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To interview Krishan Jethwa, contact Denis MacLeod at [denis.macleod@med.und.edu](mailto:denis.macleod@med.und.edu) or 701-777-2733. For a photo of Jethwa, click [here](#). For all other inquiries, contact Jeremy Moore at [jeremy.moore@aacr.org](mailto:jeremy.moore@aacr.org) or 215-446-7109.

## **Long Travel Distance Related to Later-Stage Breast Cancer Diagnosis**

NATIONAL HARBOR, Md. — Women with breast cancer who had to travel long distances to a comprehensive cancer center were more likely to have later-stage disease at diagnosis and a mastectomy at surgery, according to results presented here at the [12th Annual AACR International Conference on Frontiers in Cancer Prevention Research](#), held Oct. 27-30.

Data analysis showed an association between patients' distance from a comprehensive cancer center and stage at diagnosis, as well as an association between distance and surgery type. The longer the travel distance, the more likely women were to have later-stage disease at diagnosis, and the more likely they were to have a mastectomy.

“The main purpose of this study was to determine if women in rural North Dakota and Minnesota were at a disadvantage in terms of breast cancer screening, treatment, and ultimately, survival outcome,” said Krishan Jethwa, a medical student at the University of North Dakota School of Medicine and Health Sciences. “Travel in this part of the country can be long and difficult, especially during the winter. While investigating the public health implications of this, we found that women who live farther from a comprehensive cancer center were more likely to be diagnosed with later-stage disease. This highlights the need for improved access to screening and treatment for rural populations.”

Jethwa and colleagues analyzed demographic and clinical data from 260 women who were diagnosed with breast cancer between Jan. 1, 2007, and Dec. 31, 2007, and received treatment at a comprehensive cancer center in Fargo, N.D. The study investigated women aged 29 to 94 at diagnosis, with an average age of 60. All patients were white, and none had a prior cancer history.

Using the Mantel-Haenszel test for linear association, the researchers found that travel distance was related to both stage at diagnosis and surgery type. They found no association between distance and age at diagnosis, treatment with radiotherapy, or five-year survival.

Jethwa highlighted several areas for future analysis, including how much the risk of later-stage disease at diagnosis increases as a function of travel distance and whether mastectomy among rural women is linked to more advanced disease. He noted it is possible the choice of mastectomy is independent of stage at diagnosis and related to daily travel requirements. Jethwa also said that additional research on how travel distance affects the number of women receiving screening mammograms could help policymakers and health care providers devise effective interventions.

Institutional review boards of both the Sanford Health System and the University of North Dakota approved the study. Jethwa states that he has no conflicts of interest to declare.

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**Abstract Number:** B15

**Presenter:** Krishan Jethwa

**Title:** Association between travel distance to a comprehensive cancer center and breast cancer stage, treatment, and outcomes in a rural state

**Authors:** Krishan Jethwa, Brooke Settergren, Brittany Berg, James Beal. University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND.

**Purpose:** The purpose of this study was to investigate the association between travel distance to a comprehensive cancer center on initial stage of breast cancer diagnosis, treatment, and survival. Women with breast cancer living in rural locations in the Midwest may be at an increased risk by having to travel longer distances, often in inclement weather, to receive screening and treatment.

**Methods:** A hospital-based retrospective chart review was conducted of women (n=260) diagnosed with incident breast cancer from January 1, 2007 through December 31, 2007 and receiving treatment at a comprehensive cancer center in Fargo, ND. The women resided predominantly from southeastern North Dakota and southwestern Minnesota. Women aged 29-94 years were included in the study. Women were excluded if they were non-white or had a prior cancer history. Demographic and clinical data recorded included: age at diagnosis, zip code, diagnosis, stage of disease at diagnosis, radiation, surgery, mortality and history of previous cancer. Travel distance was categorized as follows: 0-<15 miles, 15-44 miles, 45-59 miles, and >60 miles. Stage at diagnosis was categorized as Early (0-2) and Late (3-4). Surgery was categorized as breast-conserving surgery and mastectomy. SPSS 20.0 for Windows was used to perform analysis. Chi-square test was used and Mantel-Haenszel test for linear association was used to compare distance category to stage and treatment. ANOVA was used to compare age. A P value <.05 was considered statistically significant. Institutional Review Boards of both Sanford Health System and the University of North Dakota approved the study.

**Results:** The mean age at diagnosis was 60 years (range 29-94). The 5-year survival rate was 95.5%. There were 38.1% (n=99) women residing within 15 miles of the cancer center, 12.6% (33) between 15-44 miles, 21.5% (56) between 45-59 miles, and 27.7% (72) greater than 60 miles. The distribution of staging was 17.1% (42) stage 0, 46.9% (115) stage 1, 25.3% (62) stage 2, 7.8% (19) stage 3, and 2.9% (7) stage 4. Surgical resection was performed on 98% (255) of women, with 59.2% (151) receiving breast-conserving surgery, and 40.3% (104) receiving mastectomy. Radiotherapy was performed on 61.5% (160) women.

A linear trend association was found between travel distance and stage of diagnosis (p=0.03). The further the distance the more likely women were to have a later stage of diagnosis. Similarly, linear trend association was found between travel distance and surgery type (p=0.005). The further the distance the more likely women were to have a mastectomy. No association was found between travel distance and age of diagnosis, receipt of radiotherapy, or 5-year survival.

**Conclusion:** This study indicates that women with increased travel distances are more likely to have a later stage at diagnosis and mastectomy at surgery. Improvements in access to cancer treatment may be necessary for women in rural areas.