Setting the scene: head and neck cancer in Ireland

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Financial conflict of interest

The National Cancer Registry Ireland, which employs Dr Sharp, is funded by the Department of Health.

Dr Sharp currently holds grants from the Health Research Board to investigate support needs in head and neck cancer survivors and their caregivers.

As part of the CERVIVA collaboration, Dr Sharp is grant-holder on grants from the Health Research Board and the Friends of the Coombe Hospital. She has also held grants from the Medical Research Council, National Health Service and NHS Cervical Screening Programme for HPV-related research in the UK.
Outline

• Sources of data on head and neck cancer

• Burden of head and neck cancer in Ireland
  ➢ Incidence
  ➢ Survival
  ➢ Mortality

• Head and neck cancer research in the Republic of Ireland
  ➢ The SuN Study
  ➢ Epidemiology of HPV infection in head and neck cancer

• Summary & conclusions
Sources of data on head and neck cancer in Ireland

Northern Ireland Cancer Registry (NICR)
- population-based
- operational since 1993
- records all cancers in Northern Ireland population (pop. ~ 1.5m)

National Cancer Registry Ireland (NCRI)
- population-based
- operational since 1994
- records all cancers in Republic of Ireland population (pop. ~ 4m)
## Incidence and prevalence: summary statistics

<table>
<thead>
<tr>
<th>Head and neck cancers (C01-C14, C30-C32)</th>
<th>All Ireland</th>
<th>RoI</th>
<th>NI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>females</td>
<td>males</td>
<td>females</td>
</tr>
<tr>
<td>rank*</td>
<td>16th</td>
<td>6th</td>
<td></td>
</tr>
<tr>
<td>average number of new cases per year</td>
<td>170</td>
<td>438</td>
<td>105</td>
</tr>
<tr>
<td>ratio of male to female cases</td>
<td>2.6:1</td>
<td></td>
<td>2.8:1</td>
</tr>
<tr>
<td>% of all new cancer cases*</td>
<td>1.6%</td>
<td>4.0%</td>
<td>1.5%</td>
</tr>
<tr>
<td>estimated prevalence – number of people living with HNC</td>
<td>1168</td>
<td>2755</td>
<td>724</td>
</tr>
</tbody>
</table>

* excluding non-melanoma skin cancer; 1995-2007
**HPV prevalence in squamous cell carcinomas, by site**

% high-risk HPV positive

<table>
<thead>
<tr>
<th>Region</th>
<th>% HPV positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest of the world</td>
<td>13%</td>
</tr>
<tr>
<td>Japan</td>
<td>52%</td>
</tr>
<tr>
<td>Australia</td>
<td>45%</td>
</tr>
<tr>
<td>Southern Europe</td>
<td>17%</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>38%</td>
</tr>
<tr>
<td>North &amp; Western Europe</td>
<td>39%</td>
</tr>
<tr>
<td>North America</td>
<td>56%</td>
</tr>
</tbody>
</table>

* C01, C09, C10

**Oropharynx, including tonsil and base of tongue**

**Oral cavity and larynx**

- Oral cavity: 23.5%
  - HPV16: 16.0%
  - HPV18: 8.0%
- Larynx: 24.0%
  - HPV16: 16.6%
  - HPV18: 3.9%

Kreimer AR et al., Cancer Epidemiol Biomarkers Prev, 2005; 14: 467-475

Site distribution

C01-C14, C30-C32, males & females combined, Republic of Ireland, 1994-2010

Total cases pa = 101
- parotid = 25
- other salivary = 7
- nasopharynx = 13
- pyriform = 12
- nasal cavity = 9
- sinuses = 12

Total cases pa = 53
- base of tongue = 20
- tonsil = 24
- oropharynx = 9

Total cases pa = 123
- other tongue=42
- gum = 9
- floor of mouth = 24
- palate = 14
- other mouth = 21
- other oral cavity = 13

Total cases pa = 126

- oropharynx
- oral cavity
- larynx
- other sites
Male: female ratio

Ratio of male cases to female cases, RoI, 1994-2010

- Oropharynx: 3.3:1
- Oral cavity: 1.8:1
- Larynx: 5.5:1
- Other sites: 2.6:1
Time trends in incidence

European age-standardised incidence rates per 100,000 by site, sex and year of diagnosis

**Oropharynx**
- Females: APC +4.87*
- Males: APC +2.00

**Oral cavity**
- Females: APC +3.56*
- Males: 1994-04: APC -3.74*
  2004-10: APC +4.69*

**Larynx**
- No significant trend over time in females or males

* p<0.05
Head & neck cancer incidence within the island of Ireland

Relative risks*, with 95% confidence intervals, by level of unemployment

**Females**

- Q1: lowest
- Q2
- Q3
- Q4
- Q5: highest

**Males**

- Q1: lowest
- Q2
- Q3
- Q4
- Q5: highest

* C01-C14, C30-C32; RR mutually adjusted and adjusted for age, country (RoI/NI), population density, educational level and elderly living alone
Head & neck cancer incidence within the island of Ireland

Relative risks*, with 95% confidence intervals, by urban-rural status

* C01-C14, C30-C32; RR adjusted for age, country (RoI/NI), and three markers of socio-economic status; rural = population density < 1 person/hectare; intermediate 1-5 p/ha; urban >15 p/ha
Head & neck cancer incidence within Ireland: smoothed relative risks

Females

Males
Survival: international variations

5-year relative survival, all head and neck cancers, Ireland vs other European countries, males & females

Source: EUROCARE 4.
www.eurocare.ie
Survival

5-year cause-specific survival by site, cases diagnosed 1994-2005, males and females, RoI

- **Oropharynx**
  - Base of tongue: 33%
  - Tonsil: 54%
  - Oropharynx: 33%

- **Oral Cavity**
  - Other tongue: 54%
  - Gum: 48%
  - Floor of mouth: 47%
  - Palate: 56%
  - Other mouth: 58%
  - Other mouth/pharynx: 30%

- **Other Sites**
  - Parotid: 59%
  - Other salivary: 61%
  - Nasopharynx: 56%
  - Pyriform: 24%
  - Hypopharynx: 22%
  - Nasal cavity/middle ear: 61%
  - Sinuses: 49%

- **Larynx**
  - Larynx: 62%

*No significant increase in survival over time, other than for pharynx.*
Predictors of survival

Risk of cancer-specific death: adjusted hazard ratios*, with 95% CIs, head and neck cancers (C01-C14, C30-C32), diagnosed 1994-2009, RoI

Deprivation category of area of residence

<table>
<thead>
<tr>
<th>Category</th>
<th>Adjusted hazard ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Least</td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td>1.16</td>
</tr>
<tr>
<td>3</td>
<td>1.18</td>
</tr>
<tr>
<td>4</td>
<td>1.26</td>
</tr>
<tr>
<td>5: Most</td>
<td>1.22</td>
</tr>
</tbody>
</table>

Smoking status at diagnosis

<table>
<thead>
<tr>
<th>Status</th>
<th>Adjusted hazard ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-smoker</td>
<td>1.00</td>
</tr>
<tr>
<td>Ex-smoker</td>
<td>1.11</td>
</tr>
<tr>
<td>Current smoker</td>
<td>1.36</td>
</tr>
</tbody>
</table>

* Adjusted for site, grade, age, and stratified by stage
## Mortality

Average number of deaths per year, head & neck cancer, Republic of Ireland, 2008-2010

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lip, oral cavity, &amp; pharynx</td>
<td>91</td>
<td>35</td>
</tr>
<tr>
<td>Larynx</td>
<td>48</td>
<td>7</td>
</tr>
</tbody>
</table>
### Annual % change

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lip, oral cavity &amp; pharynx: 1950-80</td>
<td>-3.0%</td>
<td>-1.7%</td>
</tr>
<tr>
<td>Lip, oral cavity &amp; pharynx: 1980-2010</td>
<td>-0.8%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>Larynx: 1950-80</td>
<td>-0.9%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Larynx: 1980-2010</td>
<td>-1.2%</td>
<td>-4.2%</td>
</tr>
</tbody>
</table>

### Graph

- **Lip, oral cavity, pharynx**:
  - Males (light blue)
  - Females (dark blue)
- **Larynx**:
  - Males (purple)
  - Females (light purple)

**Year of death**: 1950-2010

**Mortality**: world age-standardised mortality rates per 100,000, RoI, 1950-2008
The SuN study: support needs of head & neck cancer survivors and their caregivers

1. In-depth interviews with health professionals
2. In-depth interviews with survivors
3. Survey of survivors
4. Survey of carers
5. In-depth interviews with carers

Significant unmet needs in a range of domains
- Medical
- Psychological/emotional
- Practical
- Financial
- Implications
Population-based study of epidemiology of HPV infection in HNC in RoI

http://www.cerviva.ie
Epidemiology of HPV infection in HNC

- Partnership with surgeons and pathologists across Ireland
- Archival specimens of oropharynx, oral cavity and larynx cancers, diagnosed since 1994
- Collaborate with IARC for HPV testing
- Major resource for HNC and HPV research in Republic of Ireland
- Starting autumn 2013
Epidemiology of HPV infection in HNC

- Prevalence of HPV DNA positivity
- Genotype distribution in HPV+ve tumours
- Population-level incidence of HPV+ve and HPV-ve oropharynx, oral cavity, and larynx cancers
- Identify patient and clinical predictors of HPV positivity
- Project the future population-level burden
- Compare treatment received and survival in patients with HPV +ve and HPV-ve tumours
Summary & Conclusions

- 600 new cases of head and neck cancer are diagnosed each year on the island of Ireland. There are 2.6 new males cases for every 1 female case.

- Almost 4000 people are living with head and neck cancer on the island.

- Incidence rates of oropharyngeal cancers in females and oral cavity cancers in males and females are rising.

- There are striking socio-economic and geographical variations in incidence within Ireland. Probably due to variations in smoking, alcohol and HPV infection.

- Survival is lower in Ireland than the European average and, for most sites, has improved little over time. Deprivation and smoking status are independent prognostic factors.

- Mortality rates have fallen dramatically since 1950.

- Cerviva - in collaboration with surgeons and pathologists across RoI - will provide population-based data on the epidemiology of HPV infection in head and neck cancer.
Acknowledgements

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•  Research team
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Northern Ireland Cancer Registry **********

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•  Avril Hegarty

SuN

CERVIVA

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Ordinance Survey provided the maps. Dr Alan Kelly and colleagues from the Small Area Health Research Unit, TCD, created the deprivation index.

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Age distribution by sex and site*

Oropharynx

Oro cavity

Larynx

* RoI only