Evidence-Based Cancer Screening Policy and Implementation in Taiwan

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Outline

1. Background
2. Strategies to promote cancer screening
3. Results and the way forward
Background
Cancers Incidence & Mortality Rate Compared with OECD Countries

**Incidence rate**

- **Hungary**: 285.4
- **Poland**: 296.3
- **Turkey**: 293.8
- **Slovak Republic**: 321.1
- **Slovenia**: 324.6
- **Denmark**: 318.0
- **China**: 307.9
- **Czech Republic**: 295.7
- **Belgium**: 283.8
- **Taiwan**: 307.8
- **United Kingdom**: 318.3
- **Ireland**: 323.0
- **France**: 283.2
- **United States**: 287.0
- **New Zealand**: 284.3

**Mortality rate**

- **Australia**: 152.1
- **Ireland**: 131
- **Turkey**: 125.8
- **Slovak Republic**: 125.8
- **Slovenia**: 125.4
- **Denmark**: 124.9
- **China**: 122.2
- **Czech Republic**: 121.7
- **Belgium**: 116.2
- **Taiwan**: 112.4
- **United Kingdom**: 110
- **Ireland**: 108.4
- **France**: 107.9
- **United States**: 105.8
- **Estonia**: 104.6
- **New Zealand**: 103.5
- **Australia**: 103.5
- **Canada**: 103.2
- **Chile**: 103
- **Italy**: 101.8
- **Germany**: 100.8
- **Korea**: 100.3
- **Norway**: 99.3
- **Portugal**: 99
- **Greece**: 98.6
- **Spain**: 98.1
- **Luxembourg**: 96.9
- **Australia**: 96.4
- **Israel**: 94.4
- **Japan**: 93.8
- **Switzerland**: 92.5
- **Sweden**: 92.2
- **Singapore**: 90.5
- **Iceland**: 87.7
- **Finland**: 86.1
- **Mexico**: 68.9

Ranking as high as 23 in 35 OECD countries.

Ranking as high as 10 in 35 OECD countries.

**Age-standardized rate (ASR), 1/100,000**

**sources:**
1. GLOBOCAN 2012, IARC
2. 2011 Taiwan Cancer Registry, using 1976 WHO standard population (carcinoma in situ not included)
Among all cancers, screening has been proven to do more benefit than harm in 4 sites of cancers.

WHO, 2007

Table 1. Recommended activities for early detection of selected cancers

<table>
<thead>
<tr>
<th>Site of cancer</th>
<th>Early diagnosis</th>
<th>Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>Yes</td>
<td>Yes^a</td>
</tr>
<tr>
<td>Cervix</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Colon and rectum</td>
<td>Yes</td>
<td>Yes^b</td>
</tr>
<tr>
<td>Oral cavity</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Naso-pharynx</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Larynx</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Lung</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Oesophagus</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stomach</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Skin melanoma</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Other skin cancers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Ovary</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Urinary bladder</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Prostate</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Retinoblastoma</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Testis</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

* Screening for breast cancer using mammography is recommended in high-resource settings only.

^b In high-resource settings only.
Long term trend of major cancer mortality in Taiwan

- **Declining:** Cervix, Stomach, Lung, Liver
- **Rising:** Colorectum, Breast, Oral cavity, Prostate, Esophagus, Pancreas
Strategies to promote cancer screening
Strategies to advocate screening policy

(I). Reduce economical barriers
(II). Infrastructure & quality control
(III). Innovative payment design
(IV). Enhance multiple channel service system
(V). Enforce positive case follow-up
(VI). Education and mobilization
(I) Reduce economical obstacles

- Funding for screening services:
  - Civil service budget
  - New financial resource: tobacco surcharge was increased from $10 NTD/pack to $20 NTD/pack in 2009, 6% of total revenue (55 million USD) was used on cancer.

- Screening for 4 major cancer (cervical cancer, breast cancer, colorectal cancer, oral cancer) full subsidy

- Local government giving extra bonuses to target public members
(II) Enhance quality control and infrastructure

- Establish cancer screening SOPs, including illustration, service, report and follow-up

- High quality cancer screening resources:
  - Medical personnel training and accreditation.
  - Accreditation of equipment, facilities and institutes: pathology of cervical cancer, breast imaging device, iFOBT test proficiency.

- Continuous quality assurance and control: Set up QC standards, monitoring performance of service providers.
(III) Improve reimbursement

- Existed payment for service providers
  - FFS (fee for service): payment improved
  - P4P (pay for performance): pay more for higher colorectal and oral cancer positive case follow-up rate

- Extra P4P
  - Hospitals with 5,000+ outpatient number (aged 30+) / year can join
  - To enhance hospital capacity for better screening rate
Transforming healthcare practice to increase national screening capacity

1. Project-based subsidy
   ✓ Oral Screening, mammography, papsmear test, iFobt

2. A module for transforming hospital practices based on the WHO-HPH model, including:
   ✓ extra personnel,
   ✓ new IT function for automatic reminding and tracking of results,
   ✓ total mobilization of providers, services and patients,
   ✓ internal monitoring and analysis of cancer screening performance.

3. External audit, monitoring, feedback and public reporting on hospital performances
(IV) Enhance multiple channel service system

- Clinical channel: integrate hospital resources, to compensate shortage of public health facilities and clinics.
- Community channel: enhance workplace and community screening, increase availability, reduce the gap between urban and rural areas.
- Postal self sampling: Pilot programs for postal self sampling (HPV screening, iFOBT)
Cancer screening service providers

Public health resources
Local health authorities & health stations

Clinical resources
Contracted service providers

99.5% insured nationals
Three ways to get target population screened

1. Proactive reminding to patients who are already in the hospital

2. Call out to patients not yet returning

3. Facilitate community screening

“Every visit to a provider can be an opportunity to prevent cancer by making sure men and women are referred for screening appropriately,”
Mammography facility growth

2008: 3
2011: 200
2012: 209
2013: 220

- Mobile Mammography Clinic
- Mammography Facility

2008: 90
2011: 232
2012: 266
2013: 287
Sensible usage of grants to benefit the public (P4P4P)

Souvenir / Gifts prepared for "Get your prize for cancer screening" activity (photo by: National Taiwan University Hospital)
News report

i-FOBT recommended by nurse in a hospital visit for DM, stage 1 colon cancer was found

【United Daily News / 2010/08/15】
(V) Enforce positive case follow-up

(1) SOP for positive case follow-up
(2) Reward for positive case referral
(3) Unconfirmed positive cases are referred to public health system for further follow-up.

Test report reminds 1 colorectal cancer / polyps is found for every 2 iFOBT positive cases
(VI) Education and mobilization
Results and the way forward
## Evidence based screening policy and cost effectiveness

<table>
<thead>
<tr>
<th>Policies</th>
<th>Cost per test (NTD)</th>
<th>Mortality reduction for screened individuals</th>
<th>Additional cost per person-year saved (Screening interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-FOBT</td>
<td>80</td>
<td>↓ 18-33% (1-2 years)</td>
<td>Beneficial (2 years)**</td>
</tr>
<tr>
<td>Oral Examination</td>
<td>50</td>
<td>↓ 43% (Men with smoking and drinking habit, 3 years)</td>
<td>330,000 (2years)**</td>
</tr>
<tr>
<td>Pap smear</td>
<td>430</td>
<td>↓ 60-90% (3-5 years)</td>
<td>190,000 (3years)*</td>
</tr>
<tr>
<td>Mammogram</td>
<td>1245</td>
<td>↓ 21-34% (1-3 years)</td>
<td>1,210,000 (2years)**</td>
</tr>
</tbody>
</table>

Beneficial: The cost for screening is less than unscreened individual.  
Source: * 2001 Keelung City community screening program for pap smears  
** 2007 and 2008 Breast, oral and colorectal cancer screening database
The new plan expected to achieve a growth of 1.4 folds in volume between 2009 and 2010.

Targets of screening:
- 3.01 million in 2009
- 4.12 million in 2010

Volume of Cancer Screening Services, 1995-2013

- iFOBT
- Mammography
- Oral examination
- Pap smear

( × 10,000 people)
Comparison on growth of screening volume between subsidized hospitals and non-subsided health services

Screening volume increase significantly in subsidized hospitals but not in the non-subsided health services.

<table>
<thead>
<tr>
<th>Screening Type</th>
<th>2009</th>
<th>2013</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammography, 2009</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mammography, 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iFOBT, 2009</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iFOBT, 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examination of oral mucosa, 2009</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examination of oral mucosa, 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pap, 2009</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pap, 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All screenings, 2.1 vs. 1
Both: 1.5

unit=1000 persons
“Kaohsiung Medical University Chung-Ho Memorial Hospital was rewarded the Champion of Life Saviors of 2010” 【Apple Daily / report from Taipei, 2010/08/15】
Distribution of cancer stages for screened and non-screened, 2010

Source: Taiwan cancer registry (carcinoma in situ included)

Dotted line: precancerous lesion included
<table>
<thead>
<tr>
<th>Cancer type</th>
<th>target (10,000)</th>
<th>Number completed (10,000)</th>
<th>Target %</th>
<th>Positive cases follow up rate (%)</th>
<th>Detected by screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical Cancer</td>
<td>210</td>
<td>217.4</td>
<td>104</td>
<td>92.2</td>
<td>Cancer 4,543</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Precancerous lesion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10,630</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td>63</td>
<td>69.4</td>
<td>110</td>
<td>89.1</td>
<td>Cancer 3, 307</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Precancerous lesion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3, 307</td>
</tr>
<tr>
<td>Colorectal Cancer</td>
<td>115</td>
<td>102.8</td>
<td>89</td>
<td>66.9</td>
<td>Cancer 2,030</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyps 26,207</td>
</tr>
<tr>
<td>Oral Cancer</td>
<td>92</td>
<td>98.3</td>
<td>107</td>
<td>74.4</td>
<td>Cancer 1,280</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Precancerous lesion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,729</td>
</tr>
<tr>
<td>Total</td>
<td>483</td>
<td>482</td>
<td>100</td>
<td></td>
<td>Cancer 10,819</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Precancerous lesion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39,685</td>
</tr>
</tbody>
</table>

- Positive Case follow-up till 2014/2
Overall performance of the national screening program, 2013

1 colorectal polyp is found for every 24 iFOBT done
1 colorectal cancer is found for every 307 iFOBT done
1 breast cancer case is found for every 179 mammograms done

<table>
<thead>
<tr>
<th>site</th>
<th>precancerous lesion</th>
<th>cancer</th>
<th>both</th>
<th>precancerous lesion</th>
<th>cancer</th>
<th>both</th>
</tr>
</thead>
<tbody>
<tr>
<td>cervix</td>
<td>1/2</td>
<td>1/6</td>
<td>1/2</td>
<td>1/99</td>
<td>1/337</td>
<td>1/76</td>
</tr>
<tr>
<td>breast</td>
<td>1/16</td>
<td>1/16</td>
<td></td>
<td>1/179</td>
<td>1/179</td>
<td></td>
</tr>
<tr>
<td>colorectum</td>
<td>1/2</td>
<td>1/24</td>
<td>1/2</td>
<td>1/24</td>
<td>1/307</td>
<td>1/22</td>
</tr>
<tr>
<td>oral cavity</td>
<td>1/12</td>
<td>1/35</td>
<td>1/9</td>
<td>1/187</td>
<td>1/544</td>
<td>1/139</td>
</tr>
</tbody>
</table>

*Cervical cancer positive is by smear result ASCUS, LSIL, AGC, ASC-H, AGC-FN, HSIL/CIS, AIS/CIS, Cancer
*Statistics from positive case follow-up from 2013 Jan-Dec
Mammography screening rates

rapid and equitable increase!

Note:
• Metropolis: having 1 million or more populations; Sub-metropolis: 0.3-1 million pop; Others: < 0.3 million pop.
## Objectives for 「National Cancer Control Program」 (2010-2013)

<table>
<thead>
<tr>
<th>Cancer site</th>
<th>Target pop.</th>
<th>Tests and intervals</th>
<th>Screening rate achieved, 2007</th>
<th>Screening rate achieved, 2013</th>
<th>Objectives 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical Cancer</td>
<td>F, 30-69 y/o</td>
<td>Pap smear or HPV testing, Every 3 yrs</td>
<td>55%</td>
<td>70%</td>
<td>70%</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td>F, 45-69 y/o</td>
<td>Mammography, Every 2 yrs</td>
<td>7%</td>
<td>36%</td>
<td>66%</td>
</tr>
<tr>
<td>Colorectal Cancer</td>
<td>50-69 y/o</td>
<td>iFOBT, Every 2 yrs</td>
<td>11%</td>
<td>38%</td>
<td>60%</td>
</tr>
<tr>
<td>Oral Cancer</td>
<td>Smokers or betel-quit chewers, ≥30 y/o</td>
<td>Oral mucosa inspection, Every 2 yrs</td>
<td>14%</td>
<td>54%</td>
<td>66%</td>
</tr>
</tbody>
</table>
Conclusions - 1

- Taiwan has recognized our extraordinarily high burden of cancers and has turned it into strong political commitment and evidence-based actions.

- Effective funding and widespread transformation of the health system has brought about the highest-ever and equitable growth in cancer screening volume by 1.5 folds within a short period of time.
Conclusions - 2

- We recognized the importance of prevention as a core component for long-term success and has included these in its future plan.

- In our way forward, Taiwan will:
  - further reduce its smoking rate by half through periodic review of tobacco price and full coverage of cessation services;
  - turn the trend of obesity by policy intervention and creation of more supportive built environment for healthy eating and physically active living; and
  - Increase prevalence of physical activity by 2-folds through intersectoral collaboration, public-private partnership and improved built environment.
Promotion, Prevention, Protection, Participation!

Taiwan Health Promotion Administration

Ministry of Health & Welfare