Cancer Registration and Statistics in Korea

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National Cancer Center, Korea

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Contents

- Cancer Registration System in Korea
  - Korea Central Cancer Registry
  - Regional Cancer Registries

- Cancer Statistics in Korea
Korea ranks high in cancer burden

Global (2008)
Population: 6,750 M
Incidence: 12.7 million
Mortality: 7.6 million

Korea (2007)
Population: 49 M
(0.73% of world)
Incidence: 161,920
Mortality: 67,561

Source: GLOBOCAN 2008, IARC, 2010
Korea Central Cancer Registry, 2010 (ICD-O2)
Cause of Death, NSO, 2010 (ICD-10)
Causes of Death

Year of death

Data source: Annual Report of Causes of Death, NSO
Cancer is the leading burden of disease

Year of calculation, 2003
The Korea Central Cancer Registry
## History of The Korea Central Cancer Registry

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In 1980</td>
<td>The Korea Central Cancer Registry (KCCR) was established and operated within the National Medical Center</td>
</tr>
<tr>
<td>Sep 2000</td>
<td>KCCR moved from the National Medical Center to the National Cancer Center</td>
</tr>
<tr>
<td>May 2003</td>
<td>Constitution of The Cancer Act (law, basis for Cancer Registration)</td>
</tr>
<tr>
<td>Mar 2004</td>
<td>The Cancer Control Law (&quot;Request of personal information is prohibited&quot;) → difficulty in National cancer registration</td>
</tr>
<tr>
<td>Dec 2004</td>
<td>“Korea central cancer registry” and “population-based regional cancer registries” were designated officially</td>
</tr>
<tr>
<td>April 2005</td>
<td>Setup of the national cancer incidence data and the first calculation of national cancer incidence rates throughout the country</td>
</tr>
<tr>
<td>Oct 2006</td>
<td>Revision of The Cancer Act (Collection and management of personal information are permitted for national cancer registration)</td>
</tr>
<tr>
<td>Aug 2007</td>
<td>Publication of cancer incidence statistics in 2002</td>
</tr>
</tbody>
</table>
Cancer Registry System in Korea

Hospital Cancer Registries
- hospital-based since 1980
- headquarter: NCC
- coverage: 90% of all cancers

Regional Cancer Registries
- population-based
- 11 Regional Cancer Registries
  - Busan
  - Daegu / Gwangju
  - Incheon / Daejeon
  - Ulsan / Jeju
  - Chungbuk, etc

Site-specific Cancer Registries
- Academic Societies: breast, uterine, cervix etc.
Cancer Registration System in Korea

**KCCR**
- Data collection
- Data management
- Quality assurance
- Data dissemination
- Develop manual / training
- Cancer statistics

**Regional**
- Data collection for the region
- DB construction
- Collaboration with KCCR
- DB management
- Regional cancer Incidence

**Cases from Training Hospital**
- Data process and dissemination
  - Chart reviewing
  - Others

**KCCR**
- Cancer Billing Claims NHIC
- NSO Death data
- Busan, Daegu, Daejeon, others
- MR review from small hospital

**Regional Cancer Registry**
- Active
Information in Cancer Registry Data

- Personal: Name, PIN (sex, age), Address, Occupation
- Case information: Diagnosis date, Primary site, Morphology, Behavior, Method of diagnosis, Treatment method
- Outcome: Death date, Cause of death
- Others: Summary Staging (SEER), TNM stage (optional)
Korean Personal Identification Number

-YYMMDD

-SEX

-Birth place

-Register order

-Random no.

-Magic !!
Korean Personal Identification Number

Med Ins DB (ID: 2212011****10)

Korea Central Cancer Registry DB (ID: 2212011****10)

Death Certificate DB (ID: 2212011****10)
Korean Personal Identification Number

Unique PIN

- Medical Insurance DB
- Cohort DB
- Cancer Registry DW
- Death Certificate DB

Valid → Accurate

Incidence, Mortality, Prevalence, Survival
Korea National Statistical Office
(Cancer Mortality DB)

Academic Societies
(Relevant cancer registration)

*MOPAS (residential address DB)

Collection & feedback of Cancer Mortality DB
Collection & feedback of Cancer registration DB
Collection of resident registration address DB

Participating Hospitals
Registration Of Cancer patient
Cancer registration DB per hospital

Korea Central Cancer Registry
Korea Central Cancer Registry DB

Generate list of potential cancer incidence cases (using medical billing claims data and death certificate data)

Ministry of Health & Welfare
(Management & Publication of Cancer incidence rates)

National and Regional Cancer Statistics

Regional Cancer Registry
Regional Cancer Registry DB

Result DB
Result report

* MOPAS : Ministry of public administration and security
* NHIC : National Health Insurance Corporation

Cancer patient

* NHIC
Patients of cancer diagnosis & visit data & Catastrophic Diseases DB

Billing claims

Medical Record Review

Non-Participating Hospitals
Cooperation Of cancer incidence Survey Cancer patients DB in hospital

Send Review Results

Result report

Billing claims

Medical Record Review
Quality Control of Cancer Registry Data

- Standardization: Software, Manual
- Check for Multiple Primary 1988-2001
- Training Courses for Cancer Registrar
- Constant check with Death data-
  National Statistic Office
Collaboration with site-specific cancer registry data

- Breast Cancer: Korean Society of Breast Cancer
- Cervix Cancer (Ovary, Edometrium, etc): Gynecologic Oncologic Committee/Korean Society for OB & GY
- Liver Cancer: Liver Cancer Study Group
- Brain Tumor: KS for Neurosurgeon
- Head and Neck Cancer, Oral Cancer
- Colon Cancer, Stomach Cancer, etc
Cancer Incidence in Korea (1999-2002)
# Quality Indices of Cancer Incidence Data in Korea (1999-2002)

<table>
<thead>
<tr>
<th>Index</th>
<th>Value</th>
<th>Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death Certificate Only</td>
<td>5.9%</td>
<td>(not acceptable: &gt; 20%)</td>
</tr>
<tr>
<td>Microscopic Verification</td>
<td>75.5%</td>
<td>(not acceptable: &lt; 75%)</td>
</tr>
<tr>
<td>Mortality/Incidence ratio</td>
<td>0.554</td>
<td>(acceptable: 0.3~0.7)</td>
</tr>
</tbody>
</table>

Cancer Statistics in Korea
National Cancer Incidence, 2006~2007

Numbers of Cancer cases

(Unit: cases)

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>82,027</td>
<td>71,210</td>
</tr>
<tr>
<td>2007</td>
<td>85,257</td>
<td>76,663</td>
</tr>
</tbody>
</table>

Crude Rates

(Unit: rate per 100,000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>313.5</td>
<td>313.7</td>
<td>262.7</td>
</tr>
<tr>
<td>2007</td>
<td>346.2</td>
<td>344.7</td>
<td>292.1</td>
</tr>
</tbody>
</table>

Age-standardized Rates

(Unit: rate per 100,000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>268.6</td>
<td>313.7</td>
<td>246.0</td>
</tr>
<tr>
<td>2007</td>
<td>315.0</td>
<td>233.9</td>
<td></td>
</tr>
</tbody>
</table>
Trend of Cancer Incidence by Sex, Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>85,257</td>
<td>76,663</td>
</tr>
<tr>
<td>2006</td>
<td>82,027</td>
<td>71,210</td>
</tr>
<tr>
<td>2005</td>
<td>79,161</td>
<td>66,697</td>
</tr>
<tr>
<td>2004</td>
<td>73,217</td>
<td>60,313</td>
</tr>
<tr>
<td>2003</td>
<td>69,102</td>
<td>55,733</td>
</tr>
<tr>
<td>2002</td>
<td>65,531</td>
<td>51,558</td>
</tr>
<tr>
<td>2001</td>
<td>62,841</td>
<td>48,393</td>
</tr>
<tr>
<td>2000</td>
<td>58,016</td>
<td>43,756</td>
</tr>
<tr>
<td>1999</td>
<td>57,594</td>
<td>43,438</td>
</tr>
</tbody>
</table>

※ 48.0% increase in males and 76.5% increase in females for year 2007 compared to 1999.
**Cumulative Risk of Cancer in Korea, 2007**

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life expectancy <em>(2007)</em></td>
<td>80 years</td>
<td>76 years</td>
<td>83 years</td>
</tr>
<tr>
<td>* Source: NSO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative Risk</td>
<td>32.6% (3 out of 10)</td>
<td>34.4% (1 out of 3)</td>
<td>28.9% (1 out of 4)</td>
</tr>
</tbody>
</table>

* Korea National Statistical Office
Relative Frequency of Cancer Sites in Korea, 2007

- Stomach: 16.0%
- Others: 20.3%
- Thyroid: 13.1%
- Colon and rectum: 12.7%
- Lung: 11.0%
- Liver: 9.2%
- Breast: 7.2%
- Prostate: 3.3%
- Pancreas: 2.4%
- Gallbladder etc: 2.6%
- Cervix uteri: 2.2%

Total Cancer Incidence Cases: 161,920 (Unit: %)
Relative Frequency of Cancer Sites in Korea, 2007

Cancer Incidence Cases 85,257

- Stomach, 20.3%
- Lung, 15.1%
- Liver, 13.1%
- Colon and rectum, 14.4%
- Others, 17.1%
- Kidney, 2.3%
- Gallbladder etc, 2.4%
- Pancreas, 2.6%
- Bladder, 2.9%
- Thyroid, 3.7%
- Prostate, 6.2%

Cancer Incidence Cases 76,663

- Thyroid, 23.5%
- Breast, 15.1%
- Stomach, 11.2%
- Colon and rectum, 10.8%
- Lung, 6.5%
- Cervix uteri, 4.7%
- Liver, 4.9%
- Ovary, 2.4%
- Pancreas, 2.3%
- Gallbladder etc, 2.7%
- Others, 15.8%
Age-specific incidence rates by sex, 2007
Age-specific incidence rates by cancer sites, Male, 2007
Age-specific incidence rates by cancer sites, Female, 2007
International Comparison of Breast Cancer Incidence

Bray et al. Breast Cancer Res 2004
Age-specific rates of breast cancer: Female

Peak in 45-49 years age
Trend of age-standardized cancer incidence rates

- **Total**: 2.9% (P < .05)
- **Male**: 1.3% (P < .05)
- **Female**: 4.9% (P < .05)
Trend of Major Cancers in Korea, Male

<table>
<thead>
<tr>
<th>Site</th>
<th>1999</th>
<th>2007</th>
<th>Annual Percent Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach</td>
<td>68.4</td>
<td>62.8</td>
<td>-0.7</td>
</tr>
<tr>
<td>Lung</td>
<td>51.9</td>
<td>48.1</td>
<td>-0.6</td>
</tr>
<tr>
<td>Colon and rectum</td>
<td>27.0</td>
<td>44.5</td>
<td>7.0 *</td>
</tr>
<tr>
<td>Liver</td>
<td>48.5</td>
<td>39.6</td>
<td>-2.2 *</td>
</tr>
<tr>
<td>Prostate</td>
<td>8.5</td>
<td>20.1</td>
<td>13.2 *</td>
</tr>
<tr>
<td>Thyroid</td>
<td>2.3</td>
<td>11.6</td>
<td>24.5 *</td>
</tr>
</tbody>
</table>

* P < .05
Trend of Major Cancers in Korea, Female

<table>
<thead>
<tr>
<th>Site</th>
<th>1999</th>
<th>2007</th>
<th>Annual Percent Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroid</td>
<td>11.9</td>
<td>64.8</td>
<td>26.0*</td>
</tr>
<tr>
<td>Breast</td>
<td>24.5</td>
<td>39.9</td>
<td>6.6*</td>
</tr>
<tr>
<td>Stomach</td>
<td>28.3</td>
<td>25.7</td>
<td>-0.7</td>
</tr>
<tr>
<td>Colon and rectum</td>
<td>17.1</td>
<td>24.3</td>
<td>5.3*</td>
</tr>
<tr>
<td>Lung</td>
<td>12.9</td>
<td>13.7</td>
<td>1.2*</td>
</tr>
<tr>
<td>Cervix uteri</td>
<td>18.6</td>
<td>12.2</td>
<td>-4.9*</td>
</tr>
<tr>
<td>Liver</td>
<td>12.6</td>
<td>10.9</td>
<td>-1.6*</td>
</tr>
</tbody>
</table>

* P < .05
International Comparison of Age-standardized Rates by Sex: All Cancers

1) Incidence rate of all types of cancer except for other skin (C44) to compare globally
2) Data source: GLOBOCAN 2008, IARC, 2010

(단위: 명/10만명)

Male

Female

Korea (2007) 301.9
Korea (2008) 309.4
Japan (2008) 247.3
China (2008) 211
Thailand (2008) 146
France (2008) 360.6
England (2008) 298.4
USA (2008) 395
Korea (2008) 221.3
Korea (2008) 294.4
Japan (2008) 167.6
China (2008) 152.4
Thailand (2008) 158.1
France (2008) 254.9
England (2008) 249.5
USA (2008) 274.4
Trend of Five-Year Relative Survival by Sex: All Cancers

- Total:
  - '93-'95: 41.2%
  - '96-'00: 44.0%
  - '01-'05: 53.1%
  - '03-'07: 57.1%

- Male:
  - '93-'95: 31.7%
  - '96-'00: 35.3%
  - '01-'05: 44.6%
  - '03-'07: 48.3%

- Female:
  - '93-'95: 53.4%
  - '96-'00: 55.3%
  - '01-'05: 63.3%
  - '03-'07: 67.1%
# International Comparison of Five-Year Relative Survival

<table>
<thead>
<tr>
<th>Site</th>
<th>Korea ('96-'00)</th>
<th>Korea ('01-'05)</th>
<th>Korea ('03-'07)</th>
<th>USA(^1) ('99-'05)</th>
<th>Canada(^2) ('98-'00)</th>
<th>Japan(^3) ('97-'99)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cancers</td>
<td>44.0</td>
<td>53.1</td>
<td>57.1</td>
<td>66.1</td>
<td>60</td>
<td>54.3</td>
</tr>
<tr>
<td>Stomach</td>
<td>46.6</td>
<td>57.3</td>
<td>61.2</td>
<td>25.7</td>
<td>22</td>
<td>62.1</td>
</tr>
<tr>
<td>Liver</td>
<td>13.2</td>
<td>19.4</td>
<td>21.7</td>
<td>13.1</td>
<td>14</td>
<td>23.1</td>
</tr>
<tr>
<td>Cervix uteri</td>
<td>80.0</td>
<td>80.9</td>
<td>80.5</td>
<td>70.6</td>
<td>75</td>
<td>71.5</td>
</tr>
<tr>
<td>Colon and rectum</td>
<td>58.0</td>
<td>66.1</td>
<td>68.7</td>
<td>65.2</td>
<td>59/61(^4)</td>
<td>65.2</td>
</tr>
<tr>
<td>Thyroid</td>
<td>94.9</td>
<td>98.0</td>
<td>98.8</td>
<td>96.9</td>
<td>97</td>
<td>92.4</td>
</tr>
<tr>
<td>Breast</td>
<td>83.2</td>
<td>88.0</td>
<td>89.5</td>
<td>89.1</td>
<td>87</td>
<td>85.5</td>
</tr>
<tr>
<td>Lung</td>
<td>12.7</td>
<td>15.6</td>
<td>16.7</td>
<td>15.6</td>
<td>15</td>
<td>25.6</td>
</tr>
<tr>
<td>Pancreas</td>
<td>7.6</td>
<td>7.4</td>
<td>7.6</td>
<td>5.5</td>
<td>6</td>
<td>6.7</td>
</tr>
<tr>
<td>Prostate</td>
<td>67.2</td>
<td>78.6</td>
<td>82.4</td>
<td>99.7</td>
<td>94</td>
<td>75.5</td>
</tr>
</tbody>
</table>

\(^3\) National Cancer Center In Japan. Cancer Statistics in Japan, 2008
\(^4\) Colon/Rectum
Thank you

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