

1. Population and Stroke Incidence

The geographical area covered by the five population-based registries and the average annual estimated population for the two years (2018-2019), the number of registered stroke cases in each of the registries during the two-year period (2018–2019), the crude (CR), age standardised (ASR) incidence rates for all types of first-ever stroke cases and age specific (ASpR) incidence rates are given in this chapter.

I. Area covered and population at risk

The population at risk refers to all persons in whom stroke can occur. Age specific distribution or age composition describes the proportionate numbers of persons in successive age categories in a given population. The age specific distribution of the population at risk by five-year age group and the age specific pyramid of all registries are illustrated.

Table 1.1. Estimated Population of PBSRs, 2018-2019

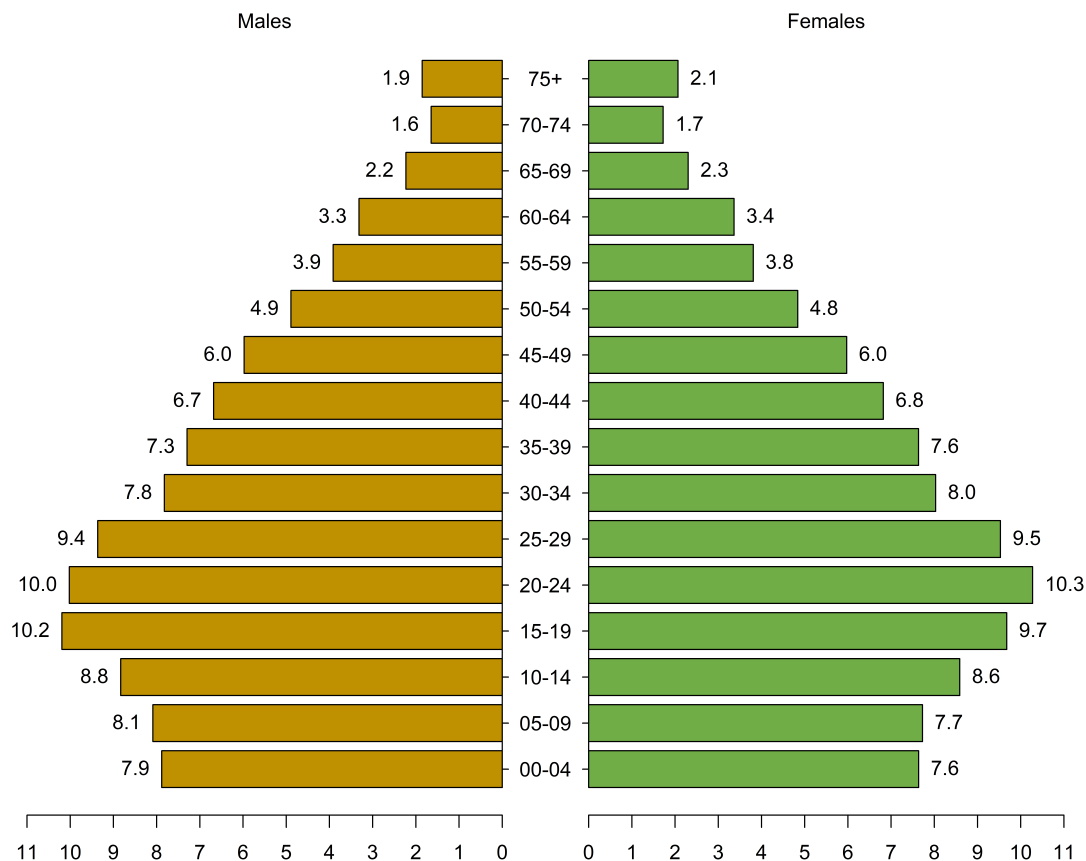
Registry	Area (sq.km.)	Males	Annual Average	Females	Annual Average	Both sexes	Annual Average
Cuttack	884.5	1180688	590344	1130646	565323	2311334	1155667
Cachar	3786.0	2035122	1017561	1976567	988284	4011689	2005845
Tirunelveli	2357.6	1487214	743607	1514850	757425	3002064	1501032
Kota	548.4	1447920	723960	1310447	655224	2758367	1379184
Varanasi	82.1	1348395	674198	1208034	604017	2556429	1278215

Table 1.2. Population of PBSRs in five year age group

Age group	Cuttack		Cachar		Tirunelveli		Kota		Varanasi	
	n	%	n	%	n	%	n	%	n	%
Males										
00-04	79499	6.7	206997	10.2	103469	7.0	116923	8.1	84305	6.3
05-09	73918	6.3	201772	9.9	110335	7.4	111479	7.7	108936	8.1
10-14	89886	7.6	202354	9.9	124645	8.4	121908	8.4	123455	9.2
15-19	104549	8.8	207675	10.2	119612	8.0	174630	12.1	157929	11.7
20-24	108653	9.2	194019	9.5	123672	8.3	165635	11.4	159434	11.8
25-29	108801	9.2	178644	8.8	135869	9.1	148597	10.3	130370	9.7
30-34	93948	8.0	145551	7.2	125341	8.4	120030	8.3	101598	7.5
35-39	93425	7.9	145785	7.2	112588	7.6	100333	6.9	94942	7.0
40-44	92295	7.8	132045	6.5	110542	7.4	85323	5.9	80847	6.0
45-49	81125	6.9	113234	5.6	99221	6.7	79945	5.5	74614	5.5
50-54	65029	5.5	90007	4.4	81120	5.5	68635	4.7	61991	4.6
55-59	53971	4.6	68836	3.4	69296	4.7	51335	3.5	50120	3.7
60-64	45746	3.9	57351	2.8	60017	4.0	40781	2.8	44759	3.3
65-69	30343	2.6	37327	1.8	44872	3.0	25032	1.7	29641	2.2
70-74	25364	2.1	26067	1.3	33122	2.2	18530	1.3	20320	1.5
75+	34136	2.9	27459	1.3	33496	2.3	18805	1.3	25134	1.9
All ages	1180688	100	2035122	100	1487214	100	1447920	100	1348395	100

Females										
Age group	Cuttack		Cachar		Tirunelveli		Kota		Varanasi	
	n	%	n	%	n	%	n	%	n	%
00-04	72093	6.4	197220	10.0	100616	6.6	105396	8.0	70006	5.8
05-09	68076	6.0	193212	9.8	107587	7.1	93821	7.2	89035	7.4
10-14	88468	7.8	192952	9.8	118963	7.9	103828	7.9	109041	9.0
15-19	98484	8.7	202364	10.2	107106	7.1	134876	10.3	148072	12.3
20-24	112490	9.9	203945	10.3	124139	8.2	158629	12.1	134430	11.1
25-29	111685	9.9	180824	9.1	133866	8.8	136999	10.5	117191	9.7
30-34	95798	8.5	149549	7.6	124708	8.2	108539	8.3	94859	7.9
35-39	93917	8.3	145444	7.4	118871	7.8	95355	7.3	91522	7.6
40-44	85079	7.5	123782	6.3	115310	7.6	85655	6.5	77214	6.4
45-49	73654	6.5	105176	5.3	98763	6.5	77244	5.9	71544	5.9
50-54	59045	5.2	82408	4.2	86221	5.7	62353	4.8	55527	4.6
55-59	46022	4.1	58734	3.0	74886	4.9	46606	3.6	45872	3.8
60-64	40913	3.6	53750	2.7	68690	4.5	38210	2.9	38656	3.2
65-69	28011	2.5	34385	1.7	53552	3.5	24373	1.9	24201	2.0
70-74	25263	2.2	24774	1.3	37894	2.5	17538	1.3	17617	1.5
75+	31649	2.8	28048	1.4	43677	2.9	21027	1.6	23247	1.9
All ages	1130646	100	1976567	100	1514850	100	1310447	100	1208034	100
Both Sexes										
Age group	Cuttack		Cachar		Tirunelveli		Kota		Varanasi	
	n	%	n	%	n	%	n	%	n	%
00-04	151592	6.6	404217	10.1	204085	6.8	222319	8.1	154311	6.0
05-09	141994	6.1	394984	9.8	217922	7.3	205300	7.4	197971	7.7
10-14	178354	7.7	395306	9.9	243608	8.1	225736	8.2	232496	9.1
15-19	203033	8.8	410039	10.2	226718	7.6	309506	11.2	306001	12.0
20-24	221143	9.6	397964	9.9	247811	8.3	324264	11.8	293864	11.5
25-29	220486	9.5	359468	9.0	269735	9.0	285596	10.4	247561	9.7
30-34	189746	8.2	295100	7.4	250049	8.3	228569	8.3	196457	7.7
35-39	187342	8.1	291229	7.3	231459	7.7	195688	7.1	186464	7.3
40-44	177374	7.7	255827	6.4	225852	7.5	170978	6.2	158061	6.2
45-49	154779	6.7	218410	5.4	197984	6.6	157189	5.7	146158	5.7
50-54	124074	5.4	172415	4.3	167341	5.6	130988	4.7	117518	4.6
55-59	99993	4.3	127570	3.2	144182	4.8	97941	3.6	95992	3.8
60-64	86659	3.7	111101	2.8	128707	4.3	78991	2.9	83415	3.3
65-69	58354	2.5	71712	1.8	98424	3.3	49405	1.8	53842	2.1
70-74	50627	2.2	50841	1.3	71016	2.4	36068	1.3	37937	1.5
75+	65785	2.8	55507	1.4	77173	2.6	39832	1.4	48381	1.9
All ages	2311334	100	4011689	100	3002064	100	2758367	100	2556429	100

Figure 1.1 Age specific distribution of population of the PBSRs (%)



II Number and Proportion of registered stroke cases

Table 1.3. Number (n) and proportion (%) of first-ever stroke cases by sex

Sex	Cuttack		Cachar		Tirunelveli		Kota		Varanasi	
	n	%	n	%	n	%	n	%	n	%
Males	1904	59.0	1608	64.5	2215	59.4	1463	62.3	1257	62.1
Females	1322	41.0	885	35.5	1515	40.6	884	37.7	767	37.9
Both sexes(N)	3226	100	2493	100	3730	100	2347	100	2024	100

Table 1.4. Number (n) and proportion (%) of first-ever stroke cases by age group in males and females

Age Group	Cuttack		Cachar		Tirunelveli		Kota		Varanasi	
	n	%	n	%	n	%	n	%	n	%
Males										
18-29	21	1.1	19	1.2	23	1.0	55	3.8	22	1.8
30-44	142	7.5	147	9.1	202	9.1	175	12.0	100	8.0
45-59	450	23.6	591	36.8	702	31.7	436	29.8	322	25.6
60-74	814	42.8	659	41.0	938	42.3	546	37.3	562	44.7
75+	477	25.1	192	11.9	350	15.8	251	17.2	251	20.0
All ages	1904	100	1608	100	2215	100	1463	100	1257	100
Females										
18-29	21	1.6	16	1.8	13	0.9	25	2.8	19	2.5
30-44	88	6.7	95	10.7	99	6.5	95	10.7	64	8.3
45-59	338	25.6	305	34.5	353	23.3	201	22.7	204	26.6
60-74	569	43.0	327	36.9	738	48.7	357	40.4	319	41.6
75+	306	23.1	142	16.0	312	20.6	206	23.3	161	21.0
All ages	1322	100	885	100	1515	100	884	100	767	100
Both Sexes										
18-29	42	1.3	35	1.4	36	1.0	80	3.4	41	2.0
30-44	230	7.1	242	9.7	301	8.1	270	11.5	164	8.1
45-59	788	24.4	896	35.9	1055	28.3	637	27.1	526	26.0
60-74	1383	42.9	986	39.6	1676	44.9	903	38.5	881	43.5
75+	783	24.3	334	13.4	662	17.7	457	19.5	412	20.4
All ages(N)	3226	100	2493	100	3730	100	2347	100	2024	100

Table 1.5. Number (n) and proportion (%) of first-ever stroke cases by place of residence

Place of residence	Cuttack		Cachar		Tirunelveli		Kota*		Varanasi*	
	n	%	n	%	n	%	n	%	n	%
Urban	1381	42.8	369	14.8	1419	38.0	2347	100.0	2024	100.0
Rural	1845	57.2	2124	85.2	2311	62.0	N.A		N.A	
Total (N)	3226	100	2493	100	3730	100	2347	100	2024	100

*Kota and Varanasi cover only urban population

Table 1.6. Number (n) and proportion (%) of first-ever stroke cases by age group and place of residence

Age Group	Cuttack		Cachar		Tirunelveli		Kota*		Varanasi*	
	n	%	n	%	n	%	n	%	n	%
Urban										
18-29	18	1.3	0	0.0	13	0.9	80	3.4	41	2.0
30-44	81	5.9	23	6.2	105	7.4	270	11.5	164	8.1
45-59	354	25.6	112	30.4	377	26.6	637	27.1	526	26.0
60-74	592	42.9	151	40.9	615	43.3	903	38.5	881	43.5
75+	336	24.3	83	22.5	309	21.8	457	19.5	412	20.4
All ages	1381	100	369	100	1419	100	2347	100	2024	100
Rural										
18-29	24	1.3	35	1.6	23	1.0	N. A			
30-44	149	8.1	219	10.3	196	8.5				
45-59	434	23.5	784	36.9	678	29.3				
60-74	791	42.9	835	39.3	1061	45.9				
75+	447	24.2	251	11.8	353	15.3				
All ages	1845	100	2124	100	2311	100				
Total										
18-29	42	1.3	35	1.4	36	1.0	80	3.4	41	2.0
30-44	230	7.1	242	9.7	301	8.1	270	11.5	164	8.1
45-59	788	24.4	896	35.9	1055	28.3	637	27.1	526	26.0
60-74	1383	42.9	986	39.6	1676	44.9	903	38.5	881	43.5
75+	783	24.3	334	13.4	662	17.7	457	19.5	412	20.4
All ages(N)	3226	100	2493	100	3730	100	2347	100	2024	100

*Kota and Varanasi cover only urban population.

III. Crude and Age Standardised Incidence (All types)

Stroke incidence refers to the number of registered cases of first-ever stroke of age ≥ 18 years in a defined geographic area in a specified period of time. The average annual stroke incidence rate of the two-year period (2018-2019) has been calculated.

Table 1.7. Crude Rate (CR) and Age Standardized incidence Rate (ASR) per 100,000 population

Registry	Males		Females		Both sexes	
	CR	ASR	CR	ASR	CR	ASR
	(95% C.I.)	(95% C.I.)	(95% C.I.)	(95% C.I.)	(95% C.I.)	(95% C.I.)
Cuttack	217.4	144.6	156.6	109.4	187.6	127.7
	(207.6-227.1)	(134.4-154.9)	(148.2-165.1)	(100.1-118.7)	(181.1-194.0)	(120.7-134.6)
Cachar	123.4	102.8	69.4	59.5	96.6	81.9
	(117.3-129.4)	(94.8-110.7)	(64.8-73.9)	(53.3-65.7)	(92.8-100.4)	(76.8-87.0)
Tirunelveli	205.9	136.2	134.9	82.0	169.9	107.7
	(197.3-214.5)	(127.3-145.0)	(128.1-141.7)	(75.5-88.4)	(164.2-175.1)	(102.3-113.1)
Kota	150.8	130.5	98.6	80.5	125.8	105.8
	(143.1-158.6)	(119.9-141.1)	(92.1-105.1)	(72.1-88.9)	(120.7-130.8)	(99.0-112.5)
Varanasi	145.9	112.9	97.8	74.2	123.0	94.3
	(137.9-154.0)	(103.1-122.7)	(90.9-104.7)	(65.9-82.4)	(117.6-128.4)	(87.9-100.8)

IV. Age Specific incidence Rates

Table 1.8. Age Specific incidence Rate (ASpR) per 100,000 population

Age Group	Cuttack	Cachar	Tirunelveli	Kota	Varanasi
	ASpR (95% C.I.)	ASpR (95% C.I.)	ASpR (95% C.I.)	ASpR (95% C.I.)	ASpR (95% C.I.)
Males					
18-29	8.1 (4.6-11.5)	4.1 (2.3-6.0)	7.5 (4.4-10.6)	14.6 (10.7-18.4)	6.8 (4.0-9.7)
30-44	50.8 (42.4-59.1)	34.7 (29.1-40.3)	58.0 (50.0-66.0)	58.9 (50.2-67.6)	38.5 (30.9-46.0)
45-59	224.9 (204.1-245.6)	217.2 (199.7-234.7)	281.2 (260.4-302.0)	230.8 (209.1-252.5)	200.7 (178.8-222.6)
60-74	802.4 (747.2-857.5)	545.8 (504.1-587.4)	679.6 (636.1-723.1)	636.2 (582.8-689.5)	597.2 (547.8-646.5)
75+	1396.9 (1271.5-1522.3)	699.2 (600.3-798.1)	1044.9 (935.5-1154.4)	1254.4 (1099.2-1409.6)	1037.7 (909.3-1166.1)
Females					
18-29	7.9 (4.5-11.3)	3.4 (1.7-5.1)	4.3 (2.0-6.7)	7.4 (4.5-10.4)	6.9 (3.8-10.0)
30-44	32.0 (25.3-38.7)	22.7 (18.1-27.2)	27.6 (22.2-33.0)	34.0 (27.1-40.8)	25.5 (19.2-31.7)
45-59	189.1 (169.0-209.3)	123.8 (109.9-137.7)	135.8 (121.7-150.0)	116.8 (100.7-132.9)	135.9 (117.2-154.5)
60-74	604.1 (554.5-653.7)	289.6 (258.2-321.0)	460.9 (427.6-494.1)	418.8 (375.4-462.3)	376.6 (335.3-417.9)
75+	966.9 (858.6-1075.3)	506.2 (423.0-589.5)	714.4 (635.2-793.7)	885.2 (764.3-1006.1)	696.7 (589.1-804.4)
Both sexes					
18-29	8.0 (5.6-10.4)	3.8 (2.5-5.0)	5.9 (4.0-7.9)	11.2 (8.7-13.7)	6.9 (4.8-9.0)
30-44	41.5 (36.1-46.8)	28.7 (25.1-32.4)	42.6 (37.7-47.4)	46.8 (41.2-52.4)	32.1 (27.2-37.0)
45-59	208.0 (193.5-222.5)	172.8 (161.5-184.2)	207.1 (194.6-219.6)	176.5 (162.8-190.2)	169.4 (154.9-183.8)
60-74	706.9 (669.7-744.2)	422.0 (395.6-448.3)	562.1 (535.2-589.0)	527.9 (493.4-562.3)	492.7 (460.1-525.2)
75+	1190.1 (1106.7-1273.4)	601.7 (537.2-666.2)	857.9 (792.5-923.2)	1055.9 (959.1-1152.7)	871.1 (787.0-955.2)

Figure 1.2 Age specific incidence rate (ASpR) per 100,000 population

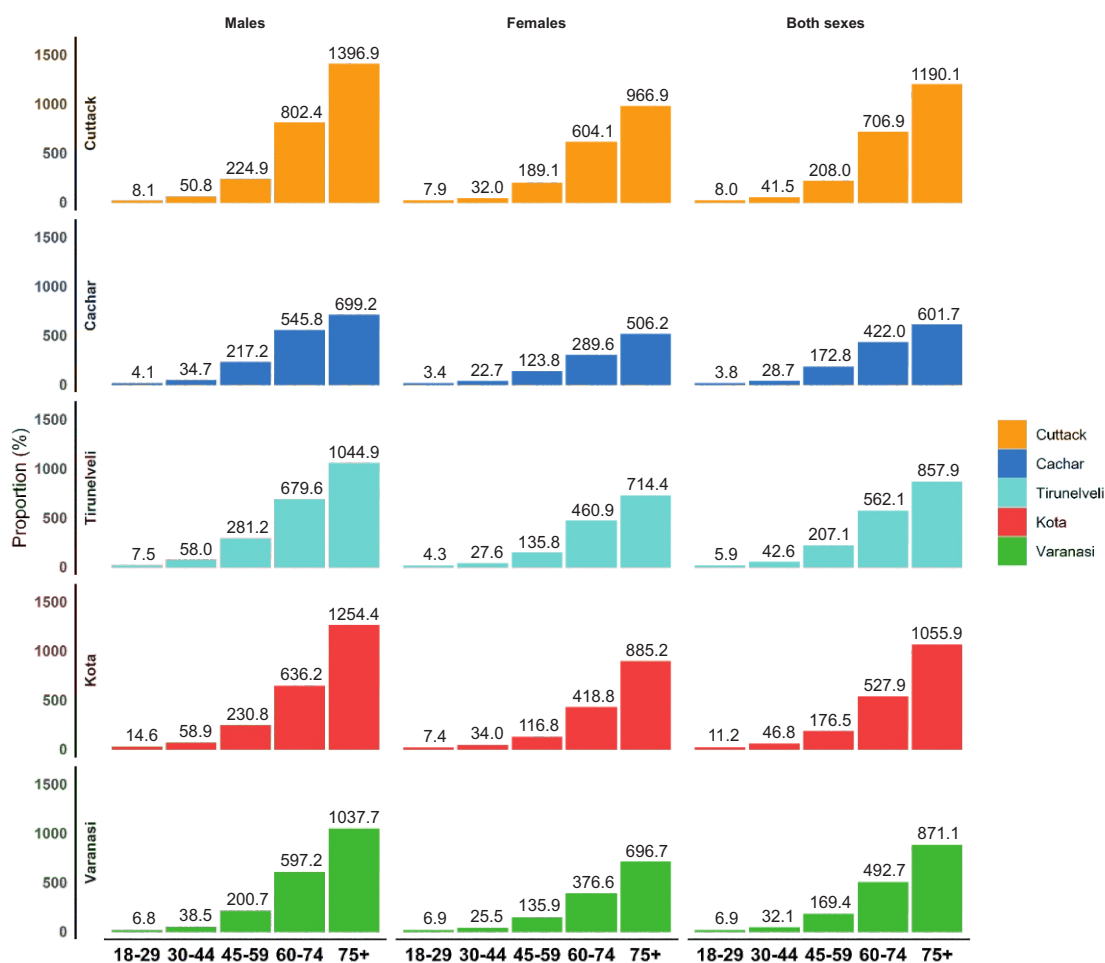


Table 1.9. Crude Rate (CR) and Age Standardized incidence Rate (ASR) per 100,000 population

Registry	Urban		Rural	
	CR	ASR	CR	ASR
	(95% C.I.)	(95% C.I.)	(95% C.I.)	(95% C.I.)
Cuttack	120.5 (114.1-126.8)	94.3 (86.5-102.2)	295.9 (282.4-309.4)	191.7 (177.9-205.5)
Cachar	56.6 (50.8-62.3)	43.4 (36.4-50.4)	107.3 (102.7-111.9)	93.9 (87.5-100.2)
Tirunelveli	108.8 (103.1-114.5)	67.6 (62.1-73.1)	253.8 (243.4-264.1)	163.3 (152.9-173.7)
Kota*	125.8 (120.7-130.8)	105.8 (99.0-112.5)	N.A	
Varanasi*	123.0 (117.6-128.4)	94.3 (87.9-100.8)		

*Kota and Varanasi cover only urban population.

Table 1.10. Age Specific incidence Rate (ASpR) per 100,000 population

Age Group	Cuttack ASpR (95% C.I.)	Cachar ASpR (95% C.I.)	Tirunelveli ASpR (95% C.I.)	Kota* ASpR (95% C.I.)	Varanasi* ASpR (95% C.I.)
Urban					
18-29	4.9 (2.6-7.1)	0.0 (0.0-0.0)	3.8 (1.7-5.9)	11.2 (8.7-13.7)	6.9 (4.8-9.0)
30-44	21.3 (16.6-25.9)	10.8 (6.4-15.2)	24.6 (19.9-29.3)	46.8 (41.2-52.4)	32.1 (27.2-37.0)
45-59	139.3 (124.8-153.9)	76.0 (62.0-90.1)	120.4 (108.2-132.5)	176.5 (162.8-190.2)	169.4 (154.9-183.8)
60-74	546.4 (502.4-590.5)	224.0 (188.3-259.7)	349.6 (321.9-377.2)	527.9 (493.4-562.3)	492.7 (460.1-525.2)
75+	973.1 (869.1-1077.2)	494.7 (388.3-601.1)	644.2 (572.4-716.0)	1055.9 (959.1-1152.7)	871.1 (787.0-955.2)
Rural					
18-29	13.0 (7.8-18.2)	4.7 (3.2-6.3)	8.8 (5.2-12.3)	N.A	
30-44	74.9 (62.9-86.9)	33.9 (29.4-38.4)	67.9 (58.4-77.4)		
45-59	312.4 (283.0-341.8)	204.1 (189.8-218.4)	332.1 (307.1-357.1)		
60-74	1052.5 (979.2-1125.9)	485.4 (452.4-518.3)	849.7 (798.6-900.8)		
75+	1701.6 (1543.9-1859.4)	625.7 (548.3-703.1)	1150.7 (1030.7-1270.7)		

* Kota and Varanasi cover only urban population.

Key Findings

- The average population at risk covered per year ranged from 11.55 lakhs in Cuttack PBSR, Odisha to 20.05 lakhs in Cachar PBSR, Assam
- The proportion of males (range 59.0% to 64.5%) was higher than females (range 35.5% to 41.0%) among registered cases in all the PBSRs
- Maximum number of first-ever stroke cases (range 38.5% to 44.9%) were observed in the age group 60 and 74 years in both sexes in all registries
- In Cuttack, Cachar and Tirunelveli PBSR, proportion of registered cases from rural areas (range 57.2% to 85.2%) was higher as compared to urban areas (range 14.8% to 42.8%), as these included a large rural population
- Cuttack has the highest CR (187.6) and ASR (127.7) per 100,000 population and in both males (CR: 217.4; ASR: 144.6) and females (CR:156.6; ASR: 109.4). The rates per 100,000 population were higher in males (CR: range 123.4 to 217.4; ASR range 102.8 to 144.6) than females (CR: range 69.4 to 156.6; ASR range 59.5 to 109.4) in all the registries
- In all PBSRs, ASpR were higher in males than females in all age groups, with increasing ASpR with increase in age
- Crude rates and Age standardised rates were higher in rural area of Cuttack PBSR(295.9/191.7), Cachar PBSR(107.3/93.9), and Tirunelveli PBSR(253.8/163.3), as compared to its urban area (120.5/94.3), (56.6/43.4), and (108.8/67.6) respectively.
- ASpR per 100,000 population was higher in ≥ 60 years in all PBSRs, higher in rural area of Cuttack PBSR (range 13.0 to 1701.6), Cachar PBSR(range 4.7 to 625.7), and Tirunelveli PBSR (range 8.8 to 1150.7) as compared to its urban area (Cuttack PBSR: range 4.9 to 973.1; Cachar PBSR : range 10.8 to 494.7; Tirunelveli PBSR: range 3.8 to 644.2)