

# Manuals for Training in Cancer Control

## Manual for Health Professionals



Directorate General of Health Services  
**Ministry of Health and Family Welfare**  
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## FOREWORD

India is one of the few countries in the world to have a National Cancer Control Programme. The programme was conceived with the objectives of providing preventive and curative services through public education and enhancement of treatment facilities.

We have been able to develop 23 Regional Cancer Centres and several Oncology Wings in India, which provide comprehensive cancer care services. One of the major limitations of the programme is the late stage at presentation of common cancers thus reducing the chances of survival. There is a need to increase awareness among the community regarding prevention and early detection of cancers. The programme is developing IEC materials for the same. Once the population is armed with the necessary information, it is expected that the health system should be geared to tackle the increased demand for care. There have to be trained health care professionals to support the needs of the community. This can be addressed by proper training and sensitisation of general practitioners and health care providers.

These manuals are developed for training health professionals and specific modules have been prepared for Cytology, Palliative care and Tobacco cessation. The facilitator's manual will assist the trainers to conduct the programmes. The manuals are self-explanatory and the health professionals will be able to use them on their own.

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## PREFACE

Demographic and epidemiological transitions and changes in lifestyle are leading to the emergence of cancer and other chronic diseases as public health problems in India. Cancer pattern in India reveals the predominance of tobacco related cancers, which are amenable to primary prevention. Cancer Registries in different parts of the country reveal that majority of cancer cases present in an advanced stage and makes treatment options prolonged and expensive. Therefore, the National Cancer Control Programme has placed its emphasis on prevention, early detection, enhancement of therapy facilities and provision of pain and palliative care. Comprehensive legislation on tobacco by the Government of India will help to control the tobacco related cancers. The programme has been able to augment the treatment capacity and to address the geographical gaps in cancer care services. Awareness and early detection programmes are undertaken through District Cancer Control Programmes.

Health care personnel have a major role in providing awareness, promoting early detection, prompt referral to a cancer treatment facility and in providing pain relief and palliative care. The knowledge and skills in the above areas have to be enhanced and these manuals have been developed in response to this need. This set of manuals, which consists of a facilitators' manual and separate manuals for health professionals, cytology, tobacco cessation and palliative care, is an attempt at providing the minimum required capacity. The manuals are self explanatory and will help the trainers, who will be from Regional Cancer Centres and other cancer treatment centres.

The manuals and the compact disc will be widely disseminated and same will be available on the website of the Ministry of Health and Welfare. The National Cancer Control Programme will urge that these may be used in cancer control training programmes in various settings.

  
(K. RAAMAMOORTHY)  
22.8.2005

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# Magnitude of Cancers

**C**ancer is a group of diseases characterized by uncontrolled cell multiplication which can occur in any living tissue in any site in the human body. Cancer develops in several phases depending on the type of tissue affected. Figure 1 shows the phases in cancer development. Control of communicable diseases and demographic changes have led to the emergence of cancer and other non-communicable diseases as major public health problems in India.



**Figure 1:** Typical phases of cancer development

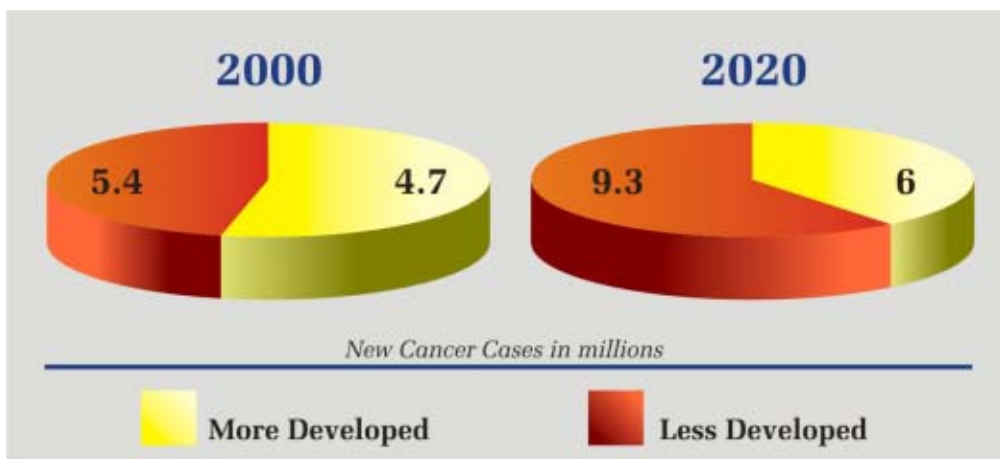
*(Source- National Cancer Control Programmes – Policies and Managerial Guidelines. World Health Organization, 2<sup>nd</sup> Edition, 2002)*

Incidence of cancer is the most reliable indicator of occurrence of cancer and is generated from population based cancer registries (PBCRs). PBCRs also provide data on cancer survival and mortality. Prevalence (number of persons living with the disease at any given time) of cancer can be estimated using the information on cancer incidence and survival.

## Global scenario

Cancer is emerging as a major problem globally; both in more developed and in less developed countries. Annually there are over 10 million new cases of cancer and more than 6 million deaths due to cancer (12% of all deaths) worldwide. The contribution of the developing world to this figure is more than half. By 2020, the number of new cancer cases is expected to reach at least 15 million a year and cancer deaths 10 million a year. Figure 2 shows the share of the more developed and less developed countries, in cancer incidence in 2000 and projected incidence in 2020. The common sites of cancer in the world are presented in Table 1.

**Figure 2:** Share of the more developed and less developed countries, in cancer incidence in 2000 and projected incidence in 2020.



(Source- National Cancer Control Programmes – Policies and Managerial Guidelines. World Health Organization. 2<sup>nd</sup> Edition, 2002)

**Table 1:** Incidence of common cancers in 2000 – World, More and Less Developed Countries

	Rank	World	More developed countries	Less developed countries
<b>Males</b>	1	Lung	Lung	Lung
	2	Stomach	Prostate	Stomach
	3	Prostate	Colon/rectum	Liver
	4	Colon/rectum	Stomach	Oesophagus
	5	Liver	Bladder	Colon/rectum
<b>Females</b>	1	Breast	Breast	Breast
	2	Uterine cervix	Colon/rectum	Uterine cervix
	3	Colon/rectum	Lung	Stomach
	4	Lung	Stomach	Lung
	5	Stomach	Corpus uteri	Colon/rectum

(Source- World Cancer Report, WHO, IARC, 2003)



Over time, certain trends have been visible for some types of cancer. Since 1950, the incidence of stomach cancer has declined by more than 50% in most countries. Lung cancer, by contrast, rose dramatically in the 20<sup>th</sup> century. Lung cancer incidence in men has shown a decline in more developed countries in the 1980s, although incidence in less developed countries continues to rise. Incidence among women also has shown a rise.

### **National scenario**

A network of cancer registries was started across the country under the National Cancer Registry Programme (NCRP) by the Indian Council of Medical Research (ICMR) in 1982. There are at present six population based cancer registries (five urban and one rural) and five hospital based registries (HBCRs) generating data on cancer in the country under NCRP. The PBCR collects information regarding all new cancer cases occurring in a defined population. PBCRs provide data on cancer incidence, survival and mortality. The HBCR records information on cancer patients attending a specific hospital with focus on clinical care and hospital services. HBCRs provide information on length and quality of survival in relation to site, stage and treatment and help to assess quality of hospital care and cancer services. Figure 3 shows the leading cancers in various PBCRs in the country, including some outside NCRP.

**Figure 3:** Leading cancers among women (Blue) and men (Red) in various cancer registries across India



- 0.8 million new cases/yr
- 2.4 million prevalent cases
- Tobacco Related Cancers (TRC) are amenable for primary prevention.
- 48% cancers in men and 20% in women are due to tobacco.
- Oral cancer - can be diagnosed early and treated successfully
- 13% of cancers in women (uterine cervix) can be potentially screened and prevented
- 9% of cancers in women (breast) can be detected early and treated effectively.

Five of the PBCRs are urban – Bangalore, Bhopal, Chennai, Delhi and Mumbai. Barshi in Maharashtra is the sole representative for rural areas. Crude incidence rates in the PBCRs vary from 37.3 per 100,000 (Barshi) to 86.7 per 100,000 (Chennai) among males, and 44.1 per 100,000 (Barshi) to 101.2 per 100,000 (Chennai) among females. Cancer incidence in India is estimated to be around 70-90 per 100,000 population with 700,000 – 900,000 new cases of cancer every year. If survival is taken as three years on an average, at any given time there will be about 2,500,000 cancer patients in the country. In 2000, 5,50,000 deaths in the country were due to cancer.

Cancer pattern as seen in the Population-based Cancer Registries (NCRP-PBCR) in India are shown in Tables 2 and 3.

**Table 2:** Five most common cancers in Men as seen in PBCR in India

Rank	Bangalore	Bhopal	Chennai	Delhi	Mumbai	Barshi (Rural)
1	Stomach	Lungs	Stomach	Lungs	Lungs	Hypopharynx
2	Oesophagus	Oral cavity <sup>#</sup>	Lungs	Larynx	Oesophagus	Oesophagus
3	Lungs	Tongue	Oesophagus	Prostate	Larynx	Liver
4	Hypopharynx	Oesophagus	Tongue	Brain	Oral cavity <sup>#</sup>	Rectum
5	Prostate	Hypopharynx	Oral cavity <sup>#</sup>	NonHodgkins lymphoma	Prostate	Oral cavity <sup>#</sup>

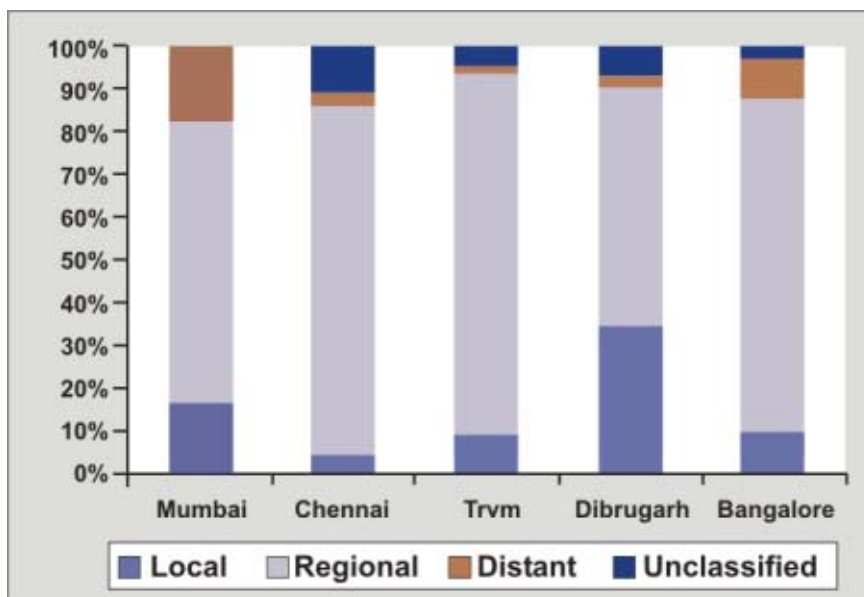
<sup>#</sup> Oral cavity includes gum, floor of mouth and other mouth cancers, and excludes lip, and tongue

**Table 3:** Five most common cancers in Women as seen in PBCR in India

Rank	Bangalore	Bhopal	Chennai	Delhi	Mumbai	Barshi (Rural)
1	Breast	Breast	Uterine cervix	Breast	Breast	Uterine cervix
2	Uterine cervix	Uterine cervix	Breast	Uterine cervix	Uterine cervix	Breast
3	Oral cavity <sup>#</sup>	Oral cavity <sup>#</sup>	Stomach	Ovary	Ovary	Oesophagus
4	Oesophagus	Ovary	Ovary	Gall bladder	Oesophagus	Ovary
5	Ovary	Oesophagus	Oesophagus	Body ueterus	Oral cavity <sup>#</sup>	Oral cavity <sup>#</sup>

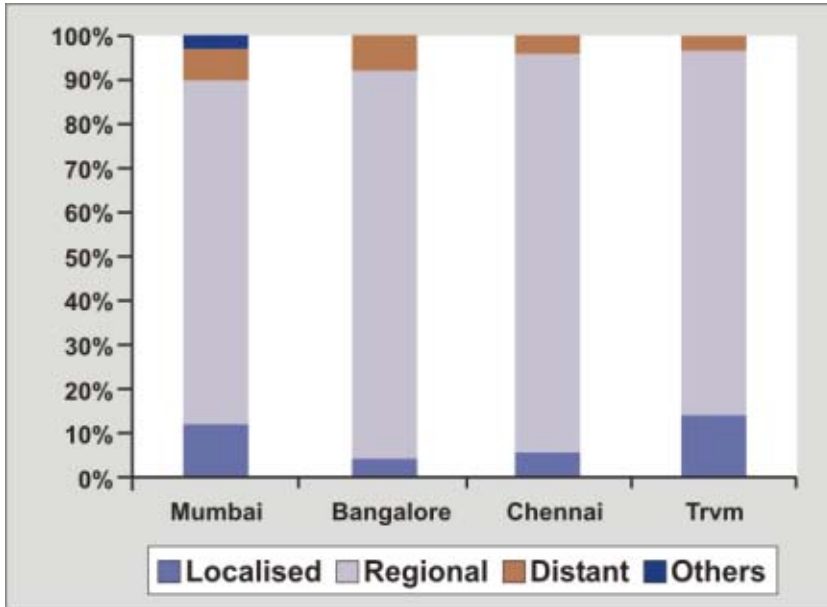
<sup>#</sup> Oral cavity includes gum, floor of mouth and other mouth cancers, and excludes lip, and tongue  
(Source- NCRP – Two-year report of the Population based Cancer Registries 1997-98. ICMR)

Stage at presentation (local, regional, distant spread) is the most important determinant of survival in cancer. HBCRs provide information on stage at presentation and hospital based survival. The stage at presentation of the three common cancers, in different hospital registries is shown in figures 4, 5 and 6. The majority of patients present with disease beyond the organ of origin, when the likelihood of cure is considerably reduced. This leads to the high numbers of deaths among cancer patients. If these cancers could be detected early, and treatment instituted, many deaths could be averted.

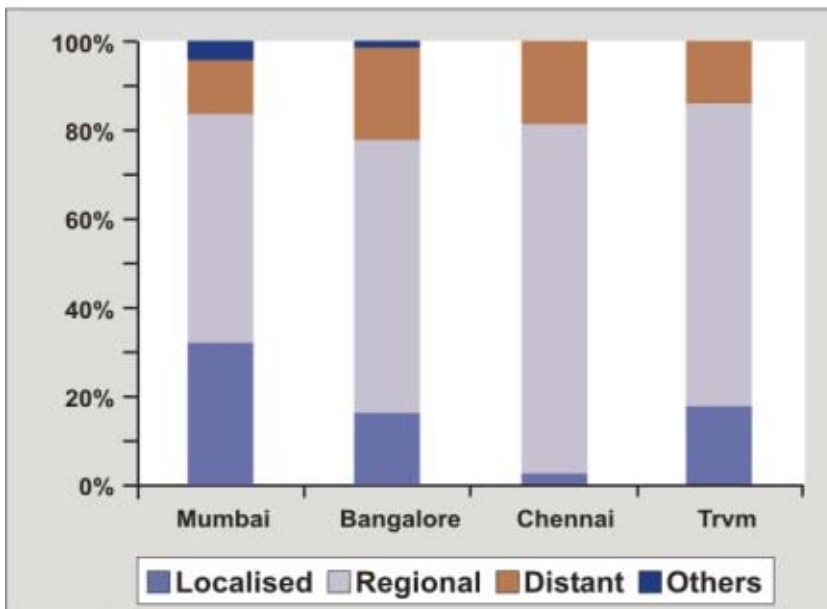


**Figure 4:** Extent of disease in various hospital cancer registries in India -Buccal mucosa-1994

**Figure 5:** Extent of disease in various hospital cancer registries in India – uterine cervix - 1994



**Figure 6:** Extent of disease in various hospital cancer registries in India – breast - 1994



## Key messages

- **Cancer is a group of diseases with common characteristics**
  - Uncontrolled multiplication of cells
  - Tendency for local and distant spread
  
- **Cancer is the cause of 12% deaths worldwide**
  
- **PBCRs provide data on cancer incidence and survival**
  
- **Incidence of cancer in India is 70-90 per 100,000.**
  
- **The most common cancers in India are:**
  - Cancers of the lungs, stomach, and oral cavity among men
  - Cancers of the uterine cervix and breast among women
  
- **HBCRs provide data on length and quality of survival in relation to site and stage at presentation and management**
  
- **Stage at presentation is the most important determinant of survival in cancer**

## Principles of Cancer Control

The cellular changes that characterize cancers are initiated by various degrees of interaction between host factors and exogenous agents. Life-style related factors are the most important and preventable among them. Studies conducted in the USA have identified the major risk factors of cancers, and these have been listed in Table 4.

**Table 4:** Causes of cancer deaths in the United States of America (USA)

Cause of Cancer	Best estimate (%)	Range of acceptable estimates (%)
Tobacco	30	25-40
Alcohol	3	2-4
Diet	35	10-70
Reproductive and sexual behaviour	7	1-13
Occupation	4	2-8
Pollution	2	1-5
Industrial by-products	1	1-2
Medicines and medical procedures	1	0.5-3
Geophysical factors	3	2-4
Infection	10	1-?

(Source- National Cancer Control Programmes – Policies and Managerial Guidelines. World Health Organization. 2<sup>nd</sup> Edition, 2002)

The relative importance of these factors in cancer causation in India may differ to some extent from the figures quoted in Table 4. Tobacco, for example, is responsible for around half of all cancers in men and 20% cancers in women in India. Knowledge of these factors can serve as the basis of cancer control.

Cancer control consists of prevention, early detection, treatment, and palliative care. A judicious mix of these approaches, when used for specific cancers, can substantially reduce cancer burden. Table 5 illustrates the approaches for some common groups of cancers.

**Table 5:** Approaches in cancer control

Approach	Cancers	Strategy
Prevention	Tobacco-related cancers	Tobacco control/ cessation
Early detection	Oral/Breast/Cervix	Propagation of awareness and self-examination Opportunistic examination Diagnostic support
Diagnosis and treatment	Common cancers	Training Treatment guidelines Infrastructure Referral practices
Palliative care	All advanced cancers	Oral morphine availability, Human resource development Community participation



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## 2A. Primary Prevention

Primary Prevention aims to reduce the incidence of disease by risk factor modification. A risk factor for a disease is an attribute or exposure that increases the probability of getting the disease. As exogenous risk factors including personal habits play a major role in the aetiology of cancer, modifying risk factor exposure may prevent many cancers. Among the activities for prevention, emphasis should be placed on:

- Tobacco control
- Health education relating to sexual and reproductive factors associated with cancer
- Avoiding alcohol use
- Healthy diet
- Physical activity and avoidance of obesity

### Tobacco

Tobacco is the single most important modifiable risk factor for cancer. Of all cancers in India, 34% are due to tobacco (48% of cancers in men and 20% of cancers in women). Tobacco smoke contains approximately 4000 chemicals of which at least 438 can cause cancer. Tobacco smoking causes cancer of the lung, larynx and oesophagus. Smoking is also associated with cancers of the pancreas, bladder, pelvis of the kidneys, ureter and squamous cell carcinoma of the uterine cervix. Tobacco chewing is the most important risk factor for cancer of the oral cavity. Inhalation of secondary smoke, known as “passive smoking” is a unique feature of smoking. It results in increased risk of cancers among non-smokers exposed to tobacco smoke.

Male tobacco use prevalence in 1998-1999 was 46.5% (National Family Health Survey – 2 1998-1999). The prevalence of tobacco use in women was 13.8% in this survey. The National Household Survey of Drug and Alcohol abuse conducted in 25 states in 2002 reported a prevalence of 55.8% in males aged 12 – 60 years of age. Data from these surveys indicate that tobacco use prevalence is higher among males than females and among older age groups than younger age groups.

Tobacco control involves health promotion and education, advocacy, support for cessation, community mobilization, taxation and other fiscal measures, livelihood alternatives, regulation, legislation and enforcement. Policy-level interventions would include levy of taxes (to raise prices of tobacco products and act as a disincentive for purchase), regulation of tobacco products (for constituents, emissions, health warnings, and misleading health

claims) and measures to reduce supply (ban on sale to youth, curbs on smuggling, and programmes to aid tobacco farmers and workers to switch over to alternative livelihoods).

Interventions at community level would involve programmes for empowering people, especially vulnerable sections, with the knowledge, motivation and skills required to abstain from or abandon the use of the tobacco habit. This includes creation of suitable environments to stimulate, support and sustain healthy lifestyle choices such as tobacco free norms at schools, worksites and homes.

At the level of the individual, the interventions would focus on behaviour change, especially aimed at tobacco cessation. This requires the availability of services ranging from counselling to de-addiction therapies, and an affordable supply of pharmacological agents for those who need it. Tobacco cessation is discussed in detail in the Manual for Tobacco control.

Health professionals have a fundamental role to play in tobacco control. They have the opportunity to help people change their behaviour and they can give advice, guidance and answers to questions related to the consequences of tobacco use. Studies have shown that even brief counseling by Health Professionals on the dangers of tobacco use and the importance of quitting is one of the most cost-effective methods of reducing tobacco use. They can also forewarn children and adolescents of the dangers of tobacco, and prevent children picking up the tobacco habit.

### **Framework Convention on Tobacco Control (FCTC)**

The World Health Assembly adopted the Framework Convention on Tobacco Control (FCTC) in May 2003 and it came in force on 27th February 2005. A framework convention is an international legal instrument that contemplates progressive development of international law by establishing a general system of governance for a specific issue. It is expected that Parties to the Convention would modify existing laws or develop new national laws which would reflect the commitments they have undertaken with respect to the convention.

The FCTC sets out guidelines for various national and international measures that would encourage tobacco users to quit and restrain non-users from taking to the habit. Table 6 sets out the framework for actions at national and international levels.

**Table 6:** Framework for national action and international cooperation in FCTC

Framework for national action	
<ul style="list-style-type: none"> <li>● Comprehensive ban on advertising</li> <li>● Protection against second-hand smoke</li> <li>● Prohibition of youth access</li> <li>● Prominent health warnings</li> <li>● Testing and regulation of contents</li> <li>● Increase in tobacco taxes</li> <li>● Cessation programmes</li> <li>● Alternative crops</li> <li>● Surveillance</li> </ul>	Requires partnerships within countries
Framework for international cooperation	
<ul style="list-style-type: none"> <li>● Ban on cross-border advertising</li> <li>● Prevention of illicit trade</li> <li>● Scientific and legal cooperation</li> <li>● Technical assistance</li> <li>● Financial support for FCTC implementation (bilateral and multilateral channels) Monitoring</li> </ul>	Requires partnerships among countries

(Source – Report on Tobacco control in India, Government of India, 2004)

### Cigarettes and Other Tobacco Products Act, 2003

A tobacco control legislation entitled 'The Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act, 2003' became an Act of Parliament on 18<sup>th</sup> May 2003. This comprehensive piece of legislation, intended to protect and improve public health, encompasses a wide array of evidence-based strategies to reduce tobacco consumption. This legislation brings the entire range of tobacco products under the jurisdiction of the Central Government for the purpose of this Act and is enforceable across all states. Some of the key provisions and penalties under the Act are listed in Table 7.

**Table 7:** Key provisions and penalties of the Cigarettes and Other Products Act, 2003

Provisions	Penalties
Prohibition on direct and indirect advertisements of tobacco products, with the exception of advertising at points of sale and on tobacco packs. Ban on gifts, prizes, scholarships or sponsorship of sports or other cultural events using the trademark or brand names of tobacco products	Advertisement is to be forfeited and disposed of. First conviction punishable with imprisonment of up to two years or fine up to Rs 1000, or both. Subsequent convictions punishable with imprisonment of up to five years and fine of up to Rs 5000
Prohibition of smoking in public places	Offences would be made compoundable with a fine of up to Rs 200
Prohibition on sale of tobacco products to persons below 18 years of age Prohibition on sale of tobacco within a radius of 100 yards of educational institutions	Offences would be compoundable with summary trials and a fine of up to Rs 200
Legible and conspicuous display of health warnings on not less than one of the largest panels of the tobacco package with text of warning in the same language as that used on the pack Indication of tar and nicotine contents on the package with maximum permissible limits as prescribed	Producer/manufacturer – imprisonment up to two years or fine up to Rs 5000, or both for first offence, and imprisonment up to five years and fine up to Rs 10,000 for subsequent convictions Seller/distributor – imprisonment up to one year or fine up to Rs 1000, or both for first offence, and imprisonment up to two years and fine up to Rs 3000 for subsequent convictions

(Source –Report on Tobacco control in India, Government of India, 2004)

## Alcohol

Increasing alcohol consumption is associated with cancers of the mouth, pharynx (excluding nasopharynx), larynx, oesophagus and liver. The risk relationship between cancer and alcohol is nearly a linear relationship with the risk increasing with increasing amount of alcohol consumed. Co-existence of tobacco habits can have a multiplicative effect on development of cancer.

Control of alcohol requires actions similar to those for tobacco control. The actions should be targeted towards individual and community and include *taxation, general public education, encouraging highly vulnerable groups like young people to avoid starting consumption etc.*

## Sexual and Reproductive Factors

Sexual and reproductive factors are associated with cancer of the uterine cervix and breast. Sexual behaviour factors, like young age at first sexual activity, multiple sexual partners and poor sexual hygiene, are associated with cancer of the uterine cervix. Human Papilloma Virus (HPV) has now been identified as the etiological agent responsible for cervical cancer. HPV prevalence increases with high risk sexual behaviour and poor sexual hygiene.

Late age at marriage, nulliparity, and late menopause have been linked to breast cancer, but the underlying mechanism is probably uninterrupted exposure to oestrogen for prolonged periods in all these cases.

Education regarding sexual hygiene and safe sexual behaviour may be provided for prevention of cancer cervix. Safe sexual behaviour protects women from the risk of cervical cancer by preventing infection with HPV. Breast cancer is not preventable to any large extent. Early detection of breast cancer is the main strategy for improving survival in breast cancer.

## Diet

Various studies in the past two decades suggest the role of diet in human cancers. Dietary factors are responsible for many cancers in the Western countries. Changing dietary patterns will lead to increased contribution of diet in cancer causation in India also. It is generally agreed that diets rich in animal fats, especially red meats, increase the risk for cancer. It is also widely accepted that diets high in fresh vegetables and fruits, and fibre reduce risk for cancer.

### **Certain basic measures may help in reducing risk of cancer:**

- Avoid being underweight or overweight
- Engage in regular physical activity
- Consumption of alcohol is not recommended
- Limit consumption of salted foods
- Choose predominantly plant based diets rich in fruits and vegetables
- Restrict the intake of red-meat (beef, pork, lamb) and preserved meat

## Occupation

Occupational cancers constitute 5-10% of all cancers. Increased risk of lung cancer has been seen in workers engaged in manufacture of rubber tyres in developing countries, textile workers, ship and dockyard workers and wood workers. Higher risk of bladder cancer was seen in workers of chemical and pharmaceutical plants.

Limiting exposure to potentially carcinogenic substances through protective gear, frequent rotation of workers, mechanized handling of such chemicals and similar mechanisms may help reduce cancers from occupational exposures.

## Infection

Infections with various agents are implicated in the aetiology of certain cancers as shown in Table 8. Control of cancers caused by or associated with infections depends upon success in combating the infection concerned. Measures include eliminating reservoirs and sources of infection, preventing transmission, increasing host immunity through vaccination, and effective treatment of those infected.

**Table 8:** Infective agents associated with cancers and measures for prevention

Infective agent	Cancer	Prevention
Human Papilloma virus	Cancer of the Uterine Cervix, Oesophageal carcinoma, Anal cancer, Penile cancer, Oral cancer	Safe sexual practices, avoiding multiple sexual partners
Hepatitis B and Hepatitis C virus	Hepatocellular carcinoma can occur from chronic active infection	Universal precautions, Safe sexual practices, vaccine for Hepatitis B
Epstein- Barr virus	Burkitt Lymphoma, Nasopharyngeal carcinoma	No specific interventions
Schistosoma haematobium	Bladder cancer	Preventing water pollution with human waste, treating patients, controlling intermediate hosts (snails)
Clonorchis sinensis	Cholangiocarcinoma	Preventing water pollution with human waste, treating patients, controlling intermediate hosts (snail, fish), avoid eating raw fish
Helicobacter Pylori	Stomach cancer	Treating patients with symptomatic infection

## 2B. Early Detection

Early detection of cancer is the detection of disease at a stage in its natural history where the chance of cure is high. Early detection is only part of a wider strategy that includes diagnosis, treatment and follow-up.

Many cancers that are potentially curable at early stages are detected only in advanced stages. Diagnosis of such cancers at a stage where treatment is effective could have a major impact on the disease outcome. Certain symptoms and signs may be early indicators of some cancers. These include:

- Unexplained change in bowel or bladder habit
- A white patch or ulcer in the mouth that does not heal
- Obvious change in a mole or wart, like rapid increase in size, bleeding or ulceration
- Bleeding from body's orifices eg – haematuria
- Persistent indigestion/ difficulty in swallowing/ difficulty in breathing
- Persistent fever unresponsive to treatment
- Unexplained loss of weight
- Chronic cough or hoarseness of voice especially in a smoker

All people should be aware of these warning signs. The presence of any of these features does not mean a definitive diagnosis of cancer. Such changes may occur in other benign conditions also. However, any such sign not responding to appropriate treatment warrants immediate medical attention and prompt management.

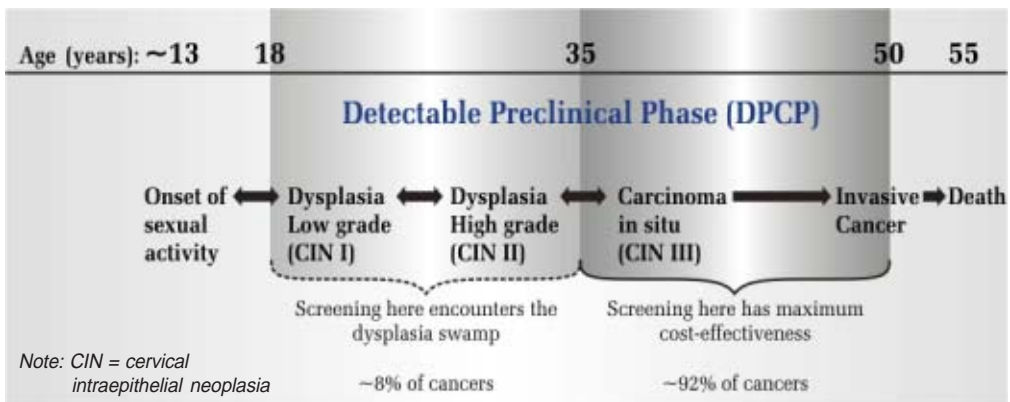
It is also important to train people to detect cancers in the early stage with self-examination of the oral cavity and breast. Health professionals should be trained for early detection and prompt referral of suspected cases.

## 2c. Screening

Screening is the presumptive identification of unrecognised disease or defects by means of tests, examination or other procedures that can be applied rapidly. Screening is based on the concept that there is a detectable pre-clinical phase of the disease being screened, and detection at this stage markedly alters disease prognosis. The success of screening depends on having sufficient numbers of trained personnel to perform the screening tests with adequate coverage of target populations, and on the availability of facilities that can undertake subsequent diagnosis, treatment and follow-up. The target disease should be a common form of cancer with high associated morbidity and mortality, and test procedures should be acceptable, safe and relatively inexpensive. Screening is recommended for cancers of uterine cervix and breast, only if resources permit.

### Screening for Cervical cancer

Cervical smear cytology is the standard screening test for cervical cancer. It is an easy and effective method revealing the presence of pre-cancerous lesions as well as in situ or very early invasive cancer. Screening should preferably begin at 35 years of age, as at younger ages dysplasia detected through screening rarely progresses to cancer, but adds to programme cost in treatment (Figure 7). The important requirement for cervical cytology is the availability of good laboratory services so that accurate diagnosis is possible. Screening programmes may be initiated in a defined population if adequate trained manpower and facilities are available. The most important aspects of a screening programme are its organization and management. All women in the target population should be invited for screening, unique identification numbers provided for follow up, and reliable laboratory facilities and personnel made available. **The screened population has to be provided appropriate interventions and follow up.** At least 80% of the target population has to be covered if reduction in incidence is to be achieved.



**Figure 7 :** Screening for cervical cancer



Alternative strategies such as visual inspection are being tested for use in low-resource settings where laboratory facilities for cervical cytology are inadequate. Test performance of Visual Inspection with Acetic acid (VIA) suggests that it has similar sensitivity to that of cervical cytology in detecting cervical intraepithelial neoplasia, but has lower specificity. Further studies are underway to judge how appropriate and feasible it will be to introduce VIA-based cervical cancer screening programmes on a population-wide basis. There is increasing interest in the use of HPV DNA testing for screening. The test, however, requires financial and sophisticated technical resources. Details of some of the methods are provided in the section on cervical cancer. However, (more than the tests) it is the health system, with the required resources and services for the follow up management of those with abnormal test results that determines the outcome of any such programme.

### **Screening for cancer of breast**

Mammography is an effective screening test for breast cancer, and can reduce mortality due to breast cancer if used with appropriate follow-up. Unfortunately, it is an expensive test that requires great care and expertise both to perform and in the interpretation of results. It is therefore currently not a viable option for many countries. Breast self-examination has not been proven to reduce breast cancer mortality. Early diagnosis of breast cancer, by promoting breast awareness among all women and clinical breast examinations for women preferably in the age group 40-69 years, should be encouraged.

Appropriate diagnostic facilities and referral practices have to be established to ensure that early detection and screening programmes result in the desired results.

## 2D. Diagnosis and Treatment

### Diagnostic Methods

The diagnostic procedures in oncology are for diagnosis, determining the extent of the disease, deciding the treatment options available and evaluating the patient during follow-up. Clinical evaluation is the first and the most important step in the diagnosis of malignancy. It requires the health professional to be alert to the early warning signals. A thorough history and clinical examination of any suspicious symptom or sign is mandatory. Clinical suspicion of malignancy can be confirmed by various diagnostic methods described below.

### Radiological Evaluation

Various imaging methods are:

- X ray
- Fluoroscopy
- Mammography
- Ultrasound
- C.T.Scan
- Magnetic Resonance Imaging
- Positron Emission Tomography

Nuclear Medicine

- Radio nuclide scan and Radioactivity uptake studies e.g. Thyroid, Bone

### Biochemical Evaluation

This is generally done to know the organ functions, like liver function tests, and renal function tests.

### Endoscopy

In oncology endoscopy is useful to:

- Detect the site of primary cancer
- Evaluate the extent of lesion
- Perform biopsy
- Perform certain therapies like endoprosthesis for oesophageal stenosis, laser therapy, etc.

## Pathological Evaluation

Pathological evaluation is an important method for confirmation of clinical diagnosis and includes:

- Haematological Examination: Examination of peripheral blood smear and bone marrow.
- Cytological Examination:
  - Exfoliative cytology: examination of exfoliated cells; e.g. female genital tract, oral cavity, urinary tract (urine examination), gastrointestinal lesions (gastric lavage) etc.
  - Fine Needle Aspiration Cytology (FNAC): to obtain material from organs that do not shed cells spontaneously. Example: Breast, Thyroid, etc.
  - Aspiration of body fluids: to rule out or confirm malignant effusions. Example: pleural fluid, peritoneal fluid.
- Biopsy: A small chunk of tissue is removed from the suspicious site and subjected to histopathological examination. It may be:
  - Excisional biopsy in small tumours
  - Incisional/ Punch biopsy in skin and mucosal lesions
  - Cone biopsy in uterine cervix
  - Needle biopsy in bone marrow, solid tumours of abdomen and pelvic organs.

## Immunological Evaluation

Some cancers release biologic or biochemical substances, in the form of hormones, enzymes, and antigens, into the circulation. The measurement of these substances in blood can be useful in the detection and diagnosis of some types of cancers. Such chemicals are called tumour markers. Some common tumour markers and the conditions in which they may be raised are listed in Table 9.

**Table 9:** Some common tumour markers and the conditions in which they may be raised

Tumour marker	Malignancies	Non-malignant conditions
Alpha feto protein (AFP)	Hepatoblastoma, Nonseminomatous germ cell tumour testis, Non-dysgerminomatous germ cell tumour ovary, Hepatocellular carcinoma,	Cirrhosis, Hepatitis
Beta human chorionic gonadotrophin (B-hCG)	Choriocarcinoma, Testicular germ cell tumours	Hypogonadism, Hydatidiform mole
Carcino embryonic antigen (CEA)	Colorectal cancers, Breast cancer, Cholangiocarcinoma, Stomach cancer	Smoking, Fatty liver, Hepatitis
CA-125	Epithelial ovarian cancer	Pregnancy, Menstruation, Endometriosis, Ascites, Pleural effusion
Prostate specific antigen	Prostate cancer	Prostatitis, Benign prostatic hyperplasia, Prostatic manipulation

(source – Role of Tumor markers and Recent advances in cancer diagnosis, Manisha Bhutani, Amish Vora and Vinod Kochupillai, Fifty Years of Cancer Control in India. National Cancer Control Programme. Government of India. 2002)

## Staging of cancer

Staging is used to assess the extent of the spread of the disease in the body. It is an indication of prognosis, and is used as a guide to determine the type and extent of treatment required.

**TNM classification-** The TNM classification for tumours has been adopted by the International Union against Cancer, and has been extended for many sites of cancer. This is a detailed clinical staging which is arrived at by the clinician by ascertaining the extent of the primary tumour (**T**), lymph node involvement (**N**), and presence of metastases (**M**). The information so obtained is scored. The details of scoring are specific to each type of cancer. Other systems of staging include the FIGO (International Federation of Gynaecology and Obstetrics) staging for cancers of the uterine cervix and body of the uterus, and the Duke's system of staging for cancer of the rectum.

## Principles of Treatment

The primary goals of cancer treatment are cure ideally, prolongation of useful life if possible, and improvement in quality of life always. The principal methods of treatment are surgery, radiotherapy, and chemotherapy (including hormonal manipulation). Each of these modalities has a well-established role, and can be used for cure or for palliation. Appropriate combination and sequencing of these modalities can be adopted for specific cancers.

### Surgery

Surgery plays an important role in the diagnosis, staging and treatment of localised cancers. Where other modalities form the mainstay of treatment, surgery can contribute through removal of tumour masses, palliation and treatment of some complications.

Surgery requires the support of other specialties including anaesthesiology, blood transfusion services, pathology (specially oncopathology) and critical care nursing. In early stage solid tumours, surgery that encompasses a sufficient margin of normal tissue is curative. These include early stage cancers of the breast, oral cavity, uterine cervix, colon, prostate and the skin. Surgery is also used post chemotherapy or radiotherapy to provide local cancer control and better chances for adjuvant therapy. In certain solid tumours, surgery is critical for reducing bulk (cytoreduction). Surgery is valuable in oncology emergencies, to relieve bowel obstruction, promote cessation of bleeding, close perforations, relieve compression, and drain ascites or pleural effusions. Apart from treatment, surgery for reconstruction and rehabilitation can improve function and cosmetic appearance and enhance quality of life for patients.

### Radiotherapy

Radiotherapy is one of the most important methods of curing local cancer. Radiotherapy is the method of treating diseases with “ionising radiation”. The ionising radiation causes damage to certain vital structures within the cells. The cells are either damaged or are rendered incapable of further multiplication. These damaging effects on normal cells are less and reversible whereas the damage in the abnormal cell is irreversible. This differential is the principle of radiotherapeutic treatment.

Radiotherapy is a capital-intensive specialty, requiring high technology equipment and skilled technicians, found only in tertiary centres. Radiotherapy may be teletherapy (administered from a distance) or brachytherapy (treatment with radioactive substances within body cavities or tissues). Teletherapy may be administered by cobalt machines or by accelerators. Clinical outcomes are identical with both machines. Brachytherapy may be delivered by low dose rate (LDR) devices using caesium and high dose rate (HDR) devices using iridium or cobalt. HDR can be used for treatment of a wider variety of cancers than LDR and reduces the need for hospital bed occupancy, but demands more expertise and has higher costs.

Radiotherapy is one of the most important methods of curing local cancer. It is also often administered before or after surgery. Such treatment either facilitates surgery or consolidates surgical gains, and reduces local recurrence of disease. Palliative radiotherapy is of value in cases of pain secondary to bone metastasis and tumours causing bleeding or compressive syndromes.

Radiotherapy can cause various side effects. Patients may notice loss of appetite, nausea, and occasionally vomiting persisting for a week. The symptoms are mild in nature and seen in about 10% of patients, and are easily controlled by medicines. Other side effects depend on the site irradiated and can include mucositis and bone marrow depression. Long-term side effects are also observed.

## **Chemotherapy**

Chemotherapy is the use of cytotoxic drugs against cancer. Cancer cells are damaged to the extent that they cannot survive. Normal cells are also damaged but to a lesser degree.

Chemotherapy is curative in certain cancers e.g. Hodgkin disease, high-grade non-Hodgkin lymphomas; palliative in many cancers, and used as adjuvant therapy for some cancers including breast cancer, ovarian cancer and colorectal cancer. The goal of adjuvant therapy (treatment given in addition to primary definitive therapy in the absence of macroscopic residual disease) is to avoid metastases, prolong life and improve quality of life. Chemotherapy is ineffective in hepatobiliary cancers, pancreatic cancer, thyroid cancer, and central nervous system cancers among others.

Acute side effects of chemotherapy are usually self-limited and reversible. Fall in blood count, hair loss, nausea, vomiting, constipation, diarrhea, anaemia, and depression of the immune system are some of the side-effects. There may be drug specific side effects like cardiotoxicity, nephrotoxicity, neurotoxicity.

## **Palliative care**

Palliative care is an approach that improves the quality of life of patients and their families facing a life-threatening illness. This is done through prevention and relief of suffering by means of early identification, accurate assessment and treatment of pain and physical, psychosocial and spiritual problems. Palliative care involves a multidisciplinary team approach. Further details on palliative care are provided in the Manual on Palliative Care.

**Table 10:** Relative importance of various interventions in different cancers

Cancer	Early Detection	Surgery	Radiation	Chemotherapy/ Hormonal adjuvant therapy	Palliative Care
Mouth/Pharynx	+	++	+++	+	+++
Oesophagus	-	+	++	-	+++
Stomach	+	+	-	-	+++
Colon/Rectum	++	+++	++	+++	+++
Liver	-	+	-	-	+++
Lung	-	+	++	-	+++
Breast	+++	+++	++	+++	+++
Cervix	+++	++	+++	-	+++

Key: — = no role; + = small role; ++ = modest role; +++ = major role

(Source- National Cancer Control Programmes – Policies and Managerial Guidelines. World Health Organization. 2<sup>nd</sup> Edition, 2002)

In summary, primary prevention, early detection, prompt diagnosis and appropriate treatment, and palliative care are the main strategies for cancer control. Each cancer requires a distinctive mix of these strategies for its control. The matrix given in Table 10 suggests the options on a prevention-treatment-palliation continuum, for each cancer.

Tobacco-related cancers like cancers of the lungs, pharynx, and oral cavity are highly amenable to primary prevention. Early detection and treatment is possible for cancers of the oral cavity, uterine cervix, and breast. Palliative care is a key intervention for all types of cancers.

Cancers of the oral cavity, uterine cervix, and breast are discussed in detail subsequently in view of the opportunity they offer for early detection and treatment with curative intent.

#### Issues that need to be kept in mind for all cancers:

- Prompt referral of patients with any suspicion of cancer for appropriate management
- Compliance of the patient with medical advice
- Provision of psychosocial services for the patient, and the family
- Rehabilitation: Physical, psychological and social rehabilitation so that the affected individual is able to take care of self, be emotionally stable, and be able to work and socialize, to the extent possible.

## Key messages

### ➤ **Primary prevention**

- Avoid use of tobacco in any form
- Avoid alcohol
- Promote physical activity
- Eat plenty of fruits and vegetables
- Practise Safe sexual behaviour

### ➤ **Early detection of cancers**

- Breast awareness
- Awareness in community regarding early warning signs of common cancers (Oral/Breast/Cervix)
- Opportunistic check up for oral, breast and cervical cancer
- Prompt referral and appropriate management  
Prompt referral of any suspicious case is the most important step towards cure.

### ➤ **Diagnostic methods:**

- Clinical history & examination – first and most important
- Radiological examination
- Pathological examination
- Diagnostic procedures help us to know:
  - \* The type of cancer
  - \* The extent (staging) of cancer
  - \* Treatment options and prognosis
  - \* Follow-up evaluation

### ➤ **Treatment Modalities:** ● Surgery ● Radiotherapy ● Chemotherapy

- Treatment modalities can be used with intention of cure or palliation, and alone or in combination depending on type and extent of disease.
- Goal of treatment is ideally cure if possible and improvement in quality of life always.



## Common Cancers

### 3A. Cancer of the Oral Cavity

Oral cancer is one of the ten most common cancers in the world. In India, oral cancer, including cancers of the lip, tongue, gum and floor of mouth, is one the most common cancers, and may be the commonest in many regions. Oral cancer is both preventable and curable. There is usually a long natural history and most cases of oral cancer arise from pre-cancerous lesions. Therefore there is ample opportunity for intervention before actual malignancy develops. Also oral cancer responds well to surgery and radiation if detected early.

#### Risk factors

Tobacco chewing is the single most important risk factor for oral cancer. Other risk factors include alcohol use, betel nut chewing, and chronic trauma to oral mucosa by sharp tooth or ill-fitting dentures. Chronic exposure to these risk factors causes changes in the oral mucosa and these changes are visible as pre-cancerous lesions. Over time, malignancy may develop in these lesions.

#### Pre-cancerous lesions

Pre-cancerous lesions or conditions are local or generalized disturbances that predispose to malignancy in a particular site. Leucoplakia, erythroplakia, palatal changes associated with reverse smoking or beedi smoking and submucous fibrosis are local pre-cancerous lesions. Plummer Vinson syndrome, syphilis, and erosive lichen planus are generalised pre-cancerous conditions.

All these conditions are amenable to early diagnosis, and treatment is possible in many cases.

#### Leucoplakia

This is defined as a white patch that cannot be characterized as any other disease clinically or pathologically (Figure 8). They can be of 4 types:

- Homogeneous leucoplakia: Low risk of cancer
- Ulcerated or erosive leucoplakia: High risk of cancer
- Speckled or nodular leucoplakia: High risk of cancer
- Verrucous leucoplakia: Very high risk of cancer

Two or more types of leucoplakia may be present in the oral cavity at the same time. Confirmatory diagnosis is by biopsy.



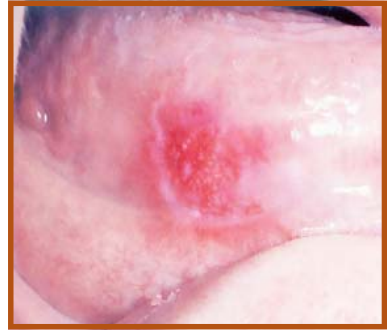
**Figure 8:** Homogeneous leukoplakia involving dorsum and right lateral border of tongue.

**Treatment of leucoplakia:**

Treatment is planned on the basis of individual cases. In all cases, patients must be advised to quit the tobacco habit. Routine follow-up observation allows early detection of any cancerous change in the lesions.

**Erythroplakia:**

This is a bright, velvety area sometimes surrounded by faint plaques which cannot be characterized as any other lesion clinically or pathologically (Figure 9). About 90% of these lesions show cellular dysplasia or malignancy. The risk of malignancy in erythroplakia is higher than in leucoplakia. Hence all cases of erythroplakia need to be biopsied. Treatment of erythroplakia is similar to treatment of leucoplakia.



**Figure 9:** Erythroplakia in the right lateral border of tongue

**Palatal changes due to beedies and reverse smoking:**

There is palatal keratosis, excrescences around the openings of minor salivary glands, white patches, red areas, ulceration and melanin pigmentation (Figure 9). All such lesions should be subjected to biopsy and treatment is to be instituted accordingly. Cessation of the tobacco habit is an essential part of treatment.

**Traumatic Ulcers / Keratosis:**

Sharp cusps, remaining root stumps, mal-aligned teeth and unscientifically fabricated dentures can cause traumatic ulcers or keratosis on the lateral margins of the tongue or buccal mucosa. Any such ulcer in the mouth that does not heal within one month of antibiotic/antiseptic treatment should be viewed with suspicion. The irritant like sharp tooth, ill-fitting dentures etc. should be removed immediately and the lesion reassessed after two weeks. Any lesion that persists should be biopsied and managed accordingly.



**Figure 10:** An elderly lady with Oral Submucous fibrosis. Restricted mouth opening and depapillated tongue can be appreciated in this lady who is a chronic chewer of tobacco.

**Oral Submucous Fibrosis (SMF):**

This is characterized by blanching of the oral mucosa, difficulty in tolerating spicy foods and slowly progressive inability to open the mouth and protrude the tongue (Figure 10). In some cases there may be involvement of soft palate resulting in nasal voice.

SMF may be localized or generalized. Diagnosis is by visualisation or palpation of fibrous bands, loss of elasticity of buccal mucosa and atrophy of tongue. In generalized SMF, the entire oral mucosa is atrophic. Once detected, the patient should be advised to stop the tobacco habit, and should be regularly followed up.

## Oral Cancer:

The most common cancer seen in the oral cavity is **squamous cell carcinoma**. It presents as a painless ulcer, mass or fissure (Figure 11). As the disease advances, patient may have excessive salivation, trismus, and difficulty in chewing, swallowing or speaking, depending on the involvement. There may also be cervical lymphadenopathy. Distant metastases are uncommon in oral cancers.



*Figure 11:* Oral cancer

## Early detection

**I. Self Examination of oral cavity:** This is important for detecting oral lesions at an early stage.



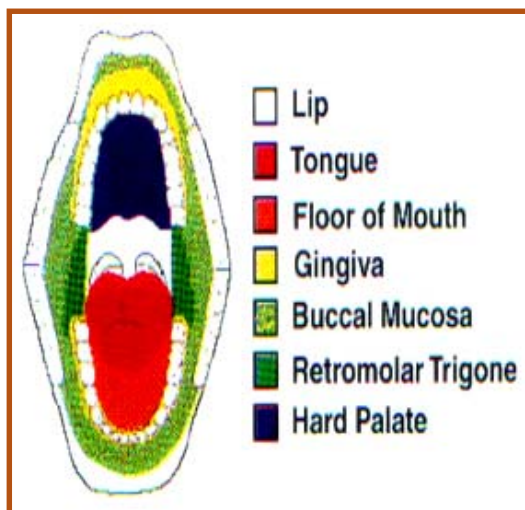
*Figure 12:* Self Examination of oral cavity

**When to do self-examination:**

All habitual tobacco users should do it once a month

**How to do it:**

- Rinse the mouth with water and stand before a mirror in adequate light
- Look in the mirror for any abnormal white or red patch, ulcer or roughened area, granular area or swelling in the mouth (Figure 12).
- If any such area is seen, the suspicious area should be felt with the fingers. Normal oral mucosal is soft and pink.
- Consult a doctor if any abnormal area is found.



**Figure 13:**  
Parts of oral cavity

**II. Examination by a health professional**

Utilize every opportunity to examine the oral cavities of tobacco users. All parts of the oral cavity should be examined; oral cavity includes lip, anterior 2/3 of tongue, floor of mouth, buccal mucosa, gingival mucosa, hard palate and retromolar trigone (Figure 13).

**Diagnosis and staging of oral cancer:**

- A thorough clinical Examination
- Biopsy: Punch or incisional
- X-Rays of mandible and paranasal sinuses
- CT scan and MRI

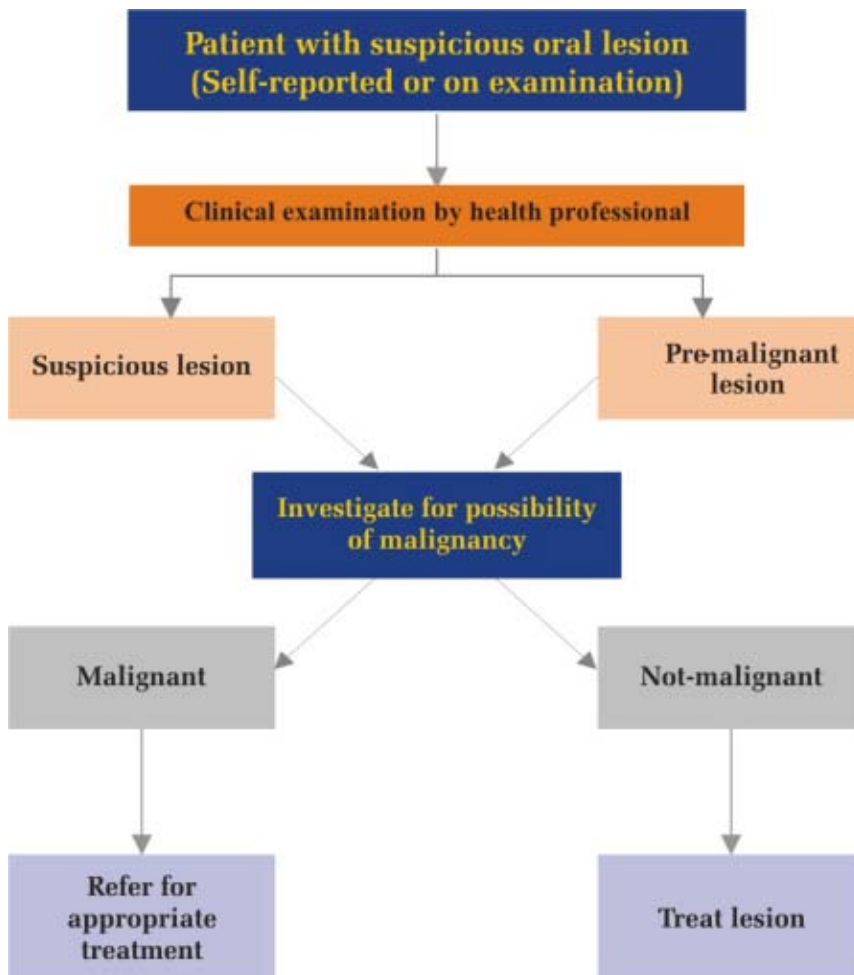
Table 11 shows the TNM staging for oral cancer.

**Table 11:** TNM Classification for Oral Cancer

Primary Tumour	Regional lymph nodes	Distant metastases	Stage
<p><b>T<sub>x</sub></b>: Primary tumour cannot be assessed</p> <p><b>T<sub>0</sub></b>: No evidence of primary tumour</p> <p><b>Tis</b>: Carcinoma in situ</p> <p><b>T<sub>1</sub></b>: Tumour &lt;2cm in its greatest dimension</p> <p><b>T<sub>2</sub></b>: Tumour 2-4cm. in greatest dimension</p> <p><b>T<sub>3</sub></b>: Tumour &gt;4cm. in greatest dimension</p> <p><b>T<sub>4</sub> (lip)</b>: Tumour invades through cortical bone, inferior alveolar nerve, floor of mouth or skin of face.</p> <p><b>T<sub>4</sub> a</b>: (oral cavity) Tumour invades adjacent structures e.g. through cortical bone, deep muscle of tongue, maxillary sinus, skin of face.</p> <p><b>T<sub>4</sub> b</b>: Tumour invades masticator space, pterygoid plates or skull base and/or encases internal carotid artery.</p>	<p><b>N<sub>x</sub></b>: Regional nodes cannot be assessed</p> <p><b>N<sub>0</sub></b>: No regional lymph nodes</p> <p><b>N<sub>1</sub></b>: Ipsilateral single node 3 cms or less in greatest dimension.</p> <p><b>N<sub>2</sub></b>:</p> <p>a: Ipsilateral single node &gt; 3 cms and &lt;6 cms in greatest dimension.</p> <p>b: Ipsilateral multiple nodes, none more than 6 cms in greatest dimension.</p> <p>c: Bilateral or contralateral nodes, none more than 6 cms in greatest dimension.</p> <p><b>N<sub>3</sub></b>: Nodes more than 6 cms.</p>	<p><b>M<sub>x</sub></b>: Distant metastases cannot be assessed</p> <p><b>M<sub>0</sub></b>: No distant metastases</p> <p><b>M<sub>1</sub></b>: Presence of distant metastases</p>	<p><b>0</b>: Tis, N<sub>0</sub>M<sub>0</sub></p> <p><b>I</b>: T<sub>1</sub>N<sub>0</sub>M<sub>0</sub></p> <p><b>II</b>: T<sub>2</sub>N<sub>0</sub>M<sub>0</sub></p> <p><b>III</b>: T<sub>3</sub>N<sub>0</sub>M<sub>0</sub> T<sub>1-3</sub>, N<sub>1</sub>M<sub>0</sub></p> <p><b>IV</b>: T<sub>4</sub>N<sub>0-1</sub>M<sub>0</sub> Any T N<sub>2-3</sub>, M<sub>0</sub> Any T, any N, M<sub>1</sub></p>

## Management of Oral Cancer

Management may be through surgery, radiotherapy, chemotherapy, or a combination of modalities. Figure 14 presents a flow chart of management of any person with a suspicious oral lesion.



*Figure 14:* flowchart for management of patient with an oral lesion

## Key messages

- **Oral cancer is preventable and curable if detected early**
- **Tobacco chewing is the most important risk factor**
- **Health professionals can**
  - Examine oral cavity of all patients with history of tobacco use
  - Advocate cessation of tobacco and alcohol use
  - Teach Oral self-examination
  - Ask clients to report to the health centre if they spot any lesion that looks suspicious
  - Ensure prompt referral of patients with suspicious lesions
  - Provide pain relief and palliative care

## 3B. Cancer of the Uterine Cervix

Cervical cancer is the third most common cancer among women in the world and the leading cause of death from cancer among women in developing countries. In India more than 100,000 new cases of cervical cancer occur each year and nearly 75,000 women die annually from this disease.

Human Papilloma virus infection, which is a sexually transmitted infection, is the primary cause of this cancer. HPV prevalence increases with multiple sexual partners for either spouse, and poor genital hygiene of both partners.

### Symptoms of cancer of the uterine cervix:

In the early stages, there will be no symptoms. By the time symptoms appear, disease may have already spread. Common symptoms are:

- Post-menopausal bleeding
- Post-coital bleeding
- Intermenstrual bleeding
- Blood stained discharge per vaginum
- Excessive seropurulent discharge
- Backache
- Lower abdominal pain

Cervical cancer develops slowly over 10 to 15 years. Initially, abnormal cells develop in the epithelial layer of the cervix [Cervical Intra-epithelial Neoplasia (CIN)]. If left undetected and untreated, such pre-cancerous lesions can progress to invasive cancer. Treatment of pre-cancerous lesions is simpler and chance of cure is higher. In contrast, treatment of invasive cancer is more difficult, and chances of cure decrease with advancing stage of cancer. Cancer cervix, due to its slow progression from pre-cancerous lesion to malignancy, and easy accessibility to examination, gives us ample opportunity for early detection and thus considerably improved prognosis. Early detection may be through opportunistic examination of women attending outpatient clinics or through a systematic programme of screening.

Screening for cervical cancer can be considered in women aged 35 to 50 years, as the chances of detecting pre-cancerous lesions are maximum in this age group. The success of screening is determined by the coverage of women in the target age group rather than the frequency of screening. Once in a lifetime screening for all women between 35 and 50 years will achieve good results at relatively low cost (Table 12). Pap smear is the established method for screening of cervical cancer. It has been effective in reducing the incidence and mortality due to cervical cancer in large programmatic settings. However, being a laboratory-



based test, pap smear requires appropriate infrastructure and skilled manpower. Also, its effectiveness as a screening test decreases if quality is not maintained. Visual inspection tests are being researched as low-cost alternatives to Pap smear.

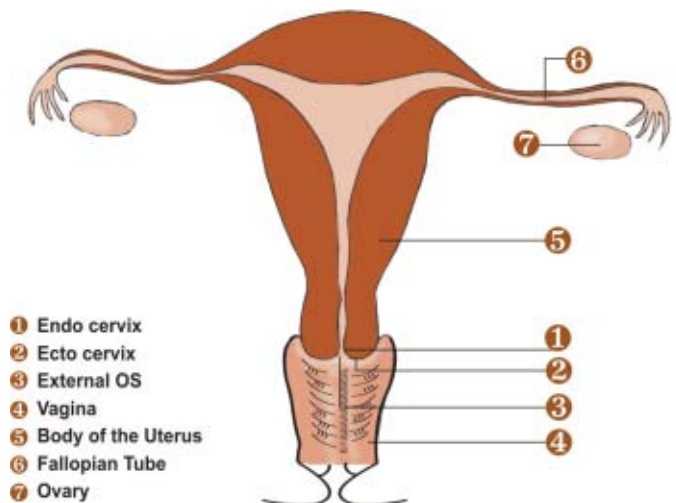
**Table 12:** Reduction in the cumulative rate of invasive cervical cancer for women aged 35-64 years, with different frequencies of screening (80% compliance and moderately sensitive test)

Frequency of screening	Percentage reduction cumulative rate	Number of tests
Yearly	61	30
2-yearly	61	15
3-yearly	60	10
5-yearly	55	6
10-yearly	42	3

(Source - National Cancer Control Programmes – Policies and Managerial Guidelines. World Health Organization. 2<sup>nd</sup> Edition, 2002)

### Anatomy of cervix

The uterus is a pear shaped hollow organ and the lower tubular part of it is called cervix (Figure 15). The part of the cervix visible through speculum examination is called ectocervix and the part hidden inside the canal is the endocervix. The ectocervix and the endocervix meet at the external os, the opening of cervix to the vagina. The lining of the cervix is called epithelium. The ectocervix is covered by squamous epithelium that consists of many layers of cells. The endocervix is covered by columnar epithelium made of a single layer of cells. The squamous and the columnar

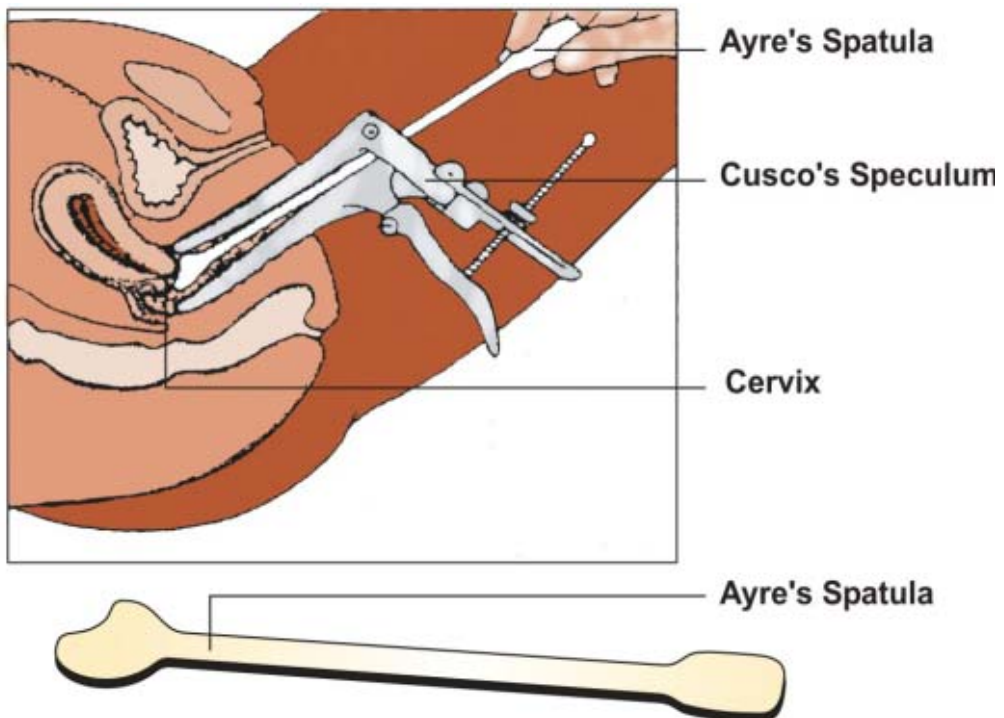


**Figure 15:** Anatomy of the uterus and cervix

epithelia meet near the external os and form the squamo-columnar junction (SCJ). The squamo-columnar junction is a distinct line between the red velvet-like columnar epithelium and the smooth pinkish white squamous epithelium and is usually situated just outside the external os. The location of the SCJ is not constant throughout the life of the woman. At a younger age the SCJ may move down on the ectocervix and as the woman grows old it may move up and get hidden inside the endocervix. The area just outside and adjacent to the SCJ is known as the Transformation Zone (TZ). Most of the cervical precancers (CIN) usually arise from this area.

### Pap smear:

The ectocervix and the endocervix are scraped to collect cells that are spread on a glass slide, stained in the laboratory and examined under microscope. Depending on the features of the cells seen under microscope the cytopathologist (or a trained technologist) can report the smear as 'negative' (normal) or 'positive' (abnormalities suspicious of low grade or high grade CIN). The details of fixation and staining are given in the Manual for Cytology.



**Figure 16:** Cusco's Speculum and Ayre's Spatula

## Requirements

Examination gloves

Speculum (Cusco's self-retaining type preferred)

Ayre's spatula (Figure16) and endocervical brush (if available)

Glass slide

Diamond tipped pencil to write on glass slide (if the glass slide has frosted edge an ordinary pencil can be used to label it)

Focusing light

Coplin's jar

95% ethyl alcohol

Cytology form

## Procedure:

Procedure should be explained to the woman.

Clean a glass slide with dry cotton and label it.

The woman should lie down on her back with legs folded (lithotomy position not required).

Insert the speculum gently and expose the cervix.

Note any abnormal discharge, bleeding or growth in the cervix.

Insert the long tip of the Ayre's spatula into the os so that the curvature touches the ectocervix.

Maintaining gentle pressure, rotate the spatula a full 360 degrees circle (Fig. 16)

Spread the content of either side of the spatula on one side of the glass slide by one or two swipes.

If available, endocervical brush should be gently inserted into the endocervix, rotated full circle once and taken out.

Spread the material of the brush on the same slide by gently rotating and swiping the brush on the slide once as demonstrated in Figure17. Materials from both endo and ectocervix will be on the same side of a single glass slide.

The smear has to be fixed on the slide immediately after it is prepared. The slide should be immersed in a Coplin's jar containing adequate amount of 95% ethyl alcohol. Take out the slide after at least 30 minutes, dry it and store it in the slide box.

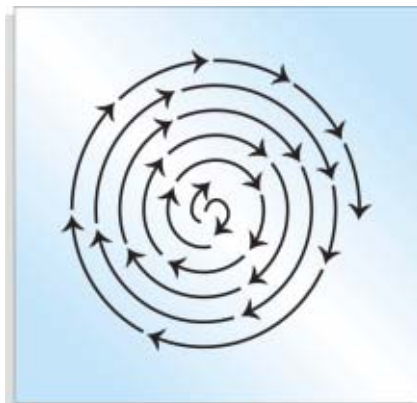


Figure 17: Preparation of smear

## Alternative strategies

### Unaided Visual Inspection:

#### Requirements:

- Examination gloves
- Speculum (Cusco's self-retaining type preferred)
- Focusing light (with halogen bulb preferred)

#### Procedure:

- Procedure should be explained to the woman.
- Introduce a steel Cusco's speculum lubricated with water or saline into the vagina gently in the closed position
- Open the speculum gently so that there is no bleeding.
- Bleeding will obscure the picture and inspection becomes difficult.

### Look for any discharge:

- Whitish curdy discharge: candidal infection
- Yellowish, frothy purulent discharge: infection with trichomonas vaginalis
- Mop any discharge with a dry cotton swab for better visualization of cervix

**Figure 18:** Normal Cervix



**Figure 19:** Visual inspection with acetic acid showing acetowhitening

### On inspection:

- Normal cervix will have reddish endocervix and paler ectocervix. (Figure18)
- Ulcer: peeled away epithelium resulting in denuded area
- Erosion: endocervix may be everted (ectropion) and there is extensive reddish area

Bleeds on touch: to be mentioned specifically in the report. Slight bleeding may be insignificant.

Growth: Friable growth with irregular surface and which bleeds on touch is usually malignant. Smooth growths with regular surface are generally benign.

Hard to touch: If the cervix feels hard and there is resistance, it should be recorded.

Any other findings should be noted down, eg. Cysts, hypertrophy, etc.

Unaided visual inspection was used historically as a method of detecting cervical cancer at an early stage, but is no longer employed for this purpose.

**Visual Inspection using 4% Acetic acid (VIA):**

Acetic acid causes dehydration of the cells and some surface coagulation of proteins thereby reducing the transparency of the epithelium. These changes are more prominent in abnormal epithelium and can be easily distinguished on naked eye inspection. (Figure19)

*Requirements:*

Examination gloves

Speculum (Cusco's self-retaining type preferred)

Cotton tipped swabs

Freshly prepared 5% acetic acid (to be produced at least once a week by diluting 5 ml of glacial acetic acid with 95 ml of distilled water)

Focusing light (with halogen bulb preferred)

VIA forms

*Procedure:*

Procedure should be explained to the woman.

The woman should lie down on her back with legs folded (lithotomy position not required).

Insert the speculum gently and expose the cervix.

Note any abnormal discharge, bleeding or growth in the cervix.

Apply adequate amount of acetic acid to the cervix using the cotton swabs. Wait for 1 minute to note the changes.

Identify the squamo-columnar junction as the line joining the pink smooth squamous epithelium with the red velvet like columnar epithelium. Look for white patches. If there are no white patches in the ectocervix the test is negative. All the aceto-white patches are not considered positive.

If there is a white patch, its density, margin and the relationship to the SCJ should be noted. Table 13 gives the detailed criteria for categorizing VIA test results as negative or positive or invasive cancer.

**Table 13:** Criteria for categorizing VIA test results

VIA category	Description
<b>Negative</b>	<ul style="list-style-type: none"> <li>• No aceto-white lesions</li> <li>• Transparent lesions or faint patchy lesions without definite margins</li> <li>• Nabothian cysts becoming aceto-white</li> <li>• Faint line like aceto-whitening at the junction of columnar and squamous epithelium</li> <li>• Aceto-white lesions far away from the transformation zone</li> </ul>
<b>Positive</b>	<ul style="list-style-type: none"> <li>• Distinct, opaque aceto-white area</li> <li>• Margin should be well defined, may or may not be raised</li> <li>• Abnormality close to the squamocolumnar junction in the transformation zone and not far away from the os.</li> </ul>
<b>Invasive cancer</b>	Obvious growth or ulcer in the cervix. Acetowhite area may not be visible because of bleeding

### Visual inspection with Lugol's iodine:

Requirements and procedure are similar to that for VIA, except that Lugol's iodine solution is used instead of acetic acid. Normal Cells containing glycogen take up iodine and turn brown. Cells that are abnormal appear yellowish white as they do not contain glycogen and therefore do not turn brown. The columnar epithelium also does not stain brown. However the neoplastic cells appear paler and thicker than the columnar epithelium. (Figure 20) Biopsy is taken from any such suspicious areas, particularly the squamocolumnar junction.

**Figure 20:** Visual inspection with Lugol's iodine

(Lugol's iodine: Dissolve 6 gms of potassium iodide in 100ml distilled water. Add 4 gms of iodine to this and dissolve properly.)

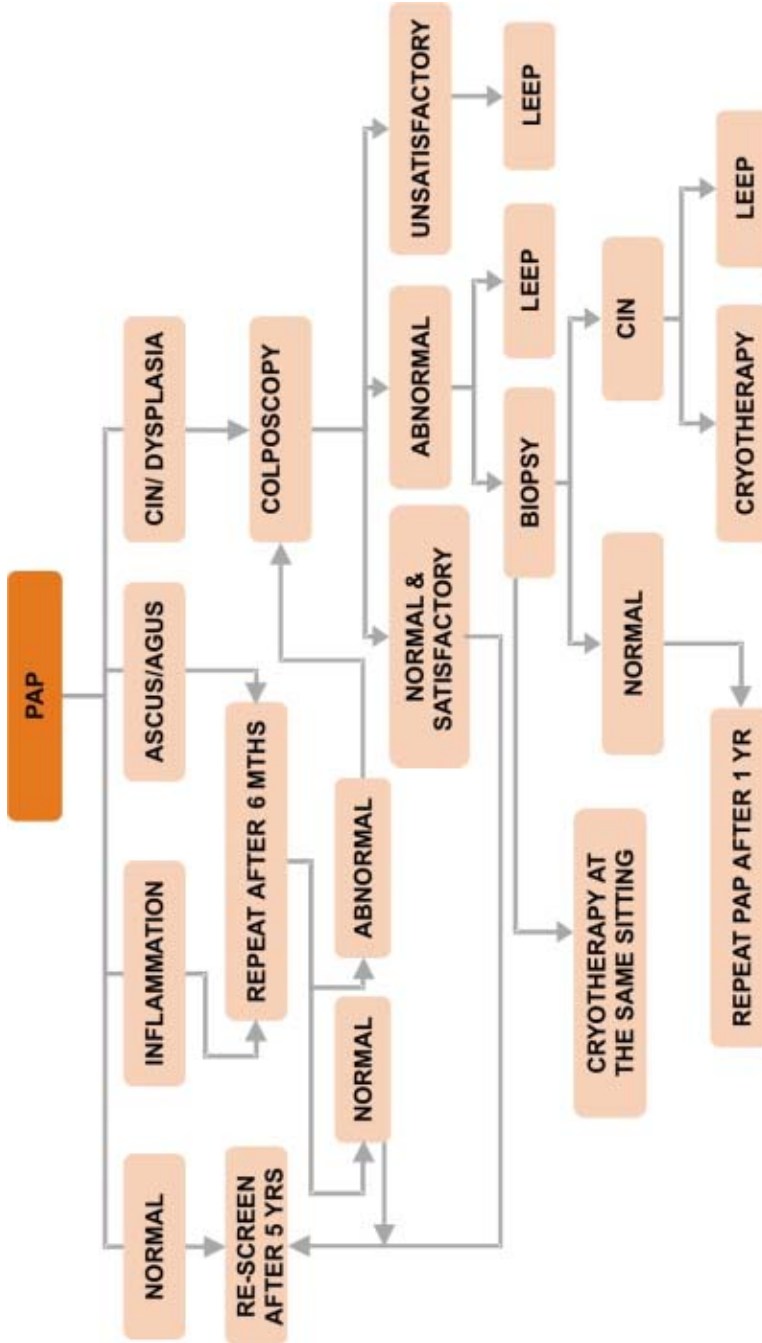
### **Documentation and delivery of test results**

Screening will be beneficial only if those testing positive in the screening are investigated further and appropriately treated. This is true also for those being tested opportunistically. It is essential that proper records be maintained of all the women who are subjected to the test (Pap smear or Visual Inspection) and their test results. It should be possible to identify and contact women who have tested positive even if they do not report back to the health centre.

### **Management of women with abnormal tests**

All cases of suspicious smears or visual inspections should be subjected to colposcopy for better visualization. Biopsy, either by endocervical curettage or cervical cone biopsy should be done in all suspicious cases on colposcopy. For such investigations, women should be promptly referred to the nearest centre performing these investigations. Figures 21 and 22 depict the sequential management of women with abnormal test results on Pap and VIA.

### Further evaluation and management after Pap smear cytology



CIN: Cervical Intraepithelial neoplasia.  
LEEP: Loop Electrosurgical Excisional Procedure.  
ASCUS: Atypical squamous cells of unspecified significance.  
AGUS: Atypical glandular cells of unspecified significance.

Figure 21



Further evaluation and management after screening by VIA

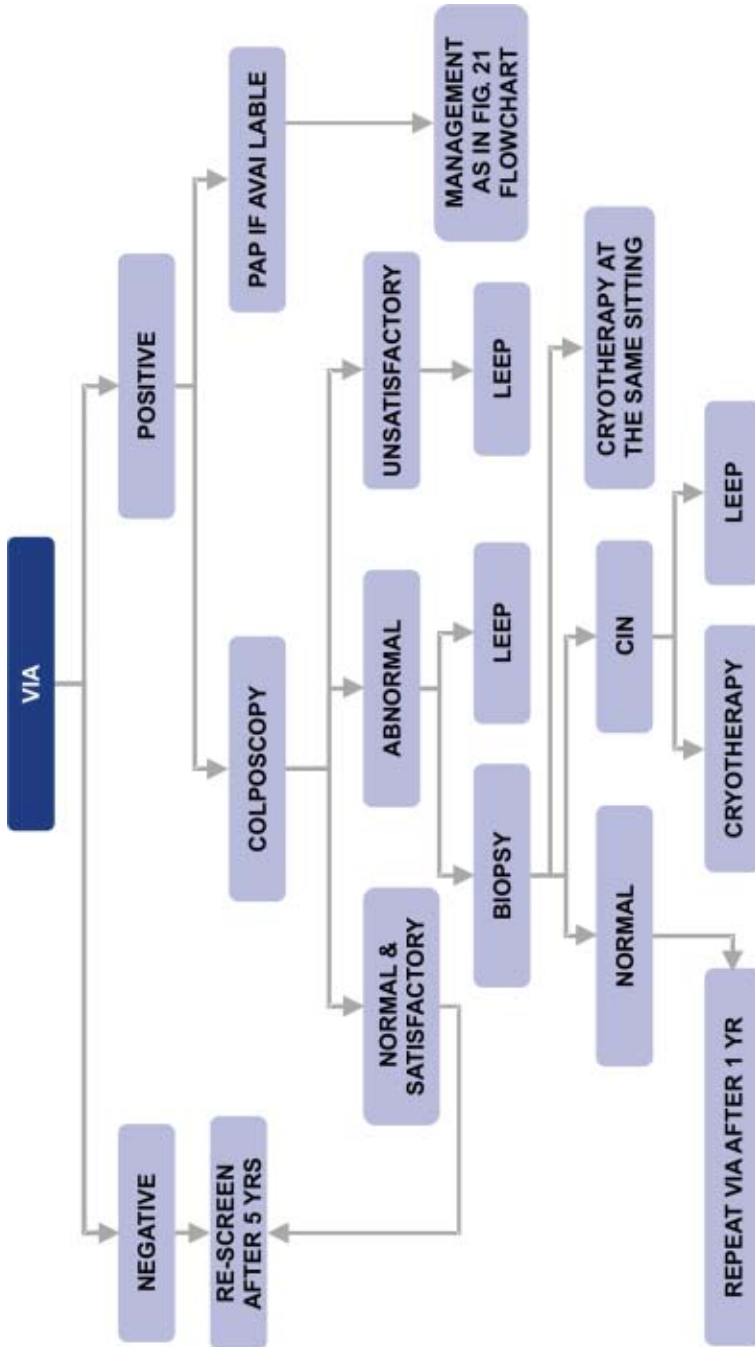


Figure 22

### Management of cervical cancers:

Cervical Intraepithelial Neoplasia (CIN) is asymptomatic and is diagnosed only on routine screening. This is a histological diagnosis.

Treatment of CIN includes Cryotherapy (ablation) and Loop Electrosurgical Excisional procedure (LEEP). Both are outpatient procedures. Follow-up of patients 6 monthly for 2 years is important.

Once the tumour has broken through the basement membrane, it penetrates the cervical stroma directly or through vascular channels and spreads to adjacent structures. This is the stage of cervical cancer.

Cervical cancer can be treated by surgery, radiotherapy, or chemotherapy, or a combination of the three.

### Stages of cervical cancer:

**Table 14:** Cervical cancer staging (FIGO)

Stage	Lesion
<b>Stage 1</b>	<b>Lesion confined to cervix</b>
Stage 1a (i)	Microinvasion < 3mm from basement membrane with no lymph or vascular spread
Stage 1a (ii)	Invasion >3mm, but <5mm deep and 7mm across
Stage 1b	Invasion of the rest of the cervix
<b>Stage 2</b>	<b>Invasion into vagina, but not pelvic wall</b>
Stage 2a	Invasion of upper 2/3 of vagina, but not parametrium
Stage 2b	Invasion of parametrium
<b>Stage 3</b>	<b>Invasion of lower vagina or pelvic wall or causing ureteric obstruction</b>
<b>Stage 4</b>	<b>Invasion of bladder or rectal mucosal or beyond the true pelvis.</b>

## Key messages

- **Cancer of the uterine cervix is curable if detected early and treated promptly**
- **HPV infection is the etiological agent for cancer cervix**
- **Early detection is possible through opportunistic examination of women attending out-patient clinics**
- **Screening of asymptomatic women through an organized approach can reduce the incidence of and mortality in cervical cancer**
- **Health professionals can**
  - Stress the importance of genital hygiene
  - Ensure prompt treatment of genital infections
  - Conduct opportunistic check up of women attending out-patient clinics
  - Ensure prompt referral and appropriate treatment
  - Provide pain relief and palliative care

## 3c. Cancer of the Breast

Breast cancer is the commonest cancer among women all over the world. In India, it is the second most common cancer among women after cancer of the uterine cervix and is emerging as the commonest cancer in urban centres. Data from Hospital Based Cancer Registry (HBCR) show that only about 15% of patients present in localized stage. Regional Lymph nodes are involved in around 75% at the time of presentation and about 10% have distant metastases at the time of presentation.

### Risk factors

Some of the risk factors for breast cancer are

- Reproductive and hormonal factors – the older a woman is when she has her first child, the greater her chance of having breast cancer. Women who begin menstruation early (before age 12), have menopause late (after age 55) or never had children are also at greater risk. Women who take menopausal hormone therapy (oestrogen and progesterone) for five years or more after menopause also appear to have an increased risk.
- Family History: Risk of cancer increases in women with a first-degree relative with bilateral breast disease. Familial occurrence of breast cancer has been linked to mutations in Brca 1 and Brca 2 genes. Such mutations are associated with an increased risk of breast cancer, and also an earlier age at onset.
- Other factors:
  - Being obese after menopause: women who are obese after menopause are at higher risk of breast cancer. Fatty tissue produces oestrogen, and therefore obese women are likely to have higher levels of oestrogen compared to thin women. This may predispose them to breast cancer.
  - Physical inactivity: women who are physically inactive throughout life have a greater risk of having breast cancer. Physical activity may reduce risk by preventing weight gain.
  - Alcohol intake: some studies suggest that the risk of breast cancer increases with increased intake of alcoholic beverages.

Prompt diagnosis of breast cancer in the early stage is very important. This is possible by increasing the level of awareness among women and health care professionals. The following methods may be used for early detection -

- Breast awareness and breast self examination (BSE): The first person to detect any lump in the breast is the woman herself. For this, it is essential that every woman be aware of the size, shape and consistency of her breasts, and know when there is an abnormal change in any of these.

- **Clinical Breast Examination (CBE):** This is to be performed by a physician, trained nurse or a health worker. It is recommended that women may be examined for any lump in the breast when they have come for other reasons.
- **Mammography:** This is a soft-tissue radiography where a small radiation dose of 0.1 rads is delivered. With this method it is possible to detect lesions as small as 1 mm.



**Figure 23**

**Breast awareness:** Being breast aware is being familiar with one's breasts. Every woman should know how her breasts look and feel so that she is able to notice any unusual change. To achieve this, every woman must examine her breasts from time to time. There need not be any set manner for doing this. It is preferable to examine the breast once a month, ten days after the menstrual period with the flat of the hand (Figure 23).

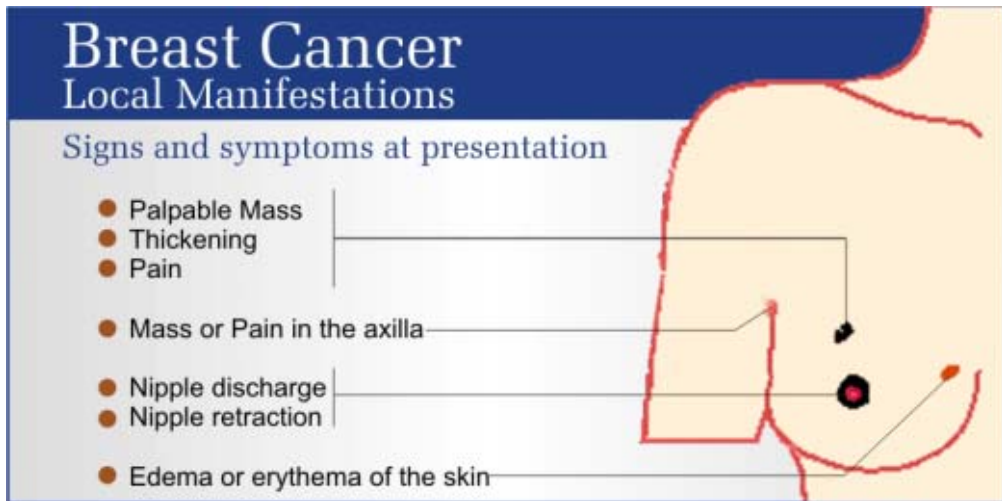
Every woman should be aware of the following signs –

- A change in size
- A nipple that is pulled in or changed in position or shape
- A rash on or around the nipple
- Discharge from one or both nipples
- Puckering or dimpling of skin
- Lump or thickening in the breast
- Constant pain in the breast or armpit

In case a woman notices any such change, she should promptly visit the health centre or a health professional.

### **Breast examination by a health professional -**

- The breasts are inspected with the patient lying down to look for any asymmetry.
- Then with the flat of the hand, both the breasts are palpated in a circular manner starting from the nipple and areolae in a clockwise manner towards the periphery and the axillary tail of the breast in sitting and lying down position. Then the axilla, supraclavicular region and liver are also examined. Figure 24 shows the symptoms and signs of Breast Cancer.



*Figure 24*

If examination reveals suspicious findings, reassure the patient: All lumps are not cancerous. Advise further investigations to confirm the diagnosis. These include:

- Mammography
- Ultrasonography of breast
- Fine needle Aspiration Cytology (FNAC)
- Core needle biopsy – this is more specific and as sensitive as FNAC
- Biopsy for histopathology and Estrogen Receptor(ER) /Progesterone Receptor (PR) status

Once the diagnosis of malignancy is confirmed, the patient needs to be referred to a centre where appropriate care is available. The referral should be prompt and the health professional should ensure that the patient reaches the centre for further treatment.

## Staging of breast Cancer:

**Stage I:** Growth confined to breast, not adherent to pectoral muscles or chest wall

**Stage II:** Same as Stage I *with* affected mobile axillary lymph nodes on the same side

**Stage III:** Skin involvement or *peau d'orange* larger than the tumour but limited to the breast and tumour fixed to the pectorals and not to the chest wall. The homolateral lymph nodes are matted and fixed to the chest wall. Homolateral supraclavicular nodes, mobile or fixed or oedema of the arm may be seen.

**Stage IV:** Skin fixation of the breast, complete fixation of the tumour to chest wall and distant metastases are seen.

The TNM classification that is more widely used is shown in Table 15.

**Table 15:** TNM staging of breast cancer

Primary Tumour	Regional lymph nodes	Distant metastases
<b>T<sub>x</sub>:</b> Tumour can not be assessed.	<b>N<sub>x</sub>:</b> Cannot be assessed	<b>M<sub>0</sub>:</b> No distant metastases
<b>T<sub>0</sub>:</b> No evidence of primary tumour.	<b>N<sub>0</sub>:</b> No palpable regional lymph nodes	<b>M<sub>1</sub>:</b> Presence of distant metastases
<b>T<sub>is</sub>:</b> Carcinoma in situ.	<b>N<sub>1</sub>:</b> Palpable, mobile, ipsilateral axillary lymph node	
<b>T<sub>1</sub>:</b> Tumour 2cm or less in its greatest dimension	<b>N<sub>2</sub>:</b> Fixed ipsilateral axillary lymph node	
<b>T<sub>2</sub>:</b> Tumour 2-5cm. in greatest dimension	<b>N<sub>3</sub>:</b> Ipsilateral internal mammary/supraclavicular lymph nodes.	
<b>T<sub>3</sub>:</b> Tumour >5cm. in greatest dimension		
<b>T<sub>4</sub>:</b> Tumour of any size, with direct extension to		

## Management of breast cancer

Breast cancer is managed by surgery, radiotherapy, chemotherapy (including hormone therapy), or a combination of the three. Figure 25 shows the management of a person with a suspicious breast lump in a flowchart.

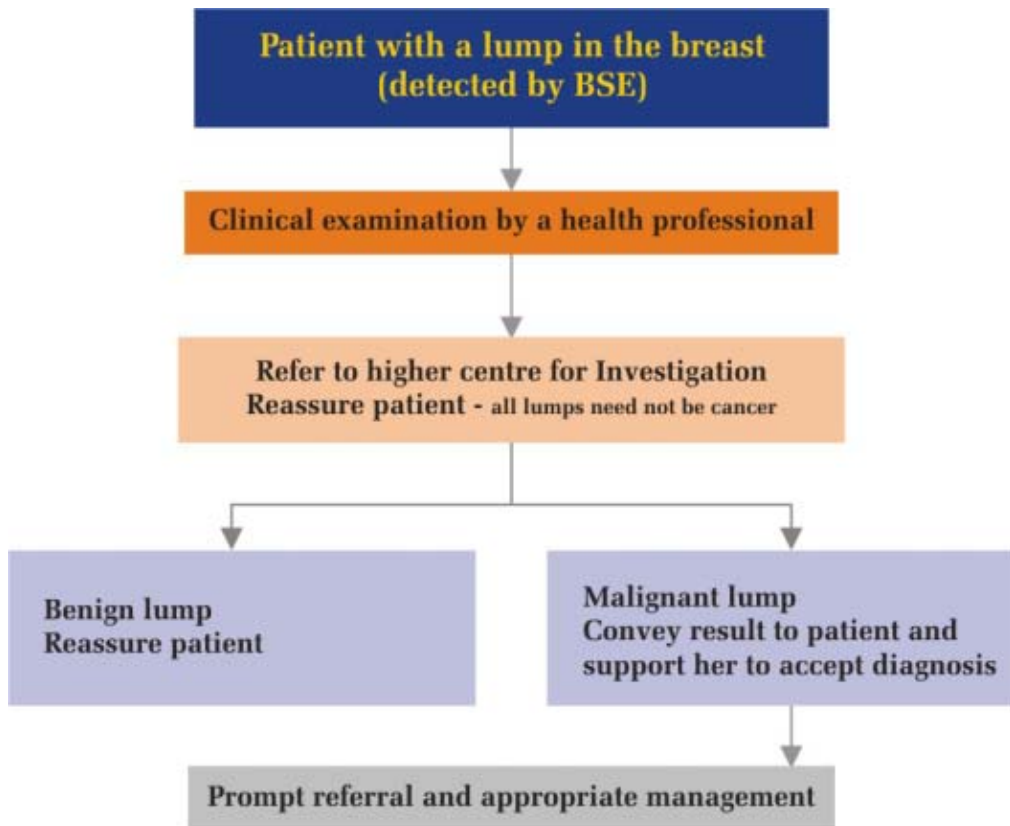


Figure 25



## Key messages

- **Breast cancer is curable if detected early**
- **Health professionals can –**
  - Create 'breast awareness' among clients and ask them to report if a lump is felt
  - Offer clinical breast examinations to women aged 40-69 years
  - Reassure – all lumps are not cancer
  - Ensure prompt referral and appropriate management
  - Provide pain relief and palliative care

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# 4

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## National Cancer Control Programme

The National Cancer Control Programme was started in 1975-76 with the objectives of:

- Primary prevention of tobacco related cancers
- Secondary prevention of cancers amenable to early diagnosis, such as cancer of the uterine cervix
- Extension and strengthening of therapeutic services including pain relief on a national scale through regional cancer centres, medical and dental colleges

### The components of the programme are

- Regional Cancer Centres (RCCs): The RCCs are envisaged as specialized centres providing comprehensive cancer care to the patients from their respective regions, undertaking awareness generation and early detection activities and offering specialized training to health professionals and conducting cancer research. There are 22 RCCs in the country at present (Figure 26). RCCs are provided financial assistance through the scheme for 'Assistance for RCCs.
- Strengthening of other cancer treatment facilities – Medical institutions are provided grants to enhance their cancer treatment facilities through purchase of radiotherapy and other equipment under the Oncology Wing development scheme.
- District Cancer Control Programme (DCCP) - The DCCP aims to make the district the hub of cancer control activities. The focus is on prevention of cancers, early detection, minimal treatment of common cancers, appropriate referral and provision of supportive care in the district.
- Activities through Non-governmental Organizations (NGOs) - This scheme is meant to extend financial assistance to NGOs working in cancer control.

Guidelines for the various schemes under NCCP are available with the Ministry of Health and Family Welfare, New Delhi.

## Regional Cancer Centres in India

Figure 26



## Role of Health Professionals in NCCP

Health professionals have the following roles to play under the National Cancer Control Programme.

### Prevention of cancers –

- Create awareness about the ills of tobacco and advocate avoidance
- Encourage and assist habitual tobacco users to quit the habit
- Promote healthy dietary practices and physical activity

### Early detection of cancers –

- Create awareness about the early warning signs of cancer
- Encourage breast awareness
- Encourage oral self-examination
- Create awareness about symptoms of cervical cancer
- Examine, as a routine, the oral cavity of patients with history of tobacco use
- Offer clinical breast examination to any woman over 35 years presenting to the health centre
- If facilities exist, perform a pap smear test for every woman at least once in her lifetime, between 35 and 40 years of age
- Promptly refer any person with a suspicious lesion for accurate diagnosis and appropriate treatment

### Treatment of cancers -

- Ensure that every patient complies with therapy advised
- If follow up care is required at the health centre level, make sure that detailed instructions are provided by the treating institution

### Palliative care -

- Ensure that the patient is free from pain as far as possible. Learn and practice the WHO step-ladder approach of pain management; refer to the appropriate centre for oral morphine
- Achieve control of unwanted symptoms to the extent possible.
- Provide psychological support to the patient to accept the diagnosis and treatment
- Involve the family in diagnosis, treatment and care as far as possible

## List of RCCs

### **Kamala Nehru Memorial Hospital**

Hasimpur Road, Allahabad - 221002  
Tel: 0532 - 2466666

### **Chittaranjan National Cancer Institute**

37, S.P. Mukarjee Road, Kolkata-700 026  
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### **Kidwai Memorial Institute of Oncology**

Hsaur Road, Bangalore - 560 029  
Karnataka  
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### **Regional Cancer Institute (WIA)**

Adyar, Chennai - 600 020  
Tel: 044 - 24910754, 24911526  
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### **Acharya Harihar Regional Centre for Cancer Research and Treatment**

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Fax: 0671 - 2614683

### **Regional Cancer Centre**

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### **Gujarat Cancer Research Institute**

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Tel: 0361 - 2220902

### **Tata Memorial Hospital**

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## References / Suggested Reading

1. Agarwal S. P., Rao Y. N., Gupta Sudhir. Eds. Fifty Years of Cancer Control in India. National Cancer Control Programme. Directorate General Health Services. Ministry of Health And Family Welfare. Government of India. 2002.
2. Mathew B., Wesley R. S. Eds. Handbook on Cancer Control. World Health Organization, Regional Cancer Centre, Trivandrum.
3. National Cancer Control Programmes – Policies and Managerial Guidelines. World Health Organization. 2<sup>nd</sup> Edition.
4. National Cancer Registry Programme – Five Year Consolidated Report of the Hospital Based Cancer Registries 1994-1998. Indian Council Of Medical Research, New Delhi.
5. National Cancer Registry Programme – Two-Year Report of the Population Based Cancer Registries 1997-1998. Indian Council Of Medical Research, New Delhi.
6. Nayak C.R., Nayak S. Eds. Handbook on Oncology. Acharya Harihar Regional Cancer Centre, Cuttack.
7. Prevention and Early Detection of Cancer. Regional Cancer Centre, JIPMER, Pondicherry.
8. Reddy K. Srinath, Gupta Prakash C. Eds. Report on Tobacco Control in India. Ministry of Health and Family Welfare, Government of India, 2004.
9. Sankaranarayanan R., Wesley R. S. A Practical Manual on Visual Screening for Cervical Neoplasia. World Health Organization – International Agency for Research on Cancer. IARC Technical Publication No.41.
10. Stewart, Bernard W., Kleihues, Paul. Eds. World Cancer Report. WHO, IARC 2003.
11. Training Programme for Health Workers, Nurses and Medical Officers – Manual. Institute Rotary Cancer Hospital, All India Institute of Medical Sciences.