



**PREDICTORS OF LOW
CERVICAL CANCER
SCREENING AMONG
IMMIGRANT WOMEN IN
ONTARIO**

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Inspired Care. Inspiring Science.

Background

- Cervical cancer = 2nd most common female cancer worldwide
- Incidence in developing = 2 x developed countries
- Patterns of low screening persist after immigration to Canada
- Risk of non-screening not equal across groups
- In Ontario, women from South Asia and Middle East/North Africa lowest relative rates*
- Women from Western Europe and Latin America/Caribbean highest relative rates*

* Lofters AK, Hwang SW, Moineddin R, Glazier RH. Cervical cancer screening among urban immigrants by region of origin: A population-based cohort study. *Prev Med.* 2010 Oct 7.



Rationale & Objectives

- The relative importance of barriers to screening may vary across cultural groups
 - To determine if the **independent effects** on cervical cancer screening of various factors (*sociodemographic, health care-related, acculturation/migration-related*) were **modified** by region of origin for immigrant women
 - To calculate population-attributable fractions for these factors for each region of origin



Methods - Data Sources

- Population-based retrospective cohort study
- Linked databases at Institute for Clinical Evaluative Sciences (ICES)
 - Landed Immigrant Data System
 - Registered Persons' Database
 - Ontario Cancer Registry
 - Canadian Institute of Health Information Discharge Abstract Database
 - Ontario Physicians' Claims Database
 - 2006 Census
 - ICES Physicians Database
 - Corporate Physicians Database
 - Client Agency Program Enrolment



Study Cohort

- Inclusion Criteria:
 - Women aged 18-69 years for all of 2006, 2007 and 2008
 - Eligible for Ontario Health Insurance Plan for all of 2006, 2007 and 2008
 - Most recent postal code in one of Ontario's metropolitan areas
 - In Landed Immigrant Data System (LIDS)
- Exclusion Criteria:
 - History of gynaecological cancer
 - History of colposcopy
 - History of total hysterectomy
 - Physician billed Q140 exclusion code



Landed Immigrant Data System

- Contains demographic information for Ontario's landed immigrants e.g. country of birth, immigrant class
- Recorded on date of issue of landing visa
- Brought in to ICES from Citizenship & Immigration Canada
- Individuals probabilistically linked (80%)
- Data available for those who report Ontario as intended residence
- Spans landing dates of 1985 - 2000



Is region of origin a source of effect modification?

- Each woman's country of birth classified into one of eight world regions, based on modified World Bank classification system
- Eight identical multivariate models created, stratified by world regions
 - East Asia & Pacific
 - Eastern Europe & Central Asia
 - Latin America & Caribbean
 - Middle East & North Africa
 - South Asia
 - Sub-Saharan Africa
 - USA, Australia & New Zealand
 - Western Europe



Variables in Models

- Sociodemographic:
 - ✓ Age category (18-34, 35-49, 50-66)
 - ✓ Neighbourhood income quintile
 - ✓ Small urban vs. large urban residence (Rurality Index of Ontario score)
 - ✓ University degree at time of landing?



Variables in Models

- Health care-related:
 - ✓ Prenatal visit in study period?
 - ✓ Saw a gynaecologist in study period?
 - ✓ In a patient enrolment model?
 - ✓ Female provider?
 - ✓ Provider from same region of the world (based on med school)?
 - ✓ Co-morbidities (Johns Hopkins Case-Mix System)



Variables in Models

- Migration-related:
 - ✓ Immigrant class
 - ✓ English speaking ability at landing
 - ✓ Age at landing
 - ✓ In Canada less than 10 years?



Outcome Definition

- Validated definition*
- At least one Pap test in the three-year study period (2006, 2007, 2008)
- Looked in Physicians' Claims Database for any 1 of:
 - ❑ 2 laboratory codes billed by cytopathologist
 - ❑ 2 procedure codes billed by performing physician
 - ❑ Tray fee code billed by performing physician

*Lofters AK, Moineddin R, Hwang SW, Glazier RH. Low rates of cervical cancer screening among urban immigrants: a population-based study in Ontario, Canada. *Med Care*. 2010 Jul;48(7):611-8.



Statistical Method

- Binary outcome BUT not rare
- Odds ratios not accurate estimate of relative risks
- Multivariate Poisson regression
- Adjusted relative risks then used to calculate population-attributable fractions



Key Findings - Characteristics

- Largest immigrant groups = South Asia (~88 000)
- Smallest = USA, Australia & New Zealand (~10 000)
- Living in poorest neighbourhoods = Latin America & Caribbean (36.1%), Sub-Saharan Africa (45.6%)
- Most education = USA, Australia & New Zealand
- Income/education mismatch = South Asia



Key Findings

- 46.9% of women not screened during 3-yr period
- Little effect modification by region
- Certain variables significantly associated with non-screening across all, or nearly all, world regions
 - Youngest or oldest age group
 - Lowest income quintile
 - Not in patient enrolment model
 - No female provider
 - Provider from same region*



Key Findings - ARRrS

- Youngest age group (18-34 yrs) – 1.24 [1.22-1.26]
- Oldest age group (50-66 yrs) – 1.15 [1.13-1.17]
- Lowest income quintile – 1.14 [1.12-1.15]
- Not in patient enrolment model – 1.39 [1.37-1.41]
- No female provider – 1.43 [1.41-1.45]
- Provider from same region – 1.15 [1.13-1.16]



Key Findings - PAFs

- $PAF = p(ARR - 1) / (1 + p(ARR - 1))$
- For ALL world regions, highest population-attributable fraction for “no female provider”
 - 16.8% [14.6-19.1%] Middle East & North Africa
 - 27.4% [26.2-28.6%] East Asia & Pacific



Key Findings - #2 PAFs

- Not in patient enrolment model
 - East Asia & Pacific 5.9% [5.3%-6.5%]
 - USA, Australia & New Zealand 9.5% [6.2%-12.8%]
 - Western Europe 12.1% [10.4%-13.8%]
- No university degree
 - Eastern Europe & Central Asia 6.9% [4.7%-9.1%]
- Lowest income quintile
 - Sub-Saharan Africa 8.9% [5.7%-12.1%]
- Youngest age group
 - Latin America & Caribbean 7.4% [5.7-9.1%]
 - Middle East & North Africa 7.5% [5.1-9.9%]
 - South Asia 7.7% [6.4-9.1%]



Summary

- Ontario's immigrant women continue to be inadequately screened
- Certain factors seem to negatively affect screening, regardless of culture/ethnicity
 - Patient enrolment model
 - Gender and cultural origin of provider
 - Age and income of patient



Limitations

- Previously collected data e.g. religion, marital status
- LIDS data only at time of landing e.g. language ability, education
- LIDS not complete
- Country of birth does not always reflect cultural or ethnic origin



Implications

- After arrival, immigrants need to be connected with primary health care system
- Increase enrolment of immigrants in patient enrolment models
- Some models provide funding for allied health staff – female nurses/nurse practitioners/physician assistants?
- Targeted physician education for foreign-trained physicians?



Future Directions

- Explore lower screening rates when ethnic congruence between physician and patient
- Qualitative work with both physicians and patients
- Targeted interventions = community-based participatory approach



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Questions?

