

Incidence estimate of Cancer Cases in State/UT of India from 2018 to 2021-v-1

DR PIYUSH KUMAR¹

¹ B. R. Ambedkar Bihar University

Funding: The author(s) received no specific funding for this work.

Potential competing interests: The author(s) declared that no potential competing interests exist.

Abstract

The data on cancer is provided by various population-based cancer registries (PBCRs) and hospital-based cancer registries (HBCRs) in India. This article contains 4 years (2018-2021) incidence data analysis from the network of cancer registries in India working under the National Cancer Registry Programme (NCRP). This study examined the cancer incidence, from 28 PBCRs and 58 HBCRs. The annual growth rates of cancer incidence were calculated by dividing current year incidence from previous year incidence and multiplying it with 100. This study provides the status and trends of cancer incidence in India. This snapshot short study will help decision makers to think for action to improve measures of cancer prevention and control to achieve the sustainable development goals.

Keywords-Cancer registry, data, national cancer registry, projected cancer cases,

Incidence estimate of Cancer Cases in State/UT of India from 2018 to 2021-v-1

Dr Piyush Kumar¹

¹ M.B.B.S. E.M.O.C., P.G.D.P.H.M., Senior General Medical Officer, Health Department, Government of Bihar, India, drpiyush003@gmail.com

Advocate Anupama²

² Senior Lawyer, Bar council, Patna, Bihar

Public Health

Article

Abstract- The data on cancer is provided by various population-based cancer registries (PBCRs) and hospital-based cancer registries (HBCRs) in India. This article contains 4 years (2018-2021) incidence data analysis from the network of cancer registries in India working under the National Cancer Registry Programme (NCRP). This study examined the cancer incidence, from 28 PBCRs and 58 HBCRs. The annual growth rates of cancer incidence were calculated by dividing current year incidence from previous year incidence and multiplying it with 100. This study provides the status and trends of cancer incidence in India. This snapshot short study will help decision makers to think for action to improve measures of cancer prevention and control to achieve the sustainable development goals.

Keywords-Cancer registry, data, national cancer registry, projected cancer cases,

Introduction

Cancer is caused by a variety of risk factors such as ageing, lifestyle, tobacco, lack of balanced diet and air pollution etc [1]. Alcohol consumption is causally associated with the cancers of the oesophagus, colorectal, oral cavity, pharynx, larynx, liver and female breast [2]. Noncommunicable diseases (NCDs) accounts for 71% of all deaths globally [3]. NCDs account for 63% of all deaths in India of which cancer is one of the leading causes (9%) [4]. Cancer registries in India, has been started since 1982 by two routes, the population-based cancer registries (PBCRs) and hospital-based cancer registries (HBCRs) under project of the National Cancer Registry Programme (NCRP)–National Centre for Disease Informatics and Research (NCDIR) of the Indian Council of Medical Research (ICMR; ICMR-NCDIR-NCRP), Bangalore [5]. HBCRs provide information on patients with cancer in a particular hospital which are used for reviewing clinical performance and the hospital cancer program. Patterns, trends, projections, and mortality and also the stage at presentation type of treatment of patients with cancer from will be analysed in version 2 of this research. Health is a state subject in India. The Department of Health & Family Welfare provides support to the States/UTs under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) which was launched in 2010 as part of National Health Mission (NHM), with focus on strengthening human resource development, infrastructure, management and referral, health promotion, early diagnosis. Cancer control is an integral part of NPCDCS. NPCDCS is population-based initiative for prevention, control and screening for Non Communicable Diseases (NCDs) such as diabetes, hypertension, cancers etc in the country under NHM (also as a part of Comprehensive Primary Health Care). Under this initiative, persons aged more than 30 years are target for screening for 03 common cancers i.e. oral, breast and cervical. Screening is an integral part of Ayushman Bharat through Ayushman Bharat Health Wellness Centre scheme. NPCDCS gives financial support for awareness generation (IEC) activities to be undertaken by the States/UTs as per their Programme Implementation Plans (PIPs). The Central Government is Strengthening Tertiary Care of Cancer, 19 State Cancer Institute's (SCIs) and 20 Tertiary Care Cancer Centres (TCCCs) have been approved so far in order to enhance the facilities for tertiary care of cancer (see- [ANNEXURE-I](#)). Treatment of Cancers is available under Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (PMJAY). Under Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) quality generic medicines are made available at affordable prices to all, in collaboration with the State Governments. AMRIT Pharmacy (Affordable Medicines and Reliable Implants for Treatment) stores have been set up with an objective to make available Cancer drugs at a discount vis-à-vis the Maximum Retail Price. Rashtrya Arogya Nidhi (RAN), provides

financial assistance to families living below poverty line for their treatment, including treatment of Cancer in hospitals.

Objectives

The NCRP was launched with the objective of generating reliable data on the burden and patterns of cancer. **The key objective is to estimate the incidence of cancer in State/ UT-wise during the last four years and to calculate growth rate. Incidence per lakh populations of all reported cancers and other epidemiological discussions will be presented in next version-2.**

Methods

Study design

Data from 36 PBCRs and 236 HBCRs registered under the ICMR-NCDIR-NCRP were collected. All neoplasm with code of 3 as defined in the International Classification of Diseases for Oncology, 3rd Edition, and the International Statistical Classification of Diseases and Related Health Problems (10th revision; ICD10) were registered in NCRP.

Setting

Cancer registration data were collected from accredited sources such as hospitals, diagnostic laboratories, vital statistics departments were collected on a standardized core form followed by specific quality control checks, measurability, accuracy with timeliness, and reliability. Incidence data were retrieved from PBCRs (urban or rural, or both).

Participants

Patients with cancer who were residents in the registration area for a minimum period of 1 year before the date of diagnosis were included in the registry.

Variables

Cancer registration data from different sources such as hospitals, diagnostic laboratories, vital statistics departments were collected.

Data sources/measurement

Multiple cancer data sources were followed for data collection. Quality of the data was maintained per International Association of Cancer Registries/International Agency for Research on Cancer (IACR/IARC) norms.

Bias

Limited secondary data sources were the main bias observed.

Study size

28 PBCRs of 2012-2016

Quantitative variables

28 PBCRs of 2012-2016 were only reliable data available.

Statistical methods

NCRP has developed its own in-house software (PBCR and HBCR Data Management) for data capture, quality checks, duplicates checks etc, and incidence calculations. The errors found during calculation were sent back to source registries for clarifications and corrections. Projected cancer incidence cases for India were computed using Age specific incidence Rate of 28 PBCRs of 2012-2016 and the projected population (person-years).

Results

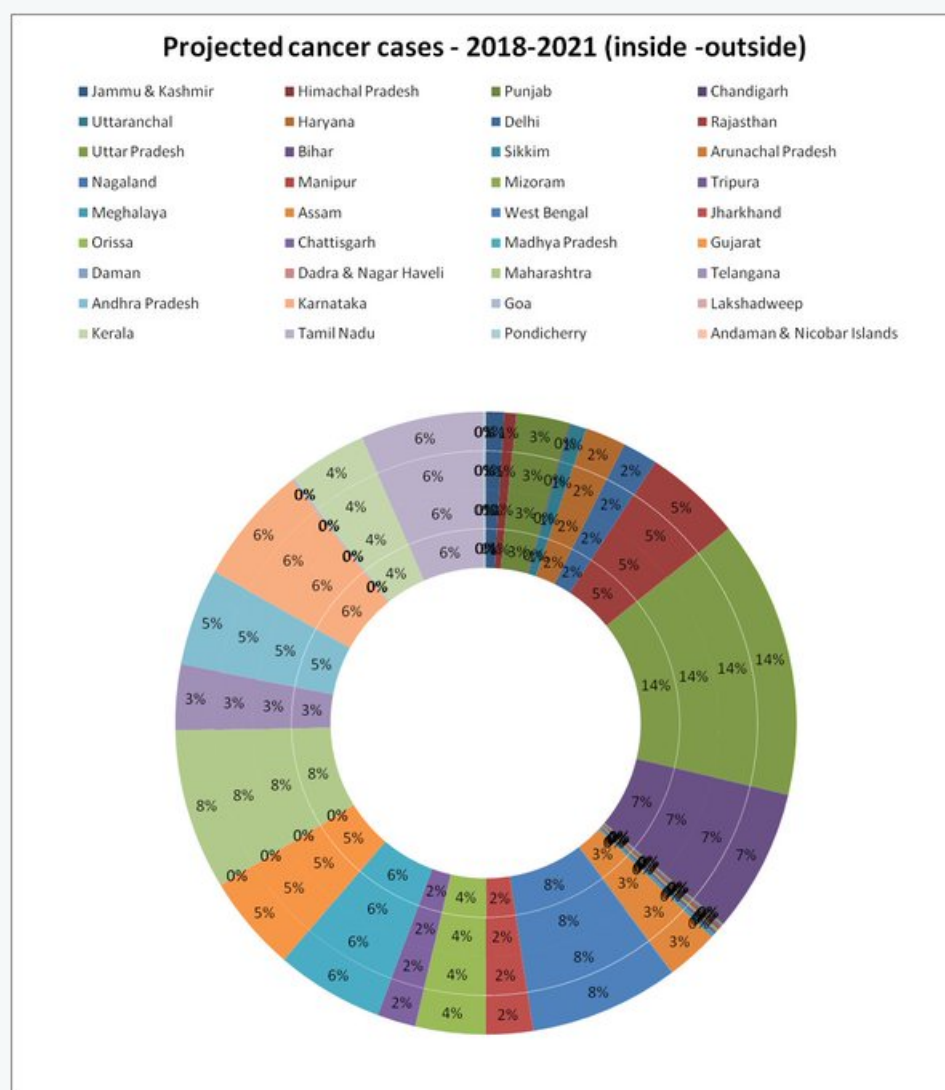
As per cancer registry data on National Cancer Registry Programme Report, the estimated number of incidence of cancer cases in the country from 2018 to 2021 by State/UT wise is shown in Table 1.

Table 1: Estimated Incidence and growth rate of cancer cases in India by different State/UT - All sites (ICD10: C00-C97) - (2018-2021)* - Both sexes

State/UT	Projected cancer cases 2018	Projected cancer cases 2019	Projected cancer cases 2020	Projected cancer cases 2021	Growth Rate2019	Growth Rate2020	Growth Rate2021
Jammu & Kashmir	12344	12675	13012	13354	102.6815	102.6588	102.6283
Himachal Pradesh	8412	8589	8799	8978	102.1041	102.445	102.0343
Punjab	36888	37744	38636	39521	102.3205	102.3633	102.2906
Chandigarh	966	994	1024	1053	102.8986	103.0181	102.832
Uttaranchal	10932	11216	11482	11779	102.5979	102.3716	102.5867
Haryana	27665	28453	29219	30015	102.8484	102.6922	102.7243
Delhi	23678	24436	25178	25969	103.2013	103.0365	103.1416
Rajasthan	67380	69156	70987	72825	102.6358	102.6476	102.5892
Uttar Pradesh	192019	196652	201319	206088	102.4128	102.3732	102.3689
Bihar	98383	101014	103711	106435	102.6742	102.6699	102.6265
Sikkim	437	443	445	465	101.373	100.4515	104.4944
Arunachal Pradesh	991	1015	1035	1064	102.4218	101.9704	102.8019
Nagaland	1684	1719	1768	1805	102.0784	102.8505	102.0928
Manipur	1803	1844	1899	2022	102.274	102.9826	106.4771
Mizoram	1742	1783	1837	1919	102.3536	103.0286	104.4638
Tripura	2454	2507	2574	2623	102.1597	102.6725	101.9037
Meghalaya	2741	2808	2879	2943	102.4444	102.5285	102.223
Assam	36029	36948	37880	38834	102.5507	102.5225	102.5185
West Bengal	103309	105814	108394	110972	102.4248	102.4382	102.3784
Jharkhand	32150	33045	33961	34910	102.7838	102.772	102.7944
Orissa	48491	49604	50692	51829	102.2953	102.1934	102.243
Chattisgarh	26443	27113	27828	28529	102.5338	102.6371	102.519
Madhya Pradesh	73957	75911	77888	79871	102.6421	102.6044	102.546
Gujarat	66069	67841	69660	71507	102.682	102.6813	102.6514
Daman	107	118	124	135	110.2804	105.0847	108.871
Dadra & Nagar Haveli	173	186	206	219	107.5145	110.7527	106.3107
Maharashtra	110696	113374	116121	118906	102.4192	102.423	102.3984
Telangana	45335	46464	47620	48775	102.4903	102.4879	102.4255
Andhra Pradesh	67370	68883	70424	71970	102.2458	102.2371	102.1953
Karnataka	81729	83824	85968	88126	102.5633	102.5577	102.5102
Goa	1543	1591	1618	1652	103.1108	101.697	102.1014
Lakshadweep	27	27	27	28	100	100	103.7037
Kerala	55145	56148	57155	58139	101.8188	101.7935	101.7216
Tamil Nadu	84320	86596	88866	91184	102.6992	102.6214	102.6084
Pondicherry	1469	1523	1577	1623	103.676	103.5456	102.9169
Andaman & Nicobar Islands	351	357	366	380	101.7094	102.521	103.8251
Total	1325232	1358415	1392179	1426447	102.5039	102.4855	102.4615

Ref: National Cancer Registry Programme report, 2020 * Projected cancer cases for India were computed using Age specific incidence Rate of 28 PBCRs of 2012-2016 and the projected population (person-years)

Figure – 1 – projected cancer cases in states and union territories of India.



Uttar Pradesh is having maximum cases as per estimate (14%) followed by west Bengal and Maharashtra with 8% of cases and Bihar 7%, please view figure 1 for details.

Discussion

Cancer is not declared a notifiable disease by Government of India hence registration faces several challenges. The causal mortality registration system gaps include incomplete and inaccurate certification of cause of death. Registering cases through passive notification by health care providers/facilities to report cancer occurrence in India would improve the coverage with limited resources. Linking of cancer registry data with Ayushman Bharat, mortality databases, and the Health management Information System would improve cancer registration, follow-up, and outcome data. This study provides a snapshot of the status and trends of cancer in India. Cancer registration needs more support for action to strengthen efforts for cancer prevention and control to achieve the sustainable development goals.

Limitations

The key limitation is the methodology which assumes constant incidence rate for future as a conservative approach. PBCR covers only 10% of the population in India hence many parts of the country are not covered. Other influencing factors likely to influence the projection of cancer cases are risk factors/behaviour, case finding procedure, screening programme, improved technique for detecting cancer patients etc.

Other information

This is the first version of this work and more versions will evolve in future with more information and analysis.

Abbreviation

population-based cancer registries (PBCRs); hospital-based cancer registries (HBCRs); National Cancer Registry Programme (NCRP); Noncommunicable diseases (NCDs); National Centre for Disease Informatics and Research (NCDIR); Indian Council of Medical Research (ICMR; National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS); National Health Mission (NHM); Programme Implementation Plans (PIPs); State Cancer Institute's (SCIs) ; Tertiary Care Cancer Centres (TCCCs); Pradhan Mantri Jan Arogya Yojana (PMJAY); Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP); AMRIT (Affordable Medicines and Reliable Implants for Treatment); Rashtriya Arogya Nidhi (RAN);

Funding

The author declares that no funds are taken from any individual or agency-institution for this study.

Reference

1. Centers for Disease Control and Prevention- Risk Factors and Cancer- available at- https://www.cdc.gov/cancer/risk_factors.htm
2. Connor J. (2017). Alcohol consumption as a cause of cancer. *Addiction (Abingdon, England)*, 112(2), 222–228. <https://doi.org/10.1111/add.13477>
3. World Health Organization - Newsroom/Fact sheets/Detail/Noncommunicable diseases – available at - <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
4. **Cancer Statistics, 2020: Report From National Cancer Registry Programme, India**
Prashant Mathur, Krishnan Sathishkumar, Meesha Chaturvedi, Priyanka Das, Kondalli Lakshminarayana Sudarshan, Stephen Santhappan, Vinodh Nallasamy, Anish John, Sandeep Narasimhan, Francis Selvaraj Roselind, and on behalf of ICMR-NCDIR-NCRP Investigator Group JCO Global Oncology 2020 :6, 1063-1075
5. **National Cancer Registry Programme – available at - <https://www.ncdirindia.org/ncrp/ca/map.aspx>**

Declarations

-This version of paper has not been previously published in any peer reviewed journal and is not currently under consideration by any journal. The document is Microsoft word with English (India) language & 1500 words excluding reference and declaration etc. (2337 words Total including all).

- Ethics approval and consent to participate: Not applicable. This study has not involved any human or animals in real or for experiments. The submitted work does not contain any identifiable patient/participant information.

-Consent for publication: The author provides consent for publication.

-Availability of data and materials: Electronic records from National **Cancer Registry Programme**, HMIS (health

management information system) of MoHFW (ministry of health and family welfare), Government of India, etc.

-Conflicts of Interest/ Competing Interest: There are no conflicts / competing of interest

- Funding: Self sponsored. No aid taken from individual or agency etc

- Authors' contributions: The whole work is done by the Author - Dr Piyush Kumar, M.B.B.S., E.M.O.C., P.G.D.P.H.M., - Senior General Medical Officer- Bihar Health Services- Health Department- Government of Bihar, India and Advocate Anupama-Senior Lawyer, Bar Council, Patna.

- Acknowledgements- I am thankful to Advocate Anupama my wife and daughters Aathmika-Atheeva for cooperation.

- Author information: The author is currently working as Senior General Medical Officer for the government of Bihar and Advocate Anupama-Senior Lawyer, Bar Council, Patna.

-Financial Support & sponsorship: Nil

-Author contact information

Department of Health, Government of Bihar, MOBILE - +919955301119/+917677833752, Email drpiyush003@gmail.com

ANNEXURE-I

List of State Cancer Institutes (SCI)/Tertiary Cancer Care Centres (TCCC)

S No	State	Name of the Institute	SCI / TCCC	
1	Andhra Pradesh	Kurnool Medical College, Kurnool	SCI	
2	Assam	Gauhati Medical College & Hospital, Guwahati	SCI	
3	Bihar	Indira Gandhi Institute of Medical Sciences, Patna	SCI	
4	Chhattisgarh	Chhattisgarh Institute of Medical Sciences, Bilaspur	SCI	
5	Delhi	LokNayak Hospital	TCCC	
6	Gujarat	Gujarat Cancer Research Institute, Ahmedabad	SCI	
7	Goa	Goa Medical College, Panaji	TCCC	
8	Haryana	Civil Hospital, AmbalaCantt	TCCC	
9	Himachal Pradesh	Indira Gandhi Medical College, Shimla	TCCC	
10	Himachal Pradesh	ShriLalBahadurShastri Medical College, Mandi	TCCC	
11	Jammu & Kashmir	Sher-i-Kashmir Institute of Medical Sciences, Srinagar	SCI	
12		Government Medical College, Jammu	SCI	
13	Jharkhand	Rajendra Institute of Medical Sciences, Ranchi	SCI	
14	Karnataka	Kidwai Memorial Institute of Oncology (RCC), Bangaluru	SCI	
15		Mandya Institute of Medical Sciences, Mandya	TCCC	
16	Kerala	Regional Cancer Centre, Tjiruvananthapuram	SCI	
17		Government Medical College, Kozhikode	TCCC	
18	Madhya Pradesh	G.R. Medical College, Gwalior	TCCC	
19		NetajiSubhas Chandra Bose Medical College, Jabalpur	SCI	
20	Maharashtra	RashtrasantTukdoji Regional Cancer Hospital & Research Centre, Nagpur	TCCC	
21		Government Medical College, Aurangabad	SCI	
22		Vivekanand Foundation & Research Centre, Latur	TCCC	
23	Mizoram	Mizoram State Cancer Institute Aizawl	TCCC	

		Andhra Pradesh Cancer Institute, Hyderabad	TCCC	
24	Nagaland	District Hospital, Kohima	TCCC	
25	Odisha	Acharya Harihar Regional Cancer Centre, Cuttack	SCI	
26	Punjab	Government Medical College, Amritsar	SCI	
27		Civil Hospital, Fazilka	TCCC	
28	Rajasthan	S P Medical College, Bikaner	TCCC	
29		SMS Medical College, Jaipur	SCI	
30		Jhalawar Medical College & Hospital, Jhalawar	TCCC	
31	Sikkim	Multispecialty Hospital at Sochyang (Sichey), near Gangtok, Sikkim	TCCC	
32	Tamil Nadu	Cancer Institute (RCC), Adyar, Chennai	SCI	
33	Telangana	MNJ Institute of Oncology & RCC, Hyderabad	SCI	
34	Tripura	Cancer Hospital (RCC), Agartala	SCI	
35	Uttar Pradesh	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	TCCC	
36	Uttarakhand	Government Medical College, Haldwani	SCI	
37	West Bengal	Government Medical College, Burdwan	TCCC	
38		Murshidabad Medical College & Hospital, Berhampore, Murshidabad	TCCC	
39		Sagore Dutta Memorial Medical College and Hospital, Kolkata	TCCC	
Total: 39 (SCI: 19, TCCC:20)				

Note: Government of India share is 60% (90% for Himalayan and North Eastern States and 100% for UTs.)