

Chapter 1

POPULATION AND CANCER INCIDENCE

The major concern of population based cancer registries (PBCR) is to calculate cancer incidence rates, study the rates of individual cancers by comparing cancer incidence and patterns in other registries and in different subgroups of population in respective areas.

The population based cancer registration data can be used to describe the magnitude of cancer burden in the community, for aetiological studies, monitoring and assessing the effectiveness of cancer control activities.

Geographical area and population at risk

Table 1.1 illustrates the geographical area, the number of male and female population covered by eight respective PBCRs. The average population covered per year ranged from 5 lakhs in Barshi to 152 lakhs in Delhi registry.

Cancer incidence- All sites (ICD-10: C00-C96)

Cancer incidence refers to new cases of cancer diagnosed in a given population during a specified time period. Incidence data given in this report are based on cancers diagnosed during the period of 1 January 2004 to 31 December 2005. The annual average incidence and mortality rates are provided. For Kolkata PBCR the number of cases are based on the period 1 January 2005 to 31 December 2005. Table 1.2 shows the number of cases registered during the respective periods by gender in different registries. The maximum number of cases were registered from the registry of Delhi (23,407) followed by Mumbai (19,784), Bangalore (10,246), Chennai (9,413), Kolkata (3,667), Bhopal (2,154), Ahmedabad district (other than Ahmedabad urban) (1,422) and Barshi (507). From Table 1.2 it can be inferred that cancer cases in males were more than females in Bhopal, Delhi, Ahmedabad, and Kolkata registries whereas female cancer cases were more than males in Bangalore, Barshi, Chennai and Mumbai registries. Overall, from the eight registries, 70,600 cancer cases were registered - out of which 35,061 (49.66%) were males and 35,539 (50.34%) were females.

Table 1.3 and figure 1.1 provide the Crude rates (CR), Age adjusted rates (AAR) and Truncated rates (TR) of the eight registries.

Crude rate (CR)

The highest CR per 100,000 population among males was observed in Chennai (97.2) followed by Kolkata (74.5), Delhi (72.8), Mumbai (68.3), Bangalore (68.1), Bhopal (61.6), Ahmedabad district (other than Ahmedabad urban) (49.9) and Barshi (45.3). Similarly among females the highest CR was observed in Chennai (109.8) followed by Bangalore (91.4), Mumbai (87.5), Kolkata (84.0), Delhi (82.4), Bhopal (67.4), Barshi (54.0) and Ahmedabad district (other than Ahmedabad urban) (37.0).

TABLE 1.1: Area Covered and person years (Combined population of two years) for all PBCRs (2004-2005)

Registry	Area (sq.km.)	Male	Female	Total Population
Bangalore	365.7	6778226	6159087	12937313
Barshi	3713.4	533808	490540	1024348
Bhopal	284.9	1762619	1585338	3347957
Chennai	170.0	4632175	4474636	9106811
Delhi	891.1	16683522	13654873	30338395
Mumbai	603.0	14255159	11492903	25748062
Ahmedabad	7677.0	1705942	1543815	3249757
Kolkata *	185.0	2524127	2126319	4650446

TABLE 1.2: Total Number of Cases Registered for all PBCRs (2004-2005)

Registry	Male	Female	Total Cases
Bangalore	4619	5627	10246
Barshi	242	265	507
Bhopal	1085	1069	2154
Chennai	4501	4912	9413
Delhi	12151	11256	23407
Mumbai	9731	10053	19784
Ahmedabad	851	571	1422
Kolkata*	1881	1786	3667
All Registries	35061	35539	70600

TABLE 1.3: Crude Rate (CR), Age Adjusted (AAR) and Truncated (TR) Incidence Rates per 100,000 population in different PBCRs (2004-2005)

Registry	Males			Females		
	CR	AAR	TR	CR	AAR	TR
Bangalore	68.1	99.4	147.7	91.4	120.8	239.8
Barshi	45.3	49.2	93.4	54.0	59.9	152.0
Bhopal	61.6	93.6	156.1	67.4	96.1	206.0
Chennai	97.2	110.4	198.3	109.8	119.7	257.4
Delhi	72.8	119.5	203.5	82.4	117.1	253.1
Mumbai	68.3	97.6	149.0	87.5	103.5	204.4
Ahmedabad	49.9	67.5	132.7	37.0	43.1	97.4
Kolkata *	74.5	71.9	129.0	84.0	79.2	174.6

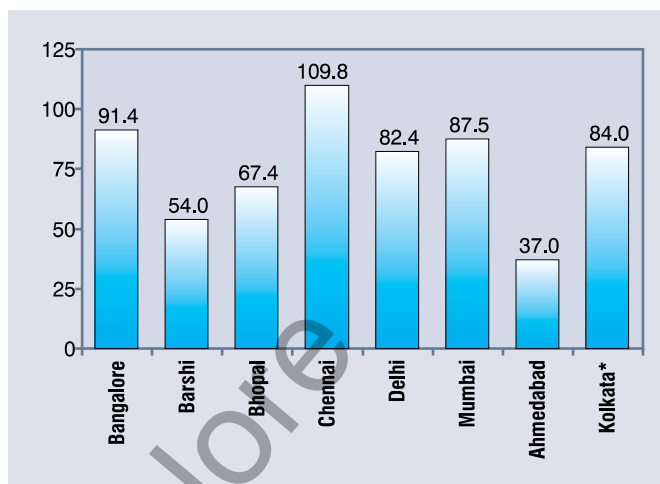
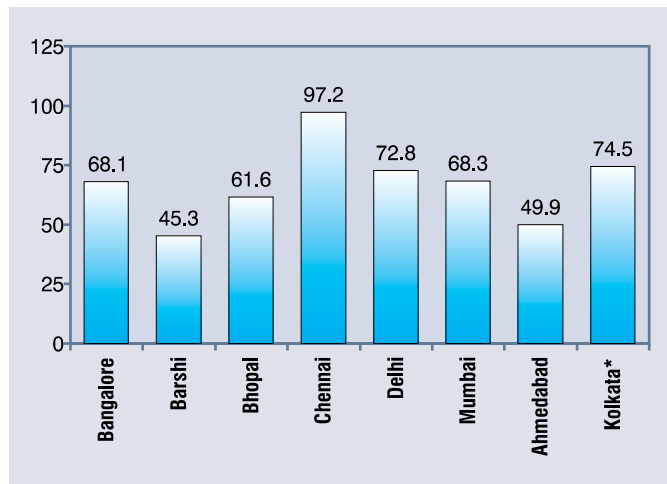
* only 2005 data.

**Fig. 1.1 : Average Annual Crude, Age Adjusted and Truncated Incidence Rates
All Sites of Cancer (ICD-10) : C00-C96**

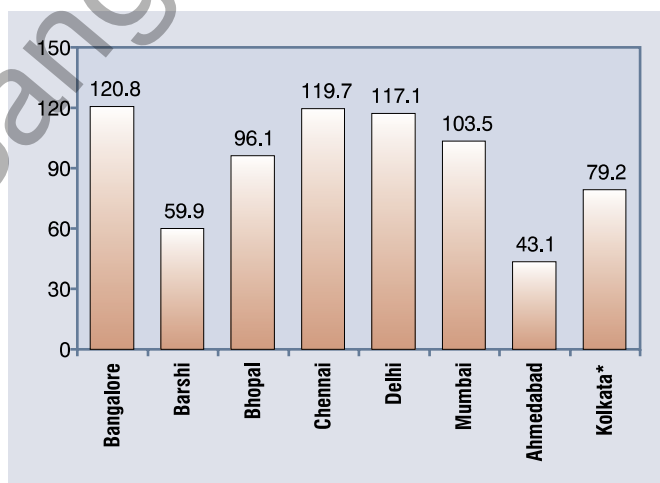
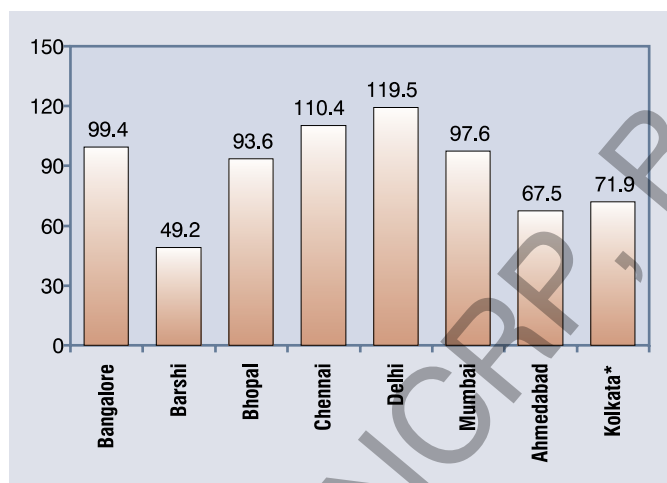
MALES

FEMALES

Crude Rate



Age Adjusted Rate



Truncated Rate

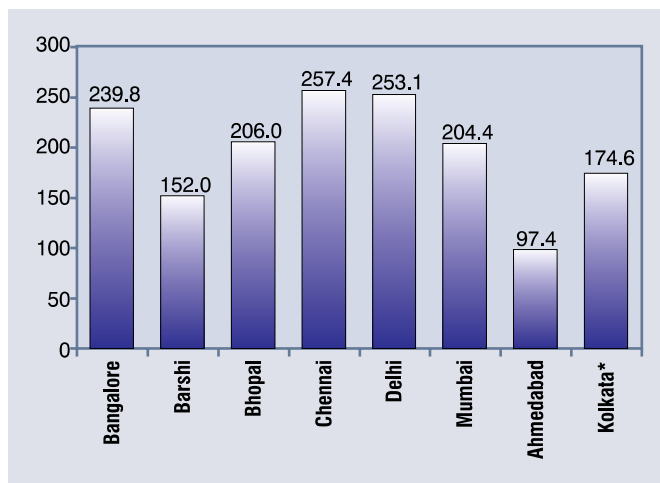
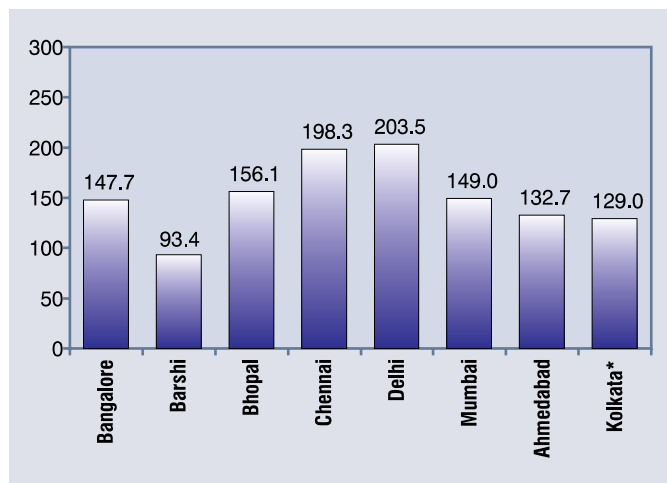
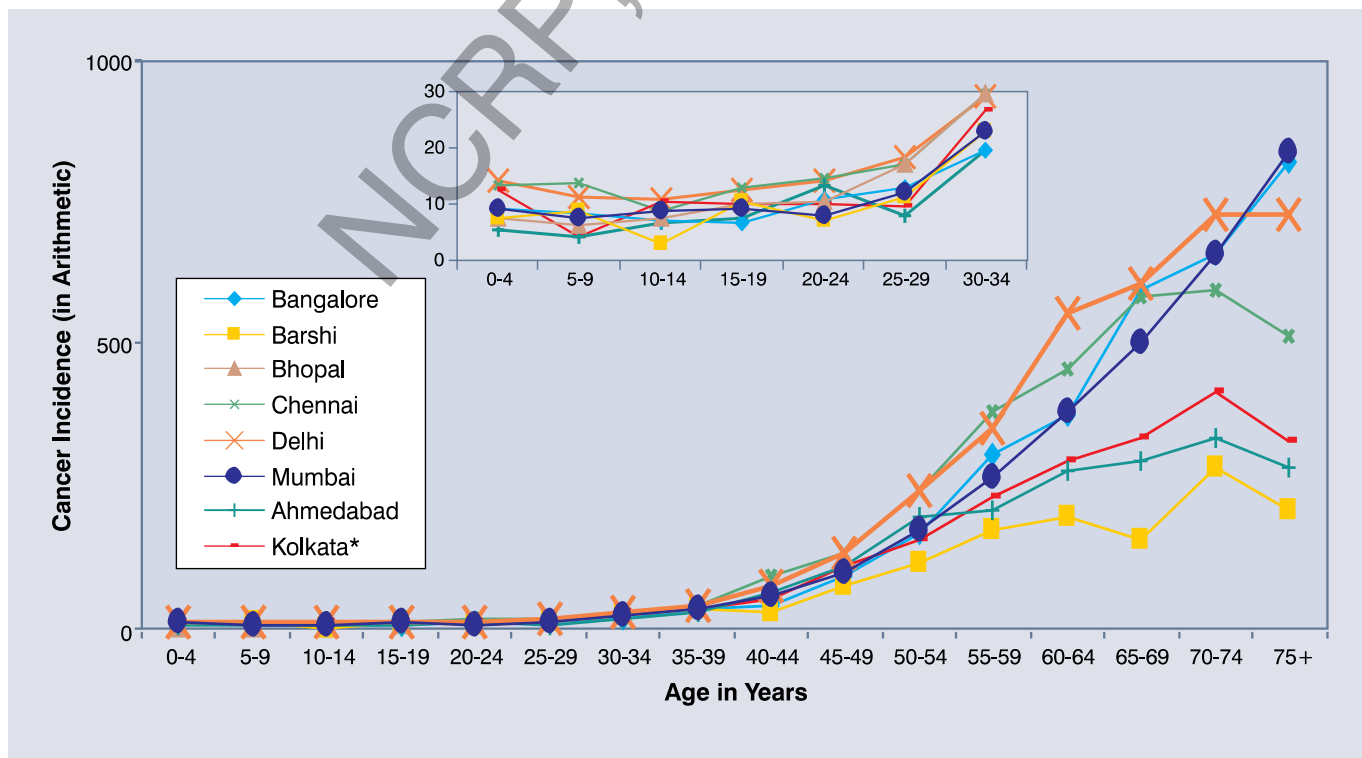
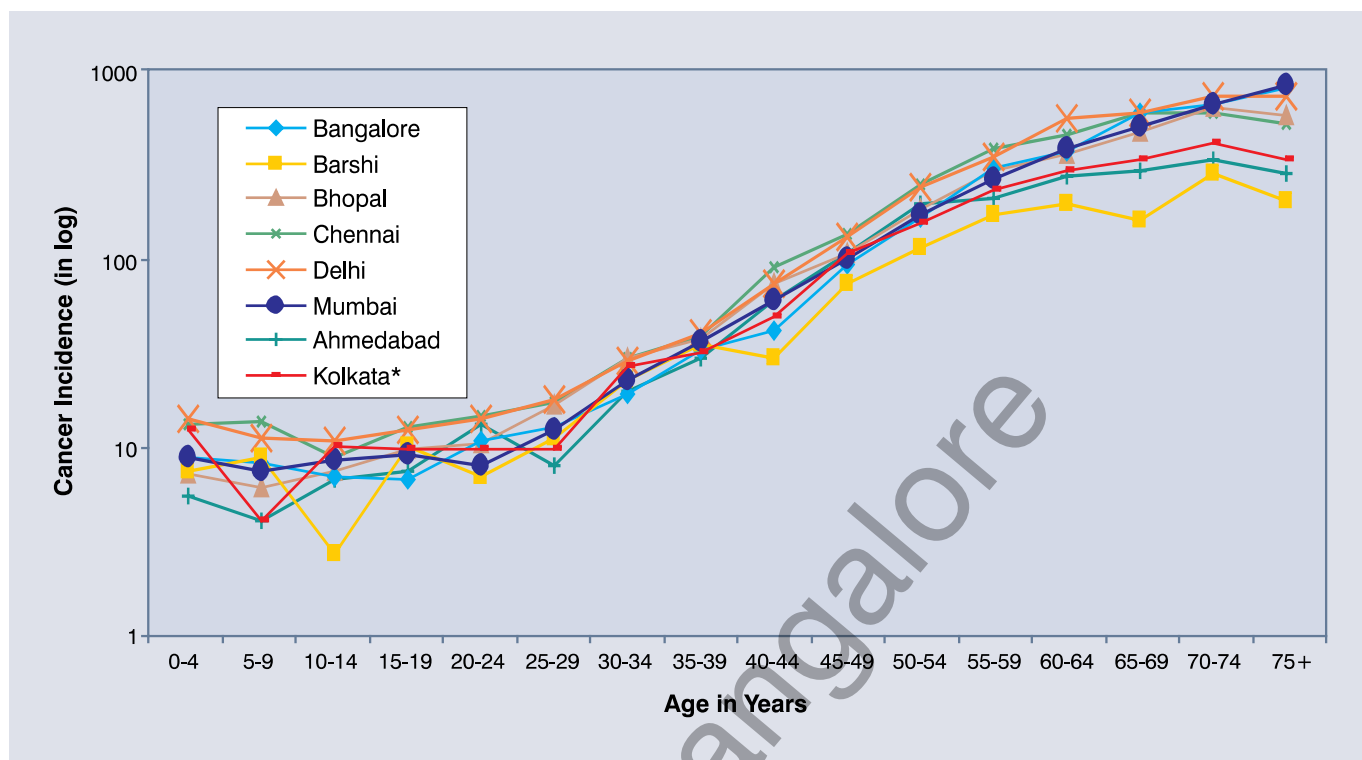


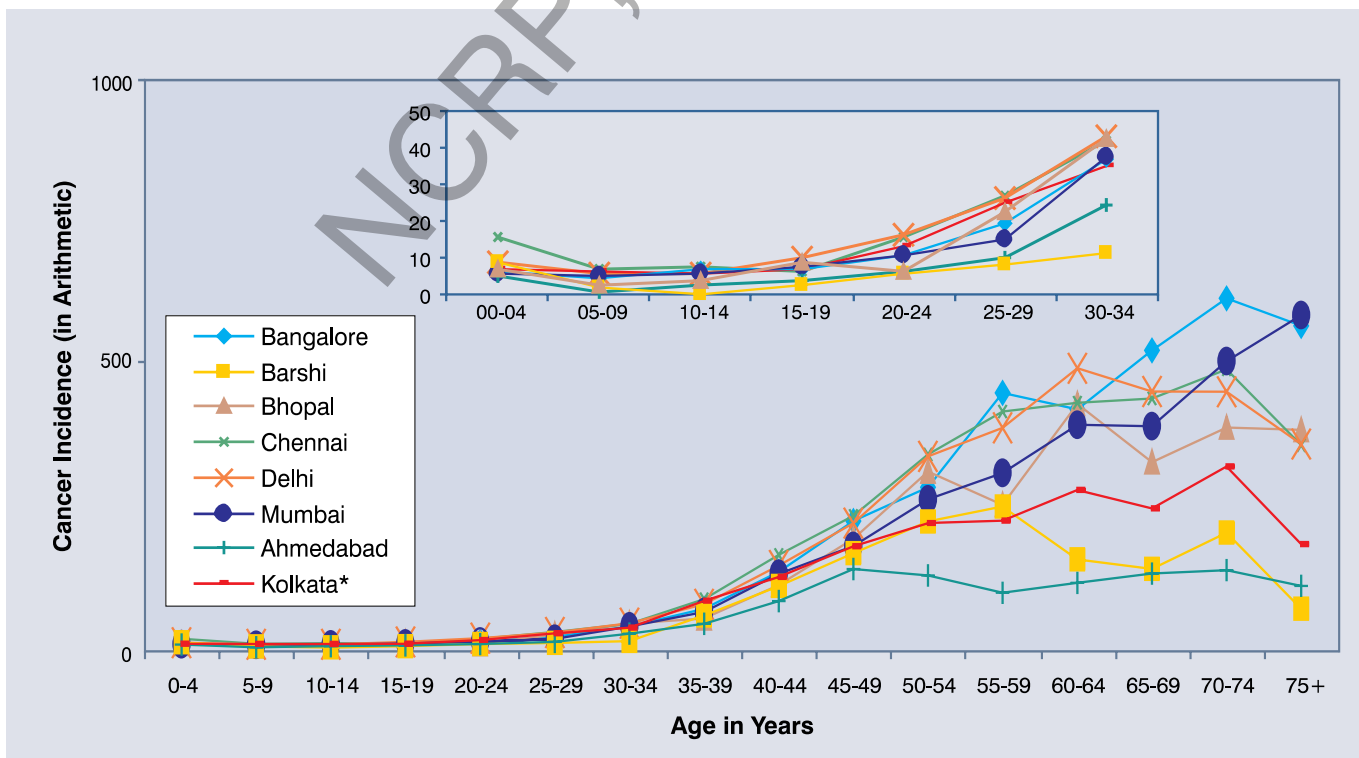
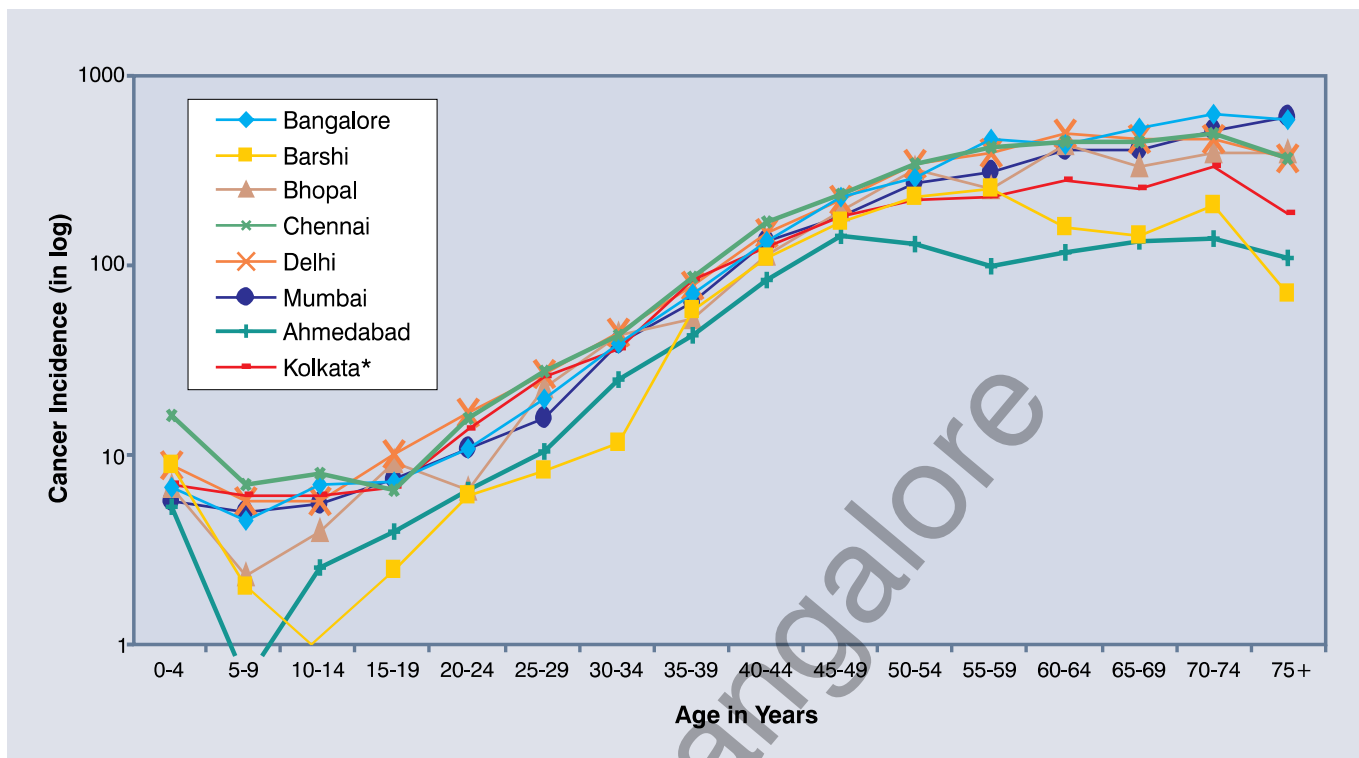
Fig. 1.2(a): Average Annual Age Specific Cancer Incidence Rates - All Sites of Cancer for all PBCRs

MALES



**Fig. 1.2(b): Average Annual Age Specific Cancer Incidence Rates
All Sites of Cancer**

FEMALES



Age adjusted rates (AAR)

In males, AAR per 100,000 population ranged from 49.2 in Barshi to 119.5 in Delhi. Of all the eight PBCRs Delhi had the highest AAR.

In females, AAR per 100,000 population ranged from 43.1 in Ahmedabad district (other than Ahmedabad urban) to 120.8 in Bangalore. Bangalore had the highest AAR closely followed by Chennai (119.7).

Truncated rates (TR)

In males, the TR per 100,000 population ranged from 93.4 in Barshi to 203.5 in Delhi. Similarly, in females, it ranged from 97.4 in Ahmedabad district (other than Ahmedabad urban) to 257.4 in Chennai.

Age specific incidence rates

Figures 1.2(a) and 1.2(b) show that age specific incidence rates increase with increase in age in all registries. Further, after 30 years of age, the average annual age specific incidence rates increased both in males and females.

Cumulative rate and risk

Day (1987) proposed the Cumulative rate as another age standardised incidence rate.

The Cumulative risk is the probability that an individual will be diagnosed with cancer during a certain age period in the absence of any competing cause of death and assuming that the current trends prevail over the time period.

For practical purposes, Cumulative rate is a good approximation of Cumulative risk over the defined period of time. Cumulative rate is the sum of age specific incidence rates over a certain age range. This can be estimated from age specific incidence rates either for the five year age group from 0-64 years or 0-74 years .

Since the average life expectancy of the population of India has gone up, one would have to examine the estimates obtained from both the calculations. In this report, 0-64 years and 0-74 years are used as an approximation for an average lifetime for calculating the Cumulative rate and risk. Both the cumulative rate and cumulative risk of different registries are tabulated in Table 1.4 for both the genders and for the 0-64 and 0-74 years age group.

Cumulative risk(%) in 0-64 years

Among males, except for the registry of Barshi the cumulative risk ranged from 4.6% in Ahmedabad and Kolkata to 7.2% in Delhi. This cumulative risk(%) gives an idea about a person developing cancer during the life period of 0-64 years of age e.g., like in Ahmedabad district (other than Ahmedabad urban) 4.6% of males in the age group of 0-64 years are likely to develop cancer in their life time. In Barshi the cumulative risk was 3.4%.

Among females, except for the registry of Ahmedabad district (other than Ahmedabad urban) the cumulative risk ranged from 4.9% in Barshi to 8.6% in Chennai. This means on an average about 8.6% of

TABLE 1.4: Cumulative Incidence Rate, Cumulative Risk & Possibility of one in number of persons developing Cancer of any Site (ICD-10): C00-C96 for all PBCRs (2004-2005)

Calculation based on age specific rates from 0-64 and 0-74 years of age

Registry	Cumulative Rate (%)		Cumulative Risk (%)		Possibility of one in number of persons developing cancer	
	Males	Females	Males	Females	Males	Females
<i>0-64 yrs</i>						
Bangalore	5.5	8.3	5.3	8.0	19	13
Barshi	3.5	5.0	3.4	4.9	29	21
Bhopal	5.7	7.2	5.6	6.9	18	14
Chennai	7.3	9.0	7.0	8.6	14	12
Delhi	7.5	8.9	7.2	8.5	14	12
Mumbai	5.5	7.1	5.3	6.9	19	15
Ahmedabad	4.7	3.3	4.6	3.2	22	31
Kolkata *	4.7	6.0	4.6	5.8	22	17
<i>0-74 yrs</i>						
Bangalore	11.7	14.0	11.1	13.1	9	8
Barshi	5.7	6.7	5.5	6.5	18	15
Bhopal	11.2	10.8	10.6	10.2	9	10
Chennai	13.2	13.6	12.3	12.7	8	8
Delhi	14.2	13.4	13.2	12.5	8	8
Mumbai	11.3	11.6	10.6	10.9	9	9
Ahmedabad	7.9	4.6	7.6	4.5	13	22
Kolkata *	8.5	8.8	8.2	8.5	12	12

* only 2005 data.

females in 0-64 age group are likely to develop cancer in their life time in Chennai. In Ahmedabad district (other than Ahmedabad urban), the cumulative risk was 3.2%.

Cumulative risk(%) in 0-74 years

Among males, the cumulative risk(%) in the 0-74 year age group ranged from 10.6 in Mumbai and Bhopal to 13.2 in Delhi. Among females, the cumulative risk percentage in the 0-74 age group ranged from 10.2 in Bhopal to 13.1 in Bangalore. In males and females, in rural registry of Barshi and the newer registries of Ahmedabad and Kolkata the cumulative risk in the age group was found to be below 10.0. Since the registry at Barshi covers a small population and the PBCRs at Ahmedabad and Kolkata are new, the cumulative rate and risk in these places should be examined with caution.

In both males and females, the cumulative risk (%) in the 0-74 years age group was almost double that seen in 0-64 years age group.