Journées Francophones d'Imagerie Médicale

Infectious Agents and Cancers: Prevalence and Importance in Public Health in India.

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Cancers: Global Burden and Causes

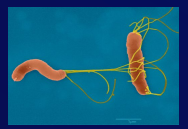
14 millions of new cancers in 2012 worldwide

Cancer is a complex group of diseases with many possible causes
and/or associated risk factors: variaibility according to age, sex, geograhical origin ...

- Tobacoo: 25-30% in developed countries

- Alcohol: 3%
  -Professional exposition (chemical products): 4-5%
  -Environmental exposures (air, soil, water) to different types of chemicals:1-4%
  -Alimentary contamination (% variable)

- Diet, nutrition and physical activity: 30%
- Genetic factors: 2-4%
- Certain types of infections: 15%



It is estimated that 35-50% of the cancer cases worldwide can be prevented by control of potentially modifiable factors

Microbes/Infectious agents and cancers

- Of 14 millions of new cancers in 2012,

2.2 millions were arttribuable to carcinogenic infections

- 15.4 % worlwide

- 3-10 % developped countries (France, UK, Australia, USA)

- >20 % in most developping countries

- >30 % several African countries

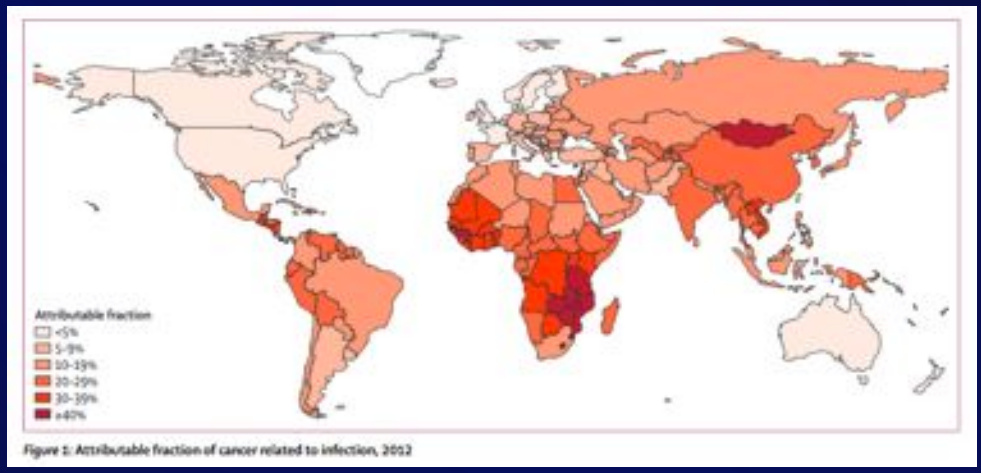


Figure 1: Attributable fraction of cancer related to infection, 2012

- 30% of these cancers occurred in individuals aged < 50 years

- 71% are associated to viruses.

International Agency for Research on Cancer in Lyon, France

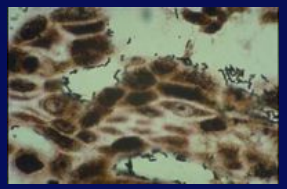
(IARC)

has identified with expert groups 12 biological agents as proven carcinogenic agents.

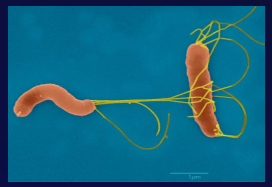
8 Viruses (EBV, HHV-8, HBV, HCV, HTLV-1, HIV, HPV, Merkel Cell polyomavirus).

1 Bacteria (*Helicobacter pylori*).

3 Parasites (*Clonorchis sinensis, Opistorchis viverrini, Schistosomia haematobium*).

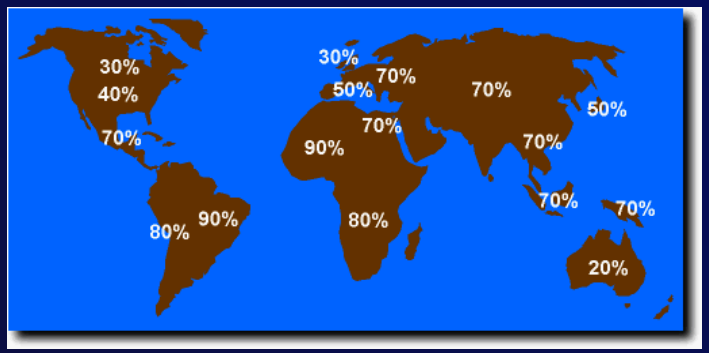


Gastric Cancer



- > 700 000 new cases/each year
- Fifth most common cancer worldwide and second mortality caused by cancer (++ in developping countries)
- 5 year survival: 10-15 %
- Role of *Helicobacter Pylory* bacteria in the genesis of gastric diseases, including gastric cancer

Very high prevalence,
half of the world population
great variability according to
geography (socio-economic level)



Robin Warren et Barry Marshall
Nobel Prize in 2005

Pathologies associated to infection by *H. pylori*

Infection by *H. pylori*

Chronic gastritis (100%)

Asymptomatic (80%)

Fonctional dyspepsia (5-10 %)

Gastric or duodena ulcers (10%)

MALT lymphoma (0.3%)

Atrophic gastritis

Intestinal metaplasia

Dysplasia

Adenocarcinoma (1-3%)

<1y

20-30Y

30-50Y

65-85Y

Multiple Steps, Multifactorial Carcinogenesis

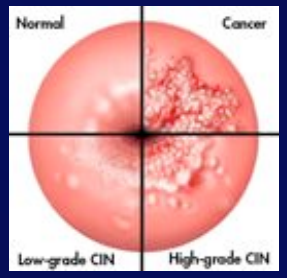
as for other cancers associated to infectious agents

Environnemental factors,
life style of the host

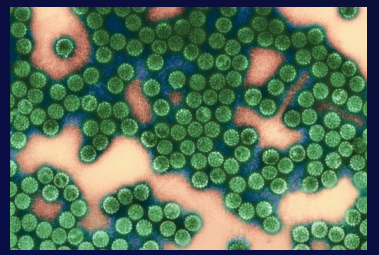
Genetic Caracteristic
of the host

Bacteria genotype

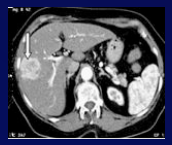
Increased risk of gastric
atrophia and
hepatocarcinoma

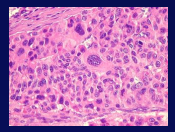


Cervix Uteri Carcinoma

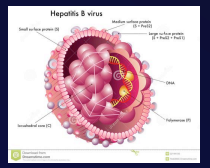


- Worldwide, cervical cancer is both the 4th-most common cause of cancer and deaths from cancer in women (after breast, colorectal, and lung).
- In 2012, 530,000 cases with 266,000 deaths.
- About 80% of cervical cancers occur in developing countries.
  (2,5 new cases/100 000 women in Israël and 55/100 000 women in Zimbabwe).
- Attribuable part to Human papillomaviruses is 100%.
- Virtually all cervical cancer cases are linked to genital infection with HPV of high grade 16/18/31/33/35...with the role of viral integration.





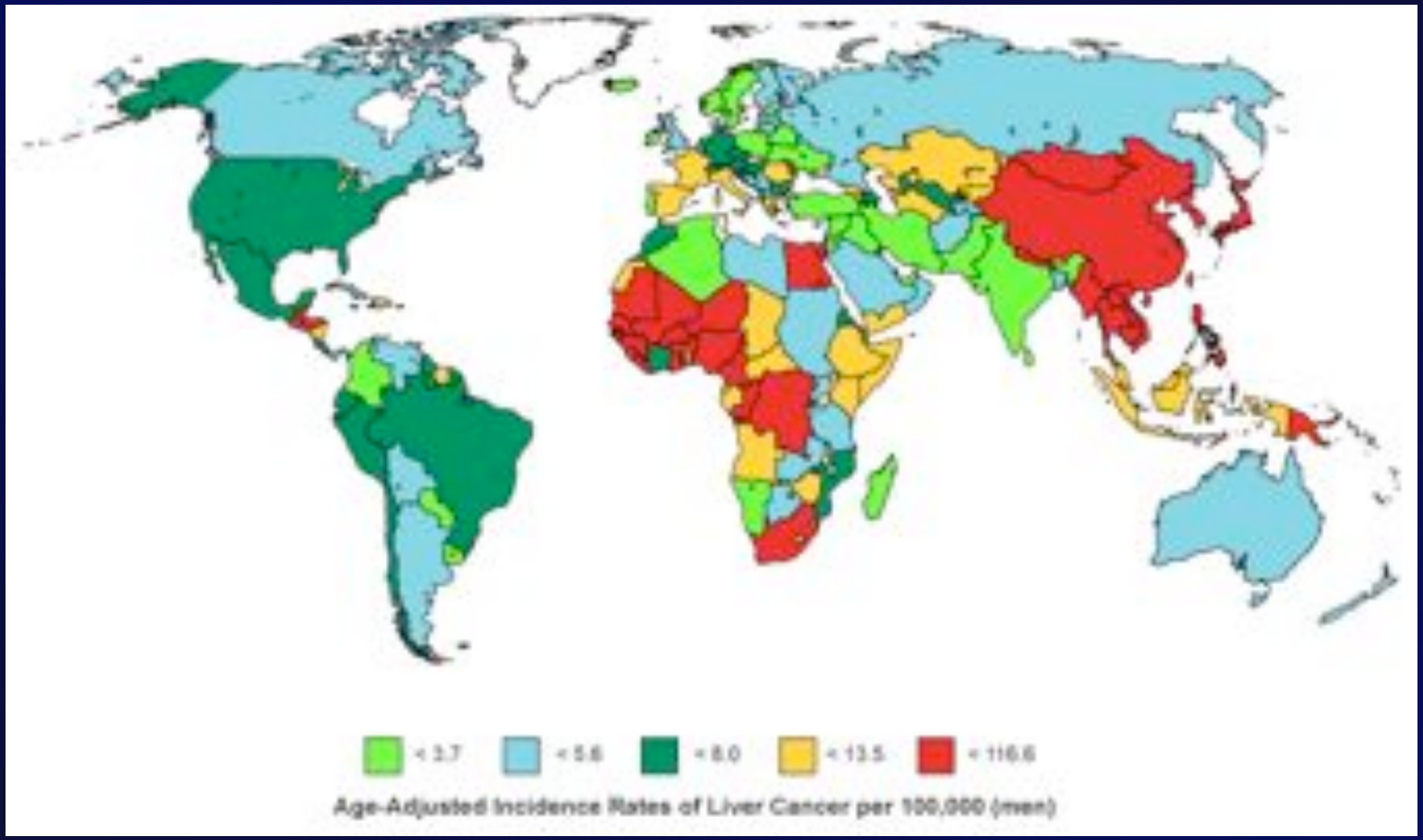
Hepatocarcinoma



- Hepatocarcinoma (HCC) is the fifth most common tumor in the world.
- 780 000 new cases in 2012 with 660 000 deaths, about half of them in China.
- The most important risk factors vary widely from country to country.
- In countries where Hepatitis B is endemic, such as China, HBV is the predominant cause of HCC whereas in countries, such as the US, where HBV is rare because of high vaccination rates, the major cause of HCC is cirrhosis (often due to Hepatitis C Virus, obesity or alcohol abuse).
- Multifactorial cancer with also co-factors as alcohol and aflatoxin

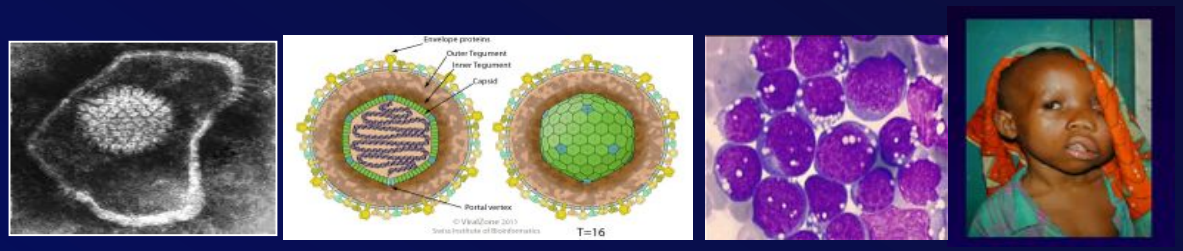
Age-ajusted incidence rate of Hepatocarcinoma

(Africa and Asia; China++)



Burkitt's lymphoma and Epstein-Barr virus (EBV)

Viral isolation in 1964 from a culture of BL cells



EBV-associated cancers with variable attribuable risk:

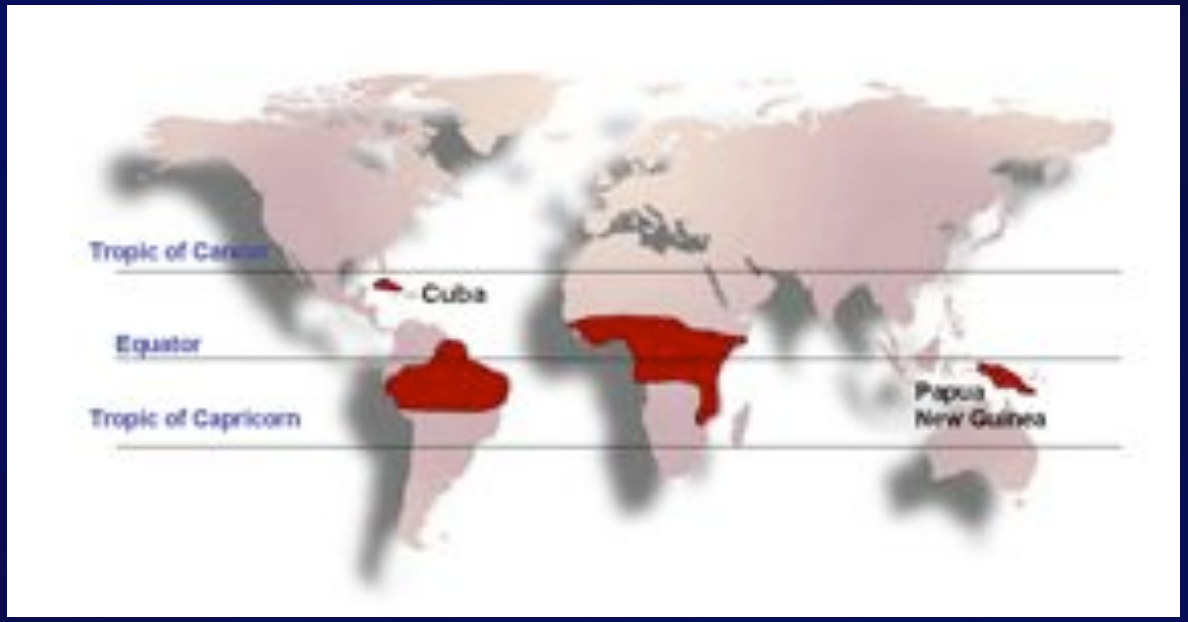
Burkitt's lymphoma
10 000 cases (10-100%)

Hodgkin lymphoma,
60 000 cases (10-70%)

NPC (Nasopharyngeal Carcinoma), 80 000 cases (80-100%)

Non Hodgkin lymphoma (AIDS/ immunosuppression)

Rare other cancers



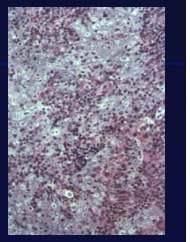
- **Endemic form nearly always associatd with EBV:**

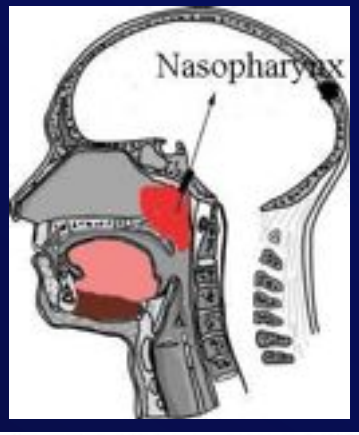
(Malaria is a Cofacteur majeur).

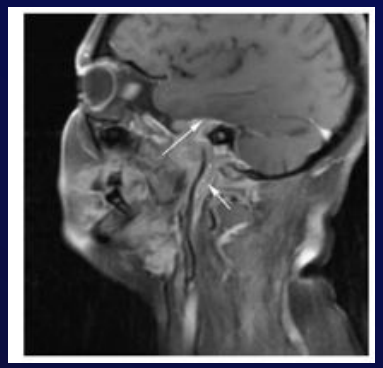
- **Sporadic form: EBV-associated in only 10% à 20% of cases.**

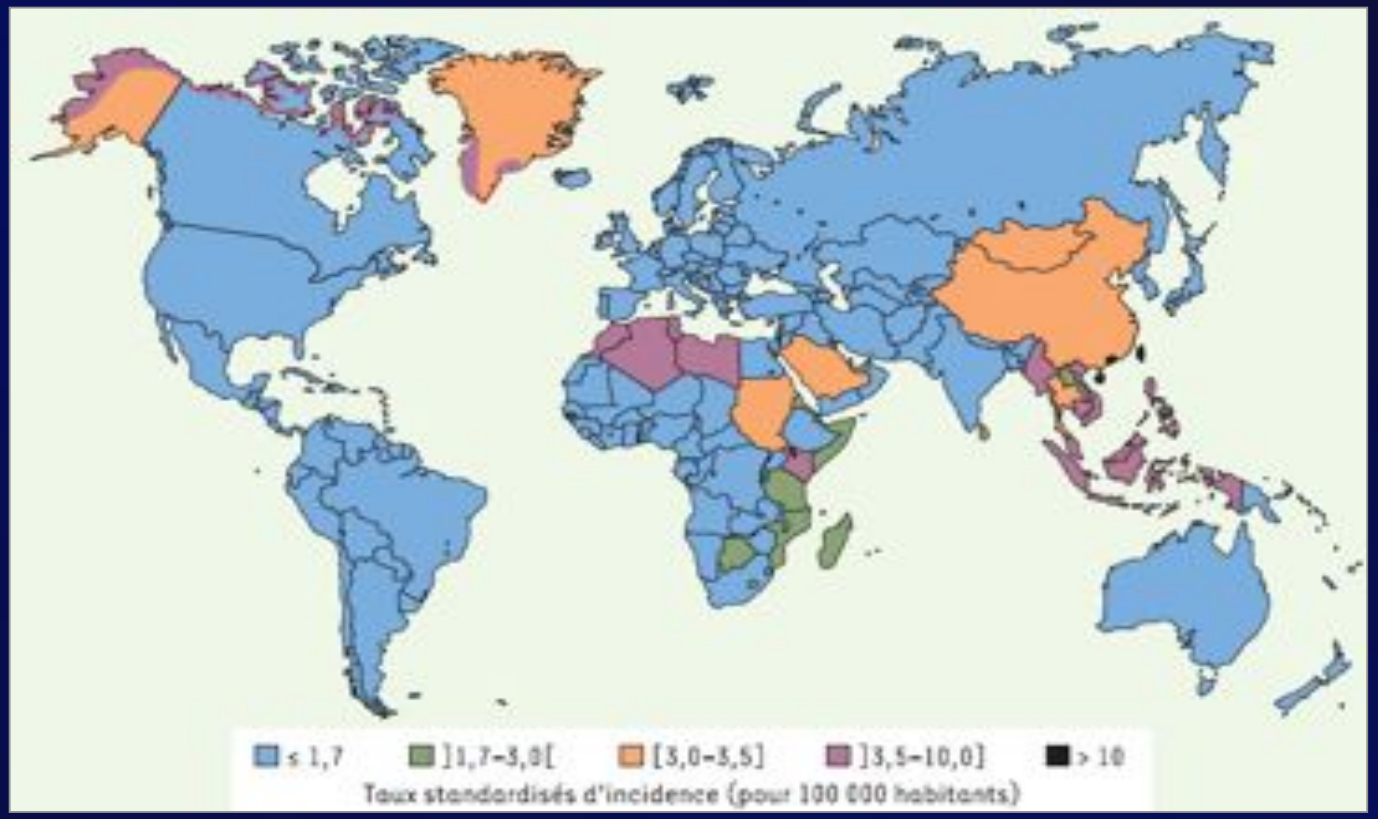
EBV and Nasopharyngeal Carcinoma (NPC)

80 000 cases/year





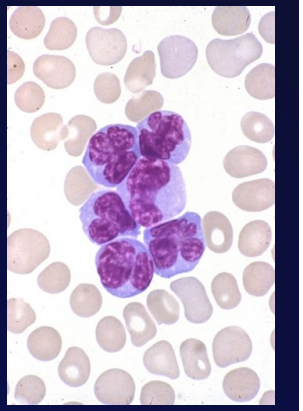




- **Multifactorial cancer always associated to EBV**
- **Major public health problem in different areas (China/Canton, Eskimos, Maghreb)**
- **Major co-factors: alimentary habits (dried fish, nitrosamine,…) and genetic**

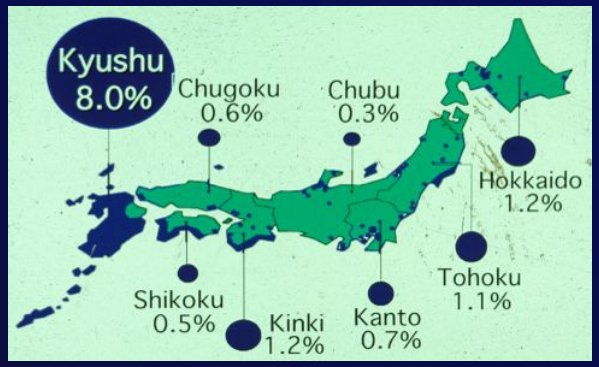
Adult T cell Leukemia/Lymphoma and the Human retrovirus HTLV-1

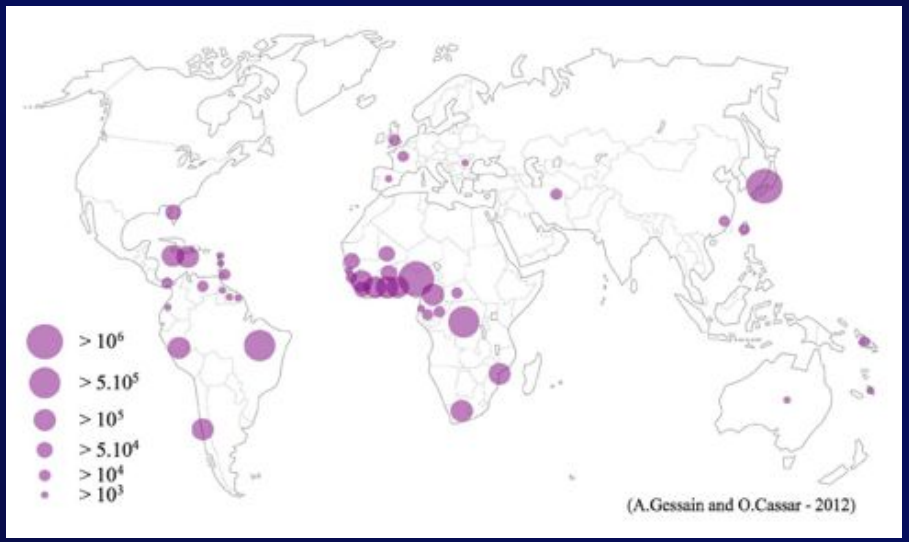
- First human retrovirus to be isolated
- Causaly associated with a very severe leukemia/lymphoma
- Median survival < 6 months (acute leukemic form)
- High endemic foci, including Japan with 1000 cases/year



ATLL cells

TSP/HAM





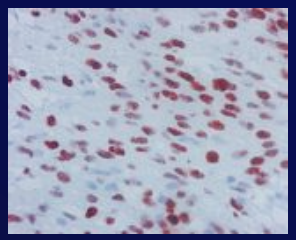
1) Age of infection (breast feeding ++). 2) Genetic factors. 3) Other cofactor : *S. Stercoralis*,.

Poor therapy. Prevention++.

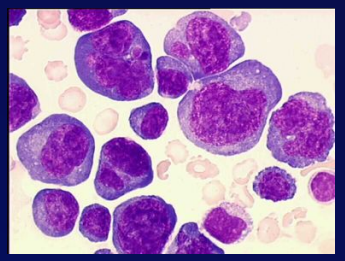
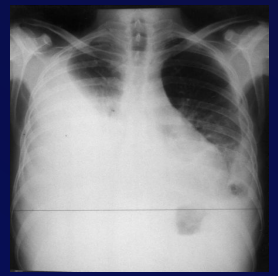
Other viruses associated with human cancers

Human herpes virus 8 (HHV-8)/ Merkel Cell Carcinoma polyomavirus (MCPyV)

HHV-8 is associated with all Kaposi sarcoma forms (45 000 new cases/year), primary effusion lymphoma and some forms of multicentric Catsleman'diseases (role of HIV++).



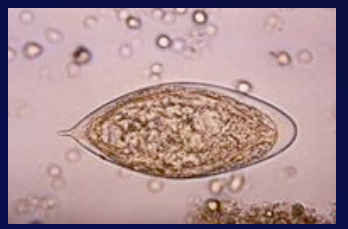


MCPyV is associated with Merkel Cell Carcinoma: a rare and agresisve skin cancer.

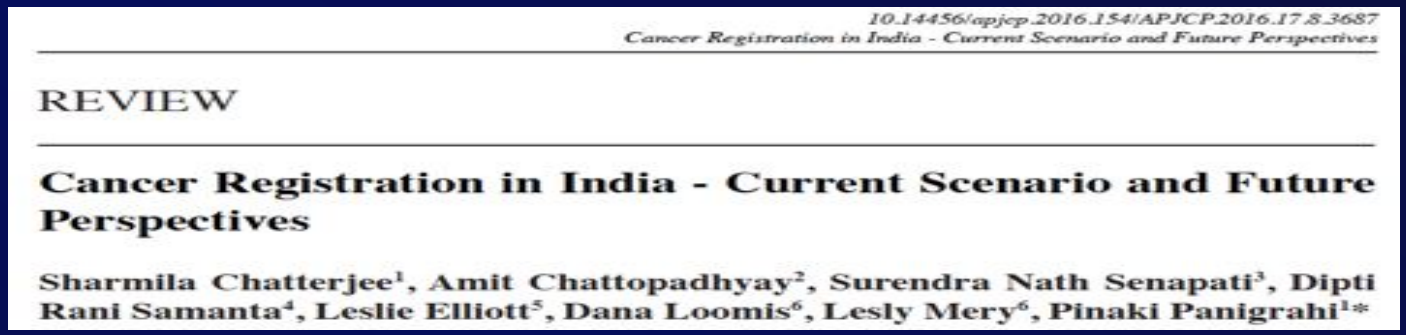
Parasites and Cancers in Humans

Shistosoma haematobium and bladder cancer
7000 cases /year
Africa and Middle East (Egypt++)



Opistorchis viverini, Clonorchis sinensis (liver flukes) induce an inflammatory reaction, epithelial hyperplasia and sometimes even cholangiocarcinoma
1300 cases/year
Thailand, the Laos, Vietnam and Cambodia (OV)
Japan, China, Taiwan, and Southeast Asia (CS)

What is the Situation of Cancers in India?
(especially for Infectious-Related cancers)



10.14456/apjcp.2016.154/APJCP.2016.17.8.3687
Cancer Registration in India - Current Scenario and Future Perspectives

REVIEW

Cancer Registration in India - Current Scenario and Future Perspectives

Sharmila Chatterjee[1], Amit Chattopadhyay[2], Surendra Nath Senapati[3], Dipti Rani Samanta[4], Leslie Elliott[5], Dana Loomis[6], Lesly Mery[6], Pinaki Panigrahi[1]*

Cancer registration in India was initiated in 1964 and expanded since 1982, through the National Cancer Registry Program (NCRP).

NCRP currently has twenty-six population based registries and seven hospital based registries.

Cover less than 15% of the population (mostly in urban areas++).

Potential concerns about some Indian registries include accuracy, detail of information, and speed in updating the databases.

Cancer in India: the Epidemic

ARTICLE IN PRESS

Journal of the Egyptian National Cancer Institute (2016) xxx, xxx–xxx

Cairo University

Journal of the Egyptian National Cancer Institute

www.elsevier.com/locate/jnci
www.sciencedirect.com

Review

Burden of preventable cancers in India: Time to strike the cancer epidemic

Ajeet Kumar Gandhi *, Pavnesh Kumar, Menal Bhandari, Bharti Devnani, Goura Kishor Rath

Department of Radiation Oncology, All India Institute of Medical Sciences, New Delhi 110029, India

India has one of the highest cancer incidence and mortality rates in the world

In 2010, about 555,000 people died of cancer in India.

The most common fatal cancers in men: oral (22.9%), stomach (12.6%), and lung cancers (11.4%), while cervical (17.1%), stomach (14.1%), and breast cancers (10.2%); in women

In 2016: 1.45 millions of new cases with 750 000 death.

In 2020: 1.73 millions of new cases with 880 000 death

Cervical Cancer in India: a major public health problem

International Journal of Women's Health

Dovepress

REVIEW

Epidemiology of cervical cancer with special focus on India

Aswathy Sreedevi
Reshma Javed
Avani Dinesh

Community Medicine, AIMS, Kochi, Amrita Vishwa Vidyapeetham, Kerala, India

India contributes to 25 % of the global burden (130 000 cases/year) and mortality of Cervical cancer cases.

Cervical cancer is the second cancer among females in India with 14% of all cancers (NCRP, 2015).

Around 78-88% of Cervical cancer are HPV-16 or 18 positive.

There is no organized national cervical cancer screening program and no national policy for cervical cancer prevention in India, and screening of asymptomatic females is practically non-existent.

HPV vaccines can make a major breakthrough in the control of cervical cancer for countries like India with high disease load.

Hepatocarcinoma in India

Review Article

Page 1 of 5

Hepatocellular carcinoma in India

Gouri Shankar Bhattacharyya[1], K. Govind Babu[2], Hemant Malhotra[3], Anantbhushan A Ranade[4], Shaiqua Murshed[5], Debasis Datta[1]

[1]Fortis Hospital, Anandapur, Kolkata, India; [2]Kidwai Memorial, Institute of Oncology, Bangalore, India; [3]Sawai Man Singh Medical College and Hospital, Jaipur, India; [4]Avinash Cancer Clinic, Pune, India; [5]AMRI Hospital, Dhakuria, Kolkata, India

Correspondence to: Gouri Shankar Bhattacharyya. HOD, Medical Oncology, FORTIS Hospital, 730 Anandapur, EM Bypass Road, Adarshanagar, Kolkata-700107, West Bengal, India. Email: docgs@hotmail.com.

Accurate data on hepatocarcinoma in India are not available.

Estimation: 30 000 to 50 000 cases/year.

Possible increase of incidence and regional differences.

The major factors responsible for HCC developpment in India is chronic HBV infection, HCV infection and alcohol consumption.

India has around 35-40 million HBV carriers.

Prevention of viral infection by universal vaccination against HBV should be adopted in India, as well as therapy fo HCV.

Gastric Cancer in India


World Journal of Gastroenterology

Online Submissions: http://www.wjgnet.com/esps/
bpgoffice@wjgnet.com
doi:10.3748/wjg.v20.i6.1503

World J Gastroenterol 2014 February 14; 20(6): 1503-1509
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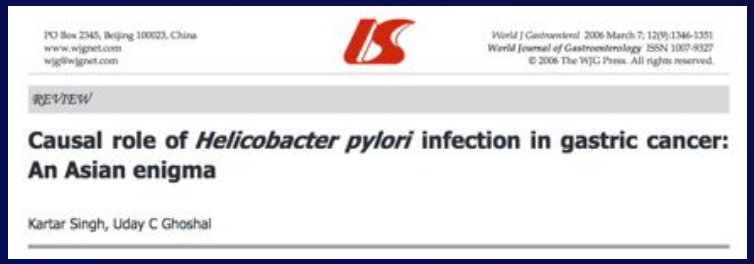
TOPIC HIGHLIGHT

WJG 20th Anniversary Special Issues (6): Helicobacter pylori

Helicobacter pylori and gastric cancer: Indian enigma

Vatsala Misra, Renu Pandey, Sri Prakash Misra, Manisha Dwivedi


PO Box 2345, Beijing 100023, China
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World J Gastroenterol 2006 March 7; 12(9):1346-1351
World Journal of Gastroenterology ISSN 1007-9327
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REVIEW

Causal role of *Helicobacter pylori* infection in gastric cancer: An Asian enigma

Kartar Singh, Uday C Ghoshal


American Journal of Gastroenterology
© 2007 by Am. Coll. of Gastroenterology
Published by Blackwell Publishing

Letters to the Editor 2113

The Indian Enigma of Frequent *H. pylori* Infection but Infrequent Gastric Cancer: Is the Magic Key in Indian Diet, Host's Genetic Make Up, or Friendly Bug?

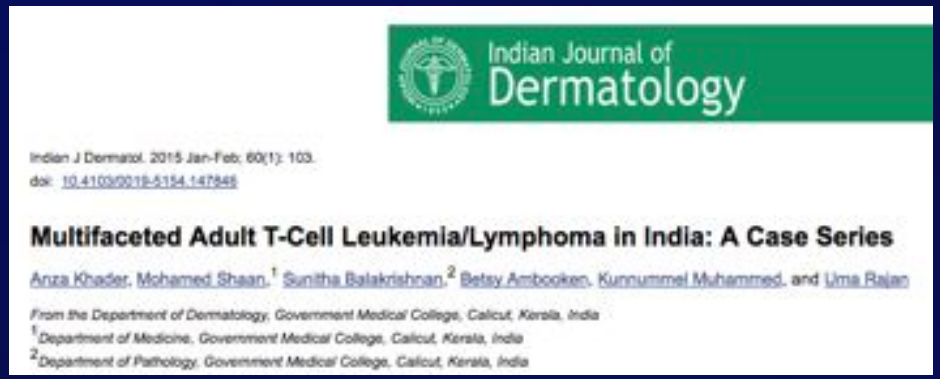
Uday C. Ghoshal, M.D., D.N.B., D.M.[1]
Shweta Tripathi, M.Sc.[1]
Ujjala Ghoshal, M.D.[2]

Departments of [1]Gastroenterology and [2]Microbiology
Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow 226014, India

Helicobacter Pylori has been etiologically linked to gastric cancer and is considered as a carcinogenic agent.

H. pylory is very frequent in India (50/80 % of the population), but the incidence of gastric cancer is low.

Gastric cancer is a multifactorial disease with include host's genetic, dietary (fish, salt in contrast to vegetarian,...) and environmental factors and not *H. Pylori* alone. All these factors need to be considered.



Indian Journal of Dermatology

Indian J Dermatol. 2015 Jan-Feb; 60(1): 103.
doi: 10.4103/0019-5154.147846

Multifaceted Adult T-Cell Leukemia/Lymphoma in India: A Case Series

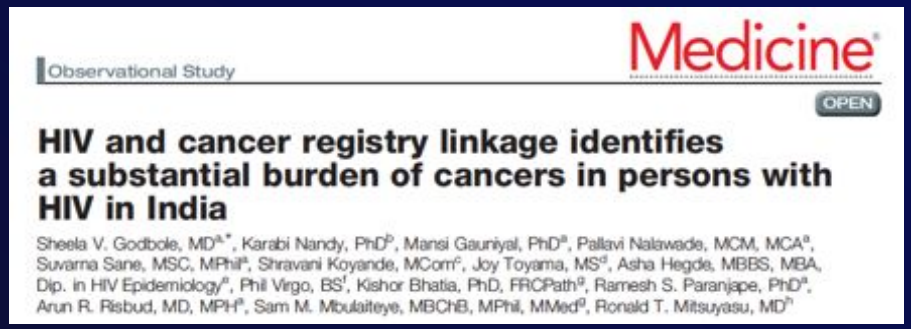
Anza Khader, Mohamed Shaan,[1] Sunitha Balakrishnan,[2] Betsy Ambooken, Kunnummel Muhammed, and Uma Rajan

From the Department of Dermatology, Government Medical College, Calicut, Kerala, India
[1]Department of Medicine, Government Medical College, Calicut, Kerala, India
[2]Department of Pathology, Government Medical College, Calicut, Kerala, India

Indian Journal of Pathology & Microbiology

HTLV 1 associated adult T cell lymphoma/leukemia a clinicopathologic, immunophenotypic tale of three cases from non-endemic region of south India

Indian Journal of Pathology and Microbiology. 2012;55(1)92-96 DOI 10.4103/0377-4929.94870



Observational Study

Medicine

OPEN

HIV and cancer registry linkage identifies a substantial burden of cancers in persons with HIV in India

Sheela V. Godbole, MD[a,*], Karabi Nandy, PhD[b], Mansi Gauniyal, PhD[a], Pallavi Nalawade, MCM, MCA[a], Suvarna Sane, MSC, MPhil[a], Shravani Koyande, MCom[c], Joy Toyama, MS[d], Asha Hegde, MBBS, MBA, Dip. in HIV Epidemiology[e], Phil Virgo, BS[f], Kishor Bhatia, PhD, FRCPath[g], Ramesh S. Paranjape, PhD[a], Arun R. Risbud, MD, MPH[a], Sam M. Mbulaiteye, MBChB, MPhil, MMed[g], Ronald T. Mitsuyasu, MD[h]

HTLV-1 and ATLL is quite rare in India and under-reported as well as HHV-8 and Kaposi's sarcoma except in HIV infected persons.

Conclusion

Cancer (including those associated with infectious agents) is already an

Important public health problem in India.

However, cancer incidence will continue to grow in the future.

We can really speak about «a cancer epidemic».

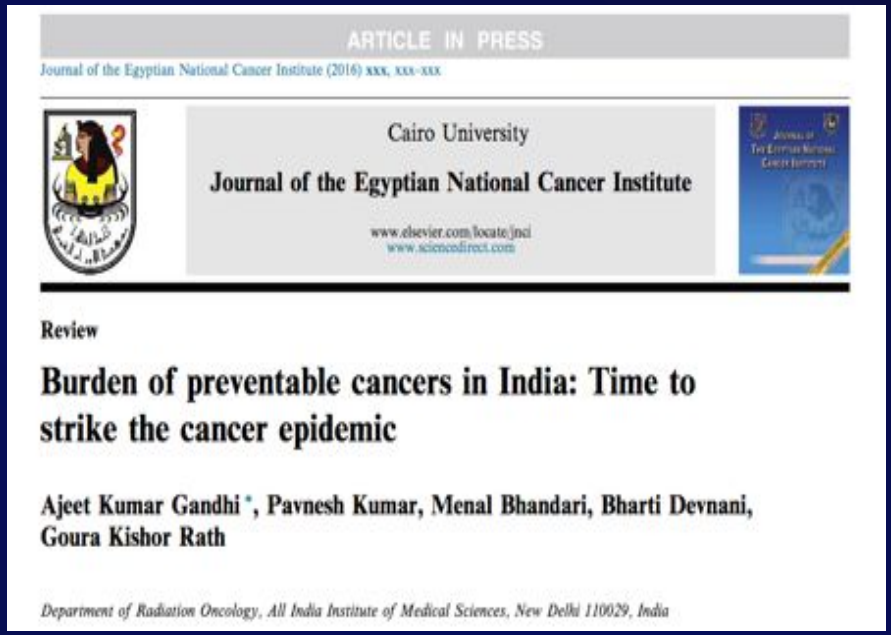
This is due to:

1) Increase in the population size

2) Increase of life expectancy

3) Increase of proportion of elderly population

4) Absence of any screening program in India



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Cairo University

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Review

Burden of preventable cancers in India: Time to strike the cancer epidemic

Ajeet Kumar Gandhi *, Pavnesh Kumar, Menal Bhandari, Bharti Devnani, Goura Kishor Rath

Department of Radiation Oncology, All India Institute of Medical Sciences, New Delhi 110029, India

What can be done?

Primary and Secondary Prevention

Primary: Prevention of the infection by Vaccination against HPV and HBV.
National program should be developped.

Secondary: Medical Education from the botom to top, from the general population and primary health structures, to nurses and medical school, will allow an earlier and better diagnosis and thus a better medical care.
This can and should be done for cervical cancer++, Nasopharyngeal Carcinoma, and Gastric cancer.

आपका ध्यान के लिए धन्यवाद

Thank you very much for your attention