

## Cancer in India – the challenges

Jan 2014

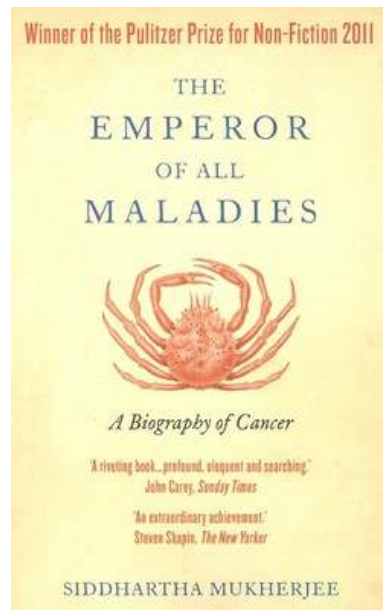
JSS University

### A growing problem

- In 2012, cancer caused about 13% of all human deaths worldwide (8.2 million).
- Rates are rising as more people live to an old age and as mass lifestyle changes occur in the developing world.
- Cancers are primarily an environmental disease with 90–95% of cases attributed to environmental factors and 5–10% due to genetics.
- Can be caused by some microorganisms - HPV cervical cancer, H.pylori gastric cancer.

## The “*Emperor of all Maladies*”

- In cancer, cells divide and grow uncontrollably, forming malignant tumors, and invading nearby parts of the body. The cancer may also spread to more distant parts of the body.
- Over 200 different known cancers that affect humans
- Causes of cancer are diverse, complex, and only partially understood.
- Risk factors include including tobacco use, dietary factors, certain infections, exposure to radiation, lack of physical activity, obesity, and environmental pollutants



## Molecular basis of cancer

- In cancer cells, the genes which regulate cell growth, cell death, and differentiation are altered.
- Changes in *many* genes are required to transform a normal cell into a cancer cell
- Cancer is also driven by epigenetic alterations, ie changes not at the level of DNA sequence.
- Advance in understanding the molecular basis of cancer will provide new ways of preventing, detecting and treating cancer.

## Cancer mortality rates

percentage of deaths within 5 years of diagnosis

- |   |   |
|---|---|
| • Pancreatic cancer – 94%                 | • Laryngeal cancer – 39.4%              |
| • Liver cancer – 83.9%                    | • <b><u>Cervical cancer – 32.1%</u></b> |
| • <b><u>Esophageal cancer – 82.7%</u></b> | • Prostate cancer – 0.8%                |
| • <b><u>Lung cancer – 83.4%</u></b>       | • <b><u>Breast cancer – 10.8%</u></b>   |
| • <b><u>Stomach cancer – 72.3%</u></b>    | • Bladder cancer – 22.1%                |
| • Brain cancer – 66.5%                    | • Skin cancer – 8.7%                    |
| • <b><u>Ovarian cancer – 55.8%</u></b>    | • Uterine cancer – 18.5%                |
| • <b><u>Oral cancer – 37.8%</u></b>       | • Thyroid cancer – 2.3%                 |
| • Kidney cancer – 28.2%                   | • Bone cancer – 33.6%                   |
| • Rectal cancer – 33.5%                   | • Leukemia – 44%                        |
| • Colon cancer – 35.1%                    |   |

## Dealing with cancer

- Prevention by minimizing risk factors.
- Early detection through screening for most common forms of cancer is critical.
- Early detection improves chances of survival.
- Treatment usually by surgery, chemotherapy, radiation, immunotherapy and monoclonal antibodies. Alternative medicine also.
- Palliative care to improve quality of life.
- Psychological and emotional support is important.

## World, cancer, 2012

Source: IARC

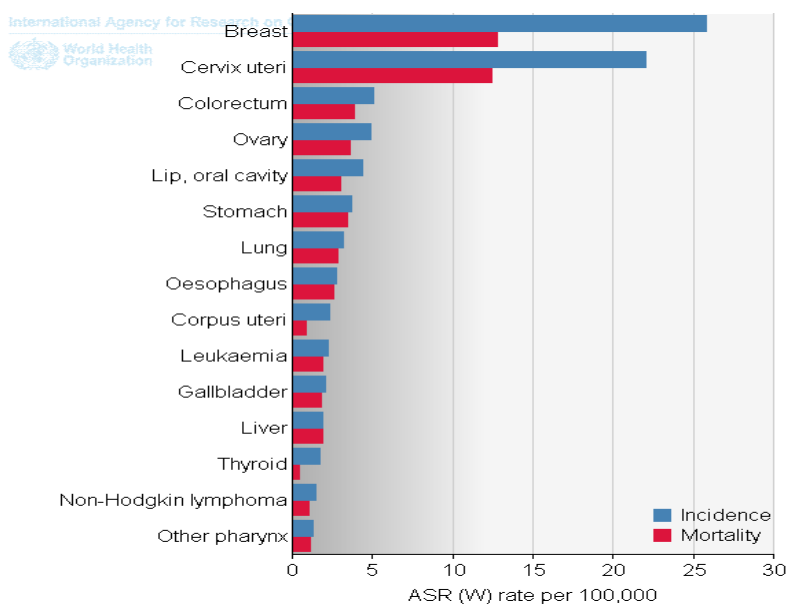
WORLD	Male	Female	Both sexes
Population (thousands)	3557717	3496728	7054446
Number of new cancer cases (thousands)	7427.1	6663.0	14090.1
Age-standardised rate (W)	205.4	165.3	182.3
Risk of getting cancer before age 75 (%)	21.0	16.4	18.5
Number of cancer deaths (thousands)	4653.1	3547.9	8201.0
Age-standardised rate (W)	126.3	82.9	102.4
Risk of dying from cancer before age 75 (%)	12.7	8.4	10.4
5 year prevalent cases, adult population (thousands)	15362.3	17182.3	32544.6
Proportion (per 100,000)	592.0	661.4	626.7

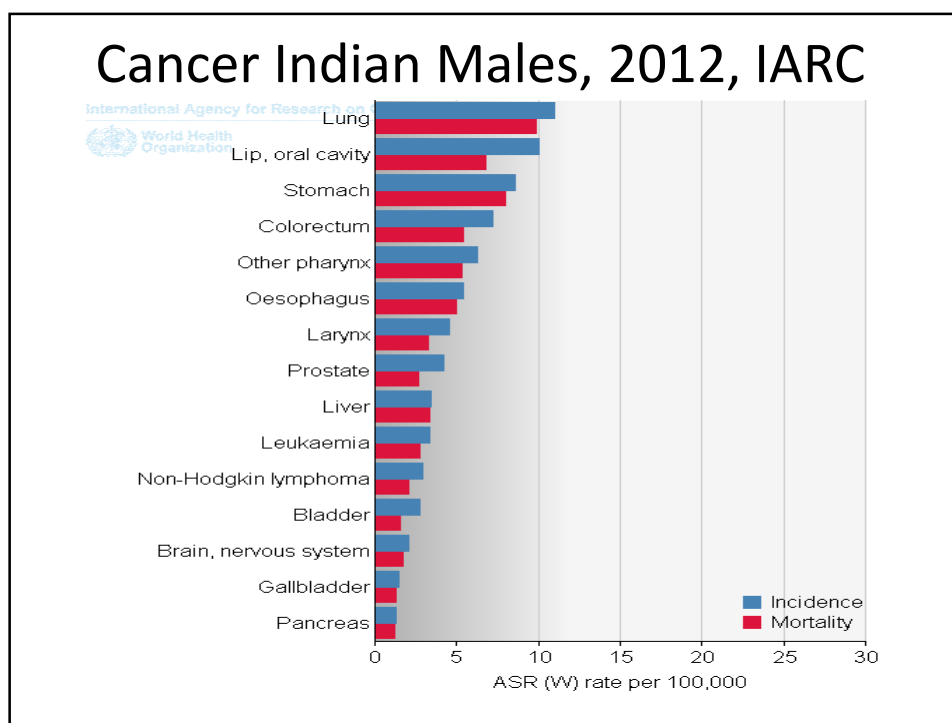
## Cancer in India, 2012

Source: IARC

INDIA	Male	Female	Both sexes
Population (thousands)	649474	608876	1258350
Number of new cancer cases (thousands)	477.5	537.5	1014.9
Age-standardised rate (W)	92.4	97.4	94.0
Risk of getting cancer before age 75 (%)	10.2	10.1	10.1
Number of cancer deaths (thousands)	356.7	326.1	682.8
Age-standardised rate (W)	69.7	60.2	64.5
Risk of dying from cancer before age 75 (%)	7.8	6.5	7.1
5 year prevalent cases, adult population (thousands)	664.5	1126.0	1790.5
Proportion (per 100,000)	146.6	262.5	202.9

## Cancer Indian females, 2012, IARC





## India – cancer situation

- 2 to 2.5 million cancer patients at any given point of time.
- 0.7 million new cases coming every year and nearly half die every year.
- Two-third of the new cancers are presented in advanced and incurable stage at the time of diagnosis.
- Over 60% of patients are in the prime of their life between the ages of 35 and 65 years.
- With increasing life expectancy the number of cancer cases will be almost three times the current number.
- Cancers of the head and neck in both sexes and of the uterine cervix in women are the most common in India.

## Environmental risks - increasing

- Urban population growing in large cities.
- Higher air pollution levels and risk of lung cancer.
- Chemicals in food, water, cosmetics, and household products.
- Exposure to harmful agents in work places in industry and agriculture.
- Radiation exposure from nuclear and other facilities.

### Lung cancer cases peaked in '09-'11

**Kolkata, Delhi and areas around these two cities have most polluted air in country**



**Analysis of three pollutants (SO<sub>2</sub>, NO<sub>2</sub> and particulate matter) at 450 air monitoring locations in 190 cities/towns across the country shows**

➤ Delhi, Jharkhand, West Bengal and Maharashtra have worst air quality

➤ Highest number of lung cancer cases during 2009-11 reported in Delhi, Mumbai and Kolkata

➤ Half of urban population breathes air that exceeds the accepted standard of PM<sub>10</sub>

**One-third of urban population lives in cities/towns with PM<sub>10</sub> levels classified as 'critical'**

## EVERY BREATH YOU TAKE

**Are you choking on smog? Beware. It has now been scientifically validated that air pollution causes lung cancer. The International Agency for Research on Cancer has declared it a carcinogen**

**TOXIC FIGURES**

Urban outdoor air pollution causes **1.3 million deaths** globally every year

➤ Quarter of a million of these deaths caused by lung cancer



**WHAT COMPRISES POISON**

**PARTICULATE MATTER (PM)**  
Microscopic particles generated by coal, oil and forest fires; natural sources like volcanoes, dust storms

**PM DIVIDED INTO 2 CATEGORIES | PM10 & PM2.5**

**Biggest threat** | PM is so light that it can float on air. Some particles are small enough to penetrate into lungs, cross into bloodstream

**Components** | Sulphate, nitrates, ammonia, sodium chloride, carbon and mineral dust, traces of arsenic, cadmium, nickel & mercury

- PM2.5 can cut life expectancy by 8 months
- PM2.5 exposure during pregnancy can cause baby to be born with a low birthweight

**OZONE** | In stratosphere it protects us from the Sun's UV rays, but at ground level, ozone is a component of photochemical smog. In high levels, it can trigger asthmatic attacks

**HEALTH RISK**

Chronic exposure can cause cardiovascular and respiratory diseases as well as lung cancer



## THAT'S THE LIMIT

*A recent study by National Institute of Nutrition on vegetables sold in Hyderabad found pesticides well above international permissible limits*



VEGETABLE	Chlorpyrifos (ppm)	Permissible limit (ppm)
TOMATO	178.87	0.2
EGGPLANT	24.02	0.2
LADY'S FINGER	2.49	0.2
CAULIFLOWER	2.85	0.01
CABBAGE	10.55	0.01

Values are in µg/kg



## POISON IVY'S KISS

**Of 32 fairness creams tested for mercury, 14 had it in the range of 0.10 ppm\* to 1.97 ppm. This heavy metal is banned for use in cosmetics under the Drugs and Cosmetics Acts and Rules**



**Aroma Magic Fair lotion** – a product of **Blossom Kochhar Beauty Products Pvt Ltd** – had the **highest level of mercury (1.97 ppm)**, followed by Procter and Gamble's **Olay Natural White (1.79 ppm)**, and Ponds White Beauty of Hindustan Unilever (1.36 ppm)

30 lipsticks, 8 lipbalms & 3 anti-ageing creams were also tested for lead, cadmium, chromium & nickel

Chromium found in **15 lipsticks tested in range of 0.45 ppm to 17.83 ppm**: Hearts and Tarts (080V) shade of **ColorBar** had the highest concentration of chromium

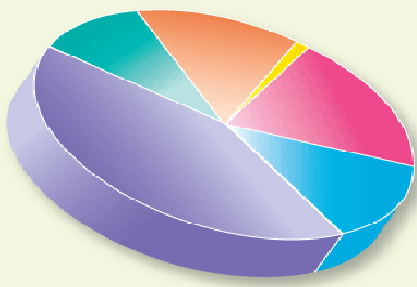
Nickel found in **13 lipsticks tested in range 0.57 to 9.18 ppm**, with LancomeLabsolu Nu-204 of **L'Oreal India Pvt Ltd** having the highest concentration

No heavy metals found in **anti-ageing creams and lipbalms**. Lead and cadmium not detected in lipsticks



\* parts per million

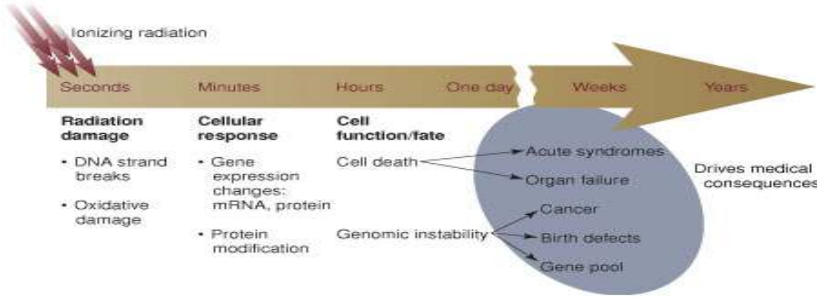
### Sources of Radiation



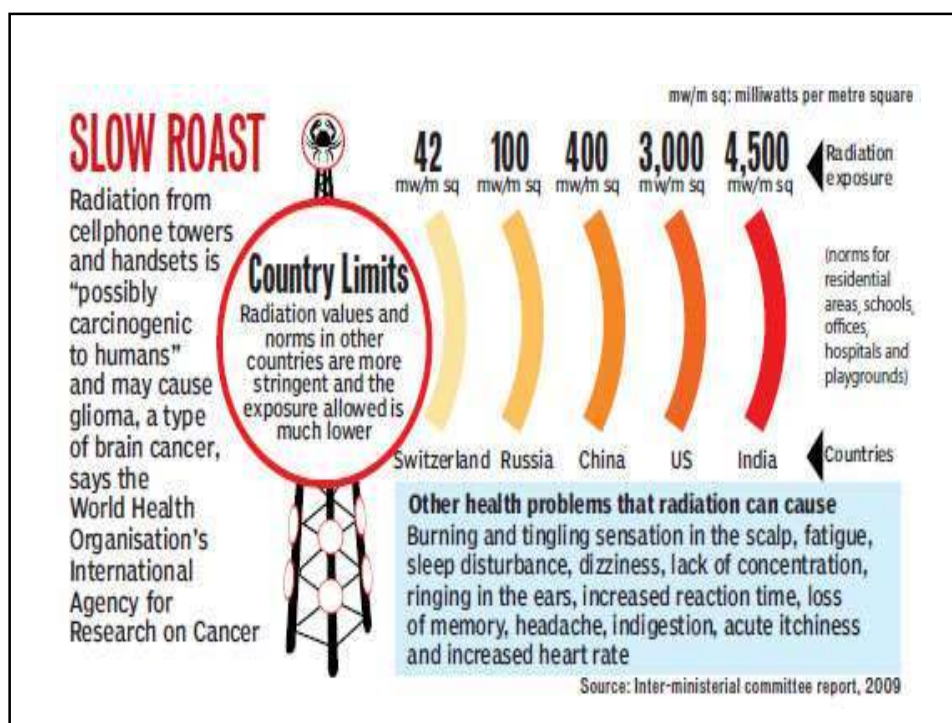
- Medicine - 14%
- Nuclear Industry - 1%
- Buildings/Soil - 18%
- Cosmic - 14%
- Radon - 42%
- Food/Drink Water - 11%

} Natural Radiation 85%

Ionizing radiation



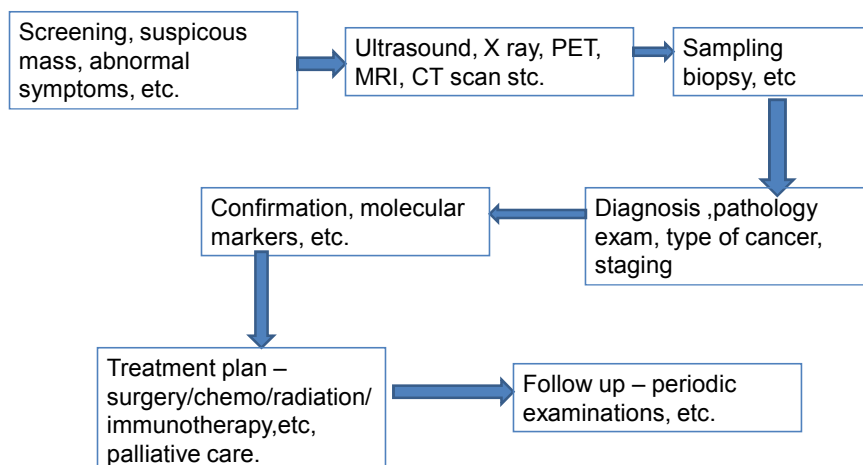
Seconds	Minutes	Hours	One day	Weeks	Years
<b>Radiation damage</b>	<b>Cellular response</b>	<b>Cell function/fate</b>	<div style="border: 1px solid gray; border-radius: 50%; padding: 10px; display: inline-block;"> <ul style="list-style-type: none"> <li>Acute syndromes</li> <li>Organ failure</li> <li>Cancer</li> <li>Birth defects</li> <li>Gene pool</li> </ul> </div>		
<ul style="list-style-type: none"> <li>• DNA strand breaks</li> <li>• Oxidative damage</li> </ul>	<ul style="list-style-type: none"> <li>• Gene expression changes: mRNA, protein</li> <li>• Protein modification</li> </ul>	<ul style="list-style-type: none"> <li>Cell death</li> <li>Genomic instability</li> </ul>			
			Drives medical consequences		



## India – cancer control programme

- National Cancer Control Programme (1975) and revised in 1984-85 stressing primary prevention and early detection of cancer.
- Goals - 1. The primary prevention of tobacco related cancers. 2. Secondary prevention of cancer of the uterine cervix, mouth, breast etc.; 3. Tertiary prevention includes strengthening of therapeutic services.
- 19 regional cancer research centre (incl Kidwai Memorial Institute, Bangalore) work with medical colleges and institutions.
- Oncology wings in govt. medical colleges (Rs 2 cr funding), District Cancer control programmes, Comprehensive anti Tobacco programme.

## Cancer – typical individual case



## Cancer in India-public information

- General information for public on incidence rates of cancer in India, the risk factors, future scenario, measures for early detection and prevention of cancer, etc.
- Help bring about a broad based national effort, involving patients, general public, health, policy makers, etc.
- Sharing information and knowledge about cancer is key to this effort.

## Why an Indian cancer portal

- Patients need open access to objective, scientific based information on all aspects of cancer.
- Need for information on diagnostic and treatment facilities available in India.
- Information on accreditation and quality control aspects.
- Information on new scientific developments.
- Need for information on screening for most common cancers, reduction of risk factors.
- Need for information on support services, counselling etc.
- Information in Indian languages is lacking.

## Providing useful information

- Objective scientific based up to date information on all aspects of cancer, the best available global knowledge.
- Include India specific aspects of cancer .
- Information on diagnostic, treatment facilities in India and abroad, and on clinical trials.
- Information on support services for patients and families.
- Role of traditional Indian medicine in cancer.
- Information on risk factors, reduction and screening for cancer.
- Insurance and financial aspects of dealing with cancer.
- International cooperation against cancer

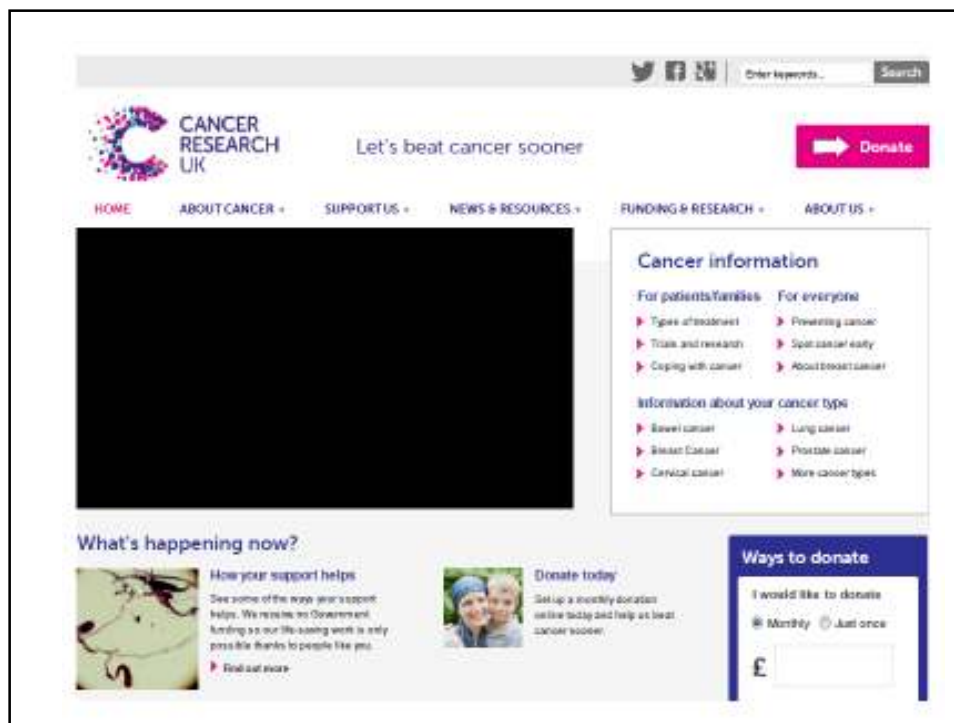
## Bringing together various Groups

AWARENESS → PREVENTION → REDUCTION

- Cancer patients and families.
- General public on risk reduction and screening for cancers of most common types in India.
- Health care personnel.
- Health policy personnel.
- Scientific community.
- Traditional medicine community.
- Business community.
- Media organizations.
- Research and academic community.
- Religious community.
- Youth, womens, and labour organizations
- Legislators and political parties.

## Working together

- Portal can provide information on specific roles and focus areas for the various target groups.
- Actions of different groups can be coordinated, avoid duplication and use resources more effectively
- Can help to mobilise resources.
- Can reinforce the overall national and international efforts against cancer.
- Can articulate concerns of various groups.
- Can help in implementing projects and activities.



**acor.org**  
Association of Cancer Online Resources

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[Home](#)

### What is ACOR?

ACOR is a unique collection of online cancer communities designed to provide timely and accurate information in a supportive environment. It is a free helpline for everyone affected by cancer & related disorders.

You are not alone! Use one of ACOR's **142** online communities to connect with people like you online and share information and support.

### Who uses ACOR?

ACOR online communities are for parents, caregivers, family members, and friends to discuss clinical and nonclinical issues and advances pertaining to all forms of a specific disease. This includes patient and caregiver experiences, psychosocial issues, new research, clinical trials, long-term side effects and discussions of current treatment practices.

[See what others say about us.](#)

### How do I get started?



To find the right online cancer-related community for you, simply use the search form below with cancer-related terms such as "prostate".

OR

[Browse the full list of communities.](#)

## Some sources of content

- Open Educational Resources for Cancer (OERC)  
oerc.merlot.org
- Adaptation of content for Indian portal, with linkages OERC portal.
- Links to Indian NGO sites, institutions, and vice versa.
- ONCONET [onconet.nic.in ] supported by MoHFW Govt of India. Needs more development and outreach
- Linkages to international web sites.

[MERLOT](#) [Browse Materials](#) [Contribute Materials](#) [Join MERLOT](#)

Home

Contributing to OERC

Participating in the OERC Community

For Healthcare Professionals

For Parents and Families

Finding More OER

About Us

### Welcome to Open Educational Resources (OER) – for Cancer

The OERC's portal is open and free for everyone around the world to use to:

- Find free, open, and online educational and training resources. We will be "recommending the best" and "adding to the rest" of materials that could meet your interdisciplinary needs.
- Contribute to the global digital library of cancer resources so everyone worldwide can have the best and latest information.
- Develop and lead the social networks needed to bring individuals out of isolation and into a supportive community.
- Participate in online community conversations with cancer researchers, physicians, healthcare professionals, and others working in cancer education to freely share experiences and expertise.

#### Online Library of OER for Cancer

Looking for free online resources about cancer you can use in formal and informal learning and education?

Simply click on the topics listed below, and you'll be provided a list of available resources, and our site, read reviews, and organize into your own personal collection. (all links open in a new window.)

[Click here to view the entire collection of cancer materials in MERLOT.](#)

<ul style="list-style-type: none"> <li><a href="#">Biology of Cancer</a></li> <li><a href="#">Cancer and pregnancy</a></li> <li><a href="#">Cancer control</a></li> <li><a href="#">Cancer diagnosis</a></li> <li><a href="#">Cancer in the elderly</a></li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Specific Cancers</a></li> <li><a href="#">Annie Lymphoid System</a></li> <li><a href="#">Acute myeloid leukemia</a></li> <li><a href="#">Adult T-cell leukemia/lymphoma</a></li> <li><a href="#">Anal cancer</a></li> <li><a href="#">Basal and squamous cell skin cancer</a></li> </ul>
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#### Looking for News?

[Open Educational Resources for Cancer Information Sheet \(PDF\)](#)

The International Network for Cancer Treatment and Research - [INCTR](#) and [MERLOT](#) have partnered to create the OERC portal. You can find more OERC news in the [INCTR News Flash!](#)

[Subscribe to the INCTR Newsletter!](#)

#### WHAT'S NEW in the MERLOT OERC Collection

[INCTR](#)

The International Network for Cancer Treatment and Research (INCTR) is a not-for-profit organization dedicated to helping build ...

[INCTR News](#)


The INCTR news site has links to the latest INCTR (International Network for Cancer Treatment and Research) news information ...

[INCTR Annual Progress Reports](#)

The INCTR (International Network for Cancer Treatment and Research) publishes an annual report information ...

## Welcome to INCTR

The International Network for Cancer Treatment and Research is a not-for-profit organization dedicated to helping build capacity for cancer research and treatment in developing countries.



#### Organization

INCTR headquarters are located in Ottawa and it has branches and offices located throughout the world. It has staff and consultants dedicated to the accomplishment of its goals.

[Read more](#)

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#### Programs

INCTR functions through a series of INCTR-based programs that involve collaboration with its partners and OERs, patients and educational, low and middle income countries.

[Read more](#)

[Subscribe to Our Newsletter](#)

#### Announcement

The 19th edition of our new journal publication *Cancer 2014*, was launched in April 2014. It is produced in collaboration with the INCTR and J. Genevieve in Guyana, and brings together high quality research which will be helpful in some areas of cancer treatment and research. [Read more](#)

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#### Resources

This section has a collection of material developed by INCTR to assist patients, cancer survivors in developing countries and health professionals in resource-limited settings with their daily work.

[Read more](#)



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CTIS believes quality healthcare for every citizen is a fundamental human right. By leveraging highly adaptive public use of brain edge, communication and sensor-based innovation, for prevention and control, we empower and connect to bring, assess and manage information about the life-cycle of patients and highest quality and cost-effective care.

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**Solutions**

CTIS offers services and products built on a solid foundation of best practices, standards and regulatory compliance, including systems integration, program management, custom solutions, thought leadership, cloud hosting and mobile applications.

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## Cancer internet portal

- A Cancer information portal is useful for India
- It is cost effective and easily accessible in Indian and globally
- It can contribute to effective action against cancer.
- It can bring together various sections of society in focused way against cancer.
- Need to implement this project as a collaborative effort.
- Visit us at <http://oercindia.merlot.org/>

**Welcome to:**  
**OPEN EDUCATIONAL RESOURCES**  
**(OER) - FOR CANCER-INDIA**



**The OERC-India portal** is open and free for everyone to use, with a special emphasis on serving the needs of cancer-focused healthcare professionals, patients and their families in India. You can use the portal to:

1. Find free, open, and online educational and training resources. We will be "recommending the best" and "linking to the rest" of materials that could meet your interdisciplinary needs.
2. Contribute to the global digital library of cancer resources so everyone worldwide can have the best and latest information.
3. Develop and lead the social networks needed to bring individuals out of isolation and into a supportive community.
4. Participate in online discussions and consultations with cancer researchers, physicians, healthcare professionals, and others working in cancer education to freely share experiences, educational materials and expertise.
5. Free of commercial, industry, or institutional bias – we are focused on the members of the broad community of cancer creating and sharing resources for the betterment of cancer treatment, education, and research.

Visit our website at - <http://oercindia.merlot.org/>

## Indian Cancer Congress 2013

- First ever Congress on Cancers of all types in India, held in Delhi 20-24 Nov 2013. Website <http://indiancancercongress2013.org> for more details of scientific sessions , etc.
- Over 4800 delegates participated, involvement of the four major oncology associations of the country and 27 of the affiliate societies
- Unique multidisciplinary congress, involvement of civil society, support groups , NGOs
- Next Congress ICC 2017 in Bengaluru. JSS community should participate actively in it !!

## Public action in India

- Main areas where the public can take action, individually, and collectively including through citizens groups and NGOs.
- Building networks for action against cancer.
- Actions at government and official levels – bringing about policy changes.
- Role of the private sector - health institutions, and corporates (through CSR)
- Strengthening international cooperation against cancer.

## Areas for action

- Stronger campaigns for risk reduction – tobacco, environment, life style changes.
- Better screening for common cancers
- Improved diagnostic facilities – imaging, molecular markers, etc.
- Facilities for treatment, access to anticancer therapeutic agents.
- Financial and insurance systems for cancer.

## What if I or my family have cancer?

- Maintain a healthy life style, promptly check any unusual growth or mass in the body. Do screening for cervical and breast cancer.
- Diagnosis – from initial imaging (Ultrasound, MRI, PET), biopsy and analysis of samples – skilled pathologist is critical, study of cancer markers.
- First reactions - Why me? Will I live? Can I be cured?
- Type of cancer and stage determines the line of treatment.
- Treatment in most cases will prolong life. Earlier stage treatment is more effective.
- Rapid advances in cancer research will help- new drugs etc.
- Do not give up the struggle – rely on support from family, doctors, support groups, etc. Positive attitude is essential.

## Yoga and cancer

- Yoga can promote general health and wellbeing, reduce obesity, and improve organ functioning.
- Yoga can reduce risk of cancer.
- Yoga can help cancer patients to deal with pain and stress.
- Regular practice of Yoga can bring many benefits.

Join the battle against Cancer !

Jan 2014

Dr. Bhaskar Balakrishnan

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