

# POPULATION-BASED CANCER REGISTRIES IN KOREA

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## History of Cancer Registration in Korea

It was not until 1980 that cancer registration was started in Korea; official registration began with the financial support of World Health Organization on July 1<sup>st</sup> of that year. Forty-five training and two non-training hospitals throughout the country initiated voluntary registration of patients in whom neoplasia had been found. All completed data sheets, containing 15 items of patient information, were to be sent from each hospital to the Korean Central Cancer Registry Center (KCCR) at the National Medical Center (1). A few years later, the Ministry of Health and Welfare compelled all the university and training hospitals to join the program.

The KCCR has continued without interruption and has published an annual report. The number of member hospitals and registered cancer cases has been increasing steadily year by year. In 1998, around 89,000 cases from 124 hospitals were registered throughout the country (2). Although the KCCR is a national cancer control program and covers almost all the large training hospitals in Korea, it cannot provide incidence data. It is, however, the only registry of its kind in the world, being neither population nor hospital based.

In 1983, a PBCR was launched in a small county, Kangwha, by Yonsei University Medical College. Kangwha County is a small island area connected by a bridge to the mainland, and is 50 Km from Seoul. It has around 80,000 inhabitants. All data were collected by active methods, and incidence statistics for 1986-1992 appeared in Vol. VII of the Cancer Incidence in Five Continents. However, the population covered is too small to be representative of the whole of Korea.

In 1990, the initial study for a PBCR in Seoul was carried out by several researchers including this author. It was supported by a civilian foundation, the Korean Foundation for Cancer Research. The study had two objectives: 1) to test the feasibility of operating a population based cancer registry in the Seoul area, with dual sources of case registration, i.e., from the KCCR, but incorporating cases diagnosed in small hospitals, and 2) to provide the cancer incidence for all sites in the Seoul area with completeness and validity assessment. In 1993 the major findings were reported, and it was suggested that the methods of data collection used in the study could be used as a model for a future population based cancer registry in other areas of Korea (3). The Seoul cancer registry (SCR) started in 1991 and has operated continuously since then (4).

The program and methodology used by the SCR was later extended to other large cities: Busan in 1995, Daegu and Kwangju in 1996, Incheon in 1997, and Daejeon in 1998 (Fig1). In each area a study of patterns of utilization of existing medical facilities by cancer patients was first carried out, and after this the registry was launched. As of 2000, six population based cancer registries are running in Korea. The Kangwha area, the earliest registry area, merged with Incheon.

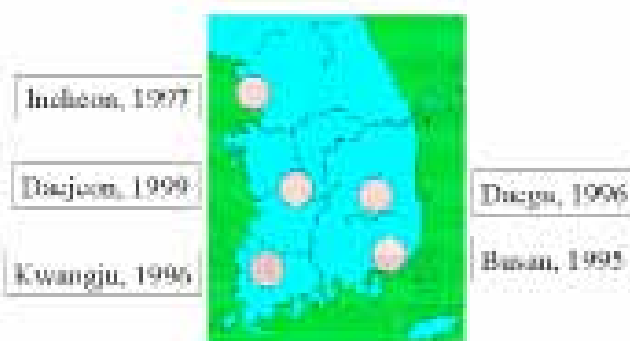
*Asian Pacific J Cancer Prev*, 2, IARC Supplement, 39-42

## Current Cancer Registration Model

### Seoul Cancer Registry

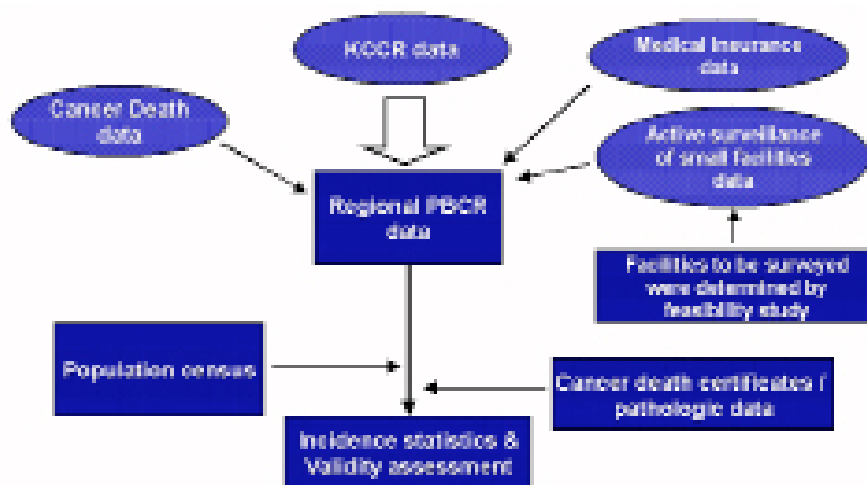
The primary source of the SCR data is the registry files of the KCCR. From these files, the records of patients residing in Seoul are extracted. Patients diagnosed in KCCR-non-affiliated hospitals, as well as other medical facilities such as pathology laboratories, are actively surveyed by SCR data collection team, who visit each hospital at regular intervals (Fig 2).

Prior to the implementation study, it was hoped that cancer patients in Seoul would not need to go elsewhere to seek better diagnosis/treatment, and that many such patients who first visit small hospitals would be referred to larger (KCCR) hospitals. If this had happened, it might have been unnecessary to survey non-KCCR hospitals. In the implementation study (3), it was estimated that less than 1% of cancer pa-



**Figure 1. Feasibility Study Sites**

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**Figure 2. Schematic Presentation of the Korean Model for PBCR**

tients visit hospitals out of Seoul, and around 10% first visit non-KCCR hospitals. Among those utilizing these latter, however, only 6.2% of patients were subsequently referred to, or visited, larger hospitals. According to duplicate record data, transfer rates from non-KCCR to KCCR hospitals were lower among older age groups than among others, and were lower in elderly females than elderly males. This implies that visit-and-abstract surveillance of the non-KCCR hospitals would improve the registration rate of new patients especially those who are older. Registry data from the implementation study were evaluated in terms of completeness and validity; several indices were used, including the M/I ratio and age-specific incidence curve for the completeness, and HV%, PSU%, and Age UNK % for validity (5).

#### *Other centres*

The medical utilization pattern of cancer patients in Korea varies somewhat according to area, including between large cities. In order to estimate the rate of non-registration, feasibility or medical utilization studies were carried out in Busan, Daegu, Kwangju, Incheon, Daegu, and Daejeon.

Busan, in the southeast of Korea, is its second largest city, according to a feasibility study (6), 91.4% of cancer cases there were registered with the KCCR, and the remainder through active surveillance. When using two data sources for cancer patient registration, i.e. KCCR files and active surveillance of non-KCCR hospitals in Busan, the degree of case loss was estimated at 1.2%. Active surveillance increased the rate of registration, especially of patients who were older.

The medical utilization pattern of cancer patients in Daegu was nearly same as in Busan. The use of two sources of registration data indicated that 1.5% of patients were not registered.

Kwangju City is located in the southwestern part of Korea, about 82% and 18% of cancer patients there are registered through KCCR files and active surveillance, respectively (7,8), and use of both data sources indicated that 2.2% of patients were not registered.

In Incheon, 40 Km from Seoul, the medical utilization pattern of cancer patients is somewhat different from those in Busan or Kwangju, with a relatively larger proportion using medical services outside the city. About half those registered in KCCR files visit hospitals in Seoul, and about 17% of those under active surveillance use medical facilities elsewhere (9). It is thus not easy to select medical facilities for active surveillance, though the final results of the feasibility study should make the decision much easier.

Daejeon City is located in the central part of Korea, a feasibility study is still going on, and will be completed very soon. The medical utilization pattern of cancer patients would be same as that in Incheon City.

## **Incidence Data**

### *A National Estimate for 2000*

IARC has prepared an estimate of the national incidence of cancer in Korea, based upon national mortality data, and mortality-incidence ratios from the Japanese cancer registries in 1988-1992. Stomach cancer incidence was estimated from the rates observed in Kangwha and Busan (see below). The results are shown in the Table.

In men, three cancers provide 61.3% of the total burden, stomach (ASR 70.0 per 100,000), Liver (48.8 per 100,000) and lung (48.4 per 100,000). In females, the profile is less extreme, with moderately high incidence rates of stomach cancer (ASR 25.7 per 100,000), and rather modest incidence rates for cancer of the cervix (15.3), breast (12.5), lung (12.1) and liver (11.6).

### *Regional variation*

Recent data from two of the regional registries are shown in Fig 3 (Kangwha county registry, 1993-1997 and Busan registry, 1996-1997). The patterns are not dissimilar from the national profile described above, although liver cancer incidence in Busan is higher (ASR 57.9 per 100,000 in males, 17.1 per 100,000 in females), as is, in both registries, the

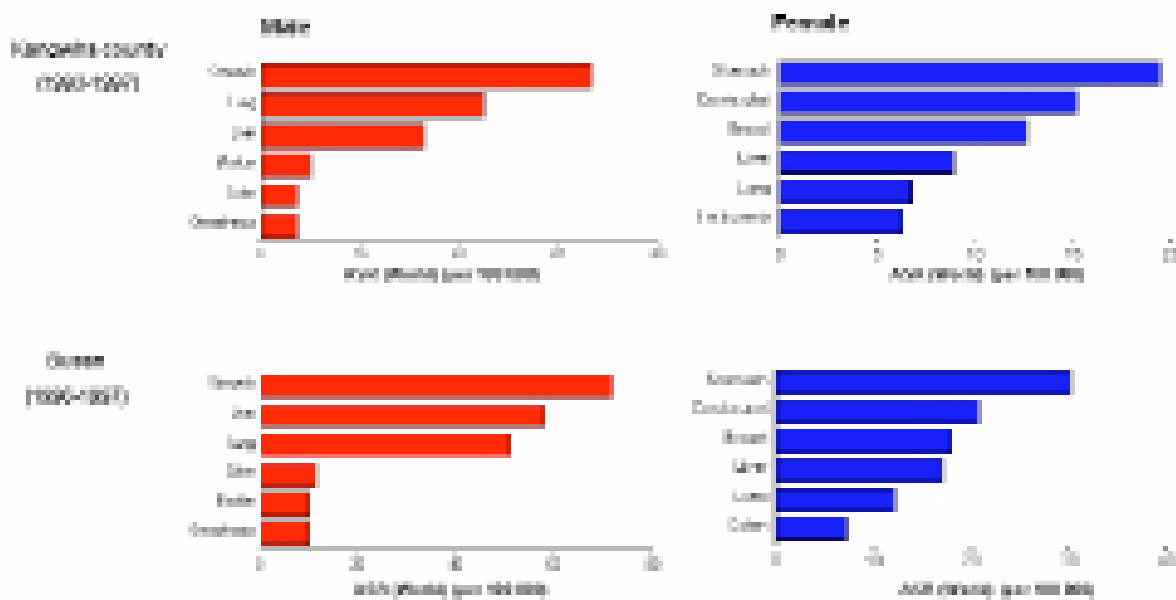
**Table. Age-specific Incidence Rates for Cancers per 100,000 Persons**

## MALES

	Number		Incidence Rates					All ages
			0-14	15-44	45-54	55-64	65+	
ASR(Wld)								
Oral cavity	700	0	0.8	5.3	11.8	20.4	3	3.3
Nasopharynx	114	0.1	0.3	1.1	1.4	1.5	0.5	0.5
Other Pharynx	229	0	0.2	2.1	3.9	6.7	1	1.1
Oesophagus	2049	0	0.3	9.6	49.1	70.7	8.7	10.1
Stomach	14433	0	9.7	75.7	286.7	494.2	61.1	70
Colon/Rectum	3074	0	2.4	9.3	69.2	103.8	13.0	14.9
Liver	10492	0.3	5.6	108.5	212.0	248.2	44.4	48.8
Pancreas	1567	0	0.8	9.2	27.8	59.5	6.6	7.7
Larynx	2101	0	0.8	19.3	42.7	58.5	8.9	10.0
Lung	9527	0	2.8	39.5	169.7	418.3	40.3	48.4
Melanoma of skin	78	0	0.2	0.6	1.2	1.3	0.3	0.3
Prostate	770	0	0.1	1.1	8.5	48.3	3.3	4.2
Testis	142	0.6	0.3	2.6	0.0	0.0	0.6	0.6
Bladder	1863	0	1.1	9.8	24.0	85.4	7.9	9.5
Kidney etc.	884	0.3	0.7	6.1	15.4	28.6	3.7	4.3
Brain, nervous system	837	1.7	2.6	3.7	8.6	14.2	3.5	3.7
Thyroid	321	0.1	0.9	2.8	4.0	4.9	1.4	1.4
Non-Hodgkin lymphoma	1461	1.2	3.1	9.9	19.6	32.5	6.2	6.6
Hodgkin's disease	192	0.1	0.1	2.6	5.0	1.1	0.8	0.8
Multiple myeloma	156	0	0.1	1.3	2.6	5.4	0.7	0.8
Leukaemia	1162	4.2	3.5	5.5	8.6	16.5	4.9	
5.2								
All sites but skin	56160	11.5	39.7	347.1	1031.2	1863.5	237.7	
271.8								

## FEMALES

	Number		Incidence rates					All ages	ASR (Wld)
			0-14	15-44	45-54	55-64	65+		
Oral cavity	272	0	0.31	1.92	2.9	6.51	1.2	1	
Nasopharynx	38	0.13	0.07	0.29	0.33	0.68	0.2	0.1	
Other Pharynx	41	0	0.03	0.24	0.5	1.07	0.2	0.2	
Oesophagus	279	0	0.14	0.77	2.23	10.08	1.2	1	
Stomach	6811	0	6.92	39.15	70.67	182.14	29.3	25.7	
Colon/Rectum	2666	0	1.35	26.6	29.09	63.19	11.5	10.3	
Liver	3030	0.14	1.91	18.74	44.71	72.78	13	11.6	
Pancreas	994	0	0.49	3.47	12.11	30.98	4.3	3.7	
Larynx	150	0	0.08	0.43	1.97	4.61	0.6	0.6	
Lung	3231	0	2.06	13.21	34.69	99.82	13.9	12.1	
Melanoma of skin	61	0.06	0.17	0.38	0.65	0.77	0.3	0.2	
Breast	3236	0	10.81	35.47	33.25	18.59	13.9	12.5	
Cervix uteri	3997	0	10.29	33.23	41.63	55.08	17.2	15.3	
Corpus uteri	390	0	0.62	6.34	3.15	4.53	1.7	1.5	
Ovary etc.	1031	0.92	2.45	5.55	14.04	13.96	4.4	4	
Bladder	410	0	0.26	2.27	3.29	12.99	1.8	1.5	
Kidney etc.	438	0.31	0.4	2.26	4.94	11.17	1.9	1.7	
Brain, nervous system	696	1.6	2.02	3.04	6.16	9.13	3	2.8	
Thyroid	1428	0.23	3.98	10.6	16.34	17.42	6.1	5.5	
Non-Hodgkin lymphoma	905	0.57	1.89	5.47	9.96	15.95	3.9	3.5	
Hodgkin's disease	108	0	0.82	0	0.33	0.2	0.5	0.4	
Multiple myeloma	134	0	0.08	1.01	2.58	2.45	0.6	0.5	
Leukaemia	827	3.12	2.57	3.81	5.49	8.46	3.6		
3.5									



**Figure 3. ASR Data Compared for Busan and Kangwha Registries**

incidence of cervix cancer(15.2 per 100,000 in Kangwha, 20.9 per 100,000 in Busan).

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