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Are patients willing to travel for better ovarian cancer care?

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HIGHLIGHTS

- Centralizing ovarian cancer care may carry significant travel burden for patients.
- 20% of patients would not travel 50 miles for survival benefits of high-volume care.
- Centralization alone will not address gaps in ovarian cancer care.
- Low-volume care should be improved and geographic disparities should be minimized.

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ABSTRACT

Objective. Improved outcomes realized by patients treated at high-volume institutions have led to a call for centralization of ovarian cancer care. However, it is unknown whether centralization respects patients' preferences regarding treatment location. This study's objective was to determine how patients balance survival benefit against the burdens of travel to a distant treatment center.

Methods. Patients presenting for evaluation of adnexal masses completed two discrete choice experiments (DCEs) assessing 1) the 5-year survival benefit required to justify 50 miles of additional travel, and 2) the additional distance patients would travel for a 6% 5-year survival benefit. Demographic data were collected with measures of health numeracy, social support, and comfort with travel. *t*-Tests were performed to test for significant differences between group means.

Results. 81% (50/62) of participants required a 5-year survival benefit of $\leq 6\%$ to justify 50 miles of additional travel (DCE#1). These participants were less likely to be employed (56% vs 83%, $p = 0.05$) and more likely to rate their health as good to excellent (86% vs 50%, $p = 0.04$) than those requiring $> 6\%$ benefit to travel 50 miles. 80% (44/55) of participants would travel ≥ 50 miles for a set 5-year survival benefit of 6% (DCE#2). No association was identified in DCE#2 between willingness to travel and collected sociodemographic covariates.

Conclusions. 1 in 5 patients with ovarian cancer may prefer not to travel to a referral center, even when aware of the survival benefits of doing so. Policymakers should consider patients' travel preferences in designing referral structures for care.

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1. Introduction

Patients with ovarian cancer realize superior clinical outcomes when treated by experienced gynecologic oncologists and in hospitals with high case volumes [1–3]. The persistence of a relationship between ovarian cancer case-volume and survival outcomes has led to a call for centralizing ovarian cancer care in high-volume institutions in the

United States, drawing on promising experience with similar efforts in Europe [4,5].

Consolidation of ovarian cancer care in the United States may be particularly challenging given that 25–35% of patients currently receive care in low-volume institutions [6,7]. Channeling ovarian cancer care to referral centers is likely to require many patients to travel far from home for preoperative consultation, surgery and recovery, follow-up, and potentially adjuvant treatment. Approximately 9% of the population currently live > 50 miles from the nearest gynecologic oncologist, corresponding to approximately 7600 new cases of ovarian cancer annually [8]. Rural residence is associated with decreased likelihood of treatment

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by a gynecologic oncologist [1] and residence >50 miles from a high-volume center is associated with decreased likelihood of guideline-adherent treatment [9]. Currently, women who live >50 miles from a high-volume center are less likely to receive high-volume care, suggesting either that 1) the burden of travel is prohibitive for many of these women, 2) they are not aware of the survival benefit that travel to high-volume care may afford them, or 3) they determine that the survival benefit is not worth the travel burden. While there is some evidence that some patients balance travel distance against clinical outcomes for surgical care for pancreatic and gastric cancers [10,11], the extent to which this process may occur in patients with ovarian cancer is not known. Efforts to improve the process of care for ovarian cancer patients must take into account patients' preferences and must not assume that patients would want to maximize clinical outcomes at all costs. We hypothesized that a substantial proportion of patients would prefer to be treated closer to home rather than travel to a referral center, even if travel for care was associated with superior clinical outcomes. If this were the case, priority should be given to improving care at lower-volume institutions rather than routing all patients to referral centers. The objective of this study is to determine how patients balance potential survival benefit against the burdens of travel to a distant treatment center.

2. Methods

2.1. Study design

We conducted a cross-sectional survey of women presenting between February 2015 and February 2016 for evaluation of a pelvic mass to one of two gynecologic oncology clinics affiliated with the University of Pennsylvania Health System. Regulatory approval was obtained through the Institutional Review Board of the University of Pennsylvania. The population of interest was patients for whom there was sufficient clinical suspicion of ovarian neoplasm to warrant referral to a gynecologic oncologist, but who did not already carry a cancer diagnosis. Therefore, patients were not recruited if imaging clearly documented uterine origin of the pelvic mass, or if the patient already carried a histologic or cytologic diagnosis of a gynecologic malignancy. The initial enrollment target was 100, to allow for regression of travel decision (yes/no) on 5 covariates [12]. Enrollment was subsequently stopped at 13 months due to limited study resources. Patients were recruited for participation in the clinic waiting area and offered a gift card as incentive for participation. All surveys but one were administered prior to the patient's clinical consultation. Research personnel administered questionnaire and discrete choice experiments in English via tablet device. Questions were read to participants or explained if the participant did not understand the question. All research personnel underwent training with the primary investigator (D.I.S.) to ensure that explanations minimized bias introduced into results. Participants could opt to receive aggregate results electronically at the conclusion of the study.

2.2. Survey content

The survey included two discrete choice experiments followed by sociodemographic, numeracy, and psychosocial factors. Discrete choice experiments (DCEs) are used to assess preferences regarding tradeoffs [13]. In this study, participants were asked to imagine they have been diagnosed with ovarian cancer and were offered the hypothetical choice between initial cancer treatment at "Hospital A" (generally closer to home, but worse survival outcomes) and "Hospital B" (farther from home, but generally better survival outcomes). Participants were instructed to assume that evaluation at hospital A or B would include a preoperative visit, hospitalization for surgery and a postoperative visit. Adjuvant treatment, if needed, would be delivered at the center closest to home. Probability data were described both in words

(e.g., "34 women out of 100...") as well as pictographically given strong evidence that the latter method improves patients' understanding of risk [14,15]. Pictographs were generated using the online Icon Array tool [16]. To account for the expected variation in participants' actual travel to their appointment, participants were also asked to assume that the distance between their home and Hospital A was the distance that they had traveled that day to the clinic.

DCE #1 was designed to assess the absolute increase in clinical benefit patients require to justify an additional 50 miles' travel distance to a referral center. This distance was chosen as patients who live farther than 50 miles from a high-volume center are less likely to receive guideline-adherent- or high-volume care [9,17]. Therefore, the distance between Hospitals A and B was held constant at 50 miles, and the 5 year survival for patients treated at Hospital A was held constant at 34%. Outcomes for patients treated at Hospital B varied between 34% (no difference) and 54% (20% absolute difference) at 2% increments. To minimize the effect of anchoring bias [18], participants were randomized to start at the highest clinical difference with decreasing intervals or to start at the lowest clinical difference with increasing intervals.

DCE #2 was designed to assess the distance participants would be willing to travel for a fixed improvement in survival outcomes. 5-year survival for patients treated at Hospitals A and B were set at 34% and 40%, respectively (Fig. 1), consistent with estimates for outcomes of patients with advanced stage ovarian cancer treated at low- and high-volume centers [19]. The distance between the hospitals (i.e. the additional travel distance needed to reach hospital B) ranged from 0 miles (i.e. hospitals were equidistant from the participant's home) to 250 miles in nine increments. For each distance, participants were asked to elect treatment at either hospital A or B. To minimize the effect of anchoring bias, participants were randomized to start at the highest distance with decreasing intervals or to start at the lowest distance with increasing intervals.

Research personnel explained the first scenario within each DCE in detail and participants were given the opportunity to ask questions. Participants completed the remainder of the scenarios on their own, with assistance available if requested. Each DCE contained one scenario in which one choice dominated the other. In DCE #1, this was the scenario in which hospitals A and B were equidistant from the patient's home, but hospital B offered improved survival. In DCE #2, this was the scenario in which hospitals A and B offered equivalent survival, but hospital B required 50 miles' additional travel. Participants giving inconsistent or uninterpretable responses to DCEs were excluded from analysis of that DCE (see Supplement 1 for list of responses excluded).

Patient demographic characteristics included: age (<45, 45–54, 55–64, 65–74, ≥85 years), race (white, black, American Indian, Asian/Pacific Islander, other, and unknown), and ethnicity (Hispanic vs. not). Distance from home to clinic was calculated using the shortest driving route (using Google Maps™) from the centroid of home ZIP Code to clinic address. Employment, relationship status, and presence of minor and adult dependents in the household were collected as relevant to resources and other obligations potentially affecting participants' ability to travel additional distance for care. We additionally hypothesized that comfort with travel, geographic ties and perceived health might independently affect willingness to travel for care; we therefore queried the number of times the participant had traveled by air in the last year, and the degree to which she knew her neighbors and participated in neighborhood activities. Participants self-rated their health; social support was assessed with a subscale of the Social Support Survey from the Medical Outcomes Study [20].

Education and basic numeracy are both likely to affect patients' ability to understand differences in survival outcomes. Participants indicated their greatest level of education; numeracy was assessed using a three item scale developed by Schwartz (Supplement 2) [21]. Willingness to travel additional distance for improved long-term outcomes was also hypothesized to stem from the ability to "discount" current burden for greater future gains. We asked participants to rate, on a

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