

# 2002 Annual Report of the Korea Central Cancer Registry: Based on Registered Data from 139 Hospitals

Hai-Rim Shin, M.D., Kyu-Won Jung, M.S., Young-Joo Won, M.R.A., Jae-Gahb Park, M.D. and 139 KCCR-affiliated Hospitals

Korea Central Cancer Registry, National Cancer Center, Goyang, Korea

**Purpose:** To estimate the number of cancer cases during 2002 in Korea through a nationwide hospital based cancer registration by the Korea Central Cancer Registry (KCCR).

**Materials and Methods:** One hundred and thirty nine hospitals participated in the KCCR program in 2002. Cancer cases were coded and classified according to the International Classification of Diseases for Oncology 2<sup>nd</sup> edition (ICD-O-2). The software program "IARC Check" was used to evaluate the quality of registered cancer cases. Of the 122,770 malignancies registered, 11,732 (9.6%) duplicated malignancies were excluded. Among the remaining 102,677 malignancies, 3,652 (3.6%) cases with carcinoma in situ (Morphology code/2) were separated. Finally, 99,025 malignancies were analyzed.

**Results:** Of the total of 99,025 malignancies, 55,398 (55.9%) cases were males and 43,627 (44.1%) were

females. More than one third of cases were from the elderly (65 years old and more). The six leading primary cancer sites in the order of their relative frequency, were stomach (24.0%), followed by the lung (16.0%), the liver (15.4%), the colorectum (11.6%), the bladder (3.2%), and the prostate (3.0%) among males. In females, the breast (16.8%) was the common cancer site, followed by the stomach (15.3%), the colorectum (10.7%), the thyroid gland (9.5%), the cervix uteri (9.1%), and the lung (6.6%).

**Conclusion:** With the continued increase in cancer cases especially prostate cancer among males and thyroid cancer among females, the total number of registered cancer cases in Korea continues to rapidly increase. (Cancer Research and Treatment 2004;36:103-114)

**Key Words:** Cancer registry, Annual report

## INTRODUCTION

The Korea Central Cancer Registry (KCCR) was started as an ambitious project of the Ministry of Health and Welfare in 1980 (1). In the beginning, 47 nationwide resident-training general hospitals participated in this program. The number of participating hospitals and registered malignancies increased year by year, and 139 hospitals submitted their data diskettes in 2002.

In 1996, the International Classification of Diseases for Oncology 2<sup>nd</sup> edition (ICD-O-2) was translated into Korean and distributed to all the participating hospitals. Topography and Morphology codes of the ICD-O-2 have been used since the 16<sup>th</sup> annual report of the KCCR.

The aim of this paper is to provide a summary of the 23<sup>rd</sup> annual report of the KCCR, which was published in December 2003 (1). It contains the relative frequencies of various cancers

in the Republic of Korea, derived from the nationwide database of the hospital-based cancer registry program from January 1, to December 31, 2002.

## MATERIALS AND METHODS

One hundred and thirty nine hospitals participated in the KCCR in 2002. All cancer registry data, submitted from the participating hospitals on diskettes during the year, were reviewed and sorted by qualified cancer registrars in the National cancer Center. After correction of erroneous coding of topography and morphology, cancer cases were classified according to the ICD-O-2. To avoid duplication, the computer compared the personal identification number of all subjects. The software program "IARC Check" which was freely distributed by International Association of Cancer Registry (IACR), was used to evaluate the quality of registered cancer cases. The pathologists working at the hospitals where the cases were diagnosed, reviewed the cases with errors showing from "IARC Check" program. Much emphasis was placed on the basis of diagnosis during this selection procedure. Cases diagnosed by histological examination were preferentially chosen.

Of 122,770 malignancies registered, 11,732 (9.6%) dupli-

Correspondence: Jae-Gahb Park, National Cancer Center, Goyang-si, Gyeonggi-do 411-769, Korea. (Tel) 82-31-920-2050, (Fax) 82-31-920-2051, (E-mail) hrshin@ncc.re.kr

This study was supported by The National Cancer Center Grant 0110010.

cated malignancies were excluded. Among the remaining 102,677 malignancies, 3,652 (3.6%) cases with carcinoma in situ (Morphology code/2) were separated. Finally, 99,025 malignancies were analyzed.

## RESULTS

### 1) Marginal frequency of malignant neoplasm and carcinoma in situ by age, sex, and topography

Of the total 99,025 registered malignancies 55,398 (55.9%) cases were males and 43,627 (44.1%) were females. The proportion of cancer cases among children (age 0~14) and among the elderly (65 and more) were 1.2 and 36.1%, respectively (Table 1).

The most common 10 primary sites among males were stomach (24.0%), lung (16.0%), liver (15.4%), colorectum (11.6%), bladder (3.2%), prostate (3.0%), esophagus (2.8%), hematopoietic & reticuloendothelial systems (2.7%), pancreas (2.5%), and kidney (2.0%). Among females, they were the breast (16.8%), stomach (15.3%), colorectum (10.7%), thyroid (9.5%), cervix uteri (9.1%), lung (6.6%), liver (6.0%), ovary (3.6%), hematopoietic & reticuloendothelial systems (2.5%), and pancreas (2.3%) (Fig. 1).

**Table 1.** Frequency of new cancer cases by sex and age group in 2002, Korea

Age group	Male		Female		Total	
	N	%	N	%	N	%
0	70	0.1	47	0.1	117	0.1
1~4	223	0.4	180	0.4	403	0.4
5~9	184	0.3	132	0.3	316	0.3
10~14	198	0.4	154	0.4	352	0.4
15~19	238	0.4	239	0.5	477	0.5
20~24	283	0.5	480	1.1	763	0.8
25~29	447	0.8	955	2.2	1,402	1.4
30~34	868	1.6	1,847	4.2	2,715	2.7
35~39	1,484	2.7	2,896	6.6	4,380	4.4
40~44	2,918	5.3	4,528	10.4	7,446	7.5
45~49	4,175	7.5	4,707	10.8	8,882	9.0
50~54	5,491	9.9	4,316	9.9	9,807	9.9
55~59	7,124	12.9	4,496	10.3	11,620	11.7
60~64	9,560	17.3	5,051	11.6	14,611	14.8
65~69	9,286	16.8	4,969	11.4	14,255	14.4
70~74	6,570	11.9	4,070	9.3	10,640	10.7
75~79	3,985	7.2	2,707	6.2	6,692	6.8
80~84	1,736	3.1	1,289	3.0	3,025	3.1
85+	558	1.0	564	1.3	1,122	1.1
All	55,398	100.0	43,627	100.0	99,025	100.0

The most common cancer among children (0~14 years old) was in the hematopoietic & reticuloendothelial systems, with 35.6% of boys and 30.0% of girls. For the age group 15~34, stomach cancer was the most common cancer among males (17.1%) and thyroid cancer among females (24.4%). For the males in the older age groups, the stomach was leading site of cancer, at 25.6% and 23.1% among 35~64 year olds and those 65 and over, respectively. However, among the females aged 35~64, breast cancer was the most common cancer (23.2%), with stomach cancer being the most common among those 65 and over (20.2%) (Table 2).

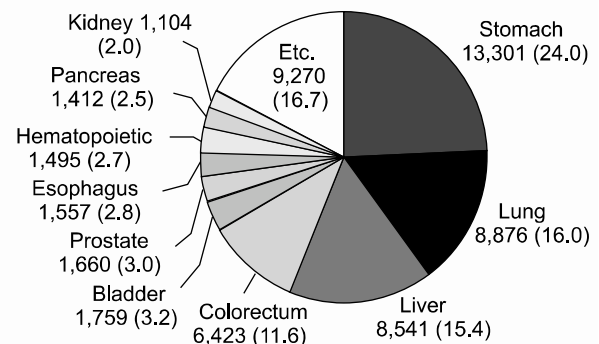
Table 3 shows the number of carcinoma in situ cases by gender. 41.9% of registered uterine cervix cases were carcinoma in situ. However, only 6.1% of registered female breast cancer cases were diagnosed as carcinoma in situ.

### 2) Distribution of the six major cancers by topographic and morphologic type

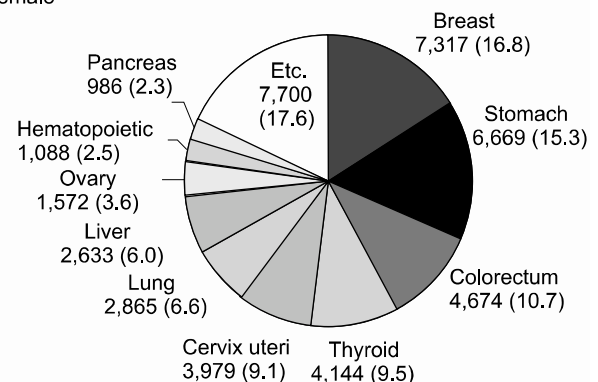
Table 4 shows the primary sites and morphologic types of the six major cancers by gender.

More than one third of stomach cancer (C16) occurred in the antrum part of the stomach (36.5% in males and 35.2% in females, respectively), and half of these were adenocarcinoma (51.6% in males and 47.3% in females). For bronchus and lung cancer (C34), the major primary site was the upper lobe (34.9%

Male



Female



**Fig. 1.** New Cancer Cases and proportion of cancer cases by major primary site and sex.

**Table 2.** Frequency of major cancer cases by gender and age in 2002, Korea

Age group	Rank	Male		Female	
		Site	N (%)	Site	N (%)
0~14	1	Hematopoietic	240 (35.6)	Hematopoietic	154 (30.0)
	2	Brain	105 (15.6)	Brain	92 (17.9)
	3	Lymph nodes	46 (6.8)	Ovary	31 (6.0)
	4	Bone and joints and articular cartilage of other and unspecified sites	32 (4.7)	Bone and joints and articular cartilage of other and unspecified sites	27 (5.3)
	5	Adrenal gland	27 (4.0)	Adrenal gland	26 (5.1)
	6	Heart, mediastinum, and pleura	24 (3.6)	Lymph nodes	26 (5.1)
	7	Eye and adnexa	24 (3.6)	Kidney	25 (4.9)
	8	Connective, subcutaneous and other soft tissues	21 (3.1)	Eye and adnexa	21 (4.1)
	9	Liver and intrahepatic bile ducts/Kidney/Other endocrine	19 (2.8)	Connective, subcutaneous and other soft tissues	17 (3.3)
	10			Liver and intrahepatic bile ducts	12 (2.3)
	etc.		99 (14.7)		82 (16.0)
Subtotal			675		513
15~34	1	Stomach	314 (17.1)	Thyroid gland	859 (24.4)
	2	Hematopoietic	239 (13.0)	Breast	650 (18.5)
	3	Colorectum	167 (9.1)	Stomach	391 (11.1)
	4	Brain	134 (7.3)	Cervix uteri	343 (9.7)
	5	Thyroid gland	125 (6.8)	Ovary	303 (8.6)
	6	Liver and intrahepatic bile ducts	124 (6.8)	Hematopoietic	174 (4.9)
	7	Lymph nodes	108 (5.9)	Colorectum	102 (2.9)
	8	Testis	78 (4.3)	Brain	80 (2.3)
	9	Connective, subcutaneous and other soft tissues	57 (3.1)	Lymph nodes	65 (1.9)
	10	Bronchus and lung	40 (2.2)	Bronchus and lung	54 (1.5)
	etc.		450 (23.5)		500 (14.2)
Subtotal			1,836		3,521
35~64	1	Stomach	7,880 (25.6)	Breast	6,027 (23.2)
	2	Liver and intrahepatic bile ducts	6,173 (20.1)	Stomach	3,533 (13.6)
	3	Bronchus and lung	4,015 (13.1)	Thyroid gland	2,869 (11.0)
	4	Colorectum	3,661 (11.9)	Cervix uteri	2,828 (10.9)
	5	Bladder	798 (2.6)	Colorectum	2,468 (9.5)
	6	Esophagus	773 (2.5)	Liver and intrahepatic bile ducts	1,431 (5.5)
	7	Pancreas	749 (2.4)	Bronchus and lung	1,212 (4.7)
	8	Kidney	731 (2.4)	Ovary	930 (3.6)
	9	Hematopoietic	680 (2.2)	Corpus uteri	663 (2.6)
	10	Larynx	493 (1.6)	Hematopoietic	499 (1.9)
	etc.		4,799 (15.6)		3,534 (13.6)
Subtotal			30,752		25,994

Table 2. Continued

Age group	Rank	Male		Female	
		Site	N (%)	Site	N (%)
65+	1	Stomach	5,104 (23.1)	Stomach	2,743 (20.2)
	2	Bronchus and lung	4,819 (21.8)	Colorectum	2,103 (15.5)
	3	Colorectum	2,587 (11.7)	Bronchus and lung	1,595 (11.7)
	4	Liver and intrahepatic bile ducts	2,225 (10.1)	Liver and intrahepatic bile ducts	1,149 (8.5)
	5	Prostate gland	1,191 (5.4)	Cervix uteri	808 (5.9)
	6	Bladder	934 (4.2)	Breast	640 (4.7)
	7	Esophagus	784 (3.5)	Pancreas	582 (4.3)
	8	Pancreas	643 (2.9)	Gallbladder	453 (3.3)
	9	Larynx	422 (1.9)	Thyroid gland	406 (3.0)
	10	Other and unspecified parts of biliary tract	409 (1.9)	Other and unspecified parts of biliary tract	383 (2.8)
	etc.		3,017 (13.6)		2,737 (20.1)
Subtotal			22,135		13,599

Table 3. Frequency of in-situ cases in 2002, Korea

Rank	Male			Female		
	Primary site	Malignant	in-situ (n=195)	Primary site	Malignant	in-situ (n=3,457)
		N (%)	N (%)		N (%)	N (%)
1	Bladder	1,759 (98.2)	33 (1.8)	Cervix uteri	3,979 (58.1)	2,872 (41.9)
2	Larynx	917 (96.9)	29 (3.1)	Breast	7,317 (93.9)	479 (6.1)
3	Skin	643 (96.3)	25 (3.7)	Skin	679 (95.5)	32 (4.5)
4	Colon	3,117 (99.2)	24 (0.8)	Vulva	60 (80.0)	15 (20.0)
5	Stomach	13,301 (99.9)	20 (0.2)	Stomach/Colon	6,669 (99.8)	11 (0.2)
etc.		35,661 (99.8)	64 (0.2)		2,391 (99.5)	11 (0.5)
					22,532 (99.8)	37 (0.2)

in males and 30.7% in females), with squamous cell carcinoma (39.5%) the major morphologic type in males, but adenocarcinomas (40.6%) in females. In males, hepatocellular carcinomas accounted for 78.6% of the liver and intrahepatic bile ducts cancers (C22); however, in females this was 65.9%. For breast cancer, 37.0% of female breast cancer (C50) occurred in the upper outer part of the breast, with 83.6% being infiltrating duct carcinomas. The most common site of colon cancer (C18) was the sigmoid colon (41.2% in males and 37.0% in females, respectively) and the most frequent morphologic type was adenocarcinomas (58.7% in males and 59.1% in females). Only 12.0% of male and 11.8% of female rectal cancers occurred in the rectosigmoid junction. As with other cancers, adenocarcinomas were the major morphologic type of rectal cancer (60.1% in males and 57.9% in females).

Appendix 2 shows the distribution of cancer cases by ICD-10 for easy comparison of the cancer death statistics.

## DISCUSSION

In December, 2003, the 23<sup>rd</sup> annual report of the Korea Central Cancer Registry based on registered data from 139 hospitals was published (1).

Information on the incidence and mortality of cancers, and their changing trends, is an essential component in the planning and monitoring of programs for cancer prevention, early detection and treatment (2).

The number of cancer cases in the KCCR for 2000 was assumed to be more than 90% precise for cancer cases with the comparison of the estimated cancer incidence cases (3), using national mortality data, and the incidence data from four frontier regional cancer registries, including Kangwha, Seoul, Busan and Deagu in the Cancer Incidence in Five Continents (4).

The KCCR database is especially useful for showing the

**Table 4.** Frequency of topography and morphology in major cancer sites

Male				Female			
Topography	Cases (%)	Morphology	Cases (%)	Topography	Cases (%)	Morphology	Cases (%)
Stomach (C16)							
Gastric antrum	4,856 (36.5)	Adenocarcinoma	6,859 (51.6)	Gastric antrum	2,346 (35.2)	Adenocarcinoma	3,154 (47.3)
Body	3157 (23.7)	Tubular adeno ca.	3,389 (25.5)	Body	1,773 (26.6)	Signet ring cell ca.	1,442 (21.6)
Overlapping lesion	1,673 (12.6)	Signet ring cell ca.	1,651 (12.4)	Overlapping lesion	820 (12.3)	Tubular adeno ca.	1,263 (18.9)
Cardia,NOS	583 (4.4)	Mucinous adeno ca.	265 (2.0)	Lesser curvature	221 (3.3)	Mucinous adeno ca.	116 (1.7)
Lesser curvature	461 (3.5)	Papillary adeno ca.	86 (0.6)	Cardia, NOS	208 (3.1)	Malig. Lymphoma, large cell, diffuse	80 (1.2)
	2,571 (19.3)		1,051 (7.9)		1,301 (19.5)		614 (9.2)
Bronchus and lung (C34)							
Upper lobe	3,095 (34.9)	Squamous cell ca.	3,504 (39.5)	Upper lobe	880 (30.7)	Adenocarcinoma	1,162 (40.6)
Lower lobe	2,105 (23.7)	Adenocarcinoma	1,851 (20.9)	Lower lobe	682 (23.8)	Squamous cell ca.	366 (12.8)
Main bronchus	382 (4.3)	Small cell ca.	1,260 (14.2)	Middle lobe	140 (4.9)	Small cell ca.	254 (8.9)
Middle lobe	331 (3.7)	Bronchiolo-alveolar adenocarcinoma	86 (1.0)	Main bronchus	82 (2.9)	Bronchiolo-alveolar adenocarcinoma	116 (4.0)
Overlapping lesion	194 (2.2)	Acinar cell ca.	75 (0.8)	Overlapping lesion	41 (1.4)	Acinar cell ca.	58 (2.0)
Lung, NOS	2,769 (31.2)		2,100 (23.7)	Lung, NOS	1,040 (36.3)		909 (31.7)
Liver and intrahepatic bile ducts (C22)							
Liver	7,251 (84.9)	Hepatocellular ca.	6,710 (78.6)	Liver	1,919 (72.9)	Hepatocellular ca.	1,736 (65.9)
Intrahepatic bile duct	1,290 (15.1)	Cholangiocarcinoma	589 (6.9)	Intrahepatic bile duct	714 (27.1)	Cholangiocarcinoma	296 (11.2)
		Adenocarcinoma	192 (2.2)			Adenocarcinoma	88 (3.3)
		Combined hepatocellular ca and cholangio ca.	26 (0.3)			Tubular adeno ca.	12 (0.5)
		Tubular adeno ca.	15 (0.2)			Carcinoid tumor	9 (0.3)
			1,009 (11.8)				492 (18.7)
Breast (C50)							

trend of cancer occurrence in Korea, as information on the changing trend of cancer incidence over time is an essential component in the planning and monitoring of programs for cancer prevention, early detection and treatment. Major cancers

including stomach, lung, liver, breast, colorectum, but with the exception of uterine cervix cancer, were increasing (data not shown). For uterine cervix cancer, the proportion of carcinoma in-situ cases increased among the registered cases, meaning

Table 4. Continued

Male				Female			
Topography	Cases (%)	Morphology	Cases (%)	Topography	Cases (%)	Morphology	Cases (%)
				Upper outer	2,709 (37.0)	Infiltrating duct ca.	6,114 (83.6)
				Overlapping lesion	959 (13.1)	Lobular ca.	271 (3.7)
				Upper inner	835 (11.4)	Mucinous adeno ca.	154 (2.1)
				Lower outer	470 (6.4)	Medullary ca.	111 (1.5)
				Central portion	308 (4.2)	Papillary ca.	88 (1.2)
					2,036 (27.8)		579 (7.9)
Colon (C18)							
Sigmoid colon	1,284 (41.2)	Adenocarcinoma	1,831 (58.7)	Sigmoid colon	885 (37.0)	Adenocarcinoma	1,414 (59.1)
Ascending colon	556 (17.8)	Tubular adeno ca.	710 (22.8)	Ascending colon	547 (22.9)	Tubular adeno ca.	524 (21.9)
Transverse colon	220 (7.1)	Mucinous adeno ca.	189 (6.1)	Transverse colon	189 (7.9)	Mucinous adeno ca.	166 (6.9)
Descending colon	209 (6.7)	Papillary adeno ca.	77 (2.5)	Cecum	168 (7.0)	Papillary adeno ca.	32 (1.3)
Cecum	180 (5.8)	Signet ring cell ca.	35 (1.1)	Descending colon	108 (4.5)	Signet ring cell ca.	23 (1.0)
	668 (21.4)		275 (8.8)		494 (20.7)		232 (9.7)
Rectum (C19~C20)							
Rectum, NOS	2,909 (88.0)	Adenocarcinoma	1,986 (60.1)	Rectum, NOS	2,014 (88.2)	Adenocarcinoma	1,322 (57.9)
Rectosigmoid junction	397 (12.0)	Tubular adeno ca.	840 (25.4)	Rectosigmoid junction	269 (11.8)	Tubular adeno ca.	564 (24.7)
		Mucinous adeno ca.	122 (3.7)			Mucinous adeno ca.	88 (3.9)
		Papillary adeno ca.	72 (2.2)			Papillary adeno ca.	57 (2.5)
		Carcinoid tumor	62 (1.9)			Carcinoid tumor	53 (2.3)
			224 (6.8)				199 (8.7)

significant uterine cervix cancers were detected at an early stage.

Currently, KCCR, being a nationwide hospital-based cancer registry, is supporting technically and financially 9 population-based regional registries; Seoul, Busan, Daegu, Incheon, Gwangju, Daejeon, Ulsan, Jeju-do and Gyeonggi-do in 2003.

The KCCR database continues to hold the most important position until a nationwide, population-based data acquisition

program can be constructed on the basis of international standards.

One area for caution in the interpretation of the KCCR data is that the numbers outlined in this report do not represent persons, but cases that have been reported. The patients who had cancers at several sites have been treated as multiple primary patients, and have been reported according to the cancer site.

## ACKNOWLEDGEMENTS

We would like to sincerely thank the participation of the medical record administrators in the KCCR-affiliated hospitals [Appendix 1] who enthusiastically participated in the KCCR by registering new cancer cases. We would also like to thank Ji-Young Kim, M.R.A., Su-Jin Kim, M.S., Hye-Jin Kim, M.R.A., Kwang-Suk Park, M.R.A., Ji-Young Oh, M.R.A., Soon-Jeong Koh, M.R.A., Sang-Hee Seo, M.R.A., Myoung-Jin Jang, M.S., Na-Yoon Chang, M.S., Soon-Young Hwang, Ph.D., for their devoted efforts to mining and clearing the KCCR data set.

## REFERENCES

1. Ministry Health and Welfare. 2002 Annual report of Korea Central Cancer Registry (published in 2003). Available from URL:<http://www.ncc.re.kr>
2. WHO IARC. Cancer Registration; Principles and methods, 1991. Lyon, France
3. Shin HR, Ahn YO, Bae JM, Shin MH, Lee DH, Lee CW, Ohrr HC, Ahn DH, Ferlay J, Parkin DM, Oh DK, Park JG. Cancer Incidence in Korea. Cancer Research and Treatment 2002; 34:405-408.
4. WHO IARC, Cancer Incidence in Five Continents. Volume VIII, 2002.

**Appendix 1.** List of the Hospitals participating the 2002 KCCR program

---

Ajou University Hospital  
 Andong General Hospital  
 Andong Presbyterian Hospital  
 Ansan Hando General Hospital  
 Asan Medical Center  
 Bag Ae Hospital  
 Benedict Hospital  
 Bupyeong Serim Hospital  
 Busan Veterans Hospital  
 Carollo Hospital  
 Catholic GEN Hospital  
 Changwon Fatima Hospital  
 Changwon General Hospital  
 Cheju National University Hospital  
 ChonBuk National University Hospital  
 Chongju St. Mary's Hospital  
 Chonnam University Hospital  
 Choon Hae Hospital  
 Chosun University Hospital  
 Chung-Ang University Hospital  
 ChungAng University Medical Center  
 Chungbuk National University Hospital  
 Chungnam National University Hospital  
 College of Medicine, Pochon CHA university CHA General Hospital  
 Dae Dong hospital  
 Dae Jeon Veterans Hospital  
 Dae Rim St. Mary's Hospital  
 Daegu Medical Center  
 Daewoo Hospital  
 DanKook University Hospital  
 Dong Kang General Hospital  
 Dong Rae Bong Seng Hospital  
 Dong-A University Hospital  
 Dongeui medical center  
 Dongguk University Kyong Ju Hospital  
 Dong-In Hospital  
 Dong-Kuk University Po-Hang Hospital  
 Dongsan Medical Center  
 Eulji General Hospital  
 Ewha Womans University Mokdong Hospital  
 Ewha Womans University Tongdaemun Hospital  
 Gachon Medical School Gil Medical Center  
 Gangneung Asan Hospital  
 Gangneung Medical Center  
 Gyeongsang University Hospital  
 Hae Dong Hospital  
 Halla General hospital  
 Hallym Sacred Heart Hospital  
 Hallym University Hang Gang Sacred Heart Hospital

---



**Appendix 1. Continued**

---

Hallym University Medical Center ChunCheon Sacred Heart Hospital  
 Hangdong University Sunlin Presbyterian Hospital  
 Hanil Hospital  
 Hanyang University Hospital  
 Hanyang University Kuri Hospital  
 Holy Hamily Hospital  
 Il Sin Christian Hospital  
 In Je University, Pusan Paik hospital  
 Inchon Christian Hopital  
 Inchon Red Cross Hospital  
 Inha University Hospital  
 Inha University Medical Center Inha Hospital  
 Inje Univ. Ilsan Paik Hospital  
 Inje University Sanggye Paik Hospital  
 Inje University, Seoul Paik Hospital  
 kang Dong Sacred Heart Hospital  
 Kangbuk Samsung Hospital  
 kangnam General Hospital Public Corporation  
 KangNam Sacred Heart Hospital Hallym University  
 Keimyung University Medical Center  
 Kon Kuk University Medical Center Seoul Hospital  
 Korea Cancer Center Hospital  
 Korea University Ansan Hospital  
 Korea University College of Medicine, Guro Hospital  
 Korea University Hospital  
 Korea Veterans Hospital  
 Kosin University Gospel Hospital  
 Kwak's Hospital  
 Kwang Ju Christian Hospital  
 Kwang Ju Veterans Hospital  
 Kwang Myung Sung Ae General Hospital  
 Kwanghye Geneal Hospital  
 Kyung Hee Medical Center  
 Kyungpook National University Hospital  
 Local Public Corp. Inchun Medical Center  
 Local Public Corporation Chung Cheong Nam-Do Hong Sung Medical Center  
 Maryknoll General Hospital  
 Masan Samsung Hospital  
 Metro Hospital  
 Moonhwa Hospital  
 Nam Kwang Hospital  
 Namwon Medical Center  
 National Cancer Center  
 National Health Insurance Corporation Ilsan Hospital  
 National Medical Center  
 National Police Hospital  
 Pochon Cha Univ. Kumicha medical center  
 Pohang St. Mary's Hospital  
 Presbyterian Medical Center

---

## Appendix 1. Continued

---

Pundang Je-Saeng Hospital  
Pusan Adventist Hospital  
Pusan Medical Center  
Pusan National University Hospital  
Samsun Hospital  
Samsung Medical center  
Sansung Cheil Hospital & Women's Health Care Center  
Sejong General Hospital  
Seo San Medical Center  
Seoul Adventist Hospital  
Seoul Municipal Boramae Hospital  
Seoul National University Hospital  
Seoul Red Cross Hospital  
Severance Hospital Yonsei University Medical College  
Shin Chun Hospital  
Soonchunhyang GuMi Hospital  
Soonchunhyang University Cheonan Hospital  
Soonchunyang Univ. Hospital  
St. Mary's hospital, The Catholic University of Korea  
St. Paul's Hospital  
Sun General Hospital  
Sung Ae Hospital  
Taebak Choongang General Hospital  
Taegu Catholic University Hospital  
Taegu Fatima Hospital  
Taegu Veterans Hospital  
Taejeon Eul-ji College Hospital  
The Catholic University of Korea Kangnam St. Mary's Hospital  
The Catholic University of Korea Taejon St. Mary's Hospital  
The Catholic University of Korea, Our Lady of mercy Hospital  
The Catholic University of Korea, St. Vincent's Hospital  
Uijongbu St. Mary's Hospital The Catholic University of Korea  
Ulsan University Hospital  
Wallace Memorial Baptist Hospital  
WonJu Christian Hospital, Won Ju College of Medicine, Yonsei University  
WonKwang University Hospital  
Yeungnam University Medical Center  
Yeungnam University Youngchun Hospital  
Yong-in Severance Hospital  
Yonsei Medical center, Yong-Dong Severance Hospital  
Young Dong Hospital

---

**Appendix 2.** Marginal frequency of malignant cases by gender and ICD-10 grouping in 2002

Site (code)	Male		Female	
	n	%	n	%
Lip (C00)	20	0.0	13	0.0
Tongue (C01~02)	225	0.4	97	0.2
Mouth (C03~06)	261	0.5	108	0.2
Salivary glands (C07~08)	126	0.2	90	0.2
Tonsil (C09)	133	0.2	20	0.0
Other oropharynx (C10)	58	0.1	3	0.0
Nasopharynx (C11)	219	0.4	76	0.2
Hypopharynx (C12~13)	253	0.5	15	0.0
Pharynx unspecified (C14)	33	0.1	6	0.0
Oesophagus (C15)	1556	2.8	119	0.3
Stomach (C16)	13164	23.8	6515	14.9
Small intestine (C17)	190	0.3	152	0.3
Colon (C18)	3070	5.5	2370	5.4
Rectum (C19~20)	3304	6.0	2271	5.2
Anus (C21)	66	0.1	76	0.2
Liver (C22)	8533	15.4	2637	6.0
Gallbladder etc. (C23~24)	1359	2.5	1389	3.2
Pancreas (C25)	1408	2.5	984	2.5
Nose, sinuses etc. (C30~31)	138	0.2	82	0.2
Larynx (C32)	915	1.7	60	0.1
Trachea, bronchus and lung (C33~34)	8867	16.0	2858	6.6
Other thoracic organs (C37~38)	187	0.3	107	0.2
Bone (C40~41)	180	0.3	147	0.3
Melanoma of skin (C43)	113	0.2	148	0.3
Other skin (C44)	511	0.9	509	1.2
Mesothelioma (C45)	32	0.1	11	0.0
Kaposi sarcoma (C46)	6	0.0	7	0.0
Connective and soft tissue (C47~49)	311	0.6	270	0.6
Breast (C50)	42	0.1	7303	16.7
Vulva (C51)	-	-	59	0.1
Vagina (C52)	-	-	49	0.1
Cervix uteri (C53)	-	-	3971	9.1
Corpus uteri (C54)	-	-	873	2.0
Uterus unspecified (C55)	-	-	42	0.1
Ovary (C56)	-	-	1572	3.6
Other female genital organs (C57)	-	-	52	0.1
Placenta (C58)	-	-	60	0.1
Penis (C60)	46	0.1	-	-
Prostate (C61)	1658	3.0	-	-
Testis (C62)	139	0.3	-	-
Other male genital organs (C63)	28	0.1	-	-
Kidney (C64)	1107	2.0	483	1.1
Renal pelvis (C65)	106	0.2	31	0.1

## Appendix 2. Continued

Site (code)	Male		Female	
	n	%	n	%
Ureter (C66)	108	0.2	62	0.1
Bladder (C67)	1759	3.2	444	1.0
Other urinary organs (C68)	16	0.0	16	0.0
Eye (C69)	52	0.1	48	0.1
Brain, nervous system (C70~72)	580	1.0	470	1.1
Thyroid (C73)	668	1.2	4134	9.5
Adrenal gland (C74)	54	0.1	57	0.1
Other endocrine (C75)	56	0.1	22	0.1
Hodgkin disease (C81)	88	0.2	59	0.1
Non-Hodgkin lymphoma (C82~85, C96)	1304	2.4	942	2.2
Immunoproliferative diseases (C88)	7	0.0	1	0.0
Multiple myeloma (C90)	277	0.5	212	0.5
Lymphoid leukaemia (C91)	322	0.6	206	0.5
Myeloid leukaemia (C92~94)	704	1.3	523	1.2
Leukaemia unspecified (C95)	52	0.1	46	0.1
Other and unspecified (C26, C39, C48, C76, C80, C97)	987	1.8	750	1.7