

# Chapter 2

## DATA AND METHODS

The numerator data of all registries has undergone a series of range and consistency checks each year and again before preparing this report. Clarifications were sought wherever required from the respective PBCRs and the data finalised thereafter.

This report is based on the data of the following PBCRs:

1. Six older PBCRs, viz., Bangalore, Barshi, Bhopal, Chennai, Delhi, Mumbai. The first and earlier report on trends in incidence rates over time (NCRP, 2009) was brought out from the incidence data of only these six PBCRs.

This second report on time trends comprises data from the following additional PBCRs:

2. Seven new PBCRs, viz., Dibrugarh, Kamrup Urban, Imphal West, Mizoram, Sikkim, Ahmedabad Rural and Thiruvananthapuram consisting of data for at least 7 calendar years.
3. More recent PBCRs at Kolkata, Ahmedabad Urban, Kollam consisting of data ranging from 2005-2010 years.

The calendar years of data for which the incidence data has been used for each PBCR is given below:

1982-2009/10	1988-2009/10	2003-2010/11	2004-2010
<i>Bangalore</i>	<i>Delhi</i>	<i>Imphal West District</i>	<i>Ahmedabad Rural</i>
<i>Chennai</i>	<i>Barshi</i>	<i>Mizoram State</i>	
<i>Mumbai</i>	<i>Bhopal</i>	<i>Dibrugarh District</i>	
		<i>Kamrup Urban District</i>	
		<i>Sikkim State</i>	
2005-2009/10/11	2006-2010		
<i>Kolkata</i>	<i>Ahmedabad Urban</i>		
<i>Nagpur</i>	<i>Kollam</i>		
<i>Aurangabad</i>	<i>Pune</i>		
<i>Thiruvananthapuram</i>			

In determining the significance of trends, the actual value of the AAR for single year, three year range, three year moving average and five year range has been used. This significance of time trend in each PBCR was assessed based on the methods and formula provided by Boyle and Parkin, 1991. In addition, for single year the Joinpoint Regression Program (see below) of the NCI of USA has been used (Kim *et al*, 2001).

For all the PBCRs single year linear trends as well as Joinpoint regression models have been used. In addition, for the older PBCRs (No. 1 above) trends for three year and five year annual average AARs and for the newer PBCRs (No. 2 above) the three year moving average AARs has been done.

### About Joinpoint Regression Program

Joinpoint Regression Program, Version 4.0.1, is a statistical software for the analysis of trends using Joinpoint models, that is, where several different regression lines are connected together at the “Joinpoints”. Cancer trends reported in NCI publications are calculated using the Joinpoint Regression Program to analyse rates calculated by the SEER. The software takes trend data (e.g. cancer rates) and fits the simplest Joinpoint model that the data allow. The user supplies the minimum and maximum number of Joinpoints. The program starts with the minimum number of Joinpoints (e.g. 0 Joinpoint, which is a straight line) and tests whether more Joinpoints are statistically significant and must be added to the model (upto that maximum number). This enables the user to test that an apparent change in trend is statistically significant. The tests of significance use a Monte Carlo Permutation method. The models may incorporate estimated variation for each point (e.g. when the responses are age adjusted rates) or use a Poisson model of variation. In addition, the models may also be linear on the log of the response (e.g. for calculating annual percentage rate change). The software also allows viewing one graph for each Joinpoint model, from the model with the minimum number of Joinpoints to the model with the maximum number of Joinpoints (Kim *et al*, 2001). For the report purposes, one Joinpoint model wherever feasible has been fitted to the data. It may be pointed out that whenever a strong linear trend exists in the data the one Joinpoint model results will tally exactly with that of linear regression method.

While depicting the results of specific anatomical sites of cancer in Chapter 4, those sites with fewer than 10 cases for any given year have been excluded.

The difference distribution method (*Takiar & Shobana, 2009*) for estimating the calendar year-wise denominator population by five year age group has been used. This was based on the census data of 1981, 1991 and 2001 (Census of India, 1981, 1991, 2001).

The data and the methods used for projecting the burden of cancer are given in Chapter 5 along with tables of projections.

“The practice of medicine is an art, not a trade; a calling, not a business; a calling in which your heart will be exercised equally with your head.”

**Sir William Osler** (1849-1919)  
Canadian Physician