

## Kerala State

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## STATES AND U.T. IN THE SOUTHERN REGION

In all there were 35 districts in the southern states and Union Territory (U.T.) comprising, Kerala, Pondicherry, Tamil Nadu, Karnataka and Andhra Pradesh that had MAAR above the level of 36.2/100,000.

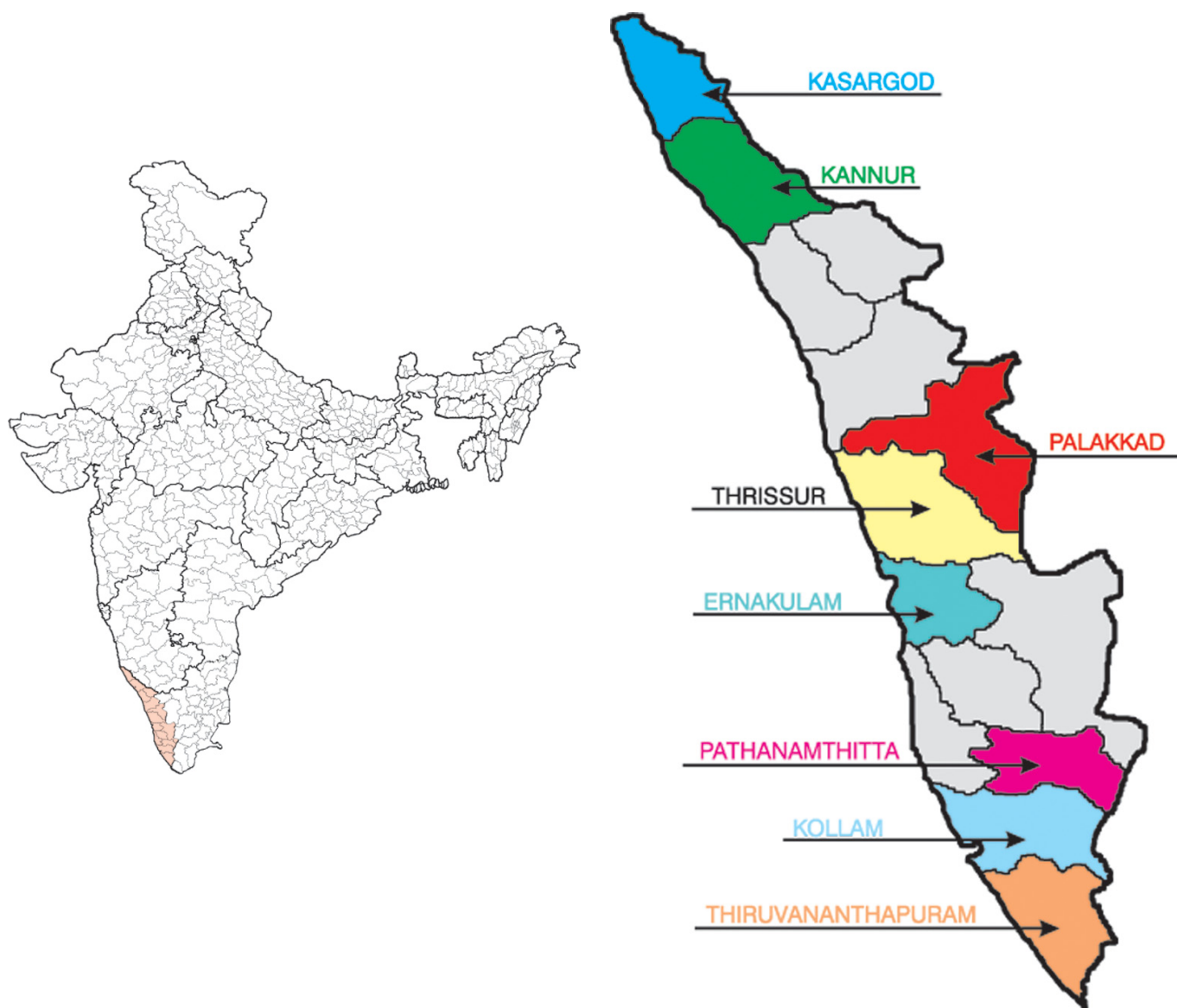


Figure 5(I) : Map of India highlighting Kerala State

Figure 5(J) : Map of Kerala State highlighting the districts with MAAR above 36.2 per 100,000

## KERALA STATE

Figure 5(I) gives the Map of India highlighting Kerala State and Figure 5(J) gives the Map of Kerala State highlighting the Districts where the MAAR was above 36.2 /100,000.

Eight of the fourteen districts of this state provided data for which detailed description of leading sites is given. These eight districts highlighted in the map and in the descending order of MAAR were: Kollam, Thrissur, Thiruvananthapuram, Palakkad, Kasaragod, Pathanamthitta, Kannur and Ernakulam.

*Leading Sites of Cancer in Males:* Among males cancer of the lung was the leading site in all the districts except Thiruvananthapuram where it very closely followed mouth and was the second leading site of cancer. Cancer of the lung constituted 12-14% of all cancers in males in these districts. Other sites of cancer (mouth, oesophagus, tongue, larynx) associated with use of tobacco dominated the leading sites in all the districts. However, cancer of the stomach was the second leading site of cancer in the northern districts of Thrissur, Palakkad and Kannur. In Kasaragod and Ernakulam, cancer of the stomach was the fourth and seventh leading site respectively. Non-Hodgkin's Lymphoma was also an important leading site of cancer in these two districts being second in Ernakulam and third in Kasaragod.

*Leading Sites of Cancer in Females:* Among females cancer of the breast was the leading site in all the districts with the proportion relative to all sites of cancer varying from 22.2% in Kasaragod to 35.4% in Ernakulam. Next only to cancer of the breast, cancer of the thyroid was the second most frequent cancer in women in Kannur and Ernakulam, third leading site in Thiruvananthapuram, and fourth leading site in Thrissur, Pathanamthitta and Kasaragod.

*Centre-wise Distribution of Cancers:* The Regional Cancer Centre at Thiruvananthapuram is a major referral centre for most of these districts. A vast proportion of cancers from the districts of Thrissur and Palakkad have been reported from Amala Cancer Hospital at Thrissur, Government Medical College and Sudharma Laboratory there.

**In males, in Thiruvananthapuram district some of the highest incidence rate in the world of cancer of the mouth was seen. There also seems to be a belt of Thyroid cancer in females in the coastal districts of Kerala, extending along the west coast on to Karnataka and Goa.**

## 5.24. KOLLAM DISTRICT, Kerala State

(Code 3213)

**TABLE 5.24(a) : Profile of Kollam District (2001 Census)**

Area (in sq. kms.)	2,491.0
Decadal Growth Rate (1991-2001)	7.33%
Literacy Rate	
Males	94.63%
Females	88.60%
Sex Ratio (females per 1000 males)	1070
Density (persons per sq. km)	1037

Source: NCRP, Bangalore



FIGURE 5.24(a) : Map of India highlighting Kerala State



FIGURE 5.24(b) : Map of Kerala State highlighting Kollam District

**TABLE 5.24(b) : Centrewise Distribution of Cancers**

Number (#) and Relative Proportion (%)

Year	2001		2002		2001 - 2002	
	#	%	#	%	#	%
Centre (with code in parentheses)						
HBCR -Thiruvananthapuram (1006)	1494	76.7	1823	84.2	3317	80.6
NBRR, Karunagappally (201)	443	22.8	333	15.4	776	18.9
All Other Centres	10	0.5	10	0.5	20	0.5
<b>Total Cancers</b>	<b>1947</b>	<b>100.0</b>	<b>2166</b>	<b>100.0</b>	<b>4113</b>	<b>100.0</b>

Source: NCRP, Bangalore

**TABLE 5.24(c) : Salient features of Cancer Incidence**

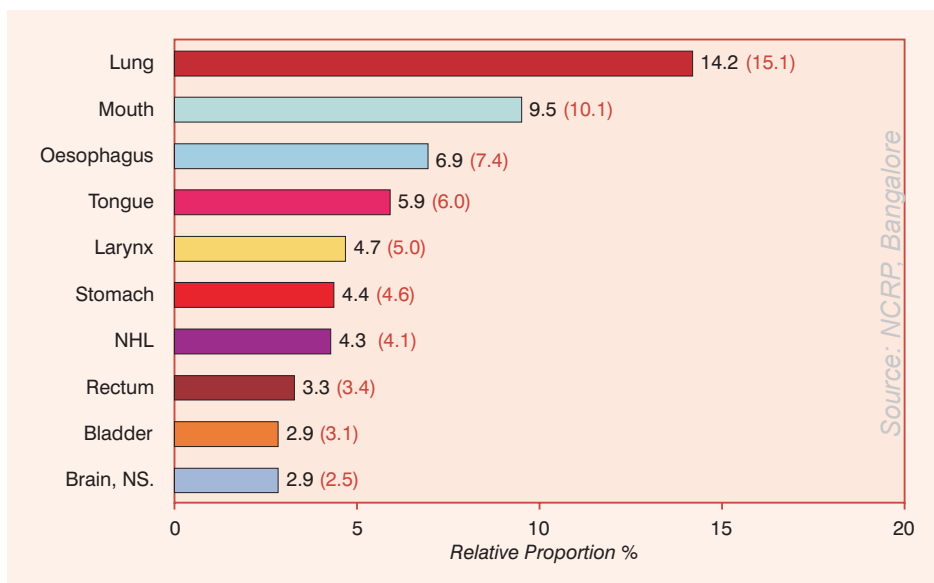
Year	2001		2002		2001 - 2002	
	Males	Females	Males	Females	Males	Females
Estimated Population	12,46,990	13,34,732	12,53,543	13,45,764	25,00,533	26,80,496
Total Cancers (All sites)	1,012	935	1,096	1,070	2,108	2,005
Min. Crude IR	81.2	70.1	87.4	79.5	84.3	74.8
Min. Age Adjusted IR	98.4	79.8	106.5	90.7	102.4	85.3
Min. Truncated IR	184.3	169.9	186.1	191.6	185.1	181.0

Source: NCRP, Bangalore

Min. = Minimum IR = Incidence Rate / 100,000

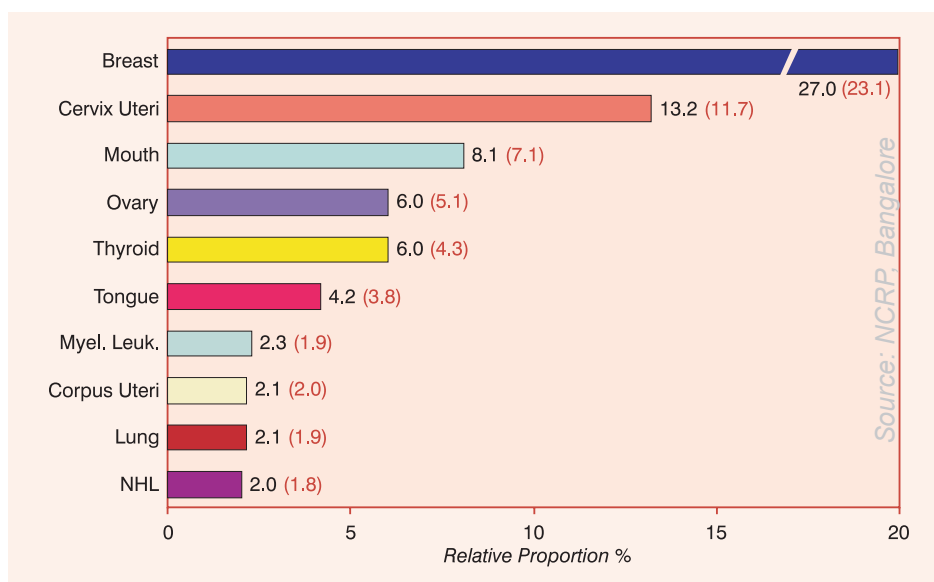
**FIGURE 5.24(c) : Ten Leading Sites of Cancer (2001 - 2002)**  
 (Minimum Age Adjusted Incidence Rates given in parentheses)

**Males**



Source: NCRP, Bangalore

**Females**



Source: NCRP, Bangalore

## 5.25. THRISSUR DISTRICT, Kerala State

(Code 3207)

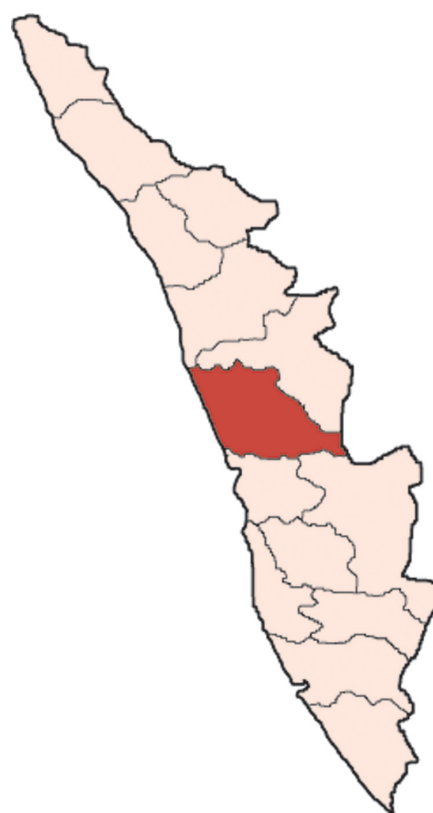
**TABLE 5.25(a) : Profile of Thrissur District (2001 Census)**

Area (in sq. kms.)	3,032.0
Decadal Growth Rate (1991-2001)	8.70%
Literacy Rate	
Males	95.47%
Females	89.94%
Sex Ratio (females per 1000 males)	1092
Density (persons per sq. km)	981

Source: NCRP, Bangalore



**FIGURE 5.25(a) : Map of India highlighting Kerala State**



**FIGURE 5.25(b) : Map of Kerala State highlighting Thrissur District**

**TABLE 5.25(b) : Centrewise Distribution of Cancers**

Number (#) and Relative Proportion (%)

Year	2001		2002		2001 - 2002	
	#	%	#	%	#	%
<b>Centre (with code in parentheses)</b>						
Amala Cancer Hospital, Thrissur (96)	768	36.8	710	30.8	1478	33.6
Government Medical College, Trichur (53)	762	36.5	696	30.2	1458	33.2
HBCR - Thiruvananthapuram (1006)	349	16.7	442	19.2	791	18.0
Sudharama Laboratory (92)	174	8.3	242	10.5	416	9.5
Elite Mission Hospital, Thrissur (98)	0	0.0	116	5.0	116	2.6
The Polyclinic Pvt. Ltd., Thrissur (99)	0	0.0	63	2.7	63	1.4
All Other Centres	35	1.7	39	1.7	74	1.7
<b>Total Cancers</b>	<b>2088</b>	<b>100.0</b>	<b>2308</b>	<b>100.0</b>	<b>4396</b>	<b>100.0</b>

Source: NCRP, Bangalore

**TABLE 5.25(c) : Salient features of Cancer Incidence**

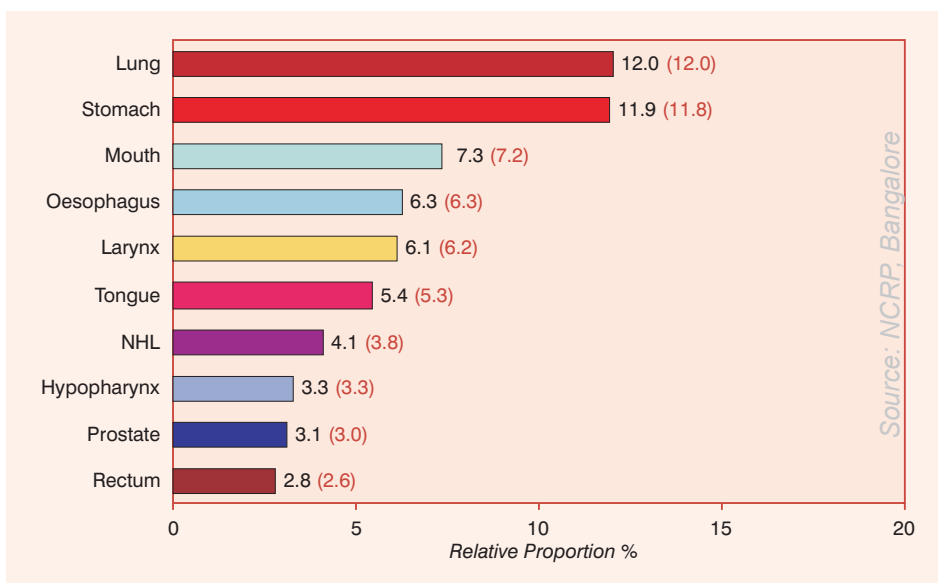
Year	2001		2002		2001 - 2002	
	Males	Females	Males	Females	Males	Females
Estimated Population	14,21,869	15,51,737	14,32,768	15,64,557	28,54,637	31,16,294
Total Cancers (All sites)	1,110	978	1,246	1,062	2,356	2,040
Min. Crude IR	78.1	63.0	87.0	67.9	82.5	65.5
Min. Age Adjusted IR	91.9	67.7	101.9	71.8	97.0	69.8
Min. Truncated IR	168.4	148.7	182.1	156.5	175.4	152.8

Source: NCRP, Bangalore

Min. = Minimum IR = Incidence Rate / 100,000

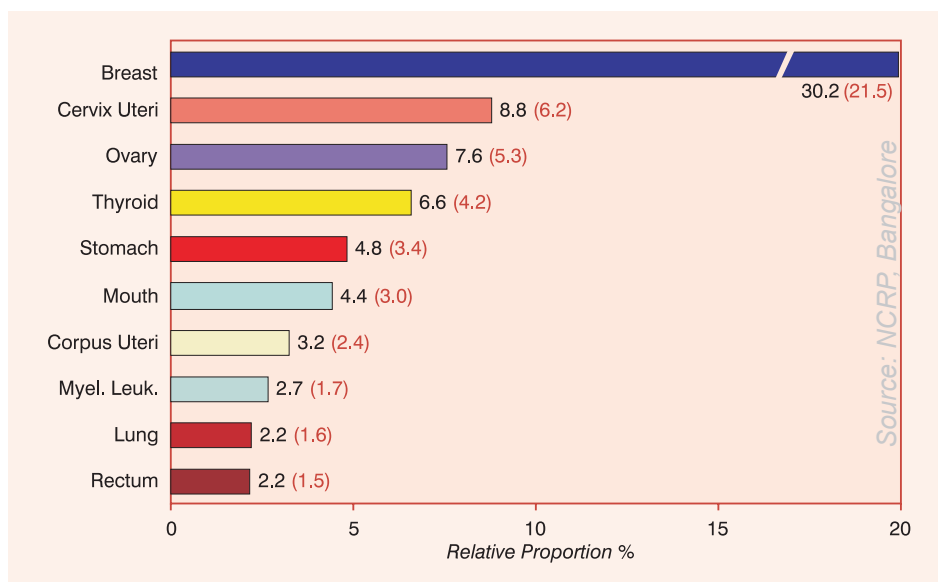
**FIGURE 5.25(c) : Ten Leading Sites of Cancer (2001 - 2002)**  
 (Minimum Age Adjusted Incidence Rates given in parentheses)

**Males**



Source: NCRP, Bangalore

**Females**



Source: NCRP, Bangalore

## 5.26. THIRUVANANTHAPURAM DISTRICT, Kerala State

(Code 3214)

**TABLE 5.26(a) : Profile of Thiruvananthapuram District (2001 Census)**

Area (in sq. kms.)	2,192.0
Decadal Growth Rate (1991-2001)	9.78%
Literacy Rate	
Males	92.68%
Females	86.26%
Sex Ratio (females per 1000 males)	1058
Density (persons per sq. km)	1476

Source: NCRP, Bangalore

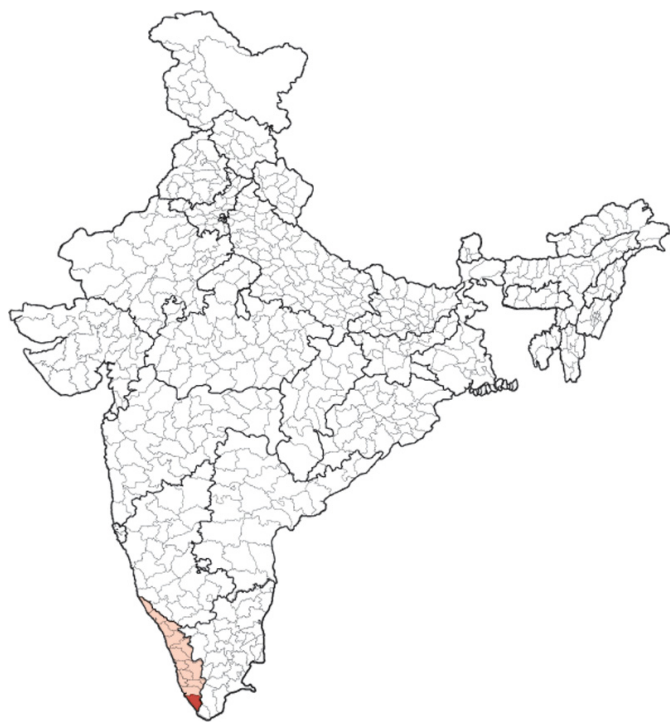


FIGURE 5.26(a) : Map of India highlighting Kerala State



FIGURE 5.26(b) : Map of Kerala State highlighting Thiruvananthapuram District

**TABLE 5.26(b) : Centrewise Distribution of Cancers**  
Number (#) and Relative Proportion (%)

Year	2001		2002		2001 - 2002	
	#	%	#	%	#	%
Centre (with code in parentheses)						
HBCR - Thiruvananthapuram (1006)	1805	99.5	2333	99.5	4138	99.5
All Other Centres	7	0.5	12	0.5	19	0.5
<b>Total Cancers</b>	<b>1812</b>	<b>100.0</b>	<b>2345</b>	<b>100.0</b>	<b>4157</b>	<b>100.0</b>

Source: NCRP, Bangalore



**TABLE 5.26(c) : Salient features of Cancer Incidence**

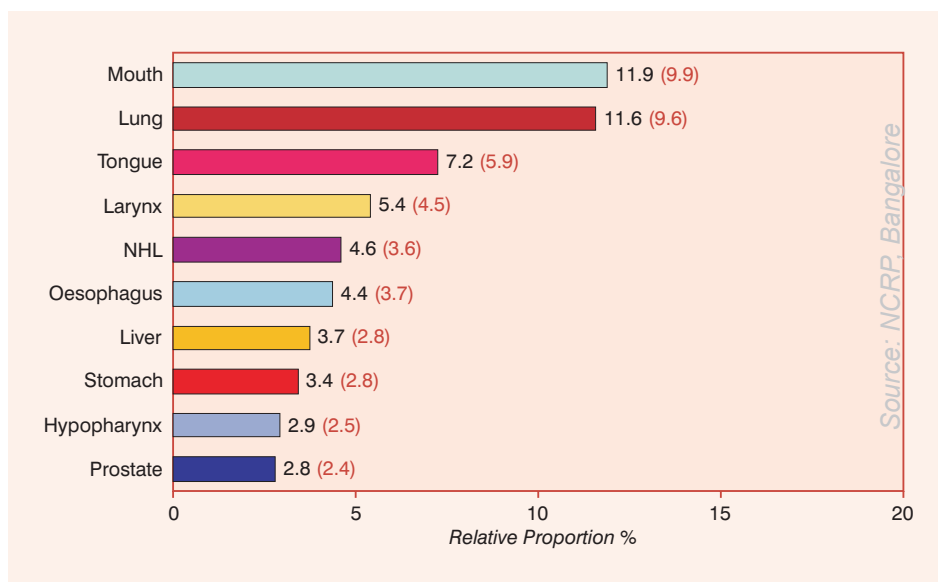
Year	2001		2002		2001 - 2002	
	Males	Females	Males	Females	Males	Females
Estimated Population	15,72,374	16,65,349	15,84,724	16,81,732	31,57,098	33,47,081
Total Cancers (All sites)	862	950	1,142	1,203	2,004	2,153
Min. Crude IR	54.8	57.1	72.1	71.5	63.5	64.3
Min. Age Adjusted IR	69.3	65.4	90.8	83.1	80.1	74.3
Min. Truncated IR	127.5	136.8	164.8	176.4	146.6	156.6

Source: NCRP, Bangalore

Min. = Minimum IR = Incidence Rate / 100,000

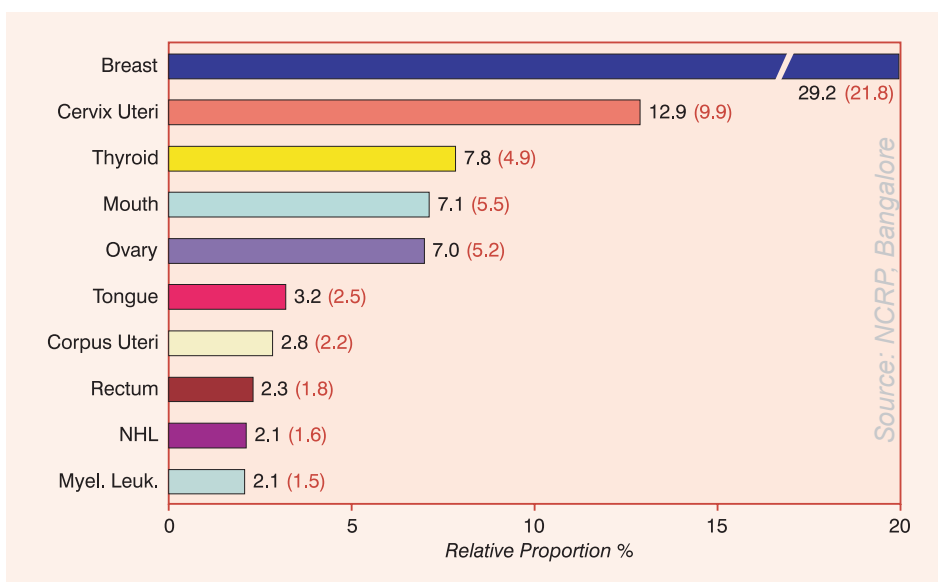
**FIGURE 5.26(c) : Ten Leading Sites of Cancer (2001 - 2002)**  
 (Minimum Age Adjusted Incidence Rates given in parentheses)

**Males**



Source: NCRP, Bangalore

**Females**



Source: NCRP, Bangalore

## 5.27. PALAKKAD DISTRICT, Kerala State

(Code 3206)

**TABLE 5.27(a) : Profile of Palakkad District (2001 Census)**

Area (in sq. kms.)	4,480.0
Decadal Growth Rate (1991-2001)	9.86%
Literacy Rate	
Males	89.73%
Females	79.31%
Sex Ratio (females per 1000 males)	1068
Density (persons per sq. km)	584

Source: NCRP, Bangalore



FIGURE 5.27(a) : Map of India highlighting Kerala State

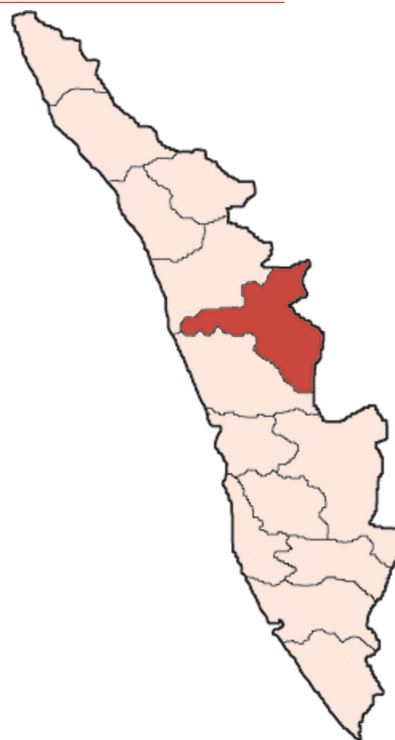


FIGURE 5.27(b) : Map of Kerala State highlighting Palakkad District

**TABLE 5.27(b) : Centrewise Distribution of Cancers**

Number (#) and Relative Proportion (%)

Year	2001		2002		2001 - 2002	
	#	%	#	%	#	%
<b>Centre (with code in parentheses)</b>						
Amala Cancer Hospital, Thrissur (96)	274	27.3	335	28.6	609	28.0
HBCR - Thiruvananthapuram (1006)	259	25.8	326	27.8	585	26.9
Government Medical College, Thrissur (53)	293	29.2	287	24.5	580	26.9
Sudharama Laboratory, Thrissur (92)	66	6.6	67	5.7	133	6.1
GKNM Hospital, Coimbatore (54)	63	6.3	52	4.4	115	5.3
Sai Subramanian Pathology Lab, CBE (91)	11	1.1	19	1.6	30	1.4
HBCR - Chennai (1009)	11	1.1	18	1.5	29	1.3
PSG Institute, Coimbatore (1)	11	1.1	16	1.4	27	1.2
All Other Centres	17	1.7	53	4.5	70	3.2
<b>Total Cancers</b>	<b>1005</b>	<b>100.0</b>	<b>1173</b>	<b>100.0</b>	<b>2178</b>	<b>100.0</b>

Source: NCRP, Bangalore

**TABLE 5.27(c) : Salient features of Cancer Incidence**

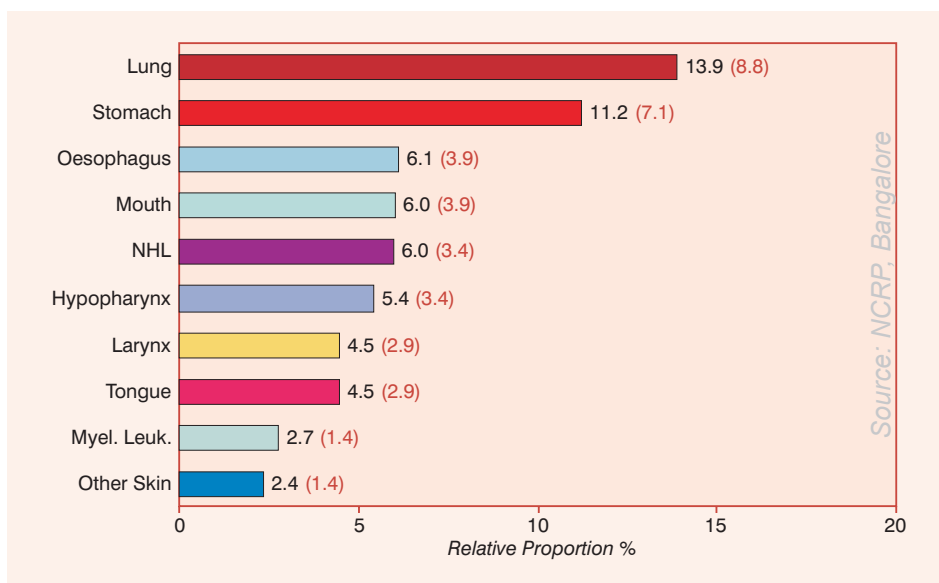
Year	2001		2002		2001 - 2002	
	Males	Females	Males	Females	Males	Females
Estimated Population	12,68,284	13,54,295	12,79,467	13,67,153	25,47,751	27,21,448
Total Cancers (All sites)	576	429	699	474	1275	903
Min. Crude IR	45.4	31.7	54.6	34.7	50.0	33.2
Min. Age Adjusted IR	56.1	37.1	66.8	40.7	61.5	38.9
Min. Truncated IR	110.6	82.3	121.9	93.5	116.0	87.9

Source: NCRP, Bangalore

Min. = Minimum IR = Incidence Rate / 100,000

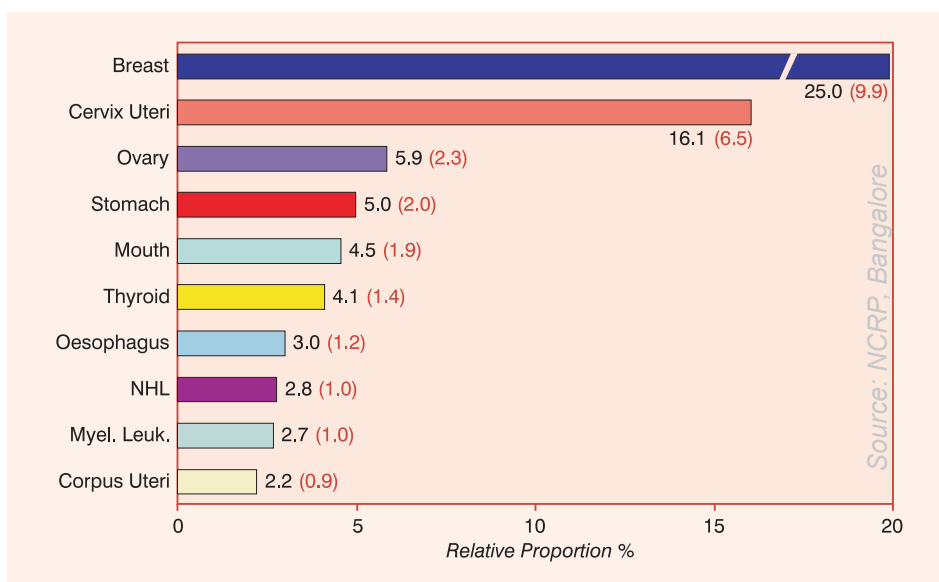
**FIGURE 5.27(c) : Ten Leading Sites of Cancer (2001 - 2002)**  
 (Minimum Age Adjusted Incidence Rates given in parentheses)

**Males**



Source: NCRP, Bangalore

**Females**



Source: NCRP, Bangalore

## 5.28. KASARAGOD DISTRICT, Kerala State

(Code 3201)

**TABLE 5.28(a) : Profile of Kasaragod District (2001 Census)**

Area (in sq. kms.)	1,992.0
Decadal Growth Rate (1991-2001)	12.30%
Literacy Rate	
Males	90.84%
Females	79.80%
Sex Ratio (females per 1000 males)	1047
Density (persons per sq. km)	604

Source: NCRP, Bangalore



**FIGURE 5.28(a) : Map of India highlighting Kerala State**



**FIGURE 5.28(b) : Map of Kerala State highlighting Kasaragod District**

**TABLE 5.28(b) : Centrewise Distribution of Cancers**

Number (#) and Relative Proportion (%)

Year	2001		2002		2001 - 2002	
	#	%	#	%	#	%
<b>Centre</b> (with code in parentheses)						
Kasturba Medical College, Mangalore (3)	228	68.9	309	72.0	537	70.7
Kasturba Medical College, Manipal (77)	54	16.3	49	11.4	103	13.6
HBCR - Thiruvananthapuram (1006)	30	9.1	61	14.2	91	12.0
HBCR - Bangalore (1007)	8	2.4	0	0.0	8	1.1
Amala Cancer Hospital, Thrissur (96)	6	1.8	2	0.5	8	1.1
All Other Centres	5	1.5	8	1.9	13	1.7
<b>Total Cancers</b>	<b>331</b>	<b>100.0</b>	<b>429</b>	<b>100.0</b>	<b>760</b>	<b>100.0</b>

Source: NCRP, Bangalore

**TABLE 5.28(c) : Salient features of Cancer Incidence**

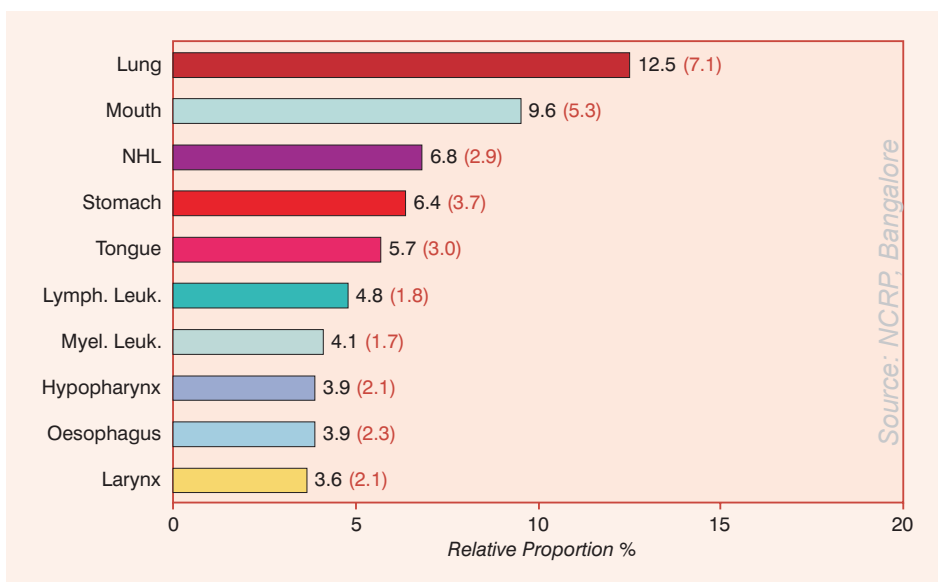
Year	2001		2002		2001 - 2002	
	Males	Females	Males	Females	Males	Females
Estimated Population	5,88,466	6,16,699	5,94,345	6,23,963	11,82,811	12,40,662
Total Cancers (All sites)	198	133	242	187	440	320
Min. Crude IR	33.7	21.6	40.7	30.0	37.2	25.8
Min. Age Adjusted IR	46.3	29.1	57.2	40.9	51.8	35.0
Min. Truncated IR	87.1	61.1	98.1	96.7	92.8	78.9

Source: NCRP, Bangalore

Min. = Minimum IR = Incidence Rate / 100,000

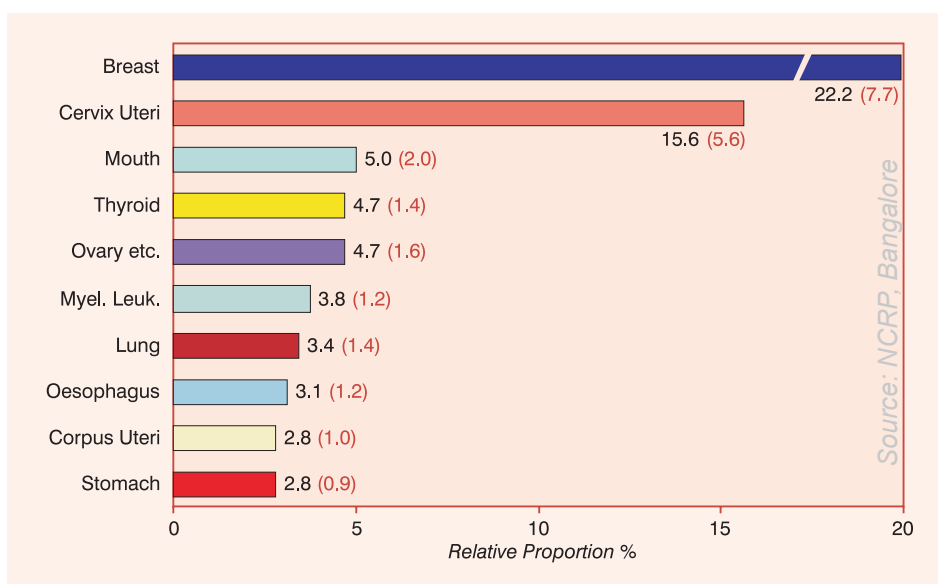
**FIGURE 5.28(c) : Ten Leading Sites of Cancer (2001 - 2002)**  
 (Minimum Age Adjusted Incidence Rates given in parentheses)

**Males**



Source: NCRP, Bangalore

**Females**



Source: NCRP, Bangalore

## 5.29. PATHANAMTHITTA DISTRICT, Kerala State

(Code 3212)

**TABLE 5.29(a) : Profile of Pathanamthitta District  
(2001 Census)**

Area (in sq. kms.)	2,637.0
Decadal Growth Rate (1991-2001)	3.72%
Literacy Rate	
Males	96.62%
Females	93.71%
Sex Ratio (females per 1000 males)	1094
Density (persons per sq. km)	467

Source: NCRP, Bangalore



FIGURE 5.29(a) : Map of India highlighting Kerala State



FIGURE 5.29(b) : Map of Kerala State highlighting Pathanamthitta District

**TABLE 5.29(b) : Centrewise Distribution of Cancers**  
Number (#) and Relative Proportion (%)

Year	2001		2002		2001 - 2002	
	#	%	#	%	#	%
<b>Centre</b> (with code in parentheses)						
HBCR - Thiruvananthapuram (1006)	537	96.1	635	97.2	1172	96.7
HBCR - Mumbai (1008)	14	2.5	8	1.2	22	1.8
All Other Centres	8	1.4	10	1.5	18	1.5
<b>Total Cancers</b>	<b>559</b>	<b>100.0</b>	<b>653</b>	<b>100.0</b>	<b>1212</b>	<b>100.0</b>

Source: NCRP, Bangalore

**TABLE 5.29(c) : Salient features of Cancer Incidence**

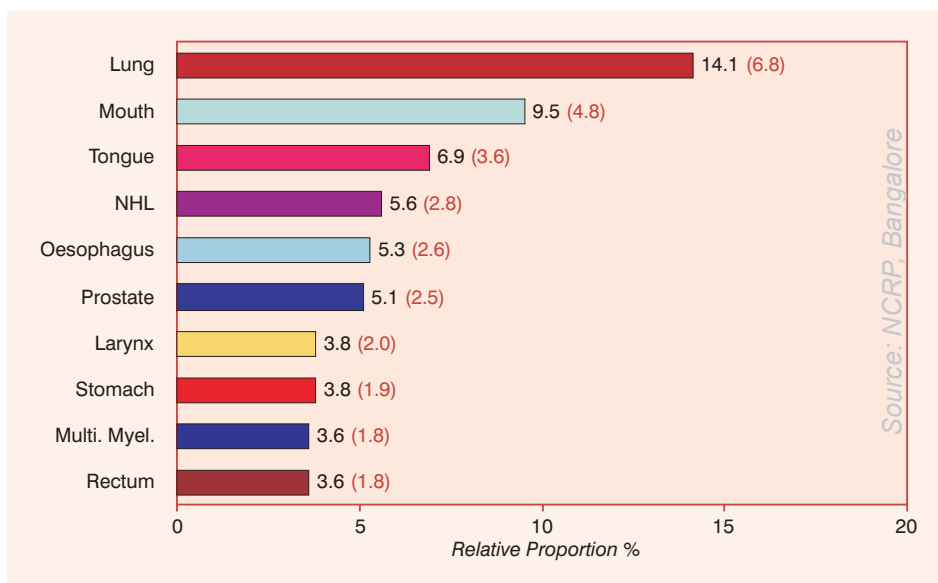
Year	2001		2002		2001 - 2002	
	Males	Females	Males	Females	Males	Females
Estimated Population	5,86,959	6,42,755	5,88,134	6,45,878	11,75,093	12,88,633
Total Cancers (All sites)	276	283	332	321	608	604
Min. Crude IR	47.0	44.0	56.5	49.7	51.7	46.9
Min. Age Adjusted IR	46.7	44.8	54.6	49.0	50.7	46.9
Min. Truncated IR	81.2	103.0	95.7	105.0	88.4	104.2

Source: NCRP, Bangalore

Min. = Minimum IR = Incidence Rate / 100,000

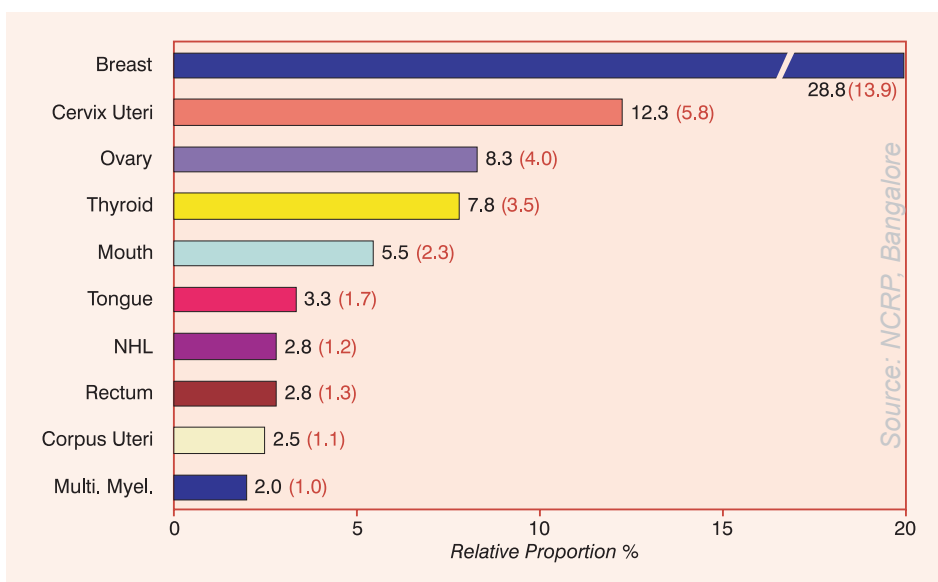
**FIGURE 5.29(c) : Ten Leading Sites of Cancer (2001 - 2002)**  
 (Minimum Age Adjusted Incidence Rates given in parentheses)

**Males**



Source: NCRP, Bangalore

**Females**



Source: NCRP, Bangalore

## 5.30. KANNUR DISTRICT, Kerala State

(Code 3202)

**TABLE 5.30 (a) : Profile of Kannur District (2001 Census)**

Area (in sq. kms.)	2,966.0
Decadal Growth Rate (1991-2001)	7.13%
Literacy Rate	
Males	96.38%
Females	89.57%
Sex Ratio (females per 1000 males)	1090
Density (persons per sq. km)	813

Source: NCRP, Bangalore



**FIGURE 5.30(a) : Map of India highlighting Kerala State**



**FIGURE 5.30 (b) : Map of Kerala State highlighting Kannur District**

**TABLE 5.30(b) : Centrewise Distribution of Cancers**

Number (#) and Relative Proportion (%)

Year	2001		2002		2001 - 2002	
	#	%	#	%	#	%
<b>Centre</b> (with code in parentheses)						
Kasturba Medical College, Manipal (77)	289	42.2	216	32.0	505	37.2
HBCR - Thiruvananthapuram (1006)	210	30.7	248	36.8	458	33.7
Kasturba Medical College, Mangalore (3)	92	13.4	104	15.4	196	14.4
Amala Cancer Hospital, Thrissur (96)	28	4.1	27	4.0	55	4.0
HBCR - Chennai (1009)	28	4.1	26	3.9	54	4.0
Sudharama Laboratory, Thrissur (92)	4	0.6	37	5.5	41	3.0
HBCR - Bangalore (1007)	18	2.6	0	0.0	18	1.3
HBCR - Mumbai (1008)	6	0.9	8	1.2	14	1.0
All Other Centres	10	1.5	8	1.2	18	1.3
<b>Total Cancers</b>	<b>685</b>	<b>100.0</b>	<b>674</b>	<b>100.0</b>	<b>1359</b>	<b>100.0</b>

Source: NCRP, Bangalore



**TABLE 5.30(c) : Salient features of Cancer Incidence**

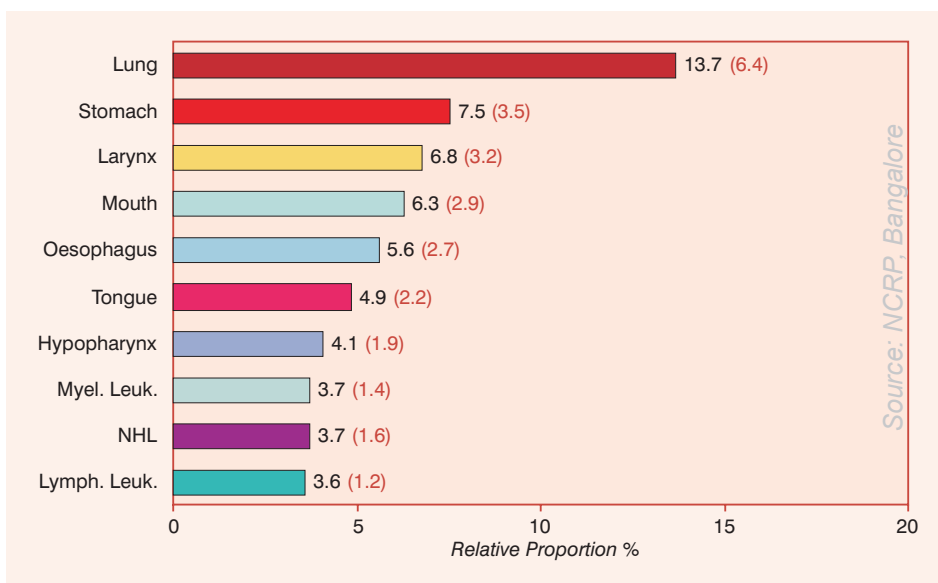
Year	2001		2002		2001 - 2002	
	Males	Females	Males	Females	Males	Females
Estimated Population	11,54,704	12,60,540	11,60,221	12,71,054	23,14,925	25,31,594
Total Cancers (All sites)	401	284	381	293	782	577
Min. Crude IR	34.7	22.5	32.8	23.1	33.8	22.8
Min. Age Adjusted IR	45.1	26.4	42.9	26.8	44.0	26.6
Min. Truncated IR	79.3	57.5	78.0	55.6	78.7	56.6

Source: NCRP, Bangalore

Min. = Minimum IR = Incidence Rate / 100,000

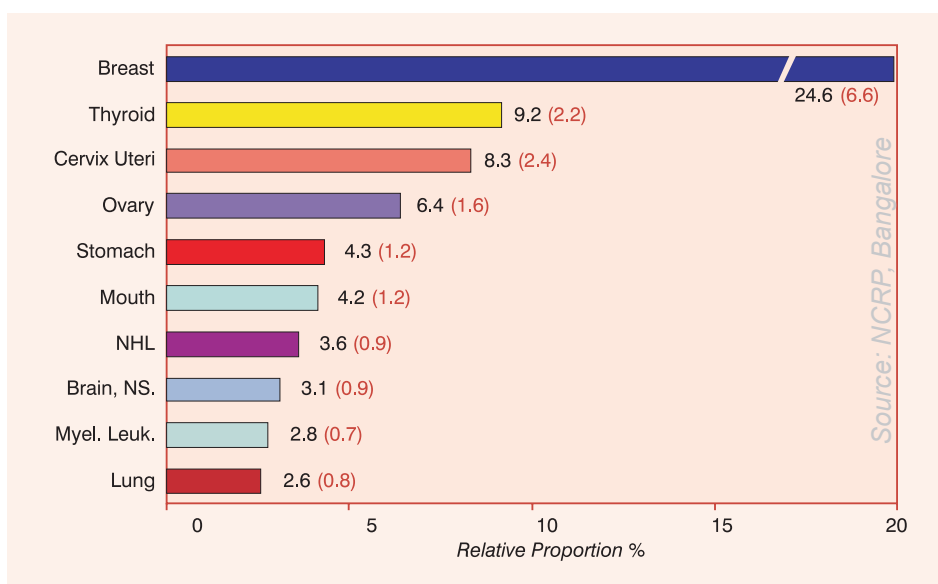
**FIGURE 5.30(c) : Ten Leading Sites of Cancer (2001 - 2002)**  
 (Minimum Age Adjusted Incidence Rates given in parentheses)

**Males**



Source: NCRP, Bangalore

**Females**



Source: NCRP, Bangalore

## 5.31. ERNAKULAM DISTRICT, Kerala State

(Code 3208)

TABLE 5.31(a) : Profile of Ernakulam District (2001 Census)	
Area (in sq. kms.)	2,950.0
Decadal Growth Rate (1991-2001)	9.09%
Literacy Rate	
Males	95.95%
Females	90.96%
Sex Ratio (females per 1000 males)	1017
Density (persons per sq. km)	1050

Source: NCRP, Bangalore



FIGURE 5.31(a) : Map of India highlighting Kerala State



FIGURE 5.31(b) : Map of Kerala State highlighting Ernakulam District

TABLE 5.31(b) : Centrewise Distribution of Cancers

Number (#) and Relative Proportion (%)

Year	2001		2002		2001 - 2002	
	#	%	#	%	#	%
<b>Centre</b> (with code in parentheses)						
HBCR - Thiruvananthapuram (1006)	559	71.2	689	73.1	1248	72.3
Amala Cancer Hospital, Thrissur (96)	153	19.5	165	17.5	318	18.4
Government Medical College, Thrissur (53)	42	5.3	47	5.0	89	5.2
HBCR - Mumbai (1008)	10	1.3	19	2.0	29	1.7
All Other Centres	21	2.7	22	2.3	43	2.5
<b>Total Cancers</b>	<b>785</b>	<b>100.0</b>	<b>942</b>	<b>100.0</b>	<b>1727</b>	<b>100.0</b>

Source: NCRP, Bangalore

**TABLE 5.31(c) : Salient features of Cancer Incidence**

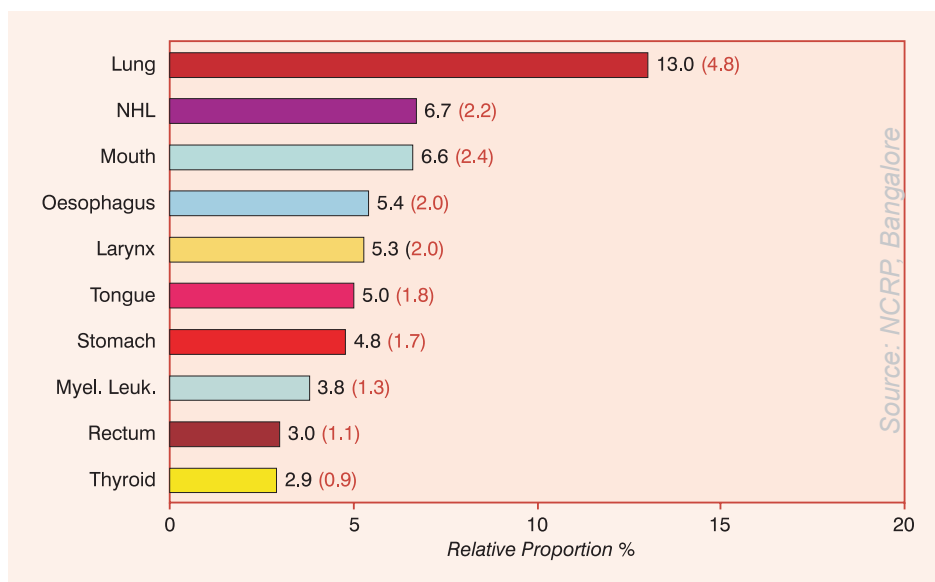
Year	2001		2002		2001 - 2002	
	Males	Females	Males	Females	Males	Females
Estimated Population	15,36,567	15,62,119	15,49,254	15,77,448	30,85,821	31,39,567
Total Cancers (All sites)	431	354	490	452	921	806
Min. Crude IR	28.1	22.7	31.6	28.7	29.9	25.7
Min. Age Adjusted IR	32.9	24.3	37.2	31.0	35.1	27.7
Min. Truncated IR	67.3	53.0	74.8	69.8	71.6	61.7

Source: NCRP, Bangalore

Min. = Minimum IR = Incidence Rate / 100,000

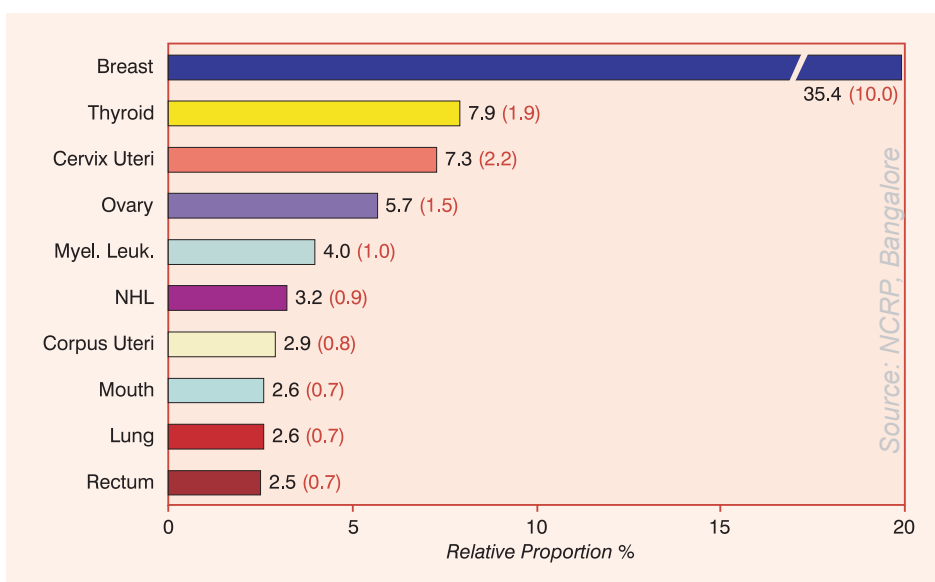
**FIGURE 5.31(c) : Ten Leading Sites of Cancer (2001 - 2002)**  
 (Minimum Age Adjusted Incidence Rates given in parentheses)

**Males**



Source: NCRP, Bangalore

**Females**



Source: NCRP, Bangalore