Trends in hepatocellular carcinoma, Victoria, Australia, 2004-2013

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Background

• Liver cancer is now the 9th most common cause of cancer death in Australia\(^1\)
• Most cases are preventable eg viral hepatitis is a major cause\(^2\)
• We examined Victorian Cancer Registry data to provide up-to-date detail on hepatocellular carcinoma (HCC) cases
  – Aim to describe trends and burden of disease

Methods

• Data sources
  - De-identified data on HCC diagnoses in the ICD-O-3 range 8170/3 to 8180/3 in Victorian residents from 1st January 2004 to 31st December 2013 from the Victorian Cancer Registry (VCR)
  - Population data from Australian Bureau of Statistics

• Analysis
  – Stata 14
  – Descriptive statistics: age, sex, metro/rural residence, country of birth, basis of diagnosis (ranksum)
  – Trends in age standardised rates (negative binomial regression)
  – Impact of demographics (age, gender, metro/rural residence) on HCC incidence (negative binomial regression)
  – Impact of demographics (age, gender, metro/rural residence, born in Australia/born overseas) on risk of death (Cox regression)
Who was diagnosed with liver cancer in Victoria, 2004 - 2013?

<table>
<thead>
<tr>
<th>Demographic characteristics (N=2172)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>80% male</td>
<td>Male: median age 65 years (IQR 56 to 74)</td>
</tr>
<tr>
<td></td>
<td>Female: median age 70 years (IQR 59 to 78) p&lt;0.001</td>
</tr>
<tr>
<td>81% resident in metro Melbourne</td>
<td>No difference in median age at diagnosis (66 years)</td>
</tr>
<tr>
<td>57% born overseas</td>
<td>Southern/Eastern Europe (21%, n=454)</td>
</tr>
<tr>
<td></td>
<td>South/East Asia (10%, n=224)</td>
</tr>
<tr>
<td></td>
<td>North/West Europe (9%, n=195)</td>
</tr>
<tr>
<td>0.8% identified as Aboriginal and/or Torres Straight Islander</td>
<td>Compared with 0.9% of the Victorian population</td>
</tr>
</tbody>
</table>
How were people diagnosed with HCC?

Best basis of diagnosis:
- 52% histology of primary tumour
- Clinical investigation:
  - 28% including x-ray
  - 8% clinical only
- Other:
  - 6% unknown
  - 2.4% histology of metastasis
  - 1.8% death certificate only
  - 1.5% cytology or haematology

Sparse data on grade of liver cancer at detection
Data for 569 cases (26%)
HCC diagnoses increased in men and women in Victoria, 2004 - 2013

8.4% (95%CI 6.6% to 10.2%) increase per year

8.3% (95%CI 4.7% to 11.9%) increase per year
HCC diagnoses increased in Melbourne and rural Victoria, 2004 - 2013

- 9.0% (95%CI 6.4% to 11.7%) increase per year
- 10.8% (95%CI 7.0% to 14.8%) increase per year
Impact of demographics on HCC diagnosis

<table>
<thead>
<tr>
<th></th>
<th>IRR</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live in metro Melbourne</td>
<td>1.5</td>
<td>1.4 – 1.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>13.6</td>
<td>11.3 – 16.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>60-69</td>
<td>20.5</td>
<td>17.1 – 24.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>70-79</td>
<td>36.0</td>
<td>30.0 – 43.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>80+</td>
<td>27.5</td>
<td>22.5 – 33.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Male</td>
<td>4.5</td>
<td>4.0 – 5.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Year</td>
<td>1.1</td>
<td>1.1 – 1.1</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

- Multivariate Poisson regression
- Interpretation:
  - People who live in the metro area have a HCC rate 1.5 times greater than people who live in rural areas, holding the other variables constant
  - For each year increase from 2004, there’s a 10% increase in the rate of HCC diagnosis, holding all other variables constant
Impact of demographics on HCC risk of death

- Median survival was just over one year (384 days, 95%CI 345 to 412 days)
- Five-year survival rate was 0.16 (95%CI 0.14 – 0.18)

<table>
<thead>
<tr>
<th></th>
<th>HR</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Born in Australia</td>
<td>1.3</td>
<td>1.2 – 1.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Live in metro Melbourne</td>
<td>0.9</td>
<td>0.7 – 1.0</td>
<td>0.016</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>1.1</td>
<td>0.9 – 1.4</td>
<td>0.212</td>
</tr>
<tr>
<td>60-69</td>
<td>1.3</td>
<td>1.0 – 1.5</td>
<td>0.026</td>
</tr>
<tr>
<td>70-79</td>
<td>1.7</td>
<td>1.4 – 2.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>80+</td>
<td>2.7</td>
<td>2.1 – 3.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Male</td>
<td>1.1</td>
<td>1.0 – 1.2</td>
<td>0.162</td>
</tr>
</tbody>
</table>

- Multivariate Cox regression
- Interpretation
  - Year and sex did not affect survival over 2004 – 2013
  - The rate of death was 10% lower for people who live in the metro area compared with people who live in rural areas, holding the other variables constant.
Limitations and further work

• Registry collects limited explanatory variables, no data on etiology
  • Linking liver cancer diagnoses with notifications for hepatitis B and C
• Potential under-counting of clinical diagnoses in registry data\(^1\)
• Further exploration of country of birth impact

1. Hong 2015
Summary and implications

• Increasing incidence
  • National increase reflected in Victoria, with rates more than doubling in 10 years among both men and women

• Very low survival
  – No great change in survival over the decade
  – Substantial impact of late diagnosis
  – Missed opportunities for prevention

• Priorities for prevention
  – Diagnoses 4.5x higher in males, but rates increasing similarly for males and females and risk of death does not differ
  – Diagnoses 1.5x higher in the metro area, although survival 10% lower
  – Those born overseas disproportionately affected
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