Increasing Trends of Kidney and Renal Pelvis Cancer in California

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Background

- 8th most common cancer in California
- Majority of cases: renal cell carcinomas (RCC)
- Risk factors:
  - Smoking
  - Obesity
  - Hypertension
- Also:
  - Long term dialysis (kidney disease?)
  - Von Hippel-Lindau syndrome
  - Exposure to asbestos, cadmium
Incidence is

- Kidney cancer incidence increasing in the US & Canada

- In California: incidence increasing in males and females, all racial/ethnic groups

- But: mortality declining

WHY?
Objectives

- Examine trends in incidence of kidney cancer by gender, race/ethnicity, age, and stage at diagnosis

- Interpret trends in light of prevalence:
  - Risk factors
  - Methods of detection
Methods

- Histologic type classified as:
  - Renal Cell Carcinoma (RCC): codes 8260, 8310, 8312, 8316-8318
  - Other

- Trends in age-adjusted rates: Joinpoint

- Prevalence of risk factors: BRFSS

- Detection: scientific literature and news media
Results

CA, 1988-2011

89,028 Kidney and renal pelvis cancer cases

73,310 RCC (82%)

15,718 Other histologies (18%)
Kidney cancer incidence and mortality trends: California, 1988-2011

Incidence by Type

- RCC
- OTHER

Mortality

- Males
- Females
Renal Cell Carcinoma (RCC) Incidence Trends: CA, 1988-2011

![Graph showing trends in age-adjusted rate per 100,000 from 1990 to 2011 for males and females. The rate increases over time for both genders, with a significant increase for females starting around 2005.]
### Annual Percent Change (APC) in RCC Incidence Rates by Sex

<table>
<thead>
<tr>
<th>SEX</th>
<th>N</th>
<th>YEAR DX</th>
<th>APC</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Males</strong></td>
<td>46,210</td>
<td>1988-2000</td>
<td>1.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000-2009</td>
<td>4.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2009-2011</td>
<td>-1.8</td>
<td>0.575</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td>26,100</td>
<td>1988-2000</td>
<td>1.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000-2008</td>
<td>5.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2008-2011</td>
<td>-0.6</td>
<td>0.724</td>
</tr>
</tbody>
</table>
### Annual Percent Change (APC) in Kidney Cancer Incidence Rates by Race/Ethnicity

<table>
<thead>
<tr>
<th>Race</th>
<th>N</th>
<th>Year DX</th>
<th>APC</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>46,461</td>
<td>1988-2000</td>
<td>1.7</td>
<td>&lt;0.001</td>
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<td></td>
<td></td>
<td>2000-2009</td>
<td>4.5</td>
<td>&lt;0.001</td>
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<tr>
<td></td>
<td></td>
<td>2009-2011</td>
<td>-1.3</td>
<td>0.699</td>
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<tr>
<td>Black</td>
<td>5,253</td>
<td>1988-2011</td>
<td>3.3</td>
<td>&lt;0.001</td>
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<tr>
<td>Hispanic</td>
<td>15,307</td>
<td>1988-2000</td>
<td>1.9</td>
<td>&lt;0.001</td>
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<tr>
<td></td>
<td></td>
<td>2000-2008</td>
<td>5.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2008-2011</td>
<td>-1.1</td>
<td>0.577</td>
</tr>
<tr>
<td>Asian/PI</td>
<td>4,532</td>
<td>1988-1999</td>
<td>1.3</td>
<td>0.319</td>
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<tr>
<td></td>
<td></td>
<td>1999-2011</td>
<td>4.3</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
## Annual Percent Change (APC) in Kidney Cancer Incidence Rates by Age at DX

<table>
<thead>
<tr>
<th>Age Group</th>
<th>N</th>
<th>Year DX</th>
<th>APC</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-49</td>
<td>11,221</td>
<td>1988-1999</td>
<td>0.8</td>
<td>0.290</td>
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<tr>
<td></td>
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<td>1999-2011</td>
<td>5.5</td>
<td>&lt;0.001</td>
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<tr>
<td>50-64</td>
<td>25,553</td>
<td>1988-2011</td>
<td>2.4</td>
<td>&lt;0.001</td>
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<tr>
<td>65-74</td>
<td>19,449</td>
<td>1988-1997</td>
<td>1.2</td>
<td>0.171</td>
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<tr>
<td></td>
<td></td>
<td>1997-2011</td>
<td>4.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>75+</td>
<td>16,087</td>
<td>1988-1995</td>
<td>-0.6</td>
<td>0.668</td>
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<tr>
<td></td>
<td></td>
<td>1995-2009</td>
<td>4.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2009-2011</td>
<td>-5.2</td>
<td>0.427</td>
</tr>
</tbody>
</table>
Incidence increase: summary

- 1988- Mid 90s’: Slight increase in incidence
  - Significant for males & females, whites & Hispanics

- Starting in the late 90s’: steep increase in incidence (all groups)

- 2008-2009: no increase
  - Reporting delay?
  - Too early for conclusions
Prevalence of Adult Obesity (BMI > 30): California BRFS
Prevalence of High Blood Pressure: California BRFS
Prevalence of Adult Smoking: California vs. US (excluding CA)

Source: California Tobacco Control Program, CDPH
RCC Incidence Trends: Remote Stage at Diagnosis

Age-Adjusted Rate per 100,000
RCC Incidence Trends: Regional and Remote Stages

Age-Adjusted Rate per 100,000

- Remote
- Regional

RCC Incidence Trends: Localized, Regional, and Remote Stages

Age-Adjusted Rate per 100,000

- Distant
- Regional
- Localized

Graph showing trends from 1990 to 2011.
Trends in diagnostic imaging use

- From 1996-2010 (UCSF study):
  - Ultrasound doubled
  - Computed tomography (CT) tripled
  - Magnetic resonance imaging (MRI) quadrupled
  - PET scan increased 10X after 2004

- Use of imaging increased with age
- Increase higher in Emergency Department
- After 2007 increase may be slowing down
Conclusions

- Mortality declined among females, and in the mid 90s’ among males as well.

- Increasing incidence of kidney cancer limited to RCC.

- From the late 90s’ forward, incidence increased in all groups.

- Among risk factors for kidney cancer:
  - Sharp decrease in smoking
  - Sharp increase in obesity
Conclusions

- Use of advanced diagnostic imaging burgeoned in the last 15-20 years

- Increase in obesity probably implicated in the increased incidence of RCC

- However: increase in RCC limited mostly to early-stage disease

- Trends most likely due to incidental findings from higher use of diagnostic imaging