian cancer screening experience. The lack of a significant predictive relationship is particularly noteworthy for some variables. For example, it is worrisome that ovarian cancer in a first degree relative was not linked to an increased likelihood of repeat TVS screening given the link between family history and risk for ovarian cancer. This suggests the need to reinforce the importance of this risk factor and not assume that those with a family history of ovarian cancer will be more likely to participate in screening. As our sample of nearly 600 women yielded sufficient power to detect at least moderately sized effects, we don't believe inadequate statistical power is an explanation for our negative findings. However, measurement of some of these factors might have been a bit weak, suggesting caution in the interpretation of negative findings. For example, our TVS screening effectiveness variable was a composite of two simple 4-point scales while our percentage approach to assessment of ovarian cancer risk perception, while often used, has been criticized for its susceptibility to bias [14] and vulnerability to unreliable risk estimates in those with poor numeracy [27]. So replication of our analyses with better measurement of our key predictor variables is recommended.

Despite recommendations to return in 12 months, over 25% of our sample did not return for a repeat TVS screening within 24 months of their baseline TVS test; over 20% of our sample never returned during the period of observation. Of course, this state of affairs is not unique to TVS screening but is common to all cancer screening modalities. Assuming the effectiveness of cancer screening is predicated on timely repeat screening, our results are worrisome and suggest the need to develop effective means of increasing the proportion of women returning

for repeat screening in a timely fashion. In general, tailoring intervention strategies to the specific factors which characterize individuals who exhibit suboptimal repeat screening is a wise approach. While age and race/ethnicity were not linked to suboptimal repeat screening in our study, lower education and lesser intentions to return for repeat screening were. As noted earlier, one strategy to encourage repeat screening for ovarian cancer would involve efforts to encourage women to state an explicit intention to return for screening as well as consider and articulate a specific action plan to achieve that intention [23–25]. The latter requires individuals to proactively consider both the potential barriers to repeat screening as well as potential means of overcoming those barriers. Strategies for enhancing repeat screening in less-educated women are a bit less clear because the precise mechanism that links lesser education to lesser likelihood of repeat screening is unclear. Poor literacy or poor health literacy [28] might be involved requiring information be communicated in low literacy formats to accommodate the low literacy screenee. Poor numeracy might also be involved, interfering with comprehension of messages involving risk for ovarian cancer or the risk reducing impact of screening [27, 29]. Communication of risk or risk reduction information should be made available in various formats (e.g., numeric, verbal, relative) to facilitate comprehension of risk [29–30]. Finally, lesser education might be associated with residence in a rural area or poorer access to transportation to the screening site. We partially address this barrier in our clinic by working with state rural extension workers to provide transportation to groups of women to and from the screening clinic.

Limitations of our study must be acknowledged. Our sample was not population-based, consisting of women who chose to participate in ovarian cancer screening. The proportion of minority women in our study sample was low (2.6%), raising questions about the generalizability of our findings to all women eligible to participate in TVS screening for ovarian cancer. Uptake of repeat screening was based on clinic program records. Some women could have undergone repeat TVS screening at another site resulting in misclassification on our dependent variable. However, opportunities to undergo routine TVS screening for ovarian cancer are limited, particularly in our catchment area. Consequently, we believe misclassification is minimal here. Finally, screening for ovarian cancer in average risk women is not presently recommended by any professional group. Therefore, extension of our findings to understanding uptake of repeat screening for cancers for which recommendations for routine screening in average risk individuals currently exist (e.g., breast, cervical, colon) may not be warranted.

Ovarian cancer represents a significant mortality burden. Efforts to develop effective methods for reducing this burden through early detection are ongoing and will continue (6). If and when a successful screening test for ovarian cancer is developed for widespread use, the overall success of this test will be predicated on appropriate, repeat usage. Understanding of the factors that may foster or impede continued uptake of ovarian screening will be important at that time and the present study contributes to that knowledge base.

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Table 1
Demographic and Clinical Characteristics of Study Sample.

	Total Sample (n=585)		Return for Screening (n=459) ^a		No Return for Screening (n=126)	
	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)
Caucasian	97.4%		98.3%		94.4%	
Married or Partnered	72.5%		74.7%		64.3%	
Annual Household Income						
< \$20,000	19.1%		17.0%		26.9%	
\$20,000 – \$40,000	28.8%		30.5%		22.2%	
\$40,000 – \$60,000	18.1%		17.4%		20.6%	
> \$60,000	21.7%		24.0%		13.5%	
Not provided	12.3%		11.1%		16.8%	
Education						
< 12 years	11.0%		8.7%		19.2%	
≥ 12 years	89.0%		91.3%		80.8%	
FDR With OC	10.6%	59.5 (9.9)	9.8%	59.3 (9.5)	13.5%	60.3 (11.1)
Age in years						

Abbreviations used: SD=standard deviation; OC = ovarian cancer; FDR=first degree relative

^a Women who returned for screening at some time during period of observation(i.e., ever screened)

Table 2
Univariate relationship between potential predictor variables and two indices of return for repeat TVS screening.

VARIABLE	HR ^b	Days to Repeat TVS Screen		Repeat TVS Screen Within 24 Months ^a		
		chi-square	p-value	OR ^c	chi-square	p-value
Age	1.001	0.059	0.81	1.001	0.024	0.88
Minority ^d	0.510	3.569	0.06	0.307	5.038	0.02
Education ≥ 12 years ^e	1.530	6.594	0.01	2.235	8.689	0.03
Married/Partnered ^f	1.218	3.366	0.07	1.660	6.318	0.01
FDR With OC ^g	0.745	3.519	0.06	0.676	1.869	0.17
LOT-Total	1.012	0.896	0.34	1.020	0.599	0.44
HVS Total	1.014	2.228	0.14	1.020	1.096	0.30
IES Intrusion	0.980	3.664	0.06	0.965	3.625	0.06
IES Avoidance	0.987	3.640	0.06	0.977	2.978	0.08
Personal OC Risk	0.999	0.004	0.95	0.999	0.001	0.99
Comparative OC Risk ^h	1.001	0.045	0.83	1.003	0.373	0.54
OC Screening Effectiveness	1.035	0.154	0.70	1.085	0.232	0.63
OC Screening Intention	1.332	12.114	0.00	1.735	13.673	0.00
TEQ-Discomfort	1.065	1.198	0.27	1.070	0.273	0.60
TEQ-Satisfaction	1.007	0.052	0.82	0.010	0.248	0.92

Abbreviations used: FDR = first degree relative; OC = ovarian cancer

^a Coded as 0 = no return; 1 = return ≤ 24 months;

^b Hazard ratio from proportional hazards regression analysis;

^c Odds Ratio from logistic regression analysis;

^d coded as 0 = nonminority; 1 = minority;

^e coded as 0 = education < 12 years; 1 = education ≥ 12 years;

^f coded as 0 = not married/partnered; 1 = married/partnered;

^g coded as 0 = no FDR with OC; 1 = FDR with OC;

^h higher values indicate perception of personal risk of OC greater than OC risk for typical woman

Multivariate Proportional Hazards and Logistic Regression Analyses of Return for Repeat Screening

VARIABLE	Ever Return for Screening			Return for Screening ≤ 24 Months		
	HR	Full Model	Best Fit Model ^a 95% CI	OR	Full Model	Best Fit Model ^a 95% CI
Minority ^b	0.65			0.45		
Education ≥ 12 years ^c	1.41	0.32 – 1.31		1.91	0.15 – 1.34	
Married/Partnered ^d	1.14	1.00 – 1.98 *	1.11 – 2.15 **	1.55	1.08 – 3.37 *	1.27 – 3.80 **
FDR With OC ^e	0.81	0.92 – 1.41		1.55	0.99 – 2.27	1.03 – 2.34 *
HVS-Total ^f	1.01	0.59 – 1.11		0.77	0.42 – 1.39	
IIS-Intrusion	0.99	0.99 – 1.03		-- --	-- --	
IIS-Avoidance	1.00	0.96 – 1.02		0.98	0.92 – 1.04	
OC Screening Intention	1.29	0.98 – 1.02	1.12 – 1.55 ***	1.63	0.96 – 1.04	
		1.10 – 1.52 **			1.21 – 2.20 **	1.19 – 2.10 **

Abbreviations used: HR = hazard ratio; OR = odds ratio; FDR = first degree relative; OC = ovarian cancer

^a Result of stepwise backward elimination of variables from full model with p < .05 as criterion for retention;

^b coded as 0 = nonminority; 1 = minority;

^c coded as 0 = education < 12 years; 1 = education ≥ 12 years;

^d coded as 0 = not married/partnered; 1 = married/partnered;

^e coded as 0 = no FDR; 1 = > FDR with OC;

^f not considered as predictor in logistic regression model.

*** p < .001;

** p < .01;

* p < .05