Chapter 9

DATA QUALITY AND INDICES OF RELIABILITY

The objective of this chapter is to provide an assessment of the quality of the data and the completeness of coverage of cases in a given registry area.

Newer PBCRs

The data of the newer PBCRs that are being reported for the first time in this report are Naharlagun PBCR including Papumpare District and Naharlagun excluding Papumpare District, Pasighat PBCR (East Siang District + Upper Siang District) and Patiala PBCR. Care has been taken to ensure that these registries have complied with quality of data in terms of actual data collation from various sources of registration of their cases, duplicate elimination and the characteristics of the data submitted (Parkin *et al.*, 1994). This has been doubly checked for the considerable high incidence rates reported for certain sites of cancer in Papumpare District. The results are along the lines of the cancer atlas and North East cancer atlas report published earlier. Nonetheless, a certain degree of discretion may be used in interpreting and drawing conclusions.

Significant Change in AARs

The 2011 census population has been used in estimating population and rates in this comparison report for data of the years, 2009-2011 and 2012-2014. As far as Kamrup Urban PBCR is concerned, the 2001 estimates have been used to calculate the AARs for 2009-2011 as well as 2012-2014. Nagaland PBCR's population has been estimated using 1991 and 2011 census to get the mid-year population of 2009-2011 and 2012 to 2014.

Among males, the AARs of Aurangabad, Mumbai, Wardha District, Kamrup Urban District, Meghalaya, Delhi, Mizoram State, Pune and Bangalore have shown a significant increase whereas the AAR of Manipur state has shown a significant decline in AARs. A decline reflects either incomplete coverage and / or changes in population dynamics.

Among females, the data from Aurangabad, Nagaland, Dibrugarh District, Meghalaya, Delhi, Wardha District, Kamrup Urban District, Kollam District and Mumbai registries show a significant increase in AARs.

Checks on Quality of Data

The registry data undergoes several quality checks, both, at the time of data entry and subsequently. These include: Range, Consistency, Unlikely and Family checks as per the IARC norms. All the checks are built into the PBCRDM 2.1 and online PBCR data entry application. The list of cases with possible errors is sent back to the respective registries for verification with the original medical records and the corrections received are updated in the registry database. Tables 9.1 to 9.8 provide an insight into the quality of the data of 27 PBCRs after such corrections have been done on the data.

Cancer Incidence in Five Continents CI 5 Vol X published by International Association of Cancer Registries (IARC), has incorporated the data of 11 Indian registries out of the 18 registries that submitted the data. However, the data was included with an asterisk. The presence of an asterisk indicated that additional care was required to interpret the data. All the Indian registries had no official mortality data, a couple of them showed fluctuation in rates from year to year and had high other and unspecified sites.

Cancer registries operating in low- and middle-income settings may face particular challenges to follow international registration standards (Bray *et al*., 2014).

Some of the specific checks that appear important in this context are:

- % Age Unknown <10%

- % Death Certificates Only <10% (0.0% is unacceptable).

- % Other & Unspecified Sites <10%

- % Microscopic verification (MV) >80% (99-100% is unacceptable).

- Stability of incidence rates (the number of new cases) over time thereby disallowing any abrupt trend.

Age Unknown

The number and proportion of cancers with age being unknown in each of the 27 PBCRs is given in Table 9.1. Most of the PBCRs do not have any cases with age unknown. Nonetheless, all the PBCRs are unable to ascertain the date of birth.

Table 9.1: Age Unknown - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	Age Unknown		Registry	Total	Age Unknown	
	#	#	%		#	#	%
Kolkata	5373	32	0.6	Cachar District	4766	1	0.0
Delhi	19746	81	0.4	Mizoram State	4656	1	0.0
Patiala District	6011	17	0.3	Bhopal	3464	1	0.0
Sikkim State	1385	4	0.3	Thi'puram District	15640	0	0.0
Kollam District	11012	15	0.1	Kamrup Urban District	5463	0	0.0
Mumbai	13357	12	0.1	Manipur State	4623	0	0.0
Ahmedabad Urban	9594	11	0.1	Dibrugarh District	2843	0	0.0
Nagpur	4653	4	0.1	Wardha District	2730	0	0.0
Meghalaya	4248	4	0.1	Barshi Expanded	2032	0	0.0
Aurangabad	2241	2	0.1	Naharlagun	1439	0	0.0
Tripura State	6330	2	0.0	Nagaland	1361	0	0.0
Bangalore	8371	1	0.0	Barshi Rural	929	0	0.0
Pune	7103	1	0.0	Pasighat	334	0	0.0
Chennai	11659	1	0.0				

Unspecified or Unknown Duration of Stay at Permanent Place of Residence

A cancer case is accepted as a case belonging to the concerned registry based on the area of living. However, only a personal interview (as opposed to abstraction from records) with the patient or the relative/accompanying person can provide information on the duration of stay at the permanent address. The number and proportion of cases where the duration of stay is unspecified by each registry is given in Table 9.2. More and more cases of cancer are being distributed across many centres in urban cities. Therefore, that much more effort and cooperation of other institutions is needed by the registries to get the desired information, that can only be obtained through personal interview (NCRP, 2006).

Table 9.2: Unspecified (Unsp) / Unknown (Unk) Duration of Stay (DOS) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	DOS Unsp/Unk		Registry	Total	DOS Unsp/Unk	
	#	#	%		#	#	%
Delhi	19746	14037	71.1	Pune	7103	18	0.3
Patiala District	6011	3247	54.0	Aurangabad	2241	7	0.3
Mizoram State	4656	2023	43.4	Thi'puram District	15640	31	0.2
Chennai	11659	4265	36.6	Kollam District	11012	17	0.2
Bhopal	3464	1254	36.2	Ahmedabad Urban	9594	13	0.1
Mumbai	13357	2731	20.4	Cachar District	4766	6	0.1
Barshi Expanded	2032	380	18.7	Nagaland	1361	2	0.1
Bangalore	8371	1506	18.0	Tripura State	6330	1	0.0
Kamrup Urban District	5463	469	8.6	Manipur State	4623	1	0.0
Barshi Rural	929	60	6.5	Dibrugarh District	2843	0	0.0
Kolkata	5373	92	1.7	Wardha District	2730	0	0.0
Meghalaya	4248	52	1.2	Naharlagun	1439	0	0.0
Nagpur	4653	34	0.7	Pasighat	334	0	0.0
Sikkim State	1385	5	0.4				

Microscopic Verification (MV)

The proportion of microscopically verified cases (Table 9.3) is an internationally accepted indicator of data quality. The higher the proportion of microscopically verified cases the more accurate is the confirmation as microscopic verification is the most valid basis of diagnosis of cancer. Still, a very high proportion (above 90-95%) of microscopic diagnosis suggests the likelihood that some cancers with a diagnosis based on imaging techniques and solely clinical diagnoses may be missed by the registry.

Table 9.3: Microscopic Verification (MV) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	MV		Registry	Total	MV	
	#	#	%		#	#	%
Nagaland	1361	1333	97.9	Pune	7103	6105	85.9
Bhopal	3464	3296	95.2	Bangalore	8371	7171	85.7
Tripura State	6330	6002	94.8	Mizoram State	4656	3987	85.6
Naharlagun	1439	1363	94.7	Mumbai	13357	11352	85.0
Aurangabad	2241	2100	93.7	Barshi Rural	929	790	85.0
Pasighat	334	312	93.4	Thi'puram District	15640	13163	84.2
Manipur State	4623	4315	93.3	Kollam District	11012	9213	83.7
Ahmedabad Urban	9594	8786	91.6	Cachar District	4766	3958	83.0
Nagpur	4653	4183	89.9	Kamrup Urban District	5463	4480	82.0
Delhi	19746	17523	88.7	Chennai	11659	9531	81.7
Barshi Expanded	2032	1799	88.5	Dibrugarh District	2843	2266	79.7
Meghalaya	4248	3747	88.2	Patiala District	6011	4529	75.3
Sikkim State	1385	1204	86.9	Kolkata	5373	3969	73.9
Wardha District	2730	2365	86.6				

Death Certificate 'Only' (DCO) Cases

The relative proportion of DCO cases (Table 9.4) is another assessor of data quality. The relative proportion of DCOs should ideally be between 2-3% or at least, less than 5%. It was less than 5% and greater than 0% in 15 of the 27 PBCRs. One PBCR recorded 0% DCO. It was more than 10% in Dibrugarh, Mumbai, Patiala and Kolkata PBCRs. There is a need to follow-back on these cases to the last hospital attended and if necessary make home visits. Investigation into the details of diagnosis especially the date of diagnosis will help ascertain whether the case has been missed or is already present in the incidence records but not picked up during the process of matching. To successfully achieve this in the majority of cases, scrutiny of current deaths mentioned as cancer in the death registers/certificates should be undertaken. This way the exact primary site of tumour would also be obtained in a good number of the cases.

Table 9.4: Death Certificate 'Only' (DCO) Cases - Both Sexes

Number (#) and Relative Proportion (%)

Registry	Total	DCO		Registry	Total	DCO	
	#	#	%		#	#	%
Kolkata	5373	1299	24.2	Pune	7103	281	4.0
Patiala District	6011	1130	18.8	Cachar District	4766	106	2.2
Mumbai	13357	1417	10.6	Nagpur	4653	78	1.7
Dibrugarh District	2843	292	10.3	Pasighat	334	5	1.5
Meghalaya	4248	394	9.3	Bhopal	3464	50	1.4
Kamrup Urban District	5463	489	9.0	Barshi Rural	929	10	1.1
Wardha District	2730	224	8.2	Nagaland	1361	13	1.0
Thi'puram District	15640	1224	7.8	Manipur State	4623	34	0.7
Chennai	11659	671	5.8	Ahmedabad Urban	9594	36	0.4
Bangalore	8371	514	6.1	Delhi	19746	52	0.3
Aurangabad	2241	111	5.0	Tripura State	6330	6	0.1
Sikkim State	1385	64	4.6	Naharlagun	1439	2	0.1
Kollam District	11012	487	4.4	Barshi Expanded	2032	0	0.0
Mizoram State	4656	204	4.4				

Mortality-Incidence Ratio (MI Ratio)

The mortality-incidence or MI ratio is an indicator of the completeness and accuracy of cancer mortality data. Table 9.5 provides registry-wise MI ratios. The system of registration of death and certification of cause of death are of major concern. In order to overcome this deficit in cancer mortality data, some PBCRs have used the all cause mortality data of their registry area to match with the incident cases and arrive at a more realistic figure of cancer mortality. Barshi Rural and Mumbai have M/I% ratios of 67.6% and 63.7% respectively.

Table 9.5: Mortality-Incident Ratio (M/I%) - Both Sexes

Number (#) and Relative Proportion (%)

Registry	Incidence	Mortality	M/I%	Registry	Incidence	Mortality	M/I%
Barshi Rural	929	628	67.6	Patiala District	6011	1777	29.6
Mumbai	13357	8506	63.7	Kamrup Urban District	5463	1534	28.1
Wardha District	2730	1535	56.2	Barshi Expanded	2032	536	26.4
Sikkim State	1385	676	48.8	Dibrugarh District	2843	685	24.1
Kollam District	11012	5143	46.7	Naharlagun	1439	339	23.6
Mizoram State	4656	2176	46.7	Manipur State	4623	1055	22.8
Tripura State	6330	2860	45.2	Chennai	11659	2562	21.9
Pune	7103	2732	38.5	Pasighat	334	67	20.1
Meghalaya	4248	1618	38.1	Nagaland	1361	208	15.3
Bangalore	8371	3150	37.6	Cachar District	4766	687	14.4
Kolkata	5373	1993	37.1	Aurangabad	2241	292	13.0
Bhopal	3464	1260	36.4	Nagpur	4653	564	12.1
Thi'puram District	15640	5367	34.3	Delhi	19746	1796	9.1
Ahmedabad Urban	9594	3078	32.1				

Other and Unspecified Site (O&U)

The sites of cancer that were categorised as "Other and Unspecified Sites (O&U)" were as per ICD-10 = C26, C39, C48, C75, C76, C77, C78, C79, C80, C97 (WHO 1994).

The relative proportion of cancers that fell into this group (Table 9.6) was more than 10% in the PBCRs at Cachar District and Patiala District. It was less than 5% in Ahmedabad Urban, Mumbai, Nagaland, Pune, Kolkata, Delhi, Chennai, Wardha District, Bhopal, Aurangabad and Naharlagun PBCRs.

Table 9.6: Other and Unspecified Site (O&U) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	O&U		Registry	Total	O&U	
	#	#	%		#	#	%
Cachar District	4766	942	19.8	Manipur State	4623	232	5.0
Patiala District	6011	769	12.8	Dibrugarh District	2843	142	5.0
Thi'puram District	15640	1452	9.3	Ahmedabad Urban	9594	455	4.7
Mizoram State	4656	431	9.3	Mumbai	13357	632	4.7
Tripura State	6330	576	9.1	Nagaland	1361	61	4.5
Meghalaya	4248	378	8.9	Pune	7103	286	4.0
Barshi Rural	929	82	8.8	Kolkata	5373	193	3.6
Barshi Expanded	2032	176	8.7	Delhi	19746	699	3.5
Sikkim State	1385	115	8.3	Chennai	11659	388	3.3
Pasighat	334	25	7.5	Wardha District	2730	78	2.9
Kollam District	11012	770	7.0	Bhopal	3464	92	2.7
Bangalore	8371	576	6.9	Aurangabad	2241	61	2.7
Nagpur	4653	284	6.1	Naharlagun	1439	32	2.2
Kamrup Urban District	5463	314	5.7				

Unspecified Sub-site

Anatomical sites of cancer are generally considered as one complete entity for overall expression of numbers for incidence/mortality rates. However, bearing in mind embryological development and in terms of identifying risk factors, there is a need for sub-site classification of at least some important pertinent sites of cancer such as tongue, oesophagus, stomach and colon. Sub-site identification is also an indicator of the meticulousness of the registry staff and the extent of detail of data availability vis-à-vis clinical-pathology records. The registry-wise proportion of unspecified sub-site for these four sites of cancer is given in Table 9.7. Suffice to state that sub-site categorisation is uniformly low across all PBCRs. Even those with small numbers are unable to obtain information on sub-site in a substantial proportion of cases. Like for "Other and Unspecified Sites" awareness by the abstractor on the need to collect such information where available and pursuing with the concerned clinician/pathologist where not available. Timeliness in both abstraction and pursuit is once again the key in getting such data.

Table 9.7(a): Unspecified (Unsp) Sub-Site - Tongue (ICD10: C01-C02) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	Unsp Sub-site		Registry	Total	Unsp Sub-site	
	#	#	%		#	#	%
Pune	261	233	89.3	Nagaland	30	14	46.7
Aurangabad	145	126	86.9	Mizoram State	59	27	45.8
Barshi Expanded	105	85	81.0	Delhi	852	363	42.6
Thi'puram District	542	402	74.2	Naharlagun	21	8	38.1
Manipur State	67	49	73.1	Chennai	481	159	33.1
Patiala District	166	121	72.9	Kamrup Urban District	150	40	26.7
Sikkim State	18	13	72.2	Wardha District	94	24	25.5
Nagpur	258	185	71.7	Tripura State	253	64	25.3
Bhopal	214	153	71.5	Barshi Rural	29	7	24.1
Bangalore	204	130	63.7	Cachar District	169	38	22.5
Ahmedabad Urban	815	469	57.5	Dibrugarh District	95	21	22.1
Kolkata	212	121	57.1	Meghalaya	187	38	20.3
Mumbai	449	240	53.5	Pasighat	4	0	0.0
Kollam District	368	173	47.0				

Table 9.7(b): Unspecified (Unsp) Sub-Site - Oesophagus (ICD10: C15) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	Unsp Sub-site		Registry	Total	Unsp Sub-site	
	#	#	%		#	#	%
Aurangabad	113	108	95.6	Thi'puram District	292	195	66.8
Cachar District	415	384	92.5	Nagaland	100	63	63.0
Barshi Expanded	83	76	91.6	Naharlagun	81	51	63.0
Patiala District	519	475	91.5	Ahmedabad Urban	489	284	58.1
Delhi	631	568	90.0	Pasighat	14	8	57.1
Pune	274	241	88.0	Wardha District	157	83	52.9
Sikkim State	84	73	86.9	Chennai	374	192	51.3
Kolkata	120	101	84.2	Dibrugarh District	356	180	50.6
Mumbai	428	354	82.7	Mizoram State	503	249	49.5
Barshi Rural	53	43	81.1	Bhopal	129	61	47.3
Nagpur	256	207	80.9	Kollam District	270	125	46.3
Kamrup Urban District	684	542	79.2	Meghalaya	1169	482	41.2
Bangalore	388	288	74.2	Tripura State	445	123	27.6
Manipur State	148	102	68.9				

Table 9.7(c): Unspecified (Unsp) Sub-Site - Stomach (ICD10: C16) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	Unsp. Sub-site		Registry	Total	Unsp. Sub-site	
	#	#	%		#	#	%
Aurangabad	60	59	98.3	Thi'puram District	417	343	82.3
Barshi Expanded	67	62	92.5	Chennai	760	615	80.9
Sikkim State	152	136	89.5	Bhopal	56	45	80.4
Patiala District	123	109	88.6	Wardha District	66	53	80.3
Nagpur	114	101	88.6	Ahmedabad Urban	169	135	79.9
Kolkata	162	142	87.7	Mumbai	429	338	78.8
Pune	180	157	87.2	Kollam District	371	282	76.0
Barshi Rural	28	24	85.7	Dibrugarh District	191	145	75.9
Manipur State	230	195	84.8	Meghalaya	299	203	67.9
Cachar District	165	138	83.6	Naharlagun	277	182	65.7
Bangalore	454	379	83.5	Pasighat	51	32	62.7
Delhi	434	361	83.2	Mizoram State	710	408	57.5
Nagaland	160	132	82.5	Tripura State	333	168	50.5
Kamrup Urban District	324	267	82.4				

Table 9.7(d): Unspecified (Unsp) Sub-Site - Colon (ICD10: C18) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	Unsp. Sub-site		Registry	Total	Unsp. Sub-site	
	#	#	%		#	#	%
Nagaland	30	25	83.3	Nagpur	75	42	56.0
Naharlagun	18	15	83.3	Mizoram State	113	62	54.9
Aurangabad	46	37	80.4	Barshi Expanded	45	24	53.3
Manipur State	114	87	76.3	Dibrugarh District	86	44	51.2
Patiala District	108	77	71.3	Pasighat	2	1	50.0
Kolkata	166	116	69.9	Mumbai	404	190	47.0
Meghalaya	37	25	67.6	Bhopal	80	37	46.2
Pune	211	141	66.8	Chennai	355	156	43.9
Sikkim State	36	24	66.7	Thi'puram District	468	192	41.0
Delhi	422	273	64.7	Ahmedabad Urban	213	87	40.8
Kamrup Urban District	138	89	64.5	Kollam District	262	98	37.4
Bangalore	240	151	62.9	Cachar District	82	27	32.9
Tripura State	111	68	61.3	Wardha District	39	12	30.8
Barshi Rural	16	9	56.2				

Unspecified Histology

While cancers of different anatomical sites have certain distinctions due to their location, the histological type of cancer in the same site has its own identity in terms of aetiology, prognosis and treatment thereof. Hence, it is important to get information in at least cases where a microscopic diagnosis of cancer is available. Table 9.8 gives the proportion of cancers of selected sites where histology was "Not Otherwise Specified".

Table 9.8(a): Unspecified (Unsp) Histology - Stomach (ICD10: C16) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	Microscopically Verified	Unsp. Histology		Registry	Total	Microscopically Verified	Unsp. Histology	
	#	#	#	%		#	#	#	%
Delhi	437	367	147	33.6	Tripura State	334	320	29	8.7
Bangalore	462	358	136	29.4	Ahmedabad Urban	170	153	14	8.2
Barshi Rural	30	26	7	23.3	Pasighat	51	51	4	7.8
Barshi Expanded	69	64	16	23.2	Meghalaya	299	283	22	7.4
Cachar District	165	142	34	20.6	Nagpur	115	103	8	7.0
Mumbai	429	368	76	17.7	Kamrup Urban District	324	248	20	6.2
Manipur State	234	222	41	17.5	Sikkim State	152	148	8	5.3
Bhopal	59	57	10	16.9	Naharlagun	277	263	13	4.7
Chennai	764	546	119	15.6	Nagaland	160	157	7	4.4
Thi'puram District	422	371	59	14.0	Dibrugarh District	191	153	7	3.7
Pune	180	142	22	12.2	Aurangabad	60	53	2	3.3
Kollam District	376	312	44	11.7	Wardha District	67	46	2	3.0
Mizoram State	711	636	79	11.1	Kolkata	162	108	3	1.9
Patiala District	123	85	11	8.9					

Table 9.8(b): Unspecified (Unsp) Histology - Lung (ICD10: C33-C34) - Both Sexes
Number (#) and Relative Proportion (%)

Registry	Total	Microscopically Verified	Unsp. Histology		Registry	Total	Microscopically Verified	Unsp. Histology	
	#	#	#	%		#	#	#	%
Aurangabad	187	151	78	41.7	Kolkata	710	482	35	4.9
Bhopal	252	235	90	35.7	Barshi Expanded	60	43	2	3.3
Kollam District	1219	945	399	32.7	Tripura State	764	673	21	2.7
Barshi Rural	37	29	10	27.0	Meghalaya	236	185	6	2.5
Manipur State	712	596	169	23.7	Naharlagun	79	74	2	2.5
Thi'puram District	1302	1067	280	21.5	Cachar District	294	235	6	2.0
Chennai	742	514	114	15.4	Ahmedabad Urban	591	492	8	1.4
Mizoram State	688	545	94	13.7	Wardha District	130	117	1	0.8
Dibrugarh District	112	60	11	9.8	Patiala District	286	244	1	0.3
Pune	444	338	37	8.3	Delhi	1360	1157	2	0.1
Nagpur	219	167	18	8.2	Sikkim State	98	93	0	0.0
Mumbai	1019	702	67	6.6	Nagaland	67	60	0	0.0
Bangalore	576	464	37	6.4	Pasighat	10	9	0	0.0
Kamrup Urban District	363	259	18	5.0					

Table 9.8(c): Unspecified (Unsp) Histology - Ovary (ICD10: C56) – Females
Number (#) and Relative Proportion (%)

Registry	Total	Microscopically Verified	Unsp. Histology		Registry	Total	Microscopically Verified	Unsp. Histology	
	#	#	#	%		#	#	#	%
Cachar District	106	72	51	48.1	Meghalaya	39	31	6	15.4
Delhi	688	590	269	39.1	Pune	273	218	33	12.1
Naharlagun	48	44	17	35.4	Manipur State	146	121	12	8.2
Bangalore	242	216	84	34.7	Mizoram State	56	49	3	5.4
Chennai	409	322	138	33.7	Kolkata	204	156	9	4.4
Sikkim State	40	39	11	27.5	Wardha District	94	84	4	4.3
Bhopal	136	131	30	22.1	Patiala District	156	145	5	3.2
Barshi Rural	24	21	5	20.8	Kamrup Urban District	131	108	4	3.1
Kollam District	293	255	59	20.1	Ahmedabad Urban	220	192	6	2.7
Mumbai	470	379	93	19.8	Dibrugarh District	120	90	3	2.5
Nagpur	153	134	30	19.6	Aurangabad	69	65	0	0.0
Thi'puram District	471	415	85	18.0	Nagaland	15	14	0	0.0
Barshi Expanded	52	41	9	17.3	Pasighat	12	11	0	0.0
Tripura State	164	150	27	16.5					

Since morphology is available only through ICD-O-3 (WHO, 2000), the same coding and not ICD-10 has been used to obtain the totals and relative proportions of unspecified histology. Since tumours of the Lymphoid and Haemopoietic system, especially extra-nodal lymphomas would be included under the specific topographic site of ICD-O-3 the numbers could be a few cases more than what has been analysed for other tables based on ICD-10.

This chapter along with Chapter 5 that addresses the most valid basis of diagnosis of cancer and Chapter 6 dealing with mortality data show the challenges and limitations of cancer registration in the Indian context vis-à-vis International comparisons. Every effort is made by both the individual PBCRs and the coordinators at NCDIR to ensure that the data reported is as correct and as complete as possible. In more recent years the PBCR software applications programme has greatly helped in enhancing the speed of data submission and its quality.

Comparability of Certain Parameters with Previous Report

Some of these tables are given below. Others are available in the web version of the report.

Some registries have been excluded from the Tables 9.9 till 9.12. These exclusions are

(1)　Registries that have only one year's data prior to 2012 (Naharlagun PBCR, Pasighat PBCR and Patiala PBCR), as 2011 was their first year of data collection,

(2)　Thiruvananthapuram PBCR as the registry covered Thiruvananthapuram Taluk till 2011 and it covers Thiruvananthapuram District 2012 onwards.

The same exclusion criteria to exclude registries have been used for "Comparison of contributions by major sources of registration" illustrated in Figures 9.1 to 9.23.

Table 9.9: Comparison of Age Adjusted Incidence Rates (AARs) between Previous (2009-2011) and Present (2012-2014) Report - All Sites

Males

Registry	AARs		% Change	Registry	AARs		% Change
	2009-2011	2012-2014			2009-2011	2012-2014	
Aurangabad	54.8	72.0	31.4	Ahmedabad Urban	95.0	98.5	3.7
Nagaland	112.4	125.8	11.9	Cachar District	121.0	125.4	3.6
Mumbai	101.6	113.1	11.3	Sikkim State	88.2	90.7	2.8
Wardha District	54.6	60.2	10.3	Tripura State	74.7	76.4	2.3
Kamrup Urban District	186.9	206.0	10.2	Bhopal	100.1	101.5	1.4
Meghalaya	155.3	169.6	9.2	Kollam District	119.4	120.5	0.9
Delhi	139.6	149.4	7.0	Nagpur	89.7	89.4	-0.3
Barshi Rural	50.6	53.9	6.5	Chennai	117.5	116.1	-1.2
Mizoram State	199.5	211.5	6.0	Dibrugarh District	93.7	92.8	-1.0
Pune	73.9	77.6	5.0	Barshi Expanded	43.0	40.9	-4.9
Bangalore	100.8	105.4	4.6	Manipur State	66.3	60.5	-8.7
Kolkata	96.6	100.9	4.5				

Females

Registry	AARs		% Change	Registry	AARs		% Change
	2009-2011	2012-2014			2009-2011	2012-2014	
Aurangabad	58.9	73.0	23.9	Pune	82.4	84.9	3.0
Nagaland	70.2	84.9	20.9	Cachar District	92.4	95.2	3.0
Dibrugarh District	68.0	78.6	15.6	Mizoram State	161.8	165.8	2.5
Meghalaya	82.2	94.4	14.8	Bangalore	123.1	125.9	2.3
Wardha District	60.4	66.7	10.4	Sikkim State	98.4	100.3	1.9
Kamrup Urban District	158.0	174.0	10.1	Manipur State	67.4	68.6	1.8
Delhi	131.8	144.8	9.9	Chennai	124.9	126.2	1.0
Kollam District	94.8	101.7	7.3	Nagpur	94.4	94.5	0.1
Mumbai	112.0	118.5	5.8	Tripura State	54.9	54.9	0.0
Bhopal	103.3	108.3	4.8	Barshi Expanded	52.4	52.0	-0.8
Ahmedabad Urban	73.6	76.5	3.9	Barshi Rural	61.5	60.4	-1.8
Kolkata	100.0	103.4	3.4				

Table 9.10: Comparison of Microscopic Verification (MV%) between Previous (2009-2011) and Present (2012-2014) Report - Both Sexes

Registry	MV%		% Change	Registry	MV%		% Change
	2009-2011	2012-2014			2009-2011	2012-2014	
Mizoram State	73.1	85.6	17.1	Tripura State	95.9	94.8	-1.1
Sikkim State	80.3	86.9	8.2	Aurangabad	95.1	93.7	-1.5
Delhi	84.4	88.7	5.1	Dibrugarh District	81.4	79.7	-2.1
Chennai	78.6	81.7	3.9	Bangalore	89.3	85.7	-4.0
Barshi Expanded	85.8	88.5	3.1	Ahmedabad Urban	95.9	91.6	-4.5
Meghalaya	86.1	88.2	2.4	Pune	91.3	85.9	-5.9
Kamrup Urban District	80.3	82.0	2.1	Nagpur	96.0	89.9	-6.4
Bhopal	94.8	95.2	0.4	Mumbai	91.0	85.0	-6.6
Manipur State	92.9	93.3	0.4	Wardha District	94.0	86.6	-7.9
Kollam District	83.6	83.7	0.1	Cachar District	91.9	83.0	-9.7
Barshi Rural	85.0	85.0	0.0	Kolkata	89.9	73.9	-17.8
Nagaland	98.9	97.9	-1.0				

Table 9.11: Comparison of Death Certificates Only (DCO%) between Previous (2009-2011) and Present (2012-2014) Report - Both Sexes

Registry	DCO%		% Change	Registry	DCO%		% Change
	2009-2011	2012-2014			2009-2011	2012-2014	
Kolkata	9.0	24.2	168.9	Kollam District	4.8	4.4	-8.3
Wardha District	3.8	8.2	115.8	Dibrugarh District	11.3	10.3	-8.8
Mumbai	5.3	10.6	100.0	Nagpur	2.0	1.7	-15.0
Cachar District	1.1	2.2	100.0	Sikkim State	6.1	4.6	-24.6
Barshi Rural	0.6	1.1	83.3	Pune	5.8	4.0	-31.0
Chennai	3.2	5.8	81.3	Mizoram State	11.3	4.4	-61.1
Nagaland	0.7	1.0	42.9	Ahmedabad Urban	1.7	0.4	-76.5
Meghalaya	7.8	9.3	19.2	Manipur State	0.5	0.7	-
Kamrup Urban District	7.8	9.0	15.4	Delhi	0.3	0.3	-
Aurangabad	4.4	5.0	13.6	Tripura State	0.6	0.1	-
Bangalore	6.4	6.1	-4.7	Barshi Expanded	0.1	0.0	-
Bhopal	1.5	1.4	-6.7				

DCO% greater than or equal to 1.0 has been taken for calculation of %Change

Identification of Quality Check Errors, Duplicate Registrations and Matches

PBCRDM 2.1 application helps to identify and rectify the quality check errors, perform duplicate checks and matching before sending the data to NCRP. Following this, NCRP does a second level of checks on the data. This ensures faster finalization of the data.

Coverage of Cancer Cases – Comparison of Contributions by Major Sources of Registration

Figures 9.1 to 9.23 give comparison of the average contributions made by the main sources of registrations in the previous and present report. Any source demonstrating a decrease in contribution since the last report would require special attention by the registries to ensure better collection and coverage in such sources. The reasons could either be, actual decline in the cancers (belonging to the registry area) diagnosed/treated by these institutions or inadequate collection of cases by the registry staff, could also include cases that are being missed because of late visits to these institutions when details of residential status will not be available, new institutions having come up with cancer diagnosis and treatment facilities.

Comparison of Data Received from Main Sources of Registration

Fig. 9.1: Bangalore
(2009-2011 & 2012)
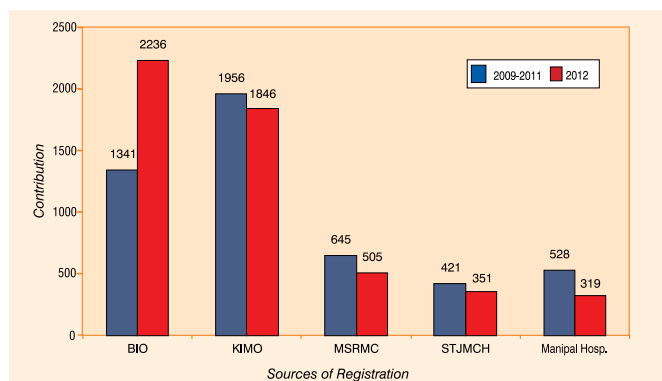
Fig. 9.2: Barshi Rural
(2009-2011 & 2012-2014)
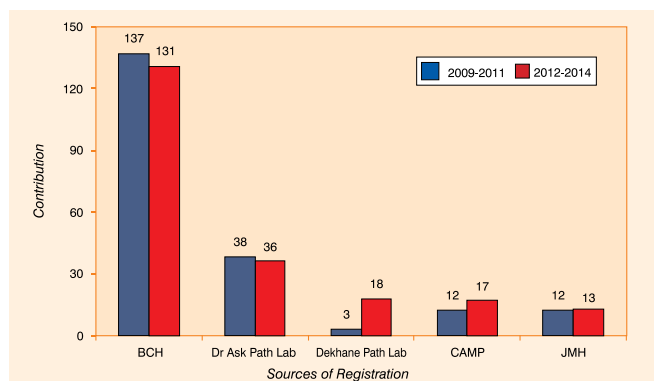
Fig. 9.3: Barshi Expanded
(2009-2011 & 2012)
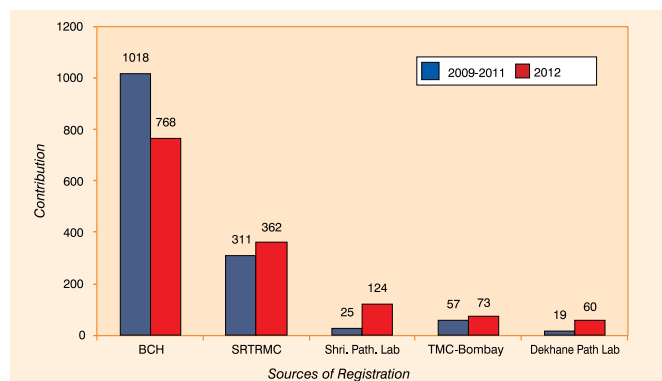
Fig. 9.4: Bhopal
(2009-2011 & 2012-2013)
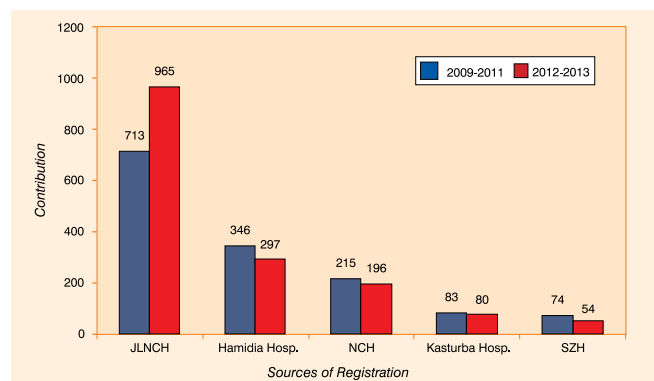
Fig. 9.5: Chennai
(2009-2011 & 2012-2013)
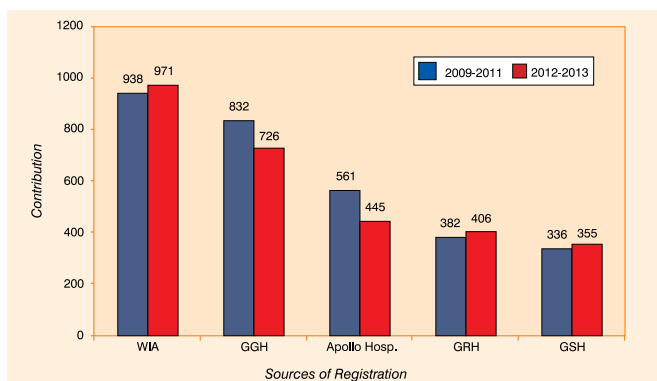
Fig. 9.6: Delhi
(2009-2010 & 2012)
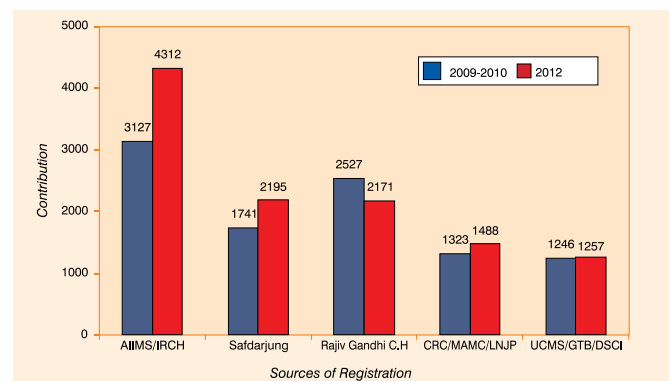
Fig. 9.7: Mumbai
(2009-2011 & 2012)
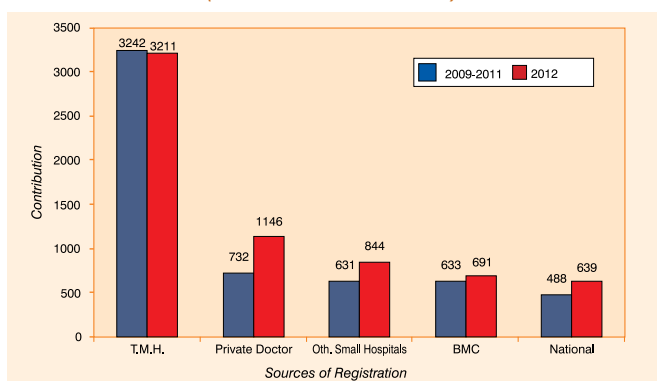
Fig. 9.8: Cachar District
(2009-2011 & 2012-2014)
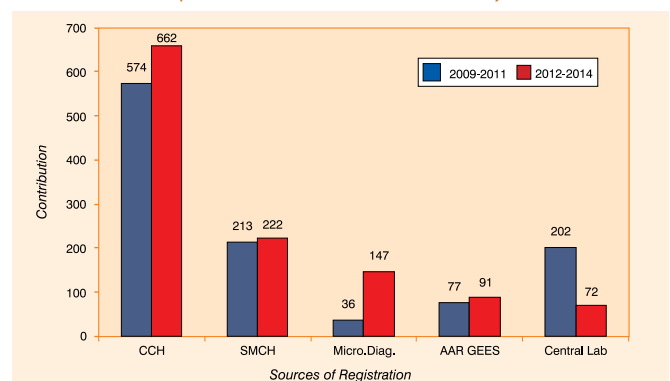
Fig. 9.9: Dibrugarh District
(2009-2011 & 2012-2014)
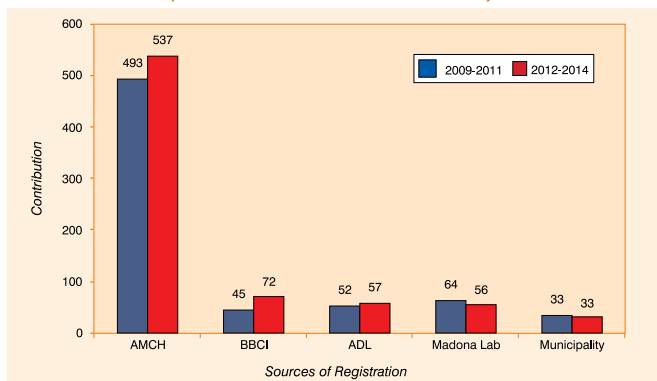
Fig. 9.10: Kamrup Urban District
(2009-2011 & 2012-2014)
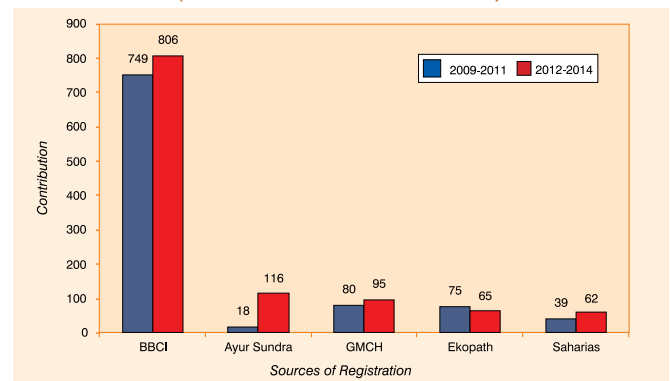
Fig. 9.11: Manipur State
(2009-2011 & 2012-2014)
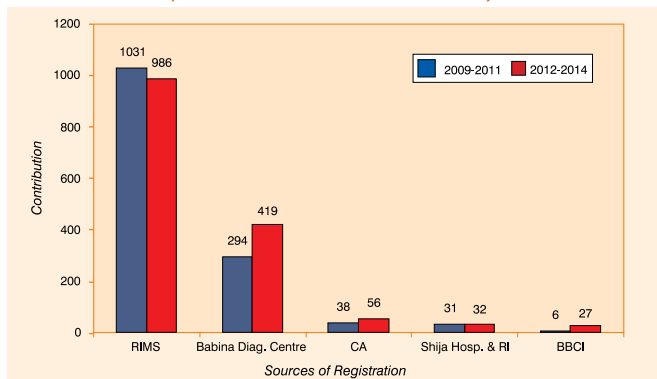
Fig. 9.12: Mizoram State
(2009-2011 & 2012-2014)
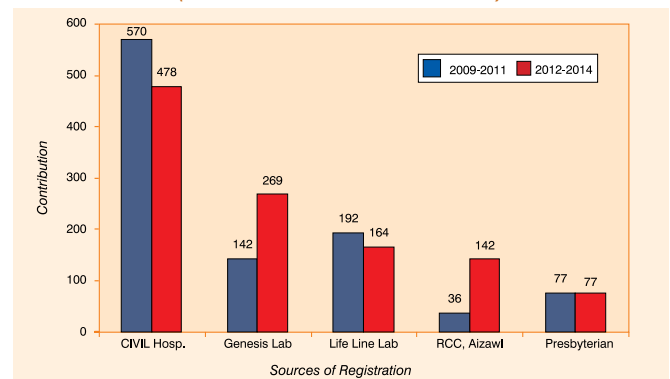
Fig. 9.13: Sikkim State
(2009-2011 & 2012-2014)
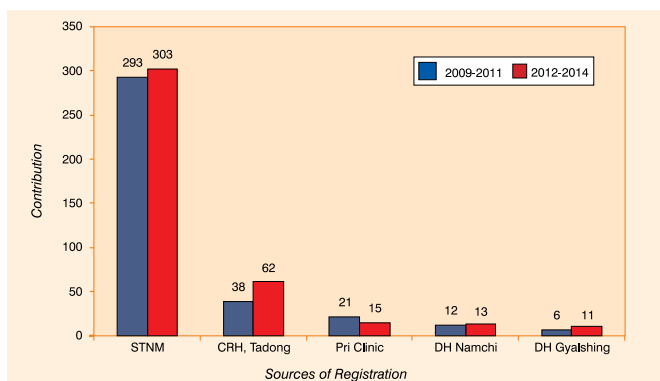
Fig. 9.14: Ahmedabad Urban
(2009-2011 & 2012-2013)
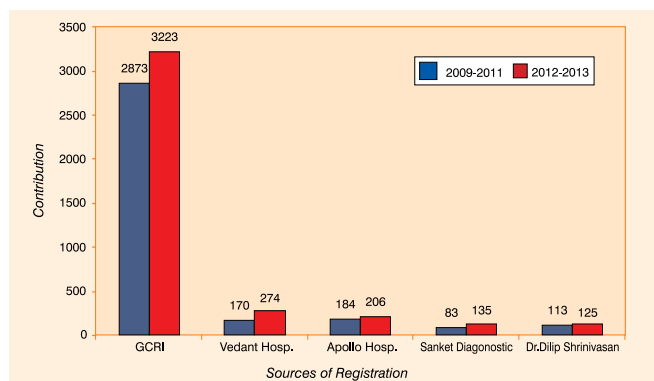
Fig. 9.15: Aurangabad
(2009-2011 & 2012-2014)
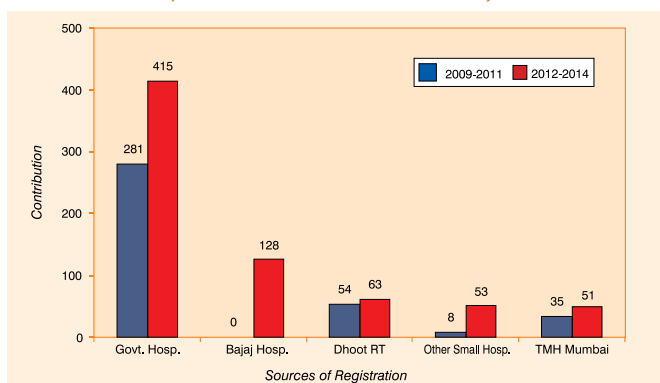
Fig. 9.16: Kolkata
(2009 & 2012)
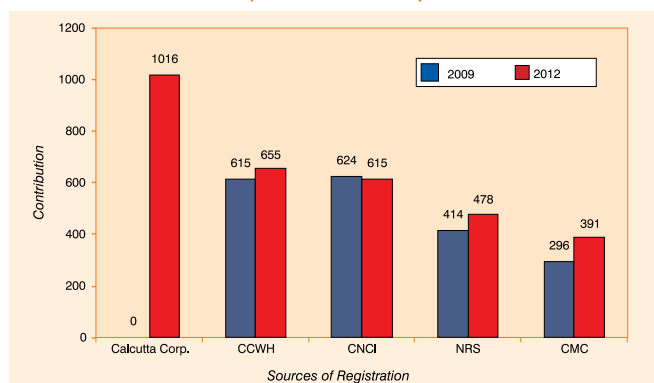
Fig. 9.17: Kollam District
(2009-2011 & 2012-2014)
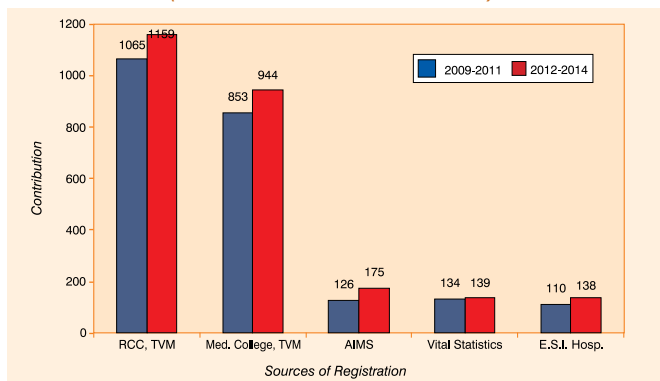
Fig. 9.18: Nagpur
(2009-2011 & 2012-2013)
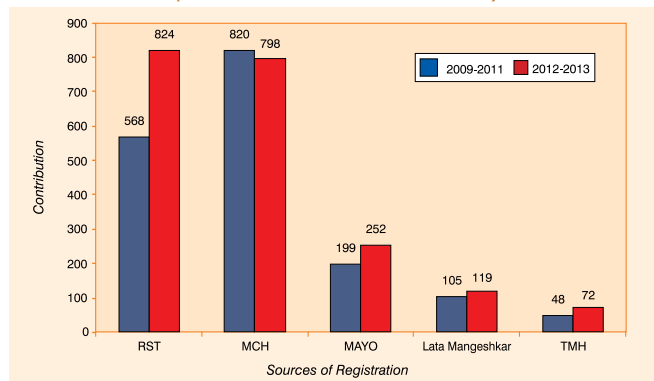
Fig. 9.19: Pune
(2009-2011 & 2012-2013)
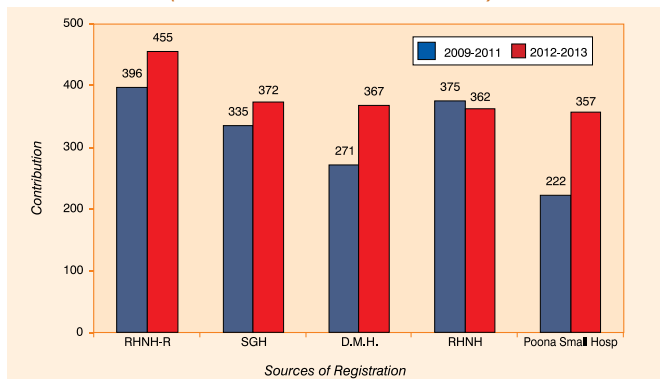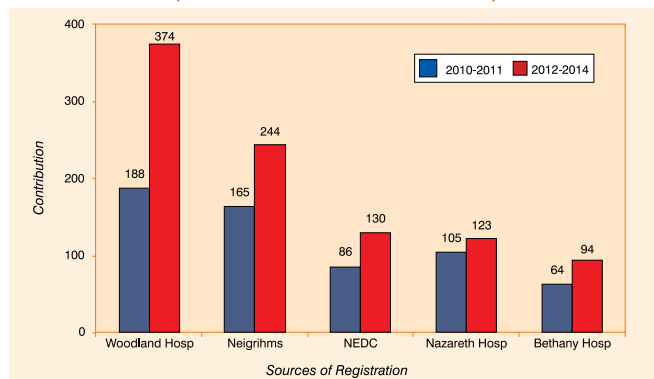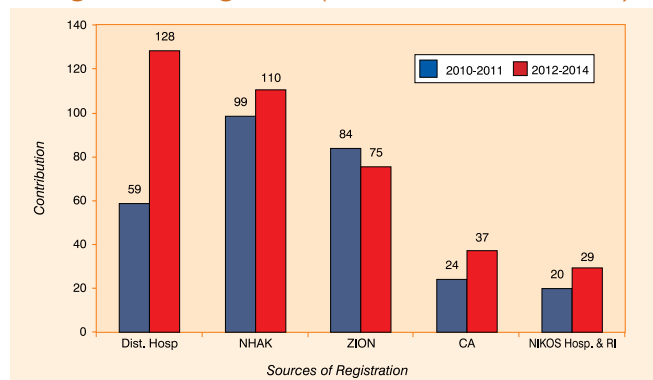

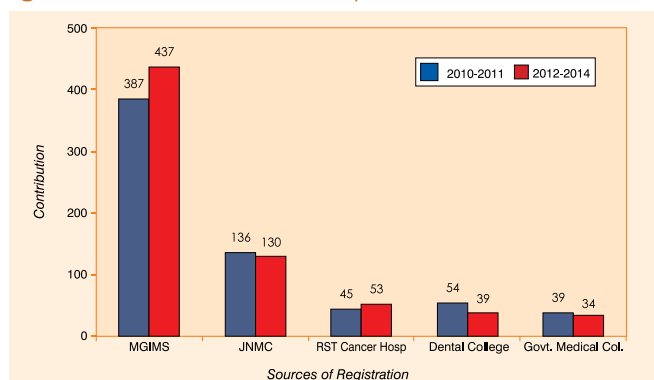### Fig. 9.20: Meghalaya
(2010-2011 & 2012-2014)

Fig. 9.21: Tripura State *(2010-2011 & 2012-2014)*
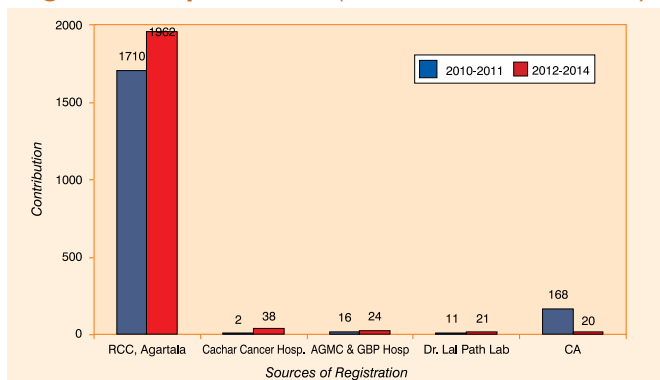
Fig. 9.22: Nagaland *(2010-2011 & 2012-2014)*

Fig. 9.23: Wardha District *(2010-2011 & 2012-2014)*

Attention by the PBCRs to completeness of coverage of cases by a slew of measures as suggested. The printing of PBCR Reports that includes data for the years 2012-2014 is recommended.

The recommendations below were made after the 28th ARM and the same have been once again recommended in the 31st ARM with some supplements. The following should be part of the regular annual activities of the registries.

All PBCRs should continue to evolve an action plan for enlisting the cooperation of sources of registration. This includes:

a) Writing to the respective state governments to make cancer a notifiable disease and following it up till such legislation is brought about; Efforts to make cancer as a notifiable disease should be pursued with specific importance to the major metropolitan cities where PBCRs are functioning.

b) Constituting advisory/panel of pathologists/any other committee/groups that would facilitate continued and sustained cooperation of the concerned institutions;

c) Encourage the major sources of registrations to use the various software modules developed by NCRP-NCDIR. These include the HBCR-DM, Pathology and Radiotherapy modules.

d) Arranging annual meetings for personnel of at least major sources at different levels:
    i) Medical records, technical and allied staff;
    ii) Senior faculty in the critical departments in clinical oncology and pathology;
    iii) Administrative heads of these institutions
    iv) Staff and concerned persons at birth and death registration/state statistical units.
    v) In PBCRs that cover districts/state the District Medical Officer/Civil Surgeon and NRHM chief of the district etc.

Each PBCR should periodically check the data on number of cases received versus the expected cases (based on previous years) from each major source. This could also be calculated month-wise or on a weekly basis. Necessary inputs and facilitation may be provided by the NCRP-NCDIR for the above activities.