

Original Article

Time Trends of Cancer Incidence in Urban Beijing, 1998-2007

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ABSTRACT

Objective: To report the time trends of cancer incidence in urban Beijing from 1998 to 2007.

Methods: All data were obtained from Beijing Cancer Registry from 1998-2007 in urban Beijing. Time trends of incidence rate of cancer were assessed by annual percentage change (APC) of age-standardized incidence rate (ASR) of world standard population during this 10-year period.

Results: For all 156851 cancer cases combined, the incidence rate rose in both males and females, with an APC of 2.23% and 3.74%, respectively. The incidence rate of upper gastrointestinal cancers declined significantly, with an APC of -2.83% in esophageal cancer and -1.37% in male gastric cancer, while lower gastrointestinal cancer, such as colorectal cancer, increased with an APC of 4.08%. The rates of kidney and bladder cancer increased with an APC of 7.93% and 5.57%, respectively. For women, the APC continued to rise in breast cancer (4.98%), ovary cancer (6.16%), cervix uteri cancer (11.74%), corpus uteri cancer (6.96%) and thyroid gland cancer (13.39%). The rate of prostate cancer among men increased with an APC of 8.58%; the rate of lymphoma and leukemia increased with APC of 5.48% and 5.44%, respectively.

Conclusion: Because of population aging and urban modernization, the cancer burden in Beijing has become more and more severe and similar to the western developed countries.

Key words: Oncology; Epidemiology; Incidence; Trend

INTRODUCTION

Cancer is the leading cause of death in urban China^[1]. The incidence rates in most types of cancers have been rising in recent years because of social and economic development, as well as population aging^[2]. According to the report released by Beijing Health Bureau, cancer mortality has taken the first place among all diseases in Beijing since 2007, which became a major issue for the public health^[3]. In this study, incidence data of cancer were analyzed to describe the characteristics and time trends of cancers in different sites in urban Beijing from 1998 to 2007.

MATERIALS AND METHODS

Patients

Data of all cancer cases were derived from Beijing Cancer Registry which has collected population-based cancer incidence data since 1976. Medical records of the new cancer inpatients were monthly required to report to the Cancer Registry from all the 138 medical hospitals in urban of Beijing. Before 2002, the information of the newly

diagnosed cancer cases were recorded using a standardized notification cards which included the following items: basic demographics, primary site of cancer, histopathology, diagnosed date, reporting hospital, and other relevant variables. Since 2003, all designated hospitals have adopted a uniform guideline of Chinese Cancer Registration to collect surveillance data from the Health Information System (HIS)^[4]. The collected data obtained from HIS were uploaded to Beijing Municipal Health Bureau of Statistics Platform monthly.

Cases with the same or similar ID number, name, sex, date of birth, medical record number with the different hospitals are examined manually by a computer program to detect any duplication. Current data analysis was restricted to the 8 urban districts including Dongcheng, Xicheng, Chongwen, Xuanwu, Chaoyang, Haidian, Fengtai, Shijingshan in Beijing. In the meantime, death information provided by death surveillance department of Beijing Center for Disease Control and Prevention were used to supplement or revise the missing incidence data (accounts for almost 15%). We merged the same cases to avoid duplicate and conducted a good quality control based on the guideline of Chinese Cancer Registration and a manual developed by Beijing Cancer Registry^[5]. Re-checking the medical records was done to correct the possible error, including illogical items between cancer site and sex, cancer

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site and histological diagnosis, age and date of birth, etc. The software of IARCrgTools 2.04 recommended by International Agency for Research on Cancer (IARC) was used to evaluate the validity and concordance between the site of cancer and morphology categories^[6].

Population Data

Beijing Municipal Bureau of Statistics completed periodic censuses in 1990 and 2000, respectively. Based on this data of age-specific birth rate and sex ratio of the new born infants, Leslie matrix was used to forecast age-specific population data for each 5 year of 1998-1999 and 2001-2002^[7]. During 2003-2007, age-specific population data for each year were provided by government's population registry, which registered all birth and death cases. Our surveillance data covered 68,704,429 urban people in 10 years (male: 34,906,580 and female: 33,797,849).

Statistical Analysis

Classification of the primary site of malignancies was coded according to the 10th revision of the International Classification of Diseases (ICD-10), and morphology categories were derived from the 2th revision of the International Classification of Diseases for Oncology (ICD-O-2).

The number of the cases, crude incidence rates, cumulative incidence rates, truncated rates (35-64 years old), age-standardized incidence rate adjusted by the world standard population were calculated with the HIS in Beijing Health Bureau^[8]. To identify the annual percentage change (APC) for all cancer types, we carried out join-point regression analysis using Join-point Installation 3.4.3 developed by the National Cancer Institute in the U.S.A, weighted by the rate of cancers. A significance level of 0.05 (two tailed) was used for all analyses.

RESULTS

Crude Incidence Rates of the Cancers

From 1998 to 2007, a total of 156,851 new cancer patients (males: 82,557, females: 74,294) were found from 68,704,429 person-years in urban Beijing (Table 1). The crude incidence rate of all combined cancers was 228.30 per 100,000 (male: 236.51 per 100,000, female: 219.82 per 100,000) in the past 10 years. Among the patients aged 0-74, the cumulative incidence rate and truncated rate (35-64 years) were 16.92% and 226.23 (per 100,000), respectively.

The malignancy with the highest incidence rate (per 100,000) among males was lung cancer (58.28), followed by cancers of colorectal (28.12), liver (25.27), gastric (24.83) and esophagus (13.59). The rate of colorectal cancer rose from the fourth place to the second and prostate cancer rose from the tenth to the fifth during 10 years. During the same period, the five most common cancers were breast (50.01), lung (36.99), colorectal (24.28), gastric (11.46) and ovarian (10.13) among females. The rate of ovarian cancer rose from the sixth place to the fifth and thyroid cancer rose from the sixteenth to the seventh. In contrast, liver cancer declined from the fifth to the eighth.

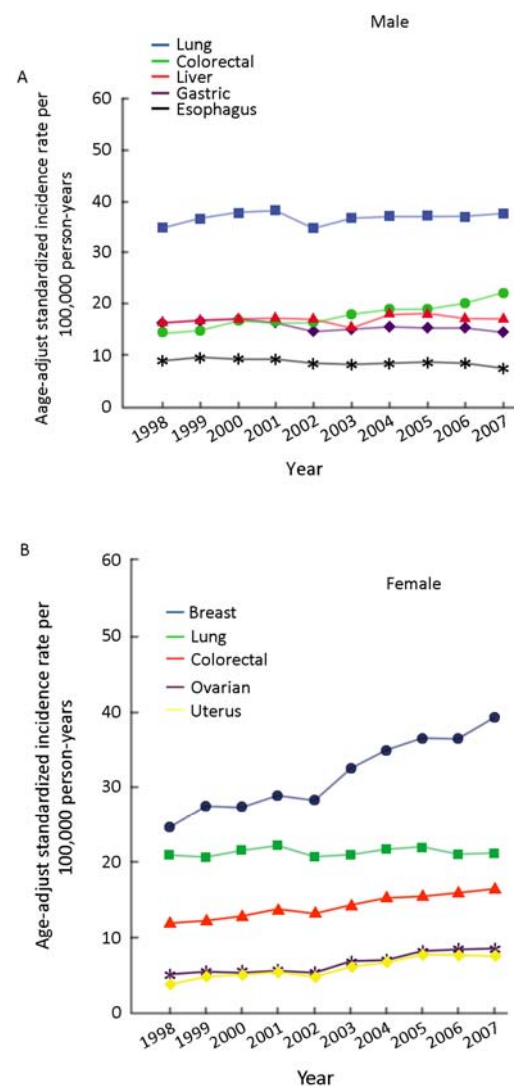


Figure 1. Incidence rates of the five most common cancers in urban Beijing, 1998-2007. A: The cancers in male; B: The cancers in female.

Time Trends of Cancer Incidence

The age-adjusted incidence rate by world standard population among men for all the cancers combined increased 18.61%, from incidence rate of 142.73 (per 100,000) to 169.29 with an APC of 2.23% (Table 1 and Figure 1). For women, the extent of the increase rate was 32.09% and incidence rate increased from 119.22 to 157.47, with an APC of 3.74%. Both APCs showed a statistical significance during the observed time period.

For the digestive system cancers, the malignancy of colorectal has been grown rapidly and increased by 40.14% with an APC of 4.08% (4.38% for men and 3.69% for women) in the last decade. The same results were noted in gallbladder and oropharyngeal cancers, with an APC of 3.26% (2.92% for men and 3.64% for women) and 4.61% (3.49% for men and 6.46% for women), respectively.