Microcephaly in Brazil: prevalence and characterization of cases from the Information System on Live Births (Sinasc), 2000-2016


Fatima Marinho , M.D., MPH, PhD
Ministry of Health – Brazil
Secretariat of Health Surveillance
Department of NCDs and Health Promotion - Information and Health Analysis
Objectives

To estimate the prevalence of microcephaly (2000-2016) and characterize the cases in Brazil (2015)
Brazilian live birth information system - SINASC

- **Vital registration:** birth throughout the country
  - public and private health facilities
  - other places as domicile

- **Standardized document for data collection**

- **Objective:** to provide information on the characteristics of
  - live births (including congenital anomalies)
  - pregnancy
  - mothers
  - childbirth

- **Filled by health professional**

- **Congenital anomalies detectable at birth** (textual form)

- **Qualified coding of the described anomalies is performed in a second moment by trained staff (coders)**
### Chapter 17 - Congenital malformations, deformations and chromosomal abnormalities

- **Q00-Q07** Nervous system
  - **Q02** - Microcephaly
- **Q10-Q18** Eye, ear, face and neck
- **Q20-Q28** Circulatory system
- **Q30-Q34** Respiratory system
- **Q35-Q37** Cleft lip and cleft palate
- **Q38-Q45** Other congenital malformations of the digestive system
- **Q50-Q56** Genital organs
- **Q60-Q64** Urinary system
- **Q65-Q79** Musculoskeletal system
- **Q80-Q89** Other congenital malformations
- **Q90-Q99** Chromosomal abnormalities, not elsewhere classified

---

**Introduction**

The International Statistical Classification of Diseases and Health Related Problems

Tenth Revision

Volumen 1

PAN AMERICAN HEALTH ORGANIZATION
Pan-American Sanitary Office, Regional Office of THE WORLD HEALTH ORGANIZATION
Methods

1. **Data source**: Live Birth Information System (Sinasc)

2. **Measures**

2.1 Prevalence percentage

Prevalence 2006-2014 (mean) vs Prevalence 2015

2.2 Prevalence of microcephaly at birth

Prevalence by regions, states, characteristics of the mother and the newborn

\[
\frac{\text{# of LB with microcephaly}}{\text{Total of LB}} \times 100,000
\]
Results

Percentage of most frequent groups of congenital anomalies 2006-2014 to 2015 in Brazil

2006-2014 ≈24,500 anomalies/year
2015 ≈29,800 anomalies (+21.6%)
### Microcephaly in Brazil

#### Results

**Microcephaly in the News**

<table>
<thead>
<tr>
<th>Date</th>
<th>Prev (per 100,000 LB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>5.5</td>
</tr>
<tr>
<td>2001</td>
<td>5.5</td>
</tr>
<tr>
<td>2002</td>
<td>6.1</td>
</tr>
<tr>
<td>2003</td>
<td>5.7</td>
</tr>
<tr>
<td>2004</td>
<td>5.7</td>
</tr>
<tr>
<td>2005</td>
<td>5.4</td>
</tr>
<tr>
<td>2006</td>
<td>5.3</td>
</tr>
<tr>
<td>2007</td>
<td>4.7</td>
</tr>
<tr>
<td>2008</td>
<td>5.1</td>
</tr>
<tr>
<td>2009</td>
<td>4.9</td>
</tr>
<tr>
<td>2010</td>
<td>5.7</td>
</tr>
<tr>
<td>2011</td>
<td>5.3</td>
</tr>
<tr>
<td>2012</td>
<td>6.5</td>
</tr>
<tr>
<td>2013</td>
<td>6.3</td>
</tr>
<tr>
<td>2014</td>
<td>5.4</td>
</tr>
<tr>
<td>jan/15</td>
<td>7.5</td>
</tr>
<tr>
<td>fev/15</td>
<td>6.3</td>
</tr>
<tr>
<td>mar/15</td>
<td>5.0</td>
</tr>
<tr>
<td>abr/15</td>
<td>6.1</td>
</tr>
<tr>
<td>mai/15</td>
<td>7.8</td>
</tr>
<tr>
<td>jun/15</td>
<td>6.3</td>
</tr>
<tr>
<td>jul/15</td>
<td><strong>11.1</strong></td>
</tr>
</tbody>
</table>

**WHO advised that the cluster of microcephaly cases and other neurological disorders reported in Brazil constitutes a Public Health Emergency of International Concern (PHEIC)**

**Brazil asks whether Zika acts alone to cause birth defects**

Puzzling distribution of cases suggests Zika is not the only factor in reported microcephaly surge.
Prevalence of microcephaly in Brazil, Jan-2015 to Dec-2015

Results

Microcephaly in Brazil

Northeast
Results

Prevalence by characteristics of the mother (per 100,000 LB)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Skin color</th>
<th>Schooling (years)</th>
<th>Marital status</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-24</td>
<td>70.3</td>
<td>60.3</td>
<td>49.0</td>
</tr>
<tr>
<td>25-29</td>
<td>49.0</td>
<td>49.0</td>
<td>28.3</td>
</tr>
<tr>
<td>30-34</td>
<td>42.0</td>
<td>28.6</td>
<td>28.3</td>
</tr>
<tr>
<td>35-39</td>
<td>62.1</td>
<td>50.4</td>
<td>50.4</td>
</tr>
<tr>
<td>+40</td>
<td>71.9</td>
<td>71.9</td>
<td>71.9</td>
</tr>
<tr>
<td>0-3</td>
<td>73.4</td>
<td>67.1</td>
<td>67.1</td>
</tr>
<tr>
<td>4-7</td>
<td>56.4</td>
<td>56.4</td>
<td>56.4</td>
</tr>
<tr>
<td>8-11</td>
<td>31.2</td>
<td>31.2</td>
<td>31.2</td>
</tr>
<tr>
<td>+12</td>
<td>62.3</td>
<td>42.0</td>
<td>42.0</td>
</tr>
<tr>
<td>Single</td>
<td></td>
<td></td>
<td>40.3</td>
</tr>
<tr>
<td>Married</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In cohabitation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Prevalence by neonates characteristics (per 100,000 LB)

<table>
<thead>
<tr>
<th>Weeks of pregnancy</th>
<th>Apgar 1st min</th>
<th>Birth weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>37&gt;</td>
<td>81.7</td>
<td>235.1</td>
</tr>
<tr>
<td>37</td>
<td>70.0</td>
<td>37</td>
</tr>
<tr>
<td>38</td>
<td>55.9</td>
<td>+2,500</td>
</tr>
<tr>
<td>39-41</td>
<td>44.8</td>
<td>48.4</td>
</tr>
<tr>
<td>+42</td>
<td>72.8</td>
<td>79.6</td>
</tr>
<tr>
<td>0-3</td>
<td>258.9</td>
<td>4-7</td>
</tr>
<tr>
<td>4-7</td>
<td>79.6</td>
<td>8-10</td>
</tr>
<tr>
<td>8-10</td>
<td>48.4</td>
<td>2,500 &gt;</td>
</tr>
<tr>
<td>2,500 &gt;</td>
<td></td>
<td>+ 2,500</td>
</tr>
</tbody>
</table>
Results

Post-outbreak

- A sharp drop in prevalence
- Higher levels compared to the period prior to the outbreak

Zika (feb/2016) vs Microcephaly (aug/2016)

Microcephaly in Brazil
Conclusions

• Zika outbreak throughout the country
• Microcephaly prevalence increased specially in the Northeast region
• Improvement in the standardized document for data collection
• Microcephaly outbreak increased anomalies awareness and notification
  • Osteomuscular anomalies (visible) increased too

Final considerations

• Why end of 2015 - beginning of 2016?
• Why the intensity and severity in Northeast?
• Ethiology: unicausal?
Thank you!

Fatima Marinho
fatima.marinho@saude.gov.br