GLOBAL BURDEN of ORAL CANCER and
RECENT TRENDS in ORAL CANCER INCIDENCE
with particular emphasis on INDIA

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Unlike in most regions of the world, in India, cancer incidence is lower and a preponderance of women is forthcoming (http://globocan.iarc.fr/)
INTRODUCTION

• Oral cavity cancers [ICD-10:C00-06]
  - Lip [C00]
  - Tongue [C01-02]
  - Mouth [C03-06]
    - Gum [C03]
    - Floor of Mouth [C04]
    - Cheek mucosa [C06]
    - Palate [C05]
Unlike in most regions of the world, in India, oral cancer incidence is higher than average global rates; male preponderance is seen. India’s share of global oral cancer burden is 26%.
ORAL CANCER INCIDENCE – TOP 5 COUNTRIES, Year 2012

Male – India ranks 14th

Female – India ranks 13th

Source: GLOBOCAN, 2012
ORAL CANCER BURDEN – TOP 5 COUNTRIES, Year 2012

Male – India ranks 1st

Female – India ranks 1st

Source: GLOBOCAN, 2012
MOUTH CANCER INCIDENCE – TOP 5 COUNTRIES, 2003-07

Source: CI5, Vol 10, 2014
TONGUE CANCER INCIDENCE – TOP 5 COUNTRIES, 2003-07

**Tongue, Male**

- India, Bhopal: 10.3
- USA, Hawaii, Wh: 6.4
- Brazil, Sao Paulo: 5.6
- Malaysia, Indian: 5.4
- Portugal, Azores: 5.1

**Rate per 100,000**

Source: CI5, Vol 10, 2014

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**Tongue, Female**

- Australia, NT: 5.2
- Canada, Yukon: 3.6
- India, Trivandrum: 3.5
- USA, Hawaii, Wh: 2
- Switzerland, Vaud: 1.6

**Rate per 100,000**
LIP CANCER INCIDENCE – TOP 5 COUNTRIES, 2003-07

**Lip, Male**

- Spain, Granada: 8.6
- Australia, Tasmania: 7.6
- Portugal, Azores: 6.2
- Ukraine: 3.3
- Italy, Trapani: 3

**Lip, Female**

- Australia, Tasmania: 2
- Thailand, KK: 1.6
- Brazil, Aracaju: 1.4
- Spain, Granada: 0.8
- Serbia, Central: 0.7

Source: CI5, Vol 10, 2014
AGE STANDARDIZED RATES OF ORAL CANCERS BY SITE, 2003-2007

Australia, Men

- Mouth: 5.0
- Lip: 2.0
- Tongue: 2.4

Australia, Women

- Mouth: 1.0
- Lip: 1.4
- Tongue: 1.0

Spain, Men

- Mouth: 3.4
- Lip: 2.2
- Tongue: 3.3

Spain, Women

- Mouth: 1.0
- Lip: 0.4
- Tongue: 1.3
AGE STANDARDIZED RATES OF ORAL CANCERS BY SITE, 2003-2007

India, Men

Mouth: 6.7
Lip: 0.3
Tongue: 6.4

India, Women

Mouth: 4.6
Lip: 0.2
Tongue: 2.2

Thailand, Men

Mouth: 2.2
Lip: 0.2
Tongue: 2.3

Thailand, Women

Mouth: 1.2
Lip: 0.6
Tongue: 0.7
**Common cancers in India, Year 2012**

<table>
<thead>
<tr>
<th>SITE-Men</th>
<th>ASR</th>
<th>Range</th>
<th>SITE-Women</th>
<th>ASR</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>11.0</td>
<td>2.4 – 45.7</td>
<td>Breast</td>
<td>25.8</td>
<td>7.2 – 36.6</td>
</tr>
<tr>
<td>Oral</td>
<td>10.1</td>
<td>3.5 – 29.3</td>
<td>Cervix</td>
<td>22.0</td>
<td>5.6 – 25.1</td>
</tr>
<tr>
<td>Stomach</td>
<td>8.6</td>
<td>1.1 – 64.2</td>
<td>Large bowel</td>
<td>5.1</td>
<td>0.9 – 6.9</td>
</tr>
<tr>
<td>Large bowel</td>
<td>7.2</td>
<td>1.9 – 9.2</td>
<td>Ovary</td>
<td>4.9</td>
<td>1.5 – 10.7</td>
</tr>
<tr>
<td>Pharynx</td>
<td>6.3</td>
<td>2.2 – 27.7</td>
<td>Oral</td>
<td>4.3</td>
<td>1.2 – 10.8</td>
</tr>
<tr>
<td>Oesophagus</td>
<td>5.4</td>
<td>2.9 – 71.4</td>
<td>Stomach</td>
<td>3.7</td>
<td>0.8 – 31.2</td>
</tr>
</tbody>
</table>

- Common cancer pattern is different from that seen in more-developed countries; Oral cancers are ranked within the top 5 in both sexes

- Regional variation within India is evident given the very wide range of values from individual registries
Oral Cancer Incidence by Regions, India, MEN, Year 2009-11

South

- Chennai: 14.0
- Trivandrum: 13.8
- Kollam: 10.9
- Bangalore: 9.0
- Dindigul: 5.1

Central & North

- Bhopal: 21.9
- Nagpur: 18.3
- Delhi: 15.5

West

- Ahmedabad: 26.1
- Wardha: 13.8
- Mumbai: 12.9
- Pune: 10.6
- Barshi: 8.9

East & North-east

- Kamrup: 17.4
- Dibrugarh: 14.0
- Kolkata: 10.0
- Tripura: 8.4
- Sikkim: 4.6
### TOBACCO USE* % BY RESIDENCE AND GENDER
#### INDIA, 2005-06

<table>
<thead>
<tr>
<th>Area</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chew</td>
<td>Smoke</td>
</tr>
<tr>
<td>Rural</td>
<td>41.8</td>
<td>35.8</td>
</tr>
<tr>
<td>Urban</td>
<td>31.7</td>
<td>29.1</td>
</tr>
<tr>
<td>Total</td>
<td>38.1</td>
<td>33.3</td>
</tr>
</tbody>
</table>

* 15-49 years of age; Source: NFHS-3, 2005-06

**Overall tobacco use prevalence is 27.5%**
- 57% in males
  - (Rural: 61%; Urban: 50%)
- 11% in females
  - (Rural: 13%; Urban: 7%)
An inverse relationship between socio-economic status and oral cancer incidence is forthcoming

Incidence ↓ as education level ↑

This suggests an association between lifestyle factors and oral cancer incidence
Oral cancers in Tamil Nadu state: Urban vs. rural

- Incidence more in Chennai by 1-2 folds than Dindigul district
- Environment factors especially ETS
- Lifestyle factors especially diet and physical exercise
• **Mouth cancer**
  • Was ranked 3rd in 1982 as well as in 2010 among men-No change
  • Was ranked 3rd in 1982 and ranked 6th in 2010 in women

• Trend in men: Incidence rate static till 2003 but ↑ in recent years
• Trend in women: Incidence rate is decreasing over the years

• Average annual percent change: 1% ↑ in men; 1.5% ↓ in women
Mouth cancer is decreasing among women
Tobacco chewing is inversely related to education
Increase in literacy levels is observed in women over time

Mouth cancer in men remained static until 2005 but ↑ in recent years
No major change in literacy levels in men
Increase in tobacco chewing in young urban men in recent years is observed (Reddy et al., 2006 in Lancet)
## Predicted cases, incidence and % change in common cancers in Chennai, India, in 2012-2016 compared to 2002-2006

<table>
<thead>
<tr>
<th>Predicted pattern for 2012-16</th>
<th>Average no. of cases/ year</th>
<th>% change -Total</th>
<th>% change due cancer risk</th>
<th>% change due to population Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2004</td>
<td>2014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouth</td>
<td>93</td>
<td>98</td>
<td>+5.4</td>
<td>- 8.6</td>
</tr>
</tbody>
</table>

The predicted decrease in mouth cancer incidence among women in 2014 compared to 2004 that is attributable to site-specific risk is offset by demographic effect resulting in no let up in burden of cases.
Average annual new cases of selected cancers
Projection for Tamil Nadu, 2012-2016

<table>
<thead>
<tr>
<th>Cancer</th>
<th>Number per year</th>
<th>% to total cancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>7,724</td>
<td>25.9</td>
</tr>
<tr>
<td>Cervix</td>
<td>7,169</td>
<td>24.0</td>
</tr>
<tr>
<td>Oral</td>
<td>5,326</td>
<td>9.7</td>
</tr>
<tr>
<td>Stomach</td>
<td>3,683</td>
<td>6.7</td>
</tr>
<tr>
<td>Pharynx/other oral</td>
<td>3,064</td>
<td>5.6</td>
</tr>
<tr>
<td>Lung</td>
<td>2,749</td>
<td>5.0</td>
</tr>
</tbody>
</table>
Intra country variation in cancer survival highlights the inequity in access to and/or development of cancer treatment services or early detection practices.
5-year absolute survival for localised and regional extent of disease among more and less developed health services – Oral cancer

<table>
<thead>
<tr>
<th></th>
<th>More dev.</th>
<th>Less dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localised</td>
<td>34.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Regional</td>
<td>25.0</td>
<td>60.0</td>
</tr>
</tbody>
</table>

Absolute survival for localised and regional extent of disease among more and less developed health services of oral cancer

<table>
<thead>
<tr>
<th>Year</th>
<th>Localised-more dev.</th>
<th>Localised-less dev.</th>
<th>Regional-more dev.</th>
<th>Regional-less dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>69.6</td>
<td>60.0</td>
<td>40.7</td>
</tr>
<tr>
<td>2</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Stage distribution (%) of oral cancer patients treated at Cancer Institute (WIA), Chennai, 2006-2009

<table>
<thead>
<tr>
<th>Stage</th>
<th>TONGUE (496)</th>
<th>MOUTH (745)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>15.7</td>
<td>2.8</td>
</tr>
<tr>
<td>II</td>
<td>23.4</td>
<td>13.8</td>
</tr>
<tr>
<td>III</td>
<td>25.4</td>
<td>35.8</td>
</tr>
<tr>
<td>IV</td>
<td>35.3</td>
<td>47.8</td>
</tr>
<tr>
<td>Unkown</td>
<td>0.2</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Majority were in Stage IV for both cancers
OVERALL SURVIVAL% of ORAL CANCERS, Treated at Cancer Institute (W.I.A), 2006-09

(n=1,241)
OVERALL SURVIVAL% of TONGUE CANCERS, Treated at Cancer Institute (W.I.A), 2006-09

(n=1,241)
OVERALL SURVIVAL% of MOUTH CANCERS, Treated at Cancer Institute (W.I.A), 2006-09

- FOM – 54.1
- Palate – 46.3
- Cheek – 39.9
- Gum – 31.0
### Five-year survival% comparison – Oral cancers

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Mouth</td>
<td>33</td>
<td>31</td>
<td>35</td>
<td>55</td>
</tr>
<tr>
<td>Tongue</td>
<td>27</td>
<td>19</td>
<td>37</td>
<td>56</td>
</tr>
</tbody>
</table>

**Source:** Swaminathan et al 2009 in Cancer Epidemiology; SEER Cancer Statistics Review 1975-2003, NCI, USA;  
*Includes all cases treated or not; CI: Cancer Institute (WIA), Chennai*
SUMMARY

• Oral cancers are common in several regions of the world where tobacco use, alcohol consumption are high; India accounts for 26% of global oral cancer burden

• The variation in incidence of cancers by subsite of oral cavity is mostly related to the distribution of major risk factors: tobacco or betel quid chewing, cigarette or bidi smoking and alcohol consumption

• Overall incidence rates over 1982-2011 in India show
  • ↑ trend in males and ↓ trend in females

• Overall trends are reflection of underlying trends in cancers of major sub-sites which seem to be related to the changing prevalence of risk factors

• Advanced stage at presentation coupled with less developed health services resulted in poor survival from oral cancers