Cancer Facts & Figures 2012

Foreword

Cancer is the leading cause of death in Korea. Furthermore, the number of deaths caused by cancer is expected to increase due to the aging of population and changing lifestyles. According to the World Health Organization, however, a third of cancer cases are preventable, another third can be completely cured with early diagnosis and treatment, and even the final third can be overcome with adequate treatment. The Korean government established the First 10-Year Plan for National Cancer Control in 1996 to implement an infrastructure for fighting cancer. In 2006, the Second 10-Year Plan for National Cancer Control was announced and is currently being driven by the public and private sectors.

Founded in 2000 as part of the nationwide effort to fight cancer, the National Cancer Center strives to lower cancer incidence and mortality rates of Korean citizens and to improve the quality of life for patients with cancer by performing cancer research, providing treatment for patients with cancer, supporting national cancer control projects, and training and educating cancer treatment professionals. In particular, the National Cancer Center is actively supporting the Second 10-Year Plan for National Cancer Control by developing cancer control policies, supporting cancer-related research projects, and strengthening collaborative networks among medical facilities specializing in cancer in Korea and abroad along with various international organizations.

The latest publication from the National Cancer Center is titled Cancer Facts & Figures in the Republic of Korea. It is a compilation of cancer-related reports, academic papers, and data published in Korea, with the information presented according to various topics. The publication also explains that the National Cancer Control Project is administered by the National Cancer Control Project Division at the National Cancer Center. We expect Cancer Facts & Figures in the Republic of Korea to provide helpful information about the current state of cancer control in Korea and the achievements of national cancer control projects and to suggest a direction for future projects focused on fighting and controlling cancer.

It is our sincere hope that Cancer Facts & Figures in the Republic of Korea serves as a pedestal for conquering cancer not only in Korea, but also in other countries throughout Asia and across the globe. We would like to express sincere appreciation to the staff and associates of the National Cancer Center who have made this publication possible.

June 2012

Jin-Soo Lee, M.D., Ph.D

President, National Cancer Center

Contents

Chapter 1.
The Second ten-year Plan for National Cancer Control

1.1 The Second ten-year Plan for National Cancer Control (Revised)

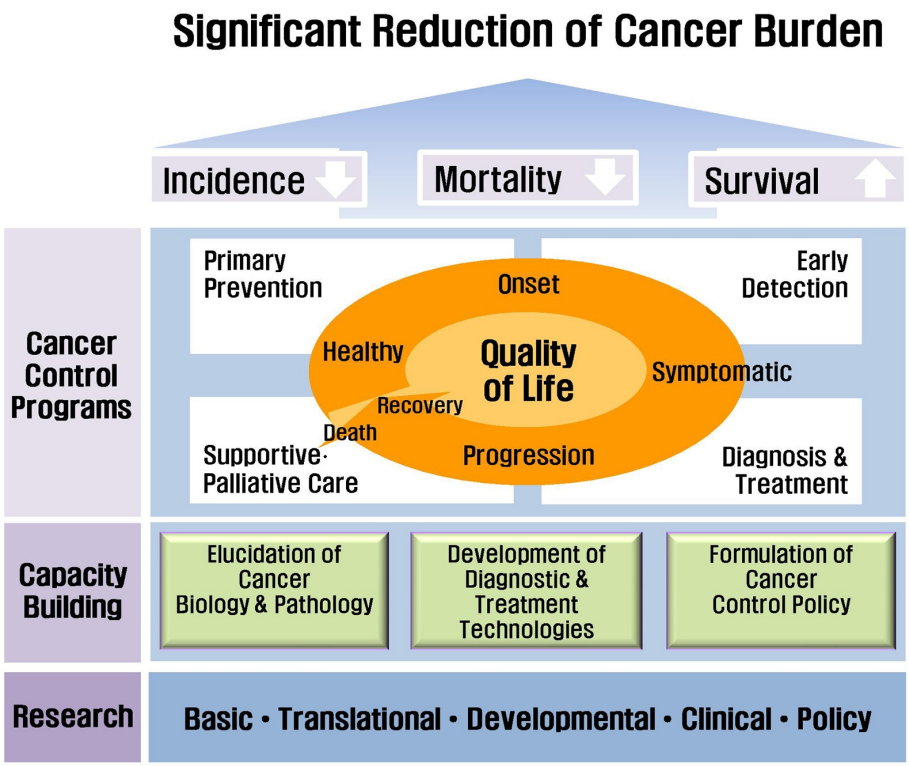
Following the First ten-year Plan for National Cancer Control (1996 to 2005), the Korean government implemented the Second ten-year Plan for National Cancer Control (2006 to 2015) for the effective control and management of cancer at the national level.

The Revised Second ten-year Plan for National Cancer Control (2011 to 2015) incorporates the results of the 2011 progress evaluation for the first five years (2006 to 2010) as well as modifications made to the original plan according to the most up-to-date information. The significance of the revised plan is that it provides a system for actively driving the national cancer control project to reduce the burden of cancer for citizens by strengthening measures against cancer mortality and slowing or stemming the increased incidence rate due to the aging population and changes in the disease structure.

With a vision of minimizing cancer incidences and deaths through comprehensive cancer control, the objective of the Revised Second ten-Year Plan for National Cancer Control is to reduce the cancer mortality rate and increase the survivor rate. In order to achieve this objective, projects in various areas have been undertaken, including intensified cancer prevention by focusing on management of cancer risk factors, cancer screening for every citizen, guarantee of cancer treatment and improvement in the quality of treatment, support for rehabilitation and palliative care of patients with cancer, building infrastructures for active national

cancer control, developing cutting-edge technologies for cancer diagnosis and treatment, providing training and promotional programs available to every citizen, and systematic cancer registration and management.

The Second ten-year Plan for National Cancer Control



Source) Ministry of Health & Welfare, 2011

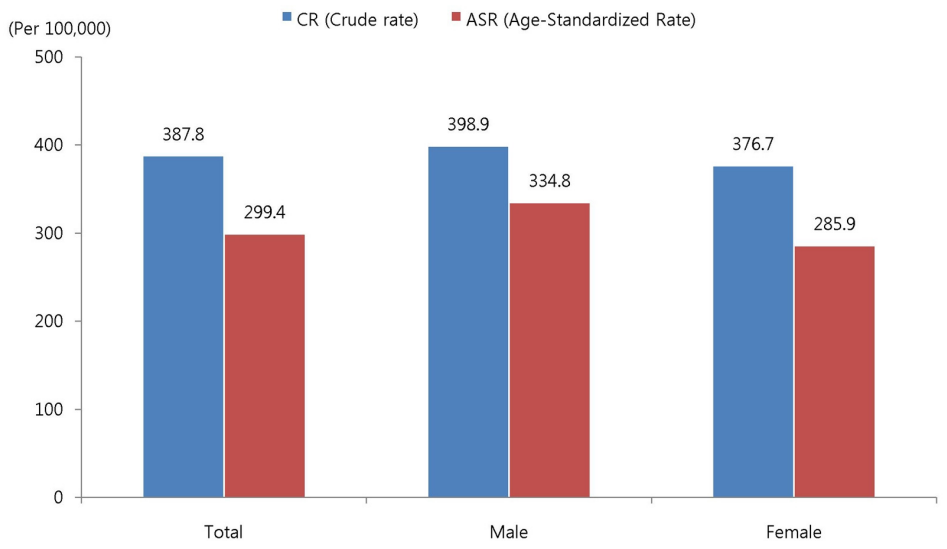
Chapter 2.
Basic Facts

2.1 Cancer Incidence

Cancer Incidence Rates

In Korea, the age-standardized cancer incidence rate in 2009 was 299.4 (334.8 for males and 285.9 for females) per 100,000 persons.

Cancer Incidence Rates (2009)



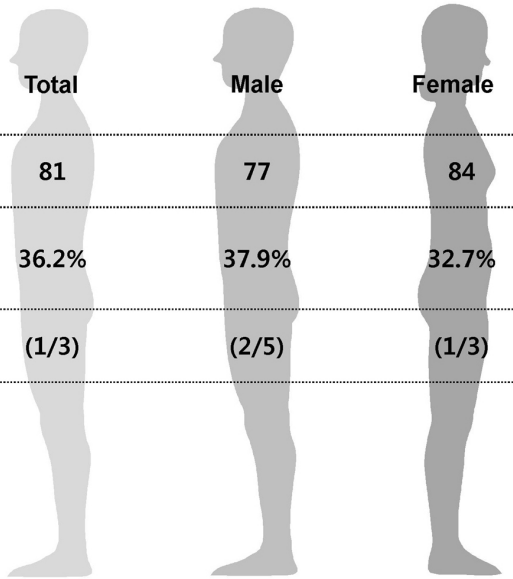
Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011
Note) ASR (Age-standardized rate) Standard population: Korean Mid-year population in 2010

Cumulative Risk of Cancer

The cumulative risk of cancer after living to life expectancy was 36.2%. The risk for males was higher than that for females at 37.9% and 32.7%, respectively.

Cumulative Risk of Cancer (2009)

	Total	Male	Female
Life Expectancy (2008)	81	77	84
Cumulative Risk to Life Expectancy	36.2%	37.9%	32.7%
	(1/3)	(2/5)	(1/3)



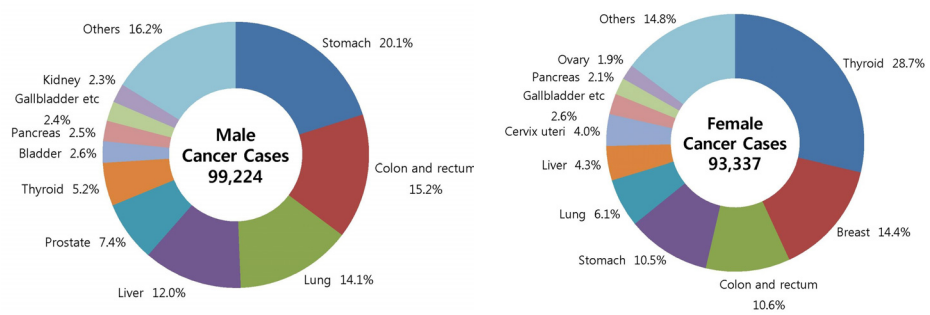
Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

Proportion of Cancer Incidence

In males, stomach cancer occurred most frequently, accounting for 20.1% of all cases, followed by colon and rectum (15.2%), lung (14.1%), liver (12.0%), and prostate cancer (7.4%).

In females, thyroid cancer occurred most frequently, accounting for 28.7% of all cases, followed by breast (14.4%), colon and rectum (10.6%), stomach (10.5%), and lung cancer (6.1%).

Proportion of Cancer Incidence (2009)



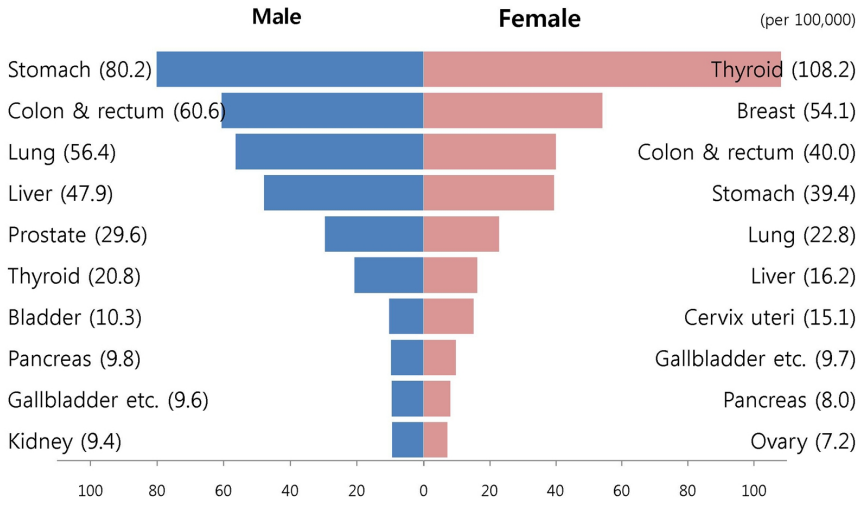
Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

Site-Specific Cancer Incidence Rates by Gender

In males, the crude incidence rate[1)] of stomach cancer was 80.2 per 100,000 persons. The incidence rates for other cancer sites are 60.6, 56.4, and 47.9 for colon and rectum, lung, and liver cancer, respectively.

In females, the crude incidence rate of thyroid cancer was 108.2. The incidence rates for other cancer sites are 54.1, 40.0, and 39.4 for breast, colon and rectum, and stomach cancers, respectively.

Crude Rates of Ten Major Cancer Sites (2009)



Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

1) Crude incidence rate = The number of new cancer cases / mid-year population × 100,000

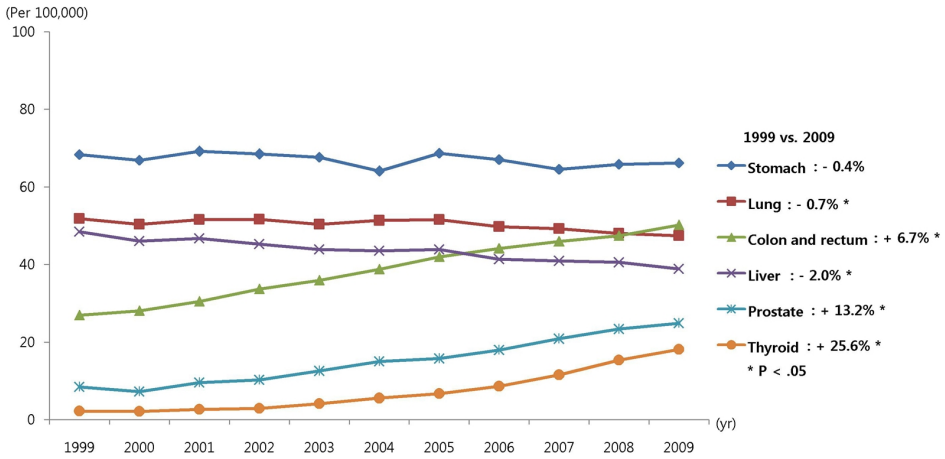
Trends of Age-standardized Incidence Rates of Major Cancers

From 1999 to 2009, the incidence rate for all sites combined increased by 1.6% per year in males and by 5.5% per year in females.

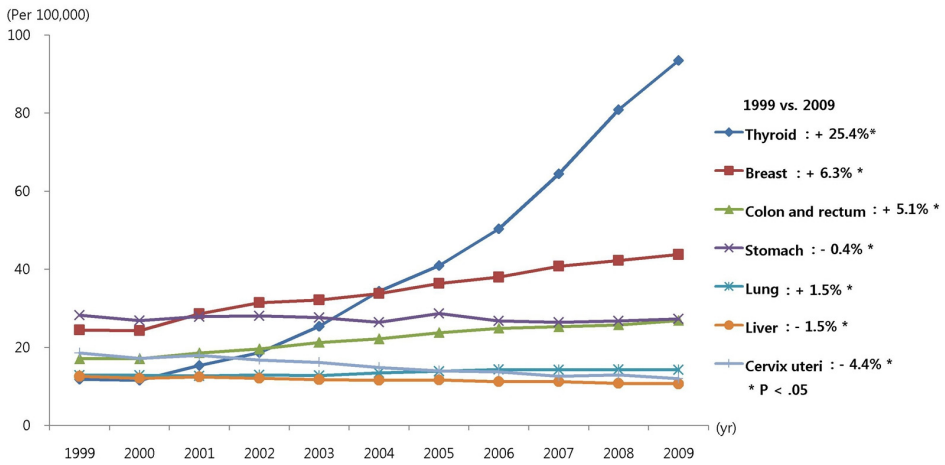
In males, liver and lung cancers decreased, while the rates of thyroid, prostate, and colorectal cancers increased by 25.6%, 13.2%, and 6.7%, respectively.

Females showed a decrease in cervix uteri and liver cancers, but the rate of thyroid cancer has sharply increased by 25.4% per year, and the rate of breast, colorectal, and lung cancers has also increased.

Trends of Age-standardized Incidence Rates of Major Cancers : Male



Trends of Age-standardized Incidence Rates of Major Cancers : Female



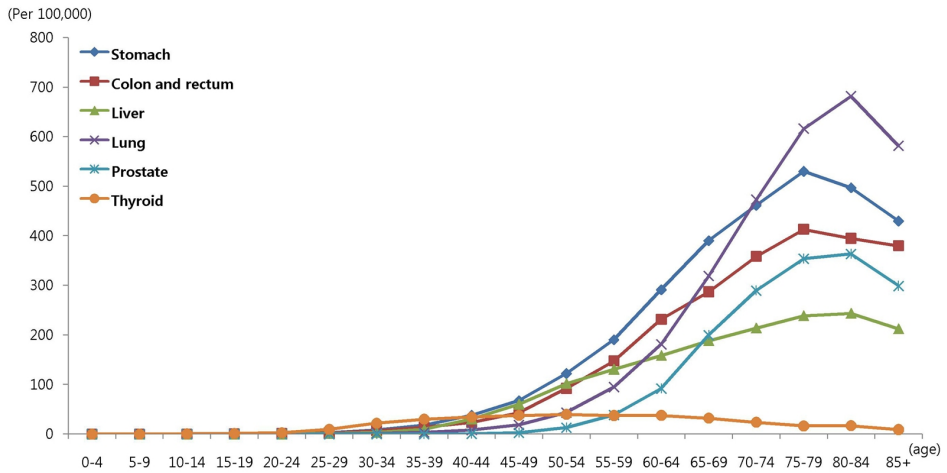
Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

Note) ASR (Age-standardized rate) Standard population: Korean Mid-year population in 2010

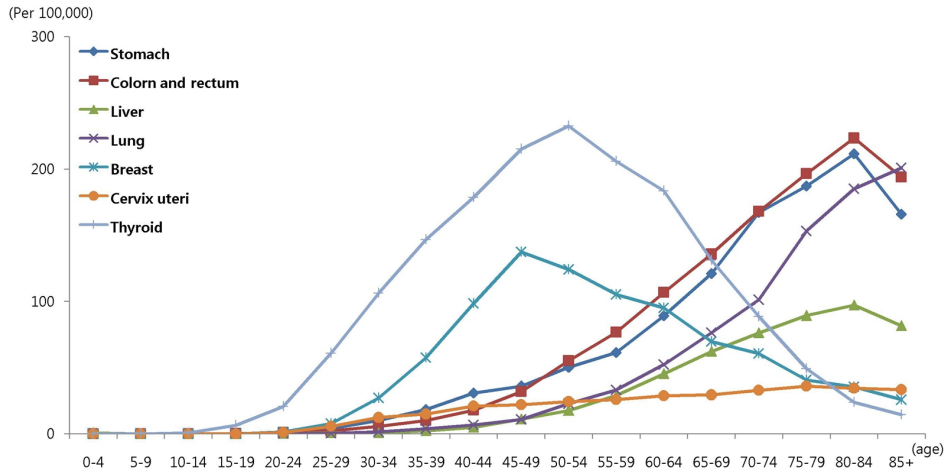
Age-specific Incidence Rates of Major Cancers According to Gender

When the incidence rates of major cancers in various age groups of males were examined in 2009, the most frequent types of cancer were stomach and liver cancers in the 40 to 49 age group, stomach cancer in the 50 to 69 age group, and lung cancer for the 70 and older age group. For females, thyroid cancer had the highest incidence for those under 65, and colorectal cancer had the highest incidence for those 65 and older.

Age-specific Cancer Incidence Rates : Male (2009)



Age-specific Cancer Incidence Rates : Female (2009)

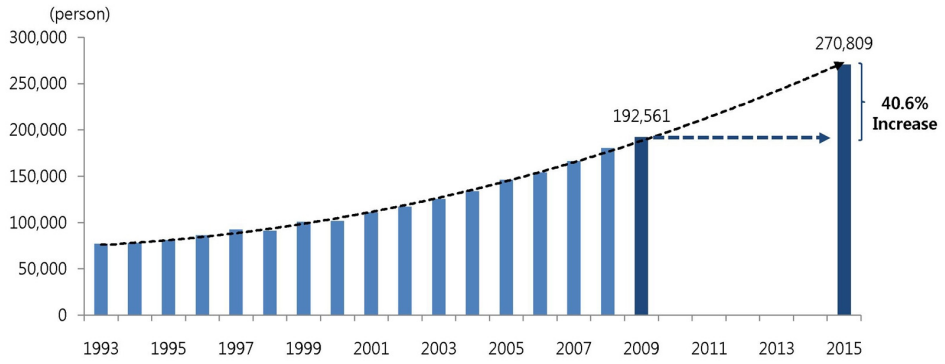


Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

Projection of Cancer incidence Cases

The total number of cancer cases is expected to increase from 192,561 in 2009 to 270,809 in 2015, showing a projected 40.6% increase over a six-year period.

Projection of Cancer incidence Cases

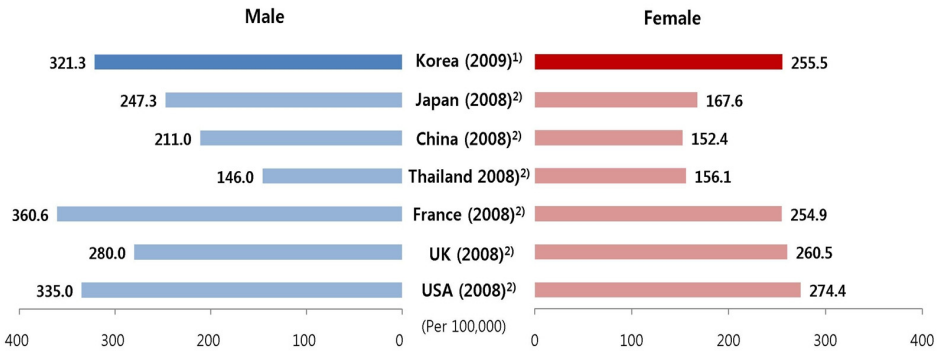


Source) National Cancer Center, 2010

Comparison of Age-Standardized Cancer Incidence Rates with Other Countries

The age-standardized cancer incidence rate of Korea is higher than that of Japan and lower than that of the United States for both males and females.

Cancer Incidence Rates



Source 1) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011
2) GLOBOSCAN 2008, IARC (International Agency for Research on Cancer) 2010

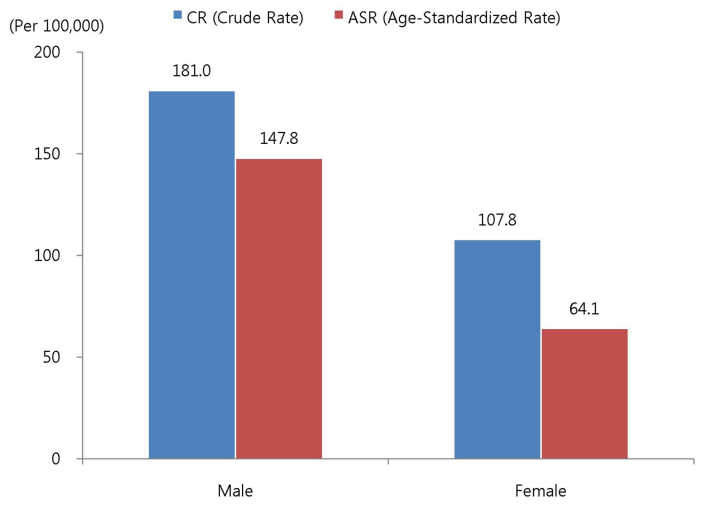
Note) Age-standardized incidence rates using the world standard population, excluded other malignant neoplasms of skin (C44)

2.2 Cancer Mortality

Cancer Mortality Rates

The age-standardized cancer mortality rates of Korea in 2010 were 147.8 per 100,000 male and 64.1 per 100,000 female.

Cancer Mortality Rates (2010)



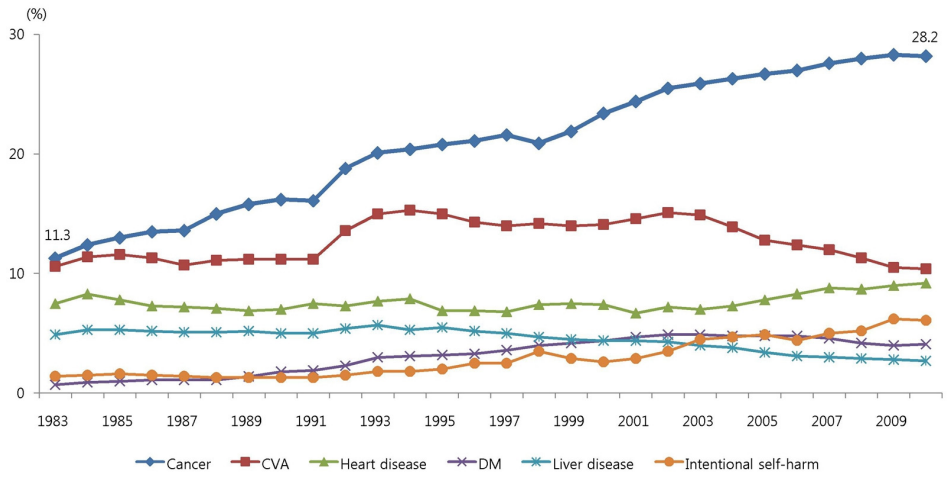
Source) STATISTICS KOREA, 2011

Note) ASR (Age-standardized rate) Standard population: Korean Mid-year population in 2010

Trends of Causes of Death

Cancer has been the leading cause of death in Korea since 1983, accounting for 11.3% of the total number of deaths in 1983. Deaths from cancer have increased steadily and accounted for 28.2% of the total deaths in 2010.

Trends of Disease Deaths (1983-2010)

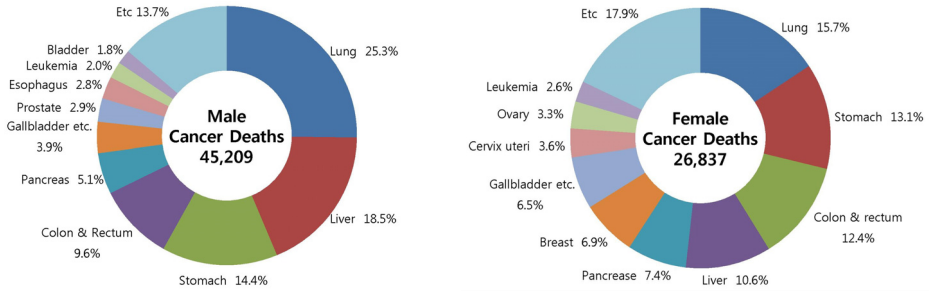


Source) STATISTICS KOREA, 2011

Proportion of Cancer Death

For the frequency of cancer deaths by gender in 2010, for males, lung, liver, stomach, and colorectal cancers accounted for 25.3%, 18.5%, 14.4%, and 9.6%, respectively. For females, lung, stomach, colorectal, and liver cancers accounted for 15.7%, 13.1%, 12.4%, and 10.6%, respectively.

Relative Frequency of Cancer Deaths (2010)

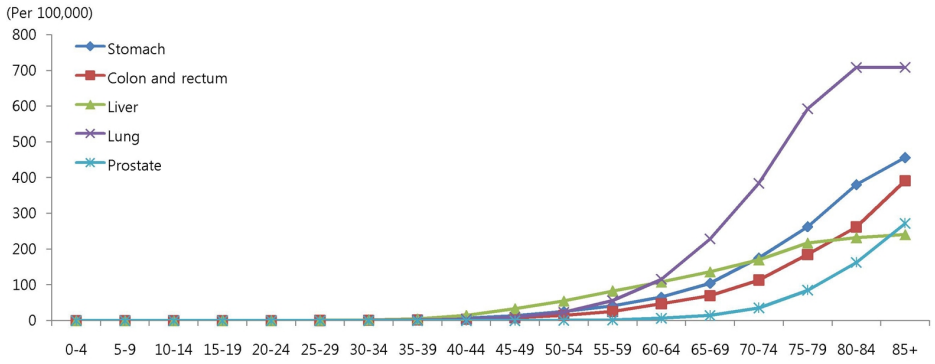


Source) STATISTICS KOREA, 2011

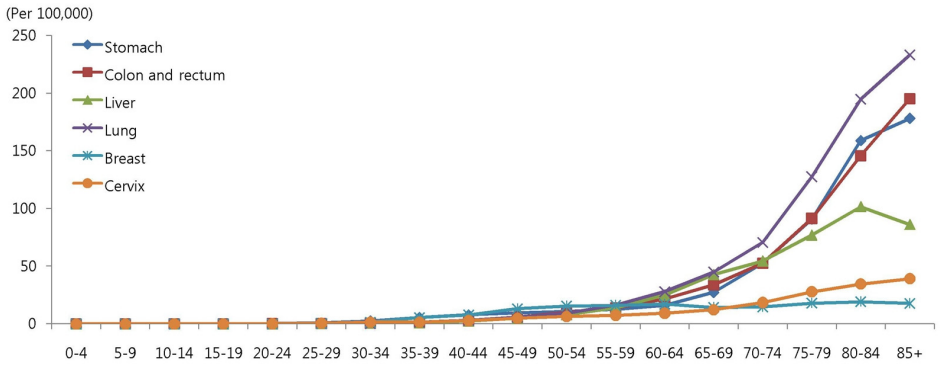
Age-specific Mortality Rates of Major Cancers by Gender

The age-specific mortality rates of major cancers in 2010 indicate that the rates are higher for older patients.

Age-specific Cancer Mortality Rates : Male (2010)



Age-specific Cancer Mortality Rates : Female (2010)



Source) STATISTICS KOREA, 2011

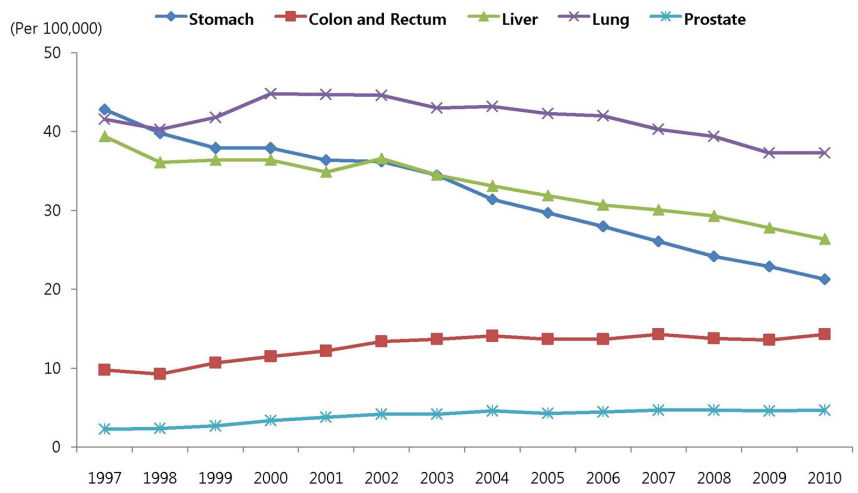
Note) Colon and rectum cancer: C18-C21 (International Classification of Disease, ICD-10)
Cervix cancer: C53-55 (International Classification of Disease, ICD-10)

Trends of Age-standardized Mortality Rates of Major Cancers by Gender

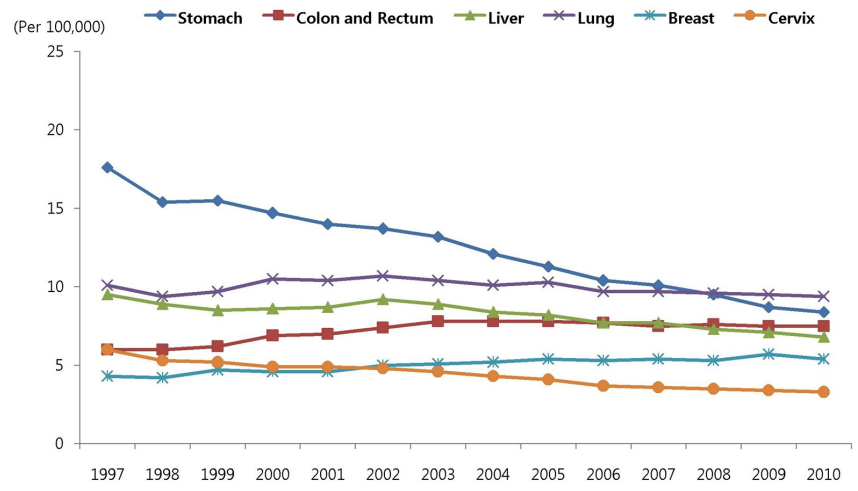
Regarding the trends of age-standardized mortality rates in males, the rates of stomach and liver cancer have fallen, but the rate of colorectal cancer has increased consistently. On the other hand, the rate of lung cancer in males has been decreasing since 2000.

The mortality rate of stomach cancer in females has shown the largest decrease. The rate of liver cancer has also decreased, along with a recent decline in the rate of cervix uteri cancer. In contrast, the rates of colorectal and breast cancer have gradually increased.

Trends of Age-standardized Mortality Rates in Major Cancers : Male



Trends of Age-standardized Mortality Rates in Major Cancers : Female



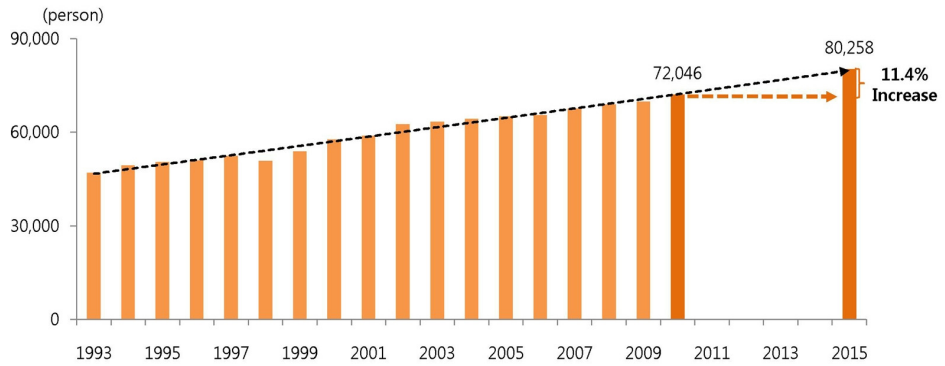
Source) Statistics on Causes of Deaths in Korea, National Statistics Portal, Statistics Korea 2011

Note) ASR (Age-standardized rate) Standard population: Korean Mid-year population in 2010
Cervix cancer: C53-55 (International Classification of Disease, ICD-10)

Projection of Cancer Deaths

The total number of cancer deaths is expected to grow from 72,046 in 2010 to 80,258 in 2015, indicating an 11.4% increase in the next five-year period.

Projection of Cancer Deaths (1993-2015)



Source) National Cancer Center, 2010

2.3 Cancer Survival

Five-year Cancer Relative Survival Rates

The Five-year cancer relative survival rate[2] in the period of 2005 to 2009 was 62.0%, which is a 20.8% and 8.3% increase from 1993 to 1995 (41.2%) and 2001 to 2005 (53.7%), respectively. The survival rate has shown steady improvements, and more than half of current patients with cancer in Korea survive for five years or longer.

Five-year Cancer Relative Survival Rates (1993-2009)

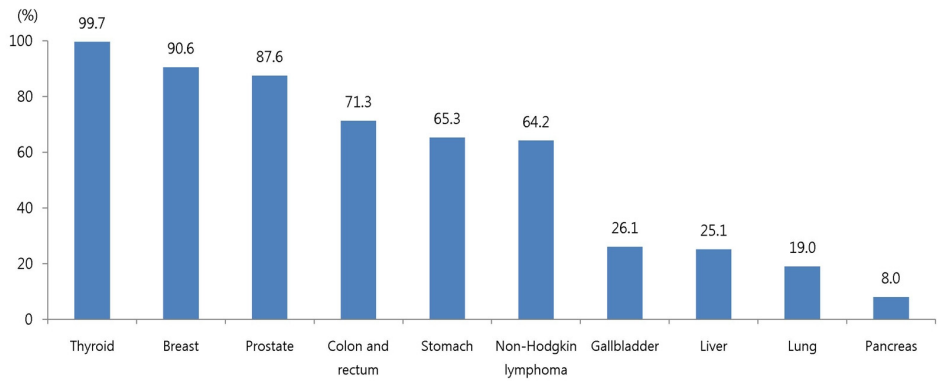
Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

2) The relative survival rate is calculated by dividing the observed survival rates of the disease of interest by expected survival rates of general people of the same gender and age. It excludes the chance of deaths from other causes.

Five-year Relative Survival Rates according to Major Cancer Sites

The Five-year relative survival rates according to cancer sites are 99.7%, 90.6%, 87.6%, 71.3%, and 65.3% for thyroid, breast, prostate, colorectal, and stomach cancers, respectively.

Five-year Relative Survival Rated by Major Cancer Sites (2005-2009)

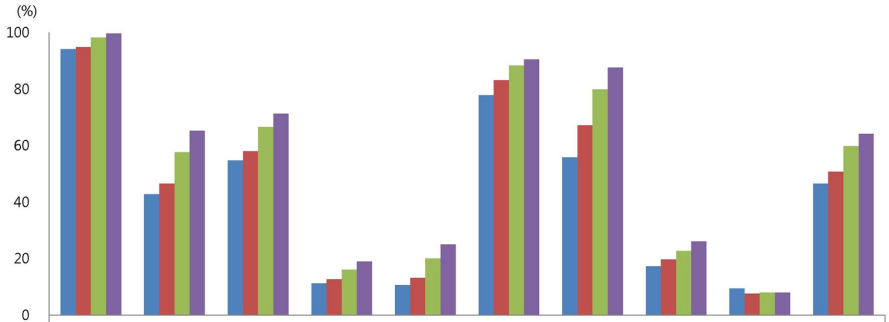


Source) Ministry of Health and Welfare, The Korea Central Cancer Registry, 2011

Comparison of Five-year Relative Survival Rates

Among the major cancers, prostate cancer showed the most significant improvement in 2005 to 2009 (up by 31.7% points from 1993 to 1995), followed by stomach cancer (22.5% points), non-Hodgkin lymphoma (17.6% points), and colorectal cancer (16.5% points). Survival rates of all major cancers, with the exception of pancreatic cancer, increased.

Comparison of Five-year Relative Survival Rates (1993-2009)



	Thyroid	Stomach	Colon and rectum	Lung	Liver	Breast	Prostate	Gallbradder etc.	Pancreas	Non-Hodgkin lymphoma
1993-1995	94.2	42.8	54.8	11.3	10.7	77.9	55.9	17.3	9.4	46.6
1996-2000	94.9	46.6	58.0	12.7	13.2	83.2	67.2	19.7	7.6	50.8
2001-2005	98.3	57.7	66.6	16.1	20.1	88.4	79.9	22.8	8.0	59.8
2005-2009	99.7	65.3	71.3	19.0	25.1	90.6	87.6	26.1	8.0	64.2

Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

†Gallbladder and biliary tracts

International Comparison of Five-year Relative Survival Rates of Major Cancers

The Five-year relative survival rates of cancers frequently found in Korea, such as stomach, cervix uteri, and liver cancers, are higher than those of the United States and Canada.

Also, the survival rates of so-called 'Western cancers'—such as colorectal and breast cancers—in Korea are on par with those in Western nations for example, the United States and Canada.

Five-year Relative Survival Rates of Major Cancers in Various Countries

(unit: %)

Site	Korea ('96-'00)	Korea ('01-'05)	Korea ('05-'09)	USA[1] ('99-'06')	Canada[2] ('04-'06)	Japan[3] ('97-'99)
All cancers	**44.0**	**53.7**	**62.0**	**66.0**	**62**	**54.3**
Stomach	46.6	57.7	65.3	26.0	22	62.1
Liver	13.2	20.1	25.1	13.8	15	23.1
Cervix uteri	80.0	81.2	80.3	70.2	70	71.5
Colon and rectum	58.0	66.6	71.3	65.0	61	65.2
Thyroid	94.9	98.3	99.7	97.3	97	92.4
Breast	83.2	88.4	90.6	89.0	82	85.5
Lung	12.7	16.1	19.0	15.8	12	25.6
Pancreas	7.6	8.0	8.0	5.6	6	6.7
Prostate	67.2	79.9	87.6	99.1	95	75.5

Source)

1) Horner MJ, Ries LAG, Krapcho M, Neyman N, Aminou R, Howlader N et al(eds). SEER Cancer Statistics Review 1975-2007. 2010

2) Canadian Cancer Registry. Statistics Canada and Provincial/Territorial Cancer Registry. 2010

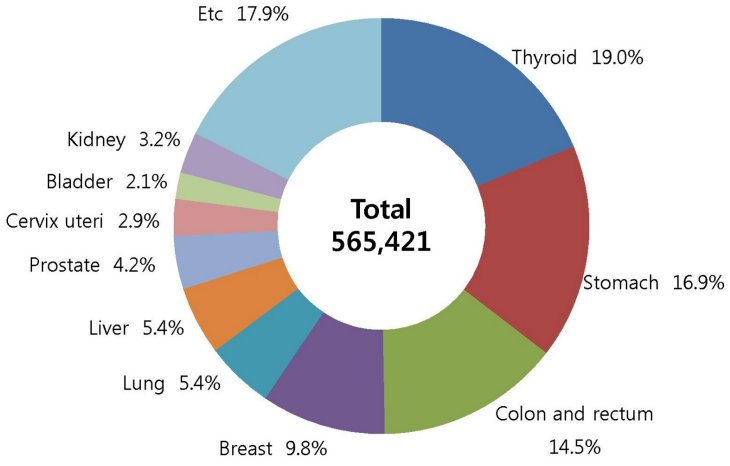
3) Matsuda T, Ajiki W et al. Population-based survival of cancer patients diagnosed between 1993 and 1999: A chronological and International Comparative Study. Japanese Journal of Clinical Oncology. 2011

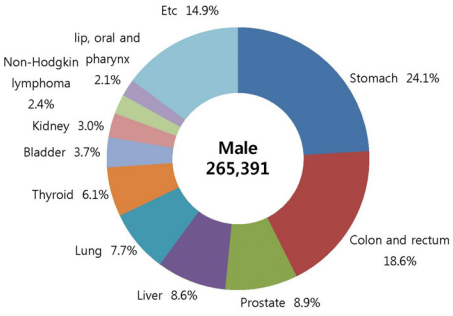
2.4 Cancer Prevalence

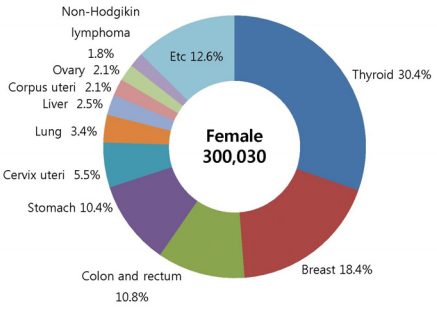
Five-year Cancer Prevalence

The number of five-year cancer prevalence was 565,421 patients in 2009. The most common cancer was thyroid cancer, followed by stomach, colon and rectum, breast, lung, and liver cancer.

Five-year Cancer Prevalence (2009)





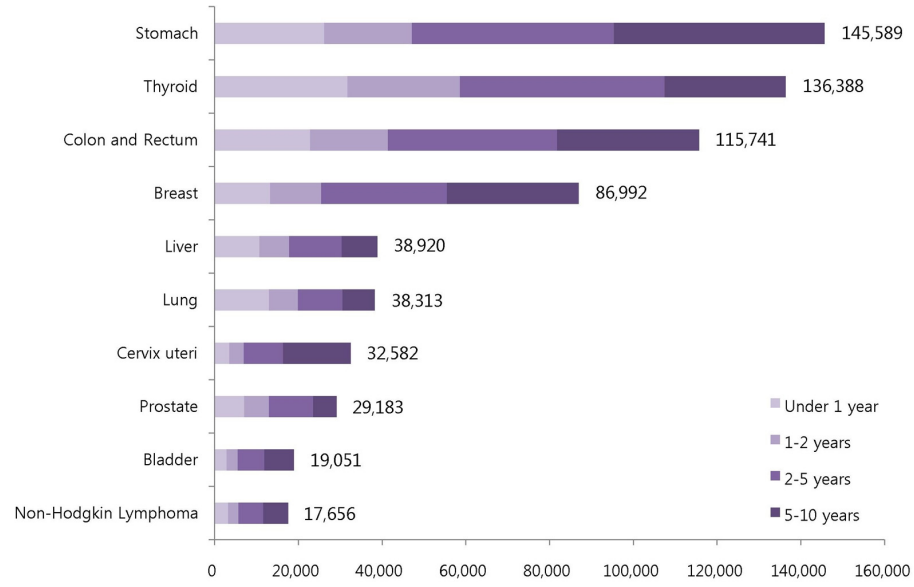


Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

Post-Diagnosis Cancer Prevalence by Time Period

For all cancers combined, the 1 to 2 year prevalence rate represents 37% of the total prevalent cases. The 1 to 2 year prevalence rate as a percentage of the total was highest for thyroid cancer (18%), followed by stomach (16%) and colorectal cancers (14%); colorectal cancer has the high incidence rate and a good prognosis. For all cancers combined, the 2 to 5 year and the 5 to 10 year prevalence rates constitute 33% and 30% of the total prevalence in both sexes, respectively. The long-term prevalence of lung and liver cancer was relatively low due to lower survival.

Post-Diagnosis Cancer Prevalence by Time Period (2009)



Source) Ministry of Health & Welfare, Korea Central Cancer Registry, 2011

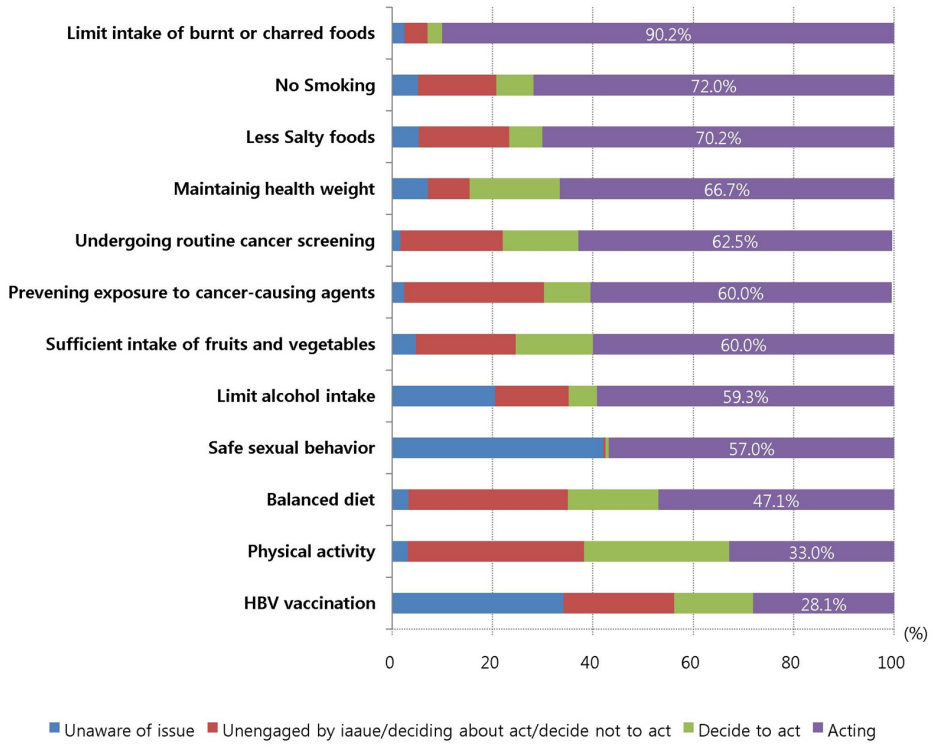
Chapter 3.
Cancer Prevention

3.1 Overview

The 10 Codes of Conduct for Cancer Prevention

According to a survey conducted among 1,006 male and female 19 years or older on the awareness and practice of the 10 Codes of Conduct for Cancer Prevention, 90.2% said that they avoid burnt food to prevent cancer. Also, 70.2% and 72.0% of the respondents said that they try to stay away from salty foods and smoking, respectively.

The Awareness of the 10 Codes of Conduct for Cancer Prevention (2010)



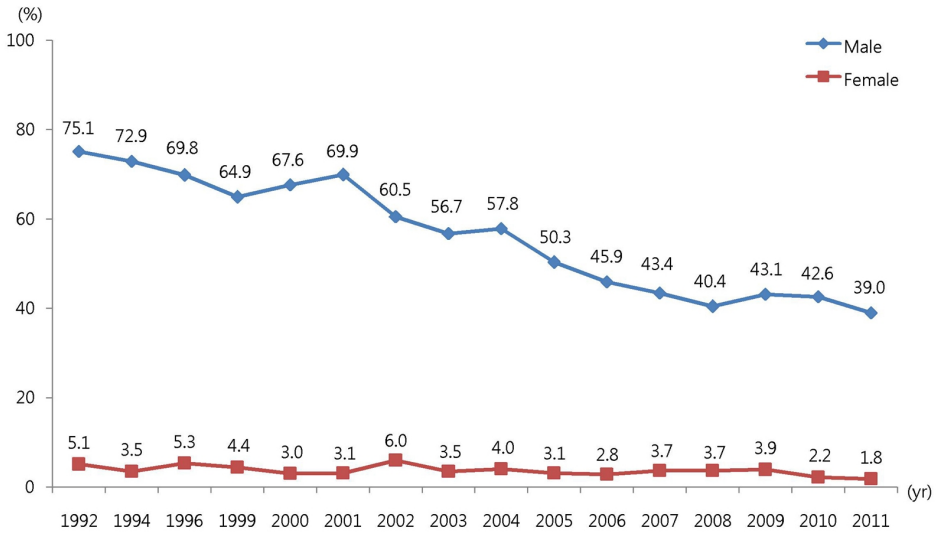
Source) The Survey on Awareness and Behavior for Cancer Prevention, National Cancer Center, 2010

3.2 Smoking

Trends of Smoking Rates

In the period of 1992 to 2011, the smoking rate in Korea decreased from 75.1% to 39.0% in male, and from 5.1% to 1.8% in female. While the decrease has been especially significant in male, the rate of reduction has recently slowed down.

Trends on Smoking Rates (1992-2011)

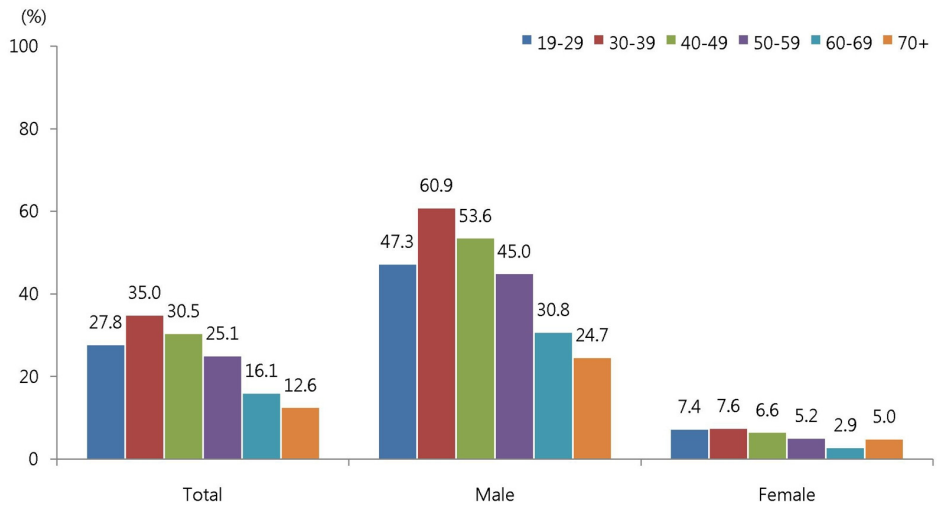


Source) Ministry of Health & Welfare, 2011 (www.nonsmokeguide.or.kr)

Current Smoking Rates by Age and Gender

Current smoking rates[3] by age and gender indicate that for male, smoking is most prevalent in the 30 to 39 age group (60.9%) and that the 70 and older age group has the lowest rate (24.7%). For female, the 19 to 39 age group and the 60 to 69 group have the highest and lowest smoking rates, respectively.

Current Smoking Rates



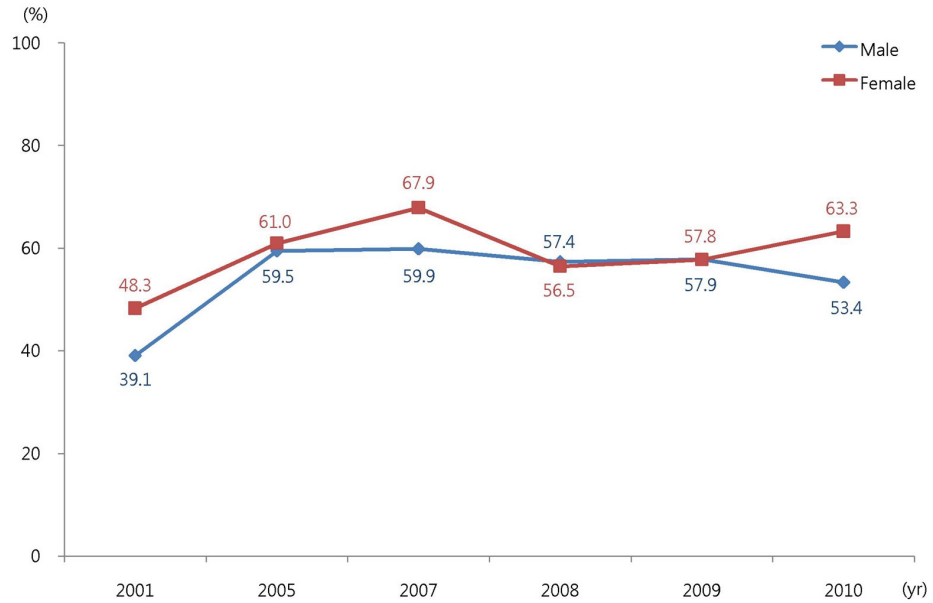
Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

3) Current smoking rate: Percentage of individuals who have smoked five or more packs(100) of cigarettes and are currently smoking (19 or older)

Attempts to Quit Smoking among Adult Current Smokers

Among current smokers (19 or older, standardized) in 2010, 53.4% of male and 63.3% of female had made attempts to quit smoking[4], and 24.6% of male and 20.5% of female said that they intended to quit smoking within a month[5].

Attempts to Quit Smoking among Adult Current Smokers



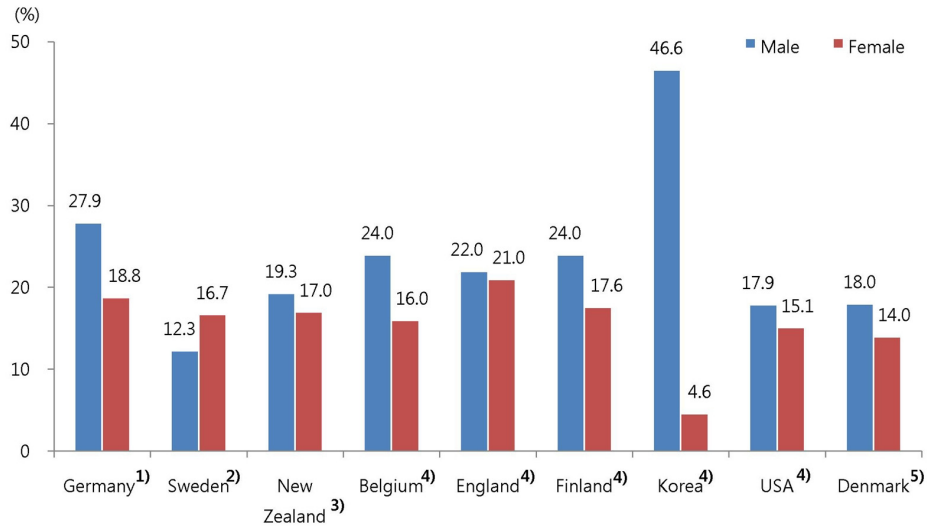
Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

4) This is the percentage of current smokers who have made an attempt to quit smoking by not smoking for a day (24 hours) or longer in the previous year (19 or older).
5) This is the percentage of current smokers who intend to quit within a month.

The Rate of Daily Smokers in OECD Countries : Adults

Among males, the rate of daily smokers in Korea is considerably higher than in other OECD countries at 46.6% for males and 4.6% for females.

Daily Adult Smokers in OECD Countries



Source) OECD Health Data, OECD 2010

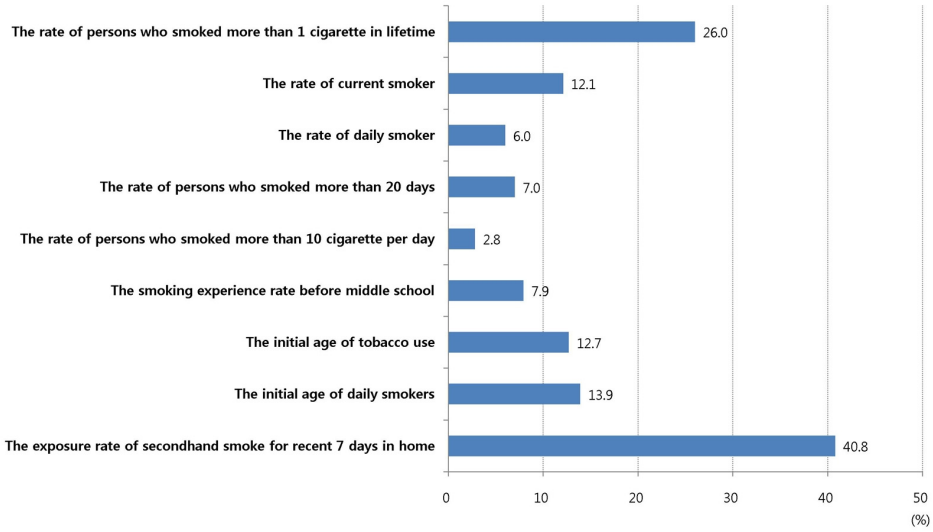
Note) age: 15 or older

Note) 1): 2005 2): 2006 3): 2007 4): 2008 5): 2009

Adolescent Smoking

In 2010, 26.0% of adolescents said that they ever had smoked at least once in a lifetime, and 12.1% said that they had smoked for one or more days in the previous 30 days. 6 % that they had smoked every day for the previous 30 days, and the average age they started smoking was 12.7. Almost half (40.8%) of the adolescents said that they were exposed to secondhand smoking for one or more days every week in their home.

Adolescent Smoking in Korea

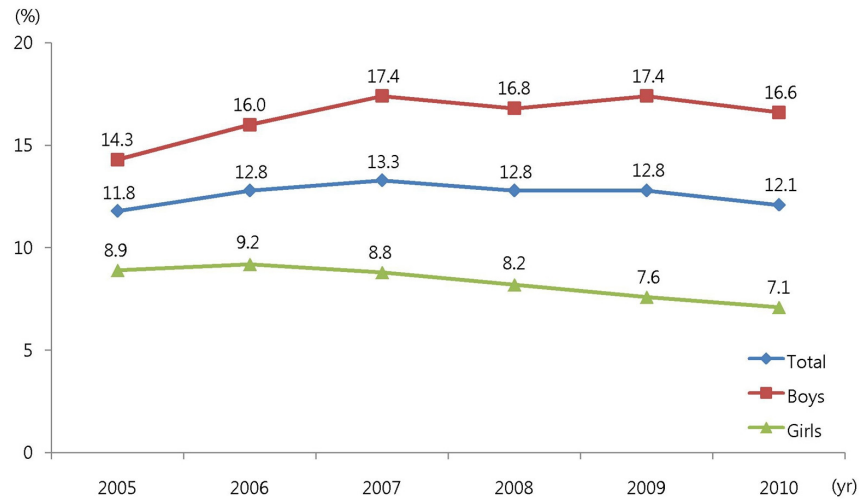


Source) Korea Youth Risk Behavior Web-based Survey-VI (KYRBWS-VI), The Korea Centers for Disease Control and Prevention, 2010

Current Smoking Rates in Adolescents

In 2010, the smoking rates of male and female adolescents were 16.6% and 7.1%, respectively, which is a slight decrease from 2009.

Current Smoking Rates in Adolescents

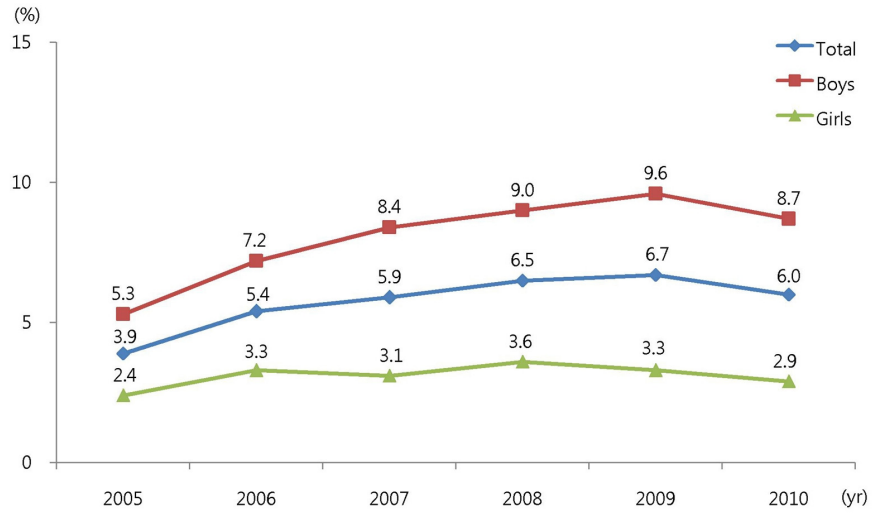


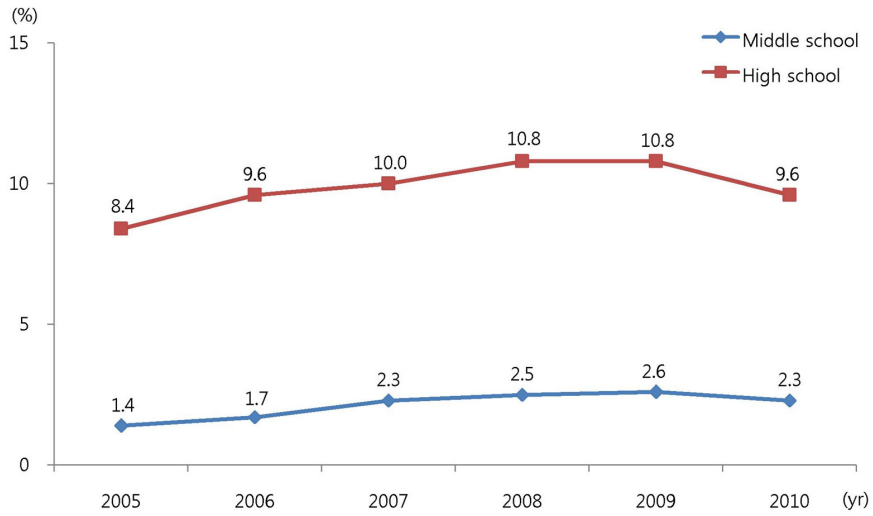
Source) Korea Youth Risk Behavior Web-based Survey-VI (KYRBWS-VI), The Korea Centers for Disease Control and Prevention, 2010

Daily Smoking Rates in Adolescents

In 2010, the daily smoking rates of male and female adolescents were 8.7% and 2.9%, respectively, which is a slight decrease from 2009. The daily smoking rate of high school students was higher than that of junior high school students.

Daily Smoking Rates in Adolescents





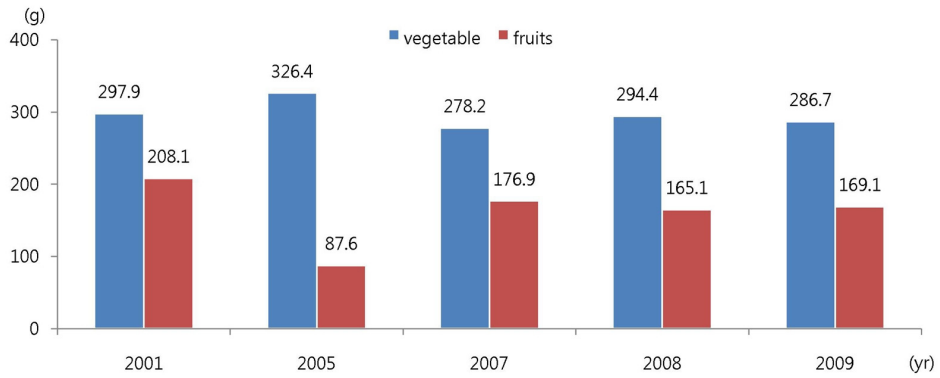
Source) Korea Youth Risk Behavior Web-based Survey-VI (KYRBWS-VI), The Korea Centers for Disease Control and Prevention, 2010

3.3 Consumption of Fruits and Vegetables

Average Fruit and Vegetable Consumption in Adults

The average daily consumption of fruits and vegetables among adults in 2009 were 169.1g and 286.7g, respectively.

Average Fruit and Vegetable Consumption in Adults

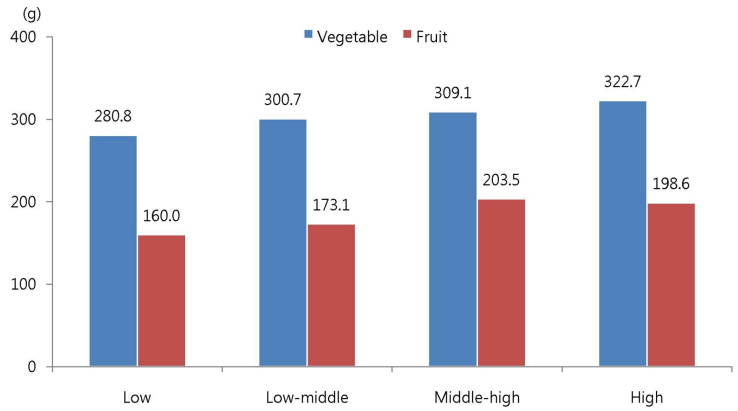


Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

Fruit and Vegetable Consumption by Income Levels

Statistics indicate what those with higher incomes consume more fruits and vegetables.

Fruit and Vegetable Consumption by Socioeconomic Status

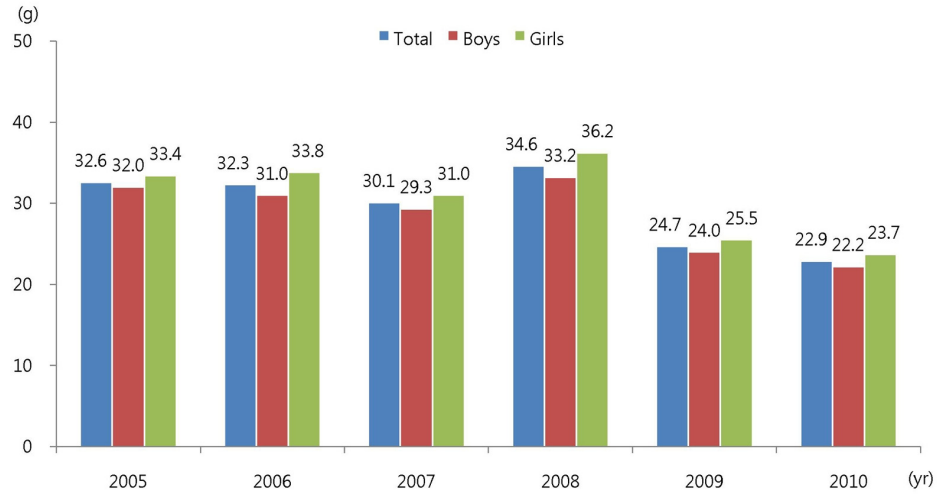


Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

Adolescents with a Fruit Consumption Rate of at least One Serving per Day

In 2010, 22.9% of adolescents ate at least one serving of fruit per day (22.2% of males and 23.7% of females). The percentage of adolescents who consumed at least one serving of fruit each day in 2010 was lower than in 2005 to 2008. Moreover, statistics showed that fruit consumption decreased as adolescents advanced in school.

Adolescents with a Fruit Consumption Rate of at least One Serving per Day



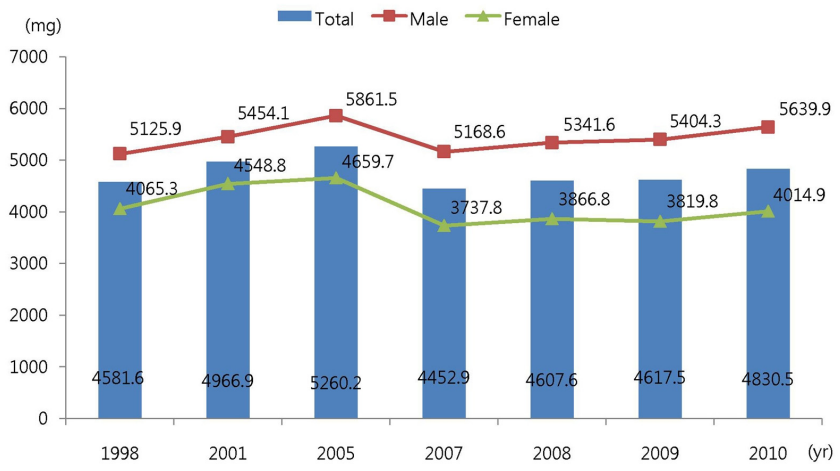
Source) Korea Youth Risk Behavior Web-based Survey-VI (KYRBWS-VI), The Korea Centers for Disease Control and Prevention, 2010

3.4 Sodium Intake

Sodium Intake

The amounts of sodium intake for the past ten years indicate that Koreans are consuming excessive amounts of sodium, with higher rates for male than for female.

Daily Sodium Intake



Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

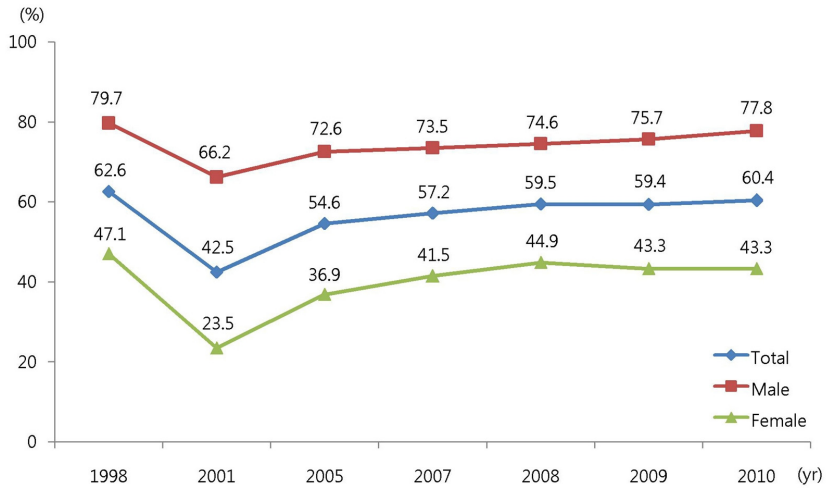
Note) Daily sodium intake targets: 2,000mg (Suggested by Korean Nutrition Society, 2005)

3.5 Alcohol Consumption

Monthly Alcohol Consumption Rate[6)]

The percentage of adults who engage in monthly alcohol consumption has increased for the past eight years. The monthly alcohol consumption rate of males is higher than that of females.

Monthly Alcohol Consumption Rate



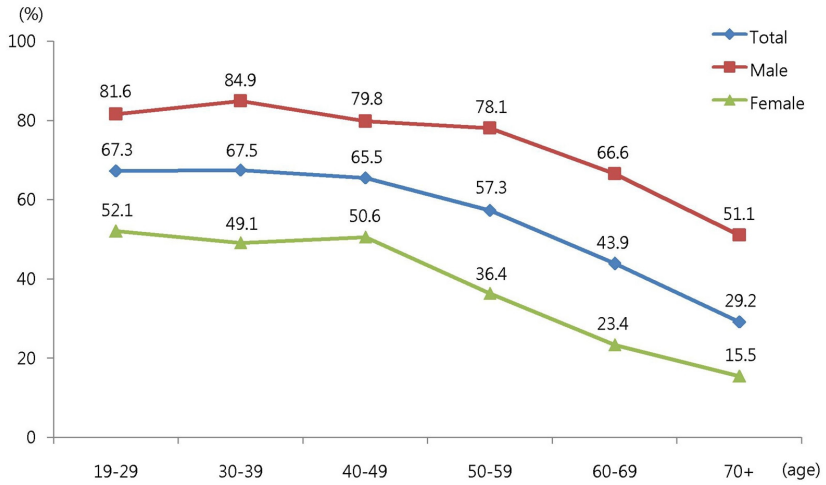
Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

6) Monthly alcohol consumption rate: Percentage of adults (19 or older) who have consumed one or more glasses of alcohol every month during the previous year

Monthly Alcohol Consumption by Age

For both adult male and female (19 or older, standardized), the monthly alcohol consumption rate in 2010 is high in the 20 to 49 age group. This rate begins to decrease for individuals 50 years or older.

Monthly Alcohol Consumption by Age

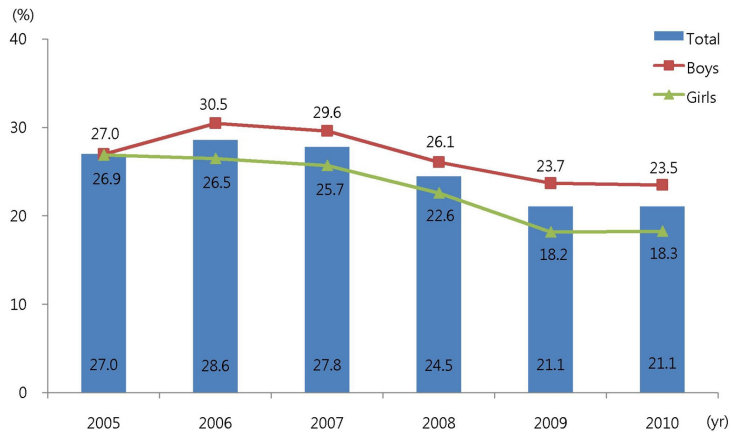


Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

Current Alcohol Consumption Rate in Adolescents

The alcohol consumption rate of Korean adolescents in 2010 was 21.1% (23.5% of boys and 18.3% of girls). The rate was significantly higher in high school students (28.9%) than in junior high school students (13.3%). The rate increased notably as students advanced in school, from 9.6% for first-year junior high school students to 32.1% for third-year high school students.

Current Alcohol Consumption Rate in Adolescents



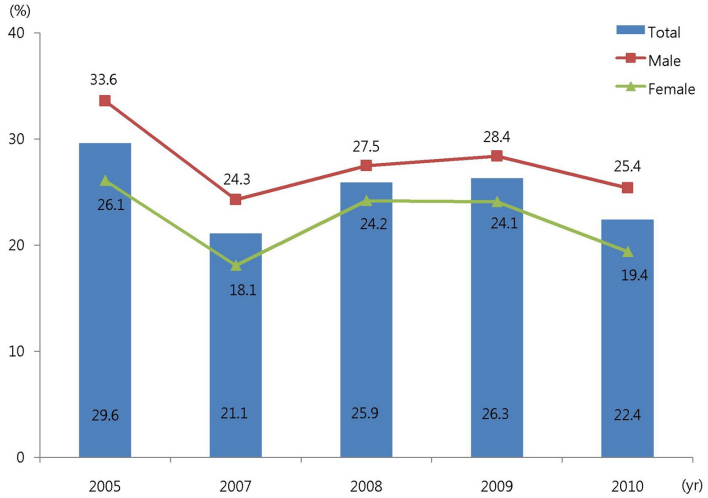
Source) Korea Youth Risk Behavior Web-based Survey-VI (KYRBWS-VI), The Korea Centers for Disease Control and Prevention, 2010

3.6 Physical Activity

Moderate-Intensity Physical Activity Rate[7] in Adults

The moderate-intensity physical activity rate among Korean citizens in 2010 was 22.4%, showing a decreasing trend from 2005.

Moderate-Intensity Physical Activity Rate in Adults



Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

Note)

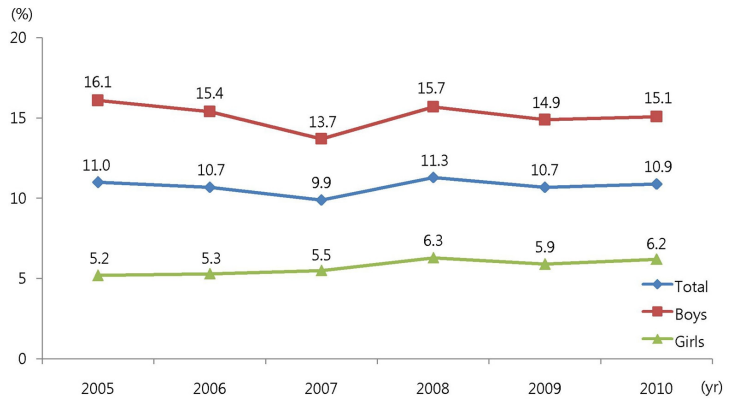
1) The 2010 Health Plan recommends engaging in moderate-intensity physical activity for at least 30 minutes, 5 days per week.
2) Age-standardized rates based on the 2005 Korean population

7) Moderate-intensity physical activity rate: Percentage of individuals who perform moderate-intensity physical activities (that involve breathing faster or harder than usual) for more than 30 minutes per day, at least 5 days a week (19 or older)

Moderate-Intensity Physical Activity Rate in Adolescents[8)]

In 2010, the moderate-intensity physical activity rate among Korean adolescents was 10.9% (15.1% of boys and 6.2% of girls).

Moderate-Intensity Physical Activity Rate in Adolescents



Source) Korea Youth Risk Behavior Web-based Survey-VI (KYRBWS-VI), The Korea Centers for Disease Control and Prevention, 2010

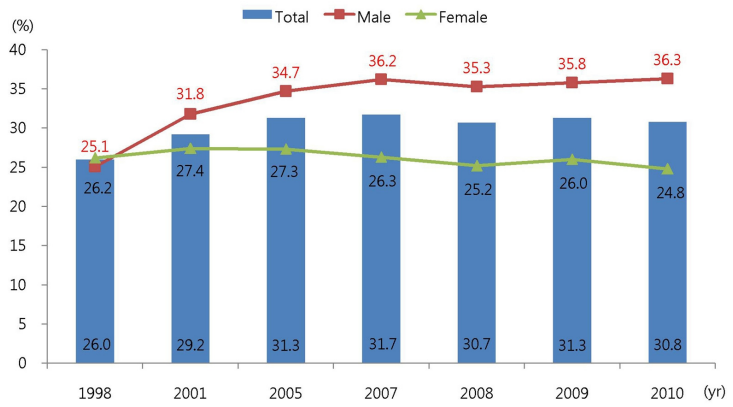
8) The rate of moderate-intensity physical activity in adolescents: Percentage of adolescents aged 13 to 18 years who conduct moderate-intensity physical activity (such as table tennis, carrying light materials, swimming slowly, volleyball, and badminton) for more than 30 minutes for 5 or more days per week

3.7 Obesity

Prevalence of Obesity in Adults

The prevalence of obesity in adults (19 or older, standardized) increased from 26.0% in 1998 to 31.7% in 2007. However, the rate has stayed at around 30% for the past five years. While obesity in male has shown a gradual increase in the past ten years, the rate of obese female has maintained a steady rate.

Prevalence of Obesity



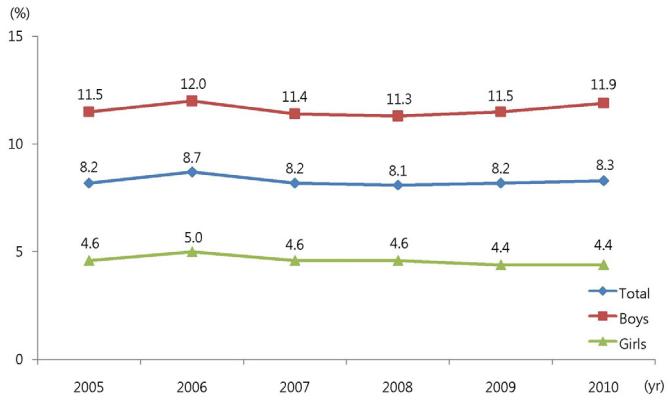
Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

Note)
1) The age-standarized rates are based on the 2005 Korean population.
2) Obesity: Body Mass Index(BMI) ≥ 25

Obesity Rate in Adolescents[9)]

The percentage of obese adolescents was 8.3% in 2010 (11.9% of males and 4.4% of females). The obesity rate increases as students advance in school.

Obesity Rate in Adolescents



Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

Note) Obesity: Body Mass Index(BMI) ≥ 25

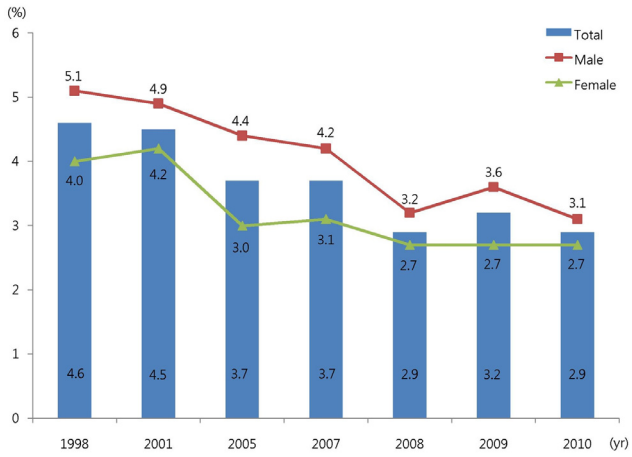
9) Adolescent obesity rate: Percentage of adolescents(13 to 18 years old) whose body mass indexes(BMIs) are more than 95% in the BMI distribution or more than 25 BMI

3.8 Hepatitis B Virus Infection

HBsAg Seropositivity

A Hepatitis B virus infection is one of the major risk factors for liver cancer. HBsAg seropositivity[10], which indicates a Hepatitis B virus infection(in those aged 10 or older, standardized) was high at 7% to 8% of the population in 1970s and 1980s. Thanks to the inclusion of the Hepatitis B vaccine in the national immunization program in 1995, HBsAg seropositivity as steadily decreased from 4.6% in 1998 to 2.9% in 2010.

Trends in HBsAg Seropositivity (ten years or older)



Source) Korea Health Statistics, 2010: Korea National Health and Nutrition Examination Survey (KNHANES V-1)

Note) The age-standardized rates are based on the 2005 Korean population

10) HBsAg seropositivity: Percentage of individuals who test positive to HBsAg (10 years of age or older)

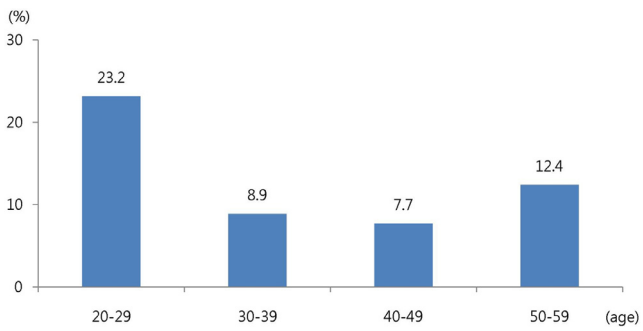
3.9 Human Papillomavirus Infection

Prevalence of Human Papillomavirus Infection

The human papillomavirus (HPV) is a major cause of cervix uteri cancer and is also associated with cancers of the vulva, vagina, penis, anus, and oropharynx.

HPV infection is very common, and about 13% of Korean female are infected. Since HPV is mainly transmitted through sexual intercourse, prevalence is highest among female in the 20 to 29 age group who are in the early phases of sexual experience; the prevalence of HPV decreases with age.

Prevalence of Human Papillomavirus (HPV)

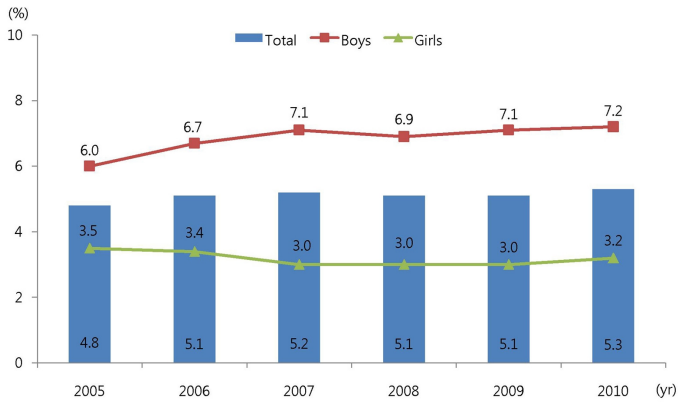


Source) Kim MA et al. Obstet Gynecol 2010

Sexual Experience in Adolescents

The rate of sexually experienced adolescents[11] in Korea increased from 4.8% in 2005 to 5.3% in 2010. Among boys, 7.2% have had a sexual experience, which is more than twice that of girls(3.2%). Percentages of students with sexual experiences in junior high school and high school were 2.5% and 8.1%, respectively.

Sexual Experience Rate in Adolescents



Source) Korea Youth Risk Behavior Web-based Survey-VI (KYRBWS-VI), The Korea Centers for Disease Control and Prevention, 2010

11) Sexual experience rate: Percentage of individuals who have had heterosexual or homosexual intercourse

3.10 Occupational Cancer

Occupational Cancers in Korea

Occupational cancers are types of cancers for which medical treatment has been authorized by the Industrial Accident Compensation Insurance Act. With the first case of malignant mesothelioma in 1993, 35 cases (10 cases of hematologic malignancy, 19 cases of respiratory cancer, 3 cases of malignant mesothelioma, and 3 cases of other cancers) have been acknowledged between 2005 and 2007. From 1993 to 2007, 122 additional cases have been acknowledged as occupational cancers.

Occupational Cancers

	Causal carcinogens	Work-related cases
Respiratory system		71
Lung	Asbestos, cystalline silica, diesel exhaust, chromium and cadmium, nickel, PAH	67
Larynx	PAH	2
Nasopharynx	Chromium, PAH	2
Malignant mesothelioma	Asbestos	13
LHP system[1)]		22
Leukemia	Benzene, radiation, anticancer drug	16
Malignant lymphoma	Benzene	6
Urologic system		
Bladder	Benzidine and benzidine based dye	3
CNS[2)]	Methylene chloride	1
Total		110

Source) Kim EA et al. Safety and Health at Work 2010

Note)

1) LHP: Lymphohematopoietic System

2) CNS: Central Nervous System

Chapter 4.
Cancer Screening Program

4.1 Cancer Screening Rates

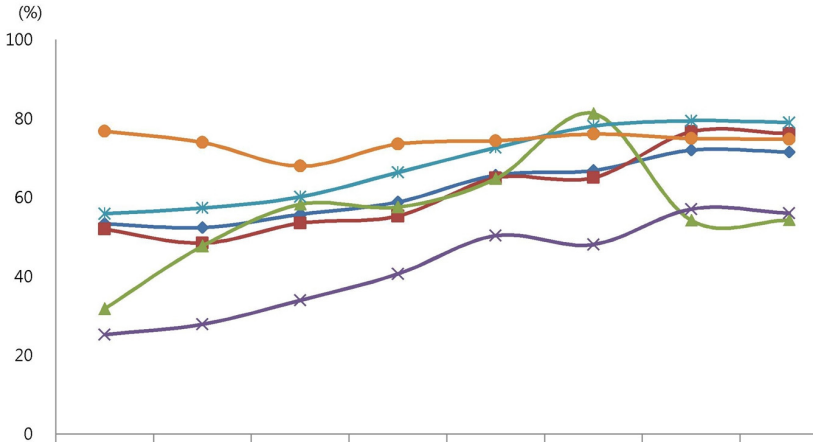
Cancer Screening Rates

The average lifetime screening rate[12] of the five major cancers identified in the National Cancer Screening Program in 2011 was 71.6%, and the average cancer screening rate based on recommendation[13] was 56.1%. With the exception of liver cancer, the cancer screening rate[14] of all cancers had increased (1.45 times versus of 2004).

In 2011, stomach cancer had the highest cancer screening rate based on recommendation (64.6%), followed by cervix uteri cancer (62.4%), breast cancer (60.4%), colon and rectum cancer (35.3%), and the high-risk group of liver cancer (22.9%).

12) Lifetime screening rate: Percentage of individuals who have undergone at least one cancer screening.
13) Screening rate based on recommendation: Percentage of individuals who have undergone screening as part of the National Cancer Screening Program (for stomach, liver, breast, and cervix uteri cancer) or based on cancer screening recommendations (such as colon and rectum cancer)
14) Screening rate = (number of screened individuals of candidates) × 100

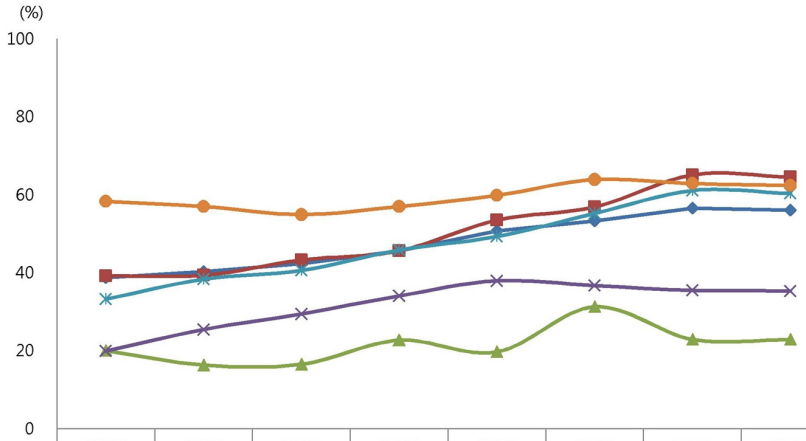
Lifetime Cancer Screening Rates (2004~2011)



	2004	2005	2006	2007	2008	2009	2010	2011
Mean	53.4	52.4	55.7	58.9	65.7	66.9	72.1	71.6
Stomach	52.0	48.5	53.5	55.3	65.0	65.1	76.7	76.2
Liver	31.8	47.7	58.3	57.6	64.8	81.3	54.2	54.3
Colon&Rectum	25.3	27.9	34.0	40.7	50.4	48.1	57.1	56.1
Breast	55.9	57.4	60.2	66.4	72.7	78.1	79.5	79.0
Cervix uteri	76.8	74.0	68.0	73.6	74.4	76.1	75.0	74.8

Source) Korean National Cancer Screening Survey, 2004~2011

Cancer Screening Rates based on Recommendation (2004-2011)



	2004	2005	2006	2007	2008	2009	2010	2011
Mean	38.8	40.3	42.3	45.6	50.7	53.3	56.6	56.1
Stomach	39.2	39.4	43.3	45.6	53.5	56.9	65.1	64.6
Liver	20.0	16.3	16.5	22.7	19.7	31.3	22.9	22.9
Colon&Rectum	19.9	25.4	29.4	34.1	37.9	36.7	35.5	35.3
Breast	33.2	38.4	40.6	45.8	49.3	55.2	61.1	60.4
Cervix uteri	58.3	57.0	54.9	57.0	59.9	63.9	62.9	62.4

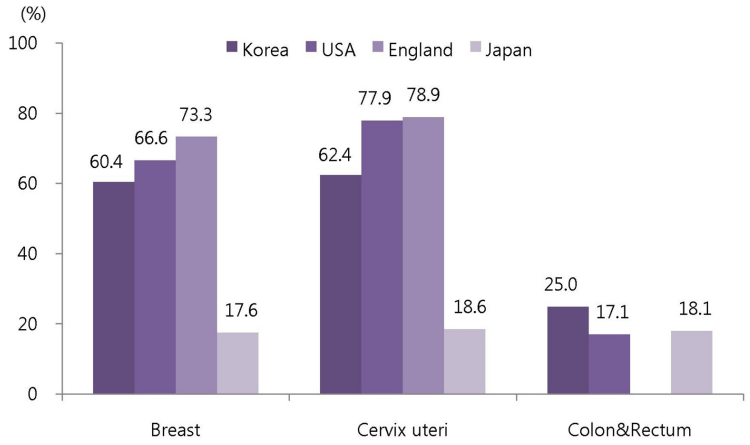
Source) Korean National Cancer Screening Survey, 2004~2011

Comparison of Cancer Screening Rates with Other Countries

A comparison of the cancer screening rate based on recommendations in Korea with those in other countries showed that the screening rates for breast (60.4%) and cervix uteri cancers (62.4%) in Korea were lower than those of England (73.3% for breast cancer and 78.9% for cervix uteri cancer) and the United States (66.6% for breast cancer and 77.9% for cervix uteri cancer).

The rate of fecal occult blood testing (FOBT) for colorectal cancer screenings in Korea was 25.0%, which was higher than the rates of the United States (17.1%) and Japan (18.1%).

Cancer Screening Rates



		Korea [1]	USA [2]	England [3] [4]	Japan [5]
Breast	Cancer Screening Rates	60.4%	66.6%	73.3%	17.6%
	Target Population	40 & over	40 & over	45-74	40 & over
	Frequency	every 2 years	every 2 years	every 3 years	every 2 years
	Test or Procedure	Mammography	Mammography	Mammography	Mammography & CBE
Cervix uteri	Cancer Screening Rates	62.4%	77.9%	25-49, 78.9% 50-64, 78.0%	18.9%
	Target Population	30 & over	18 & over	25-64	20 & over
	Frequency	every 2 years	every 3 years	25-49, every 3 years 50-64, every 5 years	every 2 years
	Test or Procedure	Pap smear	Pap smear	Pap smear	Pap smear
Colon & Rectum	Cancer Screening Rates	25.0%	17.1%	-	18.1%
	Target Population	50 & over	50 & over	60-69	40 & over
	Frequency	every 1 years	every 2 years	every 2 years	every 1 years
	Test or Procedure	FOBT	FOBT	FOBT	FOBT

Source)

1) Korean National Cancer Screening Survey, 2004-2010

2) National Cancer Institute. Cancer Trends Progress Report, 2010

3) NHS Cancer Screening Programmes, NHS Breast Screening Programme Annual Review, 2009

4) NHS Cancer Screening Programmes, NHS Cervical Screening Programme Annual Review, 2009

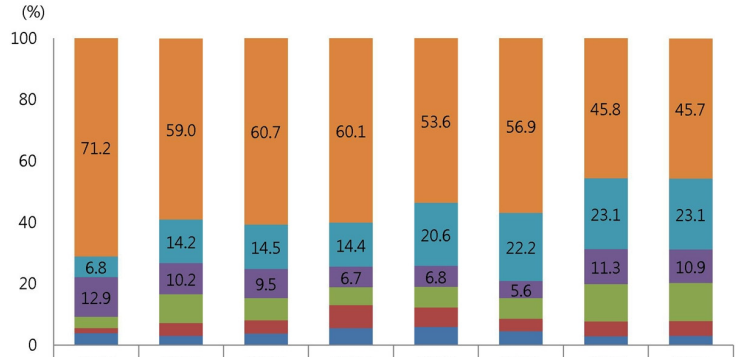
5) Health Statistics in Japan, 2007

Note) CBE(Clinical Breast Examination), FOBT(Fecal Occult Blood Test)

Reasons for Not Undergoing Cancer Screening

From 2004 to 2011, the percentage of people who said that they did not undergo cancer screening because they thought 'belief of healthiness' decreased (71.2% in 2004 to 45.7% in 2011), whereas the percentage of those who had 'time constraints to be screened' to undergo screening increased (6.8% in 2004 to 23.1% in 2011). The percentage of those who gave 'too expensive' and 'too painful, unpleasant' as reasons substantially increased from 2009.

Reasons for Never Being Screened of Any Cancer (2004-2011)



	2004	2005	2006	2007	2008	2009	2010	2011
Belief of healthiness	71.2	59.0	60.7	60.1	53.6	56.9	45.8	45.7
Time constraints to be screened	6.8	14.2	14.5	14.4	20.6	22.2	23.1	23.1
Too expensive	12.9	10.2	9.5	6.7	6.8	5.6	11.3	10.9
Too painful, unpleasant	3.7	9.4	7.3	5.8	6.8	6.8	12.2	12.4
Fear of detection	1.7	4.2	4.3	7.5	6.3	4.0	4.9	4.8
Others	3.8	2.9	3.7	5.5	5.9	4.5	2.8	3.0

Source) Korean National Cancer Screening Survey, 2004-2011

4.2 National Cancer Screening Program

National Cancer Screening Program Statistics (2002-2010)

Guidelines of the National Cancer Screening Program

Cancer	Target Population	Interval	Test or Procedure
Stomach	Age 40 & Over	2 years	Endoscopy or UGI
Liver	Age 40 & Over High risk group †	1 year	Sonography & AFP
Colon & rectum	Age 50 & Over	1 year	FOBT: in case of an abnormal result, Colonoscopy or DCBE
Breast	Age 40 & Over Woman	2 years	Mammography
Cervix uteri	Age 30 & Over Woman	2 years	Pap smear

Source) National Cancer Center, 2011

Note)

1) UGI: Upper Gastro-Intestinal series
2) AFP: Serum Alpha-feto Protein test
3) FOBT: Fecal Occult Blood Test
4) DCBE: Double-Contrast Barium Enema

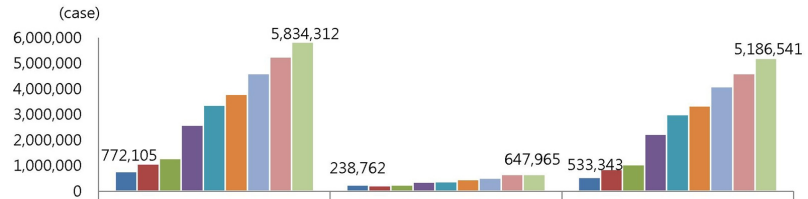
†High risk group: HBs Ag positive or anti-HCV Ab positive or liver cirrhosis

Number of Participants in the National Cancer Screening Program

The target population of the National Cancer Screening Program constitutes people insured by Medical Aid and the National Health Insurance program. The number of screening attendances insured by Medical Aid increased from 238,762 cases in 2002 to 647,965 cases in 2010. The number of screened people insured by the National Health Insurance program increased from 533,343 in 2002 to 5,186,541 in 2010.

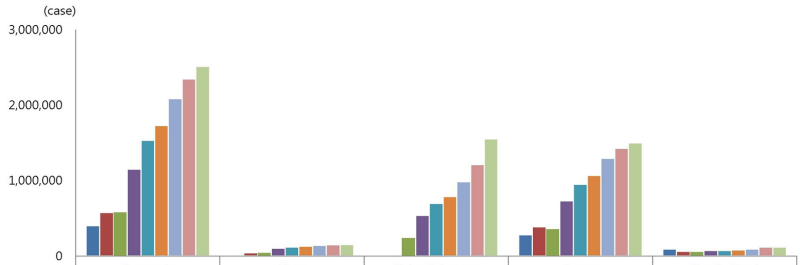
In 2010, among the five cancers in the National Cancer Screening Program, the number of recipients was the highest in those with stomach cancer at 2,511,489, followed by colon and rectum cancer at 1,552,627.

Number of Participants in the National Cancer Screening Program (2002-2010)



	Total	Medical Aid	National Health Insurance
2002	772,105	238,762	533,343
2003	1,065,331	210,697	854,634
2004	1,271,921	237,189	1,034,732
2005	2,588,668	357,860	2,230,808
2006	3,365,338	370,955	2,994,383
2007	3,791,899	460,222	3,331,677
2008	4,597,968	507,797	4,090,171
2009	5,250,871	653,088	4,597,783
2010	5,834,312	647,965	5,186,541

Number of Participants in the National Cancer Screening Program by Cancer Sites (2002-2010)



	Stomach	Liver	Colon&Rectum	Breast	Cervix Uteri
2002	402,204	-	-	279,985	89,916
2003	575,124	42,990	-	385,994	61,223
2004	578,830	41,918	239,047	357,122	55,004
2005	1,150,007	102,394	536,399	728,556	71,312
2006	1,531,360	118,414	696,445	948,495	70,624
2007	1,727,910	130,531	785,919	1,066,882	80,657
2008	2,085,978	141,852	984,957	1,295,152	90,029
2009	2,347,206	147,106	1,210,728	1,427,737	118,094
2010	2,511,489	152,479	1,552,627	1,499,718	117,999

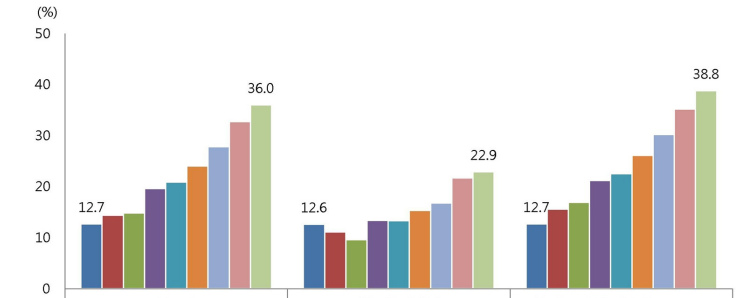
Source) National Cancer Center, 2011

Participation Rates in the National Cancer Screening Program

The overall rate of participation in the National Cancer Screening Program was 36.0% in 2010 (22.9% of Medical Aid recipients and 38.8% of the National Health Insurance holders), and the rate was increasing every year.

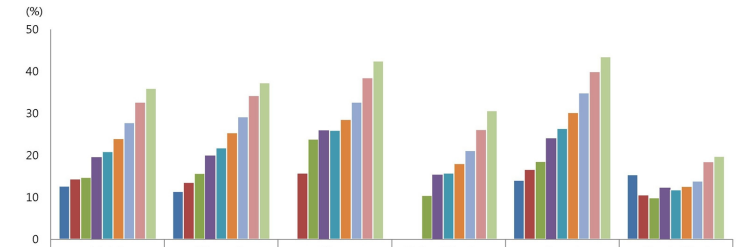
In 2010, screening for breast cancer had the highest participation rate (43.5%), followed by liver cancer (42.5%) and stomach cancer (37.3%).

Participation Rates in the National Cancer Screening Program (2002-2010)



	Total	Medical Aid	National Health Insurance
2002	12.7	12.6	12.7
2003	14.4	11.1	15.6
2004	14.8	9.6	16.9
2005	19.6	13.4	21.2
2006	20.9	13.3	22.5
2007	24.0	15.3	26.1
2008	27.8	16.8	30.2
2009	32.7	21.7	35.2
2010	36.0	22.9	38.8

Participation Rates in the National Cancer Screening Program by Cancer Sites (2002-2010)



	Total	Stomach	Liver	Colon&Rectum	Breast	Cervix Uteri
2002	12.7	11.4			14.1	15.4
2003	14.4	13.6	15.8		16.7	10.6
2004	14.8	15.7	23.9	10.5	18.6	9.9
2005	19.6	20.0	26.0	15.4	24.1	12.3
2006	20.9	21.8	26.0	15.8	26.4	11.8
2007	24.0	25.4	28.6	18.1	30.2	12.6
2008	27.8	29.2	32.7	21.2	34.9	13.9
2009	32.7	34.3	38.5	26.2	40.0	18.5
2010	36.0	37.3	42.5	30.7	43.5	19.8

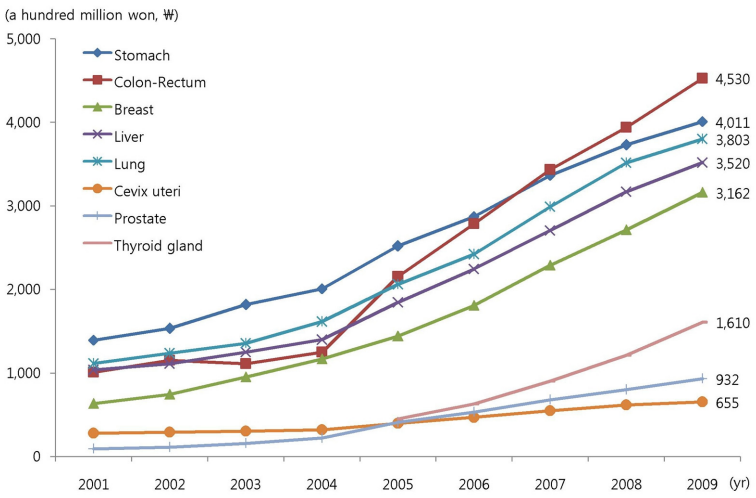
Source) National Cancer Center, 2011

Chapter 5.
Cancer Diagnosis and Treatment

Treatment Costs for Major Cancers

From 2001 to 2009, the treatment cost for prostate cancer increased 9.9 times (9.4 to 93.2 billion won), the treatment cost for breast cancer increased 5 times (63.6 to 316.2 billion won), and the treatment cost for colorectal cancer increased 4.5 times (101.0 to 453.0 billion won).

Treatment Costs for Major Cancers (2009)

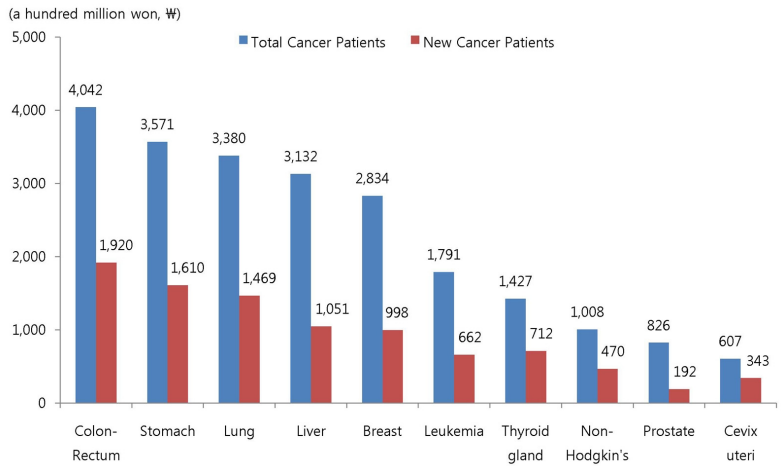


Source) National Health Insurance Corporation, 2010

Insurance Coverage of Expenses for the Treatment of Major Cancers

In 2009, the total of medical cost (excluding uncovered costs such as selective treatments, sonograms, and hospital room upgrades) incurred by 621,402 patients with major cancers who had health insurance was 3.2 trillion won. Of the total amount, 2.9 trillion won (89.1%) was paid by the insurance. Colon and rectum cancer accounted for the largest expenditure (404 billion won), followed by stomach cancer (357 billion won), lung cancer (338 billion won), and liver cancer (313 billion won).

Health Insurance Expenditures for Major Cancers (2009)



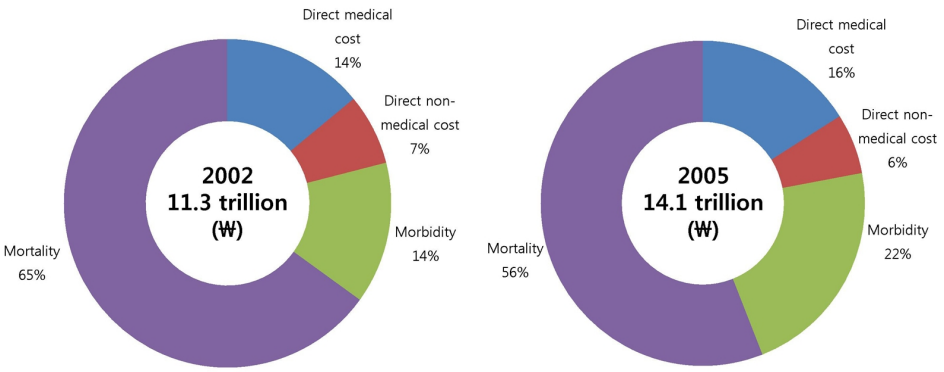
Source) National Health Insurance Corporation, 2010

5.2 Socioeconomic Costs

Socioeconomic Burden of Cancer

The socioeconomic burden of cancer in Korea increased from 11.3 trillion won in 2002 to 14.1 trillion won in 2005.

Socioeconomic burden of Cancer



Source) Kim JH et al. J Prev Med Public Health 2009

5.3 Cancer Patient's Experiences in Korea

From 2008 to 2011, surveys about the requirements in services and the experience of receiving cancer treatment were conducted at the National Cancer Center and nine regional cancer centers throughout Korea (survey respondents included patients and caregivers in 2008, patients in 2009, patients and oncologists in 2010, and patients and caregivers in 2011).

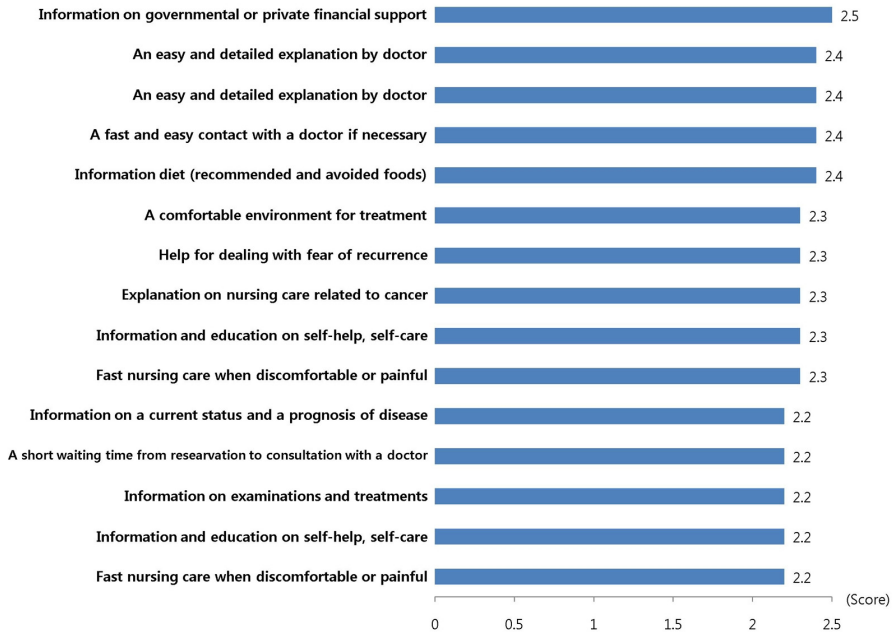
In particular, a 2011 survey was conducted to assess the communication between the patient and the caregiver, the burden on the caregiver, and the discordance between the patient and the caregiver.

Each item regarding a patient's needs was scored on a 4-point likert scale. 'Information on governmental or private financial support' was indicated as being the most needed, followed by 'help for medical costs and income loss related to cancer' and 'short waiting period from reservation to consultation with doctor.'

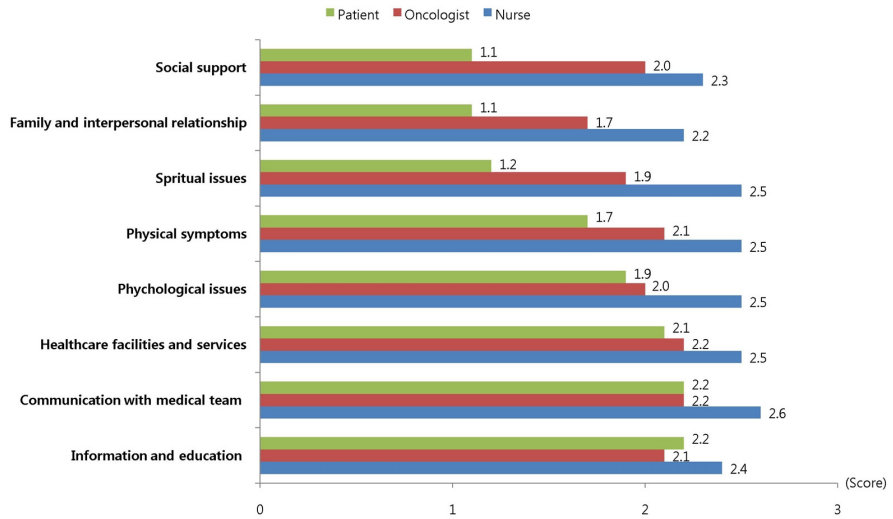
In terms of important service aspects of cancer treatment, patients emphasized information, education, and communication with the medical staff. Oncologists thought communication among medical staff and hospital facilities were important. Nurses said that communication among medical staff was the most important element of service.

Patients, oncologists, and nurses all said that family and personal relationships were not very important aspects of service.

Needs of Cancer Patients (2010)



Important Aspects of Cancer Treatment Service (2010)



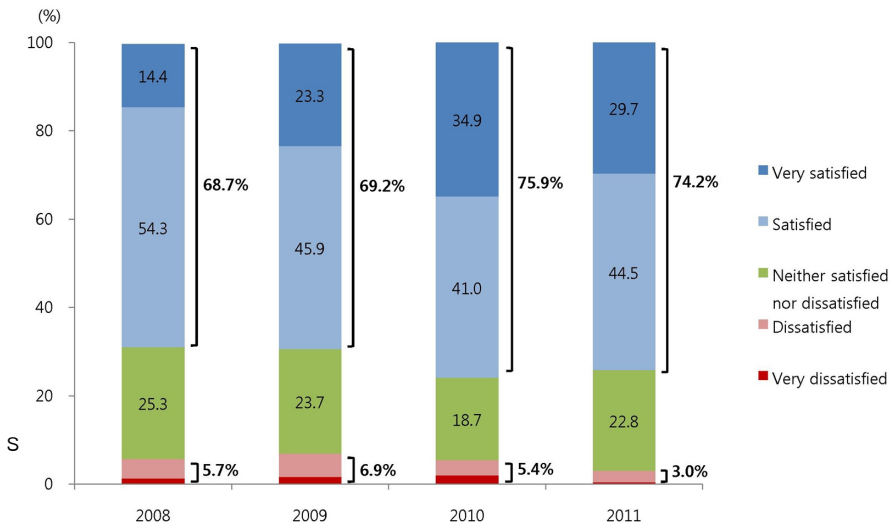
Source) National Cancer Center, 2010

Satisfaction with Medical Services Received

More than half of the patients were satisfied with the medical services they received for cancer treatments.

When comparing the 2010 and 2011 surveys, the percentage of patients dissatisfied with treatments decreased, while the percentage of those either satisfied or very satisfied increased.

Satisfaction with Medical Services (2008-2011)



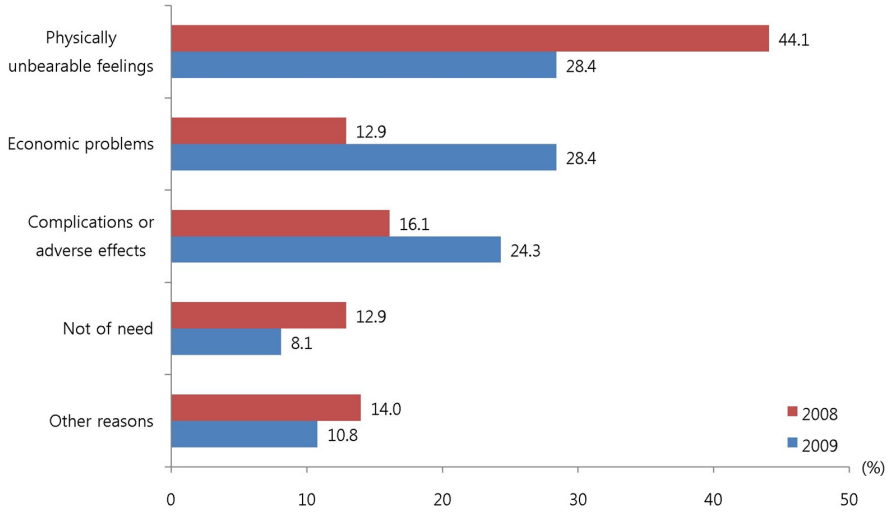
Source) National Cancer Center, 2011

Compliance with Treatment and Satisfaction of Service among Patients with Cancer

In a survey on the reasons for rejecting treatment recommended by doctors to patients with cancer in 2008, 'physically unbearable feelings' and 'economic problems' were chosen as reasons by 28.4% of the respondents, 'complications or adverse effects' was selected by 24.5%, 8.1% felt that they did not need them, and 10.8% stated that they had rejected them for 'other reasons'. In 2009, 'physically unbearable feelings' was chosen by 44.1% of the respondents, which was a large increase from 2008, followed by 12.9% indicating economic problems, 16.1% stating complications or adverse effects, 12.9% not needing treatment, and 14.0% rejecting the recommendations for 'other reasons'.

In the result of a 2008 survey on the satisfaction of treatment services among patients with cancer, 14.4% responded 'very satisfactory', 54.3% responded 'satisfactory', 25.3% responded 'average', 4.4% responded 'unsatisfactory', and 1.3% responded 'very unsatisfactory'. In 2009, satisfaction of the treatment services improved with 23.3% responding 'very satisfactory', 54.3% responding 'satisfactory', 23.7% responding 'average', 5.3% responding 'unsatisfactory', and 1.6% responding 'very unsatisfactory'.

Reasons of Rejecting Treatment Recommended by Doctors

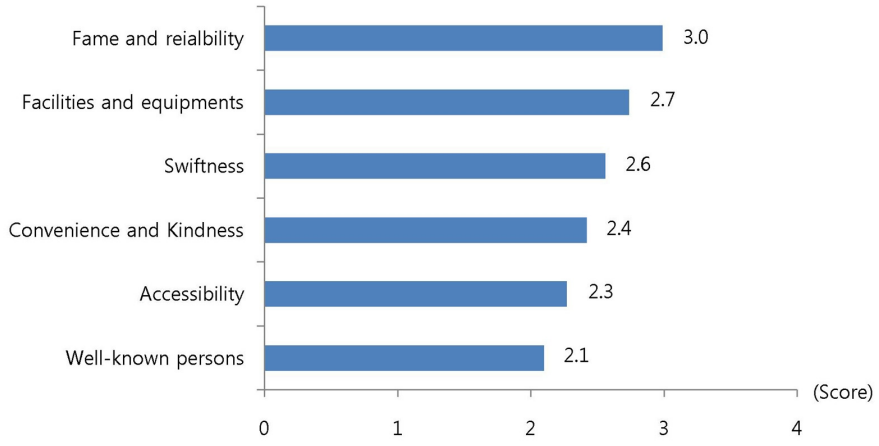


Source) National Cancer Center, 2009

Reasons for the Choice of Medical Institution by Patients with Cancer

In terms of the factors that affect a patient's choice of medical institutions, 'reputation and reliability' ranked highest, followed by 'facilities and equipment', 'swiftness', 'convenience and kindness', 'accessibility', and 'acclaimed physician'.

Motivations for the Choice of Medical Institution by Patients with Cancer

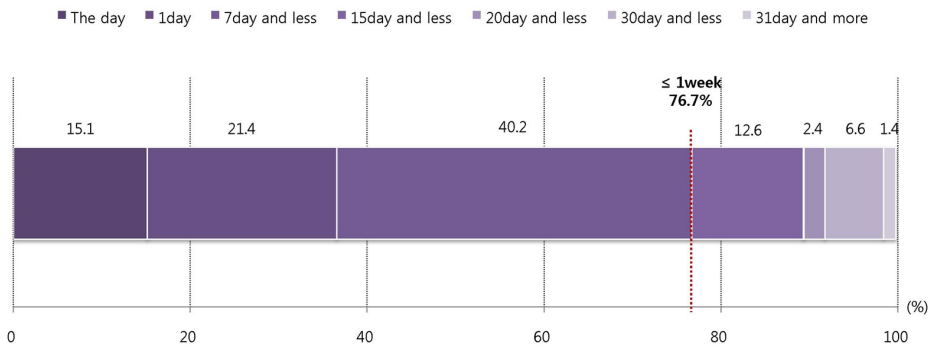


Source) National Cancer Caner, 2008

Time from Making an Appointment to Consultation with a Doctor

Among a total of 2,661 cancer patients, the largest number of them (40.2%) waited 2 to 7 days to see a doctor after making an initial appointment, but 12.6% waited over 15 days. The average waiting time from making the appointment was recorded 7 days.

Time from Making an Appointment to Consultation with a Doctor

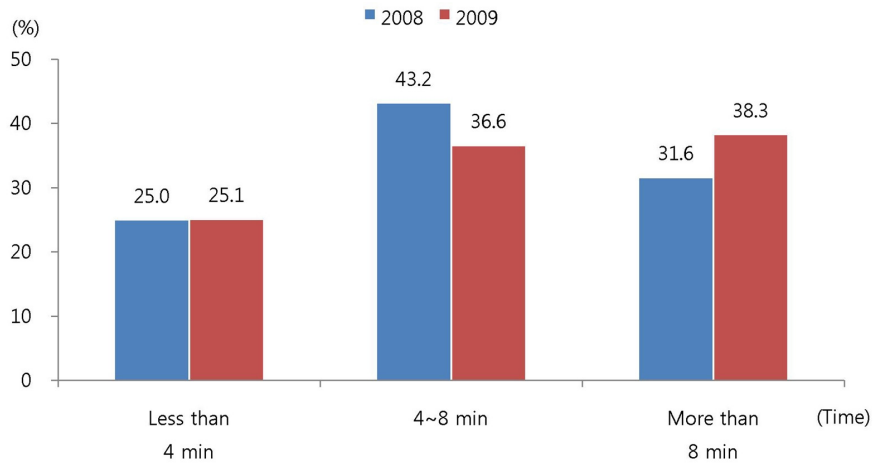


Source) National Cancer Center, 2008

Average Consultation Time with Doctors

Among the patients with cancer, 43% reported they had a consultation that lasted 4 to 8 minutes in 2008, and 38% reported their consultation lasting more than 8 minutes in 2009. In 2008, the mean perceived consultation was 7.1 minutes.

Average Consultation Time



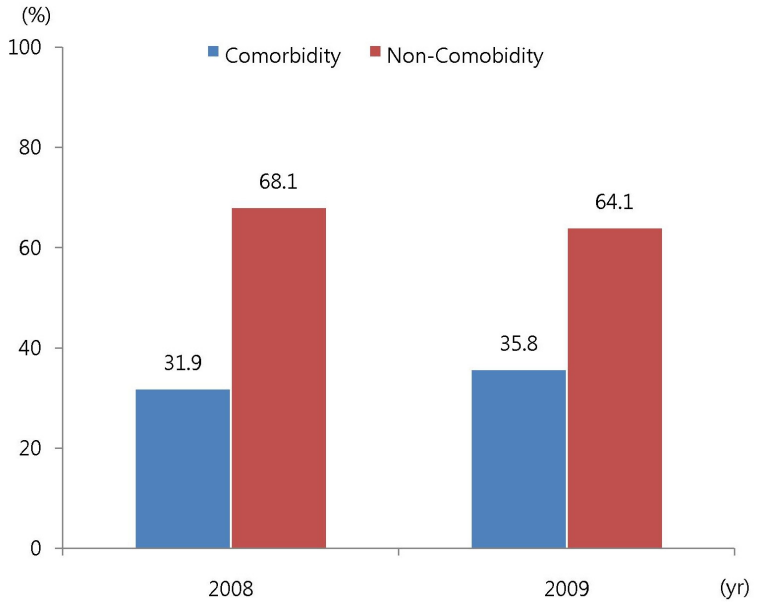
Source) National Cancer Center, 2009

Comorbidity Management of Cancer Patients

In the result of a 2008 survey on comorbidities of patients with cancer, 31.9% were patients with comorbidity, and 68.1% of patients had no comorbidity. In 2009, the rate of patients with comorbidity was 35.8%, and the rate of patients without comorbidity was 64.1%.

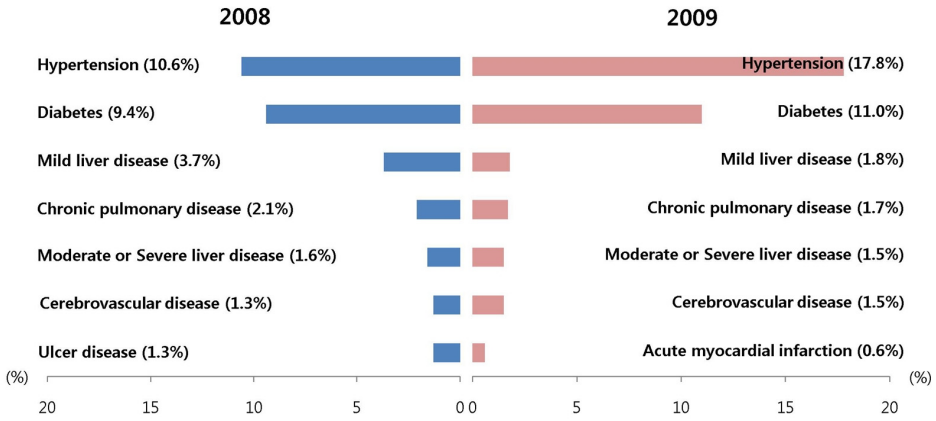
Looking at the data regarding the seven most frequently occurring comorbidities among patients with cancer in 2008, the highest was hypertension (10.6%), followed by diabetes (9.4%), mild liver diseases (3.7%), chronic pulmonary diseases (2.1%), moderate or severe liver diseases (1.6%), cerebrovascular diseases (1.3%), and ulcer diseases (1.3%). In 2009, the most frequently occurring comorbidities were hypertension (17.8%), diabetes (11.0%), mild liver disease (1.8%), chronic pulmonary disease (1.7%), cerebrovascular disease (1.5%), ulcer disease (1.5%), and myocardial infarction (0.6%).

Comorbidities among Patients with Cancer



Source) National Cancer Center, 2009

Seven Most Frequent Comorbidities among Patients with Cancer



Source) National Cancer Center, 2009

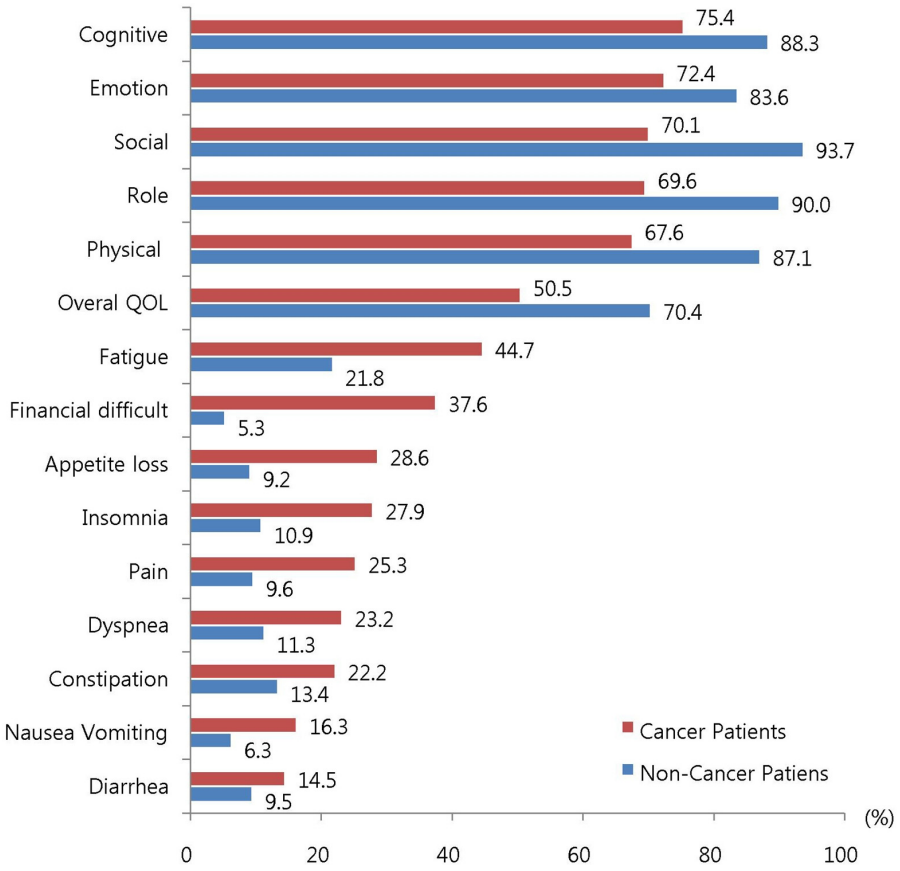
Comparison of Quality of Life between Patients with Cancer and Patients with Other Diseases

The overall quality of life among patients with cancer scored an average of 50.5 points compared to the average of 70.4 among patients with other diseases, indicating that the overall quality of life of patients with cancer was significantly poorer that the quality of life of other patients.

Additionally, in the case of patients with other diseases, the scores of functions decreased in the order of social, role, cognitive and physical, and emotional, while in the case of patients with cancer, the scores decreased in the order of cognitive, emotional, social, role, and physical function.

This shows that patients with cancer are limited in the social and role functions and that the related quality of life is less than the quality of life of patients with other diseases. This also indicates that the quality of life is qualitatively and quantitatively different between patients with and without cancer.

Quality of Life(QoL) Comparison between Patients with Cancer and Other Diseases



Source 1) National Cancer Center, 2009

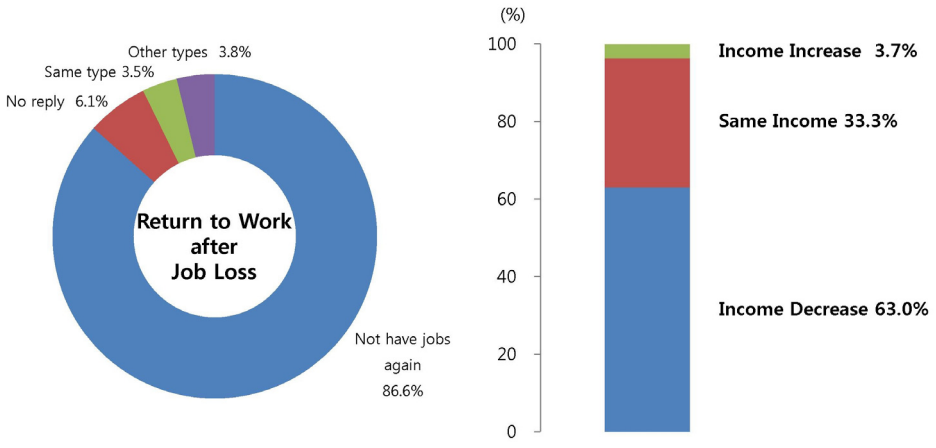
2) Yun YH et al. Journal of Clinical Epidemiology, 2007

Note) Higher the score of ability, higher the ability status and QOL while higher the score of symptom, lower the QOL relates to symptoms

Return to Work and Income Change

Among the polled patients with cancer who indicated that they had job loss after their diagnosis of cancers, an overwhelming 86.6% could not return to the workplace. In addition, the number of patients returning to other types of jobs (3.8%) was slightly higher than those who came back to the same type of jobs. Regarding change of income after a return to the workplace, 63.0% earned less money.

Job Loss and Income Change



Source) National Cancer Center, 2008

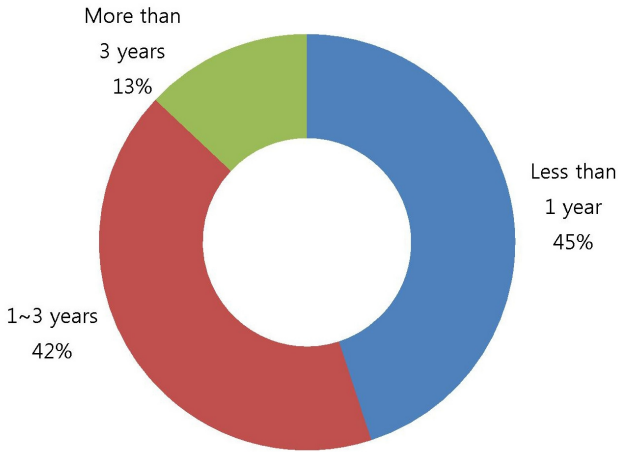
Caregiving for Patients with Cancer

According to the 2011 survey taken among family caregivers of cancer inpatients and outpatients, the highest percentage of respondents had been caring for patients for 1 year or less (45%), followed by 1 to 3 years (42%).

Regarding the time spent caring for a patient per week, 40% said that they provided care almost always, and 27% said they spent five hours or less (1 hour or less per day). When asked who had been most helpful in caring for them, 61% of the patients with cancer indicated their spouses and children.

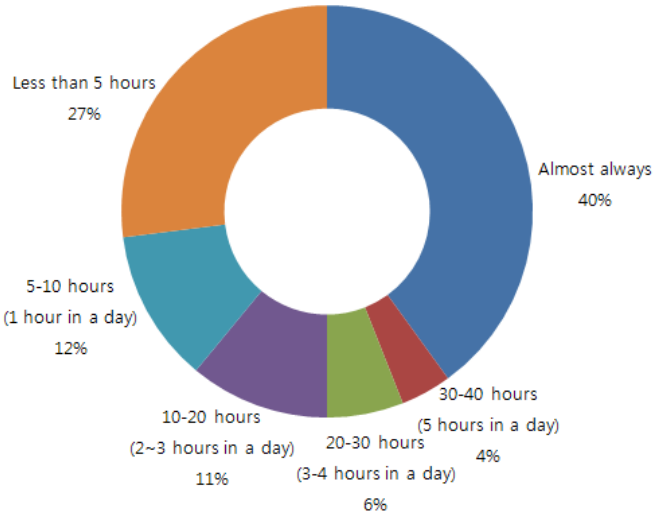
61.9% of patients and 57.1% of caregivers said that they most needed help from medical staff as well as family and friends when the patient was admitted to the hospital for treatments such as surgery. Although the exact response rates were somewhat different, the times when they needed help from those around them coincided between patients and caregivers.

Duration of Providing Care for Patients with Cancer (2011)



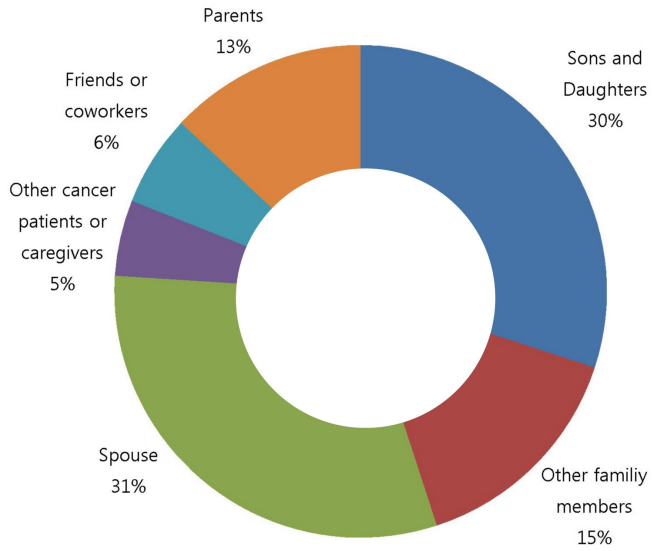
Source) National Cancer Center, 2011

Time spent on Providing Care for Patients with Cancer (2011)



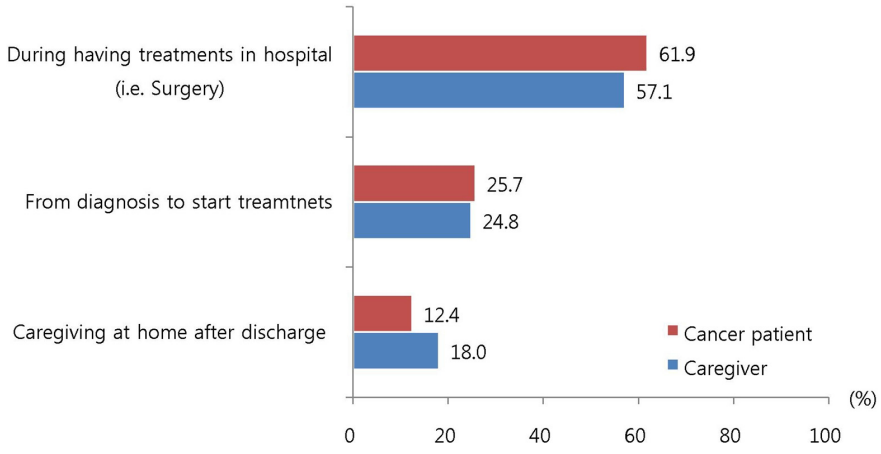
Source) National Cancer Center, 2011

The Most Helpful person in Providing Care for Patients with Cancer (2011)



Source) National Cancer Center, 2011

Most Needed to Providing Care for Patients with Cancer (2011)



Source) National Cancer Center, 2011

Chapter 6.
Palliative Care / Management of Cancer Survivors

6.1 Palliative Care

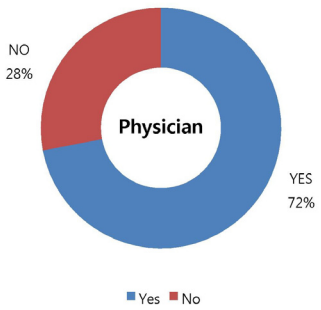
Education on Cancer Pain Management

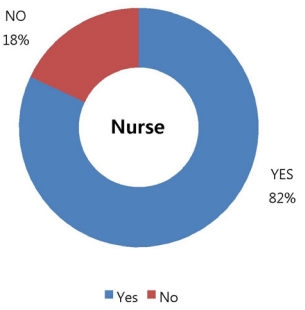
In 2011, a survey was conducted regarding improvements in cancer pain management as well as awareness and use of cancer pain management guidelines. The survey was taken among 150 physicians and 285 nurses who worked at 11 general hospitals, including tertiary medical facilities, and provided treatments to patients with cancer.

Among the respondents, 79% (72% of physicians and 82% of nurses) had received some form of education on cancer pain management, mostly during group discussion sessions at the hospital, academic seminars, and lecture training sessions.

The most widely read cancer pain guidelines were the NCCN Guideline and WHO Guideline for physicians, and the Cancer Pain Management Guidelines published by the Ministry of Health & Welfare and WHO Guideline for nurses.

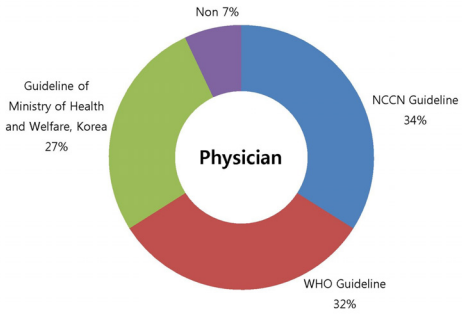
Education Experience for Cancer Pain Management (2011)

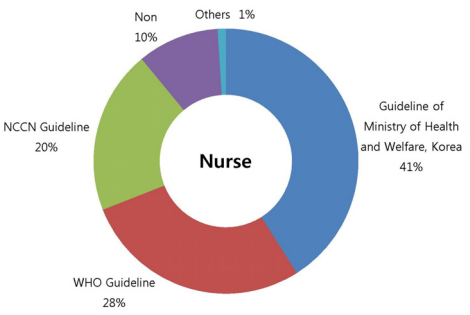




Source) National Cancer Center, 2011

Using Cancer Pain Management Guideline (2011)





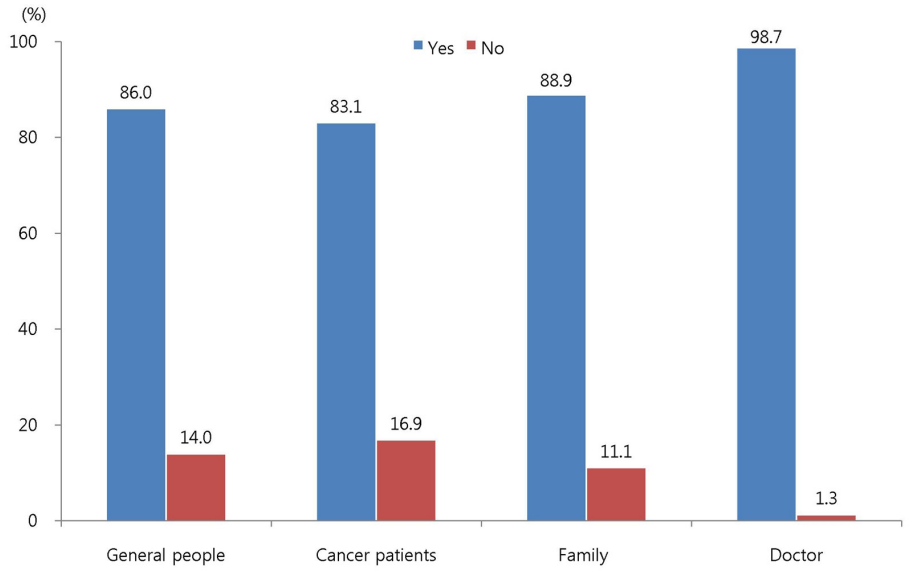
Source) National Cancer Center, 2011

Survey on Hospice and Palliative Care and Services

In 2004, a survey of 1,006 male and female adults in 16 cities and provinces throughout Korea asked the following question: “If you had an incurable disease that was getting worse, would you use hospice and palliative services?” Over half (57.4%) responded positively. When the same question was asked in 2008, it was found that the positive responses had increased substantially to 84.6%. In the 2008 survey, 86.0% of the healthy individuals, 83.1% of the patients with cancer, 88.9% of the family members of patients with cancer, and 98.7% of the medical professionals said that they intended to use hospice and palliative care services.

Furthermore, 92.8% of healthy individuals, 91.8% of the patients with cancer, 86.5% of the family member of patients with cancer, and 96.4% of the medical professionals said that a patient should be provided with exact information when his or her disease deteriorates to a terminal state.

Intention of Using Hospice Service (2008)



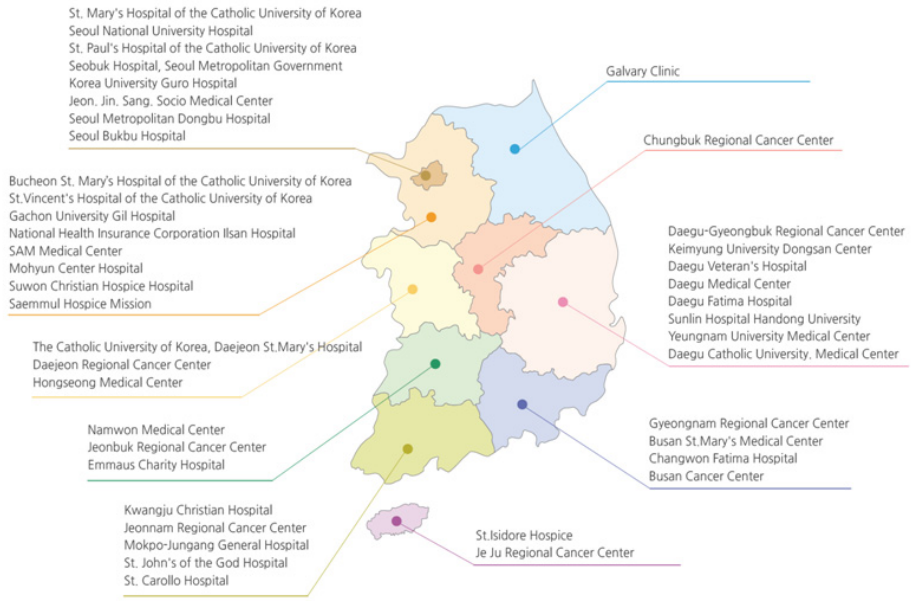
Source) Standardization of Management Guideline and Development of Efficient Health Care Delivery System on Hospice Palliative Medicine. Health Insurance Review & Assessment Service. 2008

Hospice and Palliative Care Service Resources

In 2008, the regions with low mortality rates at palliative care units for patients with cancer were Incheon, Chungnam, Ulsan, and Busan. Among the 34 facilities designated as palliative care units for patients with cancer, the regions with lower percentages of facilities that met the guideline of 50 hospital beds per 1 million patients with cancer were Incheon, Chungbuk, Chungnam, and Ulsan.

As of 2011, there were 43 palliative care units throughout Korea designated by the Ministry of Health & Welfare for patients with cancer.

Inpatient Palliative Care Units designated by Ministry of Health and Welfare



Source) Government supportive project for expansion palliative care, National Cancer Center, 2011

Use of Palliative Care Units for Patients with Cancer

According to data from 2011, 6,923 patients with cancer have used 43 palliative care units, ranging from 36 to 570 patients per facility. Among the estimated 77,000 deceased patients with cancer in 2011, about 9.0% used palliative care units.

In terms of cancer types, patients with lung cancer showed the highest usage (1,247, 18.0%), followed by stomach cancer (1,084, 15.7%), colorectal cancer (670, 9.7%), pancreatic cancer (621, 9.0%), and liver cancer (608, 8.8%).

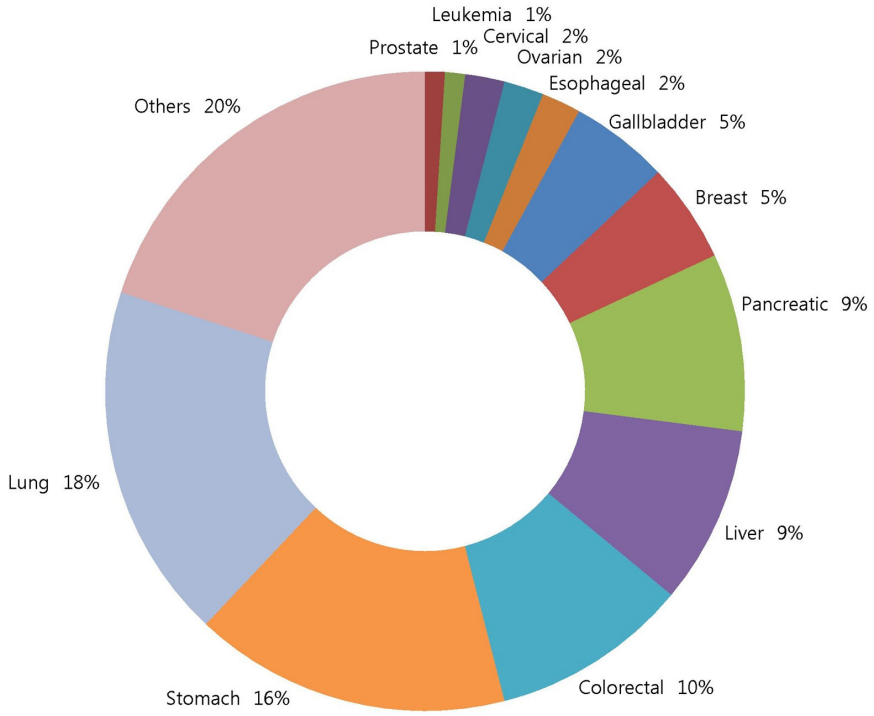
Regarding physicians' written diagnoses or opinions, 3,694 (63.8%) had a written diagnosis from two or more physicians, 1,514 (26.2%) had a written diagnosis from a single physician, and 578 (8.8%) did not have any documentation.

Among the patients who used palliative care units in 2011, 5,186 (89.4%) were aware of their disease and 4,132 (71.2%) were aware of their terminal state, while 5,609 caregivers (99.4%) were aware of the patient's disease and 5,546 (98.3%) were aware of their terminal state.

Regarding how the patients were admitted to the palliative care units, the highest percentage of patients (2,338, 40.3%) walked into the facilities without a formal referral, followed by 1,591 (27.4%) who were transferred from the general patient room of the same facility, and 1,149 (19.8%) who were referred by another general medical facility or ward.

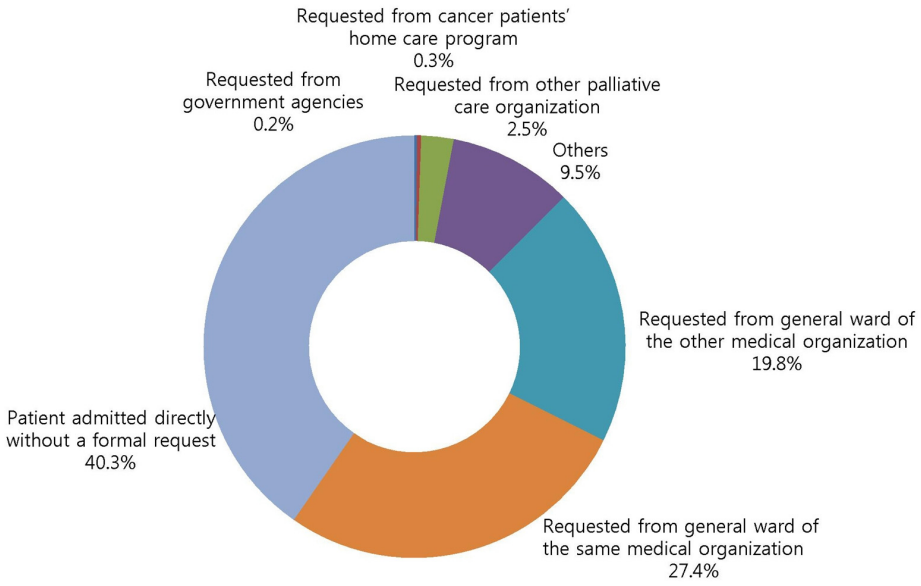
Death (3,982, 73.2%) was the leading reason for being discharged from initial hospitalization at a palliative care unit, followed by personal reasons (923, 17.0%) and transfer to a general medical facility (255, 4.7%).

Use of Hospice and Palliative Care Services by Types of Cancer

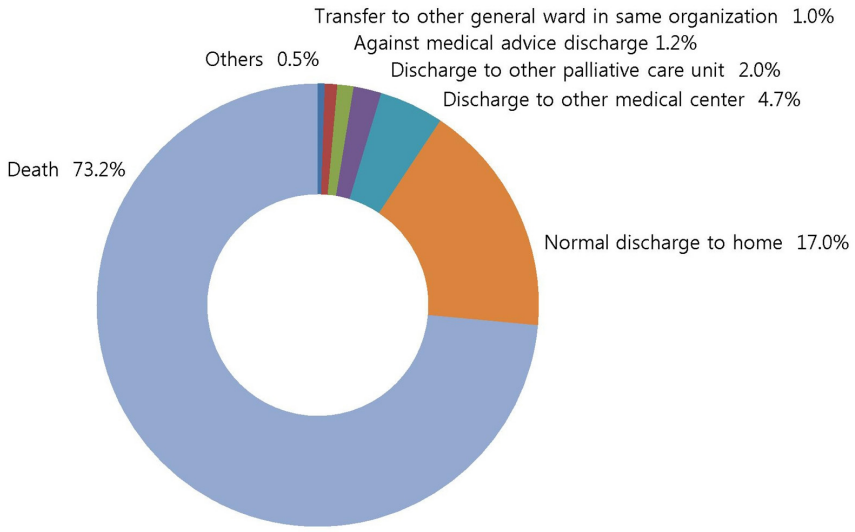


Source) Korean Terminal Cancer Patient Information System, 2011

Admission Routes to Hospice and Palliative Care Services



Reasons for Being Discharged from the 1st Hospice and Palliative Care Unit

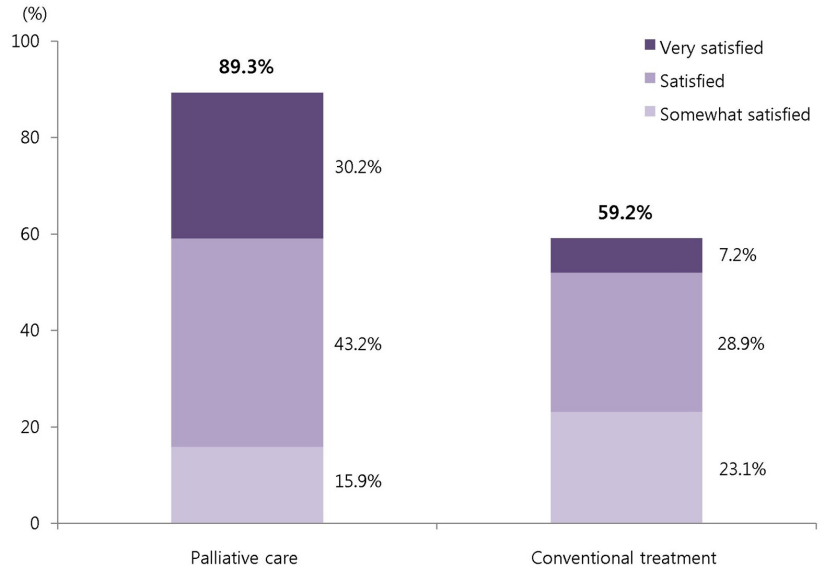


Source) Korean Terminal Cancer Patient Information System, 2011

Evaluation of Palliative Care Units by Patients' Family Members

In a 2011 survey conducted among the family members of patients with cancer regarding the overall experience of using the services at palliative care facilities, 59.2% said that they were satisfied with general cancer treatment facilities and 89.3% expressed satisfaction about the services that they had received from the palliative care units.

Overall Satisfaction of the Treatments Received (2011)



Source) National Cancer Center, 2011

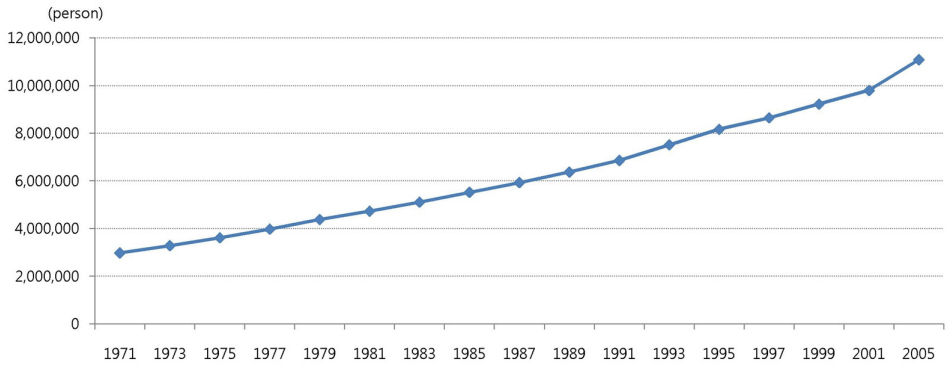
6.2 Management of Cancer Survivors

Trends Regarding Cancer Survivors in the United States

The number of survivors of cancer in the United States increased from approximately 3 million in 1971 to more than 10 million in 2005.

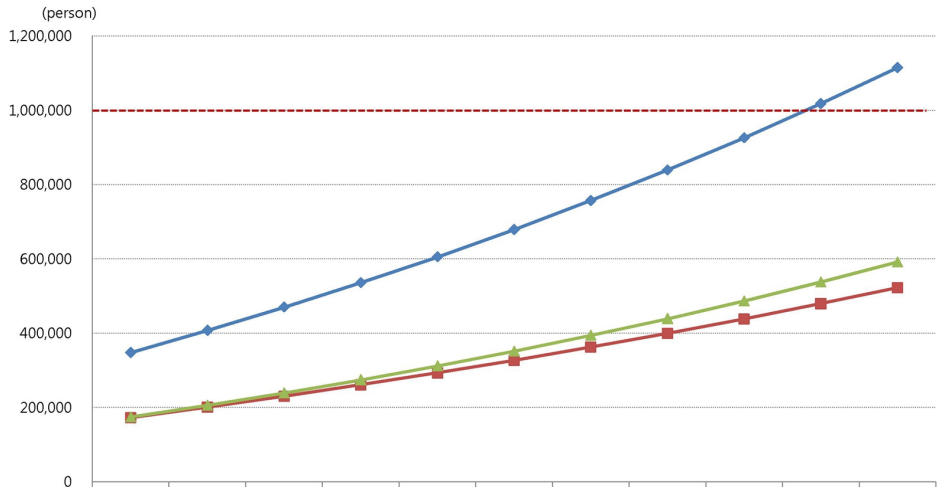
The number of survivors of cancer in the United States is expected to increase from 348,096 in 2005 to 1,114,833 in 2015 (172,872 in 2005 to 522,589 in 2015 for males, and 175,224 in 2005 to 592,244 in 2015 for females). The percentage of survivors of cancer among the general population is expected to increase from 0.72% (0.71% in males and 0.73% in females) in 2005 to 2.26% (2.12% in males and 2.41% in females) in 2015.

The number of Cancer Survivors in the U.S. (1971-2005)



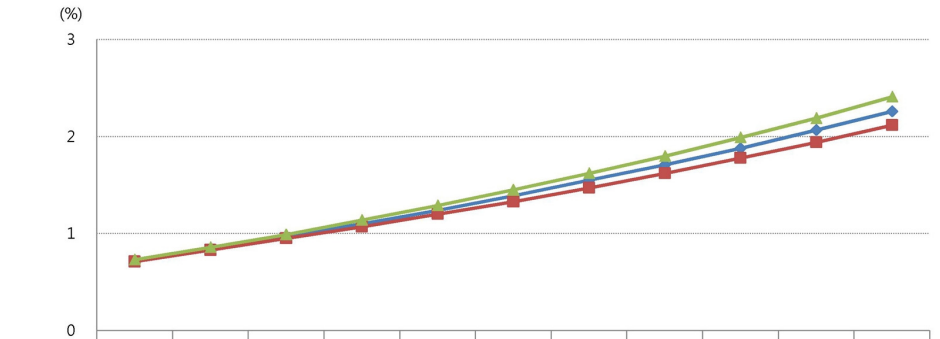
Source) National Cancer Institute in United States, 2009

Estimated Number of Cancer Survivors in the U.S. (2005-2015)



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total	348,096	407,607	470,274	536,042	605,655	679,102	756,998	839,348	926,147	1,017,97	1,114,83
Male	172,872	201,232	230,706	261,258	293,427	327,208	362,678	399,843	438,700	479,613	522,589
Female	175,224	206,375	239,567	274,783	312,228	351,894	394,320	439,505	487,447	538,357	592,244

Percentage of Cancer Survivors in the U.S.



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total	0.72	0.84	0.97	1.10	1.24	1.39	1.55	1.71	1.88	2.07	2.26
Male	0.71	0.83	0.95	1.07	1.20	1.33	1.47	1.62	1.78	1.94	2.12
Femal	0.73	0.86	0.99	1.14	1.29	1.45	1.62	1.80	1.99	2.19	2.41

Source) National Cancer Center, 2007

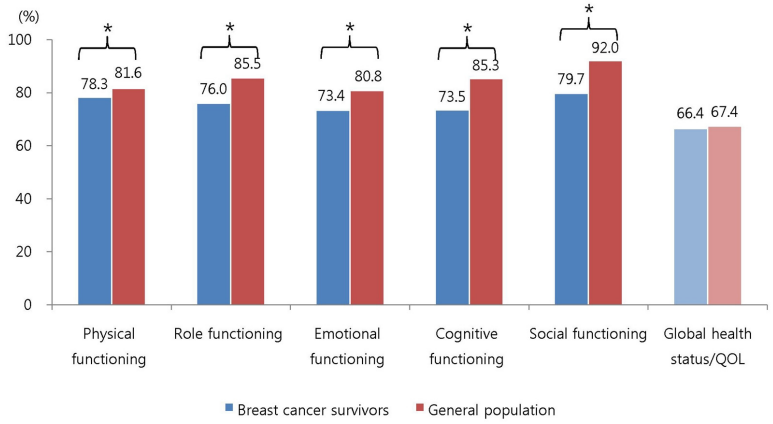
Note) Survivor: all people being alive after diagnosis with cancer

Comparison of Quality of Life by Function State and Symptom of Breast Cancer Survivors

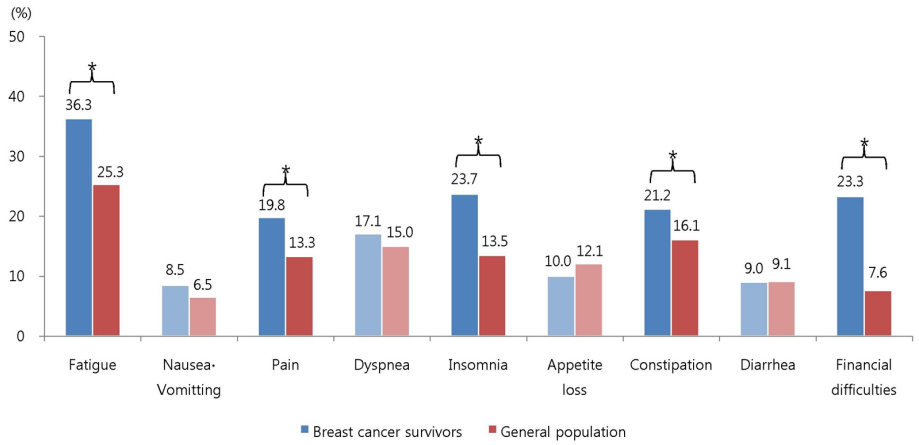
Among 10,796 patients with breast cancer undergoing primary curative surgery at five major hospitals (the National Cancer Center, Seoul National University Hospital, the Yonsei University Health System, the Samsung Medical Center, and the Asan Medical Center) from 1993 to 2002, a questionnaire was completed by 1,933 survivors of cancer.

A comparison of the quality of life according to the functional state in survivors of breast cancer (n=1,933) with that in the general population (n=500) revealed that the survivors have a poorer performance in terms of their physical, role, emotional, cognitive, and social functioning as well as overall lower quality of life. In addition, a comparison of the quality of life according to negative symptoms in survivors of breast cancer with that in the general population showed that the survivors experience physical symptoms such as fatigue, nausea and vomiting, pain, dyspnea, insomnia and constipation, and financial difficulties more of tenth an the general population (n=500).

Comparison of Quality of Life (Function State) in Breast Cancer Survivors with the General Population



Comparison of Quality of Life (Symptoms) in Breast Cancer Survivors with the General Population



Source) Ahn Sh et al, Annals of Oncology, 2007

Note)

1) *: p< 0.001 from analysis of covariance with a generalized linear model and are for the comparison between breast cancer

2) Cancer Survivor : patients without no recurrence or metastasis of cancer after treatments for complete recovery from cancer

Behavior, Attitude, Knowledge, and Opinion Cancer Survivors for Secondary Cancer Screening

A survey of 326 survivors of cancer who had been disease free for more than 1 year following a diagnostic for primary cancer in 2009 shows that only 123 patients (37.7%) received the overall necessary second cancer screening within 2 years.

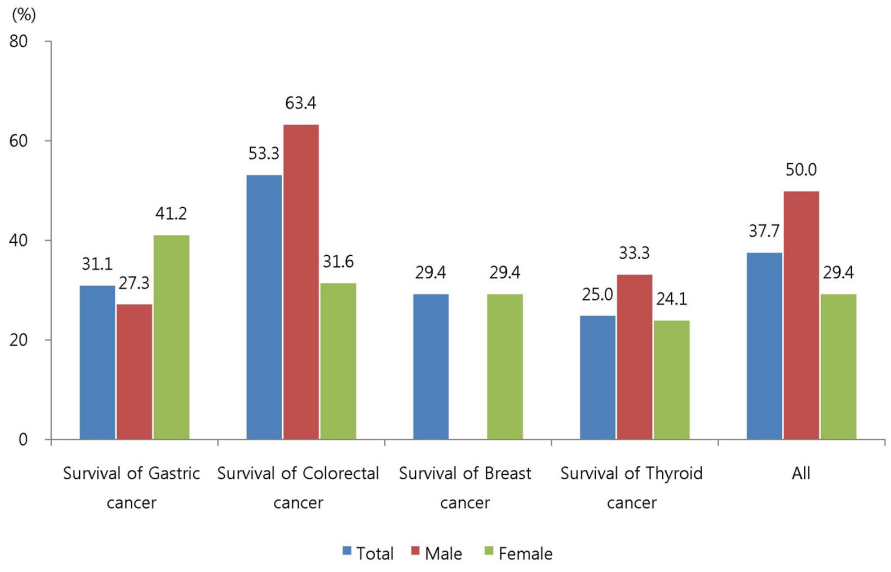
It can be seen that most survivors of cancer are very affirmative at their second cancer screening. First, they responded that screening for other types of cancer is absolutely necessary (99.1%). Second, they indicated, 'I will receive a screening for other types of cancer if they decide to go by themselves or if a doctor advises them to do it.' Further, their recognition of the advantage of the second cancer screening can be inferred from their two responses: 'If I receive a screening for other types of cancer, I will feel that my health is well cared for (95.4%)' and 'If I receive a screening for other types of cancer, it will be good for my family (95.0%)'.

In addition, survivors understood cancer screening as follows: 'I think a person who has suffered from one type of cancer can be stricken with another type of cancer (92.6%)', 'I think the probability of a patient with cancer being stricken with another type of cancer is higher than a healthy person developing cancer (85.8%)', and 'Patients with cancer must receive cancer screening targeted for healthy people (82.0%)'. However, the following statements show that a fair number of survivors do not have

specific knowledge for the need for a second screening: 'All the disorders of the body can be diagnosed by a blood test or an x-ray injection at a hospital (43.3%)' and 'Periodical screening is not necessary if we receive follow-up tests properly from the hospital (41.7%)'.

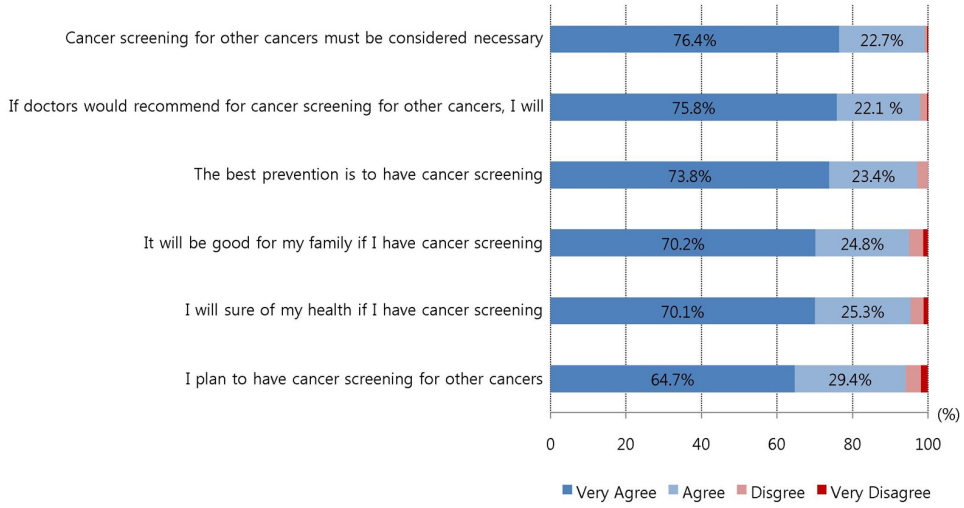
Most survivors of cancer recognized the necessity of the extra recommendations for cancer screening (92.0%), but many of them responded that they did not receive extra recommendations for cancer screening from doctors (78.0%).

Secondary Cancer Screening Rate



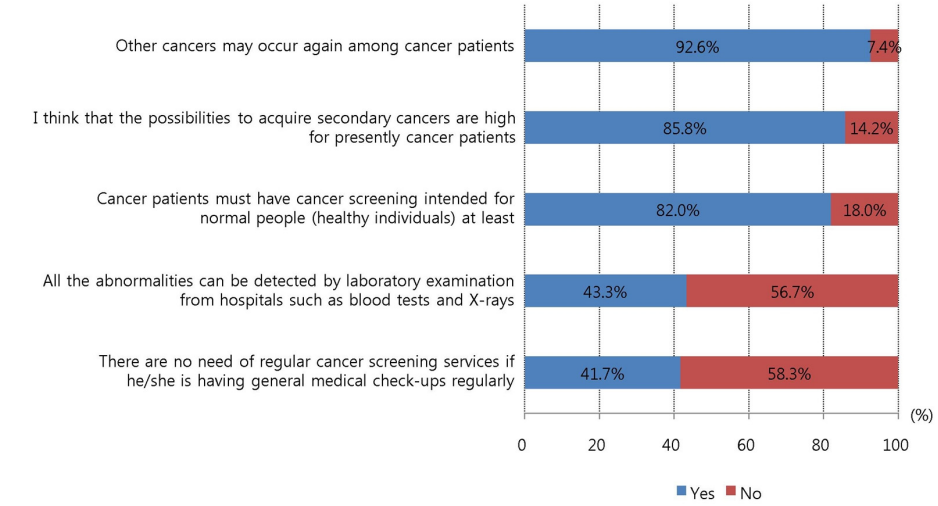
Source) National Cancer Center, 2009

Attitude toward Secondary Cancer Screening Services



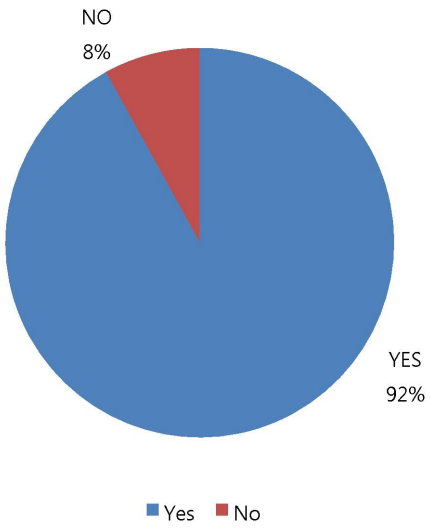
Source) National Cancer Center, 2009

Knowledge of Secondary Cancer Screening Services



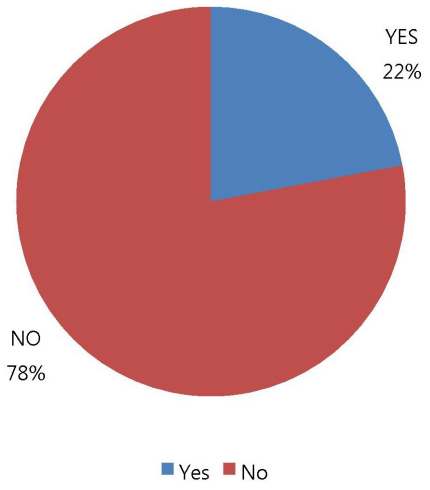
Source) National Cancer Center, 2009

Need for Supplementary Cancer Screening



Source) National Cancer Center, 2009

Cancer Screening Recommendation from Doctor



Source) National Cancer Center, 2009

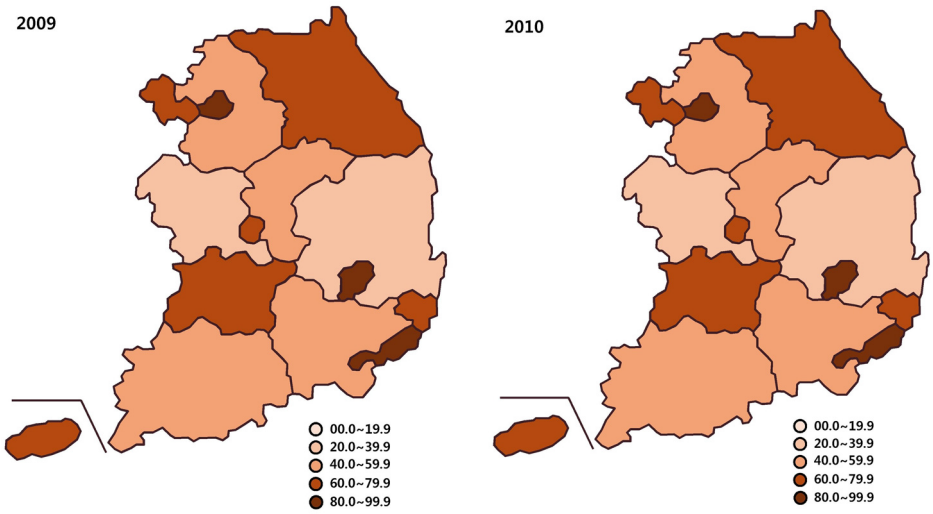
Chapter 7.
Regional Cancer Centers

Self-Sufficiency of Cancer Treatment

Except for Seoul, Daegu recorded the highest rate of self-sufficiency in treating patients with cancer in 2009 to 2010. Gyeongbuk had the lowest rate.

When comparing the self-sufficiency rates of 16 cities and provinces between 2009 and 2010, Jeju recorded the highest improvement, followed by Gyeongbuk and Gyeongnam. Chungnam showed the most significant decrease in the self-sufficiency rate during this period.

Self-Sufficiency of Cancer Treatment



Source) National Cancer Center, 2010

Geographic Location of Regional Cancer Centers

Each year from 2004 to 2006, three national university hospitals were designated as regional cancer centers. In 2011, three additional private university hospitals were designated, bringing the total to 12 regional cancer centers in operation throughout Korea.

- 2004: Jeonbuk, Jeonnam, and Gyeongmam
- 2005: Busan, Daejeon, and Daegu/Gyeongbuk
- 2006: Kangwon, Chungbuk, and Jeju
- 2011: Incheon, Gyeonggi, and Ulsan

Regional Cancer Centers

Source) National Cancer Center, 2011

Cancer Registration System in Korea

The cancer registration in Korea began in 1980 with the Central Cancer Registration Project, which involved compiling cancer data from training hospitals. Since the early 1990s, regional cancer registration projects have been carried out to calculate accurate cancer incidences according to geographic regions.

In order to accurately calculate cancer-related statistics and constantly monitor related figures, the Ministry of Health & Welfare is conducting national cancer registration and statistics projects with the Central Cancer Registry and 11 regional cancer registries (Busan, Daegu/Geyongbuk, Gwangju/Jeonnam, Incheon, Daejeon, Ulsan, Jeju, Gangwon, Chungbuk, Jeonbuk, and Gyeongnam). In addition, clinical and academic societies operate their own cancer registries for various types of cancer.

The Central Cancer Registry has implemented the national cancer incidence database, which includes type-specific cancer registration data from 11 regional cancer registries. Since publishing cancer incidence data from 1999~2001 in 2005, the Central Cancer Registry has been releasing cancer registration statistics, and regional cancer registries have been producing similar data for the populations in their respective regions.

Cancer Registry

Source) Ministry of Health & Welfare, The Korea Central Cancer Registry, 2010

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