Population-based Analysis of Breast Cancer Diagnosis in Alberta

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Introduction

- Breast cancer is the most commonly diagnosed cancer among Canadian women. Early detection and timely diagnostic resolution following detection of breast abnormalities are critical to optimize survival. In Canada, early detection is facilitated by the wide implementation of breast cancer screening programs.
- The purpose of the study was to assess in Alberta: 1) the proportion of screen vs. symptom-detected breast cancers, 2) time to diagnosis by mode of detection, and 3) assess the relationship of several demographic, clinical, and healthcare system factors to 1) and 2).

Methods

Study Population (inclusion and exclusion criteria):

- Female residents of Alberta with histologically-confirmed first primary breast cancer (ICD-O C50 malignant behaviors code 2 and 3), diagnosed between 2004-2010.
- Outcome measures, detection mode (**DetM)** and diagnostic interval (**DiagI**), can be derived (Figure 1).

Main Data Sources:

Alberta Cancer Registry: cohort identification, clinical and demographic data

Screen Test (Salaried radiologists): Screening and diagnostic tests/dates

Physician Claims (fee-for-service physicians): screening and diagnostic tests/dates, primary care visits, comorbidities

Outpatient & Inpatient: primary care visits; comorbidities

Health data were linked using the unique provincial healthcare identification number.

Statistical Analysis

DetM: Logistic regression was used to examine the association of factors associated with screen-detection.
DiagI: Quantile regression models were used to estimate the effect of factors associated with screen and symptom detected patients, separately.

Outcome Measures

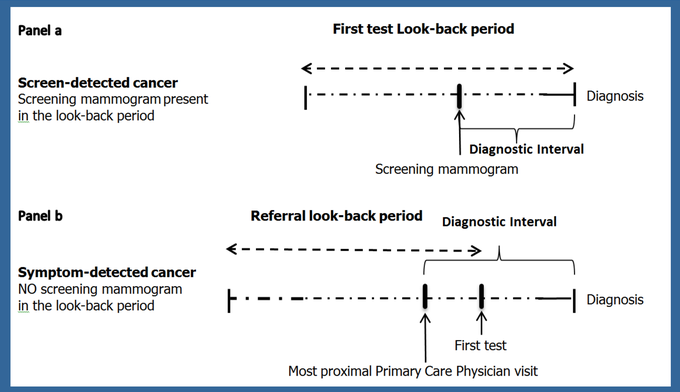

Figure 1: Derivation of the **DetM** and **DiagI** (Yuan et al.). Panel a: DiagI for the **screen-detected** cancers -- time between the date of diagnosis and the date of the screening mammogram. Panel b: DiagI for the **symptom-detected** cancers -- time between the date of diagnosis and the date of the most proximal primary care physician visit prior to the 1st diagnostic test.

Results

DetM (N=12373): Overall 38% of cancers were screen-detected; 47% among the age-eligible population (50-69 yrs)

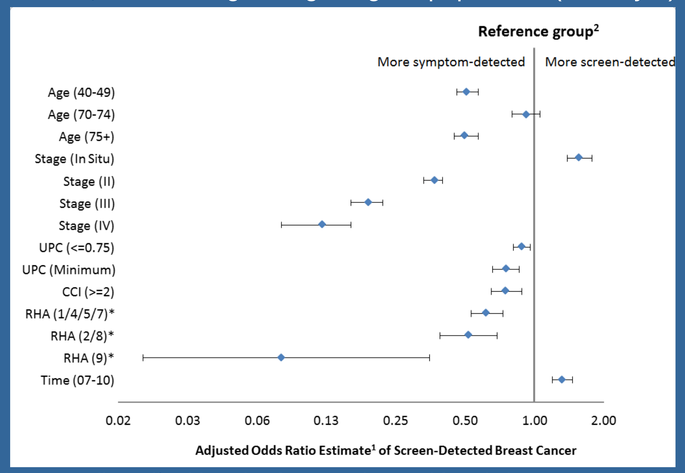

Figure 2: Adjusted[1] odds ratio of screen-detected female breast cancer in Alberta 2004-2010.
[1]Adjusted for the variables shown, plus the interaction of RHA by Time Period
[2]The reference group is: age group 50-69, cancer stage 1, UPC > 0.75, CCI 0 or 1, RHA 3/6, and years 2004-2006.

DetM (cont)

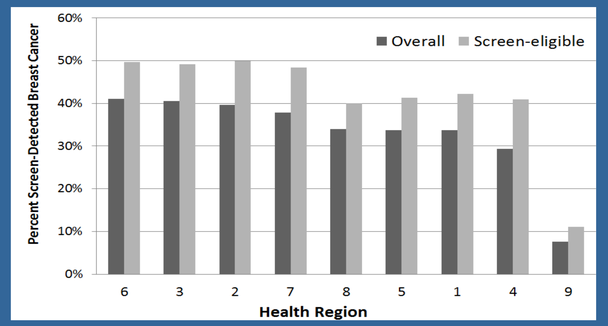

Figure 3: Percent of screen-detected breast cancer by health region (RHA), overall (black) and in screen-eligible patients only (grey) (i.e. age 50 to 69 yrs)

DiagI (N=12,027)**:** Median DiagI was ~20 days for both screen- and symptom-detected cancers. At the 90th percentile, DiagI was 70 days in screen-detected and 92 days in symptom-detected breast cancers. Large regional variation in DiagI was found by DetM (Figure 4) and by time period in symptom-detected cancers (Figure 5).

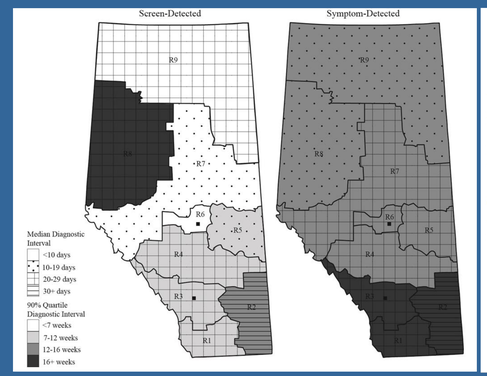

Figure 4: Maps of Alberta displaying the model-estimated median and 90th percentile diagnostic interval by detection mode in each RHA

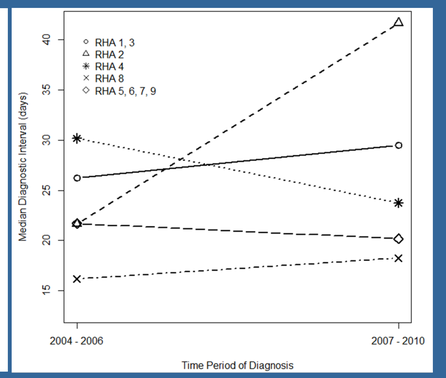

Figure 5: Interaction between Time Period and RHA on the median diagnostic interval in **symptom-detected** cancers

Discussion and Conclusions

- RHA and cancer stage had the strongest associations with DetM and DiagI.
- The patterns of variation in DiagI differed by RHA and stage for each DetM.
- Changes over time in DiagI for symptom-detected cancers that varied by RHA were also found; reasons for these regional differences are unclear.
- Large regional variation in many aspects of healthcare delivery have been found around the world. Although national public reporting efforts are useful, larger efforts are needed in process improvement, routine monitoring at the local level to identify and address root causes that lead to disparities in cancer and other healthcare.

REFERENCE: Yuan Y, Li M, Yang J, Winget M. (2015) Using administrative data to estimate time to breast cancer diagnosis and percent of screen-detected breast cancers - a validation study in Alberta, Canada. *European Journal of Cancer Care* 24: 367–375

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