DCEG Studies in China

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DCEG Studies in China

- More than 30 years collaboration
  - Currently over 25 studies

- Insights from cancer maps led to epidemiologic field studies
  - Unusual patterns of risk for lung, esophagus, and stomach cancer

- Unique opportunities to study occupational exposures
DCEG Studies in China: Special Exposures

- Occupational exposures
  * Shanghai, Tianjin
    - Benzene
    - Formaldehyde
    - Trichloroethylene
    - Particulates: diesel exhaust and coal combustion products

- Physical activity
  * Shanghai
DCEG Studies in China: Lung Cancer

- Lung cancer among never-smoking women
  *Shanghai, Shenyang, Xuanwei*
  - Indoor air pollution from coal used for cooking
  - Identified risks
  - Intervention by ventilating stoves
  - Lung cancer rates decreased substantially

- Residential radon from underground dwellings
  *Shenyang*

Consortium to Study Environmental and Genetic Etiology of Lung Cancer in Never-Smoking Females

- Genome-wide Association Study
  - ~13,000 cases from 19 studies

- 8 Novel Signals
  - Majority unique to non-smokers
  - No association found at 15q25.1
  - 2 gene-environment interactions with indoor use of coal for heating/cooking

- Ongoing Exome Sequencing
  - Susceptibility study
  - Tumor/Normal pairs

- Link residential histories to air pollution databases and satellite data

Combined GWAS of Esophageal Squamous Carcinoma

- Call for Data Sharing
  - Published editorial in Nature Genetics 2011
  - Based 3 parallel papers for ESCC
- Pooled, combined analysis
  - Individual data exchange
  - New loci
- Correction of 4 previously published
Worldwide Ranks of Cancer Mortality

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Death per year (1000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>1378</td>
</tr>
<tr>
<td>Stomach</td>
<td>738</td>
</tr>
<tr>
<td>Liver</td>
<td>695</td>
</tr>
<tr>
<td>Colon &amp; rectum</td>
<td>608</td>
</tr>
<tr>
<td>Breast</td>
<td>458</td>
</tr>
<tr>
<td>Esophagus</td>
<td>406</td>
</tr>
<tr>
<td>Cervix</td>
<td>274</td>
</tr>
<tr>
<td>Pancreas</td>
<td>266</td>
</tr>
<tr>
<td>Prostate</td>
<td>258</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>257</td>
</tr>
</tbody>
</table>
DCEG Studies in China: Upper Gastrointestinal Cancers

- Nutrition Intervention Trials in Linxian, Henan
  - Early detection of esophageal cancer
- *H. pylori* treatment trial in Linqu, Shandong
- Genome-wide association studies
- Tooth loss & oral hygiene → microbiome
  - Yunnan Tin Miner’s Cohort with serial sputum samples

Blot, et al. JNCI 1993  
Li WQ, et al. JNCI 2014  
General Population NIT: Summary of Significant Trial Results

- Selenium, β-carotene, and vitamin E
  - Total mortality reduced 9%
  - Total cancer mortality reduced 13%
  - Total gastric cancer mortality reduced 21%

- 32,912 subjects being followed
  - 6,332 incident UGI cancer cases
  - Observational studies
    - >100 publications
    - Serum selenium and UGI cancer risk
    - HPV and esophageal cancer risk
Early Detection and Intervention
## Endoscopic Localization with Lugol’s

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Sensitivity of Unstained Lesions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>---</td>
</tr>
<tr>
<td>Esophagitis</td>
<td>---</td>
</tr>
<tr>
<td>Mild Dysplasia</td>
<td>63%</td>
</tr>
<tr>
<td>Moderate Dysplasia</td>
<td>93%</td>
</tr>
<tr>
<td>Severe Dysplasia</td>
<td>96%</td>
</tr>
</tbody>
</table>
Squamous Dysplasia is the Precursor

- Severe dysplasia (RR≈30 [n=39])
- Moderate dysplasia (RR≈10 [n=30])
- Mild dysplasia (RR≈3 [n=76])
- Esophagitis (RR≈1 [n=33])
- Normal (Reference [n=492])

Taylor, et al. CEBP 2013
<table>
<thead>
<tr>
<th>Component</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID of precursor lesions</td>
<td>✔️</td>
</tr>
<tr>
<td>Primary screen</td>
<td>✔️</td>
</tr>
<tr>
<td>Endoscopic localization</td>
<td>✔️</td>
</tr>
<tr>
<td>Staging</td>
<td>✔️</td>
</tr>
<tr>
<td>Therapy</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Long-Term Follow-Up of a Community Assignment, One-Time Endoscopic Screening Study of Esophageal Cancer in China

Wen-Qiang Wei, Zhi-Feng Chen, Yu-Tong He, Hao Feng, Jun Hou, Dong-Mei Lin, Xin-Qing Li, Cui-Lan Guo, Shao-Sen Li, Guo-Qing Wang, Zhi-Wei Dong, Christian C. Abnet, and You-Lin Qiao

• 34% reduction in ESCC mortality
Improved Primary Screening

[Graph and data visualizations showing different categories such as N, ESCC, HGD, LGD, with arrows indicating specific points of interest.]