Esophageal cancer early detection program & screening cohort study in China

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1970s, In rural high-risk areas of ESCC in China
The Early Detection of Esophageal Cancer Project

- **Overall Goal:** Reduce ESCC mortality by early detection and treatment of ESCC precursor lesions and early invasive tumors
- **Specific Goal:** Develop practical clinical techniques to detect and treat these lesions in asymptomatic adults in high-risk populations like Linxian
- **Necessary components:**
  - Identification of ESCC precursor lesions
  - Primary screening test(s)
  - Endoscopic localization
  - Staging
  - Therapy

![Diagram of endoscopic equipment and samples](image-url)
The Community Intervention Trial in Cixian, China

- Non-adjacent villages assigned to intervention or control groups
- Intervention = single endoscopy with Lugol’s, Bx of USLs >5mm, EMR and/or APC for Bx-proven SD/CIS/T1mESCC
- Follow-up (monthly surveillance + registry) = 10 years

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Villages</td>
<td>14</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Population (40-69)</td>
<td>6649</td>
<td>6128</td>
<td></td>
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<tr>
<td>ESCC cases (%)</td>
<td>285 (4.17)</td>
<td>367 (5.92)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>ESCC deaths (%)</td>
<td>229 (3.35)</td>
<td>313 (5.05)</td>
<td>&lt;.001</td>
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</table>

- The intervention resulted in a **33% reduction** in ESCC mortality
Red region: screening group
Green region: Buffer region
Blue region: Control group
Long-Term Follow-Up of a Community Assignment, One-Time Endoscopic Screening Study of Esophageal Cancer in China

Cumulative Incidence of EC among the target population 4.17% vs 5.92%. reduced **29.47%**

Cumulative Mortality of EC among the target population 3.35% vs 5.05% **reduced 33.56%**

Prospective Evaluation Study of Upper Gastrointestinal Cancer Screening

- **Principal Investigator:** Dr. Wan-Qing Chen
- **Co-PIs:** Wen-qiang Wei, Youlin Qiao, et al
- **Multi-center including the urban & rural areas, high & low incidence areas**
- **Village or communities cluster randomized, controlled.**

- **Lin county:** over 10,000 Endo and biopsy /blood sample collection
- **Ci county:** 10,000 Endo and biopsy /blood sample collection
- **Wu wei:** 10,000 Endo and biopsy /blood sample collection
New project: National precision medicine cohort of esophageal cancer

13th National Key R&D Program of precision medicine

- **Principal Investigator:** Dr. Wenqiang Wei
- **Co PI:** Drs. Yushun Gao, Duowu Zou, Yanru Qin, weimin Mao.
- **Objective:**
  - Set up ESCC and its precancerous lesion bio-bank and matched information database
  - Set up Dynamic follow up system linked with National Cancer Registry system and make sure lost rate less than 10%.
  - Established mechanism of open, build together, and share together, Set up platform of biomaterial and matched big data.
National precision medicine cohort of esophageal cancer
13th National Key R&D Program of precision medicine

Set up five cohorts/projects, including

Project 1: Standardized diagnosis and therapy of later stage ESCC clinical cohort
  ✓ 20,000 cases with blood/issue sample, clinical and follow up information

Project 2: Minimally invasive therapy of early stage and precancerous lesion cohort
  ✓ 2000 cases with blood/issue sample, clinical and follow up information

Project 3: ESCC Genetic linkage cohort
  ✓ 600 family lineage at least two generation with blood sample follow up information

Project 4: ESCC rural high risk area population based cohort
  ✓ 25,000 dysplasia cases with blood/issue sample, clinical and follow up information

Project 5: ESCC opportunity screening cohort based on urban community
  ✓ 5000 dysplasia cases with blood/issue sample, clinical and follow up information
### Screening cohorts summary

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Subject</th>
<th>information</th>
<th>Sample</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort of esophageal cancer in Ci county in Hebei Province</td>
<td>21653</td>
<td>Questionnaire Cancer Endpoint</td>
<td>Biopsy of dys.</td>
<td>2000-14 yrs</td>
</tr>
<tr>
<td>Evaluation cohort of Upper GI cancer Screening program</td>
<td>20,000</td>
<td>Questionnaire Endo. Follow Cancer Endpoint</td>
<td>Biopsy of dys. Blood sample</td>
<td>2015-</td>
</tr>
<tr>
<td>National precision medicine cohort of ESCC</td>
<td>50,000</td>
<td>Questionnaire Endo. Follow Cancer Endpoint</td>
<td>Biopsy of dys. Blood sample Saliva, cyto.</td>
<td>2016-</td>
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Difficult questions on Early detection

✓ Focus on primary screening methods:
  • Potential molecular biomarkers (blood sample, cytological sample…) of ESCC or precursors as the primary screening methods to concentrate population to Endo. Exam

✓ Focus on modified Endo-Screening method:
  Starting age of, screening interval, and follow up option?
  Molecular classification and personalized diagnostic and therapeutic for ESCC Endo. screening

✓ Focus on marker development and evaluation in screening cohort:
  • Upper GI tract microbiome and other risk markers
Acknowledgement !!!

[Images of a group of people]