



Original article

Geographic Access to Mammography and Its Relationship to Breast Cancer Screening and Stage at Diagnosis: A Systematic Review



Jenna A. Khan-Gates, MPH^{a,*}, Jennifer L. Ersek, MSPH^b, Jan M. Eberth, PhD^{b,c}, Swann A. Adams, PhD^{b,c,d}, Sandi L. Pruitt, PhD^e

^a Division of Epidemiology and Biostatistics, School of Public Health, University of Illinois at Chicago, Chicago, Illinois

^b Department of Epidemiology and Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia, South Carolina

^c Cancer Prevention and Control Program, Arnold School of Public Health, University of South Carolina, Columbia, South Carolina

^d College of Nursing, University of South Carolina, Columbia, South Carolina

^e Department of Clinical Science, Southwestern University, Dallas, Texas

Article history: Received 11 October 2014; Received in revised form 24 May 2015; Accepted 26 May 2015

A B S T R A C T

Introduction: A review was conducted to summarize the current evidence and gaps in the literature on geographic access to mammography and its relationship to breast cancer-related outcomes.

Methods: Ovid, Medline, and PubMed were searched for articles published between January 1, 2000, and April 1, 2013, using Medical Subject Headings and key terms representing geographic accessibility and breast cancer-related outcomes. Owing to a paucity of breast cancer treatment and mortality outcomes meeting the criteria (N = 6), outcomes were restricted to breast cancer screening and stage at diagnosis. Studies included one or more of the following types of geographic accessibility measures: capacity, density, distance, and travel time. Study findings were grouped by outcome and type of geographic measure.

Results: Twenty-one articles met the inclusion criteria. Fourteen articles included stage at diagnosis as an outcome, five included mammography use, and two included both. Geographic measures of mammography accessibility varied widely across studies. Findings also varied, but most articles found either increased geographic access to mammography associated with increased use and decreased late-stage at diagnosis or no association.

Conclusion: The gaps and methodologic heterogeneity in the literature to date limit definitive conclusions about an underlying association between geographic mammography access and breast cancer-related outcomes. Future studies should focus on the development and application of more precise and consistent measures of geographic access to mammography.

Copyright © 2015 by the Jacobs Institute of Women's Health. Published by Elsevier Inc.

Breast cancer is the most frequently diagnosed cancer among women and the second leading cause of cancer death among women in the United States (Siegel, Ma, Zou, & Jemal, 2014). Early breast cancer detection through regular mammography screening is an important factor in breast cancer survival, because screening-detected cancers are more likely to be

diagnosed with more favorable prognostic factors than symptom-detected cancers (Burke et al., 2008; Chiarelli et al., 2012; Dillon et al., 2004). Numerous studies have documented persistent disparities in mammography use and in late-stage diagnosis across age, race/ethnicity, and socioeconomic status.

Disparities in use may be owing to a number of potential barriers in accessing mammography services, including poor geographic access to services. If only a few mammography facilities are located in a large geographic area or in an area serving a large population, this may result in limited availability of mammography appointments and longer wait lists to be seen. This can present as a barrier to women seeking regular screening mammography or timely diagnosis of abnormal mammograms.

Conflict of Interest Statement: The authors declare no conflicts of interest.
 Financial Disclosures: The authors have no financial disclosures.

* Correspondence to: Jenna A. Khan-Gates, MPH, Division of Epidemiology and Biostatistics, School of Public Health, University of Illinois at Chicago, 1603 W Taylor St. (MC 923), Chicago, IL 60612. Phone: 1-773-510-6510; fax: 312-996-0064.

E-mail address: jkhan4@uic.edu (J.A. Khan-Gates).

Long travel distance/times to a mammography facility may also be a barrier that hinders women from seeking screening mammography on a recommended schedule. Longer times between screenings owing to this barrier may result in a later stage at diagnosis.

There are numerous ways to define access to health care services. [Aday and Andersen \(1974\)](#) define access, specifically geographic accessibility, as a “function of time and physical space that must be traversed to receive care” which is aside from the mere existence of care. [Penchansky and Thomas \(1981\)](#) define five specific dimensions of access: availability, accessibility, accommodation, affordability, and acceptability. Within this concept, availability refers to the adequacy of supply of physicians or facilities, whereas accessibility refers to the supply location in relation to demand. With respect to health care facility accessibility, capacity (number of facilities that exist per number of individuals served in a predefined area) and density (number of facilities in a predefined area) are two measures that have been reported previously. Other geographic measures, such as distance, travel time, or some combination of both measures, have also been utilized. [Yang, Goerge, and Mullner \(2006\)](#) found that the combination of measures, such as distance to nearest facility, and demand for services comprise the best geographic accessibility measures. Examples of such measures include the two-step floating catchment area (2SFCA) method and the kernel density method. Geographic information systems (GIS), computer systems used to manage and display spatially referenced data on maps, can be used to describe the distribution of health services or disease patterns over space and time ([Higgs, 2004](#)) and can be used to calculate spatial accessibility measures such as the 2SFCA and kernel density method ([Yang et al., 2006](#)).

Studies have evaluated the relationship between geographic access and mammography use and/or stage at diagnosis, and have shown mixed results with regard to direction of the association and statistical significance. The purpose of this review was to synthesize the existing literature examining the relationship between geographic access measures (capacity, density, travel distance, and travel time) and both mammography use and breast cancer stage at diagnosis. The goal is to better understand the scope of the literature on this topic, assess the direction of these relationships across studies, and identify future research needs.

Methods

Literature Search

Searches were conducted in Ovid, Medline, and PubMed using the following Medical Subject Headings and key terms in the title/abstract: (“Geographic Information Systems”[MeSH] OR “Geographic information systems” OR “geographic distance” OR “Spatial Analysis”[MeSH] OR “spatial analysis” OR “Geographic Mapping”[MeSH] OR “geographic mapping” OR “geographic locations” OR GIS OR “kernel density” OR “service density” OR “geographic density” OR “Health services accessibility” OR “accessibility” OR “travel time”)) AND (“Breast Neoplasms”[MeSH] OR “Mammography/utilization”[MeSH] OR “mammography utilization” OR “breast neoplasms” OR (“breast cancer” AND (incidence OR screening OR survival OR “drug therapy” OR therapy OR “follow-up time” OR “time-to-treatment”))). The search was limited to English language articles that were published between January 1, 2000, and April 1, 2013.

Articles were limited to those published since 2000 owing to technologic advancements in GIS and the development of the 2SFCA in 2000 ([Radke & Mu, 2000](#)).

Inclusion Criteria and Data Extraction

After excluding duplicates (N = 553), the initial query returned 798 articles of which the title and abstract were screened by two reviewers (J.L.E., J.A.K.; [Figure 1](#)). Studies were excluded if conducted outside the United States owing to differences in health care systems that may affect accessibility to mammography. Articles were restricted to those including a specific set of geographic measures of mammography access (i.e., capacity, density, travel distance, and travel time; [Table 1](#)) and breast cancer related outcomes (i.e., mammography screening or diagnostic use, stage at diagnosis, timeliness or type of treatment received, and breast cancer mortality). Capacity measures are calculated as the number of facilities per number of individuals served in a predefined geographic area, whereas density measures include those calculated as the number of facilities in a predefined geographic area. Travel distance and travel time measures include road network-based or Euclidean (“as the crow flies”) measures.

Four articles included treatment outcomes ([Lipscomb et al., 2012](#); [Punglia, Weeks, Neville, & Earle, 2006](#); [Schroen, Brenin, Kelly, Knaus, & Slingluff, 2005](#); [Voti et al., 2006](#)), only two of which used comparable treatment outcome measures. Two articles included breast cancer mortality outcomes ([Russell, Kramer, Cooper, Thompson, & Arriola, 2011](#); [Tian, Goovaerts, Zhan, Chow, & Wilson, 2012](#)), but used different geographic measures (capacity vs. travel time/distance). Owing to a paucity of articles found on treatment received or breast cancer mortality and limited ability to group these articles by geographic measures or outcomes for comparison, the authors decided to focus the review only on access to screening mammography facilities and its relationship with mammography use and stage at breast cancer diagnosis. Ultimately, 17 articles met our inclusion criteria. The bibliographic references listed in relevant papers were manually searched, through which 4 additional references were identified, resulting in a total of 21 articles for review. Data were extracted from these articles by J.L.E. and J.A.K. into an Excel spreadsheet that included columns for data source for study population and mammography facilities, population, location, descriptions, and categorization of the geographic measure(s) of access, descriptions and categorizations of outcomes, additional covariates included in the analysis, and primary results. Any articles for which inclusion was questionable were discussed by all authors until consensus was reached. Specifically, the authors decided to keep one article in which the outcome was tumor size ([Schroen & Lohr, 2009](#)) because it is one of the main components of breast cancer TNM staging ([Edge et al., 2010](#)). Descriptions of included articles are presented in two tables separated by outcome (mammography use and stage of diagnosis). Tables are organized by type of access measure: capacity, density, distance, and travel time.

Results

[Table 2](#) describes the articles (n = 7) examining the relationship between geographic access and mammography use, and [Table 3](#) includes articles (n = 16) examining the association with stage at diagnosis. Many articles reported results on more than one access measure and are therefore listed multiple times.

Download English Version:

<https://daneshyari.com/en/article/1092885>

Download Persian Version:

<https://daneshyari.com/article/1092885>

[Daneshyari.com](https://daneshyari.com)