

Chapter  
IV

# PROJECTION OF CANCER PROBLEMS



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PROBLEMS*Hutcha Sriplung, M.D.*

Until 2003, four cancer registries in Thailand have been working for more than 10 years. Though Lampang registry has not completed 10 years of activity, it retrospectively collected the data from 1989. This enables projection of cancer trend beyond the year 2000.

There have been a lot of changes in environmental and lifestyle factors in Thai population. The momentum of change has been moving from the capital, Bangkok, to big cities such as the municipalities of Chiang Mai, Khon Kaen, and Hat Yai in Songkhla, and to suburban and rural levels. Though people in rural areas in different parts of Thailand are still resistant to such changes, they are gradually forced to acquire modern life through better transportation, communication, and public media. Influences of radio and television programmes cannot be underestimated. People are forced to move into big cities for better jobs and opportunities. Changes in these factors in the past decades affects cancer incidence in the recent years. Though it is not possible to project cancer incidence providing the change in exposure factors, the trend can be estimated by the change in incidence of cancer in the near past.

Scanning through the incidence of cancers in the past decade, the evidence is clear that some cancers show an increasing trend and some are not changing or even seem to be decreasing. Statistical modeling of the trend is needed for projection of cancer problems in the near future.

**PROJECTION METHOD****DATA SOURCES**

Incidence rates in periods

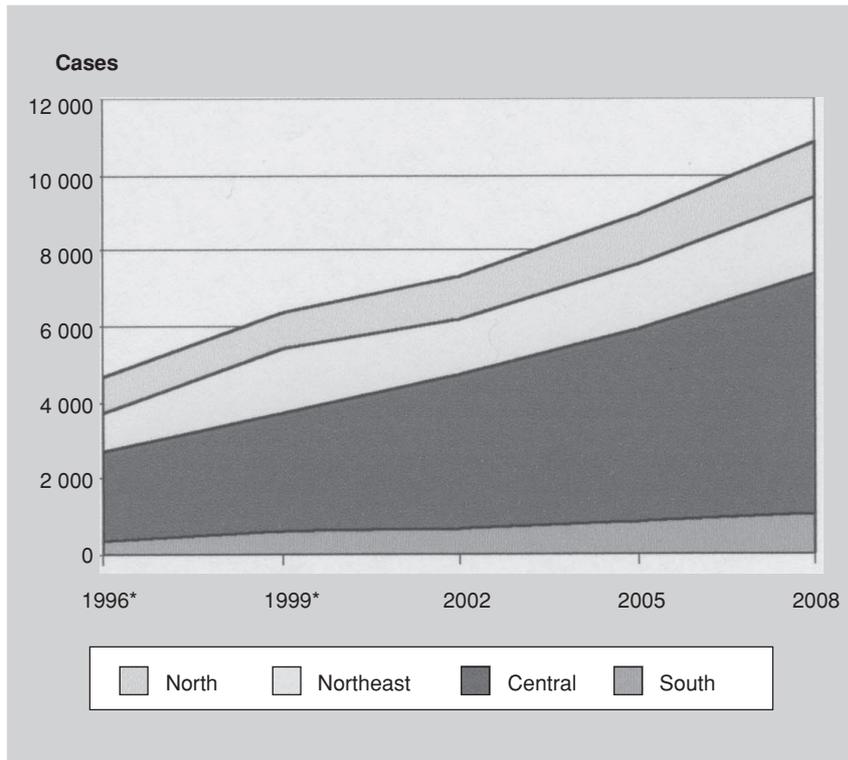
1995-1997 and 1998-2000 are those shown in the Appendices. The rates in periods 1989-1991 and 1992-1994 are recalculated using population denominators estimated from the 1990 and 2000 censuses as mentioned in Chapter I, Statistical Methods (page 5). The rates are slightly different from those published in the two previous volumes of Cancer in Thailand by two factors. One is the fact that cancer registry databases are regularly updated by registry staff and another is the change in population denominators used to calculate the rates. In Cancer in Thailand volume I, the population data available was the population projection from the 1990 census by the National Statistical Office (National Statistical Office, 1992), and in Cancer in Thailand volume II, the population denominators used for the calculation of rates were from the Population Projections for Thailand 1990-2020 (Human Resources Planning Division, 1995). The difference of the recalculated incidence rates is so slight that they are not shown here.

Only common cancer sites - liver, lung, colon-rectum, cervix uteri, and female breast were selected for trend projection for the sake of public health impact. The trend of all cancer sites was also projected.

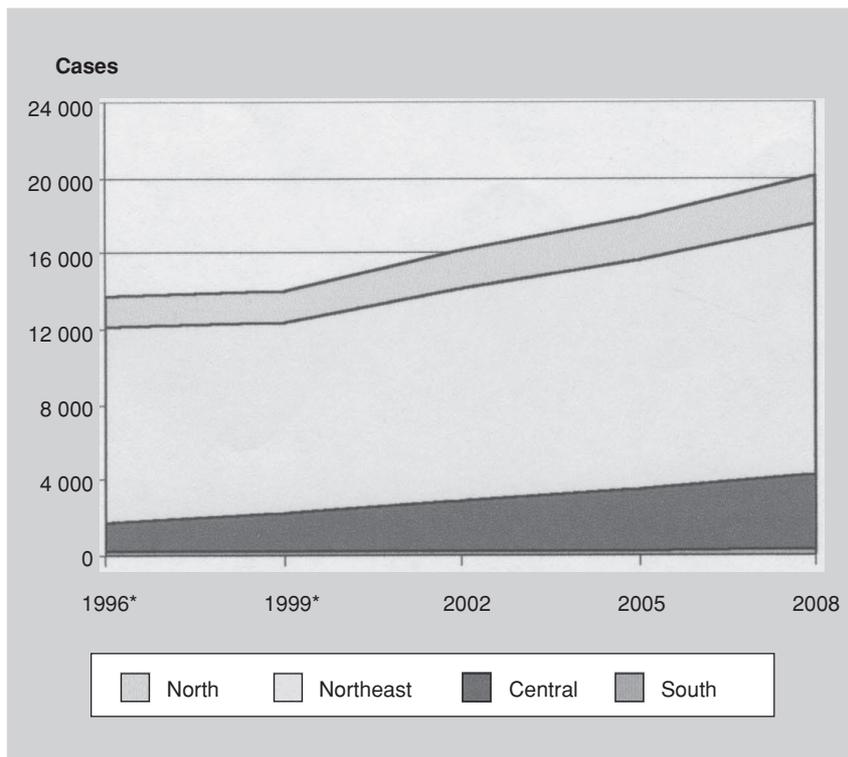
**STATISTICAL METHOD**

Age-specific incidence rates of each 5-year age group in the periods 2001-2003, 2004-2006, 2007-2009 in all registries were projected from the rates in the four previous periods except Bangkok registry where the rates in the period 1998-2000 had to be projected since the observed rates were not available.

**Figure 4.1** Projection of colon-rectum cancer cases, both sexes



**Figure 4.2** Projection of liver cancer cases, both sexes



A linear regression model was used when the trend was increasing and a logarithmic regression model was applied when it was a declining trend to prevent a negative age-specific incidence rate. Age-standardized incidence rates (ASR) for cancer sites were calculated but not shown here.

The population in four regions in Thailand for future time periods by 5-year age group was projected based on the 1990 and 2000 censuses using a log-linear model. Expected cancer cases for each region were calculated based on the age specific incidence rates and the population in each 5-year age group. The incidence rates in Chiang Mai and Lampang were used for the calculation of expected cancer cases in the northern region. Khon Kaen was the representative of the North-eastern region. Bangkok was used to represent the Central region, and the Southern region was represented by Songkhla. All the cases were added to make the expected number of cancer cases for the whole Kingdom of Thailand in future time periods.

### RELIABILITY OF PROJECTIONS

Reliability of projections depends largely on the quality of data in five registries. A continuously declining trend in incidence of most cancer sites in Chiang Mai while an increasing trend was observed in most cancer sites in Lampang reflects some degree of under-ascertainment of cancer cases in Chiang Mai registry. A steep increase in incidence in Bangkok registry can be explained by an improvement of case collection in recent years.

Some registries are not good representatives for the region.

Bangkok is a unique city and differs in many aspects from other provinces in the Central region. Songkhla is on the Malaysia border and the people may be slightly different from the rest in the Southern region.

Despite the possible imprecision of trend projection mentioned above, a figure of cancers in the present decade is informative enough for public health policy planning.

### RESULTS

Cancer of the colon and rectum is increasing rapidly in both sexes. Over 10 000 new cases are expected in 2008 (Figure 4.1). The largest proportion of cases is in the central region. The rate of increase is greater in the Central region than the others. It might not be that much since a rapid increasing trend of Bangkok can be an artifact as mentioned above. However, an increasing trend is not objected.

Liver cancer is expected to continuously increase in both sexes and over 20 000 new cases are expected in 2008 for the whole country (Figure 4.2). The largest proportion is expected in the North-eastern region, accounting for approximately 64%, followed by the Central and Northern regions. Though the incidence rate of liver cancer in males in the North-eastern region is expected to be decreasing, the expected number of cases continues to slightly increase due to an expansion of the population. The incidence of liver cancer in the Northern and Central regions is expected to be increasing. The trend is slightly declining in the South since most of cases are hepatocellular carcinoma which is ex-

Figure 4.3 Projection of lung cancer cases, both sexes

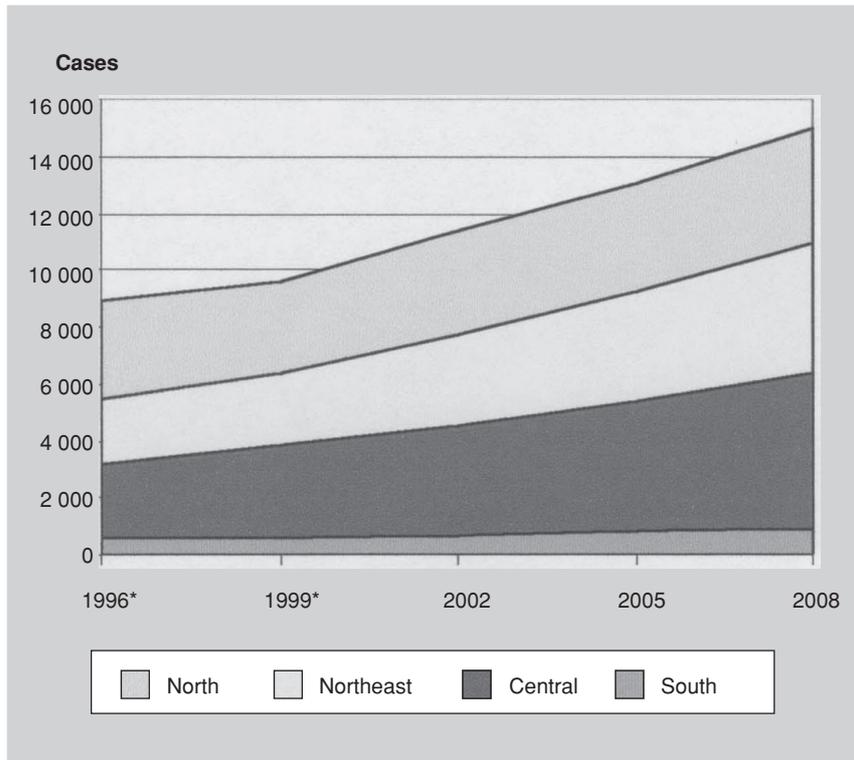


Figure 4.4 Projection of cervix uteri cancer cases

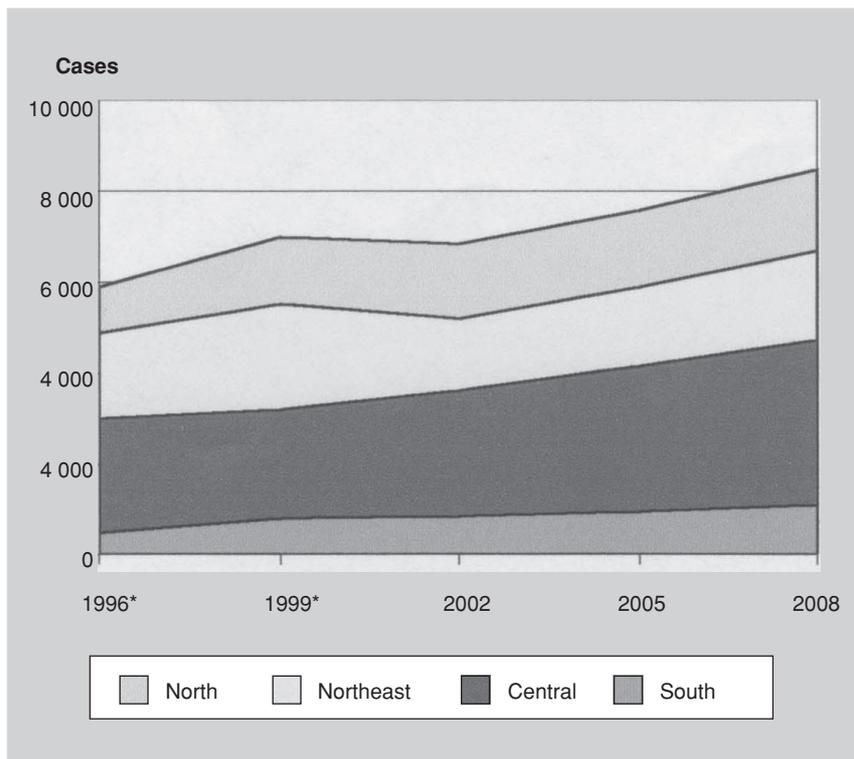


Figure 4.5 Projection of female breast cancer cases

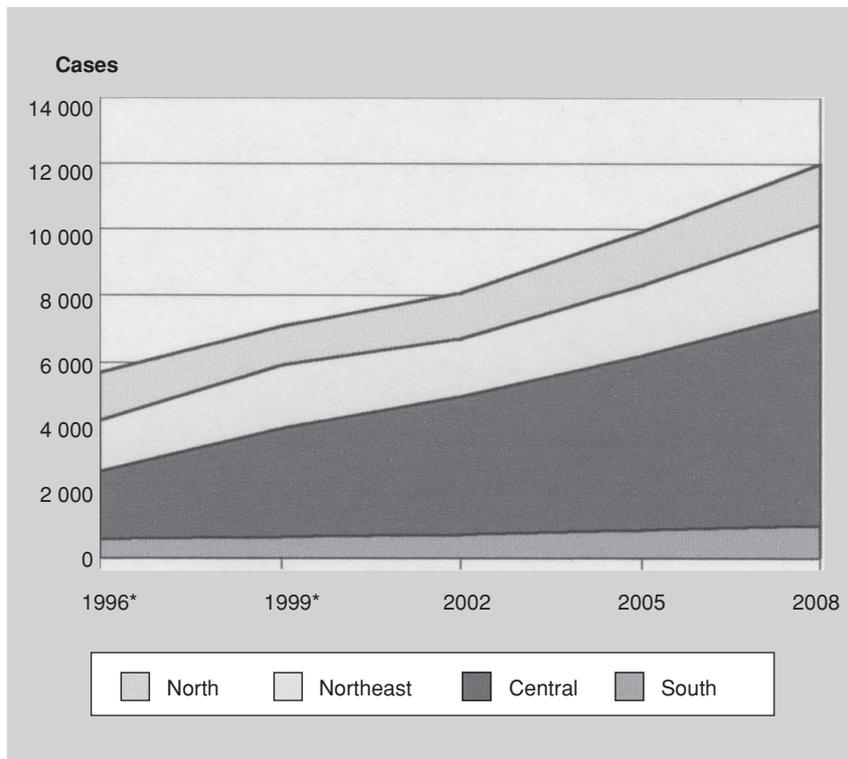
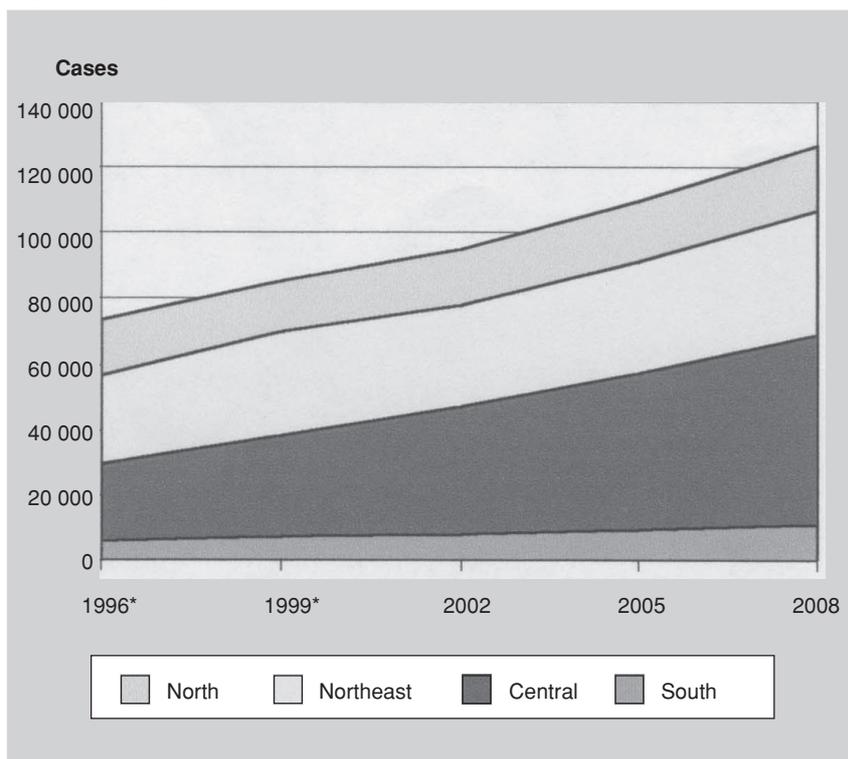


Figure 4.6 Projection of all cancer cases, both sexes



pected to be effectively controlled by the screening programme for hepatitis B virus in blood transfusion.

Though the highest incidence rate of lung cancer in both sexes is observed in the Northern region, a large proportion of population in the Northeastern and Central regions makes the number of cancer cases in the two regions not different from that in the North (Figure 4.3). Approximately 15 000 new lung cancer cases are expected in 2008.

Both incidence rate and number of new case of cervical cancer are increasing. Over 8 000 new cases are projected in 2008 for the whole country (Figure 4.4). The largest proportion of cases is in the Central region, though the incidence rate is higher in the North. The projection can be underestimated if the population-wide screening programme for the cancer is successfully implemented.

The incidence rate of breast cancer is rapidly increasing in Thailand. The number of 12 000 new cases per year expected in 2008 (figure 4.5) is greater than that of cervical cancer. The largest proportion is observed in the Central region. However, this figure can be overestimated since Bangkok, as mentioned above, is not a good proxy of the region.

Over 120 000 new cancer cases are projected by the end of the first decade of the 21st century (figure 4.6). This number reflects approximately 50% increment rate per 10 years. The consistently low number of new cases in the Southern region is due to the lower incidence rate of cancers and the smallest proportion of population in the region.