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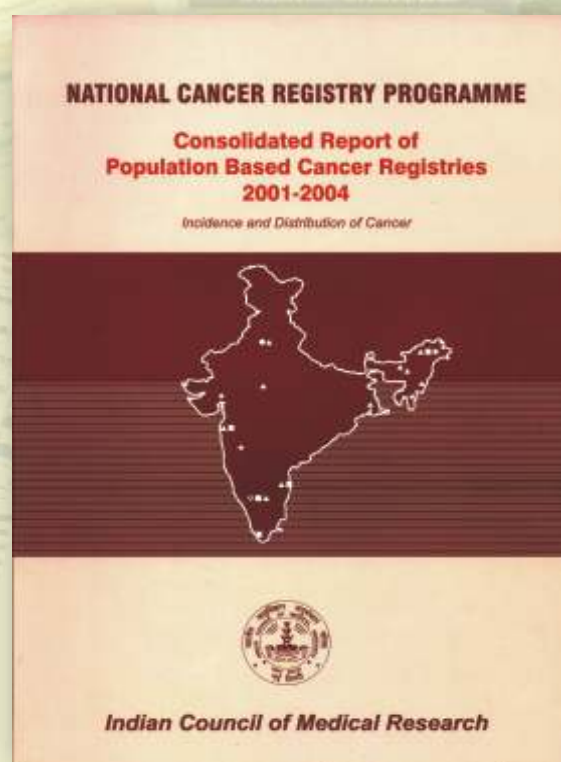
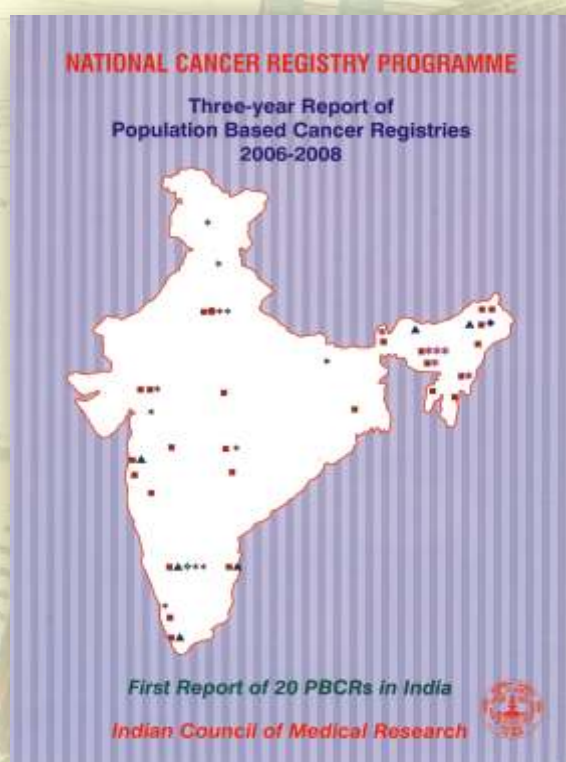
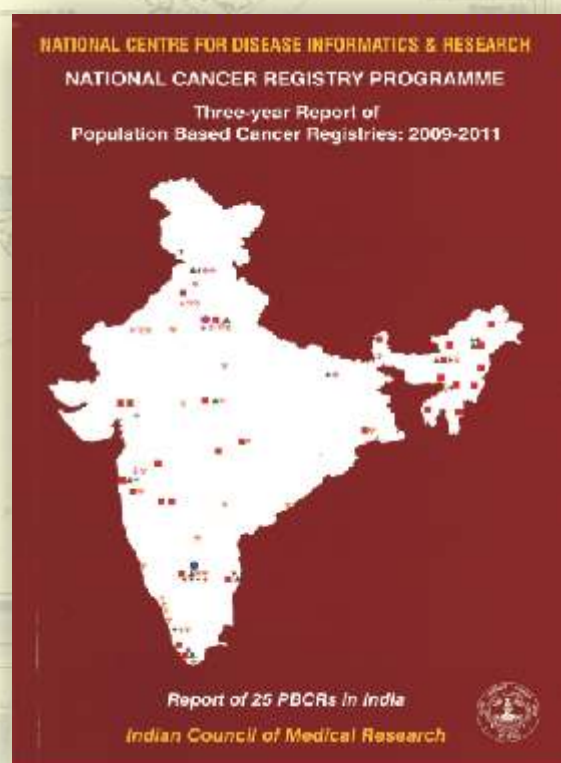
The Newsletter of NCRP

# Cancer Registry ABSTRACT

# CRAB









Volume XIX, Number 1, December 2014

The Newsletter of NCRP

# Cancer Registry ABSTRACT

## CRAB

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# **NATIONAL CENTRE FOR DISEASE INFORMATICS AND RESEARCH**

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### Message

I am happy to know that National Cancer Registry Programme (ICMR), National Centre for Disease Informatics and Research is going to publish Cancer Registry Abstract (CRAB) with Dr. A.C. Katakai as a Editor. During the last 30 years National Cancer Registry Programme has grown an institution under the leadership of Dr. A. Nandakumar. Principal Investigator (PIs) of different centres from across the country have made tremendous contributions and are part of the history of its growth. We are confident that this publication will become another reference point for the Govt. science agencies and other potential contributors to plan their strategies accordingly.

I convey my best wishes to Editor and all the contributors for their endeavors.

( V.M. Katoch )





**Roberto Zanetti, MD, PhD**  
President, International Association of Cancer  
Registries (IACR)  
Director, Piedmont Cancer Registry, Torino, Italy

September 3, 2014



#### MESSAGE

"India has a remarkable tool for cancer surveillance: the NCRP, National Cancer Registry Programme. The programme has been established long ago (in 1982), and since then provides an efficient coordination of the country population based cancer registries, providing them with strategic, scientific and technical assistance. The coverage in observing the impact of cancer has progressively expanded to nearly 10% of the total population, which is a tremendous result for a country as large as India. And the time series goes back of decades for some of the registries, allowing the assessment the time trends beside the geographical variations. This activity is performed in cooperation with the IARC, the International Agency for Research on Cancer, with the IACR, the International association of Cancer Registries, and more recently with the GICR (Global Initiative in Cancer Registration), a joint initiative of the main international agencies for cancer control and advocacy.

The present issue of the CRAB report, so rich in data, analyses and interpretation of cancer figures, will surely reveal a fundamental reading for epidemiologists, oncologists, health policy makers, and for the whole community of professionals engaged in cancer control at local, national and continental level"

*Roberto Zanetti*

**Roberto Zanetti**



**Dr. B.R.A. Institute Rotary Cancer Hospital  
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**Dr. G.K. Rath**  
**Professor, Dept of Radiation Oncology**  
**Chief, DRBRAIRCH &**  
**Head, National Cancer Institute**



#### **MESSAGE**

I would like to convey my warm congratulations to Dr Kataki on being entrusted with the responsibility of publishing the volume XIX of Cancer Registry Abstract (CRAB) of NCRP as editor. With articles on cancer registration and news items pertaining to new events in cancer registries, CRAB has always been informative to all researchers, scientists, clinicians and policy makers in this field.

The NCRP, from its inception has been providing valuable data, which has helped in formulating cancer control policies in our country. Even though, we have a long way to go so far as the coverage of entire population of the country is concerned, the success of NCRP has culminated in the formation of National Council of Disease Informatics and Research (NCDIR). NCDIR, which is also under the ICMR, is vested with the responsibility of planning, coordinating and evaluating the magnitudes and patterns of diabetes, CVD and stroke besides cancer.

Keeping in mind, the common etiological factors and management strategies of the non-communicable diseases (NCDs), the government of India has formulated NPCDCS (National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke). Government of India under this scheme in the 12<sup>th</sup> five year plan is providing financial assistance up to 120 crores each for establishment of 20 state cancer Institute and 45 crores each for strengthening and setting up of 50 tertiary cancer care centers (including 27 regional cancer centers).

I wish CRAB all the best!

Sincerely,

*G.K. Rath*



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## Editorial

One of the key measures for cancer control and prevention is reliable and timely information on the pattern and burden of cancer in the country. In India, the National Cancer Registry Programme has been ongoing with active support from the Indian Council of Medical Research since 1982. The scope of National Cancer Registry Programme has been widened and is now covered under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS). Over the last 3 decades cancer registries in India has shown the distribution of cancer across the country. However, still most part of the country is not represented in the network of cancer registries under Indian Council of Medical Research. National Cancer Registry Programme has been able to attract the attention of cancer researchers all over the world. This presents us the opportunity to participate in global research on cancer.

Cancer registry is the step towards descriptive epidemiology of cancer, which identifies hypothesis on various risk factors and furthermore, to associate such risks by analytic studies. The data provided by pattern of care and survival studies provides a guiding platform to the clinicians for evaluating treatment policy. This forms the basis of evidence based practice in oncology.

At present cancer is not a notifiable disease in India so, the collection of data for population based cancer registries is an active one. The staffs engaged in cancer registries across the country are doing a commendable job in

active collection of cancer data. The cooperation from various sources of registration (SOR) like, laboratories, diagnostics centers, hospitals, mortality registration centers etc is of paramount importance in generating the real incidence rates of cancers in our population. In this regard, some registries of the country have been successful in receiving administrative supports from their respective state Health departments for cooperation from these SOR.

There has been a steady and consistent increase in the age adjusted incidence rates of certain cancers across all major urban registries in India. This calls for evaluating change in life styles and the impact of environment as possible risk factors. The success of cancer registration is a joint effort by epidemiologists and biostatistician working in tandem with clinicians, pathologists and all researchers working in the field of oncology. It is time that the information gained from epidemiological studies on cancer is translated to action for cancer control in the country.

I am thankful to NCDIR for giving me the responsibility to publish the 19th issue of CRAB. I congratulate all the authors for their valuable contribution and record my sincere appreciation to staff of PBCR/HBCR, Guwahati for their help in bringing out this volume.

**Amal Ch. Kataki**  
Director

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# International Agency for Research on Cancer



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## Leads from Indian Cancer Registries for Cancer Control in India

### Indian cancer registry network:

Efforts in India to establish population based cancer registration began with the establishment of the first population-based cancer registry in the country in Mumbai in 1963 as a unit of the Indian Cancer Society by visionary cancer control leaders like Dr Jussawalla. The Mumbai cancer registry started collecting data since 1984. In addition to the Indian Cancer Society, Mumbai cancer registry was supported by the National Cancer Institute, USA until 1975 and by the Department of Science and Technology, Government of India during 1976 to 1980. Since 1981, it became a part of the National Cancer Registry Programme (NCRP) of India established by the Indian Council of Medical Research (ICMR) in 1981. Mumbai cancer registry is the longest surviving population-based cancer registry that has continuously reported cancer incidence data since 1964, whose data has been continuously included in volumes 2-11 of the series "Cancer Incidence in Five Continents".

A major advancement in cancer control in India was the establishment of a network of both population-based cancer registries in Bangalore, Chennai and Mumbai and hospital-based cancer registries in Chandigarh, Dibrugarh and under the NCRP by ICMR in December 1981, thanks to the foresight of visionaries such as Dr UshaLuthra, Dr V. Shantha, Dr Krishna Bhargava, DR B.D. Gupta, and DR M. Krishnan Nair among others. Three more hospital registries in Bangalore, Chennai and Mumbai and two more

population cancer registries in Bhopal and Delhi were established in 1984 and 1986 respectively; the first rural population cancer registry in Barshi was established in 1987 under the NCRP network, thanks to the foresight of Drs B.M. Nene, P.B. Desai and Mrs K. Jayant. Currently NCRP has a network of 25 population-based cancer registries with a huge concentration of registries in the north-eastern region of India and with a remarkable inadequacy of population-based cancer registration in northern and north-western India as well as in rural India where the vast majority of Indian population lives (NCRP 2013a). Despite these lacunae, the NCRP represents the largest government supported population cancer registration network in low- and-middle income countries after that of China. Recently the state of Tamil Nadu in southern India has launched a statewide population cancer registration initiative covering 72 million people since 2012. NCRP registries and the state wide cancer registry of Tamil Nadu together cover around 165 million people which accounts for 13% of the Indian population.

All cancer registries, both within and outside the NCRP network in India put together have made enormous efforts to improve the coverage and the quality of data collected. They have contributed significantly to provide the information base for planning, implementing and monitoring cancer control inputs and in evaluating cancer control outcomes. The regular annual review meetings of the NCRP and frequent training and re-training courses for



the registry staff as well as the technical collaboration that many NCRP registries have with international partners such as the International Agency for Research on Cancer of the World Health Organization, International Association of Cancer Registries and the US National Cancer Institute and other cancer registry networks have substantially improved the completeness, validity and quality of data from the Indian cancer registries. A core group of young cancer epidemiologists have evolved with the growth of the NCRP network. Such inputs have helped to generate reliable data in projecting the magnitude, pattern and trends of cancer incidence in India. The registries have contributed substantially to the study of patterns of cancer care in major cancer hospitals in the country, population-based cancer survival outcomes and to the conduct of epidemiological studies and in generating human resources in the domain of cancer registration and cancer epidemiology. The major findings from Indian cancer registries that provide valuable leads for cancer control in India are briefly discussed.

#### **Estimates of cancer burden in India:**

Data from Indian registries clearly indicate that the cancer incidence rates in India are lower than many western countries. However, a large population (~1.3 billion) and changing life styles in the context of a fast growing economy are responsible for a large cancer burden which requires enormous health care and fiscal resources to tackle. The cancer incidence data and relative frequencies reported by Indian cancer registries have been used to project the burden of cancer for the whole country (GLOBOCAN 2012). Around 1 million new cancer cases have been estimated for the year 2012 in India (Table 1). Although, there is more room to improve these estimates by getting additional information on cancer incidence rates and relative frequencies of different cancer sites in under-represented regions of India (such as north-western and northern India, rural areas of India), these are the best estimates that we have at the moment thanks to the information generated by existing cancer registries in India. Around 60% of the cancers in men are constituted by those occurring in the head and neck, lung, lymphoreticular organs, stomach and large bowel, whereas both breast and cervical cancers account for half of the incident cancer cases in Indian women.

#### **Trends in cancer incidence in India:**

Availability of cancer incidence data for more

than 50 years for the Mumbai cancer registry, for more than 30 years for Bangalore and Chennai cancer registries and for more than 25 years from Barshi, Bhopal and Delhi cancer registries permits analysis of observed time trends in cancer incidence in these populations.

The analysis of longer term incidence data from Mumbai since the 1970s indicate increasing trends in the incidence of breast cancer; the increases in incidence of breast cancer are greater among older women and the incidence rate of breast cancer is expected to double in 2020 as compared to 1976 rates (Dikshit et al., 2012; NCRP 2013 a; NCRP 2013 b). The long term data during 1976-2011 indicate significant declines in cervix cancer in Mumbai (Dhillon et al., 2011, NCRP 2013 a; NCRP 2013b). These trends have been reflected in Chennai in south India (Swaminathan et al., 2011; NCRP 2013 a; NCRP 2013 b). The divergent trends of breast and cervical cancer is widely reflected throughout India and possibly indicate the impact of changing risk profile in successive cohorts of women in terms of improved education, higher socioeconomic status, later age at marriage and at first child, and lower parity. The increase in tobacco related cancers clearly indicate the need for stringent and active tobacco control measures, particularly in the taxation and pricing fronts to reduce consumption of all forms of tobacco products.

For other cancer sites, among men, there have been significant increases in incidence rates for cancers of the tongue, mouth, large bowel, liver, lung, prostate and non-Hodgkin lymphoma (NCRP 2013 a; NCRP 2013 b; Dikshit et al., 2014). Among women significant increases have been observed for cancers of the gall bladder, lung, endometrium, ovary, thyroid and non-Hodgkin lymphoma (NCRP 2013 a; NCRP 2013b; Dikshit et al., 2014). There have been significant declines in the incidence of cancers of the stomach and esophagus. It is also possible to observe if some of the above trends are emerging in the short-term in other recent cancer registries.

#### **Patterns of care: population-based cancer survival in India:**

Data from Indian cancer registries indicate that vast majority of cancers in India are diagnosed in locally advanced stages and there has been no significant improvement in this scenario. Patterns of care studies conducted by Indian registries also indicate that a substantial proportion of cancer patients default or do not complete prescribed course of treatment due to accessibility, affordability, socio-economic and

cultural/belief issues. Population-based cancer survival data for selected cancer sites have been reported by cancer registries in Bangalore, Barshi, Bhopal, Chennai, Dindigul-Ambillikai, Karunagappally and Mumbai cancer registries (Sankaranarayanan et al., 1998; Swaminathan et al., 2009; Sankaranarayanan et al., 2011). Five-year survival rates for breast cancer varied from 31% in Bhopal to 54% in Karunagappally; five-year survival rates varied from 35% in Bhopal to 60% in Chennai for cervix cancer; it ranged between 19% in Bhopal to 29% for ovarian cancer; for colorectal cancer it varied between 5% in Bhopal to 33% in Karunagappally; it varied between 12% in Barshi to 30% in Karunagappally for tongue cancer and between 26% in Barshi to 45% for mouth cancer in Karunagappally. These results clearly indicate the poor survival prospects for those cancersites for which prognosis can be significantly improved through early detection and adequate treatment. Pooling several cancer sites together from the above cancer registries, the estimated 1, 3 and 5-year survival rates among 73,412 cancer patients diagnosed during the 1990s were 53%, 31% and 25% respectively. It is evident from the survival data reported by Indian cancer registriesthat cancer survival prospects in India are much inferior to that of developed countries and other advanced economies in Asia. For instance in the 5-year from breast cancer exceeds 93% in South Korea due to more than 70% of cancers diagnosed in stage 1 and better access to health care due to highly developed health care infrastructure and adequate health care financing mechanisms.

#### Indian cancer registries and cancer research:

Indian cancer registries have contributed significantly to descriptive cancer epidemiological research. Young researchers have used the registry

databases to elucidate cancer patterns and trends. Population based cancer registries in Barshi, Dindigul-Ambillikai, Mumbai and Thiruvananthapuram have substantially contributed to the follow-up of the large breast, cervix and oral cancer screening studies by allowing linkage of the study populations with the cancer incidence and mortality databases of these cancer registries.

#### Conclusion:

The information on cancer patterns, trends and outcomes emerging from Indian cancer registries provide a valuable basis for planning, investing, monitoring and evaluating cancer prevention, early detection, diagnosis, treatment and follow-up care interventions in the country. The overarching importance of creating cancer awareness, tobacco control measures, alcohol control measures, hepatitis B vaccination, human papillomavirus (HPV) vaccination, promotion of physical activity, healthy eating, prevention of overweight and obesity, creating breast awareness and ensuring improved access to triple diagnosis, HPV screening, fecal immunochemical blood testing (FIT or iFOBT) linked with colonoscopy for FIT positive subjects, improving access to diagnosis, treatment and follow-up care of cancer patients by health systems reforms/investments in infrastructure and appropriate health care financing mechanisms in reducing cancer burden and improving cancer outcomes is overtly clear from the impressive database that Indian cancer registries provide. They are a valuable tool to adapt and respond to the emerging cancer burden in India (Sankaranarayanan et al., 2014). In summary, the Indian cancer registries are a very valuable asset to the National Cancer Control Programme of India which is now integrated into the non-communicable diseases control initiative.

**Table 1: Estimated incident cancer cases in India in 2012**

Cancer Site	Estimated incident cases in Men in 2012	Estimated incident cases in Women in 2012	Estimated incident cases in both sexes in 2012
All sites except non-melanoma skin	477,482	537,452	10,14934
Head and neck	111,433 (23%)	33,654 (6%)	145,087 (14%)
Lung	53728 (11%)	16,547 (3%)	70,275 (7%)
Lymphoreticular neoplasms	45,445 (10%)	26,214 (5%)	71,659 (7%)
Stomach	43,386 (9%)	19,711 (4%)	63,097 (6%)
Colorectum	36,917 (8%)	27,415 (5%)	64,332 (6%)
Breast	–	144,937 (27%)	144,937 (14%)
Cervix	–	122,844 (23%)	122,844 (12%)
Ovary	–	26,834 (5%)	26,834 (3%)



**References:**

1. Badwe RA, Dikshit R, Laversanne M, Bray F. Cancer incidence trends in India. *Jpn J Clin Oncol*. 2014; 44: 401-7
2. Dhillon PK, Yeole BB, Dikshit R, Kurkure AP, Bray F. Trends in breast, ovarian and cervical cancer incidence in Mumbai, India over a 30-year period, 1976-2005: an age-period-cohort analysis. *Br J Cancer*. 2011; 105: 723-30.
3. Dikshit RP, Yeole BB, Nagrani R, Dhillon P, Badwe R, Bray F. Increase in breast cancer incidence among older women in Mumbai: 30-year trends and predictions to 2025. *Cancer Epidemiol*. 2012; 36:e215-20.
4. <http://globocan.iarc.fr/Default.aspx> (accessed on 2 September 2014)
5. National Cancer Registry Programme of India. Three year Report of Population Based Cancer Registries: 2009-2011, Bangalore, 2013a
6. National Cancer Registry Programme of India. Time Trends in Cancer Incidence Rates 1982-2010, Bangalore, 2013b
7. Sankaranarayanan R, Black RJ, Parkin DM. Cancer Survival in Developing Countries. IARC Scientific Publications No.145. IARC Press, 1998
8. Sankaranarayanan R, Swaminathan R. Cancer Survival in Africa, Asia, the Caribbean and Central America. IARC Scientific Publications No.162. IARC Press, 2011
9. Sankaranarayanan R, Ramadas K, Qiao YL. Managing the changing burden of cancer in Asia. *BMC Med*. 2014; 12: 3. doi: 10.1186/1741-7015-12-3
10. Swaminathan R, Shanta V, Ferlay J, Balasubramanian S, Bray F, Sankaranarayanan R. Trends in cancer incidence in Chennai city (1982-2006) and statewide predictions of future burden in Tamil Nadu (2007-16). *Natl Med J India*. 2011; 24: 72-7
11. Swaminathan R, Selvakumaran R, Esmy PO, Sampath P, Ferlay J, Jissa V, Shanta V, Cherian M, Sankaranarayanan R. Cancer pattern and survival in a rural district in South India. *Cancer Epidemiol*. 2009; 33:325-31. □



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## Natural History of Human Papillomavirus and Cervical Cancer - Epidemiology and Risk

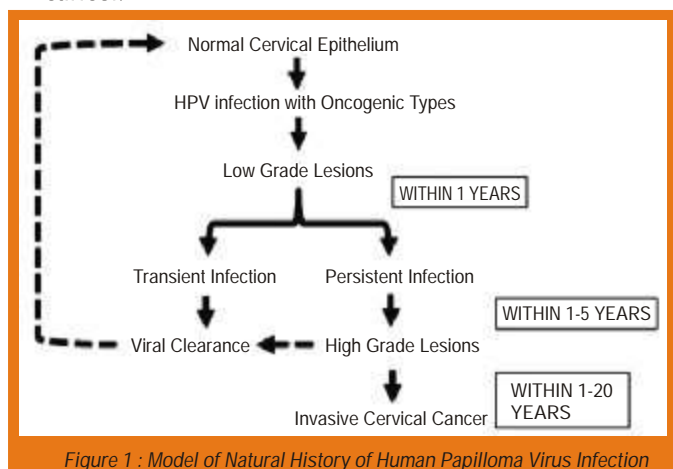
### Introduction:

Organized screening has contributed to a decline in cervical cancer incidence and mortality in developed countries over the past fifty years. However, women in developing countries without access to these extensive screening and treatment programs are yet to benefit [1]. Throughout the past fifty years, substantial insight into the natural history of cervical cancer, the human papillomavirus (HPV) infection, and major treatment advances including the HPV vaccine and new cytological and histological guidelines have not only increased survival but also decreased incidence of the disease where implementation of new technology is possible.

### Human Papilloma Virus:

Papillomaviruses are small, double stranded DNA viruses. HPV, of which there are over 100 known types differentiated only by their outer capsid protein L1, are species specific, only infecting humans epithelium. Approximately 40 types infect the mucosal epithelium and have association with cervical cell abnormalities [2]. Infection with low-risk, or nononcogenic types, such as 6 and 11, can cause benign or low-grade cervical cell abnormalities, genital warts and laryngeal papillomas. High-risk oncogenic HPV types act as carcinogens in the development of cervical cancer. High-risk types, currently including types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 69, 73, 82, can cause low-grade cervical cell abnormalities, high-grade cervical cell abnormalities that are precursors to cancer, and anogenital cancers.

High-risk HPV types are detected in 99% of cervical cancers. Type 16 is the cause of approximately 50% of cervical cancers worldwide, and types 16 and 18 together account for about 70% of cervical cancers [3]. Infection with a high-risk HPV type is considered necessary for the development of cervical cancer, but by itself it is not sufficient to cause cancer because the vast majority of women with HPV infection do not develop cancer [4]. Figure 1 is a representative schematic of the natural history of HPV infection development into cervical cell abnormalities and cancer.



### Epidemiology of HPV in Females :

It is estimated that 75 to 80 percent of sexually active adults will acquire a genital tract HPV infection before the age of 50 [5]. The prevalence of cervical HPV infection decreases sharply in women after the age of 30 [6] suspected to be correlated to monogamy and



marriage. A meta-analysis in 157,879 women with normal cervical cytology demonstrated that the worldwide point-prevalence of HPV is approximately 10 percent with the most common types being 16 and 18 [7]. The highest regional prevalence was 22 percent in Africa. In India, there is a 7.9% prevalence of HPV infection [8].

There also appears to be geographic variation in the distribution of HPV genotypes. One example from an HPV prevalence study conducted in 13 areas from 11 countries that included Nigeria, India, Vietnam, Thailand, Korea, Colombia, Argentina, Chile, the Netherlands, Italy and Spain, that performed HPV screening tests via polymerase chain reaction (PCR) on 15,613 sexually active women ages 15 to 74 with normal cervical cytology [9]. The authors of this paper concluded that the most relevant difference between regions was in the prevalence of HPV 16 in relation to other types. Although the prevalence of HPV 16 was higher in sub-Saharan Africa than Europe, HPV positive women in sub-Saharan Africa were less likely to be infected with HPV 16 (8%) than their European counterparts at 21%.

### Epidemiology of HPV in Males:

Factors associated with prevalent HPV infection in men include HIV infection, current and past sexual behavior, number of sex partners, absence of condom use, prior sexually transmitted diseases, race, ethnicity, and circumcision status [10-11]. Natural history studies demonstrate that uncircumcised men have slower rates of HPV clearance compared with circumcised men [12]. The prevalence of genital HPV of any type in men is quoted at 53 percent with almost one-third having an oncogenic HPV type [13] although depending on reference it can vary from 1-73%. This wide range of prevalence was attributed to a combination of factors, including the anatomic sites sampled, number of specimens processed, and methods of detection used. A consistent finding among demographic groups is an association of increased sexual activity and high-risk HPV genotypes [14].

### CERVICAL CANCER

#### Incidence and Mortality:

Globally cervical cancer is the fourth most common cancer in women and the seventh most common cancer overall. It accounted for 528,000 new cancer cases worldwide and 266,000 deaths in 2012 [15]. Figure 2 depicts the estimated age-standardized rates in the world as per WHO estimates from GLOBOCAN 2012 [15]. In India alone there are approximately 123,000

annual cases of cervical cancer with around 67,000 deaths, making it the second most common cause of female cancer.[8]. Approximately eighty-four percent of new cervical cancer cases will be seen in developing regions [16].

Global incidence and mortality rates depend upon the presence of screening programs for cervical cell abnormalities and cancer and on the availability of the HPV vaccination, most commonly available in developed countries. Due to these interventions, there has been a 75 percent decrease in the incidence and mortality of cervical cancer over the past 50 years in developed countries [17-18] and it is now the 10<sup>th</sup> most common cancer in women in developed countries (9 per 100,000) with mortality at 3.2 per 100,000 [16]. Age-standardized incidence rates are lowest in Australia/New Zealand and Western Asia at 5.5 per 100,000 and 4.4 per 100,000, respectively [15]. In the United States the number of new cases was 7.8 per 100,000 and mortality at 2.4 per 100,000. [19]. Contrasted to developing countries where until 1990s cervical cancer was the most frequent malignancy in when it was surpassed by breast cancer[1] the incidence is 17.8 per 100,000 with mortality at 9.8 per 100,000 [16]. In India the age-standardized incidence rate is 22 per 100,000[8]. Cervical Cancer is the most common cancer in women in Eastern and Middle Africa with estimated age-standardized incidence rates per 100,000 of 42.7 and 30.6, respectively. Cervical cancer is the top cause of cancer related mortality to women in Africa and Central America [16]. Figure 3 A shows a global distribution of incidence and mortality rates quoted from GLOBOCAN 2012 [15].

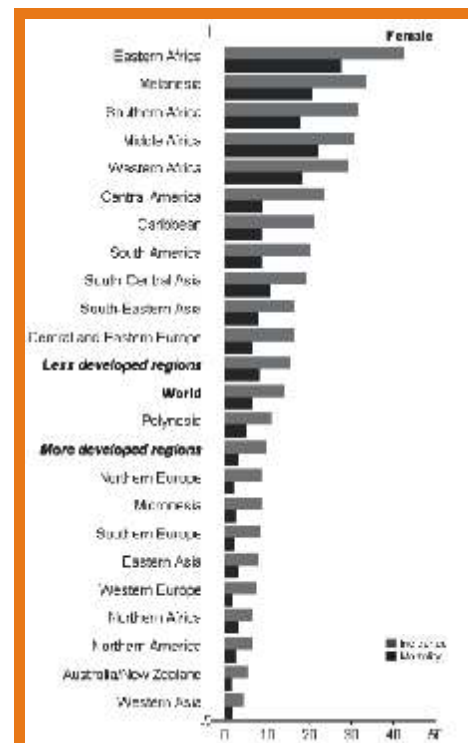
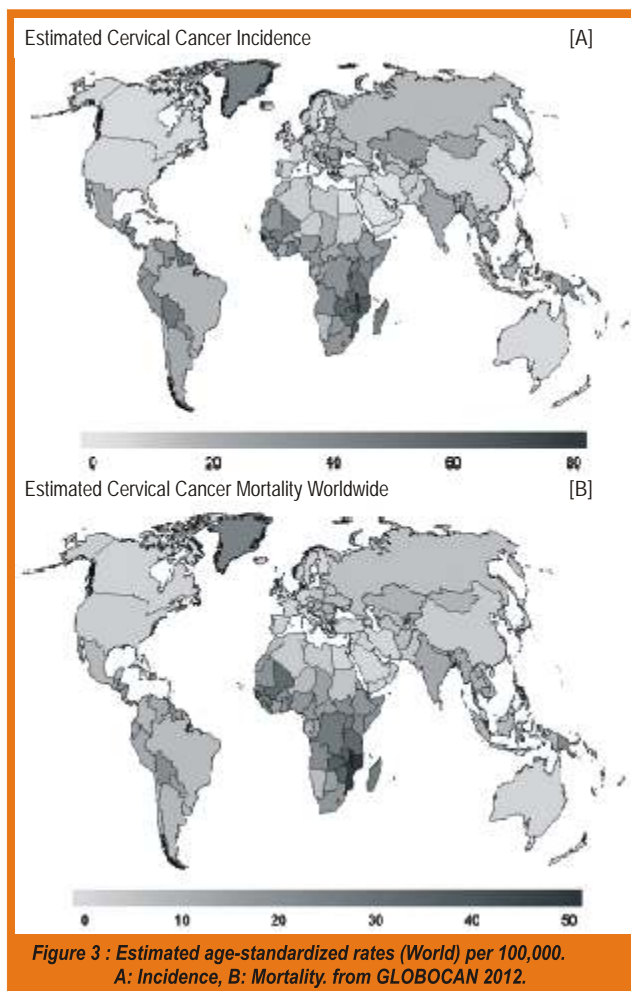


Figure 2 : Estimated age-standardized rates (World) per 100,000. from GLOBOCAN 2012



### Age Distribution:

The cumulative lifetime risk of developing cervical cancer by age 75 is 0.9% in developed countries and 1.9% in developing countries. Specifically for India, the cumulative risk at age 75 is 2.4% in comparison to 1.4% in the rest of the world. The cumulative risk of death from cervical cancer by age 75 is 0.3% in developed countries and 1.1% in developing countries [20].

### Risk Factors:

Most risk factors associated with cancer of the cervix are associated with increased exposure to HPV infection, known to cause 99.7% of all cervical cancers, or compromised immunologic response to clearance of the HPV virus [21].

There is no well-established model of a genetic basis for cervical cancer although population studies have shown an increased incidence of cervical cancer within families [22]. Findings to-date include an association of cervical cancer with a large array of polymorphisms in multiple genes including those that regulate immunity, cytokine production angiogenesis,

tumor suppressor pathways, and signal transducer and activator of transcription pathways [23-26]. As ongoing research throughout the world continues and we will learn more about the genetic basis that makes some women more susceptible to persistent HPV infections and thus the development of cervical cancer. For now the most commonly cited risk factors for squamous cell carcinoma and adenocarcinoma of the cervix include [16, 21]:

- Young age at first coitus (younger than 21 years old)
- Multiple sexual partners (two fold with two partners; three fold with 6 or more partners)
- High parity (three or more full term births)
- Young age at first birth (less than age 20)
- History of sexually transmitted infections
- Cigarette smoking or exposure to cigarette smoke (squamous cell type only)
- History of HPV exposure
- Oral contraception use for greater than five years (promiscuity)
- History of vulvar or vaginal squamous intraepithelial neoplasia or malignancy
- Immunosuppression
- Low socioeconomic status

### Conclusion:

The widely used HPV vaccines are promising new cervical cancer prevention strategies that have been relatively recently implemented in developed countries. Based on our improved knowledge and identification of the pathogenesis and natural history of cervical cancer being caused by oncogenic HPV, coupled with improved detection of HPV via PCR, and identification of pre-malignant lesions via cytologic, histologic, and visual examination one could envision the ability to restrict the spread of its viral cause and thus decrease the cervical cancer burden as made evident in drastic decrease in cervical cancer and pre-malignant cervical cell abnormalities in developed countries with the use of HPV vaccination. In countries that do not have access to cervical cancer screening and prevention programs, cervical cancer remains the second most common type of cancer and cause of cancer deaths among all types of cancer in women. For this reason HPV vaccination and cervical cancer programs deserves to be a high priority among global efforts to prevent cancer.

### REFERENCES:

1. Franco EL, Duarte-Franco E, Ferenczy A. *Cervical cancer: epidemiology, prevention and the role of*



- human papillomavirus infection. *CMAJ*. 2001 Apr 3; 164(7):1017-25.
2. Trottier H, Franco EL. The epidemiology of genital human papillomavirus infection. *Vaccine*. 2006 Mar 30; 24 Suppl 1:S1-15.
3. de Sanjose S, Quint WG, Alemany L, et al. Human papillomavirus genotype attribution in invasive cervical cancer: a retrospective cross-sectional worldwide study. *Lancet Oncol* 2010; 11:1048.
4. American College of Obstetricians and Gynecologists. Human papillomavirus vaccination. ACOG committee opinion No. 344. *Obstet Gynecol* 2006; 108:699705.
5. Centers for Disease Control and Prevention, Workowski KA, Berman SM. Sexually transmitted diseases treatment guidelines, 2006. *MMWR Recomm Rep* 2006; 55:1.
6. Wright TC Jr, Schiffman M. Adding a test for human papillomavirus DNA to cervical-cancer screening. *N Engl J Med* 2003; 348:489.
7. de Sanjosé S, Diaz M, Castellsagué X, et al. Worldwide prevalence and genotype distribution of cervical human papillomavirus DNA in women with normal cytology: a meta-analysis. *Lancet Infect Dis* 2007; 7:453.
8. Bruni L, Barrionuevo-Rosas L, Serrano B, et al. ICO Information Centre on HPV and Cancer (HPV information Center). Human Papillomavirus and Related Disease in India. Summary Report 2014-03-17. Retrieved on 7/02/2014 from <http://www.hpvcentre.net/statistics/reports/IND.pdf>.
9. Clifford GM, Gallus S, Herrero R, et al. Worldwide distribution of human papillomavirus types in cytologically normal women in the International Agency for Research on Cancer HPV prevalence surveys: a pooled analysis. *Lancet* 2005; 366:991.
10. Baldwin SB, Wallace DR, Papenfuss MR, et al. Condom use and other factors affecting penile human papillomavirus detection in men attending a sexually transmitted disease clinic. *Sex Transm Dis* 2004; 31:601.
11. Nyitray AG, Carvalho da Silva RJ, Baggio ML, et al. Age-specific prevalence of and risk factors for anal human papillomavirus (HPV) among men who have sex with women and men who have sex with men: the HPV in men (HIM) study. *J Infect Dis* 2011; 203:49.
12. Hernandez BY, Shvetsov YB, Goodman MT, et al. Reduced clearance of penile human papillomavirus infection in uncircumcised men. *J Infect Dis* 2010; 201:1340.
13. Nyitray AG, da Silva RJ, Baggio ML, et al. The prevalence of genital HPV and factors associated with oncogenic HPV among men having sex with men and men having sex with women and men: the HIM study. *Sex Transm Dis* 2011; 38:932.
14. Dunne EF, Nielson CM, Stone KM, et al. Prevalence of HPV infection among men: A systematic review of the literature. *J Infect Dis* 2006; 194:1044.
15. International Agency for Research on Cancer. World Health Organization. GLOBOCAN 2012(IARC), Section of Cancer Information retrieved on 6/20/2014 from [http://globocan.iarc.fr/Pages/fact\\_sheets\\_cancer.aspx](http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx).
16. International Collaboration of Epidemiological Studies of Cervical Cancer. Comparison of risk factors for invasive squamous cell carcinoma and adenocarcinoma of the cervix: collaborative reanalysis of individual data on 8,097 women with squamous cell carcinoma and 1,374 women with adenocarcinoma from 12 epidemiological studies. *Int J Cancer* 2007 Feb 15; 120(4):885-91.
17. Castellsagué X, Bosch FX, Muñoz N, et al. Male circumcision, penile human papillomavirus infection, and cervical cancer in female partners. *N Engl J Med* 2002; 346:1105.
18. Anttila T, Saikku P, Koskela P, et al. Serotypes of Chlamydia trachomatis and risk for development of cervical squamous cell carcinoma. *JAMA* 2001; 285:47.
19. WHO/ICO Information Center of HPV and Cervical Cancer (HPV Information Center). Human Papillomavirus and Related Cancers in the World. Summary Report 2010.
20. "SEER Stat Fact Sheets: Cervix Uteri Cancer". NCI. Retrieved 6/20/2014 from <http://seer.cancer.gov/statfacts/html/cervix.html>.
21. Hawes SE, Kiviat NB. Are genital infections and inflammation cofactors in the pathogenesis of invasive cervical cancer? *J Natl Cancer Inst* 2002; 94:1592.
22. Craveiro R, Bravo I, Catarino R, et al. The role of p73 G4C14-to-A4T14 polymorphism in the susceptibility to cervical cancer. *DNA Cell Biol* 2012; 31:224.
23. Wang L, Gao R, Yu L. Combined analysis of the association between p73 G4C14-to-A4T14 polymorphisms and cancer risk. *Mol Biol Rep* 2012; 39:1731.
24. Wang K, Zhou B, Zhang J, et al. Association of signal transducer and activator of transcription 3 gene polymorphisms with cervical cancer in Chinese women. *DNA Cell Biol* 2011; 30:931.
25. Wang Q, Zhang C, Walayat S, et al. Association between cytokine gene polymorphisms and cervical cancer in a Chinese population. *Eur J Obstet Gynecol Reprod Biol* 2011; 158:330.
26. Craveiro R, Bravo I, Catarino R, et al. The role of p73 G4C14-to-A4T14 polymorphism in the susceptibility to cervical cancer. *DNA Cell Biol* 2012; 31:224. □



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## Epidemiology of Nasopharyngeal Carcinoma

The Globocan (2012) project estimated that there were 86700 newly diagnosed cases of nasopharyngeal cancers (NPC) and caused 50800 deaths worldwide, representing about 0.6% of the global cancer incidence. (101) Although NPC is relatively rare in absolute numbers, being ranked the 24th most common cancer by incidence, the cancer burden, as measured by disability-adjusted life-years (DALYs), is shouldered disproportionately by developing countries with medium to low Human Development Index. That is to say, countries with middle to lower rates of adult literacy and standard of living (based on gross domestic product per capita adjusted for purchasing power parity) suffers the greatest years of life lost (YLL) and longest years lived with disability (YLD). In Southeast Asian and Chinese males for example, NPC results in the 7th and 8th highest age-adjusted DALYs respectively amongst 27 cancer sites. (1)

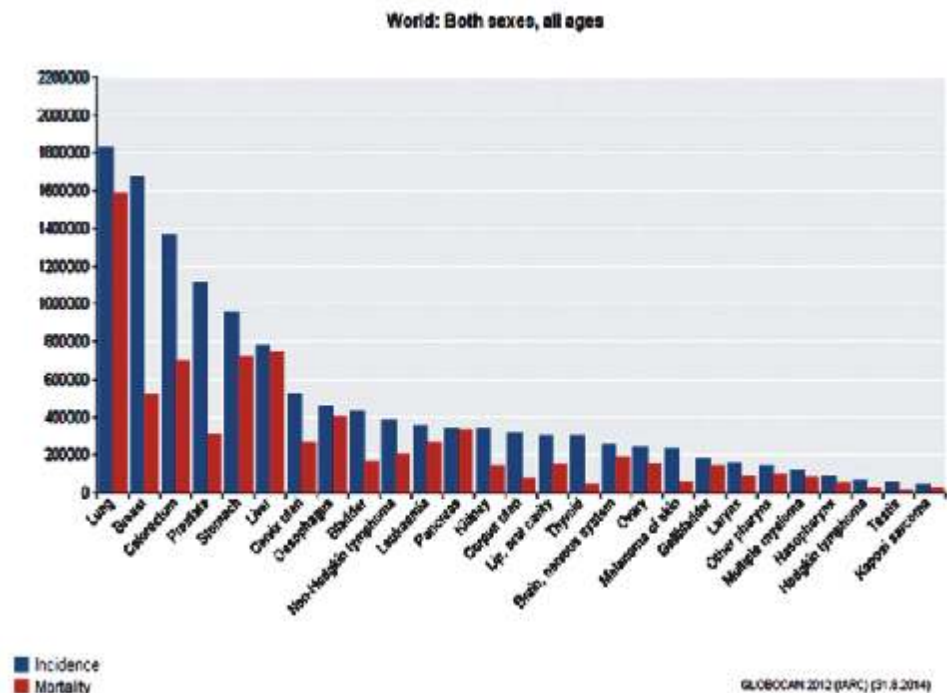


Figure 1 : Incidence and mortality rates of various cancers for both sexes and all ages, 2012. Reproduced with permission [101]

Worldwide geographical variations in the incidence of NPC can be broadly divided into three groups: areas of highest incidence, such as Southern China and Hong Kong, have age standardised ratio (ASR) ranging between 20 to 30 per 100,000 males.

Countries in East Asia (such as Singapore, Malaysia, Taiwan, and Vietnam) and North Africa (Tunisia and Algeria) have an intermediate risk with ASR of 3-15/100,000 males. Other regions of the world have incidence rates well below 1/100,000.



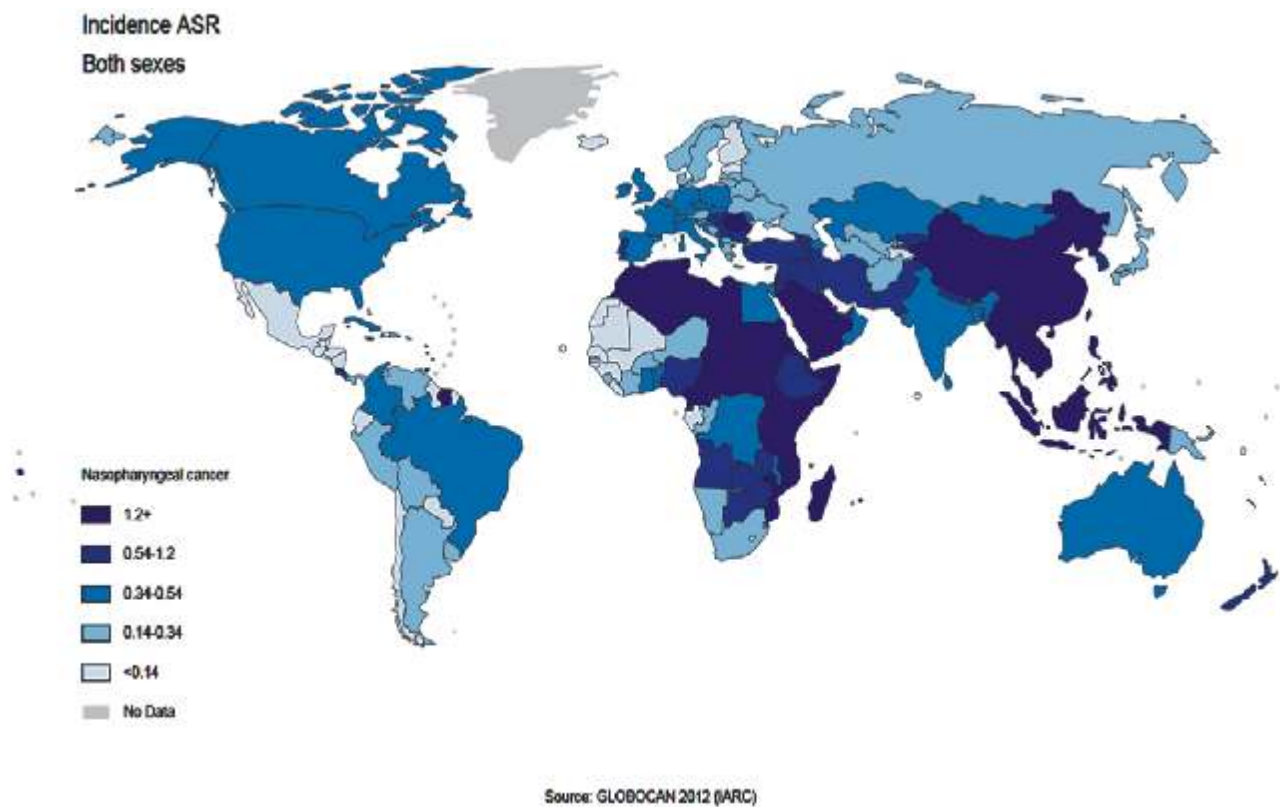


Figure 2 : Global age standardised ratio (ASR) of nasopharyngeal cancer for both sexes and all ages, 2012. Reproduced with permission [101]

Studying the global distribution on its own can be rather misleading, because, in addition to continental variation, there is also significant variation within countries. This is elegantly demonstrated by De-The, who studied the epidemiology of NPC in China. This study demonstrated that the mortality rates from NPC (Figure 3) is highest in the south-eastern regions of Guangdong and Fujian (where ASR for males approach or exceed 20/100000) and decreases further north (where ASR is approximately 1.1/100,000 males in Harbin City) in a rather gradual manner.(2)

**Figure 3:** Mortality rates for nasopharyngeal carcinoma in China. The dark areas represent the regions of highest annual mortality rates (11 25/100000 inhabitants). The intermediate regions have an annual mortality rate of 2 10/100000 inhabitants.(4)



Finally, there are specific ethnic peculiarities as well (figure 4). For example, the Bidayus in Borneo (ASR 29.4/100000 males), Nagas in Northeast India (22) (ASR 19.4/100000 males) and the Inuit in the Arctic (16.6/100000 males) all have much higher ASR compared to the rest of the population living nearby. Genetic and anthropological epidemiology suggest that there are many similarities between the ethnic minorities of the Southeastern China region and the aboriginal peoples of Borneo and northeast India; the Inuit of Greenland, and the Polynesians of Oceania, suggesting perhaps some common ancestry. Besides their genetic similarities, there are also certain cultural and linguistic similarities among these diverse groups. Another characteristic shared by these groups of people is their fairly high incidence of NPC. These evidence gave rise to the hypothesis that these groups may have shared a common (Bai-Yue) ancestry.(3)

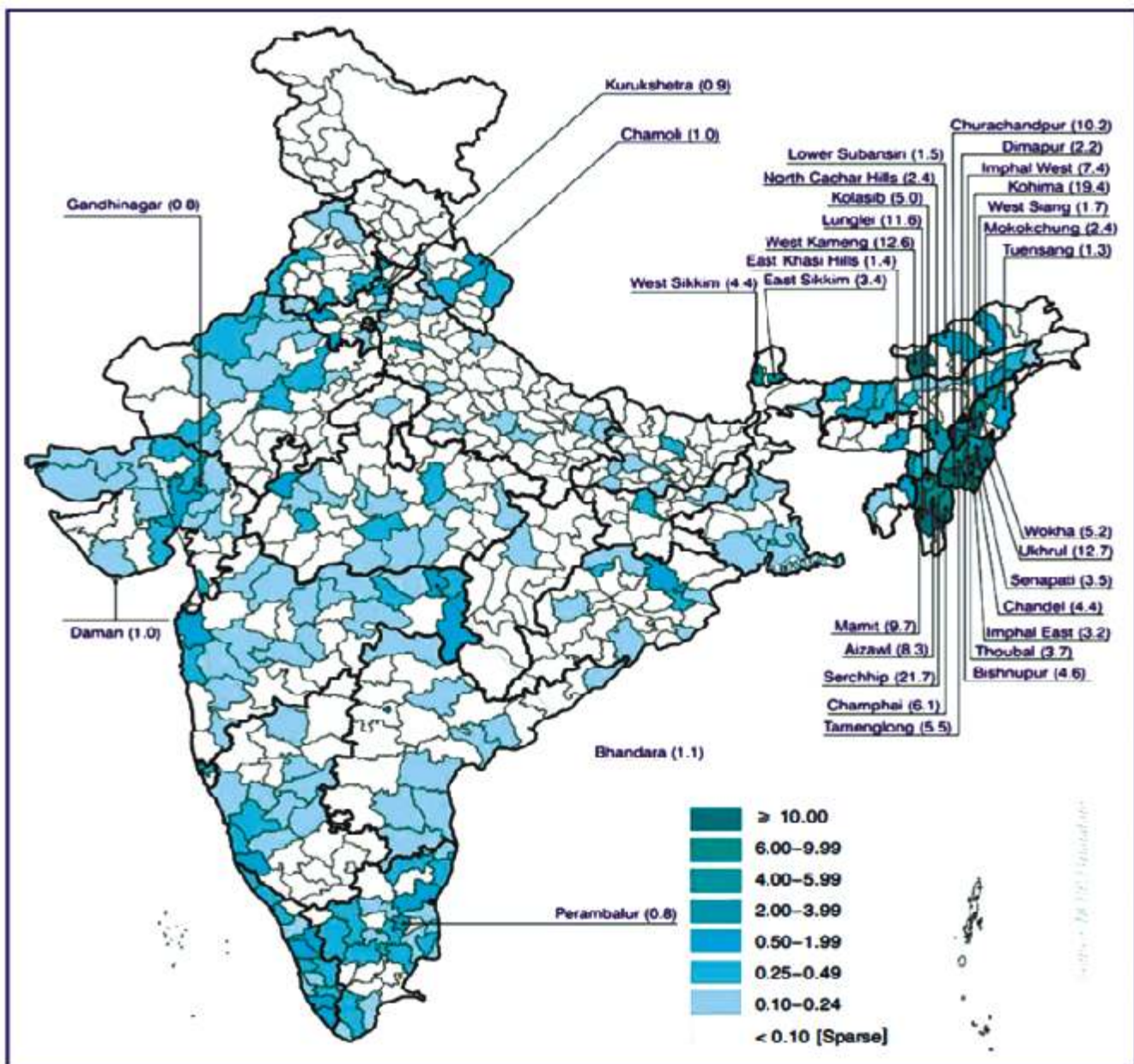


Figure 4 : ASR for nasopharyngeal carcinoma in India. (22)

This study of the exact geographical distribution is important because the significance and impact of NPC on certain communities might be overshadowed by the particular country that has a low overall incidence of NPC. To illustrate, NPC might not appear to

very important in India as it ranks 19<sup>th</sup> out of 23 cancers (excluding cervix, corpus, ovary, breast) in its impact on DALY in Indian males. However, it might be fair to hypothesise that the cancer burden and impact on DALY of NPC in North-East India would be much higher.



The World Health Organisation classifies NPC into three sub-types, namely, non-keratinizing carcinoma, keratinizing squamous cell carcinoma and basaloid squamous cell carcinoma (WHO).(102) Non-keratinizing carcinoma can be further divided into differentiated or undifferentiated sub-types. The majority of cases from the endemic regions (95%) comprise of are non-keratinizing, or undifferentiated sub-types, whereas those from non-endemic regions tend to have a larger proportion of patients with keratinizing carcinoma. In the Intergroup-0099 study done in the United States, 24% of patients had keratinizing carcinoma. (19) This is in contrast with studies done in South East Asia (20) and Mediterranean (21), where keratinizing carcinoma only forms 2% to 5% of cases seen.

In areas where nasopharyngeal carcinoma is endemic, such as southern China, Epstein-Barr Virus (EBV)infection tends to occur at an early age. Environmental agents acting in conjunction with the host's genetic background are thought to impair immune control of EBV infection, eventually leading to nasopharyngeal carcinoma. It has been found that the association of EBVinfection and NPC is specific to undifferentiated or non-keratinizing squamous carcinomas, rather than keratinizing squamous carcinoma tumours. This might explain the preponderance for these histological subtypes in the endemic region.

In contrast, in non-endemic regions, case control study by Vaughan et al(12) found that smokers of more than 60 pack years had an odds ratio of 6.5 of developing keratinizing NPC, whereas there was no association seen between undifferentiated or non-keratinizing sub-types and smoking. The same study also showed that heavy alcohol consumers were also at increased risk.

Regardless of geography, NPC is generally 2-3 times more frequent in males compared to females. NPC is uncommon in children. The incidence increases in adulthood and peaks at around ages 50 to 60 years before declining thereafter. Exposure to carcinogenic agents early in life has been cited as a reason for this age trend.

Migration also has an important role in the epidemiology of NPC. In Singapore for example, NPC incidence amongst Chinese (most of which originated from southern china) is 12.5/100,000 compared to 1.1/100,000 among Indians (most of which originate from southern India).(5) Data from the Swedish registry suggests that immigrants from endemic areas that arrived in Sweden in their 20s and 30s have incidence

rates that are similar to their countries of origin.(6) This data would also support the hypothesis that genetic damage leading to carcinogenesis could have occurred early in life.

In contrast, although the incidence rate of NPC amongst Chinese in the United States remains considerably higher than non-Chinese, this rate is only approximately half of that seen in southern China. However, Chinese migrants to America could have originated from both low- and high-risk regions. Thus, without studying the specific geographic origins and other associated risk factors of these Chinese migrants, it would be difficult to attribute a decreasing trend of NPC incidence to migration alone.

NPC incidence in endemic areas has been decreasing since the 1980s (figure 4). Epidemiological studies from Hong Kong have shown that the age-standardized incidence rate of NPC has fallen approximately 30% in both genders between 1980 to 1999.(7) This trend has also observed in Singapore and Taiwan,(8) but not in Southern China. It is postulated that perhaps lifestyle changes associated with the rapid economic development (e.g. decreased intake of preserved salted fish) could be contributory with a lag time of several decades. In Singapore, rapid economic growth occurred in the 1960s, whereas development in Hong Kong began about one to two decades earlier. The latest ASR for NPC in Singapore males has declined to 8.4 per 100,000 per year. (103)

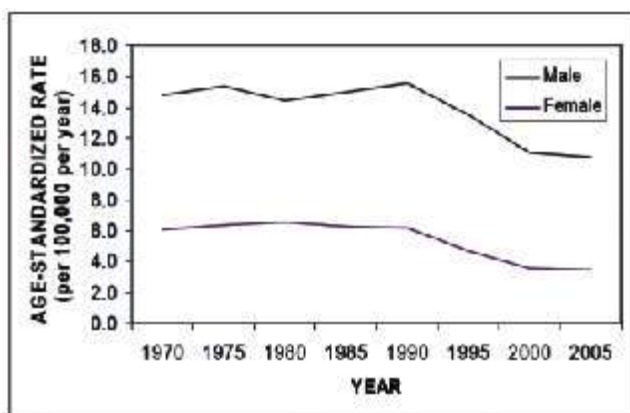


Figure 5 : Age-standardized incidence for NPC over time for Singapore (5)

The etiology of NPC is likely to be multi-factorial. In particular, evidence has shown it to be associated with environmental factors, infective factors, especially the Epstein-Barr virus (EBV), and host genetics.

Perhaps the best studied dietary risk factor for NPC would be the intake of salted or preserved foods - in particular, Cantonese style salted fish. Salted fish typically contains N-nitrosamine, which has been



implicated as carcinogenic. A large case control study from Guangzhou has shown that intake of salted fish in childhood is associated with increased risk for NPC (odds ratio 2.45) compared to intake during adulthood (odds ratio 1.58).(10) Intake of other preserved food has also been associated with a two-fold increase in risk of developing NPC in a meta-analysis by Gallicchio.(11)

In contrast to preserved foods, Gallicchio also showed that high intake of non-preserved vegetable is associated with a 35% reduction in risk of NPC. It is postulated that this is due to the antioxidant effects of these foods.

EBV is the etiologic agent of infectious mononucleosis and has been shown to be strongly linked to some human malignancies, including Burkitt lymphoma and NPC. Antibody titers to EBV-related antigens have been shown to be higher in patients with nasopharyngeal carcinoma (NPC) compared with controls, supporting the hypothesis of an etiologic relationship. By examining sera from high, intermediate and low incidence areas, NPC was also consistently found to be associated with an active infection (or reactivation) by EBV.

IgA antibodies against EBV viral capsid antigens (VCA) and early antigens (EA), and anti-EBV DNase antibodies have been shown to be characteristic of NPC. In a study examining IgA antibodies against VCA and antibodies against EBV-specific DNase, Chien et al(13) demonstrated that the cumulative risk of NPC per 100,000 person-years was 11 for subjects positive for neither marker, 45 for those with one marker, and 371 for those positive for both markers. This prospective cohort study suggests a temporal relationship between EBV activation or re-infection and NPC pathogenesis. Amongst the antibodies, it is likely that VCA-IgA is the most useful predictor for NPC, with a recent meta-analysis showing a sensitivity of 0.91 and a specificity of 0.92 for VCA-IgA in the diagnosis of NPC.(14)

EBV DNA has also been detected in both invasive and pre-invasive (15) lesions. The EBV DNA detected was noted to be clonal, and the EBV-transforming gene, LMP-1, was also seen in all the neoplastic cells, suggesting that EBV infection is an early, possibly initiating event in the development of NPC. Circulating EBV DNA fragments, EBERs, and BART microRNAs (16) has also been detected in the plasma or serum of NPC patients. Detectable EBV DNA levels post therapy High levels of plasma EBV DNA prior to radiation therapy, or persistently detectable EBV DNA levels have been shown to be a strong adverse prognostic factors for survival.(17)

The association between cigarette smoking and

NPC is not well established. While most case control studies reported a 2 to 6 fold increase in risk of NPC, there are also numerous studies that showed no association.

Some authors have shown that a history of chronic ear or nose condition approximately doubles the risk of NPC, with the proposed mechanism being that chronic infection or inflammation could render the nasopharyngeal mucosa to be more susceptible to the development of NPC.(9)

Familial clustering and genetic factors have been implicated in the development of NPC since the 1970s, but advancement in gene sequencing and statistical methods have allowed researchers to delve into this in much greater depth. In general, individuals with a first-degree relative with NPC have a 4 to 10 fold increased risk of developing NPC. Conversely, up to 15.5% of newly diagnosed patients will have a family history of NPC. This magnitude of familial risk in endemic regions is one of the highest amongst cancers, and is likely to be due to interaction between shared genetic susceptibility as well as environmental risk factors. One of the biggest documented "NPC families" is the one originating from the Bidayuh pedigree from Sarawak, Malaysia.

High throughput genotyping technologies have allowed large-scale association studies to be conducted for NPC. A recent review highlighted 83 published papers which included Genome Wide Association Studies (GWAS), and studies exploring Human Leukocyte Antigen (HLA) Class I/II and other immune-related genes, as well as genes modulating phase I/II metabolism, DNA repair, cell cycle control, cell adhesion/migration, angiogenesis and DNA methylation.(18)

The main findings of the three published GWAS were that genes within the major histocompatibility complex (MHC) region on chromosome 6p21 were strongly associated with NPC. This region includes the HLA genes, which are subdivided to three main groups, namely Class I, II and III. Case control studies looking specifically at HLA Class I/II genes in the Chinese population have shown a strong association between some alleles and NPC.

In conclusion, nasopharyngeal cancer has a fascinating epidemiological story. To truly learn and understand this disease, one has to consider the interplay between genetics, an infectious agent, effect of migration (both from anthropology and modern perspective) as well as the various risk factors. To quote Dr ET Chang, the epidemiology of NPC is truly enigmatic.(9)

## References:

1. Soerjomataram I, Lortet-Tieulent J, Parkin DM, et al. Global burden of cancer in 2008: a systematic analysis of disability-adjusted life-years in 12 world regions. *Lancet* 2012;380(9856):1840-50.
2. Cao SM, Simons MJ, Qian CN. The prevalence and prevention of nasopharyngeal carcinoma in China. *Chin J Cancer* 2011;30(2):114-9.
3. Wee JT, Ha TC, Loong SL, Qian CN. Is nasopharyngeal cancer really a "Cantonese cancer"? *Chin J Cancer* 2010;29(5):517-26.
4. De-The G. The Chinese epidemiological approach of nasopharyngeal carcinoma research and control. *Yale J Biol Med* 1981;54(1):33-9.
5. Trends in Cancer Incidence in Singapore 1968-2007. In: Health Promotion Board; 2010.
6. Mousavi SM, Sundquist J, Hemminki K. Nasopharyngeal and hypopharyngeal carcinoma risk among immigrants in Sweden. *Int J Cancer* 2010;127(12):2888-92.
7. Lee AW, Foo W, Mang O, et al. Changing epidemiology of nasopharyngeal carcinoma in Hong Kong over a 20-year period (1980-99): an encouraging reduction in both incidence and mortality. *Int J Cancer* 2003;103(5):680-5.
8. Hsu C, Shen YC, Cheng CC, Hong RL, Chang CJ, Cheng AL. Difference in the incidence trend of nasopharyngeal and oropharyngeal carcinomas in Taiwan: implication from age-period-cohort analysis. *Cancer Epidemiol Biomarkers Prev* 2006;15(5):856-61.
9. Chang ET, Adami HO. The enigmatic epidemiology of nasopharyngeal carcinoma. *Cancer Epidemiol Biomarkers Prev* 2006;15(10):1765-77.
10. Jia WH, Luo XY, Feng BJ, et al. Traditional Cantonese diet and nasopharyngeal carcinoma risk: a large-scale case-control study in Guangdong, China. *BMC Cancer* 2010;10:446.
11. Gallicchio L, Matanoski G, Tao XG, et al. Adulthood consumption of preserved and nonpreserved vegetables and the risk of nasopharyngeal carcinoma: a systematic review. *Int J Cancer* 2006;119(5):1125-35.
12. Vaughan TL, Shapiro JA, Burt RD, et al. Nasopharyngeal cancer in a low-risk population: defining risk factors by histological type. *Cancer Epidemiol Biomarkers Prev* 1996;5(8):587-93.
13. Chien YC, Chen JY, Liu MY, et al. Serologic markers of Epstein-Barr virus infection and nasopharyngeal carcinoma in Taiwanese men. *N Engl J Med* 2001;345(26):1877-82.
14. Li S, Deng Y, Li X, Chen QP, Liao XC, Qin X. Diagnostic value of Epstein-Barr virus capsid antigen-IgA in nasopharyngeal carcinoma: a meta-analysis. *Chin Med J (Engl)* 2010;123(9):1201-5.
15. Pathmanathan R, Prasad U, Sadler R, Flynn K, Raab-Traub N. Clonal proliferations of cells infected with Epstein-Barr virus in preinvasive lesions related to nasopharyngeal carcinoma. *N Engl J Med* 1995;333(11):693-8.
16. Wong AM, Kong KL, Tsang JW, Kwong DL, Guan XY. Profiling of Epstein-Barr virus-encoded microRNAs in nasopharyngeal carcinoma reveals potential biomarkers and oncomirs. *Cancer* 2012;118(3):698-710.
17. Lin JC, Wang WY, Chen KY, et al. Quantification of plasma Epstein-Barr virus DNA in patients with advanced nasopharyngeal carcinoma. *N Engl J Med* 2004;350(24):2461-70.
18. Hildesheim A, Wang CP. Genetic predisposition factors and nasopharyngeal carcinoma risk: a review of epidemiological association studies, 2000-2011: Rosetta Stone for NPC: genetics, viral infection, and other environmental factors. *Semin Cancer Biol* 2012;22(2):107-16.
19. Al-Sarraf M, LeBlanc M, Giri PG, et al. Chemoradiotherapy versus radiotherapy in patients with advanced nasopharyngeal cancer: phase III randomized Intergroup study 0099. *J Clin Oncol*. 1998 Apr;16(4):1310-7.
20. Tham IW, Hee SW, Yeo RM, et al. Treatment of nasopharyngeal carcinoma using intensity-modulated radiotherapy-the National Cancer Centre Singapore experience. *Int J Radiat Oncol Biol Phys*. 2009 Dec 1;75(5):1481-6.
21. Demirci SI, Kamer S, Kara G, et al. Does the prognosis of nasopharyngeal cancer differ among endemic and non-endemic regions? *Acta Otolaryngol*. 2011 Aug;131(8):852-60.
22. Katakaki AC, Simons MJ, Das AK, et al. Nasopharyngeal carcinoma in the Northeastern states of India. *Chin J Cancer*. 2011 Feb;30(2):106-13.

## Website References:

1. International Agency for Research on Cancer.GLOBOCAN Project. <http://globocan.iarc.fr/>. Last accessed 31 August 2014.
2. Cancer Pathology and Genetics. Pathology and Genetics of Head and Neck Tumours.IARC Publications. <http://www.iarc.fr/en/publications/pdfs-online/pat-gen/bb9/index.php>. Last accessed 14 June 2013.
3. Singapore Cancer Registry Interim Annual Registry Report Trends in Cancer Incidence in Singapore 2009-2013. National Registry of Diseases Office (NRDO). <http://www.nrdo.gov.sg>. Last assessed 31 August 2014. □



# ARTICLES



## History of Cancer Registration in India

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**D**r. Khanolkar in his book 'A look at cancer' mentions that 'Cancer' was known in India since Vedic times. Locally used terminologies like 'Kavilvarpu' depicting oral cancer (in Malayalam) have been prevalent in the country since a long time which indicates long term presence of cancer in our population.

Practitioners of modern medicine who reached India from western world were quick to identify cancers which were rare or unknown in their country. Thus in 1819 Dr. Maxwell reported 'Kangri'(Skin Cancer) cancer of Kashmir. Hospital based cancer occurrence reported since 1900 were mainly on oral cancer and tobacco habit. Such observations were done by Dr. Niblock in 1902, Dr. Fells in 1908 & Dr. IM Orr in 1933. Dr. Orr(L M S Hospital, Neyyoor - now in Tamil Nadu) also suspected nutrition and venereal disease as related to oral cancer. This made him start a unique case control study seeking answers to the following questions.

- Is there a definite geographical distribution?
- Is the disease definitely associated with the betel chewing habit; if so, what are the carcinogenic factors in the quid?
- Is it associated with syphilis?
- Is it associated with any particular dietetic or nutritional defect?

This demonstrate that there was a keen interest in the epidemiology of cancer. In 1937, an unusual occurrence of hard palate cancer was reported by Dr. Kini and Dr. Subba Rao among those who practiced reverse smoking of 'Chutta' with burning end inside the mouth. A nation wide study on cancer mortality was reported by Dr. Viswanath and Grewall in 1935.

The Tata Memorial Hospital was established in 1941 by the noble philanthropic attitudes and health

concerns of the people of this country by the House of Tatas. This was the first major totally committed cancer treatment and study centre in the country. Several other centres like Bernard Institute of Radiology in Madras, SN Medical College, Agra, Radium Institute, Patna, CMC Vellore were hospitals known at that time for cancer treatment. Chittarajan National Cancer Centre was inaugurated by Madam Curie in 1950 in Kolkotta. Cancer Institute (WIA), Adyar was started in 1954 by Dr. S Muthulakshmy Reddy, the first woman medical graduate in the country. Several studies and reports from such cancer centres made visible the variations in cancer occurrence in different parts of the country. Systematized recording and storing of information on cancer patients and cancer which are essential for registry operations was in vogue at Tata Memorial Hospital from 1941 and in Cancer Institute (WIA) from 1954.

Country wide surveys mainly on oral cancer, pre-cancer and tobacco use were reported by Dr. Khanolkar in late 1950s. . In a land mark case control study in 1955, Dr. Sanghvi, Ms. Rao (later Mrs. Jayant) and Dr. Khanolkar from Tata Memorial Hospital identified a statistically elevated significant risk of oral cancer to the habits of bidi smoking and chewing tobacco. During this period the available data on cancer was highly suggestive of wide variation in cancer occurrence in different parts and population subgroups of the country which were suspected to be due to life style variations. Thus in 1956 Dr. Paymaster reported a high frequency of breast cancer in Parsees of Greater Bombay based on the data from Tata Memorial Hospital. In 1960s Dr. Paymaster, Dr. Jussawalla, Dr. Wahi and Dr. Krishnamurthy analyzed hospital based data and demonstrated significant differences in cancer occurrence across the country. However, in almost all case-series, oral and cervix cancers

predominated. During 1964–1966, Dr Wahi initiated studies investigating the role of Mainpuri tobacco in the high frequency of oral cancer seen in Agra Medical College. Later a population based study supported by WHO covered the entire Mainpuri district of UP. The findings were published in 1968. Dr. Fali Mehta in 1966 started systematic surveys of tobacco habits and oral cancer and pre-cancer in various population groups in India in collaboration with Dr. J. J. Pindborg from Denmark, a well known oral pathologist, with Dr. P C Gupta organizing and analyzing the entire field studies. The Tata Institute of Fundamental Research, Mumbai housed their study offices. These surveys were undertaken in 7 different parts of the country covering a total population of more than 2 lakhs. A cohort study was undertaken after 10 years of this initial survey in three districts including Ernakulam.

Such studies underscored the need for systematic planning and standardised studies on Cancer Burden pattern and trends across the country using modern scientific methodologies.

The country's first population based cancer registry was established in 1963 covering the Greater Bombay population by the Indian Cancer Society under Dr. Jussawalla with technical and fund support from the US National Cancer Institute, Dr. William Haenszel was the advisor for this registry and William Lourie as technical consultant from NCI visited Bombay more than once to help organization of the PBCR. Mr. V A Deshpande was the statistician and he along with Mr. M V Natekar did all the pioneering work for 10 years. Dr Yeole joined the team as statistician in 1972. The Bombay Cancer Registry under Dr. Yeole further expanded cancer registration to Pune (1973), Aurangabad (1978), Nagpur (1980). Dr. Yeole headed registry operations till 2011. The Gujarat Cancer Research Institute organized urban and hospital (GCRI) based registry in Ahmedabad in 1972.

To facilitate Cancer Control the need for information on cancer burden and cancer risk in the country was expressed in scientific forums and discussions started in several meetings during 1960 to 1964 in which WHO experts were present.



I recollect such a meeting held in New Delhi, WHO office. The WHO scientists notably Dr. John Higginson, Dr. Otte, Dr. Albert Tuyns, Dr. Cooray (Ceylon), Dr. Takeshi Hirayama (Japan), Dr. Calum Muir (Singapore), Dr. Shanmugha Ratnam (Singapore), Dr. Nugamanov (Russia), Dr. Walter Davis (IARC), Dr. J C Paymaster, Dr. D J Jussawalla, Dr. S Krishnamurthy, Dr. P N Wahi, Dr. U K Luthra were all present in the meetings organized by ICMR and WHO. Similar meeting was held in 1964 in Bombay also. All stressed the need for more systematized studies which would also help standardizing patient care services and guide cancer control services in the country. The need for cancer registration was also voiced.

In 1965, recognizing cancer as a serious health hazard the Government of India appointed a scientific committee with Dr. K N Rao as Chairman to examine the methods for establishing Regional Cancer Centres (RCCs) in the country as focal institutions to offer state-of-the-art treatment, research and education to help control the disease. The functioning of the RCCs was modeled on the Russian experience for organizing cancer treatment in that country. The recommendations of the committee were reviewed by another committee under the Chairmanship of Dr. Wahi in 1973. Both stressed the need for cancer registry organization and suggested that cancer be made a notifiable disease in the country.

In 1970s, Dr. Jussawalla published site wise cancer distribution seen in more than 40 hospitals located all over the country as supplements to Indian Journal of Cancer. Apart from the variations in site distribution, it was observed that the terminologies like head and neck cancer, cervix cancer, uterus cancer etc included several anatomical sites which according to ICD were separate entities. This lack of adherence to international classification system made comparisons between various series problematic. ICD classification was not used in hospital records.

The role of ICMR was highly significant in providing the essential leadership and guidelines for all cancer related studies at that time. Dr. Ramalingaswamy who was the D.G of ICMR had a real zeal for conducting the programme. Dr. Ramalingaswamy's population based study on Sub-Himalayan endemic goiter was well appreciated by all. Great efforts were made by Prof. Wahi and Dr. Luthra for the creation of a networked, systematized plan for the development of cancer information collection leading to studies and control of the disease in India.

**In February 1980 the Advisory Committee on Cancer Research of ICMR was formed with the following members.**

**Members of the Advisory Committee:**

Dr. B K Aikat, Dr. B K Bachhawat, Dr. Sumathi Bhide (Rapporteur), Dr. Jayasree Roy Chowdhury, Dr. M G Deo (Rapporteur), Dr. D J Jussawalla, Dr. S K Kashyap, Dr. Usha K Luthra (Member Secretary), Dr. Fali S Mehta, Dr. N C Nayak, Dr. V Ramalingaswami, Dr. L D Sanghvi, Dr. B Sankaran (Chairman), Dr. P N Wahi, Dr. M Thangavelu (WHO Representative), Mr. A K Prabhakar (ICMR Staff), Dr. Kamala Rani (ICMR Staff).

**The committee recommended the following-**

1. To set criteria for selection of centres/areas for organization of various types of cancer registries.
2. Augmenting the existing registry and establishing new registries in various parts of the country with the main objectives to lay down guidelines for organization of hospital based, population based (urban and rural) cancer registries in the country.
3. To define the modus operandi of the work-plan and performance evaluation of the registries.

A Task Force was constituted to work out the details of these recommendations. The first meeting of the task force was held on 27th and 28th November 1980 at Tata Memorial Hospital.

**Members of the Task Force:**

Dr. B D Baruah, Dr. Krishna Bhargava, Mr. P. Gangadharan, Dr. B D Gupta, Dr. I M Gupta, Mr. D K Jain, Dr. D J Jussawalla (Chairman), Dr. Usha K Luthra (Convener), Dr. L D Sanghvi, Dr. V Shanta, Dr. AD Taskar

The Task Force recommended establishment of population and hospital based cancer registries at selected places in the country, taking into account the local development. It also went into details regarding operation methodology, staff structure, training programmes, uniform collection of data, periodical review and evaluation of working of the registries. The ICMR fund support was also sanctioned for the first five years. The committee, after getting approval of ICMR decided first to strengthen the Bombay registry and to establish additional population based and hospital based registries.

The first meeting of the NCRP project chiefs (PI) was held on 22nd and 23rd December 1981 at Tata

Memorial hospital. This was intended to co-ordinate the activities and to have agreement on procedures of registry operations so as to ensure consistency, continuity and comparability nationally and internationally.

Thus in 1982 the locations of first three Population Cancer Registries (PBCR) and the first three Hospital Cancer Registries (HBCR) were decided. The PBCRs were to be in Bombay, Chennai, Bangalore and HBCRs in Assam Medical College, Dibrugarh, PGI Chandigarh and RCC, Thiruvananthapuram. All the registries started functioning from 1.1.1982.

Dr. Krishna Bhargava was the Director of Kidwai Memorial Institute at Bangalore, Dr. S. Krishnamurthi, Director, Cancer Institute (WIA), Chennai and Dr. Krishnan Nair was the Director of RCC, Thiruvananthapuram. These three Krishnas initiated and managed the three registries in South India.

In 1986, recognizing the work accomplished and the need to continue the activities, the ICMR renamed the 'Project' as National Cancer Registry 'Programme'. The Registry operation initiated in 1982 is followed and practiced even after 32 years, particularly the reporting annual review meeting and (1) the registry workshop (2) Annual Review Meeting (3) Registry Report. The procedure manuals were also made to guide the registry operations of both HBCR and PBCR. Of the three HBCRs initiated in 1982, the HBCR at PGI Chandigarh functioned only during 1982-1989 but rejoined the programme in 2011. The fund support for the registries was extended by the NCRP ICMR and the practice insisted was to submit the cancer cases abstracted as per the NCRP guidelines to NCRP office for processing, collating and reporting. This is a significant achievement still continued and stands to the credit and dedication of the organizers of the programme.

Due to the strength of such well thought out programme it could work all these years and we had supportive leaders for this. Dr. L D Sanghvi, Dr. D K Jain, Dr. A K Prabhakar, Dr. Ravi Rangachari, Dr. Radhakrishna, Dr. Sunder Rao, Dr. Kishor Chowdhry, Dr. V Sreenivas were in the leadership team. For a short time we also had Dr. Sarala Krishnamoorthy. Dr. Bela Shah has been guiding the registry operations from ICMR head quarters till 2011 and very cordially looked after the registry needs. Dr. Nandakumar who joined the Hospital Cancer Registry at Kidwai Memorial Hospital in 1982 has been elevated to the position of chief of the National Cancer Registry Programme from 1990 and has been described as a 'workaholic'. The technical headquarters of the National Cancer Registry



Programme was located at Tata Memorial Hospital till 1991 December and Bangalore became the technical headquarters of the programme in 1992.

The modus operandi of the registry system set by NCRP-ICMR in 1981 received guidance from Dr. Usha Luthra for several years. During the annual review meetings, the procedures, outcome and format of registries were discussed in the presence of PIs, supported and guided by WHO experts Dr. Calum Muir, Dr. Takeshi Hirayama, Dr. Matti Hakama and Dr. John Young. In all annual review meetings such experts from IARC were invited. Many items of information that the registries collect today were all formulated and discussed during the meetings and such sustained efforts have helped us to project the NCRP of India to be included in the Global Cancer Registry map. Further, advanced training in cancer epidemiology for registry staff was made possible by the generous appreciation of the NCRP needs by Dr. Hakama and Tampere University, UICC, WHO etc.

In the annual meetings of NCRP the principal investigators of all registries and steering committee members who more often were the directors of cancer centres actively participated. Dr. D J Jussawalla, Dr. Krishnamurthy, Dr. V. Shanta, Dr. Krishna Bhargava, Dr. Anantha, Dr. P B Desai, Dr. Kusum Verma, Dr. Zaman, Dr. Dinshaw, Dr. B D Gupta, Dr. R. A. Badwe, Dr. Krishnan Nair, Dr. N.C Mishra, Dr. Padam Singh, Dr. A.K Mukherjee, Dr. P.C.Gupta, Dr. F U Ahmed, Dr. Sheila Kanhere, Dr. Prabhakaran, Dr. A. C. Kataki, Dr. R C Mahajan, Dr. J Mahanta, Dr. B M Nene, Dr. Neel Kamal Kapoor, Mrs. Jayant, Dr. Pankaj Shah, Dr. G K Rath all have actively participated in the meetings. These demonstrate the whole hearted commitment of the institutions and scientists involved in the programme.

In 1982, there were less than 30 people working in the 6 registries. But now it employs more the 500 technical personnel assisting 58 registries and connected projects like Atlas of Cancer, Patterns of Care and Survival Studies etc. In 2014, we have 29 population cancer registries, 29 hospital based cancer registries, 56 centres are using NCRP software for hospital registries and 17 centres participate in Patterns of Care and Survival Studies. In the Punjab Atlas Project, 99 centres participate. Here the consistency, continuity and the dedicated effort of Dr Nandakumar and his team should receive appreciation.

An important feature of the registry operations is the regular training programmes held along with annual review meetings over the past 32 years and efforts for conducting such programmes are often planned 6-7 months ahead. These training

programmes help the workers to refresh and update their skill as well as to sustain their interest and involvement in the programme. The annual meetings are held in different registries and one of the early meetings; the third was held in RCC, Trivandrum under the leadership of Dr. Krishnan Nair. This activity gave a lead for cancer control efforts in Kerala and helped to gain national significance.

The registries have also willingly and voluntarily expanded registration system to nearby areas with support from NCI, ICMR, WHO, IARC, BARC, HRF Japan etc (see Vol. XVIII CRAB). The RCC, Thiruvananthapuram conducted five tumour registry training programmes with the help of Dr. Calvin Zippin of University of California in Sanfrancisco. Thus one can see that the registries of the National Cancer Registry Programme, very many efforts have been undertaken for expansion of cancer registration activities in India in spite of the heavy ground work involved in organizing such registries. The NCRP-ICMR support was crucial in such developments. The registry recording and processing of information are guided by the procedure manuals prepared by NCRP.

The many publications on cancer occurrence in India have attained importance in guiding cancer research and cancer education and one can observe the various scientific works from India being quoted by many organizations all over the world like WHO, IARC etc. Indian cancer data published in the successive volumes of Cancer Incidence in Five Continents (IARC) illustrates that Indian registry data is comparable to international standards. The registry staff utilized their scientific skill in several international meetings and publications. Cancer survival in Africa, Asia and Caribbean and Central America was edited by Dr. Sankaranarayanan and Dr. Swaminathan in 2011. This book published by IARC stands unique on survival studies on cancer in developing countries. Dr. Swaminathan is also a co-editor for the Cancer Incidence in Five Continents Vol. X and Mr. Athul Sreevasthava of Bhopal Registry works on ICD(WHO).

Many of the registry staff after attaining experience from registries were able to proceed for higher training abroad with support from WHO, IARC, Tampere University etc and some of them were able to place themselves in international organizations like WHO, IARC etc. They in turn have helped the NCRP registries significantly. Dr. Sankaranarayan, IARC who started his career in cancer registry at RCC, Thiruvananthapuram helped the formation of cancer registries at Kolkata, Thiruvananthapuram Taluk and Ambilikai-Dindigul area with fund support from

various scientific organizations abroad.

The International Association of Cancer Registries held its annual meeting in Bangalore in 1994. Dr. Nandakumar was the chief organizer for this conference held for the first time in India.

Computerization of registry activities was initiated and attempted from the beginning of registry operations. But it did not take off due to several reasons. The routine registry functioning were sustained without break and till 2000 there was no expansion of activities. However, the Cancer Atlas Project launched in 2001 made substantial progress in the registry working in India by introducing IT services. Realizing the limitations to appreciate the burden and pattern of cancer in India from the existing few hospital based and population based registries, the NCRP undertook the creation of an Atlas of cancer in India. A beginning for this was made through the analysis of Pathology reports of cancer cases seen in more than 100 centres spread all over the country. These centres were either hospitals or pathology laboratories. The main focus of this was microscopic diagnosis of cancer recorded by these centres. 2,00,000 cancer case reports were received at NCRP office during 2001-2002 from 105 centres where processed at NCRP office during 2001-2002. The advice, guidance and appreciation for the programme was received from Dr. Max Parkin, Chief of unit of Descriptive Epidemiology of IARC. The fund support for the project was received from WHO. The data collection and compilation was through an in-house developed and networked IT system from all the centres.

#### **This programme yielded significant outcomes as follows:**

1. Recognition of very high cancer incidence in North East States. More often the minimum incidence rates obtained were more than the usual rates seen in other registries of NCRP.
2. An important by-product of this programme was that it achieved a reliable and fast information transfer and processing technology required for cancer registry system and studies in India.

Such an efficiently run programme has been translated to the normal working of population based and hospital based cancer registry reporting system since then. Here the cooperation of the registries and from the staff is successfully managed and guided by Dr. Nandakumar with support from NCD team at ICMR.

Initially the NCRP cancer registries were confined

to urban population or cancer hospitals located in Urban areas. The first rural cancer registry in India was the Barshi registry(NCRP) initiated in 1987. Adopting an active and novel registration method trained investigators visited villagers and interacting with the community conducted cancer detection camps in villages and PHCs. The registration system implemented was organized by Mrs Kasturi Jayant who had the experience in the early 1970's when she organized cancer screening cum control program in Rural Alibag. This work gave the essential leads to organize the program in Rural Barshi.

Two other significant registries joining the NCRP were the Bhopal cancer registry and Karunagappally NBRR cancer registry. These two are special purpose registries. The first was concerned with investigating the health effects of exposure to MIC. The second was the Karunagappally registry by RCC which was targeted to study the health effects of exposure to Natural Radiation emitted from the monozite sand in the area. The Bhopal registry later expanded to cover the Medical college Hospital, Bhopal. Subsequent to the findings of Atlas project the Karunagappally registry was expanded by NCRP to cover the entire Kollam district. This Kollam Registry thus formed the first district covering registry in Kerala and in south India.

In 2014 statewide registries are in Mizoram state, Tripura state, Manipur state, Sikkim state. Other registries cover districts, rural areas or urban areas. These total to 29 PBCRs and 29 HBCRs.

One of the most important functional development in the registry operations is the introduction of IT technology for registry operations. By introducing the HBCR DM and PBCR DM 2.0 softwares developed by NCRP the process of transfer of standardized information from HBCRs and PBCRs to NCRP office became possible. All such HBCRs are not under the ICMR-HBCR Network. Such data underwent cleaning, error corrections before processing and report generation.

Realising the need for information dissemination on cancer registry operations the formation of a News Letter was suggested in one of the earliest ARM . For this newsletter Dr Sankaranarayanan was chosen as the editor. The name of the news letter CRAB (Cancer Registry ABstract) was suggested by Dr. Babu Mathew, HOD of community Oncology Division of RCC. It is a welcome sign that the editorship changes between registries now.

**References (Publications-Yearwise):**

*(There are several publications from all cancer registries relevant to the text matter presented in this write up. Only a selected number have been included in this list. Sincerely regret this.)*

1. Maxwell T; Lancet; 152-154; 1819
2. Niblock WJ; Indian Medical Gazette 27; 161; 1902
3. Fells A; British Journal: 1357-1358; June 6, 1908
4. Ian Morrission Orr; Lancet 2; 575; 1933
5. Viswanath and Grewal K S, Indian Medical Research 23; 149; 1935
6. Kini M G and Rao K V S; Indian Medical Gazette; 72; 677-679; 1937
7. Sanghvi L D, Rao K C M, Khanolkar V R; Br. Med. J. i 1111- 114; 1955
8. Paymaster J C; Surgery 40; 372-377; 1956
9. Khanolkar V R; A look at cancer; Indian Cancer Research Centre, 1958
10. Shanta V, Krishnamoorthy S; Brit. Med. J. 13; 381; 1959
11. Paymaster J C; Cancer Vol. 3; 578-583; 1962
12. Paymaster J C; Cancer; Vol. 17, No. 8; August; 1026-1034; 1964
13. Wahi P N; Bul. World Health Organization; 38; 495-521; 1968
14. Mehta F S, Pind Borg J J, Gupta P C and Daftary D K Cancer 24; 832; 1968
15. Paymaster J C and Gangadharan P; Int. J. Cancer 5; 426-431; 1970
16. Paymaster J C; J. Ind. Med. Association; Vol. 57; No. 2; 37-44; 1971
17. Gangadharan P, Ind JI Ca; Vol 16; 1979
18. Jussawala D J; Report of Exploratory meeting on Geographical Pathology in the Indian subcontinent. Supplement to Indian Journal of Cancer, March 1965;
19. Kasturi Jayant, Rao S, Nene B M, Dale P S; Population Based Rural Cancer Registry Barshi Maharashtra Report 1987-1988; Tata Memorial Hospital; 1989. □



## Priorities for Cancer Research and Control

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The results of the reports of National Cancer Registry Programme, ICMR have provided a lead to set priorities for cancer research and identified target sites both anatomic and geographic, for cancer control measures.

The upper aerodigestive tract cancers as a group (oral cavity, hypopharynx etc., larynx, oesophagus and stomach) have emerged as important sites for undertaking risk factor research and implementing early detection programme. The Population Based Cancer Registries (PBCRs) in the North East have shown the highest or some of the highest incidence rates in the world of these sites of cancer and also comprise a substantial proportion of all cancers. They comprise 37.6% of all cancers in both sexes (50.5% in males and 24.7% in females) in the registries in the North East. Investigation into the type of tobacco consumption and dietary factors (for cancers of the oesophagus and stomach) is an obvious necessity. Aside from the unmistakable need for tobacco control and possible elimination of the habit (for primary prevention), early detection and screening exercises specifically for the cancers of these anatomical sites as an entity is an immediate requirement. Such plans are vital across the North East and in other registry areas like Bangalore that has shown consistent high AARs over the years for cancer of the oesophagus in both sexes. Programmes using endoscopy and laryngoscopy should be tried out initially as pilot studies in the Indian context and then depending on the feasibility, validity and acceptability extend state/region-wise. Simultaneously, education of the public about these sites of cancer and the need for early detection including the benefits of undergoing endoscopy should be widely publicised. In patients who do come and undergo endoscopy, facilities should be created for prompt diagnosis and wherever necessary, adequate treatment.

Over all, cancer incidence is higher in the North East compared to the reports available in other parts of the country. This is particularly so in Mizoram State and Kamrup Urban District. Such higher incidence rates for all sites of cancer in both males and females have not been reported earlier. Therefore a general cancer awareness programme with specific primary prevention measures should be included.

The incidence of cancer of the stomach is extremely high in Mizoram State and on the higher side in Sikkim and Manipur. Therefore, an action plan to have early detection of stomach cancer through endoscopy is essential. It would be desirable to establish endoscopy units in all district hospitals in Mizoram State and selected district hospitals in Sikkim and Manipur States. Periodic visits by the gastroenterologist or other trained medical staff to conduct endoscopy as a screening procedure should be undertaken through periodic visits to the district hospitals. Simultaneously, education of the public about stomach cancer and the need for early detection including the benefits of undergoing endoscopy should be widely publicized.

A similar programme as above for oesophageal cancer in Assam is also essential.

Since lung cancer is also very common and of high incidence in both men and women in these states, campaigns on harmful effects of tobacco as also early detection programmes for lung cancer should be instituted. The value of a simple chest X-ray in early detection of, or at least picking early stage, lung cancer should be tried out as a pilot project and subsequently extended.

Besides the above, cancer of the gall bladder especially in women, also shows a higher incidence in these areas. The specific risk factors for gall bladder cancer are largely unknown. Therefore, programmes

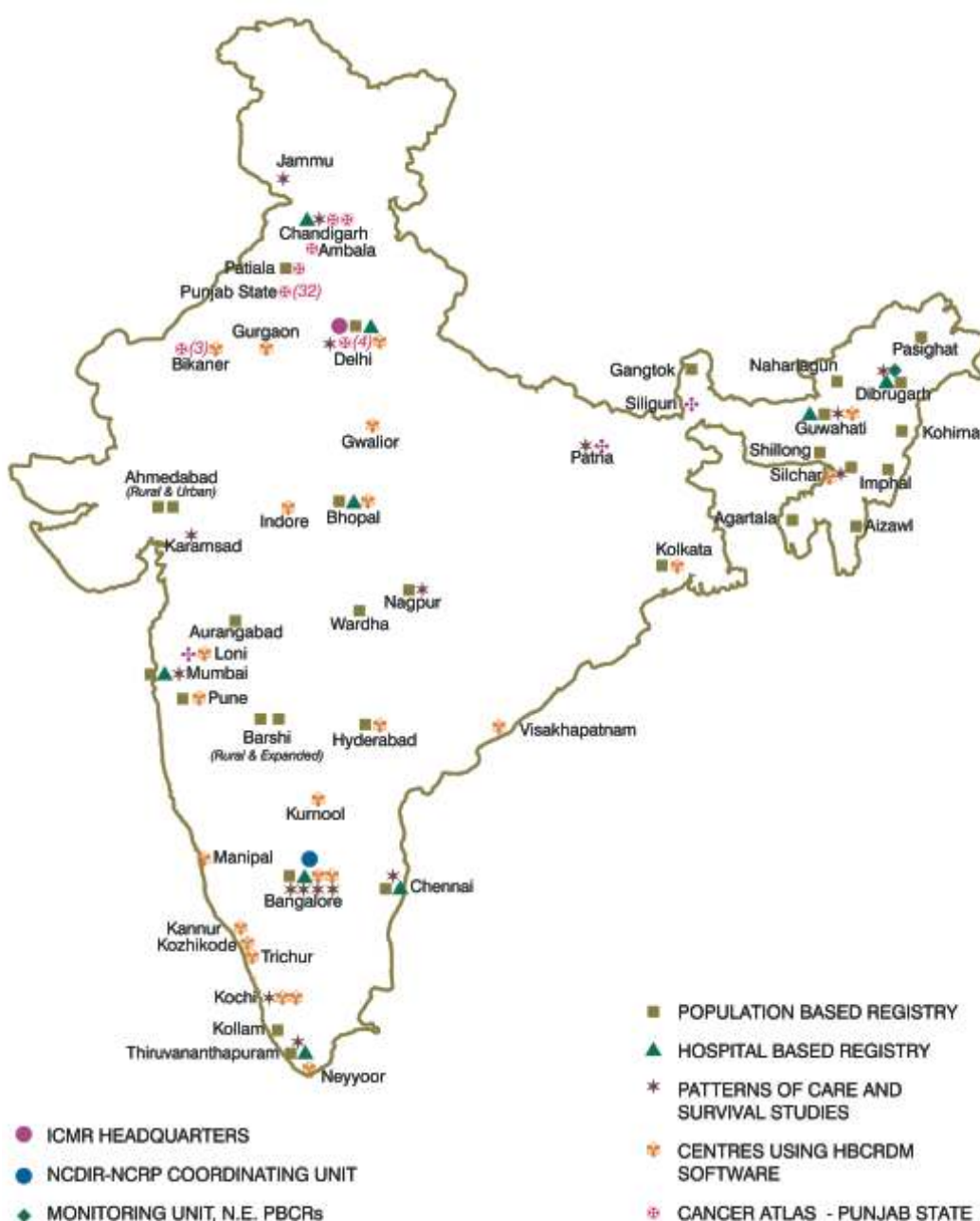
for early detection need to be taken up. The value of ultrasound is a method of early detection of gall bladder cancer should be tested out.

Cancer of the nasopharynx is also high in these North East States. Nasal and Oropharyngeal examination by trained medical personnel could help in the early detection of these cancers also.

There are several other anatomical sites of cancer (as documented in previous reports) that continue to

be a challenge in terms of aetiology and control. Cancers due to use of tobacco including cancers of the lung, are at the top of the list followed by cancers of the breast and cervix in women. Cancers of the gallbladder and thyroid also in women, too require special attention in terms of identifying risk factors and initiating early detection schemes. The former is seen in the north and northeast and the latter in the south and northeast of the country.

### NATIONAL CENTRE FOR DISEASE INFORMATICS AND RESEARCH NATIONAL CANCER REGISTRY PROGRAMME - NETWORK (Indian Council of Medical Research)



## List of collaborating centres under the Network of National Cancer Registry Programme, Bangalore

### Population Based Cancer Registries:

1. Kidwai Memorial Institute of Oncology, Bangalore
2. Cancer Institute (WIA), Adyar, Chennai
3. Indian Cancer Society, Mumbai
4. Institute of Rotary Cancer Hospital, AIIMS, New Delhi
5. Ashwini Rural Cancer Research & Relief Society, Barshi
6. Ashwini Rural Cancer Research & Relief Society, Barshi Expanded
7. Gandhi Medical College, Bhopal
8. The Gujarat Cancer and Research Institute, Ahmedabad Rural
9. The Gujarat Cancer and Research Institute, Ahmedabad Urban Agglomeration
10. Chittaranjan National Cancer Institute, Kolkata
11. Regional Cancer Centre, Thiruvananthapuram
12. Natural Background Radiation Cancer Registry, Karunagapally, Kollam District
13. Nagpur Cancer Registry, Nagpur
14. Aurangabad Cancer Registry, Aurangabad
15. Poona Cancer Registry, Pune,
16. Assam Medical College, Dibrugarh (Assam)
17. Sir Thutob Namgyal Memorial Referral Hospital, Gangtok, Sikkim
18. Silchar Medical College, Silchar (Assam)
19. Regional Institute of Medical Sciences, Imphal (Manipur)
20. Dr. B. Borooah Cancer Institute (RCC), Guwahati, (Assam)
21. Civil Hospital, Aizawl (Mizoram)
22. Cancer Hospital, Regional Cancer Centre, Agartala (Tripura)
23. Naga Hospital Authority, Kohima (Nagaland)
24. Civil Hospital, Shillong (Meghalaya)
25. Mahatma Gandhi Institute of Medical Sciences, Sevagram Wardha
26. General Hospital, Pasighat Arunachal Pradesh
27. General Hospital, Naharalgun Arunachal Pradesh
28. Government Medical College, Patiala, Punjab
29. Nizam's Institute of Medical Sciences, Hyderabad.
5. Assam Medical College, Dibrugarh
6. Dr. B. Borooah Cancer Institute (RCC), Guwahati
7. Postgraduate Institute of Medical Education & Research, Chandigarh
8. Dr. B. R. Ambedkar Institute - Rotary Cancer Hospital, AIIMS, New Delhi
9. Chittaranjan National Cancer Institute, Calcutta
10. The Gujarat Cancer & Research Institute, Ahmedabad
11. Regional Institute of Medical Sciences, Imphal
12. Mizoram State Cancer Institute (Civil Hospital), Aizawl
13. Civil Hospital, Agartala
14. Pt. J.N.M. Medical College & Dr B.R. Ambedkar Memorial Hospital, Raipur
15. Sher-I-Kashmir Institute of Medical Sciences (SKIMS), Srinagar
16. Cancer Hospital & Research Centre, Gwalior
17. Acharya Harihar Regional Cancer Centre, Cuttack
18. Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry
19. Kamala Nehru Memorial Hospital, Allahabad
20. MNJ Institute of Oncology & Regional Cancer Centre, Hyderabad
21. Pt. B.D. Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak
22. Indira Gandhi Medical College, Shimla
23. Rashtrasant Tukdoji Regional Cancer Hospital, & Research Centre, Nagpur
24. Govt. Arignar Anna Memorial Cancer Research Institute & Hospital, Kancheepuram
25. Sanjay Gandhi Post-Graduate Institute of Medical Sciences, Lucknow
26. Acharya Tulsi Regional Cancer Treatment & Research Institute, Bikaner
27. Indira Gandhi Institute of Medical Sciences, Patna
28. Government Medical College, Jammu
29. Gandhi Medical College, Bhopal

### Hospital Based Cancer Registries including Regional Cancer Centres:

1. Tata Memorial Hospital, Mumbai
2. Kidwai Memorial Institute of Oncology, Bangalore
3. Cancer Institute (WIA), Adyar, Chennai
4. Regional Cancer Centre, Thiruvananthapuram
5. Shirdi Saibaba Cancer Hospital & Research Centre-Kasturba Hospital, Manipal
6. Lakeshore Hospital & Research Centre Ltd., Kochi
7. Amala Institute of Medical Sciences, Amalanagar, Trichur

### HBCR Data Management Software - Centres:

1. Medanta Cancer Institute, Gurgaon
2. Indo-American Cancer Institute & Research Centre, Hyderabad
3. Indian Institute of Head & Neck Oncology-Indore Cancer Foundation, Indore
4. Pravara Rural Hospital & Rural Medical College, Loni
5. Shirdi Saibaba Cancer Hospital & Research Centre-Kasturba Hospital, Manipal
6. Lakeshore Hospital & Research Centre Ltd., Kochi
7. Amala Institute of Medical Sciences, Amalanagar, Trichur



8. Amrita Institute of Medical Sciences & Research Centre, Kochi
9. General Hospital, Ernakulam
10. Malabar Cancer Centre, Kannur
11. Advanced Medicare and Research Institute, Kolkata
12. Nizam's Institute of Medical Sciences, Hyderabad
13. Cachar Cancer Hospital and Research Centre, Silchar
14. Viswabharathi Cancer Hospitals, Kurnool
15. Andhra Medical College, King George Hospital, Visakhapatnam
16. Narayana Hrudayalaya Health City, Mazumdar-Shaw Cancer Centre, Bangalore
17. HCG Bangalore Institute of Oncology, Bangalore
18. Baby Memorial Hospital Ltd., Kozhikode
19. International Cancer Centre, Neyyoor
20. Rajiv Gandhi Cancer Institute & Research Centre, Delhi
21. Apollo Hospital, Bhubaneswar
22. Vydehi Institute of Medical Sciences, Bangalore
23. Erode Cancer Centre, Thindal, Erode
24. Bharath Hospital & Institute of Oncology, Mysore
25. Rural Development Trust Hospital, Bathalapalle
26. Malnad Hospital & Institute of Oncology, Shimoga
27. MES Medical College & Hospital, Malaparambu, Perinthalmanna
28. Kovai Medical Center and Hospital, Coimbatore
29. A.J. Hospital & Research Centre and A.J. Institute of Medical Science, Mangalore
30. Cancer Research Institute - Himalayan Institute Hospital Trust, Dehradun
31. Max Super Speciality Hospital - A Unit of Devki Devi Foundation, New Delhi
32. Ashadeep Hospital, Moradabad
33. Sagar Hospital, Bangalore
34. Madras Cancer Care Foundation, Chennai
35. Bhagwan Mahaveer Cancer Hospital and Research Centre, Jaipur
36. Yenepoya Medical College Hospital, Mangalore
37. Mangalore Institution of Oncology, Mangalore
38. Apollo Hospitals, Bangalore
39. Institute of Medical Science and Sum Hospital, Bhubaneswar
40. Caritas Cancer Institute - Caritas Hospital, Kottayam
41. Thanjavur Cancer Centre (Unit of Jeeva Centenary Trust), Thanjavur

### **Patterns of Care and Survival Studies on Cancer Breast, Cancer Cervix and Head & Neck Cancers:**

1. Amrita Institute of Medical Sciences, Kochi
2. Assam Medical College, Dibrugarh (Assam)
3. Cachar Cancer Hospital & Research Centre, Silchar
4. Cancer Institute (WIA), Adyar, Chennai
5. Dr. B. Borooah Cancer Institute (RCC), Guwahati, (Assam)
6. Government Medical College, Jammu
7. Government Medical College, Nagpur
8. HCG Bangalore Institute of Oncology, Bangalore
9. Kidwai Memorial Institute of Oncology, Bangalore
10. M.S. Ramaiah Medical College & Teaching Hospital, Bangalore
11. Mahaveer Cancer Sansthan, Patna
12. Postgraduate Institute of Medical Education & Research, Chandigarh
13. Pramukhswami Medical College, Karamsad
14. Rajiv Gandhi Cancer Institute & Research Centre, Delhi
15. Regional Cancer Centre Thiruvananthapuram
16. St. Johns Medical College Hospital, Bangalore
17. Tata Memorial Hospital, Mumbai
18. Christian Medical College, Ludhiana
19. Malabar Cancer Centre, Kannur

### **Cancer Atlas North-East Centres:**

1. Assam Cancer Society and Rural Based Preventive Oncology Res, Bokakhat
2. Babina Diagnostic Centre, Imphal
3. Cachar Cancer Hospital and Research Centre, Silchar
4. Cancer Hospital, Agartala
5. Civil Hospital, Shillong
6. Dr. B. Borooah Cancer Institute (RCC), Guwahati
7. Dr. Imkongliba Memorial Hospital, Mokokchung
8. General Hospital, Naharlagun
9. General Hospital, Pasighat
10. Naga Hospital Authority, Kohima
11. Nazareth Hospital, Shillong
12. NEIGRIHMS, Shillong
13. North Bengal Oncology Centre (P) Ltd., Darjeeling
14. Oil India Hospital, Duliajan
15. Silchar Medical College, Silchar
16. G B Panth Hospital, Agartala

**Development of an Atlas of Cancer in Punjab State:**

1. Government Medical College , Amritsar
2. SGRD Institute of Medical Sciences & Research, Amritsar
3. Dr. Grover's Hi - Tech Labs, Barnala
4. Dr. Monika's Lab , Bathinda
5. Max Super Speciality Hospital , Bathinda
6. Mittal Labs & Hormone Centre , Bathinda
7. Adesh Institute of Medical Sciences and Research , Bathinda
8. Civil Hospital , Bathinda
9. Dr Sheena's Path Lab, Bathinda
10. Kanwal Lab & Diagnostic Centre, Bathinda
11. Bansal Hospital & Cancer Centre, Bathinda
12. Wadi Hospital , Bathinda
13. Guru Gobind Singh Medical College, Faridkot
14. Civil Hospital, Kotkapura
15. Civil Hospital, Firozpur
16. Kumar's Hospital, Hoshiarpur
17. BBMB Hospital, Talwara
18. Patel Cancer and Superspeciality Hospital, Jalandhar
19. Sardana Labs , Jalandhar
20. Punjab Institute of Medical Sciences, Jalandhar
21. Sacred Heart Hospital, Jalandhar
22. Civil Hospital, Jalandhar
23. Mohan Dai Oswal Multispeciality and Cancer Hospital, Ludhiana
24. Dayanand Medical College & Hospital, Ludhiana
25. Christian Medical College & Hospital, Ludhiana
26. Civil Hospital, Jagraon
27. Civil Hospital, Mansa
28. Office of Civil Surgeon, Moga
29. Behgal Hospital, S.A.S. Nagar
30. Fortis Hosiptal, Mohali
31. Grecian Super Speciality Hospital, Mohali
32. Civil Hospital, Mohali
33. IVY Hospital, Mohali
34. Max Super Speciality Hospital, Mohali
35. Indus Super Speciality Hospital, Mohali
36. Civil Hospital, Kharar
37. Adesh Cancer Hospital, Muktsar
38. Government Medical College, Patiala
39. Gian Sagar Medical College & Hospital, Ram Nagar, Banur
40. Mata Kaushalya Hospital, Patiala
41. Ashok Clinical Laboratory, Patiala
42. Civil Hospital, Ropar
43. Civil Hospital, Sangrur
44. PGIMER, Chandigarh
45. Govt. Medical College & Hospital, Chandigarh
46. Rajiv Gandhi Cancer Institute and Research Centre, New Delhi
47. Dr. B. L. Kapur Cancer Centre, New Delhi
48. Medanta Cancer Centre, Gurgaon, Gurgaon
49. Acharya Tulsi Regional Cancer Treatment and Research Institute, Bikaner

## Anomalies and Impediments in Cancer Registry Information Accrual

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Amrita Institute of Medical Sciences and Research Centre

Several problems faced by the cancer registries regarding data collection, compilation, completeness checking, quality and reporting of cancer registry information are briefed in this write up.

The comments, opinion and experience of NCRP registries in connection with the registry operations are most welcome. Methodological guidelines for filling the NCRP Proforma are explained in the procedure manuals for HBCR and PBCR. All Registries should have these for reference. If not, contact NCRP. All staff especially data collectors and abstractors should study this manual thoroughly.

### [A]. Data Sources and Methods of Information Capture:

For information collection on cancer patients and on cancer, most registries have to resort to an "active method" and the abstract of the case is prepared from the information recorded routinely by the clinicians. Cancer is not yet a reportable disease in our country; hence the registry staff abstracts information from the records. Very few registries can hope to interview all patients to record the required information. Sometimes the registries go through all patient records in a hospital and elicit the required information. Or at times, the concerned medical record staff of the institution provide records of cancer cases for abstracting and reporting. Here, it should be ascertained whether all cancer cases seen in an institution were provided to the registry. Such cases should not be a convenient sample or a random sample of cancer records.

A consecutive series of case records of the hospital may be reviewed jointly by NCRP staff and hospital record officer to ensure that all cases have been received by NCRP. A similar review on Pathology

records may also be undertaken. Information abstracting from the records is done by registry staff who received special training in cancer registry work. Generally the information required for registry are obtained by record scrutiny from several sources as mentioned below.

- a) Medical records of a dedicated cancer treatment centre
- b) Patient records of a General hospital
- c) Laboratory reports particularly Pathology reports
- d) Vital Statistics Records of local administration
- e) Inter registry sharing of information on cancer cases is also resorted to as many patients from a population covered by the registry are referred to centres outside their registration area for treatment especially when no dedicated treatment facility is available in the area.
- f) In some areas cancer patients are provided special financial support to receive treatment. These records also can be used for registry purposes.
- g) Some registries scan news paper reports indicating deaths due to cancer and use them for registry purposes.

For an HBCR, the first two referred above are the essential data sources. For population registries searching all the seven sources would be productive. The registry's aim is to collect and collate information from all possible sources. Such information collected relate to socio-demographic status(SD), about disease, treatment and follow up.

In a dedicated cancer centre the opportunities for personal interview for information collection from all patients are excellent and trained workers can obtain the required SD information at the registration



time itself. Essential medical details of the cases would require periodic review of records. For this it is essential that we have in place a system for periodic review of registered cases. Usually it takes 6 months to complete the first course of treatment. Such a procedure can be implemented only with the co-operation from several concerned staff and administration. The procedure should be intended to optimize collection of quality information. This can be achieved in a dedicated cancer centre.

In the case of a General Hospital, cancer patients are seen in different speciality OP clinics and also among the in-patients. All such patients are registered at first attendance in OP registration counter and directed to appear in different speciality sections. There would be a common registration system for all patients attending the hospital. If all medical records (OP and IP) are maintained and preserved centrally a review of medical records of the hospital would be an important information source for registry work. However, this is often a massive work load. If disease coding is adopted by the medical records system it would be very supportive for the work. In a General Hospital setting it would not be easy to locate and interview all cancer patients in time. Thus scrutiny of medical records including OP records, IP records, Death records, Pathology records and OT records are essential. In some hospitals especially teaching hospitals the case records are preserved separately in the departments and this hinders timely retrieval of information for registry work. Attempt to retrieve a case paper a second time may not be productive in the absence of an efficient medical record system.

The third source of data and information for registry (population registry work) are the records kept by the diagnostic laboratories in the area, particularly pathology laboratories, which often work outside a hospital. If they adequately record the patient's socio-demographic information and preserve the reports, the co-operation from such laboratories would help the registry to collect the required information. There have been occasions when laboratories collect the required information and transfer them to the registries. However many laboratory records would be lacking the information required for a cancer registry like socio-demographic (SD) information, primary location and stage of cancer, previous treatment etc. However, the cancer registry should obtain them for identifying new cases, to eliminate duplicates and to merge information for completeness of records. Reluctance to share the information is often linked to confidentiality issues. The clinician's referral to the laboratories may have only

limited information on the disease like location of primary lesion etc.

The fourth source for a population cancer registry data is the records of Vital Statistics Department of the area covered by registry operation. All Population Based Cancer Registries in India should collect information on cancer deaths from the records officially kept in the Vital Statistics Department or Panchayats covering the area. Inadequacies of required information are very many in such records. WHO death reporting form require information on immediate cause and underlying causes. Very often these are not available. As we have been practicing death registration primarily for legal issues and not for research, the limitations should be foreseen.

Inter-registry sharing of information is practiced by some registries. This is an important avenue to pursue. The patients reach specialized centres when only an inadequate facility exists in their area.

In some states in our country a governmental financial support for cancer treatment is available, especially in areas where a dedicated cancer treatment centre is unavailable. It will be necessary to collect the information about such persons, their cancer and treatment received. Further information on such cancer cases would be available only from centres where the patient received the treatment. A computerized information recording and processing system would help most in all the above activities. For a population cancer registry several different sources will have to be searched. Sometimes the registry staff have to travel through difficult terrain or work in uncomfortable settings. (See page 41 CRAB 2013).

The population cancer registry of an area should hold periodic meetings and discussion with the co-operating centres regarding the information contributed by the centre. Such review meetings would act as incentives to improve data quality and ensure completeness of registration. The consolidated report of information collected from each centre should be provided to the contributing centre. This would enhance co-operation and support.

#### **[B]. Information Collection:**

The following are some of the essential information to be noted for the registry work.

- a) **Name of patient:** All registries have to collect the name of the patient for identification, duplicate checking and merging information obtained from various sources. The correct recording of names is thus essential. The

problems arise while abstracting and recording the name of patient for cancer registry work particularly if it is from recorded observations. They are

- i. Name-surname position and the initials could be before or after the name. Absence of surname is also observed.
- ii. Spelling of the names. Eg., Lakshman Laxman, Lekshman. Various computer checks are programmed for this by NCRP to eliminate such duplicates. Other checks include name spell check, address check, age Vs site of cancer etc. Apart from these checking the diagnosis and date of diagnosis are essential. If one individual has two cancers and made into two separate records consult the concerned clinicians.
- iii. In ICD-O- on Page 28 an important example of how the same patient got three different diagnosis of one cancer from three records from three sources has been mentioned. If the information on name, address etc are cross-checked, it would eliminate the multiple information recorded by the registry on one patient.

**b. Address:** For Population cancer registries and hospital registries, the patient's residence and duration of stay are important. While attending a hospital many patients provide local address of stay and when the patient completes the treatment returns to his/her native place. This shifting then hinders communication for follow up. In the usual institution records we get only one address. If it is temporary address the registry staff will have difficulty for patient contact. There are registries in India which collect even up to 6-7 addresses (Cancer Institute (WIA) Adayar). Communication with the patients are often hampered by address insufficiency or wrong contact telephone numbers

**c. Age of Patient:** While registering in a hospital, the patient is asked by the OP staff - What is your age? The patient who is anxious to go through the registration process fast to meet the doctor often tells the age in a hurry. The correctness of it can be verified if there is a recording of his/her date of birth, which also, the patients do not recollect nor asked for by the OP staff. The result is that the patient tells an age near to the actual, if not the actual age. The first tendency is to state the age ending

with 5 or 0 ie., 20, 25, 30 etc. The same statement errors may influence while recording age at death of the patient recovered from VSD files (See 2013 CRAB) against the recorded age in a hospital record. If the age at death is greater than age at diagnosis, it could be considered correct but if the reverse is recorded ie., age at death < age at diagnosis the error is apparent. While merging the information this needs attention. A re-scrutiny of medical record of the patient may help, but in the absence of such evidence a home visit of the deceased individual may be opted.

**d. Diagnostic information:** The laboratory records also have limitations especially when a laboratory report only is recorded in the treating hospital. The laboratory report tells about a neck node microscopically involved with cancer. Search for primary then becomes the responsibility of the registries which often requires searching the entire recorded information of the hospital patients; sometimes even covering the past few years records.

Many cancer diagnosis are recorded as 'unknown primary'. This happens when the patients appear only a limited number of times, or when they present with disseminated disease and due to lack of detailed investigations the primary site of cancer may not get identified. Another issue is that the hospital into which the patient was admitted had only limited facilities. The registry staff in such a situation can resort to repeated retrieval and scrutiny of records, discussion with the concerned medical officer do an active follow up of the patients etc. Another difficult situation is the identification of the sub sites which are important in cancers of tongue, esophagus, stomach, colon. These above have separate sub codes. Further the epidemiology and etiology may differ between these subsites. Here also periodic review of reports, follow up and discussions with the concerned clinician, pathologists or radiologists would be helpful.

**e. Date and Age at Diagnosis:** There are occasions when patient change the hospital for treatment or visit the same hospital after a few years break. When the patient attends a hospital at the OP registration desk the age recorded would be the current age at attendance. While abstracting the case to NCRP form the age at registration (current) is wrongly

entered as age at diagnosis and thus considered as age at first diagnosis. Review of records might indicate two issues. A patient now aged 43 years was treated in another hospital for the same cancer 4 years back. Here the persons recorded current age (43) is not the age at first diagnosis. However, if the current visit identifies another cancer the current age (age at attendance/Registration) would be the age at diagnosis for the second cancer only.

**[C]. Reporting Formats:**

**New and Old cases:** While reporting cases of a hospital registry separation between new and old cases was advocated from the beginning. In NCRP reports these are identified as

Group A) Prior treatment only, Prior treatment and Treatment at RI.

Group B) Treatment only at RI and No Rx.at RI

Separation of cases into these two groups is essential and a more meaningful conclusion of treatment outcome can be obtained.

There is a practice now to tabulate and present sites of leading cancers for (a) 0-14 age group, (b) 15-34 age group, (c) 35-64 age group and (d) 65+ age groups.

This grouping signifies pediatric age, adult age, reproductive age (Life style related diseases age group) and geriatric age group. The total number of cases obtained in these four groups should not be compared because the groups comprise as follows

Group A contains 15 years

Group A contains 20 years

Group A contains 30 years

Group A contains 20 years

Hence the usually mentioned comparative observations that the maximum number of cases was seen in 35-64 year age group is incorrect.

Training and Retraining of Cancer Registry workers:- It is essential that the cancer registry workers receive the systematic training and retraining every three years. □



## Feasibility of Collaborating with a PBCR in a Cohort Study - A Case Study from Mumbai

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### INTRODUCTION:

A population-based cancer registry (PBCR) provides incidence rates that can be interpreted as probability or risk of developing cancer in the population. Thus the data provided by PBCR are invaluable in deciding cancer control strategies, planning activities, assessing effect of various interventions and long term trends. It is imperative for a PBCR to provide incidence by cancer types (different cancers have different incidence rates), by age and by gender which are major factors influencing incidence rates. In addition, PBCR can also provide information by clinical and histopathological parameters and by selected socio-demographic variables such as ethnicity. Cancer incidence however, is also greatly affected by specific exposures such as tobacco use but generally it is not feasible for a PBCR to provide incidence data by exposure factors, however important they may be.

Exposures in the population are assessed through cross-sectional studies. If this cross section of the population can be followed as cohort, it would provide the estimates of the risk of various diseases and these estimates then can be categorized by exposure factors. This is an extremely powerful method to assess etiological role of exposure factors. In a cohort study, it is generally feasible to ascertain the fact of death and the cause of death. Therefore cohort studies report risks by exposure factors and causes of death.

If a cohort study is conducted in an area where a PBCR is also functional, it may be feasible to match cohort with incident cancer database of registry and that would provide the incidence rates in the cohort. These incidence rates representing risk of developing different types of cancers then would be analyzable by exposure factors measured during the baseline survey. In this paper we report on feasibility of such an approach from Mumbai where a PBCR has been

functioning for long time and a large cohort study has also been going on.

### MATERIALS AND METHODS:

#### PBCR Mumbai:

The PBCR Mumbai was established in June 1963 as a unit of the Indian Cancer Society situated at Mumbai. It was the first such registry in India. Information was obtained on all cancer patients registered in 150 government hospitals/institutions and private hospitals or nursing homes in Mumbai who are under the care of specialists (surgeons, physicians, pathologists, radiologists, and gynecologists). Cases under code '0=' (benign) or '1' (uncertain whether benign or malignant borderline malignancy) or '2' (carcinoma in situ) are not included. Patients, in whom cancer has been ruled out or has not been diagnosed, are also omitted. Cancer cases where the death certificate is the only source of information, however, are included. The coding system used is the one devised by the World Health Organization using code number C00-97 as published in the manual of the International Classification of Diseases, Injuries and Cause of Death (10th revision).

#### Mumbai Cohort:

Mumbai (formerly Bombay) is a large, densely populated cosmopolitan city. It is divided into the following three parts: the main or island city, suburbs, and extended suburbs. This cohort study was conducted in the island city of Mumbai. The voters' lists were used as the sampling frame. These lists provided name, age, sex, and address of all individuals aged  $\geq 18$  yrs and were grouped in polling stations comprising 10001500 voters. Polling stations that served the upper-middle class and upper-class housing complexes (based on pilot study experiences)

were excluded as such complexes were difficult to access because of their security issues (i.e., they were essentially “gated communities”). To be eligible subjects had to be resident of the study area and have no evident cancer at the time of recruitment. Data were collected using a structured questionnaire administered in face-to-face interview in the subject's home. Details of the survey methods and results of cross-sectional survey have been described elsewhere.<sup>1-7</sup>

An active house-to-house follow-up was conducted after an average of 5.5 years from administration of the initial survey. The field investigators were instructed to revisit each person. If the person was alive and available, a face-to-face re-interview was conducted. If the person was reported to have died, the date and place of death were recorded as accurately as feasible. Permanent migration from the study area was considered as withdrawal from the study, and the date of migration was noted. The re-interviews were conducted during 1997-2003. Follow-up results have been described earlier.<sup>8-20</sup>

#### Linking the Mumbai Cohort Study database with the PBCR Incidence database:

Information on all incident cases aged in subjects'  $\geq 35$  years reported during years 1991-2003 were abstracted from the PBCR database. The most common variables available between the two databases, Mumbai Cohort and the PBCR, which could be used to establish the link between two databases were Name, Gender, Age, Postal Pincode, Religion and Mother tongue. During the matching process we found that the address of the individual was the key field to identify and confirm a match. As the PBCR did not have an electronically inputted address field, the project staff inputted the address field for the years 1991-2003 in the PBCR cancer incidence database. Most of the matching was done manually, as the special record linkage program (Rec-Link) developed by the IARC did not support long text variables such as address. For obtaining reliable matches through Rec-Link programme, the name field in both the databases was split into three fields; first name (individual's name), middle name (generally father's or husband's name), and last name (surname). Because one standard common order was not followed to record the name of an individual in two databases, different combinations of name field between two datasets were used along with a few other variables such as age, gender, and pincode common between two datasets to identify probable matches. Then, all the probable matches were

manually checked for the address field and, based on the address field, the matches were confirmed. We also found a few exact matches (around 80) outside the Mumbai Cohort Study area, but within Mumbai, and for these a 10% random check was performed. Their status; i.e., having emigrated outside the study area but still residing within Mumbai (mostly they were older people staying with their other children or relatives at different location in Mumbai), was found to be consistent during random check as well. Therefore, they were included in the final analytic data set.

Thus, all the common cases found in either or both of these two databases constitute the numerator. The denominator was calculated as the number of person-years of observation up to 31st December 2003, the cut off date for calculation of person-time of observation or the date of endpoint ascertainment (defined as the date of expiry, date of cancer incidence, re-interview, or migration), whichever occurred earlier.

#### Statistical Analysis:

Person-years of follow up were calculated by using the date of recruitment and 31st December 2003 or the date of endpoint ascertainment (defined as the date of expiry, date of cancer incidence, re-interview, or migration), whichever occurred earlier. In cases where the exact date of death or migration was not available, the midpoint between date of recruitment and the date of ascertainment was used. For cancer cases obtained from linking two datasets, the mid point (30th June) of the year on which a cancer was first diagnosed was used as the incidence date. Age-adjusted incidence rates for men and women were calculated by using the overall five-year age-specific person-years as weights (i.e., the direct method).

#### RESULTS:

A total of 148,173 persons were recruited in the cohort; 88,658 men and 59,515 women during 1991-97. The person-years of observations among men were 367,066 and among women, 327,372 (Table 1).

**Table1:** Person years, number of cancer incidence cases, age adjusted (world) incidence rate per 100,000 for Mumbai cohort and PBCR, Mumbai.

Habit	Habit Years	Cancer incidence cases	Incidence Rate (per 100 000)	PBCR Incidence Rate (1999)
Male	367066	862	230	247
Female	327372	755	247	270

*\*Age adjusted (world) Incidence rate (per 100 000).*

There were 862 incident cancers found among men and 755 among women. The overall age-adjusted cancer incidence in the cohort was 230 per 100,000 among men and 247 per 100,000 among women. The age-adjusted cancer incidence published by PBCR Mumbai for 1999, recomputed for comparison, was 247 among men and 270 among women.

Figure 1 shows a comparison of the proportion of site specific cancers in the PBCR and in the cohort data among men and women. The proportions, although not identical, were in similar range. For example, among men lung cancer in PBCR was 10.6% whereas in Cohort, it was 10.1%, esophagus 6.3% and 7.1% and so on. Among women, the difference was more pronounced for most common cancers: breast 27.3% vs 17.6% and cervix 15.5% vs 20.4% but for other cancers, proportions were similar.

**Figure 1**

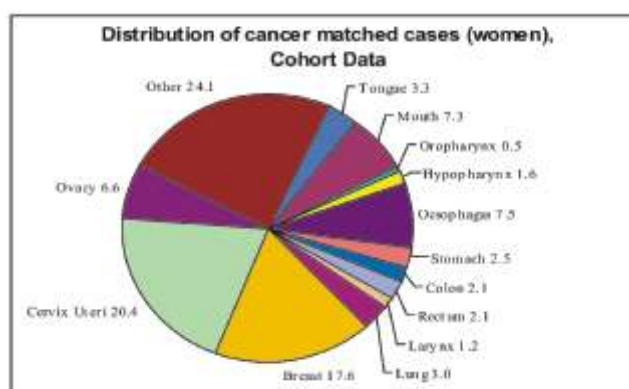
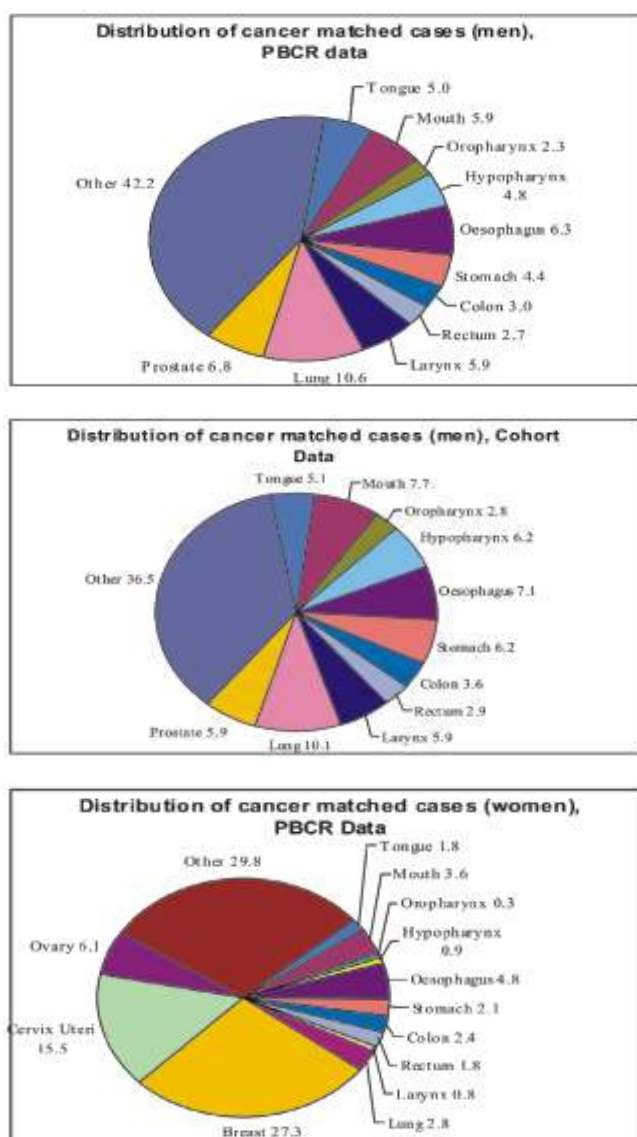


Figure 2 shows the age specific incidence rate (per 100 000) from cohort and population based cancer registry (PBCR) data by gender. Cohort incidence rates were higher in younger age groups than PBCR data for both men and women.

**Figure 2 : Age specific cancer incidence rate for cohort and PBCR data.**

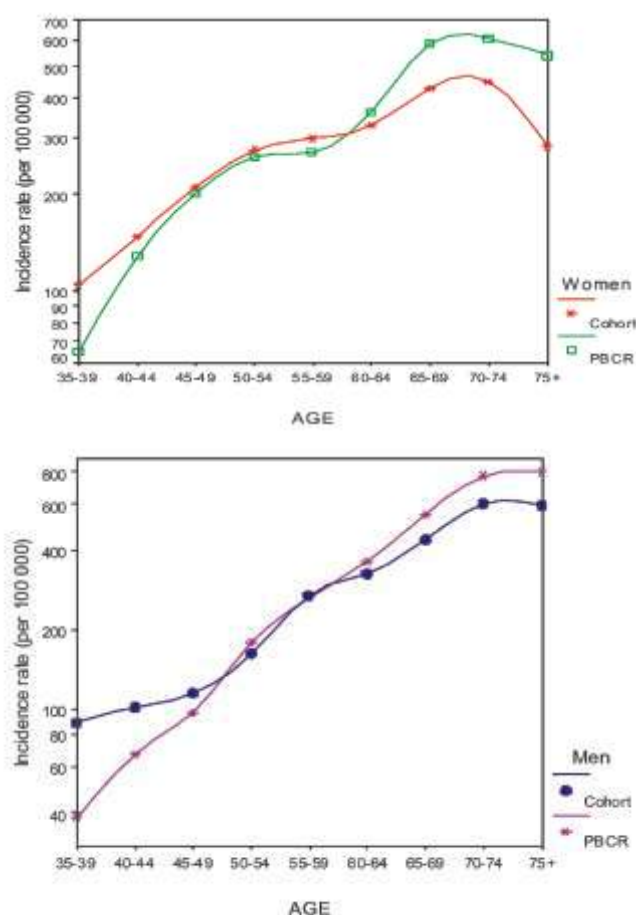


Figure 2 shows age distribution of incidence rates in the PBCR and incidence rates in the cohort among men and women. In the cohort, ascertainment of cancer appeared better in younger age-groups among men as well as women showing slightly higher



incidence but somewhat worse in older age groups showing lower incidence rates.

## DISCUSSION:

This is the first study from India that has attempted matching between a cohort and corresponding PBCR database. In Indian situation, such matching is not easy since there is no numeric identifier attached to an individual's name. Therefore the study could use only some text based identifiers that were transcribed from original Indian languages into Roman script without any specific standard or order of items in the text variables such as name and address. Despite all difficulties, the study clearly showed that it was feasible and the results obtained were reasonable. This opens up a very powerful method of investigating etiological factors for cancer in Indian situation.

A specific feature of this study was availability of accurate denominator in the form of person years of observation. That was possible because just like recruitment, follow-up was also done on a house-to-house basis. This provided us the exact date of withdrawal from the study. Calculation of person years requires only the date of recruitment and accurate date of withdrawal from the study.

This study can also provide the relative risk of different types of cancer for different exposure groups ascertained during the baseline survey. Results have already been published for tobacco use among men showing that for cancer development, bidi smoking is no less harmful than cigarette smoking.<sup>16</sup>

It can be concluded that although difficult, it is feasible to conduct cohort study in a PBCR area in India with incident cancer as the outcome variable.

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**Conflict of interest statement:** None declared.

## REFERENCES:

1. Gupta PC. Survey of sociodemographic characteristics of tobacco use among 99,598 individuals in Bombay, India using handheld computers. *Tob Control* 1996;5(2):114-20.
2. Shukla HC, Gupta PC, Mehta HC, Hebert JR. Descriptive epidemiology of body mass index of an urban adult population in western India. *Journal of Epidemiology and Community Health*. 2002 Nov;56(11):876-80.
3. Gupta PC, Saxena S, Pednekar MS, Maulik PB. Alcohol consumption among middle aged and elderly men: A community study from Western India. *Alcohol and Alcoholism*. 2003 Jul;38(4):327-31.
4. Gupta PC, Gupta R, Pednekar MS. Hypertension prevalence and blood pressure trends in 88 653 subjects in Mumbai, India. *J Hum Hypertens*. 2004 Dec;18(12):907-10.
5. Sorensen G, Gupta PC, Pednekar MS. Social Disparities in Tobacco Use in Mumbai, India: The Roles of Occupation, Education and Gender. *Am J Public Health*. 2005 Jun;95(6):1003-8.
6. Gupta PC, Maulik PK, Pednekar MS, Saxena S. Concurrent alcohol and tobacco use among a middle-aged and elderly population in Mumbai. *National Medical Journal of India*; 18(2): 88-91, 2005.
7. Pednekar MS, Gupta PC, Shukla HC, Hebert JR. Association between tobacco use and body mass index in urban Indian population: implications for public health in India. *BMC Public Health*. 2006. 6:70.
8. Gupta PC, Mehta HC. A cohort study of all-cause mortality among tobacco users in Mumbai, India. *Bulletin of the World Health Organization*. 2000; 78(7); 877-83.
9. Gupta PC, Pednekar MS, Parkin DM, Sankaranarayanan R. A cohort study of 99,570 individuals in Mumbai, India for tobacco-associated mortality. *International Journal of Epidemiology*. 2005 Dec;34(6):1395-402.
10. Pednekar MS, Gupta PC. Prospective study of smoking and tuberculosis in India. *Preventive Medicine*. 2007 Jun;44(6):496-8.
11. Pednekar MS, Gupta PC, Hebert JR, Hakama M.

- Joint effect of tobacco use and body mass on all-cause mortality in Mumbai, India: Results from a population-based cohort study. American Journal of Epidemiology. 2008 Feb 1;167(3):330-40.*
12. Pednekar MS, Hakama M, Hebert JR, Gupta PC. Association of body mass with all-cause and cause-specific mortality from a prospective cohort study in Mumbai (Bombay) India. *International Journal of Epidemiology. 2008 Mar 13;358(11):1137-47.*
  13. Pednekar MS, Gupta R, Gupta PC. Association of blood pressure and cardiovascular mortality in India: Mumbai cohort study. *Am J Hypertens. 2009 Oct;22(10):1076-84.*
  14. Pednekar MS, Hébert JR, Gupta PC. Tobacco use, body mass and cancer mortality in Mumbai Cohort Study. *Cancer Epidemiol. Dec 2009; 33(6);424-430.*
  15. Hebert JS, Pednekar MS, Gupta PC. Forced expiratory volume predicts all-cause and cancer mortality in Mumbai India: Results from a population-based cohort study. *Int J Epidemiol. 2010;39(6):1619-27.*
  16. Pednekar MS, Gupta PC, Yeole BB, Hébert JR. Association of Tobacco Habits, including Bidi Smoking, with Overall and Site-Specific Cancer Incidence: Results from the Mumbai Cohort Study. *Cancer Causes and Control. 2011; 22(6), 859-68.*
  17. Pednekar MS, Gupta R, Gupta PC. Illiteracy, low educational status, and cardiovascular mortality in India. *BMC Public Health. 2011 Jul 15;11:567*
  18. Pednekar MS, Sansone G, Gupta PC. Association of alcohol, alcohol and tobacco with mortality: findings from a prospective cohort study in Mumbai (Bombay), India. *Alcohol. 2012 Mar;46(2):139-46.*
  19. Pednekar MS, Hakama M, Gupta PC. Tobacco use or body mass - do they predict tuberculosis mortality in mumbai, India? Results from a population-based cohort study. *PLoS One. 2012;7(7):e39443. Epub 2012 Jul 27.*
  20. Gupta PC, Pednekar MS. Re: Jumping the gun: the problematic discourse on socioeconomic status and cardiovascular health in India. *Int J Epidemiol. 2014 Feb;43(1):276-8. doi: 10.1093/ije/dyt244. Epub 2014 Jan 4. □*

## Mumbai (Bombay) Cancer Registry 50 years Successful Journey

Shravani Koyande

Indian Cancer Society was formed in 1951 by Dr. D. J. Jussawalla who was an eminent oncologist surgeon with Tata Memorial Hospital Mumbai. The Mission of the Indian Cancer Society is **"Care to Cure"** for the underprivileged, needy cancer patients and control of the disease among the population.

The cancer was being recognized as a major health concern and the need to control its occurrence. For control of cancer, a total understanding of the magnitude and pattern of disease as it occurred in communities are absolutely essential. Such observations are needed not only to organize treatment facility but also for research into its causation for prevention. Identifying modifiable and non modifiable risk factors are essential for control of the disease. Constant attempt to identify optimal treatment so as to enhance cure rate, study of the biologic process of malignant transformation, assessment of survival time, observing trend of the disease over time etc are embedded in control objectives.

The historic lead for organizing Cancer Registry in India was taken by Dr. Jussawalla and India's first cancer registry covering the population of Greater Mumbai was organized in 1963 under the Indian Cancer Society

The Mumbai registry was functionalized with continuous fund support from the National Cancer Institute (NCI), United States till 1975. The department of Science and Technology, Govt. of India supported the registry from 1976 to 1980 and from the year 1982 the registry was merged with the National Cancer Registry Programme (NCRP) which is the national effort organized by the Indian Council of Medical Research (ICMR) and receives partial fund support from ICMR since 1982. The Mumbai cancer registry has been in the ICMR-NCRP network of registries since the last 32 years.

The Mumbai Population Cancer Registry was

established in 1963 and became operational from 1<sup>st</sup> January 1964. Mr. William I Lourie from the NCI, US came down to Mumbai several times and guided all the technical work connected with the organization and functions of the registry which made the work of the registry internationally compatible.

Mumbai is the Capital city of State of Maharashtra. It is the most populous city in India and the fourth most populous city of the World. The city lies on the West Coast of India and has a natural harbour. A large majority of population of the city are migrants from other states of India. Greater Mumbai is the leading trade zone and industry in the country. It occupies an area of 603 sq. Kms and is the smallest administrative district in Maharashtra state. It is situated between 18° 54" and 19° 18' north and longitudes 72° 47" and 73° 00" east.

The first scientific publication on cancer incidence from India "Cancer incidence in Greater Mumbai Assessment of the cancer risk" appeared in British Journal of cancer in 1968, authored by Dr. Jussawalla, Dr. Haenzel, Mr. Deshpande and Mr. Natekar. After Mr. Deshpande left Dr. D K Jain took the charge in 1973 and Dr. Yeole joined the team in 1973.

The solid foundation laid by Dr. Jussawalla has not changed after his demise in 1998. Dr. Kavarana, Dr. Kurkure succeeded as Honorary Secretary of Indian Cancer Society. Dr. Vinay Deshmane, Oncologist is the present Principal Investigator of Cancer Registry Division.

The Mumbai Cancer Registry has been following an 'Active Registration' method for recording the cancer cases. This was achieved with the cooperation from the various medical institutions like hospitals, nursing homes, laboratories, clinicians etc from public and private sector in the city. Tata Memorial hospital is the leading source of the registration to the Mumbai cancer registry. We are also thankful to Dr. Rajendra Badwe, the present Director of Tata Memorial



Centre for his active support to the registry operations. More importantly the cooperation from the health administration of the Mumbai Municipal Corporation was also significant. They permitted the registry workers to look into the death information recorded in the Vital Statistics Department.

The population covered by the registry operations increased from 4.6 million of 1964 to 14.1 million in 2011. Cancer cases recorded in 1964 were 3,057 whereas in the year 2011 the recorded cases were 12,231 an increase of almost 3.9 times over 1964. An increase of Cancer cases has been noted for males till the year 2003. During the past 10 years this has changed and now female cancer cases outnumber the male cancer cases.

**Table 1 : Yearly Increase of Incident Cancer Cases 1964-2011**

Year	No. of cases registered			Average Annual No. of Cases		
	Male	Female	Total	Male	Female	Total
1964-1968	9866	6458	16324	1973	1292	3265
1969-1973	11605	8135	19640	2321	1627	3928
1974-1978	13217	10202	23419	2643	2040	4683
1979-1983	15260	12149	27409	3052	2430	5482
1984-1988	17346	14741	32077	3469	2946	6415
1989-1993	19647	17920	37567	3929	3585	7513
1994-1998	21264	20431	41698	4253	4086	8339
1999-2003	22604	22486	45090	4521	4497	9018
2004-2008	25468	27680	43148	5094	5536	10630
*2009-2011	17310	18451	35761	5770	6150	11920

\*3 years data only.

### Quality indicator :

The registry is expected to carry out certain consistency checks and quality control measures to ensure the reliability of the data. The exercises cover the completeness as well as accuracy of the information. The international Agency for Research on Cancer, Lyon, France, periodically publishes the data collected by various population based cancer registries, in a standardized fashion, the latest being the tenth volume of The Cancer Incidence in Five Continents.

### All Cancer Incidence Rates Vol-II to Vol -X CIN V-ASR:

CIN V Volumes	Males	Females
II 1964-1966	71.8	67.7
III 1968-1972	68.8	65.7
IV 1973-1977	143.3	130.2
V 1978-1982	145.0	126.0
VI 1983-1987	126.0	116.8
VII 1988-1992	133.1	126.6
VIII 1993-1997	116.3	122.4
IX 1998-2002	102.2	104.5
X 2003-2007	97.9	105.5

### Survival Studies:

Mumbai Registry has undertaken survival studies several times. Recent survival studies has shown 5 year relative survival for the breast cancer is 56 %, cervical cancer is 40% , lung cancer 7% and for mouth cancer it is 42%. 5-Year survival rate were generally higher for young adults than for older ages.

### Expansion of Mumbai Registry:

The outcome and experience of establishing and maintaining the cancer registry operations in Mumbai led us to organize similar registries in other areas of Maharashtra. The outcome of cancer registry in Mumbai reflected more often the experience of a highly cosmopolitan group. The other three areas viz Pune, Aurangabad and Nagpur which would represent mainly the Maharashtrian population.

Thus over the period 1972-1980 three other population registries Pune in 1972, Aurangabad in 1978 and Nagpur in 1980 were established.

### Population Registry Pune 1972:

The Pune cancer registry initiated in 1972 was the first effort in expanding the cancer registry operations of Mumbai registry. This registry became operational from 1<sup>st</sup> March 1973. With 9 years of working experience of registry operations in Mumbai the Pune registry was organized on the same lines.

Pune city, the head quarters of western Maharashtra lies 487 metres above sea level. Pune city agglomeration was about 344.8 sq. Kms and had a population density of 10330 per sq. Km. The population of the city in 2001 was 3.5 million. Of the total population, almost 28% were in the 0-14 year age group and 13% was in the 50+ age group.

### Population Registry Aurangabad 1978:

The 3<sup>rd</sup> population cancer registry was initiated in Aurangabad city in 1978. Aurangabad is the headquarters of Marathwada and lies almost in the centre of Maharashtra. Aurangabad city covered an area of 50.96 Sq. Kms. As per 2001 census, it had a population of almost 8.7 lacs and the population density was 173,000. per sq. Kms. The main source of data collection was from Govt. medical college and Dhoot Radiotherapy centre. The data sources comprised similar to that was followed in Mumbai and Pune. Almost 35% of the population was below 15 years and 11% was above 50 years of age.

### Population Registry Nagpur 1980:

Nagpur cancer registry was the 4<sup>th</sup> registry

established by the Indian Cancer Society in 1980. The registry was established in association with Nagpur Medical College. The registry area covers 236.93 Sq. Kms. In 1991, the Nagpur city agglomeration comprised of 2.05 million population (2001 census). The population density was 8660 per Sq. Kms. In the 0-14 age group there were 29.5% of the population and in the 50+ age group there were 13.4% of the population.

### Human Resource Generation:

Mumbai Cancer Registry has generated invaluable human resource in cancer epidemiology and registration, through various international fellowships like the Indo-Finnish collaboration with University of Tampere, UICC Fellowship, IARC Fellowship, etc and continuing education programmes for registry workers. The scientists have been instrumental in establishment of departments of cancer epidemiology and have contributed in training of other staff of the registries.

Late Dr. B. B. Yeole, Director of Cancer Registry received his PhD (Epidemiology) and Dr. Lizzy Sunny PhD (Epidemiology) a former employee of the cancer registry had received their doctorates from Tampere School of Public Health. They both used the cancer registry data of Mumbai registry for their thesis work. Dr. B.B. Yeole was engaged in the registry operations for 35 years. Many staff members from the Mumbai Cancer Registry has been benefited with the International Course on Cancer Registration and Application to Cancer Epidemiology arranged by International Agency of Research on Cancer, Lyon, France and workshops arranged by National Cancer Registry Programme (NCRP), Indian Council of Medical Research (ICMR).

### Cancer Registry and Research:

A number of research studies have been undertaken based on the cancer registry data and many of these have been published in national and international journals. Up till now the Mumbai cancer registry has published more than 100 research articles in national

and International journals. More than 45 Monographs have been published by the registry based on cancer database. More than 70 papers have been presented in scientific conferences at national and international cancer conferences.

### Cancer Registry Network:

Late Dr. B.B. Yeole, Director of Cancer Registry Division of Indian Cancer Society, one of the national expert, who has contributed to the success of the cancer registry operations in the country from its inception. He made several presentations in scientific forum both in India and abroad. Being part of ICMR, he shared his expertise in guiding research projects funded by ICMR and its affiliated institutions. His contributions for research projects in non-communicable disease is very significant which is evident from many scientific publications, both in national and international journals. He was involved in various capacities in the preparation of monographs, technical reports, task force project reports and reports based on cancer funded by ICMR.

Late Dr. B. B. Yeole was also deputed on IARC Project to establish three Cancer Registries in Nigeria/Africa. He has acclimatized the data collection, coding, scrutinization, obtaining reliable morbidity and mortality data on cancer from a precisely defined population.

### Cancer Registry and Cancer Control:

Mumbai Cancer Registry have provided high quality data on cancer occurrence. The data has been used for estimation of load of the disease for the country, establishment of management facilities, as well as for development of the objectives & strategy for the national cancer control programme. The population based survival studies by the registries have provided information on age and stage specific survival and mortality. The information was useful in planning, implementation, and monitoring of district cancer control programmes. □

**Tributes:** Late Dr. D. J. Jussawalla, late Dr. B. B. Yeole and Dr. A. P. Kurkure were instrumental for initiation and successful implementation of Cancer Registries to cancer control programme of India. Their contribution will always be remembered being the stalwarts of Cancer Registry Division of the Indian Cancer Society.



Dr. D. J. Jussawalla



Dr. B. B. Yeole



Dr. A. P. Kurkure

## An Experience of Mortality Data Collection in Beed District, Maharashtra

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### Background :

The first population based rural cancer registry in the country was established at Barshi in Solapur district in 1987. There are many urban registries in India but very few rural registries working in the country despite India being predominantly rural. There are several obstacles to setting up rural cancer registry including lack of cancer awareness in the rural population, inaccessibility of modern medical facilities and absence of medically certified deaths. Cancer registration is a very difficult task in rural population; taking into consideration all these limitation the rural registry adopted a special methodology which is suitable for rural conditions. The methodology consisted of creating cancer awareness, motivation, early detection. Verbal autopsy is also a part of the methodology adopted.

In the absence of medically certified deaths the field staff of Rural registry collects death information from Panchayat office, BDO office, Municipal office, death register of all the major hospitals, as also from the villagers directly, during village visits. Home visits to relatives of all dead are under taken to ascertain the cause of death. Medical papers (hospital discharge summaries etc) if available are scrutinized and if not, details regarding hospital attended, date of illness etc will be recorded to facilitate a 'follow back' to the medical records in the hospital. Matching of the records with the registry files is undertaken.

After 20 years of registry activity, cancer awareness in the community has increased and literacy rates have also increased. In this scenario when in 2006 NCRP suggested that registry area of the Rural Cancer Registry be expanded and 'ATLAS' methodology tried out, we agreed to do so in Osmanabad and Beed district which surround the area covered by Barshi Rural Cancer Registry.

### Study Area:

We will present here the mortality data collected

in Beed District which has a population of 2.1 million in 2011 and covers 11 tehsils spread over 10,693 km<sup>2</sup>.

### Methodology:

In the expanded registry we do not visit villages as we do in the Barshi Rural Cancer Registry. As per Maharashtra state government death registration system, information on deaths is available from BDO office. However it is incomplete and therefore very difficult to match with incidence cases. Also, all cause mortality data is not useful because the name of deceased person is not given even through it is available at Gram Panchayat office in the village. In this scenario, we have taken extra efforts to collect mortality data. We have collected mortality data for the year 2010-2011 using various methodology on experimental basis as outlined below.

- 1) At Nargis Dutt Memorial Cancer Hospital, Barshi: More than 60% cancer cases are registered in this hospital as a first or second source of registration. The registry staff went through the patients files. After completing each incidence year, they would check the last follow up date. If the patient had attended after 31<sup>st</sup> December of that year, these cases were considered as alive cases. The remaining cases were followed up to assess their vital status.
- 2) By PHC Health Worker: We have prepared suitable proforma of mortality data and circulated among the PHC (Primary Health Centre) Health Workers in the monthly meeting and asked them to collect all deaths that occur in the particular village in the year 2010-11.
- 3) Direct Phone Calls: At the time of incidence data collection, we have collected phone numbers of patients or their relatives. We have used these numbers to enquire about the vital status of the patients.
- 4) By ASHA (Health Worker): Under government scheme, ASHA workers were appointed to tackle the health problem of people. One ASHA worker covers



1000 population. We have collected the list of ASHA workers with their contact numbers from Tehsil Health Office and we have contacted them and taken the status of the patients. These methods were used for those patients who have no phone number or their phone was not working.

### Results:

In year 2010-11, expanded registry (Beed District) registered 706 cases of death, 344 in males and 362 in females (M/I ratio 30%). In 2010, 166 cases in males and 180 in females were registered and the corresponding numbers for the year 2011, were 178 and 182 respectively.

Above cases were registered through the following sources.

### Mortality collection from various sources (2010-11)

Sources	No. of Death	Percentage
PHC Workers	102	14
ASHA Workers	335	47
Direct Phone Calls	257	36
BCH Records	012	3
Total	706	100

We have taken extra efforts to collect mortality data in expanded registry area and achieve near about 30% mortality to incidence ratio which is similar to other registries.

### Discussion:

In 9 tehsils in Beed District, we circulated a structured questionnaire to PHC workers and asked them to collect data on deaths. They reported 3685 deaths which worked out to death rate of 2.5 per 1000. The official all causes mortality rate for the area is 6 per 1000 (Vital Statistic Dept. Maharashtra) which shows the inefficiency of depending only on data collected by the Health worker. In the earlier years, any relative could go and register the death at the Gram Panchayat office. Now the deaths can be registered only by Health Worker. As we have seen above only 61% of Cancer Deaths were registered by PHC/ASHA workers. It is only because of our concerted efforts outlined above that we have achieved M/I ratio of 30%. M/I ratio for various registries is given below.

### Comparison of mortality-Incidence %

Registry	Year	Male (M/I)	Female (M/I)
Mumbai	2009-10	46.9	40.6
Pune	2010	40.6	38.3
Aurangabad	2009-10	23.6	15.4
Nagpur	2009-10	19.8	15.7
Wardha	2010-11	47.6	40.5
Barshi Rural	2009-10	71.8	67.2
Barshi Expanded (Beed District)	2010-11	33.2	28.0

In 2009-2010 Barshi rural cancer registry registered 196 and 203 deaths respectively for males and females. Barshi Rural cancer Registry showed highest mortality to incidence ratio (M/I Ratio 71.8 and, 67.3 respectively for males and females). In the absence of medical death certificates, Registry staff visit each and every death that occurs in the registry area and do verbal autopsy and follow back to the medical records in the hospital. Due to this exercise the M/I ratio is high. As mentioned earlier there are certain limitations in the collection of cancer mortality data due to poor registration system of government. Even though death registration is mandatory. In expanded registry area M/I ratio is only 30% because the percentage of 'no information cases' is quite high (50% cases) in contrast to the RCR area, where due to the active follow up, the percentage of 'no information' cases is almost nil. The methodology of RCR which is active interaction with the community is still relevant for rural condition to achieve complete Cancer registration and mortality although this approach is expensive.

### Summary:

In 2006 we have expanded Barshi Registry area to Beed District which is in the neighborhood of Barshi and followed ATLAS' methodology. In the 'Atlas' method followed by NCRP importance is given to incidence and not mortality. In 2008 NCRP suggested to collect mortality data in expanded area using ATLAS method. Due to poor registration system of death in the rural area, mortality collection is a difficult task. All cause mortality data is available only in numerical format and the names of deceased persons remain at village Gram Panchayat office. Due to this system matching of deaths to incident cancer cases is not possible. We used several methods like contacting PHC workers, ASHA workers, directly contacting cancer patient by phone, extracting information from hospital files etc to achieve MI ratio of 30%.

### Acknowledgment:

We thank NCRP for their financial support & especially Dr. A. Nandakumar for his support to the registry. We gratefully acknowledge Mrs. K. Jayant Hon. Counsellor for guidance and Dr. Nene P.I., Mr. M. K. Chauhan projects Co-ordinator for their valuable support. We also gratefully acknowledge RCR, Nutrition and BCCP staff members for their diligent work. □

## The Role of Cancer Registries in Cancer Control

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### Background:

Cancer control encompasses prevention, detection, diagnosis, treatment, after care and rehabilitation aimed at reducing morbidity and mortality due to cancer. One of the main approaches to achieve this is by record based surveillance for measuring incidence rates through population-based cancer registries and frequencies of high-resolution data through hospital-based cancer registries besides surveys and follow-up studies. Hence, registries are sine qua non for any rational cancer control. In India, information on cancer is derived from systematic and continuous data collection through the network of population-based cancer registries (26), hospital-based cancer registries (6) and centres for special studies (>18), located throughout the country under National Cancer Registry Program of Indian Council of Medical Research and outside of it.

cancer is generally lesser by 50% in rural than urban areas in Tamil Nadu with a few exceptions for specific cancers (Swaminathan et al., 2009a). A female preponderance among incident cancers was forthcoming. Breast cancer was the commonest among women in Chennai and Coimbatore districts but not in Dindigul. Also, even the most common cancer among men was different in neighbouring districts. This reiterates the need for increased coverage of rural and urban populations through cancer registries in every state for reliable data on cancer incidence pattern. The estimated average annual burden of new cancer cases in whole of India was 1,024,000 (<http://globocan.iarc.fr>) and in Tamil Nadu was 55,000 in the year 2012 (Swaminathan et al., 2011).

### Cancer incidence in different populations:

Population-based cancer registries form the basis for inference through "situation analysis" including cancer pattern, burden, patterns of care and survival. The first information on variation in cancer risk is provided by data on cancer incidence from different populations. Figures 1a and 1b give the comparisons of cancer incidence patterns observed in three populations in Tamil Nadu: Chennai (metropolitan), Dindigul (predominantly rural) and Coimbatore (predominantly urban) districts. The overall incidence of

Figure 1a : Variable Cancer Pattern in Metropolitan and Rural Population in Tamil Nadu, 2009-2010  
(Age Standardized Rates are per 100,000 population)

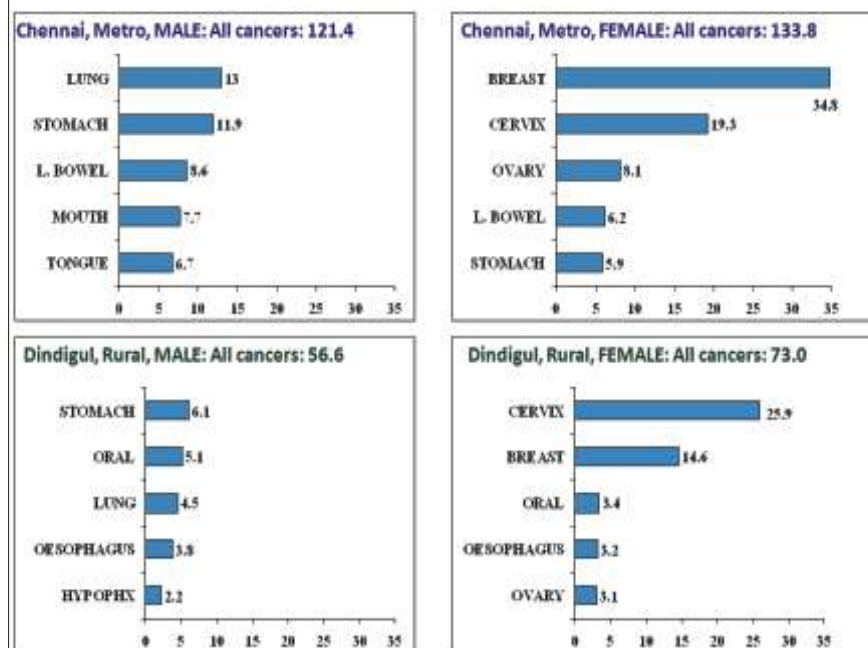
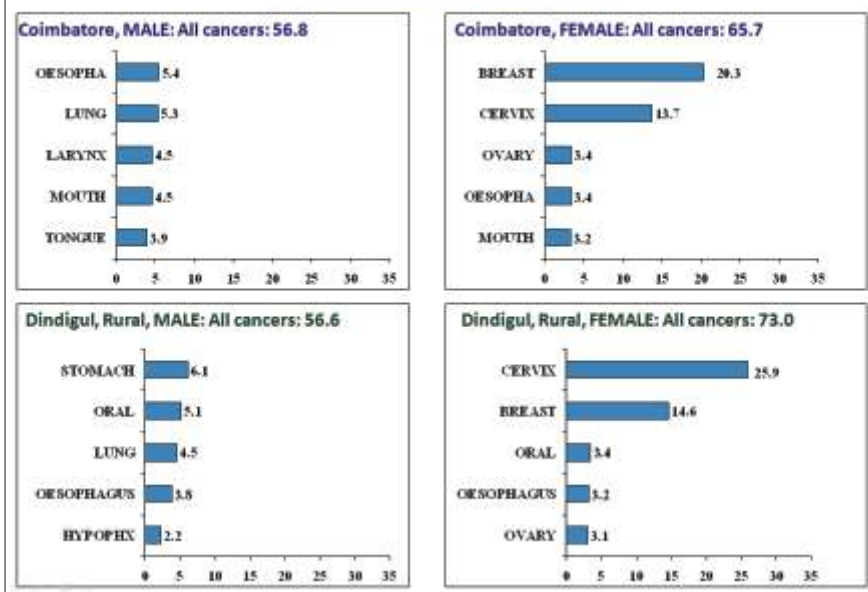


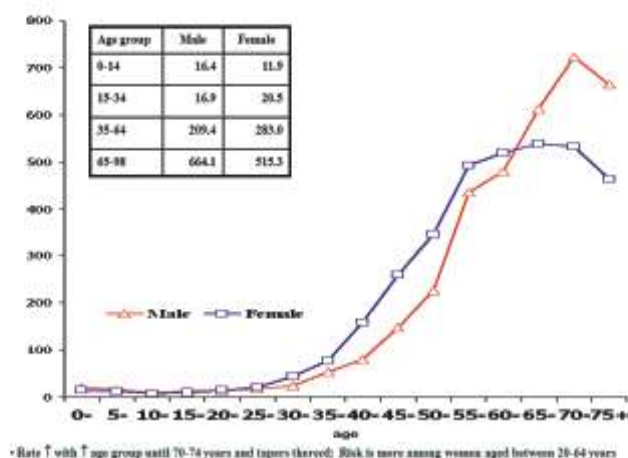
Figure 1b : Variable Cancer Pattern in Predominantly Urban and Rural Population, Tamil Nadu, 2009-2010  
(Age Standardized Rates are per 100,000 population)



### Age-specific incidence rate of all cancers together:

Age-specific incidence rates offer meaningful insights. Figure 2 gives the 5-year age-specific rates of all cancers together among men and women in Chennai during 2009-2010. An increasing rate with increasing 5-year age group was forthcoming. The risk of cancer was more among women than men between 20 and 64 years of age. Childhood cancer (0-14 years of age) incidence comprised 3% of total cancers in all ages with an excess of boys (16 per 100,000) than girls (12 per 100,000). The bulk of cancer cases were registered in the age-group of 35-64 years in both sexes. However, the highest incidence rates were observed in the geriatric age group of 65+ years in men (664 per 100,000) and women (515 per 100,000) (Swaminathan et al., 2013).

Figure 2 : Age-specific incidence rate of all cancers together among both sexes, Chennai, 2009-2010



### Education-specific incidence rate of selected cancers:

The scope of descriptive analysis using routine data can be widened further to include lifestyle factors and cancer risk. Literacy status is one measurable characteristic that could serve as a surrogate for socio-economic status. A six-fold increased risk of breast cancer and 68% reduced risk of cervix cancer among women with more than 12 years of education compared to illiterates were forthcoming (Figures 3a and 3b). A clear delineation of contrasting age-specific incidence rates observed between literates and illiterates for cervix and breast cancers further fortify the association of lifestyle

factors with these cancers (Swaminathan et al., 2009b). Such analysis are necessary for recognizing the different challenges associated with planning intervention strategies for secondary prevention like cancer screening or early detection and provide valuable inputs for public education campaign.

Figure 3a : Education specific incidence rate and age-specific rate by literacy status of Breast cancer in Dindigul district, 2003-2006

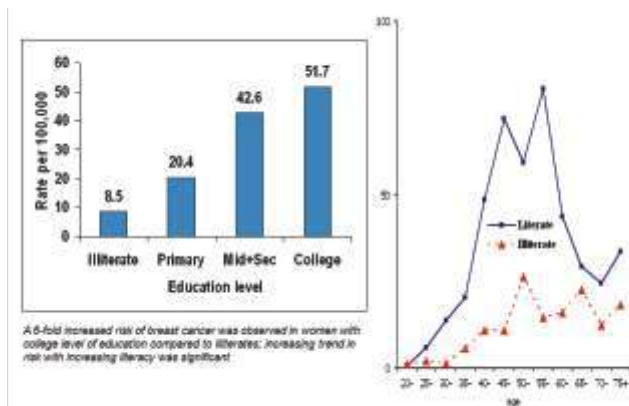
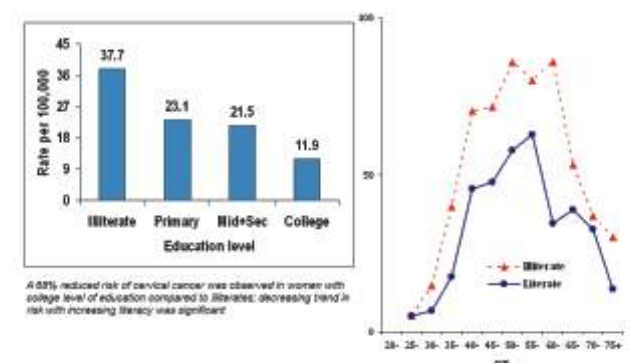


Figure 3b : Education specific incidence rate and age-specific rate by literacy status of Cervix cancer in Dindigul district, 2003-2006





### Trend in cancer incidence rates of common cancers:

Cancer surveillance is best attained by monitoring time trends in cancer incidence pattern, extent of disease or tumour stage, therapy, care and survival through registries. The annual percent-change in trend of incidence rates - Cancers of the cervix (-2%), stomach (-1%) and oesophagus (-2%) have shown a decline while cancers of breast (+3%), ovary (+2%), large bowel (+5%) and prostate (+8%) have shown an increase in Chennai during 1982-2010 (Tables 1a and 1b). Mouth cancers have risen among men (+1%) but fallen among women (-2%)(Swaminathan et al., 2013). This is consistent in most places of India. These can be attributed to a variety of lifestyle factors (like age at first child birth, parity, tobacco habit, incidental diagnosis by increased screening, etc.) and their changes at the population level among men and women.

Table 1a: Common Cancer ASR Trend, Chennai, Men, 1982-2010

SITE	1982-1987	1988-1993	1994-1999	2000-2005	2006-2008	2009-2010
Lung	7.5	11.5	10.5	11.6	13.3	13.0
Stomach	13.8	13.8	12.9	11.6	12.2	11.9
Large Bowel	3.4	4.4	4.6	5.7	7.3	8.6
Mouth	6.4	6.7	5.8	6.2	7.4	7.7
Tongue	4.3	5.1	5.5	5.3	5.9	6.7
Lymphomas	4.4	4.7	4.9	5.7	6.2	6.3
Prostate	2.1	2.9	4.7	4.5	4.8	6.3
Esophagus	7.1	9.1	8.5	8.5	7.9	6.0
Liver	2.0	2.1	2.9	2.9	3.7	4.8
Larynx	4.2	4.5	4.7	4.7	4.5	4.7
All cancers together	88.8	105.0	105.3	109.6	119.5	121.4

ASR: Age-standardized rate per 100,000 population; Average annual increase: liver (6%); L. bowel (6%); prostate (8%); Average annual decrease: Stomach (1%); Esophagus (1%)

Table 1b: Common Cancer ASR Trend, Chennai, Women, 1982-2010

SITE	1982-1987	1988-1993	1994-1999	2000-2005	2006-2008	2009-2010
Breast	19.1	21.3	24.1	30.5	32.7	35.6
Cervix	44.3	34.7	26.4	25.0	19.3	19.3
Ovary	5.2	5.3	5.7	5.7	7.7	8.1
Large Bowel	2.8	3.0	3.9	3.9	5.5	6.2
Stomach	6.3	6.4	6.3	5.6	6.2	5.9
Lung	1.2	2.1	2.2	2.9	4.2	5.0
Mouth	8.0	7.1	5.0	5.1	4.6	4.9
Corp. uteri	1.6	2.0	2.3	2.2	3.2	4.7
Esophagus	5.5	6.0	6.0	5.0	4.4	4.4
Lymphoma	1.9	2.5	2.7	2.9	3.7	3.9
All sites together	120.1	117.8	114.7	118.3	125.5	133.8

ASR: Age-standardized rate per 100,000 population; Average annual increase: breast (3%); L. bowel (5%); lung (13%); Average annual decrease: cervix (2%); mouth (2%); esophagus (2%)

Table 2: Trend in stage at presentation for common cancers - Cancer Institute (WIA), Chennai & RCC, Trivandrum

Stage	Chennai		Trivandrum	
	1984-88	2004-06	1984	2003
Breast				
1	1.2	2.1	4.8	5.8
2	22.4	32.4	43.3	32.1
3	53.3	52.0	34.6	40.1
4	16.0	10.0	17.3	14.3
UNK	7.1	3.5		
Cervix				
1	4.9	9.1	6.3	11.1
2	30.9	57.5	27.4	36.2
3	45.7	30.4	59.4	41.8
4	18.3	2.0	6.9	6.1
UNK	0.1	1.1		
Oral Cancer				
1	4.4	9.8	5.7	12.9
2	10.4	22.6	17.8	14.5
3	36.9	24.5	39.7	44.7
4	40.8	42.2	36.8	15.2
UNK	7.5	0.9		

### Trend in frequencies of stage at presentation:

Time-trends in stage at presentation of common cancers in tertiary care centres in Chennai and Trivandrum show very minimal down-staging (Table 2). Stage I breast cancer frequencies were still <6% rising by 1 percent units in 20 years; cervix cancers were 9-11% rising by 5 percent units and oral cancers were 10-13% rising by 6-7% in both centres. A majority of cases (70-80%) still presented in locally advanced stage (Stages II to IV) at both centres. This reiterated the need for delivering more organized and aggressive education, awareness and detection programmes at population level in India.

### Long-term survival from breast cancer hospital series:

Cancer registries are important sources of data not only on cancer incidence or frequencies but also on outcomes like mortality, survival and cure. Data acquisition on cancer mortality is done as a routine in a demographic registry and when coupled with concerted efforts of active follow up for vital status provides the platform for knowing cancer survival and pattern of care that can be correlated to patient, disease and treatment characteristics.

Time-trend survival analysis of hospital series of patients with specific cancers helps to correlate cancer outcomes with treatment milestones over a long time period (Figure 4). The breast

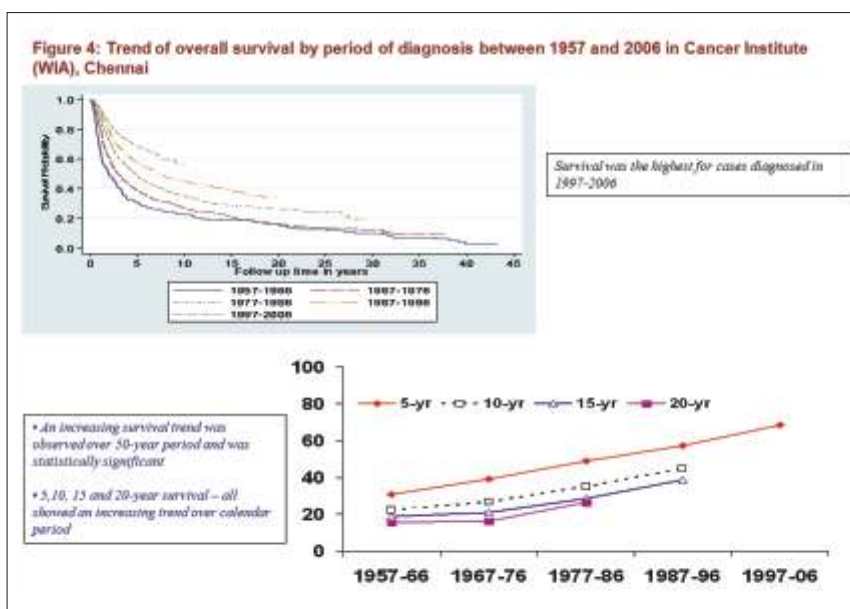
cancer series treated at the Cancer Institute (WIA), Chennai, during the 50-year period of 1957-2006 were followed up for lifetime. The overall survival was the highest for the cohort of patients treated during the latest period of 1997-2006. The trend of overall survival was definitely increasing over this period and was statistically significant ( $p < 0.001$ ). Also, 5-year, 10-year, 15-year and 20-year overall survival from breast cancer showed an increasing trend from 1957-1966 to subsequent 10-year calendar time periods and were statistically significant ( $p < 0.001$ ). This type of long-term survival analysis led to the evolution of modern treatment protocols at the institute based on the evidence generated on its own data (Shanta et al., 2013).

Table 3: Five-year survival% comparison – common cancers

Cancer	Treated + untreated cases -Dindigul dt	Treated + untreated cases -Chennai city	Cancer Institute (WIA) (treated cases) only	Treated + untreated cases -USA, White*
Cervix	35	54	62	72
Breast	38	44	67	88
Mouth	33	31	35	55
Esophagus	6	7	14	16
Tongue	27	19	37	56
Lung	4	7	8	15
Leukemias	19	20	44	48
Lymphomas	25	29	61	66
Larynx	25	31	70	64
Ovary	30	27	45	45
Large bowel	29	NP	NP	64
All cancers	29	NP	NP	65

Source: Swaminathan et al., Cancer Epidemiology 2009; \* SEER Cancer Statistics Review 1975-2003, NCI, USA; NP: Not published

fared the least. The survival differences between cases registered from Dindigul district and Chennai city populations were minimal for most cancers (Swaminathan et al., 2009b).



### Five-year cancer survival Population series comparison:

Population-based cancer survival brings out the general efficiency of cancer diagnostic and treatment services in terms of equity, access and development (Sankaranarayanan et al., 2010). The absolute survival generated from this type of data reflects the average outcome from cancer in a region by including both treated and untreated cancers in the analysis. Table 3 gives the comparison of survival experience from selected cancers in three different settings in Tamil Nadu with the USA experience as reference. Clearly, the survival experience of treated cancers at the Cancer Institute (WIA), Chennai approached that of the average survival in US-White while the unselected series of cancers from Dindigul

### Other roles played by cancer registries:

Cancer registries also contribute to cancer control through research on aetiology and in the evaluation of population-based organized screening programmes. Analytical epidemiological studies on various common cancers specific to regions, like stomach, breast, cervix and oral cavity, have categorically identified a host of lifestyle-related risk factors. Demographic registries have provided the framework for unbiased evaluation of field intervention trials on common

cancers. An example is the cluster-randomized field intervention trial on visual inspection with acetic acid for cervix cancer in Dindigul district by the International Agency for Research on Cancer, a World Health Organization body on cancer research. The Dindigul Ambilikai Cancer Registry provided the list of cervix cancer patients from the intervention and control areas along with their vital status for unbiased evaluation of this screening program and the results showed significant benefit among those who underwent screening (Sankaranarayanan et al., 2007). This finding led to the expansion of this study into an organized program by the state government of Tamil Nadu and was implemented on a large scale covering the entire state since 2008.

**Summary:**

The example from Tamil Nadu reiterates the significant role of cancer registries in cancer control. The reliable data on cancer frequencies along with follow up data on vital status from the hospital cancer registry at Cancer Institute (WIA), Chennai (since 1954), the situation analysis and surveillance of incident cancers by population-based cancer registries covering Chennai city (since 1982) and Dindigul district (since 2003) and other aside registry activities associating lifestyle factors with cancer occurrence formed the basis. These culminated in the formation of state cancer registry covering 73 million population of Tamil Nadu since 2012. These registry activities clearly summarize the cancer experience so far and have provided very valuable leads for effective cancer control in the state.

**Acknowledgment:**

My sincere thanks to the registry staff of the Cancer Institute (WIA), Chennai, including the Madras Metropolitan Tumour Registry and Dindigul Ambilikai Cancer Registry, for their diligent work. Thanks are due to the heads, officers and other staff at numerous institutes that are the sources of data of these registries, for their assistance, cooperation and unstinting support.

**References :**

Sankaranarayanan R, Esmey PO, Rajkumar R, Muwonge R, Swaminathan R, Shantakumari S, Fayette JM, Cherian J. Effect of visual screening on cervical cancer incidence and mortality in Tamil Nadu, India: a cluster-randomised trial. *Lancet* 2007; 370: 398406. PMID: 17679017

Sankaranarayanan R, Swaminathan R, Brenner H, Chen K, Chia KS, Chen JG, et al. Cancer survival in Africa, Asia and Central America: a population-based study. *Lancet Oncol* 2010; 11(2): 165-73 PMID: 20005175

Shanta V, Swaminathan R, Rama R. Cancer prevention and control in India: A perspective from the Cancer Institute (WIA). In: *Cancer Control 2013 Cancer care in emerging health systems. International Network for Cancer Treatment and Research, Brussels, 2013, pp 124-129.*

Swaminathan R, Selvakumaran R, Esmey PO, Sampath P, Ferlay J, Jissa V, Shanta V, Cherian M, Sankaranarayanan R. Cancer pattern and survival in a rural district in South India. *Cancer Epidemiol.* 2009;33(5):325-31. PMID: 19853553.

Swaminathan R, Selvakumaran R, Vinodha J, Ferlay J, Sauvagat C, Esmey PO, Shanta V, Sankaranarayanan R. Education and cancer incidence in a rural population in south India. *Cancer Epidemiol.* 2009 Aug;33(2):89-93. PMID: 19679053.

Swaminathan R, Shanta V, Ferlay J, Balasubramanian S, Bray F, Sankaranarayanan R. Trends in cancer incidence in Chennai city 1982-2006 and statewide predictions of future burden in Tamil Nadu 2007-16. *Natl Med J India* 2011; 24(2):72-7. PMID: 21668047.

Swaminathan R, Shanta V, Balasubramanian S, Sampath P. Madras Metropolitan Tumour Registry Technical Report 2009-2010. National Cancer Registry Program, Cancer Institute (WIA), Chennai, 2013. □



## Population Based Cancer Registry, Sikkim Cancer Incidence, Mortality and Time Trends Brief report of Ten Years (2003-2012)

Yogesh Verma, P.K Pradhan, Anubhav Verma, Saroj Deep Sapkota,  
B.N Bhattarai, Pranay Giri, Prakash Sundas

National Cancer Registry Programme (NCRP) was commenced by the Indian Council of Medical Research (ICMR) with a network of cancer registries across the country in December 1981.

In Sikkim the Population Based cancer Registry was established in June 2003.

Cancer registration in Sikkim is active and staffs of the registry visit hospitals, pathology laboratories and all other sources of registration to collect cancer cases on a routine basis. Death certificates are also scrutinized from the office of the Registrar of birth and Deaths and information collected on all cases where cancer is mentioned on the death certificates.

Quality Control checks, tabulations and statistical analysis were done at the Coordinating Unit of NCRP, Bangalore.

The function of the Population Based Cancer Registry is by active registration of all cancers for the state of Sikkim. All cases of cancer including those not having a Microscopic diagnosis are also included. The staffs of the Population Based Cancer Registry visit the different sources of registration at regular intervals.

### Demographic Characteristics of Sikkim:

Sikkim is mountainous and the population sparse and scattered. On the world map it is just a speck with approximate latitude of 27degrees North and longitude of 88 degrees East but its size belies its richness of culture, customs, heritage, flora and fauna. Sikkim may have a small size but this is amply compensated by formidable physical features. It are the physical features like the rivers and the mountains that define the boundaries of the state with its neighbors.

Sandwiched between Nepal in the west and Bhutan in the west lies a small stretch of rugged land just 115 kilometers by 65 kilometers. On its northern border towers the plateau of Tibet whereas it shares its southern border with West Bengal.

Sikkim possesses all the climates right from the tropical to the tundras. Sikkim is also one of the rainiest regions in India . The population comprises mainly of Nepalese who form the Majority followed by the Bhutias and the Lepchas, who comprise the Tribal population . The area of Sikkim is 7096 sq km.

### Sources of Registration:

There are 39 sources of registration out of which STNM hospital is the main source of registration of cancer patients where the PBCR office is situated. From 2003-2012 around 69.3% of cases were registered in STNM Hospital which comprised of 2656 cases.

### Results :

The total number of Cancer cases registered for the year 2003-2012 was 3834. The females comprised of 48% (1858) and the males 52% (1976) of the total cancer cases.

**The Crude Rate (CR), Age Adjusted Rate (AAR) and Truncated Rate (TR) incidence rate per 1,00,000 population 2003-2012 Sikkim can be seen in Table No. 1.**

**Table No.1**

	CR	AAR	TR
Males	63.4	88.7	131.2
Females	67.3	98.4	180.5

The leading sites of cancer for both Males (Table No. 2) and Females (Table No. 3) can be seen below.

**Table No. 2 (MALES)**

Leading Sites	Number	%	AAR	CR	TR
Stomach	298	15.1	13.9	9.6	20.0
Oesophagus	178	9.0	8.4	5.7	12.4
Liver	168	8.5	7.8	5.4	11.9
Lung	143	7.2	6.8	4.6	7.4
Larynx	102	5.2	4.8	3.3	6.2

**Table No. 3 (FEMALES)**

Leading Sites	Number	%	AAR	CR	TR
Breast	191	10.3	9.3	6.9	22.4
Cervix	187	10.1	9.1	6.8	24.1
Stomach	141	7.6	8.0	5.1	12.1
Lung	134	7.2	8.0	4.9	10.0
Oesophagus	128	6.9	7.7	4.6	10.6

Looking at the district wise breakup of cancer cases we can see in the Table No. 4 that the maximum number of cases was registered in East District of Sikkim but for stomach cancer the percentage is high in North District as seen in Table No. 5.

**Table No. 4**

**Sikkim District-Wise Leading Sites (2003-2012):**

Sikkim District Wise Number, CR and AAR per 100000 Population-(2003-2012)						
District	#		Crude Rate		AAR	
	M	F	M	F	M	F
North	124	95	51.0	51.2	87.3	79.4
West	336	342	49.3	53.4	65.3	75.7
South	354	384	47.9	56.5	32.5	78.7
East	1147	1019	78.9	81.1	114.4	121.6
Unknown/Others	15	19	-	-	-	-
Sikkim	1976	1858	63.4	67.3	88.7	98.4

**Table No. 5**

**Tobacco Related Cancers: (Stomach - Males)**

Sites (ICD-10)	#	%	CR	AAR	TR
North	26	21.0	10.7	20.5	35.7
West	47	14.0	6.9	9.3	17.4
South	37	10.5	5.0	6.8	11.0
East	186	16.2	12.8	19.6	24.0
Sikkim	298	15.1	9.6	13.9	20.1

The number and relative proportion of cancers associated with the use of Tobacco has been worked out according to the International Agency of Research of Cancer Monograph (IARC 1987). The anatomical sites of cancers that have been associated with the use of tobacco (TRC) include lip, tongue, mouth, pharynx including oro-pharynx and hypo-pharynx, esophagus, larynx, lung and urinary bladder.

The table below illustrates the number and relative proportion of various tobacco related cancers.

**Table No. 6**

It is found that 33.7% male and 21.6% females were tobacco related cancers.

—	Male	%	Female	%
Lip	09	0.5	03	0.2
Tongue	41	2.1	22	1.2
Mouth	71	3.6	39	2.1
Oropharynx	06	0.3	04	0.2
Hypopharynx	52	2.6	13	0.7
Pharynx Unspecified	18	0.9	5	0.3
Esophagus	178	9.0	128	6.9
Larynx	102	5.2	37	2.0
Lung	143	7.2	134	7.2
Urinary Bladder	46	2.3	16	0.9
TRC	666	33.7	401	21.6
Total	1976	—	1859	—

**Microscopic Verification:**

Mostly the cases are diagnosed microscopically. In males the microscopic diagnosis was 78.6% and in females it was 80.7%.

**Cancer Mortality:**

It is defined as the number of cancer deaths per 1,00,000 population occurring in a defined population in a defined geographical area during a particular period. The age adjusted mortality rate is similar to the age adjusted incidence rate where the mortality rate is adjusted to the standard world population.

**Table No. 7**

**Incident, Mortality / Incident % 2003-2012**

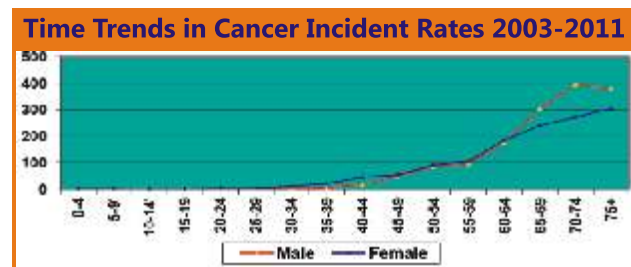
Incident	Mortality	Mortality/Incident %
3834	1801	47.0

**Table No. 8**

**Cancer incidence and mortality rates were found to be very low in the younger ages.**

Male			Female		
Incident	Mortality	M/I %	Incident	Mortality	M/I %
1976	991	1976	1858	810	43.6

The age specific rates were found to follow the general pattern of increase with age. An increase in the mortality was seen in both sexes in the fourth decade. Mortality in males and females peaked at age group above 70.



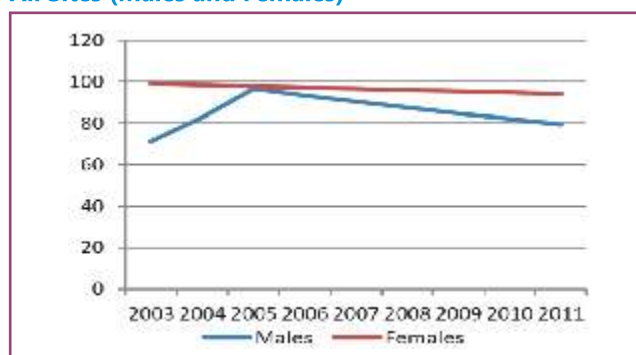
Incidence of cancer is known to increase with age. Increase in life expectancy has resulted in a greater population in the older age group. The increase in population also contributes to the number of cancer cases. Apart from this improved literacy, greater consciousness of health and awareness about cancer in particular makes more people seek medical advice at an earlier stage.

The question is whether cancer is on the increase after taking account for these factors and whether that rise is statistically significant.

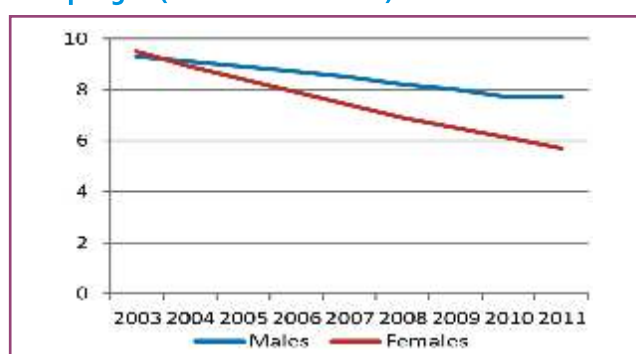
In determining the significance of the trends the actual value of the AAR for single year and three year moving average has been used.

The significance of time trends was based on the formula provided by Boyle and Parkin 1991. In addition for single year the Joinpoint Regression Program of the NCI of USA has been used (Kim et al, 2001)

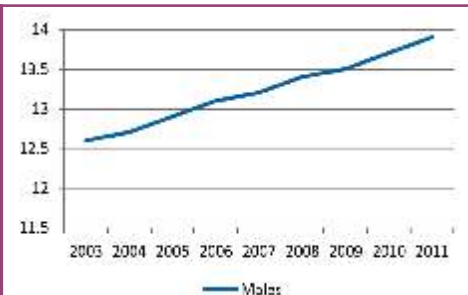
#### Trends over time based on Joinpoint Regression Model All Sites (Males and Females)



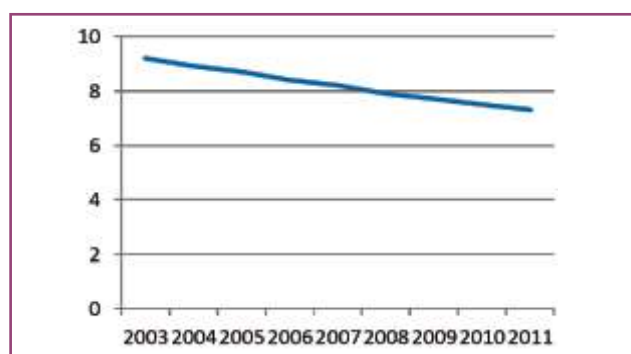
#### Oesophagus (Males and Females)



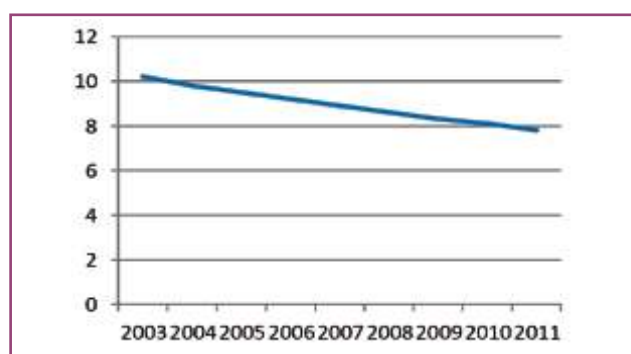
#### Trends over time based on Joinpoint regression Model stomach (males)



#### Trends Over time based on Joinpoint Regression Model Breast (Females)



#### Trends Over time based on Joinpoint Regression Model Cervix (Females)



It has been found that the trends over time are unchanged in the females but there is a steady decline in the trends seen in males. Looking at common cancers in males there is a significant increase over time. Similarly there is a steady decrease in trends over time in cancer of oesophagus for both males and females.

Among common cancer of females there is a steady decrease in trends over time in breast and cancer of the cervix uteri.

#### Conclusion:

The compilation of the ten years report is the first report of its kind and gives an insight into the common cancer prevalent in Sikkim. It even gives an insight into common tobacco related cancer in Sikkim. Cancer Mortality information is a good quality indicator and also reflects on the cancer care and completeness of data. The time trends from 2003-2011 of cancer all sites gives an indication that the rates of cancer have been steady over the period of time. However specific site like stomach cancer shows a steady increase over time. This report can be used by decision makers of Sikkim to plan their cancer control program with special emphasis on cancers which need intervention. □



## Hospital Based Cancer Registry-Delhi

N. Manoharan, P.K.Julka, Sunil K Varma, G.K.Rath

Dr. B.R. Ambedkar Institute Rotary Cancer Hospital, New Delhi-29

The Delhi Cancer Registry situated at Dr. B.R.Ambedkar Institute Rotary Cancer Hospital (Dr.BRAIRCH), All India Institute of Medical Sciences, New Delhi is a Population Based Cancer Registry established in 1986. Now it is in the process of establishing Hospital Based Cancer Registry.

The purpose of the HBCR is to assess the patterns of cancer patient care and outcome in the concerned hospital/institute. This present report gives a brief scenario on the patients registered in Dr.BRAIRCH during the year 2010.

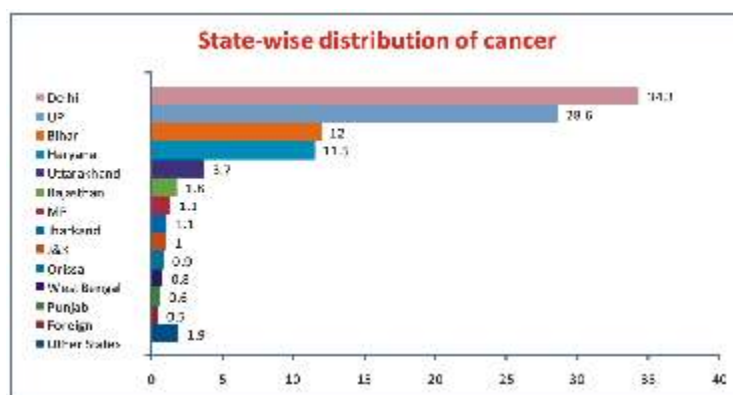
Dr. B.R. Ambedkar Institute Rotary Cancer Hospital (Dr. BRAIRCH) at AIIMS founded in 1975. It initially started functioning in 1983-84 on 2 floors with 35 beds. It is 30 years old and has expanded to 7 floors with the bed strength of 182. It currently has 856 employees. It has three major departments viz. Radiation Oncology, Medical Oncology and Surgical Oncology and six supporting units namely Anaesthesiology, Radio-diagnosis, Oncopathology, Medical Physics, Delhi Cancer Registry and Medical Records Section. All the major departments and units are engaged in teaching and research and has post graduate and doctoral programmes.

The major sources of data collection for the HBCR are from Medical Records files. All the microscopically confirmed and clinically/radiologically suspected cases of cancer seen/ diagnosed in various other department of AIIMS/other hospital are referred to Dr.BRAIRCH for further consultation for surgery, radiotherapy, chemotherapy etc. All these new patients are first registered in the registration counter and assigned a unique medical records number. While registering the patient in medical records section patients were asked to fill up a registration form which contains the information

on residential address along with the duration of stay in their present address and all this information are entered into the computer. All investigation reports, treatment procedures and discharge summary etc. are available in these files. These files are arranged and kept in chronological order in MR section for easy access. Radiotherapy details are also available in separate files maintained by Radiation Oncology department. In-patient register and death register are kept separately by the Medical Records Section. All these files and registers are regularly screened for data collection. The collected information is then assimilated, processed for elimination of duplicates before being entered into the computer. Coding is done according to ICD.10 and ICD.O-3.

### Results

During the year 2010 a total of 8693 new cases were registered. Of these 8040 were malignant cases and the remaining 653 cases were non-malignant (benign/insitu) cases. The gender distribution of malignant cases were males constituted 4367 cases (54.3%) and females 3673 (45.7%). The geographical distribution of cases registered were shown in fig.1.



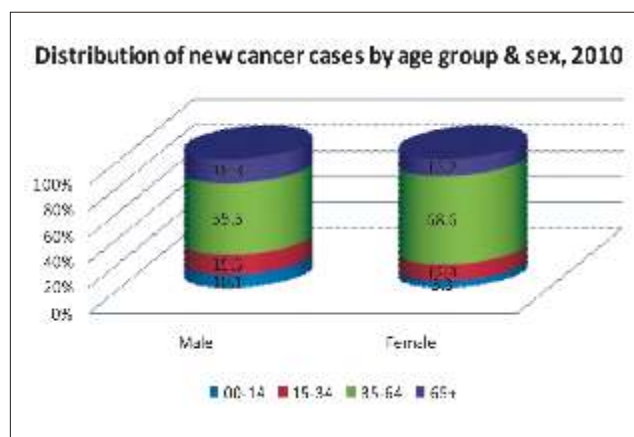
Out of the 8040 malignant cases registered 34.3% were from Delhi followed by Uttar Pradesh (27.9%), Bihar (12%), Haryana (11.5%) and Uttarakhand (3.7%). Foreigners mainly from Nepal constituted about 0.5% of cases.

### Religion:

The majority cases in males were Hindus (85.7%) followed by Muslims (11.9%), Christians (0.8%), Sikhs (1.2%), Buddhist (0.3%) and Jains (0.1%) and in females Hindus (86.1%) followed Muslims (11.0%), Christian (0.9%), Sikhs (1.6%), Buddhist (0.3%) and Jains (0.1%).

### Group-wise distribution of cancer:

In pediatric age group (0-14 years) the proportion of cancer cases registered among boys (10.1%) was higher than girls (5.3%). In young adults (15-34 years) and geriatric ages (65 & above) the proportion of cases registered in males are higher than females. But in middle age group (35-64 years) the female cases (68.6%) registered were higher than males (55.5%).



### Common cancer among males and females:

Cancer of the lung (9.0%) was the most common cancer registered in Dr.BRAIRCH followed by mouth (8.1%), tongue (7.1%), NHL (6.2%) and Brain and Nervous System (5.4%). In females, cancer of breast (23.4%) was the leading site followed by cervix (17.7%), ovary (8.6%), gallbladder (5%) and corpus uteri (3.5%).

### Common cancers among Delhi Residents:

Lung (11.7%) was also the leading site of cancer among Delhi males followed by mouth (7.3%), NHL (7.2%), Tongue (6.7%) and larynx (5.3%). Among Delhi females also breast (25.7%) was the most common site followed by cervix (18.0%), ovary (8.4%), gallbladder (5.2%) and corpus uteri (5.2%).

### Pediatric cancer (0-14 years):

Pediatric cancers constituted 7.9% of all cancers seen in the IRCH during the year 2010. The total pediatric cancer load among males and females were 10.1% and 5.3% respectively. The residential status of majority of pediatric cancer among boys were Uttar Pradesh (36%) followed by Bihar (19%), Delhi (18%) and Haryana (12%). Most of the pediatric cases among girls are from Uttar Pradesh (27%), Bihar (27%) and Delhi (20%).

### Common sites of cancer in Boys & Girls:

The most common site of cancer in boys was lymphoid leukemia (20.1%) followed by eye (16.3%), Brain & NS (12.2%), bone (10.8%) and NHL (6.8%).

The leading sites of cancer among girls were eye (22.8%) followed by lymphoid leukemia (14.5%), brain & NS (11.9%), bone (11.4%) and myeloid leukemia (5.7%).

### Common sites of cancer in young adults (15-34 years):

The leading site of cancer among young adult males was bone (12.7%) followed by NHL (9.7%), brain & NS (8.6%), lymphoid leukemia (8.3%) and connective & soft tissue (7.2%). In females the most common site was breast (20.3%) followed by ovary (12.9%), myeloid leukemia (8.2%), bone (6.3%) and brain & NS (5.3%).

### Common sites of cancer in middle age adults (35-64 years):

The leading site of cancer among males in the age group 35-64 years was lung (11.3%), mouth (10.5%), tongue (9.5%), larynx (5.5%) and NHL (5.2%). In females the leading site was breast (26.0%) followed by cervix (21.2%), ovary (8.8%), gallbladder (6.0%) and tongue (2.7%).

### Geriatric cancer (65 years & above):

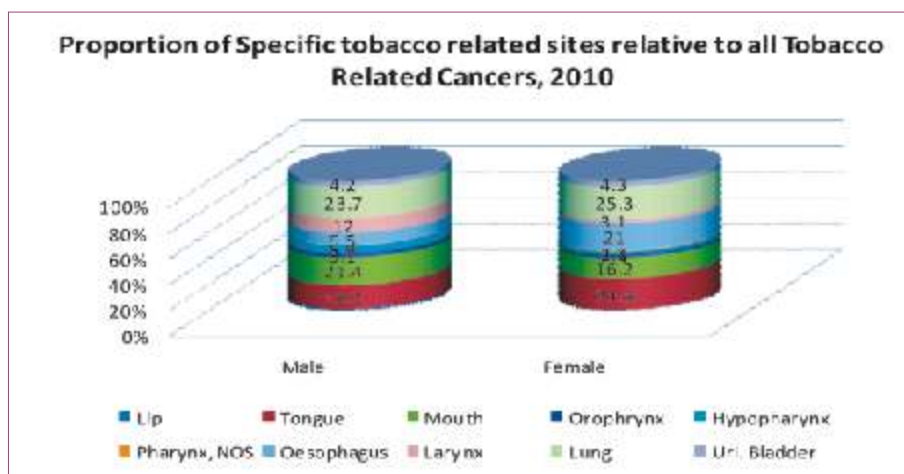
Lung (13.0%) was the leading site of cancer in the geriatric age group followed by prostate (10.4%), larynx (7.6%), mouth (7.2%) and NHL (6.1%). In geriatric female, breast (22.1%) was the leading site followed by cervix (19.8%), corpus uteri (6.8%), ovary (4.2%) and lung (4.9%).

### Tobacco Related Cancers (TRC):

Cancers of the lip, tongue, mouth, pharyngeal cancers (excluding nasopharynx), esophagus, larynx, lung and urinary bladder were considered as sites of cancer related to tobacco use. Tobacco related cancers constituted about 37.9% of all cancers in males and

9.6% of all cancers in female.

Among the tobacco related cancer sites in males, cancer of the lung was the most common site (23.7%) followed by cancer of the mouth (21.4%), tongue (18.7%) and larynx (12.0%). In females also cancer of the lung (25.3%) was the leading site associated with tobacco use followed by tongue (24.4%), esophagus (21.0%) and mouth (16.2%).



### Conclusion:

The present report gives only a brief picture of the cases registered in Dr. BRAIRCH during 2010. The other aspects of hospital based cancer registry viz. types of treatment and treatment outcome etc. with latest data will be brought out in due course of time. □



## Importance of Accurate Classification in Cancer Registry

**Debanjana Barman**

Medical Research Officer.

PBCR- Dr B Borooah Cancer Institute, Guwahati

**A**ccurate classification provides uniform platform to various study in any disease and removes inter observer variations amongst morphologists, clinicians and epidemiologists in understanding various diseases in question. Classification is meant for grouping specific disease entity with characteristic morphology and behavior. It is the common language amongst various investigators.

The International Classification of Diseases (ICD) is the standard diagnostic tool for epidemiology, health management and clinical purposes. This includes the analysis of the general health situation of population groups. It is used to monitor the incidence and prevalence of diseases and other health problems and helps to classify diseases recorded on many types of health and vital records including death certificates and health records. It enables the storage and retrieval of diagnostic information for clinical, epidemiological and quality purposes. The use of codes has expanded from classifying morbidity and mortality information for statistical purposes to diverse sets of applications, including administration, epidemiology, and health services research. Medical researchers use ICD codes for many purposes. By grouping patients according to their diagnoses, clinical epidemiologists use ICD codes to study patterns of disease, patterns of care, and outcomes of diseases. Detection and treatment of cancer has now been provided a global standard with the introduction of the international classification of diseases for oncology (ICD-O). The classification is mainly used to aid and categorize malignant tumors in order to code the site of occurrence and the cause for the development or growth of neoplasm in that precise area.

International Classification of Diseases for Oncology, third edition (ICD-O 3) is used primarily in tumour or cancer registries for coding the site

(topography) and the histology (morphology) of neoplasms, usually obtained from a pathology report. The purpose behind the classification of disease is to classify the cause of tumour based on pathology reports so as to bring cancer treatments on an international platform. A multi-axial classification of the site, morphology, behaviour, and grading of neoplasms are provided in the ICD(O)3. The morphology axis provides five-digit codes ranging from M-8000/0 to M-9989/3. The first four digits indicate the specific histological term. Behavior is the fifth digit (after the "/") of the morphology code indicating the pathologic behavior of the neoplasm - benign, in situ, malignant. A separate one-digit code is also provided for histologic grading (differentiation).

### ICD-O-3 Code = 10 Digit Code

TOPOGRAPHY— 4 digits (a decimal point (.) separates the 3 digits).

MORPHOLOGY— 4 Digits

BEHAVIOR----- 1 Digit

GRADE----- 1 Digit

**10 Digits**

**ICD-10** is the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD), a medical classification list by the World Health Organization (WHO). Neoplasm that is malignant is classified on the basis of ICD-10.

The topography axis uses the ICD-10 classification of malignant neoplasms (except those categories which relate to secondary neoplasms and to specified morphological types of tumours) for all types of tumours, thereby providing greater site detail for non-malignant tumours than is provided in ICD-

The benefit of having a classification dedicated entirely to oncology is that it helps to deal the serious issue of cancer in a much more efficient manner. International

classification code provides a common platform for researchers and oncologists from all over the world to discuss and share research information thereby helping the cause of cancer in a big way. Oncologists now have a more precise way of knowing whether a tumor is cancerous due to the classification. This distinction itself is the biggest step towards planning and initiating treatment. The various factors that are taken into consideration for preparing the classification provide a better platform for more definite diagnosis.

**References:**

1. Cancer Epidemiology: Principles and Methods (IARC,WHO) Isabel dos Santos Silva
2. "International Classification of Diseases (ICD)". World Health Organization.
3. Measuring Diagnoses: ICD Code Accuracy Kimberly J O'Malley, Karon F Cook, Matt D Price , Health Service Research.

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## Data Management Softwares at BBCI and Data Quality for Cancer Registry Purpose

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Computer Programmer, Data Entry Operator<sup>1</sup>

PBCR-Guwahati, Data Entry Operator<sup>2</sup> HBCR

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A good hospital requires easy accessibility to instant, comprehensive and updated information about the patients it treats. Computer based health information system is playing an important role in the field of hospitals, clinics, diagnostic services and medical records departments etc. The management of patient information and care requires objectives pertaining to record keeping, record retrieval and record sharing. For greater accuracy, quality data in large quantity must be regulated to assist in decision making. The concept of 'paper less' documentation is the main objective in the field of bio-informatics.

In 2003, Patient Registration software was installed at the reception counter of Dr. B.Borooah Cancer Institute (BBCI) and Local Area Network (LAN) connectivity was mounted with terminals in few selected areas. However due to lack of execution, the process of enabling accessibility to other connected terminals did not take off. Moreover Hospital Patient Registration software was a limited version with insufficient information details. It was therefore felt that further up-gradation and integration of extra modules to the existing software was needed to be developed, installed and interlinked so that, maximum efficacy of the software about patient care could be evaluated.

In the period of 2008 -2009, an effort was made to initiate the up-gradation of existing system despite of technical shortcomings. Thereafter, it was decided to start a home grown system with a bare skeletal networking system. Mr. Kamal Deka, MSc. (IT) had developed several tailor -made software package and installed in critical areas of the hospital on a prototype basis. Fortunately the prototype was found to be suitable for operational basis.

Visual Basic 6.0 and MS- Access were used to develop this software. Some of the critical areas in BBCI where this prototype software (module wise) has been implemented are:

- 1) Patient Information System of BBCI at Reception Counter.
- 2) Pathology Information System for Pathology department of BBCI.
- 3) Blood Bank data entry, updating and retrieval system.
- 4) Inventory system for Store Department of BBCI.
- 5) Monthly audit statistics of BBCI at Record department.
- 6) Tumor board patient information for Radiotherapyscheduling.
- 7) Patient admission and discharge reporting for Indoor patient.

With the successful implementation of the above mentioned integrated software, the data quality of record keeping, retrieval and data accuracy at BBCI has improved significantly. Though BBCI patient registration database has been created in 2003, the complete Hospital Information System (HIS) was generated in 2009 and since then most of all departmental records are computerized.



Main menu of HIS



Patient Registration form

Pathology Information form

In view of the importance of quality data on socio-demographic information of patients, a direct patient-MSW interface is required. So, a separate area for new patient registration was created. For this purpose the staffs of HBCR and PBCR are engaged on rotational basis. In the new registration area the MSW can carry out a detailed interview of the patients or its attendants in order to obtain information on additional addresses, and information on co-morbid conditions, history of tobacco usage etc. Also, in order to reduce the waiting time of patients at the registration area, a systemized data collection followed by simultaneous data entry is done. However, a major limitation is the failure to integrate the databases of Hospital Information System of the initial data entry with the HBCRDM 1.0/PBCRDM2.1 database. This could have gone a long way in updating information in the HBCR and PBCR databases with real time information (partial entry) of socio-demographic characteristics of cancer patients with the provisional diagnosis and the date of first diagnosis. Over and above that, keeping in mind

with one of the specific objectives of HBCR of short term case-control study, MSW's can participate in such studies at the registration area itself, as interview of patients or healthy individuals/attendants are best conducted at the time of registration.

### Advantages of Computerized database of BCCI:

With the help of this software 'paper less' record keeping of patient, ease of searching information and report generation became possible. It reduces load of paper documentation and manual record retrieval. Hence chances of missing information of cancer patients registered at record department have drastically diminished. Number of missing, unknown variables, unknown primary site can be listed on regular basis, so that quality of information can be improved. Data handling is easy and safe. To ensure data protection, the software can be only accessed by authorized user as it is protected by password.

Population Based Cancer Registry (PBCR)-Guwahati was established in 2003 in the department of Pathology at BCCI. As an integral part of NCRP (ICMR), PBCR-Guwahati has been engaged in its effort to generate authentic information on incidence and pattern of cancer of Kamrup Urban District. BCCI is the main source of registration of PBCR- Guwahati where direct interview is possible for all the registered cases and there are 40 private hospitals, 31 diagnostic centers and 18 birth & death registration centre in the registry area. BCCI contributes more than 50% of cases belonging to Kamrup Urban District. Records of the patients interviewed at registration counter are fed into the computer. These records are also readily made available at PBCR office through LAN connection.

### PBCR Data Management Software (PBCRDM 2.1):

PBCRDM was installed in October, 2010 at PBCR Guwahati and Local Area Network (LAN) connection was first set up at PBCR office at BCCI in July, 2010. This software was designed and developed by coordinating unit NCRP (ICMR) at Bangalore. PBCRDM 2.1 is used for entering and managing cancer data (both incidence and mortality) of "Population Based Cancer Registries". The highlights of the software are that it is an all in one comprehensive package that can be used to simulate all the activities of a registry. The improvement of data quality and data accuracy has been noticed in PBCR Guwahati with the help of PBCRDM2.1 and BCCI in-house software. Real time data entry (in 2012) has resulted in the improvement in availability of Demographic details (93.1%), improvement in Microscopic diagnosis (84.9%) as well as in the areas of

Clinical details (85.6%) and Treatment details(71.6%). The proportion of unknown primary sites (4%) and DCOs (6%) from unmatched mortality has been diminished. And accordingly, time taken for submission of data has reduced significantly from one year to few months.

### **HBCR helper software: To accelerate large volume of data entry:**

Data entry and management of database is an important component of cancer registry. Nowadays with avalanche of data especially data on cancer has put data entry operator, programmer and professionals handling these data sets in a fix. In the event of large volume of data entry, helper software can reduce the effort and time of data entry operators. Mr.Manjit Sharma, data entry operator at HBCR has developed a helper software which reduces the effort of typing and decreases the time required to complete some of the fields of proforma into the Hospital Based Cancer Registry Data Management Software v1.0.

Purpose of this software is to automatically fill up some fields of HBCRDM v1.0.

The screenshot shows a Java Swing window titled 'HBCRDM v1.0'. Inside the window is a form with the following fields: 'Hospital Reg No:' with a red text box, 'Room No:' with a green text box, 'Title/ R4NT / Worker:' with a blue text box, 'Department:' with a yellow text box, 'DD/MM/YYYY (RI):' with three small grey text boxes, and 'DD/MM/YYYY (FP):' with three small grey text boxes.

### **These fields are -**

HBCR registration number; Department Code / Doctor's Name / Department Name.; Date of registration at Reporting Institute.; Title of patient's Father/Mother/ Spouse/ Son/Daughter. ;Other sources of registration. Primary Site of Tumor Topography - Code and Name.; Reason for Non-treatment. Social Investigator's Name.; Date of fill-up of proforma.

and it contains Labels and Text Fields using JLabel and JTextFields. Event Listener classes are used to receive any event/action occurred in this software and to execute command accordingly.

### **Additional measures adopted by NCRP/ICMR unit at BBCI:**

Timely review meetings: The staffs of HBCR, PBCR and POCSS at Dr.B Borooah cancer Institute are engaged in monthly coordination meets to share information and updates on progress.

Quarterly /half yearly workshops of cancer registry: Time to time meetings/workshops with clinicians, pathologists, and record officers of outside sources and mortality registration of Kamrup-Urban registry area have been organized to achieve their cooperation. □

Java Development Kit was used to develop this software. No back-end is used for this software.

Java class JFrame is used to develop Main Form,

## Cancer Registration in NE Registries - A Prelude Plus other Aspects

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The need for organizing cancer registries in the country had been spelt out by Rao's Cancer Assessment Committee as early as in 1965, which was further re-emphasized and elaborated by Wahi's Cancer Assessment Committee in 1972. The National Seminar on Cancer Control was held on 20-23 December, 1976 in New Delhi under the auspices of the Ministry of Health and Family Planning and WHO. Around 32 renowned clinicians, pathologists and cancer epidemiologists had participated and 21 scientific articles on cancer were presented in that seminar. After the deliberations the seminar suggested that an efficient organization for cancer registration is essential to supply constant feedback to the health agencies for successful implementation of any national cancer programme and establishment of cancer registries which are pre-requisites for efficient cancer control programme should be given utmost priority. It was also felt that national organizations like the ICMR, which is the apex body for planning, monitoring and supporting biomedical research in the country, and is autonomous in its functioning, is best suited for organizing cancer registries at national level.

Subsequently, the ICMR's Advisory Committee on Cancer Research in 1980 reiterated the need for strengthening of existing cancer registries and organization of new registries in various parts of the country and constituted the Task Force. The Task Force group discussed the various aspects of organizing the two types of registries and decided that certain pre-requisites have to be fulfilled before a registry is organized. It also laid down the terms of reference for guidance. Proforma was developed incorporating the essential requirements and terms of reference and circulated to all the medical colleges and cancer hospitals to obtain baseline data. A core committee was

formed with Late Dr. Jussawalla as chairman and Dr. U.K Luthra as the convener to screen the information received from the centres and submit the report for final decisions.

Keeping in view the essential pre-requisites and the information available, the members of the task force felt that the following centres fulfilled the criteria for population based registry and hospital tumour registry:

PBCR: Bombay, Bangalore

HTR: Ahmedabad, Calcutta, Chandigarh, Delhi, Dibrugarh, Goa, Madras, Trivandrum, Varanasi and Vellore.

The task force members further felt that each of the provisionally selected centres shall have to follow and adhere to certain conditions like:

- a) Population based registries should accept the working plan of Bombay Cancer Registry with suitable modifications.
- b) The established plan of action of TMH with necessary suitable changes may be followed by hospital tumour registries.
- c) Proforma designed by the task force should be followed by the registries to ensure uniform data collection.
- d) There will be periodical review and evaluation of the working of the registries and most importantly
- e) Each of the registry must fulfill the mandatory financial terms of reference that if the registry is established by ICMR, it will be maintained as per rules, for an initial period of five (5) years and thereafter its activities should have to be undertaken by the respective state or any responsible agency as a continuing project.

Based on the responses received from each of the



centres and keeping in view of the suggestions of the core committee the Task Force on Cancer Registries finally recommended that the existing Bombay Cancer Registry will be taken over by the ICMR with certain augmentation along with two new population based registries at Bangalore and Madras and three hospital tumour registries at Chandigarh, Dibrugarh and Trivandrum under the National Cancer Registry Project of ICMR. A great deal of planning had gone into this activity and the recommendations of the task force had considerably helped in formulating a uniform methodology for functioning of the registries. All the registries started collection of cancer data from 1st January, 1982. So, the first seed of cancer registration though institution based was sown at AMC, Dibrugarh in the name of Hospital Tumour Registry on that landmark day of 1 January, 1982.

During early 1980's, AMCH, the base institution of hospital tumour registry, Dibrugarh, was the only centre in the entire N.E Region having adequate facilities for diagnosis and proper treatment of cancer patients. Cancer patients from across the region used to report at AMCH for diagnosis and treatment. The observation accrued during that period was approximately indicative of the prevalent patterns in the region which obviously have changed considerably overtime.

Cancer registration in a particular region implies determining cancer morbidity and mortality including patterns and trends over time in that defined area and on that count hospital registry data has no role to play except providing quality data to any existing PBCR covering the area around the hospital. Until 2003, the NCRP comprised of only six PBCRs covering 3.5% of the total population of the country. For a vast country like India this was obviously utterly inadequate to extrapolate even conservatively the cancer burden of the country. In order to assess the geographical patterns of cancer in the country, the Coordinating Unit of NCRP with support from WHO launched an innovative and landmark project on 'Development of Cancer Atlas in India' in 2001. The first report of the project for the year 2001-2002 threw open vistas of high incidence and patterns of cancer hitherto unknown. The report has brought about a whole set of new findings especially in N.E Region and as a fallout six PBCRs under the banner, "North East Regional Cancer Registries (NERCR)" have been setup in four states of the N.E Region in 2003 under NCRP. Gradually the remaining four states of Nagaland, Meghalaya, Arunachal Pradesh and Tripura, which remained within the ambit of cancer atlas project for some years,

eventually promoted to PBCRs. By 2010, the NCRP has established PBCRs in all the states of N.E Region covering 42% of the population of the region. The uncovered 58% population are from the state of Assam, largest in terms of population, where only three districts are covered and some areas of Meghalaya and Nagaland.

One can note the enormity of cancer burden in N.E Region from 'The Report of 25 PBCRs in India, 2009-2011, NCRP (ICMR)'. For instance, Mizoram, Meghalaya and Kamrup urban have featured in the world ranking of cancer incidence in males and Kamrup urban and Mizoram in females. In specific sites the N.E Registries have highest incidence in hypopharynx and oesophagus in the world in both sexes.

The N.E Region is often described as an anthropologist's paradise because of its numerous cultural and linguistic tribes and races. The region which comprises more than 120 ethnic groups with distinct cultures and lifestyle may provide enough mundane statistics for postulating hypothesis of epidemiological importance.

The older PBCRs of the region are more than a decade old now and have strived hard to produce reliable incidence data from their respective regions albeit certain relative problems and accrued sufficient authentic data. It is time to reap the benefits of the data by implementing relevant and urgently needed epidemiological research. Time is ripe to collect high-resolution data on systematic and continuous basis suiting the objectives. Variations of the cancer patterns in the region added impetus to in-depth investigations. Each registry has its own priorities and can formulate their objectives to suit their needs. We have the resources and necessary skills and assured financial and technical support of NCDIR (ICMR). It is high time that we all make up our minds to embark on relevant epidemiological research so that the results benefit the vast sufferers from this fell disease and reduce the calamity through appropriate preventive measures.

#### References:

1. *Report of National Seminar on Cancer Control, New Delhi, 20-23 November, 1976.*
2. *"How it all began! ICMR Task Force on Cancer Registries, 1980", CRAB, Vol. VII, June 1998*
3. *Report of 25 PBCRs in India, 2009-2011, NCRP (ICMR). □*

## Epidemiology and Genetic Risk Factors in the Development of High Incidence of Cancers from North East India

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Population based cancer registries (PBCR) in India have reported a very high incidence of cancer of all anatomical sites in North East India. This region is the abode of ethnic diversity due to migration of people over the centuries from other parts of India, South China, Thailand, Myanmar and other Southeast Asian countries. With diverse genetic pool, inherent culture, food habit; unique gene environment interaction is observed in this part of India.

International comparison of cancer incidence with that of different PBCRs in India have reported a very high incidence of lung cancer, esophageal cancer, stomach cancer, cancer of Gall bladder, nasopharynx and tongue in North East India (NCRP, 2013).

Very high incidences of esophageal cancer among both sexes have been documented from Mizoram and Assam. The proportion of tobacco related cancers of all sites is highest in Meghalaya (66.1% in men and 40% in women) followed by Assam (48.6% in men and 24.1% in women). In the state of Manipur, it is about 36.4% in men and 21.1% in women; in Mizoram it is about 41.6% in men and 23.2% in women (NCRP, 2013).

To investigate the epidemiological and genetic risk factors associated with the high incidence of cancer in this region, published data were taken from the studies that were carried out at Regional Medical Research Centre, North East Region (Indian Council of Medical Research), Dibrugarh, Assam in collaboration with Civil hospital (PBCR) Aizawl, Mizoram, RIIMS (PBCR), Imphal, Manipur, Dr. B. Borooah Cancer Institute (PBCR), Guwahati, Assam and Institute of Pathology, New Delhi, India.

Data for lung, Stomach and esophageal cancer are included from various case control studies carried out at different time periods in North East India.

Study on the risk of lung cancer among women in Mizoram has revealed a strong association between environmental factors and GST polymorphisms. Exposure of cooking oil fumes ( $p < 0.003$ ), wood as fuel for heating source for cooking ( $p = 0.044$ ), kitchen inside living room ( $p = 0.001$ ), improper ventilation in house ( $p = 0.003$ ), tobacco smokers ( $p = 0.043$ ), intake of smoked fish ( $p = 0.006$ ), smoked meat ( $p = 0.001$ ), Soda ( $p < 0.001$ ) and GSTM1 null genotype ( $p = 0.003$ ) were significantly associated with increased risk of lung cancer among women in Mizoram. Protective effect was observed for intake of bamboo shoots ( $p < 0.001$ ) and egg ( $p < 0.001$ ). Strong association between exposure to cooking oil fumes and lung cancer risk was also observed in Mizoram ( $p = 0.007$ ). Mizo cooking often involves stir frying at high temperature, which produces ample amount of fumes from cooking oil, containing several carcinogens.

In both Manipur and Mizoram no independent association for XRCC1 and XPD genotype was observed, however p53Pro/Pro genotype was significantly associated with increased risk of lung cancer in the study population ( $p = 0.001$ ). Significant gene environment interaction was observed for XRCC1, XPD and p53 and environmental factors.

The combined Gln/Gln genotype of XRCC1 and XPD genes ( $p = 0.040$ ) was significantly associated with increased risk for lung cancer in Mizoram and Manipur. Interaction of XRCC1Gln/Gln genotype with exposure of wood combustion ( $p = 0.020$ ), exposure of cooking oil fumes ( $p = 0.008$ ) and tobacco smoking ( $p = 0.014$ ) and interaction of XPD with betel quid chewing ( $p = 0.009$ ) and tobacco smoking ( $p = 0.022$ ) were found to be significantly associated with increased risk for lung cancer.

In case of stomach cancer, risk was significantly

higher among current smokers ( $p=0.002$ ) in Mizoram. Higher risks were observed for meiziol (a local cigarette) smokers ( $p=0.003$ ). Intake of smokeless tobacco, tobacco smoking, chewing of tobacco and tuibur were common in Mizoram among both the gender. Tuibur (tobacco smokeinfused water) increased the risk of stomach cancer among current users ( $p=0.001$ ). Tobacco chewing too ( $p=0.028$ ) showed significant risk.

Tobacco use in any form [smoking and smokeless (tuibur and chewing)] increased the risk of stomach cancer in Mizoram.

Frequent consumption of Saum ( $p<0.001$ ) (Saum is fermented pork, a traditional food), smoked dried salted meat ( $p<0.001$ ), smoked dried salted fish ( $p<0.001$ ) and use of soda ( $p=0.001$ ) were significantly associated with development of stomach cancer. N-nitroso compounds found in smoked fish and meat are potent animal carcinogens and possible human carcinogens. Indigenous people of the northeastern region of India use soda (alkali) or other alkaline preparations frequently as food additives. Kalakhar (an alkaline preparation), consumed in Assam, was implicated as a risk factor for esophageal cancer. p53

Pro/ Pro genotype was significantly associated with a higher risk of stomach cancer ( $p<0.040$ ). However in terms of polymorphisms no independent association was observed for stomach cancer. Significant gene-environment interactions exist in terms of p53 GSTM1 and GSTT1 gene for stomach cancer in Mizoram.

Studies on esophageal cancer in NE India identified the risk factors associated with the high incidence of esophageal cancer in this region. Tobacco chewing was found to be a significant risk factor for esophageal cancer development. Risk was highest for those who were using fermented betel nut with any form of tobacco (for male  $p<0.01$  & for female  $p<0.001$ ). Among others, intake of spicy food ( $p<0.001$ ), hot food and beverages ( $p<0.001$ ) and diet containing high amount of chili ( $p<0.001$ ) were also implicated for development of esophageal cancer in Assam. Use of Kalakhar (an alkali preparation made from extract of banana leaf frequently used as food additives) was found to be associated with esophageal cancer in Assam. The risk was approximately twice in individuals having homozygous GSTM1 ( $p=0.001$ ) and GSTT1 null genotypes ( $p=0.040$ ). □



## Status of Cancer Registries in India

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### Introduction:

Nearly six and a half decades on since independence, India continues the attempts to assess and reduce the burden of an apprehended disease like Cancer in its varied geographical terrains, cultural and socio-economic groups. The actual assessment of the burden of this disease as a national effort commenced in the year 1982 when six cancer registries were established at suitably selected cities in different parts of the country under the auspices of Indian Council of Medical Research (ICMR). This venture was given an appropriate name of National Cancer Registry Programme (NCRP). The point to be noted at this stage is that this initiative was taken almost a decade before the introduction of a full-fledged IT policy in the country! Also, at this point of time there were several well established Cancer Registries in the Continents of Europe (Finland, Scotland & Denmark), North America, South and Central America (Brazil), Asia (China & Singapore) and Oceania (Australia & New Zealand). Another fact which cannot be neglected at this stage is that the city of Bombay (Now Mumbai) had started data collection and compilation on cancer under Indian Cancer Society as early as 1964.

NCRP thus began its activity of planning; directing, supporting, coordinating and evaluating data as a National Programme of Cancer Surveillance. Hard Copies of a Pre designed form started reaching the coordinating unit from the aforementioned registries. The criteria for data collection were as robustly designed as any other part of the world. The forms were systematically segregated and with the minimum computer related infrastructure available at that point of time, the data entry commenced.

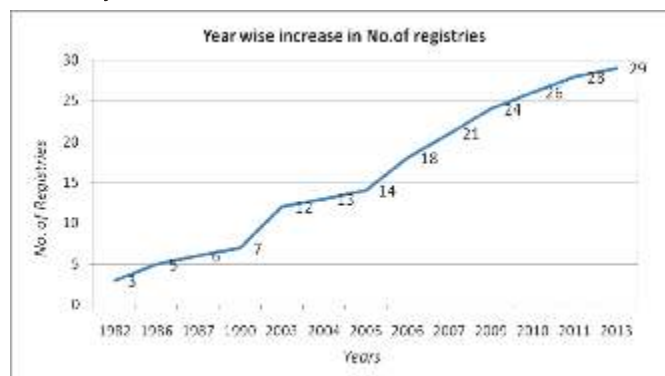
The next boost for the cancer registries came in the year 2001-2002 where a unique concept of an Atlas of Cancer in India was developed thus mapping the

patterns of cancer region wise. This almost coincided with the IT boom in the country and the location of the coordinating unit at Bangalore which was the IT capital of the country came as a blessing for the Cancer Registry Programme in India!

The fruitful collaboration with International Agencies at this stage also eased the way in this activity. The publication of the Third edition of International Classification of Diseases for Oncology (ICD-O-3) which gave a high resolution view of coding and classification of Diseases took place around the same time. The training of manpower (both short and long term trainings) generated human resource in this field which showed its results immediately as well as at a later date.

### Material and Methods:

Cancer Registration is a process of continuing systematic collection of data on the occurrence and characteristics of reportable neoplasms (McLennan et al, 1978). It is forerunner of studies in descriptive epidemiology of cancer which in turn generates scientific hypotheses. It is necessary in all settings, more so in the setting of developing country like ours. A graph representing the number of cancer registries over years is shown below.



### Consolidated Reports:

The efforts put in by this National venture would be incomplete if there is no mention of the reports published by NCRP. The first report (which included the data of year 1982) was published in the year 1985. The data contribution increased exponentially in the subsequent reports - so did the effort to clean and analyze the data to transform it into the form in which it is presented into the reports! The published reports took the growth rate of the population of India through census data of the respective decade while analyzing the data. The reports which are available online are the foundation for evidence based scientific cancer research, be that of determining risk factors, assessing control measures (PBCR) or evaluating patterns of cancer care (HBCR). The reports can be taken as a reference material for medical education and would provide guidelines for health care system in the country. The latest report in this regard is published in Feb 2013 which covers the data of the year 2009-2011.

### Specificity of each registry:

A surprising revelation regarding the registries in India is each registry is specific in its own sense (unlike many other registries of different countries in the world where there is considerable uniformity). Besides having vast variations of the geographical terrains, cultural groups and socioeconomic status which are mentioned earlier, there are certain administrative aspects which have to be kept in mind. As health is more of a state subject in our country; each state has its own unique way of dealing with the registry guidelines.

Whether it is Mumbai Registry which is the oldest and covers the dense metropolitan area of the city or Chennai Registry where the methodical collection of data has set standards. Bhopal Registry which was established in the year 1986 when the city was just recuperating from a major chemical disaster maybe considered by some as post-hoc but it has performed at par with other registries over the years. Barshi registry has covered pure rural population and has generated data which brings out effects of different lifestyles in rural and urban population in India (NCRP, 1990-96). The registries of Dibrugarh and Kamrup Urban District are covering the demarcated population of state of Assam. The registry of Mizoram has its own unique way of data collection (700 registrars of births and deaths spread throughout the state!) and has given remarkable results. Kollam was established as an extension of Natural Background Radiation Cancer

Registry in the year 2006 and covered primarily a rural population.

The registry of Sikkim covers the entire state (one of the smallest state of India!) and is bordered by three countries China, Nepal and Bhutan.

The registries in Gujrat (Ahmedabad Urban and Rural) give an idea regarding status of Cancer in the western part of the country.

### Role of Principal Investigator:

The Principal Investigator (PI) is the key person dealing with the project especially in cases of Registry establishment and functioning. He/ she delivers the objective of the project which in this case is complete coverage of data. The commitment of the staff of registry is also directly proportional to the quality of data generated by the registry. In statistical terms, the "provider factor" gets altered there is any major difference in the skills/performance of the staff.

### Aspect of Ongoing Innovation Role of Information Technology:

The coordinating unit of NCRP developed in-house software programmes. These programmes markedly improved the quality and coverage of data and also brought uniformity into the inflow of data at the coordinating unit level. The full potential and thereby the benefit of the software will be felt if the registries could quickly get into doing real time data entry. (NCDIR-NCRP, 2009-11). PBCRDM 2.1 and HBCRDM1.0 are the recent versions of software developed for the Population Based and Hospital based Cancer Registries respectively in India. The rate at which integration of data is progressing very soon it would achieve the ultimate goal of providing single software to all registries in the nation!

### The challenges faced!

The initial challenge faced by the assigned registries and coordinating unit was to make the mammoth effort of covering its intended or target population (the population of India!). While the efforts are still continuing in this direction the coordinating unit and the registries are making efforts to reach the population at the grass root level. The population based registries located in different states of the country are consistently making efforts to cover the demarcated populations. The hospital based registries are not only complementing the PBCRs in data generation but also adding the dimension of Cancer care to the data. The overall effort is to make their data representative of the nation's population.

**Conclusion - Consolidation Phase :**

Cancer Registration is a means to a purpose and not the purpose in itself. The Cancer registry is central to any programme on cancer control (Muir, C.S., 1985). While there has been a constant evolution of Cancer Registries in the country and they have

increased in number almost uniformly since 1982, it appears that the vastly diverge components have started to merge to form fewer components. This is indicative of the "consolidation phase" which the registries in India are heading towards. □

**Abstract**

## A Model Approach to Calculate Cancer Prevalence from 5 years Survival Data for Selected Cancer Sites in India- Part II

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**Background:**

Prevalence is a statistic of primary interest in public health. In the absence of good follow-up facilities, it is difficult to assess the complete prevalence of cancer for a given registry area.

**Objective:**

An attempt is made to arrive at complete prevalence including Limited Duration Prevalence in respect of selected sites of cancer for India by fitting appropriate models to 1,3 and 5 years cancer survival data available for selected registries of India.

**Methodology:**

Cancer survival data, available for the registries of Bhopal, Chennai, Karunagappally, and Mumbai was pooled to generate survival for the selected cancer sites. With the available data on survival for 1, 3 and 5 years, a model was fitted and the survival curve was extended beyond 5 years (up to 30 years) for each of the selected sites. This helped in generation of survival proportions by single year and thereby survival of cancer cases. With the help of survival proportions available year wise and the incidence, the prevalence figures were arrived for selected cancer sites and for selected periods. In our previous paper, we dealt with the cancer sites of Breast, Cervix, Ovary, Lung, Stomach and Mouth: Takiar and Jayant (2013).

**Results:**

The Prevalence to Incidence ratio (PI ratio) was calculated for 30 years duration for all the selected cancer sites showing that from the knowledge of incidence, the prevalence can be calculated. The P/I ratios for the cancer sites of Lip, Tongue, Oral Cavity, Hypopharynx, Oesophagus, Larynx, NHL, Colon, Prostate, Lymphoid Leukemia, Myeloid Leukemia was observed to be 10.26, 4.15, 5.89, 2.81, 1.87, 5.43, 5.48, 5.2, 4.61, 3.42, 2.65 respectively.

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## All Cause Mortality Software - A Brief Outline

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Silchar Medical College, Silchar

### Development of a software for collection of all cause mortality data:

Cancer registration includes incidence cases and cancer deaths. Registration of cancer cases in the cancer registry comprises collection of data on all newly diagnosed cancer cases and mortality due to cancer. In spite of all possible efforts, the data on cancer mortality is still deficient in PBCR Cachar District. Lack of proper documentation is one of the most important causes for inadequate cancer mortality data. To improve the cancer mortality data the PBCR Cachar has developed a software in which all death cases except Cancer can be recorded. After entering the mortality cases, all those records are exported in Microsoft Access file and the file is sent to NCRP so that those records can be matched with our incidence record.

The front end design of the software was developed using Microsoft Visual Basic 6.0 and back end by SQL Server 2005 and Microsoft Access. Software package can be installed on computer having Microsoft windows XP or any other higher version of windows operating system.

Large amount of mortality data can be stored in this software in efficient way as well as exported in to Microsoft Access file and the file is sent to NCRP so that those records can be matched with our cancer incidence record. Multiple

data can be accessed or stored at a time through number of Pc's. Any details can be obtained with in a second by searching technology. Backup facility of the database included into this software.

### Some of the screen-shot of All Cause Mortality Software given below:



In conclusion, the installation of this software has become very useful for registry in improving cancer mortality data. The number of matched cases has also increased reasonably with the use of this software. □



# **PUBLICATIONS**

## PBCR &amp; HBCR Guwahati

1. Jagannath D Sharma, AmalC. Kataki, Vijay C R . Population based incidence and patterns of cancer in Kamrup Urban Cancer Registry, India, The National Medical Journal of India. Vol.26,No. 3,2013 .
2. Jagannath Dev Sharma, Manoj Kalita,Tulika Nirmolia,Sidharha PratimSaikia, Arpita Sharma, Debanjana Barman ;Cancer :Scenario and Relationship of Different Geographical Areas of the globe with special reference to North East India. Asian Pacific Journal of Cancer Prevention,Vol 15(8),2014,p-3721-3729.
3. Krishnatreya M., Sharma JD, Kataki AC, Kalita M., Survival in carcinoma of unknown primary to neck nodes treated with neck dissection and radiotherapy. Ann med Health Sci Res 2014;4(Supl 2):S165-S6.
4. Jagannath Dev Sharma, Debanjana Barman , Arpita Sharma, Amal Chandra Kataki; Tobacco Related Cancers In Kamrup Urban District :Pattern &Incidence (Report From Population Based Cancer Registry -Guwahati):Asian Academic Research Journal of multidisciplinary , Vol 1,Issue 22,June 2014 ISSN: 2319-2801(p:517-535) .
5. Musumi Shara, Jaganath Dev Sharma, Anupam Sarma, Shiraj Ahmed, Amal Chandra Kataki, Rahul Saxena, Diputpal Sharma. Triple negative breast cancer in people of north-east India: critical insights gained at a regional cancer centre. Asian Pac J Cancer Prev 2014;15(11):4507-11.
6. Jagannath Dev Sharma, Manoj Kalita, Jamil Ahmed Barbhuiya, Ranjan Lahon, Arpita Sharma, Debanjana Barman, Amal Chandra kataki, Barsha Deka Roy; Descriptive Report on Pattern of Variation in Cancer Cases within Selected Ethnic Groups in Kamrup Urban district of Assam, 2009-2011.Asian Pacific Journal of Cancer Prevention, Vol 15,2014 .6381-6.
7. Jagannath Dev Sharma, Manoj Kalita, Debanjana Barman, Arpita Sharma, Amal Chandra Kataki, Ranjan Lahon, Jamil Ahmed Barbhuiya, Barsha Roy Deka; The pattern of Upper Aero-digestive group of cancers in Kamrup Urban district of Assam, A retrospective study : Asian Pacific Journal of Cancer Prevention,Vol 15(17), p-7267-7270. 2014
8. Jagannath Dev Sharma , Debanjana Barman, Mridul Kumar Sharma, Arpita Shrama, Manoj Kalita, Amal Chandra Kataki, Jamil Ahmed barbhuiya, Ranjan Lahon. Burden of Head and Neck Cancers in Kamrup Urban District Cancer Registry of Assam(India)-a retrospective study . International Journal of Research in Medical Sciences (accepted)
9. Krishnatreya M, Kataki AC, Sharma JD, Das K . Carcinoma of Unknown Primary ;An early cancer with metastasis for epidemiological purposes?. Journal Medical Society 2013;27(2):144-146 .
10. Manigreeva Krishnatreya, Jagannath D Sharma. Childhood Cancers vis-à-vis unlikely error determinant in the data management software: An important feature of HBCRDM1.0, Cancer Registry Abstract 2013,Vol 18,Issue 1pp-25-27 .
11. Manigreeva Krishnatreya, Gayatri Gogoi, Jagannath Dev Sharma and Amal Chandra Kataki. Patterns of Cancer in select Ethnic groups from Assam: A retrospective study. International Research Journal of Social Sciences. Vol 3(4),17-20, April (2014)
12. Manigreeva Krishnatreya, Nazmul Hoque, Jagannath Dev Sharma and Amal Chandra Kataki. A Comparative Study on the Pattern of Tobacco Related Cancers and Habits Tobacco Usage amongst Bengali Muslim Community of Barpeta District Assam, India. International Research Journal of Social Science,Vol.3(5),22-24,May (2014).
13. D. Barman. Cancer Mortality in Kamrup Urban District . Cancer Registry Abstract 2013,Vol 18,Issue 1pp-27-31.
14. A. Sharma. Experience using North East Data Entry software (NEDES 2.0) and PBCR data management software 2.1 at PBCR Guwahati. Cancer Registry Abstract 2013,Vol 18,Issue 1pp-19-24.
15. SM Bhagabaty, JD Sharma, M Krishnatreya, P Nandy, A C Kataki. Profiles of gall bladder cancer reported in the hospital cancer registry of a



- Regional Cancer Centre in the North-East India. Int J Res Med Sci 2014; Vol-2, Issue-4
16. JD Sharma, D Barman, MK Sarma, A Sharma, M Kalita, AC Kataki, JA Barbhuiya, R Lahon, BR Deka. Burden of Head & Neck Cancers in Kamrup urban District Cancer Registry of Assam, India : A retrospective study. Int J Res Med Sci. 2014 Vol-II, Issue -4, 1382-87.
  17. Krishnatreya M, Saikia A, Kataki AC, Sharma JD, Baruah M. Variations in the spatial distribution of gall bladder cancer: A call for collaborative action. Ann Med Health Sci Res 2014;4:329-31.
  18. Hazarika M, Krishnatreya M, Bhuyan C, Saikia BJ, Kataki AC, Nandy P et al. Overview of Childhood Cancers at a Regional Cancer Centre of North-East India. Asian Pac J Cancer Prev 2014;15:7817-19.

### Cancer Registry, Bhopal

1. Ramnath Takiar, Atul Shrivastava: Additive Properties of Crude, Age Specific and Age Adjusted Rates for Cancer Incidence and Mortality Asian Pac J Cancer Prev, 15 (13), 5407-5409.

### Cancer Registry, Ahmedabad

1. Jivarajani Parimal J, Pandya Vishruti B, Solanki Jayesh B, Patel Himanshu V, Shukla Shilin N: "Cancer Atlas in Gujarat, India", Gujarat Cancer Society Research Journal, Volume 16:7-12, April 2014.
2. Jivarajani Parimal J, Shah Prachi K, Patel Himanshu V, Solanki Jayesh B, Pandya Vishruti B: "Cancer estimation of male population in Patan district, Gujarat." Healthline. Volume 5, Issue 1, 29-34, January-June 2014.
3. Parimal J Jivarajani, Prachi K Shah, Jayesh B. Solanki, Himanshu V. Patel, Vishruti B Pandya, Shilin N. Shukla: Cancer profile in Patan district, Gujarat: A Comprehensive review. Gujarat Medical Journal I.M.A.G.S.B. News Bulletin, 9: 70-74, 2014
4. Jivarajani Parimal J, Solanki Jayesh B, Shah Prachi K, Patel Himanshu V, Pandya Vishruti B: "An overview of tobacco related cancers in Patan district, Gujarat state." The article is accepted in BJkines, official publication of B.J. Medical College, Ahmedabad on 28/03/2014. (Accepted)
5. Jivarajani Parimal J, Shah Prachi K, Patel Himanshu V, Pandya Vishruti B, Solanki Jayesh B: "Cancer scenario in women in Patan district, Gujarat State." The article is accepted in GCSMC journal of Medical Sciences on 27/12/2013. (Accepted)
6. Jivarajani Parimal J, Patel Himanshu V, Mecwan Rupal R, Solanki Jayesh B, Pandya Vishruti B: "Major sites of cancer occurrence among men and women in Gandhinagar District, India." The article is accepted in Indian Journal of Community Medicine on 23/06/2014.(Accepted)

### Cancer Registry, Delhi

1. Descriptive Epidemiology of Primary Brain and CNS tumors in Delhi, 2003-07 Asian Pacific Journal of Cancer Prevention, Vol.13 : 707-710, 2012.
2. "Population Based Cancer Registry, Delhi" in "Three year report of the Population Based Cancer Registries, 2009-2011 - Report of 25 PBCRs in India". National Cancer Registry Programme, Indian Council of Medical Research, Bangalore, page 102-103, February 2013.
3. Cancer Incidence and Mortality in Delhi UT Urban, 2008-09, May 2013 (Registry Report).
4. Evaluation of the Surveillance System for Tobacco-Related Cancers in Delhi, India. (Report)

### Cancer Registry, Thiruvananthapuram, Kerala

1. Varghese BT, Mathew A, Sebastian S, Iype EM, Sebastian P, Rajan B. Objective and perceptual analysis of outcome of voice rehabilitation after laryngectomy in an Indian tertiary referral cancer centre. Indian J Otolaryngol Head Neck Surg. 2013 Jul;65 (Suppl 1):150-4.
2. Jayakrishnan R, Uutela A, Mathew A, Auvinen A, George PS, Sebastian P. Smoking cessation intervention in rural kerala, India: findings of a randomised controlled trial. Asian Pac J Cancer Prev. 2013;14(11):6797-802.
3. Jayakrishnan R, Mathew A, Uutela A, Auvinen A, Sebastian P. Multiple approaches and participation rate for a community based smoking cessation intervention trial in rural Kerala, India. Asian Pac J Cancer Prev. 2013;14(5):2891-6.
4. Daniel CR, Kapur K, McAdams MJ, Dixit-Joshi S, Devasenapathy N, Shetty H, Hariharan S, George PS, Mathew A, Sinha R. Development of a field-friendly automated dietary assessment tool and nutrient database for India. Br J Nutr. 2014 Jan 14;111(1):160-71.

### Mumbai Cancer Registry

1. Cancer Incidence and Mortality in Greater Mumbai, 2011. (In Press)
2. Rural Urban differences in Breast Cancer in India, Indian Journal of Cancer Nagrani Rajini T, Buduk Atul, Koyande Shravani, Panse NS, Mhatre Sharayu S, Badwe Rajendra.
3. Mrs. Shravani Koyande and Miss. Shweta Jadhav has attended a symposium on "Raise taxes on Tobacco" on 22 May, 2014.
4. Invited as a speaker at Joint Conference of Maharashtra Chapter & Central India, AROI during 15<sup>th</sup> - 16<sup>th</sup> August, 2014. To talk on Cancer Registry fundamental element of Cancer Management in India.

### Cancer Registry, Bangalore

1. Ramesh C 1, Vijay C R1, Gopalakrishnappa B R1, Appaji L2, Venkatesh K 1 Vijayakumar M3 "A Descriptive study of Childhood malignancies: A Ten year Study (1999-2008) in Regional Cancer centre", Asian Journal of Pharmaceutical Technology & Innovation, 2014
2. Gopalakrishnappa B R\*1, Vijay C R1, Ramesh C1, Bapsy P P2, Uday kumar M3, Vijayakumar M4 "A Case-Control Study of Stomach Cancer In Bangalore, India", Asian Journal of Pharmaceutical Technology & Innovation 5:1-8, 2014
3. Praveen S Rathod, P.N. Shakuntala, V. R Pallavi, Rajashekar Kundrangi, B. Shankaranand, C. R Vijay, K. Umadevi, Uttam D. Bafna. "The Risk and Pattern of Pelvic and para Aortic Lymph nodal Metastasis in Patient with Intermediate and High Risk Endometrial Cancer": Indian journal of Surgical Oncology, 2014;5:109-114

**Lancet Publication****CANCER REGISTRIES FROM INDIA PARTICIPATED IN A GLOBAL STUDY ON SURVEILLANCE OF CANCER SURVIVAL**

Allemani C, Weir HK, Carreira H,.....Coleman P, CWG\*. Global surveillance of cancer survival 1995-2009: analysis of individual data for 25 676 887 patients from 279 population-based registries in 67 countries (CONCORD-2). The Lancet published online on 26th November, 2014.

\* CONCORD working group members from India are R Swaminathan (Chennai Cancer Registry); AC Katak, M Krishnatreya (Guwahati Cancer Registry); PA Jayalekshmi, P Sebastian (Karunagappally Cancer Registry); SD Sapkota, Y Verma (Population Based Cancer Registry, Sikkim); A Nandakumar¥ (National Centre for Disease Informatics and Research; National Cancer Registry Programme)

¥ CONCORD Steering Committee



The cover features a large, light beige circle on a solid orange background. The text "CANCER REGISTRY REPORT" is centered horizontally and partially overlaid by the circle.

# **CANCER REGISTRY REPORT**

**PBCR, Agartala, Tripura**

Agartala the capital city of Tripura, a north east state, is growing fast financially in comparison to whole state. Economic progress compels the city dwellers' to change their food habit and life style. All these accentuated in increased percentage of non-communicable diseases in the state.

According to census 2011 population of Tripura is 3673917. Out of this, total urban and rural populations are 961453 & 2712464 respectively. These populations are distributed in 8 districts and their respective 23 sub-divisions in the table below.

Total area of the State is 10,483.46 sq.km. The smallest district, Unakoti contains 591.93 sqkm areas and largest district Dhalai contains 2,400 sq.km areas. Mostly populated district is West Tripura district having population of 9,11,837 and the least populated district is Unakoti district having 2,76,241 population. 31.05% of population of the state are being tribal and they are distributed in Dhalai district 54.03%, Khowai district 41.7%, Gomati district 41.07%, North Tripura District 39.79%, South Tripura district 33.66%, Sipahijala 25.03%, Unakoti 20.45%, West Tripura 19.92%.

Population Based Cancer Registry registered 1976 new cancer cases (including updated) in the year

2010 and 1937 new cancer cases in the year 2011. These newly registered cases are distributed in the table.

From the table it is evident that crude incidence rate of cancer in the year 2010 and 2011 are 54 and 53 respectively whereas average crude incidence rate of cancer in Sadar Sub-Division comes 102. Similarly, incidence rate of Bishalgarh Sub-Division, Santirbazar Sub-Division and Udaipur Sub-Division are 66, 58 & 57 respectively. The low incidence rates of cancer are found in Longtharai Valley (14), Karbook (16), Gandacherra (16), Jampuijala (22), Kanchanpur (23), Teliamura (33) and Kailasahar (35) Sub-Divisions. So high cancer incidence is noticed in urban areas especially at the state capital and low incidence is seen in distant rural areas where tribal population is majority. As per available data 299 (15.4%) and 274 (14.1%) cancer cases are recorded in the year 2010 and 2011 respectively among the tribal population though they constitute 31% of the total population.

Precisely 142 (7.4%) and 96 (5%) cancer cases are registered in the year 2010 and 2011 respectively in the Muslim community of Tripura which is at per with their 8% ratio of total population.

**Table**

Name of the Districts with population	No. of registered cancer cases in the year 2010	No. of registered cancer cases in the year 2011	Average crude incidence rate of 2010 & 2011	Name of the Sub-Divisions with population	No. of registered cancer cases in the year 2010	No. of registered cancer cases in the year 2011	Average crude incidence rate of 2010 & 2011
West Tripura (911837)	685	748	79	Sadar (489038)	489	534	102
				Jirania (203962)	93	105	49
				Mohanpur (208837)	103	109	51
Sipahijala (489978)	296	223	53	Bishalgarh (175496)	142	90	66
				Jampuijala (69378)	15	16	22
				Sonamura (245104)	139	117	52
Khowai (346845)	144	146	42	Khowai (168457)	79	93	51
				Tellamura (178388)	65	53	33
				Kamalpur (133972)	72	36	40
Dhalai (392207)	123	97	28	Longtharai Valley (125082)	19	16	14
				Ambassa (57316)	24	29	46
				Gandacherra (75837)	8	16	16
Unakoti (276241)	103	113	39	Kumarghat (101697)	43	51	46
				Kailasahar (174544)	60	62	35
				Dhamanagar (238092)	137	102	50
North Tripura (513501)	190	164	34	Kanchanpur (100815)	26	21	23
				Palisagar (74594)	27	41	46
				Udaipur (269931)	153	157	57
Gomati (433217)	205	217	49	Amarpur (102175)	50	43	46
				Karbook (61111)	2	17	16
				Santirbazar (129956)	79	71	58
South Tripura (410081)	230	229	56	Belonia (160283)	106	113	68
				Sabroom (119852)	45	45	38
					<b>1976 (CR-54)</b>	<b>1937 (CR-53)</b>	<b>53</b>

**Breast Cancer Facts and Figures from Tripura Cancer Registry. Detailed tabulation on distribution of Breast Cancer in Tribes, District wise and Age group wise (2010-11).**

**Figure1.**

Particulars	2010	Sch. Tribe	2011	Sch. Tribe
Newly cases registered in PBCR	1936	299 (15.4)	1938	274 (14.1)
Breast Cancer Cases Identified	113	22 (16.2)	104	13 (12.5)

**Figure2.**

Districts	Population	% of Population	No. of Registered cancer cases in the year 2010	No. of Breast cancer cases registered in the Year 2010	No. of Registered cancer cases in the year 2011	No. of Breast cancer cases registered in the Year 2011
West	911836	25	685	44	748	51
Khowai	346846	9	144	8	146	6
Sipahijala	489979	13	296	16	223	9
Dhalai	392207	11	123	5	97	5
Uankoti	276241	8	103	6	113	6
North	413501	11	190	8	164	7
Gomati	433217	12	205	7	217	11
South	410091	11	230	19	229	9
<b>Total</b>	<b>3673917</b>	<b>100</b>	<b>1976</b>	<b>113</b>	<b>1937</b>	<b>104</b>

**Figure 3.**

Age Group --->	0-14		15-34		35-59		60 and above	
Year	2010 : 2011		2010 : 2011		2010 : 2011		2010 : 2011	
District								
West	0	0	5	5	33	33	6	12
Khowai	0	0	0	1	7	6	1	0
Sipahijala	0	0	1	1	14	6	1	2
Dhalai	0	0	0	0	5	5	0	0
Uankoti	0	0	0	1	6	4	0	1
North	0	0	0	0	6	5	2	2
Gomati	0	0	1	0	5	10	1	1
South	0	0	2	2	14	6	3	1
<b>Total</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>10</b>	<b>90</b>	<b>75</b>	<b>14</b>	<b>19</b>

**Figure 4.**

District	2010		2011	
	Tribal	Non-tribal	Tribal	Non-tribal
West	6	38	5	46
Khowai	7	1	3	3
Sipahijala	2	14	1	8
Dhalai	2	3	1	4
Uankoti	0	6	1	5
North	1	7	0	7
Gomati	1	6	0	11
South	3	16	2	7
<b>Total</b>	<b>22</b>	<b>91</b>	<b>13</b>	<b>91</b>



Figure 5.

Sl. No.	Nature of Treatment	Number of patients treated in the year	
		2010	2011
1	Chemotherapy	21	20
2	Radiotherapy	5	2
3	Surgery	8	5
4	Surgery + Chemotherapy	13	17
5	Chemotherapy + Radiotherapy	22	15
6	Surgery + Radiotherapy	0	1
7	Surgery + Chemotherapy + Radiotherapy	7	6
8	Palliative Care only	9	7
9	Unknown	28	31
<b>Total</b>		<b>113</b>	<b>104</b>

It is reported that good numbers of cancer patients of Tripura especially from North of Tripura are treated in Cachar Cancer Centre, Meherpur, Silchar and Makunda Christian Hospital, Karimganj, Assam for near distance and these cases are not reported in PBCR, Tripura for registration. At times these cases remains as missing cases.

Dr. Gautam Majumbar, Principal Investigator and Dr. Santi Ranjan Pal, Research Scientist (Medical) of PBCR, Tripura visited both centres on 27.03.2014 for evaluating and to create an active process to get the details of each case history of cancer patients of Tripura.

Mr. Priyatosh Dhar, Statisticaian, PBCR, Tripura participated in the IARC workshop on Cancer survival methods for cancer registries at Chennai organized by cancer Institute (WIA) Adyar, Chennai during 4th to 6th March, 2014.

Principal Investigator, Medical Officers, Research Scientist (Medical), Social Investigators and other staffs of PBCR, Tripura actively participated in a seminar on awareness programme for prevention of cancer on 'World No Tobacco Day' organized by West District Tobacco Control Cell on 30.05.2014 held at Circuit House, Agartala.

## PBCR, Ahmedabad

### Name of the registry

1. Rural Cancer Registry Ahmedabad District (NCRP ICMR)
2. Population Based Cancer Registry Ahmedabad Urban Agglomeration Area (NCRP ICMR)
3. Hospital based Cancer Registry and Patterns of Care and Survival Studies

### A. Conference/Meeting/Seminar/ Workshop attended

Name & Designation	Date	Even
Mr. Himanshu Patel Statistical Assistant	17th to 21st June, 2013	IARC Summer School in Cancer Epidemiology at Lyon, France.
Dr. Parimal Jivarajani Associate Professor	28th to 29th Nov'2013	XXIX- Annual Reveiw Meetings (NCRP) at Patiala, Punjab
Mr. Himanshu Patel Statistical Assistant	28th to 29th Nov'2013	XXIX- Annual Reveiw Meetings (NCRP) at Patiala, Punjab
Dr. Parimal Jivarajani Associate Professor	4th to 6th March'14	Cancer Survival Analysis at Cancer Institute, Chennai

### B. Cancer Registry Report

1. Population based cancer registry Ahmedabad urban agglomeration area for the year- 2010
2. Rural cancer registry Ahmedabad District for the year- 2010
3. Population based cancer registry Ahmedabad urban agglomeration area for the year- 2011
4. Rural cancer registry Ahmedabad District for the year- 2011

**PBCR, Thiruvananthapuram, Kerala****A. Events organized / conducted by the registry**

1. Five Doctors Training Programme on Campaign Against Cancer in Kerala, Breast, Cervix uteri, Oral cavity Cancer (BCO) Screening Programme in Rural Kerala at Regional Cancer Centre, Thiruvananthapuram, 22<sup>nd</sup> January 22<sup>nd</sup> March 2014.
2. Five Nurses Training Programme on Campaign Against Cancer in Kerala, Breast, Cervix uteri, Oral cavity Cancer (BCO) Screening Programme in Rural Kerala at Regional Cancer Centre, Thiruvananthapuram, 27<sup>th</sup> January 29<sup>th</sup> March 2014.
3. Workshop on Research Methodology and Knowledge Enhancement in Scientific Writing at Regional Cancer Centre, Thiruvananthapuram, 28-29 April 2014.
4. One week training on Cancer Registration and Epidemiology given to a Student, Annamalai University, at Division of Epidemiology & Biostatistics, Regional Cancer Centre, 16-23 September 2013.

**B. Invited Lectures****Dr.Aleyamma Mathew**

1. Workshop on Analytical methods in Cancer Research at Demography Department, University of Kerala, 17<sup>th</sup> January 2014.
2. Campaign Against Cancer in Kerala: Breast, Cervix Uteri and Oral Cavity Cancer Screening Programme in Rural Kerala at DMO-Conference in Thiruvananthapuram, Organized by Directorate of Health Services, 30<sup>th</sup> January 2014.
3. ICSSR sponsored Research Methodology workshop entitled 'A Short Course on Quantitative Data Analysis' on Parametric and Non-parametric Tests at Demography Department, University of Kerala, 22<sup>nd</sup> February 2014.
4. Workshop on State-level Workshop on Non-communicable Diseases on Burden of Cancer and the need for Cancer Screening at Directorate of Health Services, 1<sup>st</sup> March 2014.
5. Pre-Conference Workshop on statistics for Twenty-first century-2014 on Survival analysis in Cancer Research at University of Kerala, Kariavattom, 17<sup>th</sup> March, 2014.

6. National Conference on statistics for Twenty-first century-2014 on Cancer Statistics & Survival in Kerala at University of Kerala, Kariavattom, 21<sup>st</sup> March, 2014.
7. Global Trends in Breast cancer incidence and mortality.CNE on Breast Cancer, Organized by Nursing Division, Regional Cancer Centre, Thiruvananthapuram, 12 April 2014.
8. Workshop on Research Methodology & Knowledge Enhancement in Scientific Writing, Organized by the Division of Epidemiology & Bio-statistics, 28-29 April, 2014.
9. Development of a disease registry with emphasis on Interstitial Lung Disease Registry, Workshop on Research Agenda Setting and Activities on Chronic Respiratory Diseases, 1<sup>st</sup> June 2014, Organized by Health Action by People, Thiruvananthapuram.

**Dr.Preethi Sara George**

1. Data Processing and Analysis, Workshop on Research Methodology and Knowledge Enhancement in Scientific Writing at Regional Cancer Centre, Thiruvananthapuram, 28-29 April 2014.

**C. Honors received by staff**

1. **Dr. Preethi Sara George** Recognized as research guide in Biostatistics under Mahatma Gandhi University, Kottayam, Kerala.

**D. Training received by the staff**

1. **Prasanth Kumar R.K.**, participated in IARC Workshop on Cancer Survival Methods for Cancer Registries at Cancer Institute (WIA), Chennai, 4-6 March 2014.
- 2) All Staffs of the Thiruvananthapuram cancer registry attended Workshop on Research Methodology and Knowledge Enhancement in Scientific Writing at Regional Cancer Centre, Thiruvananthapuram, 28-29 April 2014.

**E. Ongoing Doctoral Programmes**

**Research Guide Dr. Aleyamma Mathew of the following students, University and their Topic.**

1. Grata Ildaphonse, Associate Professor in Statistics, FMN College, Kollam (Part-time), University of Kerala, Risk estimates of bladder cancer:multiple logistic regression model.

2. Manju L, Assistant Professor in Statistics, Gokulam Medical College, Thiruvananthapuram (Part-time), University of Kerala, Risk factors of kidney cancer: a matched case-control study.
3. Sona P S, Assistant Professor, College of Nursing, Thiruvananthapuram (Part-time), University of Kerala, Performance status and quality of life of ovarian cancer patients.
4. Subha R Nair, Lecturer in Statistics, NSS College, Karaman (Part-time), University of Kerala, Risk prediction models for the development of breast cancer.
5. Dr. Jayakrishnan, Assistant Professor in Community Oncology, RCC (Part-time), University of Tampere, Evaluating the effectiveness of community based tobacco cessation strategies In Thiruvananthapuram district.
6. Mr. Melbin John, University of Tampere, Burden and projection of Cancer in India.
7. Mrs. Devi Vijaya A, Mahatma Gandhi University, Statistical prediction of breast cancer patient survival using artificial neural network models-undergoing course work.
8. Dr. Kalavathy MC (Part-time), Mahatma Gandhi University, Evaluation of Papsmear screening and HPV pattern among women with ASCUS (Atypical Squamous Cells of Undetermined Significance) in Trivandrum, South Kerala.

### PBCR & HBCR, Delhi

1. Attended the XXVIII Annual Review Meeting and Pre ARM workshop of National Cancer Registry Programme, ICMR, held at Regional Cancer Institute, Thiruvananthapuram, Kerala during 4-7 December 2012 and presented the progress report of the Delhi Population Based Cancer Registry.
2. Organized a Workshop on Cancer Registration System in AIIMS, New Delhi on 12th January 2013 in collaboration with NCRP, NCDIR, ICMR, Bangalore
3. Attended the Workshop on "Development of an Atlas of Cancer In Punjab State" held at National Centre for Disease Informatics and Research, Bangalore from 18-19 March 2013 and given a talk on "Working of Delhi Population Based Cancer Registry".
4. The research paper entitled "Descriptive Epidemiology of Primary Brain and CNS tumors in Delhi, 2003-07" published in Asian Pacific Journal of Cancer Prevention, Vol.13 : 707-710, 2012 has been chosen as landmark paper for poster display and has been presented at 1st Indian Cancer Congress held at New Delhi during 20-23 November 2013.
5. Attended the XXIX Annual Review Meeting of National Cancer Registry Programme, Indian Council of Medical Research held at Department of Pathology, Govt. Medical College, Patiala during 26-29 November 2013 and presented the progress report of the Delhi Population Based Cancer Registry.
6. Attended a "Workshop on Cancer Survival Methods for Cancer Registries" jointly organized by IARC, Lyon, France and Cancer Institute (WIA), Chennai during 4-6 March 2014 at Chennai

## Mumbai, Pune, Aurangabad and Nagpur Cancer Registry

### MUMBAI CANCER REGISTRY

Principal Investigator: Dr.Vinay Deshmane  
Co-Principal Investigator: Mrs.Shravani Koyande

Mumbai cancer registry is the second oldest population based cancer registry in Asia and the first in India. It was established in 1963 and started actually working from 1964 onwards. This year registry is completed successful 50 years contributions to cancer control program of India. Indian Cancer Society has four Population Based Cancer Registries in Maharashtra i.e. Mumbai, Pune, Nagpur, Aurangabad.

Dr. Vinay Deshmane has taken charge of Principal Investigator of Cancer Registry Division of Indian Cancer Society.

#### DATA COLLECTION:

Mumbai registry is following active method of data collection of incidence. More than 100 source from private and government sectors have been visited by the staff members. Tata Memorial Hospital is the main source of registration for Mumbai Cancer Registry. From Tata Hospital, registry is getting information on cancer patients registered at Tata Memorial Hospital as a soft copy as well personal visit are made for the completeness of the database.

For mortality data collection, staff members personally visit to the Vital Statistics Department of the Municipal Corporation of Mumbai.

At present Mumbai Registry is doing data collection of the year 2013 and 2014 and data entry for the year 2012 is going on.

#### FOREIGN VISITORS:

1. Dr.Vgyon Tshomo and Dr.Tashi Vendup from Bhutan has visited to Mumbai Registry to overviews the work process of Cancer Registry.

2. Dr.Les Morry from America has visited to Mumbai Cancer Registry to understand the registry activities and research work.

### PUNE CANCER REGISTRY:

Pune cancer registry is established in year 1972 in collaboration with B.J.Medical Hospital. At present Dr.Adhav is the Honorable Secretary of the registry and in the year 2013 Dr.Kalpna Kulkarni has taken charge as a Honorable Joint Secretary.

At present for the year 2012 data entry is in process and data collection work of 2013 is going on.

### AURANGABAD CANCER REGISTRY:

Aurangabad Cancer Registry was established in the year 1978 with the support of Government Medical College of Aurangabad. At present Dr.Shewalkar is the Honorable Secretary of Aurangabad Cancer Registry.

At present for the year 2013 data entry is under process and data collection work of 2014 is going on.

### NAGPUR CANCER REGISTRY:

Nagpur Cancer Registry is established in the year 1980 with the support of Government Medical College & Hospital. At present Dr.Kamble is working as a Honorable Secretary of Nagpur Cancer Registry.

At present for the year 2012 data entry is going on and data collection of 2013 is going on.



## PBCR, Cachar

### Dr. Sekhar Chakravarty

Principal Investigator & Vice Principal  
Silchar Medical College, Silchar

The Population Based Cancer Registry (PBCR) Cachar District is one of the six cancer registries of North East India functioning since March 2007 under National Cancer Registry Programme of Indian Council of Medical Research. The registry is located in the Department of Pathology, Silchar Medical College, Silchar, Assam.

### Registry Area and Demographic Profile:

The district of Cachar is situated in the southern most part of Assam. It is surrounded by the neighboring states of Manipur, and Mizoram on its two sides. It has an area of 3786 sq. km and a population of 14,42,141 (2001 census). The male and female population is 7,41,580 and 7,00,561 respectively. The population density is 321 per sq. km and the rural population comprises the most (89%). There are two subdivisions namely Silchar sadar and Lakhimpur, two towns Silchar and Lakhimpur and 895 villages. Silchar town is the headquarter of Cachar district. The overall literacy rate is 68.42%.

### Functioning of the Registry:

#### a) Collection of Incidence Data -

Registration of cases is done by attending different well defined sources through direct interview of the patients or his/her attendant/relative and from available records.

**Some of the photographs of these sources registration along with the cooperating staff are as follows:**



The incidence data are also collected from the Awareness/Health Check-up Camps jointly organized by PBCR Cachar District with other organizations at various remote areas of Cachar district. Likewise, an Awareness cum Health Check-up camp was organized jointly by PBCR Cachar District and UdhARBond Cheritable Heart Care Clinic of UdhARBond on 25th May, 2014.

**Some photographs of that above mentioned camp organized at UdhARBond of Cachar district is given below:**



#### b) Collection of Mortality Data-

Mortality data are collected from mortality register of Silchar Medical College, Silchar and other hospitals, Silchar Municipality Board and office of the District Registrar, Birth & Death, Cachar, Silchar. The data collected in core proforma is submitted to the Co-ordinating Centre online.

There are some problems faced by the registry staff while collecting the mortality data from the records available in the Office of the District Registrar, Birth & Death, Cachar, Silchar. The data available in the records are not adequate i.e., in some cases names of deceased are missing, in some cases addresses of deceased are not mentioned and in some cases age, cause of death are missing. In case of cancer death, site of cancer is not being mentioned at the time delivery of death report. Based on these issues, we have conducted a meeting with the Joint Director of Health Services, Cachar District along with the concerned staff of the entire PHCs of Cachar district with the aim of getting more meaningful data from them.

The photographs of that meeting is given below:



Mortality data are also collected by making calls on the telephone/mobile number which is being recorded in the core-proforma while registering the incidence data through direct interview from the patient/attendant/relative or from records.

### Registry Staff:

The registry comprises of the following staffs at present:

- |                             |   |
|-----------------------------|---|
| 1. Medical Research Officer | - Dr. R. P. Banik,<br>MBBS, DLO   |
| 2. Programmer               | - Mr. Samit Paul,<br>M. Sc.<br>(Computer Science)   |
| 3. Statistician             | - Mrs. Madhuchhanda<br>Goswami,<br>M. Sc. (Statistics)  |
| 4. Social Investigators     | - Mr. Biswajyoti<br>Choudhury, MSW<br>Ms. Srabani Mitra,<br>MSW<br>Ms. Rini<br>Bhattacharjya, MSW |
| 5. Data Entry Operator      | - Mr. Bidhan Kr. Sarkar,<br>B. Sc. (IT)   |

### PBCR STNM Hospital, Gangtok, Sikkim

1. Dr. Anubhav Verma and Mr. B.N Bhattarai participated in the IARC workshop on cancer survival analysis for cancer registries at Chennai during March 4<sup>th</sup> 6<sup>th</sup> 2014.
2. The Social Investigators visited all the District Hospitals and PHCs, urban and rural areas to follow up the cancer cases and get all cause mortality details of 2013.
3. Entries of 2013 core proforma is complete. Final check has to be done. Entries of all cause mortality of 2013 is also completed.
4. With the help of NCRP Bangalore we are on the verge to publish ten years report of Sikkim PBCR from 2003-2012. Hopefully it will be finalised before the Annual Review Meeting.
5. A paper entitled "Ethnicity as a risk in the first ten years population study in Sikkim A north eastern state of India" has been accepted for presentation at world cancer congress at Melbourne, Australia from 3-6 December 2014.

**PBCR, Meghalaya**

Meghalaya Population Based Cancer Registry has been functioning under the National Cancer Registry Programme (NCRP), Indian Council of Medical Research (ICMR) since the year 2009 covering the four districts of Meghalaya i.e. East Khasi Hills District, West Khasi Hills District, Jaintia Hills District and Ri-Bhoi District with an estimated population of 18.6 Lakhs. The Registry was initially started as Cancer Atlas at Civil Hospital Shillong from 2005 along with two other Cancer Atlas Programmes in the state i.e. Cancer Atlas Nazareth Hospital and Cancer Atlas NEIGRIHMS, Shillong.

Although the centre of the registry is at civil hospital Shillong, but the office and the working of the registry is based at Pasteur Institute under the Directorate of Health Services (Research), Shillong.

Since Data quality and completeness is a prime requisite for good cancer registration, necessary steps are ensured to the best possible extent by the Registry. Incidence as well as mortality cancer data is collected routinely from various hospitals, pathological labs as well as practitioners of alternate medicine. With the coming years data quality has improved drastically due to the proactive participation of medical personnel serving in Government and private medical institutions.

Data abstraction of Incidence and Mortality is routinely performed by the Social Investigators after collecting data from various sources either through direct contact with patients or from Medical records section. The details are then entered accordingly into a Core-Proforma in a format provided by the NCRP Bangalore where Codings are followed according to the International Classification of Diseases for Oncology (ICD-O) along with the International Statistical Classifications of Neoplasms

(ICD-10) published by the WHO.

The data is then entered into the database are subjected to a series of quality checks with the tools provided in the PBCRDM 2.0 software. Necessary updations were made after a subsequent follow-up through case sheets, telephonic conversations with the patients (or relatives) and home visits. Also with the access to the electoral roll from the Meghalaya state Portal the registry staffs were able to verify and attain more information about the identifying and demographic details of the patients.



Patients at Civil Hospital Shillong

After running these checks and proper follow-up, the data are then exported in Comma Separated Value (CSV) format to the coordinating unit in Bangalore for finalization. Necessary corrections are also done as instructed by the coordinating unit.

**Recent Activities:**

Include interaction with medical officers serving in rural as well as urban areas in the four districts at their monthly doctor's meeting at the Office of the District Medical Health Officer (DMHO) in their respective headquarters. Through these interactions many important points like awareness programmes about the increasing number of cancer cases and the importance of cancer mortality data for survival studies is being addressed. The Registry is planning to conduct more meetings/workshops in the near future. The Registry is making an effort to visit all the treatment and diagnostic institutions in and outside the state for cases which falls under the Registry area. With this effort the Registry was able to convince and thereby able to collect data from a few new sources.

The registry was able to organize a one day workshop for the staff in contact with the medical records from various institutions within the registry area on the 4th march 2013.



The registry has also plan to organize a seminar for the specialist of different specialties of all reporting Institutions in the near future. Also with the creations of four new districts within the state recently, the registry is planning to visit their district head -quarters so as to involve and seek participation of health facilities /departments in that region. With the alarming increase of cancer cases in the state and as suggested by the NCRP Bangalore, the Registry has given a written suggestion to the Government of Meghalaya to make cancer as a notifiable disease in the state.



Meetings with Medical Officers, DMHO Nongpoh

Since the inception of the Population Based Cancer Registry in the state the registry was able to

register a total of 5562 (M: 3478, F: 2084) numbers of invasive cancer cases.

The registry is registering more incidence and mortality data than in the previous years, and also started to collect all cause mortality data. We expect we shall be performing better in the future with more data and more information on the status of cancer in the state. Hope that the Population Based Cancer Registry in the state will attain the main objective of the Programme, along with the coordination of the National Cancer Registry Programme (ICMR), Bangalore.



Meetings with Medical Officers, DMHO Jowai

### PBCR, Nagaland

PBCR, Nagaland organized a one day Workshop & Awareness Programme on "Awareness & Prevention of Pre Cancer-Cervix organized under the aegis of the Department of Health & Family Welfare, Nagaland was held on the 9th of October, 2013 at Naga Hospital Authority, Kohima.

During the Workshop, the Principal Investigator gave a power point on the "Cancer Scenario of Nagaland" and Dr. Atoshe gave a talk on "Awareness & Prevention of Cervical Cancer".

A host of dignitaries/ officials from different state government departments, Additional Secretary, Economics & Statistics, Private Hospitals & Nursing Homes, Media etc. attended the programme with Smti. Banuo Z Jamir, IAS, Chief Secretary, Government of Nagaland as the Chief Guest where making Cancer a notifiable disease was one of the main agenda and has been put up for approval from the government and also

decided to organize workshops and create cancer awareness among the womenfolk, Self Help Groups (SHG's), NGO's etc.





## PBCR, Bhopal

Established in the year 1985 Population Based Cancer Registry Bhopal is under the network of National Cancer Registry Programme. The registry is placed in the Department of Pathology, Gandhi Medical College. The collection and compilation of data began from 1st January 1986.

In the last two and half decades of its functioning the registry has observed a very high incidence of tobacco related cancers among males which accounts to more than 50% of all cancers. Cancer of the lung, tongue, mouth, hypopharynx, oesophagus and prostate are the leading sites with incidence of tongue cancer being highest in the world.

Among females cancer of breast, genital system and oesophagus are the leading sites of cancer. These malignancies account for more than 55% of the total female cancer burden.

Mouth Cancer among males and Breast cancer among females have shown a rising trend where as cancer of the cervix has recorded a decreasing trend.

A Hospital Based Cancer Registry has also been established at Gandhi Medical College Bhopal. The registry started working from 1st of January 2011.

## Team at Task:

Dr. Reeni Malik	Principal Investigator
Mr. Atul Shrivastava	Research Officer & Co- principal Investigator
Dr. Sunil Surange	Research Officer
Mrs. Alka Goley	Social Investigator
Mrs. Sushma Shrivastava	Social Investigator
Mrs. Shubhra Trivedi	Social Investigator
Mrs Ragini Nair	Typist

## Events of the Registry:

Workshop on Cancer Registration held on 24th March 2014 Attended by staff handling the medical records at sources of registration.

Meeting of staff of sources of registration held on 15th September 2014 - Attended by senior treating doctors and administrative faculties of sources of registration.

Meetings / Conferences / workshops attended		
Name of the meeting/ workshop Conference, place, month/Year	Name of person and nature of participation	Title/Topic of presented
36 <sup>th</sup> Annual Meeting of IACR held at Ottawa Canada from 26 <sup>th</sup> - 28 <sup>th</sup> June - 2014	Atul Shrivastava Oral presentation	"Rising Burden of Tobacco Related Cancers" : A Cause of Concern for the City of Bhopal in India.
36 <sup>th</sup> Annual Meeting of IACR held at Ottawa Canada from 26 <sup>th</sup> - 28 <sup>th</sup> June - 2014	Sushma Shrivastava Oral Presentation	Automated Data Capturing for Early Finalization of Data "An Experience of Cancer Registry Bhopal India"
36 <sup>th</sup> Annual Meeting of IACR held at Ottawa Canada from 26 <sup>th</sup> - 28 <sup>th</sup> June - 2014	Atul Shrivastava Poster Presentation	Matching of Computerized Data Set : A key to Completeness of Registry Data
Workshop organized by Cancer Institute, Chennai and IARC France held at Chennai from 4 <sup>th</sup> to 6 <sup>th</sup> March 2014.	Delegate	Cancer Survival Methods for Cancer Registries
All India Workshops for Medical Persons on ICD-10 at Bhopal, organized by CBHI December 2013, February & April 2014	Atul Shrivastava As faculty	1. Overview on ICD-10 2. Basic Guide Lines 3. Coding of neoplasm
Review Meeting on ICD-10 at Bangalore, organized by Regional Office for Health & Family Welfare, Government of India, held on 10th & 11th February, 2014	Atul Shrivastava Advisor to - WHO Collaborating Centre on (ICD-10 & ICF) in India & Ministry of Health & Family Welfare Government of India	Family of International Classification of Diseases; Planning for implementation in India.
All India workshops for Medical Record Officers on Health Statistics, at Bhopal organized by CBHI, June & August 2014	Atul Shrivastava As faculty	Introduction to ICD-10 & its Implementation in Medical Department
Workshop held at Indira Gandhi Medical College Nagpur, organized by CBHI, 9 <sup>th</sup> September 2014	Atul Shrivastava As faculty	Introduction to International Classification of Functioning Disability and Health



Mr. Atul Shrivastava & Mrs Sushma Shrivastava  
36th Annual Meeting of IACR held at Ottawa Canada

## PBCR & HBCR Guwahati

### Participation in various workshops:

1. A workshop on the "Role of cancer registry in cancer control" was organized by cancer registry at Dr.B.Borooah Cancer Institute on 11.11.13. Dr.D Hojai, Director of Health Services (DHS), Government of Assam was the chief guest of the workshop and Dr.S N Chowdhury, Joint Director of Health Services (JDHS) of Kamrup metro was the guest of honor. The workshop was attended by delegates representing different private and govt. hospitals, diagnostic centres, clinics and mortality centers in Kamrup urban district. Dr. A C Katak, Director of Dr. B. Borooah Cancer Institute delivered the welcome address and Dr.J D Sharma , Prof and Head of Dept. of Pathology gave a power point presentation on "Role of cancer registry in cancer control".
2. Cancer mortality workshop was organized by PBCR-Guwahati at Dr.B.Borooah Cancer Institute on 6th January 2012. The workshop was attended by staffs representing 18 Birth and Death registration centers in Kamrup metro. Staffs of PBCR, HBCR, POCSS and medical record department of Dr.B.Borooah Cancer Institute actively participated in the workshop. The welcome address was delivered by Dr.JD Sharma, Prof and Head of Dept of Pathology. Dr.Debanjana Barman, Medical Research Officer gave a power point presentation on Methods of Mortality Data Collection followed by a presentation on Statistical Measures on cancer mortality by Mrs.Gitanjali Devi, statistician. Mrs. Arpita Sharma, Computer Programmer gave a presentation on Effective use of computerized documentation of cancer data.
3. A workshop on incidence of cancer cases in Kamrup Urban district was held at Dr.B.Borooah Cancer Institute on 6th March 2010. The meeting was attended by representatives from various hospitals, laboratories and X ray centers.

### Participation in Annual Review Meeting (ARM) and Pre-ARM workshop:

The 29th Annual Review Meeting (ARM) and Pre-ARM workshop of National Cancer Registry Programme, Indian Council of Medical Research was held at Patiala, from 26th to 29th November, 2013. Dr. Debanjana Barman has presented the progress report of PBCR-Guwahati and took part in various discussions in the meeting. Dr. M. Krishnatreya presented the

progress report of HBCR-Guwahati.

### Organized XXVII ARM of National Cancer Registry Programme:

XXVII ARM of National Cancer Registry Programme Indian Council of Medical Research was organized by NCRP-ICMR's unit at Dr.B.Borooah Cancer Institute at Guwahati from 1st to 4th November 2011.

### Periodic Meetings:

The staff of PBCR Guwahati regularly arranges meetings with the Director and Principal Investigator at periodic intervals and thereby presents the monthly progress report of PBCR activities. The progress report is also presented in the presence of the members of the ethical committee on 6.5.14.

### Advisory Committee Formation:

An advisory committee was constituted by the following members, Principal Secretary Health, Govt of Assam, Vice Chancellor, Srimanta Shankardeva University of Health sciences, DHS, Govt of Assam, DME , , Govt of Assam, DC Kamrup metro , Director of Dr. B. Borooah Cancer Institute and JDHS, Kamrup Urban district. This is in pursuance of active collection of cancer data. Panel of pathologist is formed.

### Administrative order:

An Administrative /Legislative order was issued by Principal Secretary Health, Govt. of Assam, Health & Family Welfare Department dated Dispur on 9th December 2013 to make cancer a notifiable disease in Kamrup Urban District. A diagnosis or suspicion of cancer should be reported to the appropriate authority for early detection and treatment of cancer and research.

### Seminars:

1. A National Seminar on Molecular Pathology of Cancer was organized at Dr. B. Borooah Cancer Institute on 10/01/14. Organizing Chairperson Dr. Jagannath Dev Sharma gave a power point presentation on cancer in North East highlighting the priority areas for cancer control and research. A poster titled " Cancer Pattern & Incidence in Kamrup Urban District( Report from Population Based Cancer Registry-Guwahati )" was presented by Dr.Debanjana Barman, Medical Research Officer and Mrs .Arpita Sharma , Computer Programmer.



2. The 9th Annual Conference of Association of Oncologists of Northeast India 2014 held in Guwahati on 1/3/14 and 2/3/14 where Dr. Jagannath Dev Sharma chaired a scientific session on pediatric cancer. An oral and poster presentation titled "Tobacco Related Cancers in Kamrup Urban District: Pattern & Incidence (Report from Population Based Cancer Registry-Guwahati)" was given by Dr. Debanjana Barman, Medical Research Officer and Mrs. Arpita Sharma, Computer Programmer.
3. Mrs. Arpita Sharma, Computer Programmer, attended workshop on Cancer Survival Methods for Cancer Registries jointly organized by Department of Biostatistics and Cancer Registry, Cancer institute (WIA), Chennai, India and International Agency for Research on Cancer, Lyon, France from 4.3.14 to 6.3.14.
4. Mrs. Arpita Sharma, Computer Programmer gave a power point presentation on Population Based Cancer Survival analysis & Methodology on 2.5.14 at BBCI.
5. A seminar on "Cancer Genomics" organized by Institute Of Advanced Study In Science And Technology on 6th May, 2014 was attended by Dr. Debanjana Barman, Medical Research Officer.

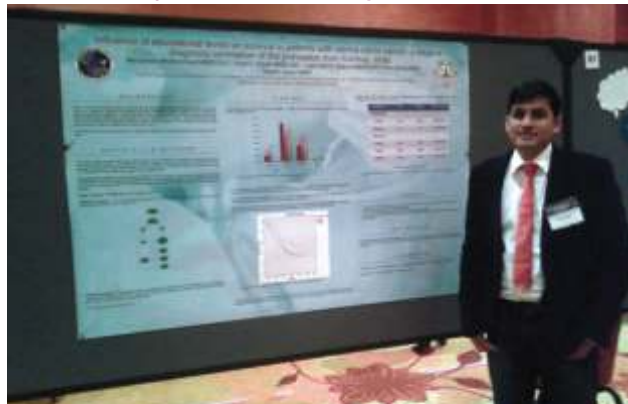
**Dr M Krishnatreya at London School of Hygiene and Tropical Medicine in June 2013**



**Mrs A Sarma at the Cancer Survival Workshop, WIA, Chennai**



**Dr. M Krishnatreya at AACR conference presentation at SA, Texas USA**



**Poster Presentation of PBCR Guwahati at Various Forum**



**Workshop for sources of cancer registration at BBCI on 11.11.2013**



**HBCR & PBCR, Kidwai Memorial Institute of Oncology, Bangalore****Training Programme conducted by the Registry:**

1. One week training programme in Practical aspects of functioning of HBCR for Post Graduate students of Kidwai Memorial Institute of Oncology, Bangalore was conducted during May and June 2014.

**Projects Undertaken/Collaborated involving Registry Staff:**

1. Dr. C. Ramesh Principal Investigator and Mr. Vijay CR, Co Principal Investigator for the project "Barriers Related to Screening, Diagnosis and treatment of Oral Cancers in the Resource Limited Setting" in collaboration with Research Triangle Institute of U.S.A.
2. Dr. C. Ramesh Principal Investigator from KMIO, for the project "Demographic profile of Lung cancer in India" in collaboration with Thoracic Oncology Disease Management Group, Convener, Dr. C.S.Pramesh, Tata memorial Centre, Mumbai.
3. Dr. C. Ramesh Co Principal Investigator for the Research Project "Correlation of Clinical target volume in Head & Neck Cancer to Pathological Tumor margins and nodal disease and analysis of Predictive variables for microscopic disease (Proposal submitted to ICMR and clearance awaited).
4. Dr. C. Ramesh Principal Investigator for the project "Lifelong Vegetarianism and Risk of Colorectal Cancer in India. Case Control Study : Project of Indox Case Control Consortium (Ongoing Project)
5. B.R. GopalaKrishnappa: To identify the risk factors of stomach cancer incidence: Ph.D. work registered under Rajiv Gandhi University of Health Sciences.
6. C.R. Vijay: To identify the risk factors for Oral cancer incidence: Ph.D. work registered under Rajiv Gandhi University of Health Sciences.

**Meeting Attended by Registry Staff:**

The following staff from KMIO attended the 29th ARM of NCRP (ICMR) held at Department of Pathology, Govt Medical College, Patiala, Punjab. From 26-29th November, 2013

1. Dr. C Ramesh, Prof. & HOD
2. Mr.C.R. Vijay, Asst.prof.
3. Mr.B.R. Gopalakrishnappa, Field Supervisor (PBCR)

The following staff from KMIO attended the Patterns of Care and Survival of Breast, Cervix and Head & Neck Cancer held at ICMR complex, Poojanahalli, Bangalore, February, 2014

1. Mr.C.R. Vijay, Asst.prof.
2. Mr.D.J. Jayaram, Field Supervisor (HCR)

**Lecturers delivered:****Dr. C. Ramesh, Prof.& Head,**

1. "ICD -10 Neoplasm" in the Orientation course on Family of International Classification, CBHI, Bangalore, 8th Jan 2014 & 6th August 2014
2. "Application of Statistics in the field of Medicine" on the Silver Jubilee Year at Mount Carmel College, Bangalore, 26th Feb 2014
3. "Statistical Methods in Medical Research" at P.G. Department of Statistics, Bangalore University, Bangalore, 26th March 2014
4. "Epidemiology of Gynaecological Malignancies in India" at Workshop on Gynaec Preventive Oncology at Vydehi Institute of Medical Sciences and Research, Bangalore, 26th June 2014
5. "Statistics as a Profession" in the Seminar on Applications of Statistics, Christ College, Bangalore 4th July 2014
6. "Establishment of Registry Principle & Methods" at the Department of Epidemiology, Centre of Public Health, NIMHANS, Bangalore, 25th July 2014
7. Series of Lectures on "Statistical Issues in Clinical Trials" At Apollo Hospital, Bangalore, August 2014
8. "Epidemiology of Oesophageal Cancer The Indian Scenario" at the surgical Live workshop and CME on Oesophageal cancer, Kidwai Memorial institute of oncology, Bangalore 7th Sept 2014

**Training Received by the Staff of the Registry:**

Mr.C.R.Vijay, Asst.Professor and Mr.B.R.Gopalakrishnappa, field supervisor attended a training programme IARC Workshop on Cancer Survival analysis. Held at Adyar Cancer Institute Chennai. From March 4-6, 2014.

**Registry News:**

1. Mr.R. Lingaraju who worked as Asst.Social Scientist (more than 25 years) since the inception of HBCR at KMIO, attained superannuation February 2014. The department



gratefully acknowledges his contribution to the Registry.

2. Mr. K.V. Krishna Reddy who worked as Junior Biostatistician in the PBCR of KMIO took

voluntary Retirement in May 2014. His contribution to the PBCR is gratefully acknowledged.

### PBCR, Arunachal West

The Population Based Cancer Registry (PBCR) Arunachal West located in the department of Pathology, Arunachal State Hospital, Naharlagun started functioning from 1st January'2011 under the auspices of National Cancer Registry Programme (Indian Council of Medical Research) as a part of network of 25 PBCR network across the country. The main objectives of the cancer registration are:

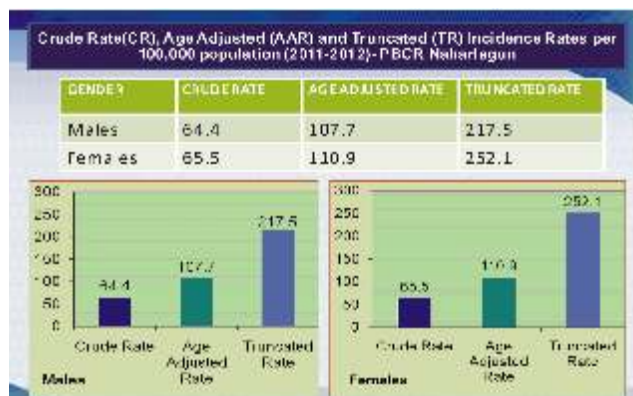
1. To generate reliable data on the magnitude and pattern of cancer.
2. Undertake epidemiological studies based on results of registry data.

We have been collecting data of all cancer cases from the population of western Arunachal and have analysed data for the year 2011 and 2012. The following cancer patterns have emerged from our preliminary study:

#### 1. Cancer incidence and Mortality (2011-2012)

PBCR, Naharlagun (2011-2012)				
Cancer Incidence and Mortality: Number and Relative Proportion (%)				
	Incidence	%	Mortality	%
Males	520	51.2	131	66.5
Females	495	48.8	66	33.5
<b>Total Cases</b>	<b>1015</b>	<b>100.0</b>	<b>197</b>	<b>100.0</b>

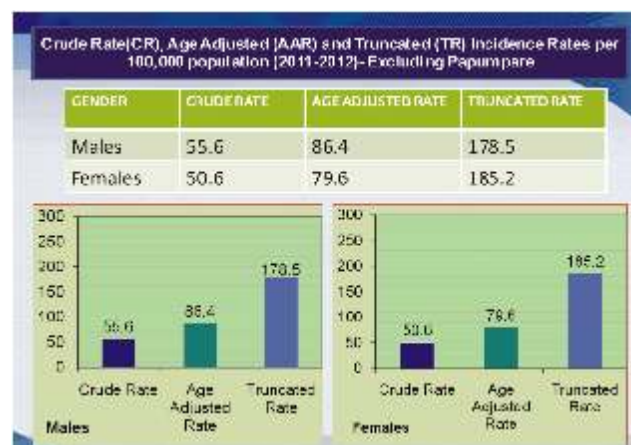
#### 2. Crude Rate, Age Adjusted Rate and Truncated Rate West Arunachal.



#### 3. Crude Rate, Age Adjusted Rate and Truncated Rate Papumpare district.



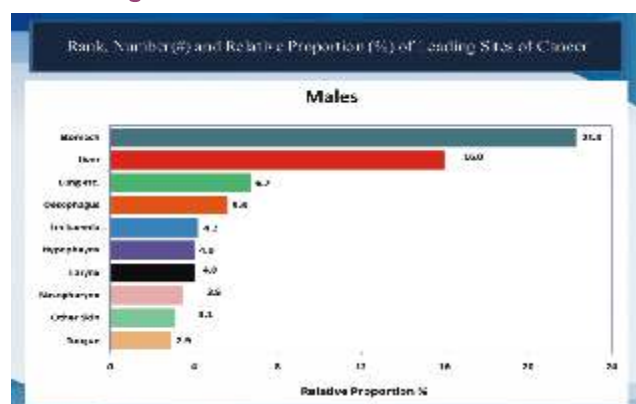
#### 4. Crude Rate, Age Adjusted Rate and Truncated Rate excluding Papumpare district.



#### 5. Table: Representation of Leading sites of Cancer Male

Top Ten Leading Sites of Cancer – Males (2011-2012) Number (N), Relative Proportion (%) and AAR				
Rank	Sites (ICD-10)	#	%	AAR
1	Stomach (C16)	116	22.3	25.4
2	Liver (C22)	83	16.0	18.6
3	Lung etc. (C33-C34)	35	6.7	7.8
4	Esophagus (C15)	29	5.6	6.5
5	Leukaemia Unsp (C95)	22	4.2	3.3
6	Hypopharynx (C12-C13)	21	4.0	4.6
7	Larynx (C12-C13)	21	4.0	4.7
8	Nasopharynx (C11)	18	3.5	3.0
9	Other Skin (C44)	16	3.1	2.7
10	Tongue (C01-C02)	15	2.9	4.0
<b>All Sites</b>		<b>520</b>	<b>100.0</b>	<b>107.7</b>

## 6. Leading sites of Cancer -Male

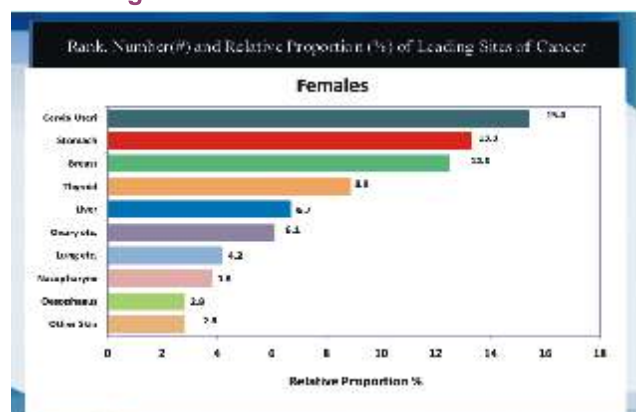


## 7. Table: Representation of Leading sites of Cancer - Female

Top Ten Leading Sites of Cancer – Females (2011-2012)  
Number (#), Relative Proportion (%) and AAR

Rank	Sites (ICD-10)	#	%	AAR
1	Cervix Uteri (C53)	76	15.4	15.1
2	Stomach (C16)	66	13.3	15.7
3	Breast (C50)	62	12.5	13.0
4	Thyroid (C73)	49	9.9	7.3
5	Liver (C22)	33	6.7	8.1
6	Ovary etc. (C56)	30	6.1	5.9
7	Lung etc. (C33-34)	21	4.2	5.9
8	Nasopharynx (C11)	19	3.8	4.4
9	Oesophagus (C15)	16	3.2	4.0
10	Other Skin (C44)	14	2.8	3.4
	<b>All Sites</b>	<b>495</b>	<b>100.0</b>	<b>110.9</b>

## 8. Leading sites of Cancer - Female

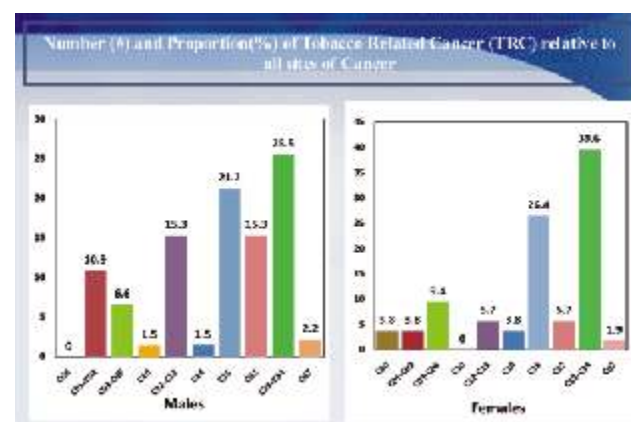


## 9. Table representation of Tobacco Related Cancer relative to all sites of Cancer

Proportion (%) of Specific Tobacco Related Sites relative to all Tobacco Related Cancers (TRCs) (2011-2012)  
Number (#) and Relative Proportion (%)

Sites of Cancer	Males		Females	
	#	%	#	%
Lip (C00)	-	-	2	3.8
Tongue (C01-02)	15	10.8	2	3.8
Mouth (C03-06)	9	6.6	5	9.6
Oropharynx (C10)	2	1.5	-	-
Hypopharynx (C12-13)	21	15.3	3	5.7
Pharynx (C14)	2	1.5	2	3.8
Oesophagus (C15)	29	21.2	14	26.4
Larynx (C32)	21	15.3	3	5.7
Lung (C33-34)	35	25.5	21	39.5
Urinary Tract etc (C67)	1	0.7	1	1.9
<b>Tobacco Related Cancer</b>	<b>137</b>	<b>100.0</b>	<b>53</b>	<b>100.0</b>

## 10. Tobacco Related Cancer relative to all sites of Cancer



## 11. District wise number of cancer cases

District wise number of Cancer Cases – (2011-2012) - Incidence

District	No. of Cases	%
Papum Pare	377	130.4
West Siang	160	86.9
Lower subansiri	117	86.0
Upper subansiri	101	74.3
East Kameng	76	59.4
West Kameng	80	56.3
Kurung Kumey	74	50.3
Tawang	30	36.6
<b>Total</b>	<b>1025</b>	<b>81.6</b>

## DATA QUALITY ISSUES

Some data quality issues have been raised during XXIV Annual Review meeting at Government Medical College, Patiala held on 28th-29th November'2014.

## District wise expected and received cases:

It has been seen that number of cases registered from districts like East Kameng, West Kameng, Kurung Kumey and Tawang are far less than expected cases. We are putting our effort to reach out to all the doctors of these districts as well as diagnostic centres & hospitals in Tezpur and other places.

## Mortality Cases:

We do active follow up of cancer patients through phone calls but due to frequent changes of sim card and network issues it has become a hurdle. Other sources are death records of the hospitals, obituary references and registrar of birth & death. Due to lack of crematoria in the state and cultural variations of disposing dead bodies, we don't get mortality data from this source. However, we are trying to get 2-3 telephone numbers for active follow up and also use community network to get death information.

**Clinical & X-ray based diagnosis:**

We have discussed this issue with all available Radiologists and Clinicians for their cooperation on this regards.

**Unspecified sub-sites/Histology:**

There were considerable cases of unspecified sub-site in relation to tongue, Oesophagus, Stomach and Colon. We have revisited these cases and wherever possible necessary rectifications have been done and all prospective cases are taken care of.

**PBCR, Kollam**

The Population Based Cancer Registry of Kollam District started in 2006 as an expansion of Karunagappally Cancer Registry which initiated in 1990 as part of the Natural Background Radiation Cancer studies funded with the support of Department of Atomic Energy Govt. of India. The registry was extended to the whole Kollam district in order to verify the results as higher cancer incidence reported in the project of cancer Atlas in India. The registry is located in Kollam District 100 KM away from the capital city of Kerala Thiruvananthapuram. There is no dedicated cancer treatment facility in this area. The area constitutes 5 taluks, 3 municipalities and 1 corporation. The registry caters a total population of 26,35,375 living in 2483 Sq.Km.

Cancer Registration in this area is voluntary and the method adopted is active case finding methodology covering more than 200 sources. The registry staff routinely interviewed the patients and collect the primary information needed for the registry from patients wherever possible. Registry data is utilized for implementing cancer control activities and cancer patient support services. The cancer data pertaining to high background radiation of this district highlights the effect of natural radiation and cancer in the sea coast of Kerala.

3368 cases registered during the year 2012. Among them 1694 males and 1674 were females. Age adjusted Incidence rates for males was 111.9 and for females 95.7 for 100,000 population. The leading sites are following.

**Incidence (AAR) Rates of Five Leading Cancers in Kollam 2012**

Males	AAR	Females	AAR
Lung	21.5	Breast	25.6
Mouth	6.5	Thyroid	10.7
Larynx	5.4	Cervix Uteri	6.7
Rectum	5.3	Ovary	5.1
Prostate	5.3	Mouth	3.9
All Cancer	111.9	All Cancer	95.7

Studies are ongoing for population based survival and mortality data analysis. The community programmes such as cancer awareness, cancer

detection among the public and selected group, like the scheduled caste people, coir workers were conducted. This enhanced the co-operation of local administration and public for registry activities.

**Project undertaken/Collaborated by Registry:**

1. Cancer incidence studies in High Background Radiation area Kerala. Supported by Health Research Foundation, Japan, 2009-2015.
2. Socio-demographic and cancer studies in Kollam Corporation and other coastal area 2009-2014. Department of Atomic Energy, Govt of India.
3. Molecular Signature of Thyroid cancers in relation to natural radiation in Karunagappally.
4. Prevention and cancer control projects of Jilla Panchayats, Kollam, 2014.

**Conferences/Workshops/Training Programmes attended.**

Participants	Conference/ Meeting	Date & Venue	Paper Presented / Talk delivered / Participants status.
Dr. P. Jayalekshmi	Working group meeting of Cancer & Radiation studies	02/05/2013 Health Research Foundation, Koyota, Japan	NBRR Studies in Karunagappally, Kerala
Dr. P. Jayalekshmi	Annual Review Meeting of NCRP (ICMR)	28-29 Nov. 2013, Patiala, Punjab	Talk : Quality of data and completeness of coverage of cancer registry data
Mr. Harikrishnan K Mr Jyaprakash V	IARC Workshop on Cancer Survival methods for Cancer Registry	04-06 Mar. 2014, Cancer Institute (WIA), Chennai	Trainees in STATA Software

**Acknowledgements:**

The financial and technical support of NCRP ICMR acknowledged. The Administrators, Directors of all hospitals and Labs contributed by providing data to Social Investigators. The Medical Record staff and Hospital Cancer Registry staff of RCC supported in the registry activities. All the supports acknowledged.



## PBCR &amp; PCA, Patiala

**Promotional Events & Meetings:-**

1. Feb. 12th, 2013 :- Cancer Awareness camp & Lecture by Dr. Manjit Singh Bal, PI PBCR and PCA & he was awarded by NGO Mrs. Nirmal Verma Cancer Cry Care Society (REGD.) Patiala on 12-02-2013.
2. March 18-19th, 2013:- Attended and participated actively in training cum workshop on Development of an Atlas of Cancer in Punjab State at National Centre for Diseases Informatics and Research (NCDIR) Bangalore on 18-19/03/2013. Dr. M.S. Bal(PI), Dr. Bodal(Co-PI) and Dr. Jaspreet (Research Scientist) actively participated in the discussions, whereas, power point presentations were given by Ms. Asha, Ms. Swati and Ms. Amandeep Kaur. Rest of the PBCR & PCA staff, Ms. Parvinder Kaur, Mr. Vicky Harinderpal and Mr. Dalvir Singh also participated.
3. April 15th, 2013:- Meeting with Ms. Vini Mahajan, Principal Secretary, to Govt of Punjab, regarding Punjab Cancer Atlas. Dr. Manjit Singh Bal, Dr. Vijay Kumar Bodal and Mr. Dalvir Singh along with Dr. A. Nanda Kumar, attended the meeting.
4. May 17th, 2013:-Meeting with Ms. Vini Mahajan Principal Secretary, to Govt of Punjab and Dr. Tejbir Singh Director Research & Medical Education Punjab, regarding PBCR, Punjab Cancer Atlas and hosting of Annual Review Meeting (ARM) at GMC Patiala. Dr. Manjit Singh Bal, Dr. Vijay Kumar Bodal, Mr. Dalvir Singh & Ms. Swati Sharma attended the meeting.
5. June 19th, 2013:-Meeting at Chandigarh regarding 29th Annual Review Meeting of National Cancer Registry Program which was organised by Department of Pathology Govt. Medical College, Patiala, by Dr. A. Nanda Kumar, Dr. Manjit Singh Bal, Dr. Vijay Kumar Bodal and Mr. Vicky Harinder Pal attended the meeting.
6. July 15th, 2013:- Visit to Cancer Control Cell, Chandigarh regarding cancer data of Punjab registered under the Scheme Mukh Mantri Punjab Cancer Rahat Kosh Scheme by Dr. M.S. Bal & Mr. Dalvir Singh.
7. July 23rd, 2013:- Visit to Civil Hospital, Municipal Corporation & Civil Surgeon office at Kotkapura regarding cancer data by Dr. Vijay K. Bodal.
8. August 19th, 2013:- Visit to Civil Hospital, Municipal Corporation & Civil Surgeon office at Ferozpur regarding cancer data by Dr. Vijay K. Bodal, Mr. Dalvir Singh & Ms. Amandeep Kaur.
9. Sep. 7th, 2013:-Punjab Health System Corporation Mohali, on 07/09/2013, organized a training about online submission of cancer data at NCRP Web Site; the training to pathologists working in various health centres and civil hospitals of Punjab, provided by Dr. Jaspreet Kaur, Ms. Swati Sharma, Mr. Vicky Harinderpal, Mr. Dalvir Singh.
10. Sep. 22nd, 2013:- Participation in Mega Camp for Cancer Awareness at district Hoshiarpur on 22/09/2013 by Dr. Vijay Kumar Bodal and Dr. Sarabjit Kaur (PG Student Pathology).
11. Sep. 28-29th, 2013:-Participation in Mega Camp for Cancer Patients at Rajindra Hospital Patiala on 28-29/09/2013 by Dr. Manjit Singh Bal, Dr. Vijay Kumar Bodal, Dr. Jaspreet Kaur, Ms. Asha Rani, Ms. Monika, Ms. Parvinder Kaur, Ms. Amandeep Kaur, Ms. Swati Sharma, Mr. Vicky Harinderpal, Mr. Dalvir Singh.
12. October 10-11th, 2013:-Visit to PGI to attend workshop on Cancer Registry organised by PGI & Tata Memorial Cancer institutes by Dr. M.S. Bal, Dr. Vijay Bodal, Mr. Vicky Harinderpal, Ms. Swati Sharma & Ms. Amandeep kaur.
13. November 26-29th, 2013:- PBCR Patiala hosted the XXIX ARM of NCRP at GMC, Patiala. Inaugurated by Dr. VM Katoch Director General ICMR, Secretary Health Research, Ms. Vini Mahajan, Principal Secretary, to Govt of Pb Deptt. of Medical Education & Research, Dr. Talwar, Advisor to Govt. of Punjab, Deptt. of Health & Family Welfare & Medical Education & Research, Dr. AC Katki, Director DR. Borooah Cancer Institute Guwahati, Dr. A. Nandakumar, Officer Incharge National Cancer Registry Program (ICMR) Bangalore, Dr. Alizabeth, Mr. Gangadharan, Dr. Usha Luthra Former Additional Director General of National Cancer Registry Programme(ICMR, India).
14. December 16th, 2013:- Meeting with Ms. Vini Mahajan, Principal Secretary, to Govt of



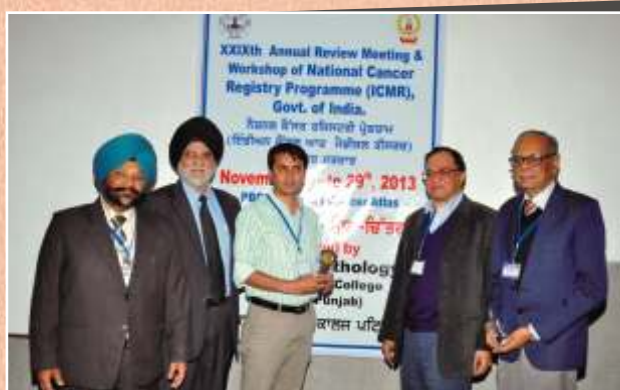
Punjab, regarding cancer cases registered under MMPCRKS. Dr. M.S. Bal(PI), Dr. K.D. Singh (Principal, GMC, Patiala), Dr. Vijay K. Bodal (Co-PI) attended the meeting.

15. January 24th, 2014:- Visit to Civil Hospital, Municipal Corporation & Civil Surgeon office at Mansa regarding cancer data by Dr. M.S. Bal, Dr. Nishit (PG Pathology), Mr. Vicky Harinderpal & Ms. Amandeep Kaur.
16. March 19th, 2014:- Visit to Civil Hospital, Municipal Corporation & Civil Surgeon office at Pathankot regarding cancer data by Dr. Vijay K. Bodal.
17. March 29th, 2014:- Workshop on Cancer Registry Awareness held at Pathankot by PBCR & PCA Patiala. Civil Surgeon of Pathankot, Doctors of IMA Pathankot, Local practitioners, PCMS Doctors, including Surgeons, Gynecologists, Radiologists, Ortho, and Pathologists attended the workshop.
18. October 14-15 2014:- Meeting at National Cancer Registry Programme at Bangalore attended by Dr. Manjit Singh Bal (PI), Dr. Jaspreet Kaur (RS) and Mr. Vicky Harinderpal data entry operator of PBCR, Patiala.

#### Sources of Data of PBCR & PCA Patiala:-

1. Govt. Rajindra Hospital and Govt. Medical College Patiala.
- (Radiotherapy Department, Pathology Department & Others)**
2. Mata Kaushalya Hospital. Patiala
3. Govt. TB and Chest Hospital. Patiala
4. Visit to Private Laboratories in various districts of Punjab.
5. Local Private Hospitals & Clinics.
6. Visit to Civil Surgeon Office in various districts of Punjab.
7. Municipal Corporations in various districts of Punjab.
8. Various Private Hospitals at Mohali (Fortis, Grecian, Behgal, Gian Sagar)
9. PHCs and CHCs under Civil Surgeon in Patiala & other districts.
10. Mukh Mantri Punjab Rahat Kosh Scheme.

#### ARM Patiala 2013





## ARM Patiala 2013





# ARM Patiala 2013





## Regional Workshop of NE Cancer Registries, October/November, 2014, BBCI, Guwahati





**Presentation of Award to Dr A Nandakumar, Mr P Gangadharan & Dr M S Ali  
by Dr B Borooah Cancer Institute (RCC), Guwahati for Lifetime contribution to  
National Cancer Registry Programme during Regional Workshop of  
NE Cancer Registries, October/November, 2014, Guwahati**



**Media coverage of NE Cancer Registries, October/November, 2014 at BCCI, Guwahati**

## The Assam Tribune

Tuesday, October 28, 2014

Guwahati, Tuesday, October 28, 2014

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### City to host Regional Workshop on Cancer Registry

#### STAFF REPORTER

GUWAHATI, Oct 27 - Keeping in mind the stated objectives of the National Cancer Registry Programme of India, a Regional Workshop on Cancer Registry (NCRP) is being organised by the Dr B Borooah Cancer Institute in association with the National Centre for Disease Information and Research, Bangalore, under the Indian Council of Medical Research at the institute auditorium from October 30 to November 1.

The workshop will be attended by delegates from 11 population-based cancer registries, five hospital-based cancer registries and 13 cancer sites projects from all the northeastern

States. Prof Upendra Sharma, Vice-Chancellor of Guwahati University, University of Health Sciences, will inaugurate the workshop, a press release stated.

The workshop will be presided by Dr A Nandakumar, Director-in-charge of the National Centre for Disease Information and Research, Bangalore, and Dr B Borooah, Director of the Institute, Guwahati. The workshop will also have a session on the importance of cancer registration in India. In India, the National Cancer Registry Programme was commenced by the Indian Council of Medical Research with a network of cancer registries across the country in December 1982.

The main objectives of the programme are to identify the strengths and patterns of cancer in the country and to undertake epidemiological studies on cancer. Currently in India, there are 27 population-based cancer registries and seven hospital-based cancer registries. The incidence of cancer in the North East is high, especially in the State of Mizoram.

According to the report published by the National Cancer Registry Programme, the age-adjusted incidence rates (AAR) of cancer in the North East range from 80.4 to 213.4 per one lakh population and 71.9 to 127.6 per one lakh population in males and females respectively. The incidence of cancers of tongue, oral cavity, hypopharynx, and bladder is highest in the country.

Also, the incidence of ovarian cancer is highest in Karang (Mizoram) and the incidence of gall bladder and prostate cancer amongst males of Karang (Mizoram) is highest in India. The incidence of cancer of the tongue, hypopharynx, esophagus in both males and females in different registries of the North East is also amongst the highest in the world.

The leading site cancer incidence of Assam is esophagus, and stomach is the second cancer. In terms of the other sites of the North East, either lung or stomach are the leading sites of cancer and amongst females, lung cancer is the leading site amongst registry area of the North East.

Cancer is a disease caused by high consumption of tobacco, and this may be a hypothetical study on other causes of cancer for which more specific studies are required.

The focus was on the importance of hospital-based cancer registries and on epidemiological studies

## THE TIMES OF INDIA

Friday, October 31, 2014

### Cancer expert advocates linear approach to research

Guwahati Press

Guwahati: Describing the northeast as a hotspot for epidemiological research on cancer studies, A Nandakumar, director of National Centre for Disease Information and Research, Bangalore, said there should be a linear approach towards the study of the contributory causes of cancer other than tobacco.

Nandakumar is in the city for a two-day regional workshop on the National Cancer Registry programme which was inaugurated here on Thursday. He said the northeast has the dubious distinction of having a high prevalence of cancer cases.

"Cancer is being detected and this calls for exploration of techniques. Factors such as lifestyle need to be evaluated. It is



The need for more hospital-based cancer registries and a complete database for research was the main focus in the two-day workshop on cancer and its causes.

linear and clinical research in the region. Regional variation of prevalence of different forms of cancer is an important tool in epidemiology.

"It is seen that there is wide consumption of tobacco items in the region. It is not firmly established that such dietary practices could lead to cancer. We do not have enough evidence and we cannot say they are the contributory causes. It is just a hypothetical approach," said Nandakumar.

"Cancer is being detected and this calls for exploration of techniques. Factors such as lifestyle need to be evaluated. It is

this regard that cancer registries can help in ascertaining data," added Nandakumar.

Mizoram records a very high prevalence rate of stomach cancer in the country. Besides tobacco consumption, there should be a comprehensive study on dietary practices, he said.

There are 11 population-based cancer registries in the northeast and two hospital-based cancer registries.

The need for more hospital-based cancer registries in the northeast and two hospital-based cancer registries.

The need for more hospital-based cancer registries in the northeast and two hospital-based cancer registries.

**সত্যনিষ্ঠ সাংবাদিকতাত উৎসর্গিত**

গুৱাহাটী, যোৰহাট আৰু লক্ষিমপুৰৰ পৰা প্ৰকাশিত

# আমাৰ অসম

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## Assam Tribune

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### Workshop on cancer registry

#### STAFF REPORTER

GUWAHATI, Nov 3 - A Regional Workshop on Cancer Registry of North East was held at the Dr B Borooah Cancer Institute in association with the National Centre for Disease Information and Research, Bangalore, under the Indian Council of Medical Research at the institute auditorium from October 30 to November 1.

The workshop was attended by delegates from 11 Population-based Cancer Registries and 10 Cancer Atlas Projects from all the north eastern States. A total of 46 delegates from all the cancer registries participated in the workshop.

Prof UC Sharma, Vice-Chancellor of the Jorhat University of Health

Sciences, Assam, inaugurated the workshop as the chief guest, a press release said.

Prof Sharma spoke about the importance of observational studies in epidemiology and stressed the need for translational research from cancer registry data. The workshop was presided by Dr A Nandakumar, Director, NCDIR, Bangalore, and Dr MS Ali, Principal Investigator of FICR, Dibrugarh, by the Director of Dr B Borooah Cancer Institute, Dr Anil Chandra Katak, for their longstanding and valuable contribution to the National Cancer Registry Programme.

Dr A Nandakumar, Director-in-charge of National Centre for Disease Information and Research, Bangalore, attended the workshop as the chief guest and conducted the three-day workshop. The workshop covered various topics related to cancer registries, including epidemiological study design using registry data and survival analysis.

Dr Jagannath D Sharma, managing director and principal investigator of cancer registry unit at Dr B Borooah Cancer Institute, spoke at length about the importance of collaboration and cooperation of various hospitals, diagnostic centres and birth and death registration centres in smooth running of population-based cancer registry.

Cancer Institute (WIA), Assam, Manipal from AIIMS, New Delhi, and faculty from the Manipal Cancer Institute, Bangalore, attended the workshop. This workshop was aimed at helping all the delegates in adequately collecting information of cancer cases and generation of meaningful data for undertaking epidemiological studies on cancer, which is an essential step for cancer prevention and control.

It was decided that the Government of Assam has made cancer a notifiable disease in Karang (Mizoram) district.

# National Cancer Centre for Disease Informatics and Research

## Indian Council of Medical Research

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2. Assam - Dr. B. Borooah Cancer Institute, Guwahati.
3. Bihar - Indira Gandhi Institute of Medical Sciences, Patna.
4. Chandigarh - Post Graduate Institute Medical Education & Research, Chandigarh
5. Chhattisgarh - Pt. J.L.N Medical College & Dr. B. R. Ambedkar Memorial Hospital, Raipur
6. Delhi - Dr. B.R. Ambedkar Institute Rotary Cancer Hospital, AIIMS, New Delhi
7. Gujarat - Gujarat Cancer Research Institute, Ahmedabad
8. Haryana - Post Graduate Institute of Medical Sciences, Rohtak.
9. Himachal Pradesh - Indira Gandhi Medical College, Shimla.
10. Jammu & Kashmir - Sher-i-Kashmir Institute of Medical Sciences, Srinagar.
11. Jammu & Kashmir - Government Medical College, Jammu.
12. Karnataka - Kidwai Memorial Institute of Oncology, Bangalore.
13. Kerala - Regional Cancer Centre, Thiruvananthapuram.
14. Madhya Pradesh - Cancer Hospital & Research Institute, Gwalior.
15. Maharashtra - Rashtrasant Tukdoji Regional Cancer Hospital & Research Centre, Nagpur.
16. Maharashtra - Tata Memorial Hospital, Mumbai.
17. Manipur - Regional Institute of Medical Sciences, Imphal.
18. Mizoram - Civil Hospital, Aizwal.
19. Odisha - Acharya Harihar Regional Cancer Centre, Cuttack.
20. Puducherry - Jawaharlal Institute of Postgraduate Medical Education & Research
21. Rajasthan - Acharya Tulsi Regional Cancer Treatment & Research Institute, Bikaner.
22. Tamil Nadu - Govt. Arignar Anna Memorial Cancer Research Institute & Hospital, Kancheepuram.
23. Tamil Nadu - Cancer Institute (WIA), Adyar, Chennai.
24. Tripura - Civil Hospital, Agartala.
25. Uttar Pradesh - Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow.
26. Uttar Pradesh - Kamla Nehru Memorial Hospital, Allahabad.
27. West Bengal - Chittaranjan National Cancer Institute, Kolkata.

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