Breast cancer control in Brazil

Gulnar Azevedo e Silva

London, May 2014
The burden of breast cancer in Brazil
Incidence

Age-standardized incidence of breast cancer in Brazil, selected cities

## Incidence

Age-standardized incidence of breast cancer in Brazil, selected cities, compared to those of higher and lower incidence in the world, 1999-2002

<table>
<thead>
<tr>
<th>Incidence*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>USA, Distr Columbia: White</td>
<td>115,2</td>
</tr>
<tr>
<td>USA, California, San Franc Bay Area: Non-Hispanic White</td>
<td>110,9</td>
</tr>
<tr>
<td>USA, California, Los Angeles County: Non-Hispanic White</td>
<td>110,0</td>
</tr>
<tr>
<td><strong>Brazil</strong></td>
<td></td>
</tr>
<tr>
<td>Brasília</td>
<td>68,7</td>
</tr>
<tr>
<td>Cuiabá</td>
<td>51,7</td>
</tr>
<tr>
<td>Goiânia</td>
<td>53,8</td>
</tr>
<tr>
<td>São Paulo</td>
<td>80,8</td>
</tr>
<tr>
<td>Oman: Omani</td>
<td>14,6</td>
</tr>
<tr>
<td>China, Jiashan</td>
<td>14,7</td>
</tr>
<tr>
<td>China, Zhongshan</td>
<td>15,4</td>
</tr>
</tbody>
</table>

*per 100 000 age-standardized World Population (Doll 1966)
## Incidence

Age-standardized incidence of breast cancer in Brazil, selected cities, compared to those of higher and lower incidence in the world, 2003-2007

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Incidence*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>110,8</td>
</tr>
<tr>
<td>New Zealand: Maori</td>
<td>107,4</td>
</tr>
<tr>
<td>USA, Hawaii: Hawaiian</td>
<td>106,4</td>
</tr>
<tr>
<td><strong>Brazil</strong></td>
<td></td>
</tr>
<tr>
<td>Aracaju</td>
<td>59,7</td>
</tr>
<tr>
<td>Belo Horizonte</td>
<td>66,8</td>
</tr>
<tr>
<td>Cuiabá</td>
<td>51,8</td>
</tr>
<tr>
<td>Fortaleza</td>
<td>52,0</td>
</tr>
<tr>
<td>Goiânia</td>
<td>69,3</td>
</tr>
<tr>
<td>São Paulo</td>
<td>77,7</td>
</tr>
<tr>
<td>South Africa: PROMEC</td>
<td>7,3</td>
</tr>
<tr>
<td>India, Barshi, Paranda and Bhum</td>
<td>8,3</td>
</tr>
<tr>
<td>India, Sikkim State</td>
<td>8,6</td>
</tr>
</tbody>
</table>

*per 100 000 age-standardized World Population (Doll 1966)
Incidence

Increasing incidence due to strong demographic changes (urbanization process and changes in life style)
  - increase of life expectancy at birth
  - significant fertility decline
  - increase of obesity

Overall incidence is still on the increase whereas mortality has began to decline in the capitals of the Southeast and South regions
Mortality

. 13 225 deaths in 2011 (15.4% of total deaths from cancer)

. By regions, capitals/interior

*per 100000, age-standardized (World Population – Doll, 1966)
Mortality

Mortality* from breast cancer, Brazil, 1980-2010

North region

Northeast region

Center-West region

*per 100000, age-standardized (World Population – Doll, 1966)
Mortality

Mortality* from breast cancer, Brazil, 1980-2010

Southeast region

South region

*per 100000, age-standardized (World Population – Doll, 1966)
Mortality* from main types of cancer in women, Rio de Janeiro State, 1980-2009

*rates by 100,000, age-standardised (Brazilian Population CENSO – Brasil 2010).
Gamarra, Girianelli e Azevedo e Silva, 2013.
Mortality* from breast cancer, Rio de Janeiro State, Brazil, 1980-2010

*rates by 100,000, age-standardised (Brazilian Population CENSO – Brasil 2010).
Gamarra, Girianelli e Azevedo e Silva, 2013.
Mortality

Mortality* from cervical cancer, Rio de Janeiro State, 1980-2010

*rates by 100 000, age-standardised (Brazilian population CENSO – Brasil 2010).
Gamarra, Girianelli e Azevedo e Silva, 2013.
Mortality

Mortality* from breast cancer, Brazil, Southeast and South regions, 1980-2010

<table>
<thead>
<tr>
<th>Region</th>
<th>Trend 1</th>
<th></th>
<th>Trend 2</th>
<th></th>
<th>Trend 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Period</td>
<td>APC</td>
<td>95% CI</td>
<td>Period</td>
<td>APC</td>
</tr>
<tr>
<td><strong>Southeast</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capitals</td>
<td>1980-1997</td>
<td>0,9</td>
<td>0,8 a 1,0</td>
<td>1997-2002</td>
<td>-2,8</td>
</tr>
<tr>
<td>Interior</td>
<td>1980-2010</td>
<td>0,6</td>
<td>0,4 a 0,8</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>South</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capitals</td>
<td>1980-1991</td>
<td>1,6</td>
<td>1,1 a 2,2</td>
<td>1991-2010</td>
<td>-1,3</td>
</tr>
<tr>
<td>Interior</td>
<td>1980-2010</td>
<td>2,4</td>
<td>2,0 a 2,8</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Brazil</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capitals</td>
<td>1980-1997</td>
<td>0,7</td>
<td>0,6 a 0,8</td>
<td>1997-2003</td>
<td>-2,6</td>
</tr>
<tr>
<td>Interior</td>
<td>1980-2010</td>
<td>1,1</td>
<td>1,0 a 1,2</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Mortality

. Increasing trends in the mortality rates:
  - higher in the interior

. Declining rates are been observed in capitals of the most developed regions:
  Southeast region (since 1998)
  South region (since 1992)

Women living outside of the state capitals are not benefiting from early detection and treatment (i.e. not been treated in the early stages of the disease)
Screening and early detection of breast cancer in Brazil
Breast cancer control in Brazil
Ministry of Health (2004)

Screening recommendations:

- 40-69 yrs: physical examination annually
- 50-69 yrs: mammographic exam biannually
Early detection

Coverage of self-reported mammography

*IBGE (PNAD)*

50-69 years old
2003: 54.5 %
2008: 71.5 %

Factors associated with performing the exam:

*Oliveira et al., 2011*

- income, education, being married, having had medical consultation, having health insurance
- to live in the metropolitan area trebles the risk
Early detection

Mammographic capacity: available with currently installed machines & required to reach 60% coverage, Brazil and regions, 2012

<table>
<thead>
<tr>
<th>Region</th>
<th>Female population -2012</th>
<th>No mammographic machines in SUS</th>
<th>Mammographic capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High risk*</td>
<td>40-49 yrs**</td>
<td>50-59 yrs***</td>
</tr>
<tr>
<td>Center-West</td>
<td>28.745</td>
<td>156.232</td>
<td>582.924</td>
</tr>
<tr>
<td>Northeast</td>
<td>106.658</td>
<td>531.559</td>
<td>2.217.144</td>
</tr>
<tr>
<td>North</td>
<td>25.150</td>
<td>135.285</td>
<td>488.053</td>
</tr>
<tr>
<td>Southeast</td>
<td>191.526</td>
<td>938.117</td>
<td>4.222.442</td>
</tr>
<tr>
<td>South</td>
<td>65.069</td>
<td>325.382</td>
<td>1.452.449</td>
</tr>
<tr>
<td>Brazil</td>
<td>417.147</td>
<td>2.086.574</td>
<td>8.963.012</td>
</tr>
</tbody>
</table>

* 1% female pop >35 years
** 16% of females
*** 56% of females
**** No. of mammographic machines *4 exams/hr * working day of 8 hrs * 22 days *12 mths * 80% capacity

Adapted from: Ministério da Saúde/INCA, 2006. A Situação do Câncer no Brasil
Early detection

No. of mammographic exams paid by SUS & No. that can be performed with currently installed equipment in SUS, 2005

Adapted from: Ministério da Saúde/INCA, 2006. A Situação do Câncer no Brasil
Early detection

No. of mammographic exams paid by SUS & No. that can be performed with currently installed equipment in SUS, 2012

Adapted from: Ministério da Saúde/INCA, 2006. A Situação do Câncer no Brasil
Early detection

Access to early detection of breast cancer in Brazilian Unified Health System: an analysis based on data from Health Information System


**Aims:**

(i) estimate the coverage of mammographic screening;
(ii) assess the extent to which abnormal mammographic findings are being further investigated;
(iii) examine whether the number of surgeries performed is appropriate given current estimates of breast cancer incidence.

**Methods:**

The analysis was carried out using data from the Unified Health System (SUS) SISMAMA, SIA and SIH - for the year 2010, by macro region and age-group.

Ratios were calculated in order to assess the correspondence between the registered numbers of mammographies, biopsies and surgeries in the SUS and estimated new cases of breast cancer among women SUS dependent (about 70% of Brazilian population).
Access to early detection of breast cancer in Brazilian Unified Health System (SUS): an analysis based on data from Health Information System

_Azevedo e Silva, Bustamante-Teixeira, Tomazelli, Aquino e Santos Silva. Cad Saúde Pública, 2014, in press._

### Coverage*(%) of mammography among the target population – SUS dependent women, 2010

<table>
<thead>
<tr>
<th>Region</th>
<th>North</th>
<th>Northeast</th>
<th>Southeast</th>
<th>South</th>
<th>Center-west</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-59 yrs old</td>
<td>11,4</td>
<td>19,4</td>
<td>40,6</td>
<td>47,6</td>
<td>18,7</td>
<td>32,2</td>
</tr>
<tr>
<td>60-69 yrs old</td>
<td>8,3</td>
<td>13,7</td>
<td>32,6</td>
<td>38,0</td>
<td>13,6</td>
<td>25,0</td>
</tr>
</tbody>
</table>

*Estimated based on number of mammograms registered in SUS/ female population SUS dependent*
### Coverage*(%) of mammography among the target population – SUS dependent women, 2010

**Region**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>North</th>
<th>Northeast</th>
<th>Southeast</th>
<th>South</th>
<th>Center-west</th>
<th>Brazil</th>
</tr>
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<tr>
<td>50-59 years old</td>
<td>11,4</td>
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<td>8,3</td>
<td>13,7</td>
<td>32,6</td>
<td>38,0</td>
<td>13,6</td>
<td>25,0</td>
</tr>
<tr>
<td>40-49 years old</td>
<td>9,5</td>
<td>17,6</td>
<td>33,8</td>
<td>39,4</td>
<td>15,5</td>
<td>26,4</td>
</tr>
</tbody>
</table>

*Estimated based on number of mammograms registered in SUS/ female population SUS dependent.

Early detection

Results

Number of mammographies/ Number of women from the target population:
- low in all age groups analyzed
- the values may be overestimated:
  1. including screening and diagnostic mammographies
  2. duplicated exams were not taken into account

Number of biopsies/ Number of screened cases which demand diagnosis

0.27 = 50-59 years old and 0.63=60-69 years old

Did many cases undergo surgery without biopsy?

Early detection

Results

The ratio of Number of surgeries/ Estimated cases is higher than the ratio of Number of detected cases/ Estimated new cases

. Are there a subset of women that underwent MMG out of the SUS and the surgery in the SUS?

. Is it possible that some cases diagnosed and operated on as malignant neoplasms were indeed benign neoplasms?

. Are there a number of women undergoing surgery in advanced stages?

. Are there an excess of surgeries out of the target population? (which would increase the chancer of overdiagnosis)

_Azevedo e Silva et al. Cad Saúde Pública, 2014, in press._
Conclusions

• The low coverage of the mammography screening, the inadequate follow-up of suspected lesions and the insufficient access to surgery lead to a very low impact of the screening actions in the mortality of breast cancer in Brazil

• The improvement of the specific indicators based on well planned measures to monitor the cost-effectiveness of mammography screening should be regarded as a priority of public health
Challenges

- Improving the access to screening, diagnosis and treatment
  - Ensuring the follow-up of all women with altered results
  - Extending the offer of exams for obtaining early diagnoses

- Organizing specialized services of surgery, radiotherapy and chemotherapy in all regions (and not only in the urban centers)

Control efforts aimed at reducing mortality from breast cancer must be implemented within a rigorous evaluation framework with constant monitoring of their impact at a population level
Partnership between IMS/UERJ and LSHTM

Studies are being planned:

The evaluation of the early detection of breast cancer

1. Analysis of the follow-up of women with lesions detected in mammography exams through linkage of different SUS databases (with the participation of two PhD students)

2. Survival analysis using data from PBCR and Mortality Health System among screened women (SIM) (with one MSc student)

Investigation of factors associated to late detection

A methodology is being developed using a case-case design to compare factors associated with having a diagnosis in III-IV stages compared to I-II stages (downstaging studies)

Study population: patients admitted in the two larger centers of breast cancer surgery in Rio de Janeiro city (with one MSc and one PhD student)