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Chapter 1: Introduction

A non-communicable disease, or NCD, is a disease which is not infectious but the risk factors such as a person's lifestyle, genetics, or environment are known to increase the likelihood of certain non-communicable diseases. The non communicable diseases include Cardiovascular, Renal, Nervous and Mental Diseases, Respiratory Diseases, and permanent results of Accidents, Blindness, Cancer, Diabetes, Obesity and various other Metabolic and Degenerative diseases.

Demographic changes and changes caused in the environment and the economy are the major reasons for shift against a predominantly communicable diseases scenario. Ageing population allows manifestation of cardiovascular diseases, cancer and mental disorders which also result in high prevalence of chronic disability. Out of the 35 million people who died from chronic disease in 2005, half were under 70 and half were women. Contrary to common perception, 80% of chronic disease deaths occur in low and middle income countries.

Non Communicable Diseases contribute to 53% of premature mortality in the most productive age groups in India. WHO has been providing consistent technical support and advocacy for NCD prevention and control. The Ministry of Health and Family Welfare, Government of India, has started a pilot program for Prevention and Control of Diabetes Mellitus, Cardiovascular Diseases and Stroke (NPDCS). The emphasis is on prevention through health promotion and health system capacity strengthening. The recently held inter-country meeting 'Scaling up prevention and control of non-communicable diseases-The SEANET-NCD meeting", Phuket, Thailand, 22-26 October 2007' added impetus to this initiative.

The Ministry of Health and Family Welfare has constituted a multidisciplinary steering committee with the Director General of Health Services as Chairman. WHO would be collaborating on a technical advisory capacity. This committee will work for a period of one year to review and expedite the NPDCS. This is a major step in the ongoing progress towards rationalizing and strengthening NCD prevention and control in India.

In 2005, NCDs caused an estimated 35 million deaths, 60% of all deaths globally, with 80% in low income and middle-income countries and approximately 16 million deaths in people less than 70 years of age. Total deaths from NCDs are projected to increases further by a 17% over the next 10 years. Knowing the risk factors for chronic disease means that approximately 80% premature heart disease and stroke, 80% of Type 2 diabetes and 40% of cancers are preventable. (Source: WHO, 2008 Action plan on NCD)

By 2020, it is predicted that these diseases will be causing seven out of every 10 deaths in developing countries on account of developmental transition (rapid urbanization and the large shifts in population from rural to urban areas).

The management of NCDs is often technology-intensive and expensive. It is estimated that approximately 80% of heart disease, stroke, type 2 diabetes and 40% of cancers can be prevented through inexpensive



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases and cost-effective interventions that address the primary risk factors (WHO/World Economic Forum Report).The Commission on Chronic Illness in USA has defined "chronic diseases" as comprising all impairments or deviations from normal, which have one or more of the following characteristics:

- o Permanent
- o Leave residual disability
- Caused by non-reversible pathological alteration
- Require special training of the patient for rehabilitation
- o May be expected to require a long period of supervision, observation or care

Why should we talk about NCDs?

Since independence a lot have been achieved in health sector

- a. Crude death rate decrease
- b. Crude birth rate decrease
- c. Life expectancy increase
- d. Small pox and guinea worm eradicated
- e. Leprosy on the elimination
- f. IMR decrease
- g. Health infrastructure expanded

Still communicable diseases like malaria & TB continued to be public health problems. New emerging and reemerging – like plague, dengue fever, chikungunya, HIV infection, H1N1, continue to challenge health system.

Besides, the communicable diseases there is a rapid increase in non-communicable diseases like-

- a. Cancers
- b. CVD-CAD and Hypertension
- c. Obesity
- d. Endocrine and metabolic disorders
- e. Asthma
- f. Psychiatric illnesses
- g. Accidents
- h. Degenerative diseases.

The major causes of which have been identified as:

- a. Poor life-style includes, poor diet, lack of exercise, smoking, excess alcohol, poor sleep, stress due to heavy workload.
- b. Longer average life span, rising income, increasing tobacco consumption, decreasing physical activity and increased consumption of unhealthy food.
- c. Increased longevity of life
- d. Increased proportion of geriatric population
- e. lifestyle changes



Why NCDs are considered as a burden?

- a. Incidences/ prevalence is on increase
- b. Changing life style Increases the risk
- c. Increase in life expectancy resulting in increase in number of elderly

What are implications of increase burden of NCDs?

- a. Need to increase budgetary allocation for prevention control
- b. Impoverishment of already poor on account of continuous treatment over long period
- c. Increase improvement of HR- Doctors, Nurses, Technicians, and Dieticians
- d. Increase investment on drugs

What can we done at the level of hospitals?

- 1. Counseling of identified patients of NCDs
 - What is the illness?
 - What is the prognosis?
 - What complication would come up?
 - What drugs to take- Dosage, regularity of drug intake, possible side effects
 - What intervention can reduce severity?
 - o Modification in life-style
 - o Physical exercise, diet, meditation, avoidance of alcohol and tobacco
- 2. Proper display of health education messages
- 3. Educating women in self examination of breasts
- 4. Education of people to risk factors
- 5. Screening of early diagnosis of NCDs
 - Routine BP monitoring
 - Screening of high risk cases
 - Pap smear examination
 - o Periodic examination of oral cavity
- 6. Training of health staff



Burden of Disease:

Global Scenario: Status and Projections

2004						2030
Disease or injury	Death s (%)	Rank		Rank	Deaths (%)	Disease or injury
Ischemic heath disease	12.2	1		1	14.2	Ischemic heart disease
Cerebrovascular disease	9.7	2]▶	2	12.1	Cerebro-vascular disease
Lower respiratory	7.0	3	_	3	8.6	Chronic obstructive pulmonary
infections						disease
Chronic obstructive	5.1	4		4	3.8	Lower respiratory accidents
pulmonary disease			`			
Diarrheal diseases	3.6	5		5	3.6	Road traffic accidents
HIV/AIDS	3.5	6		6	3.4	Trachea, bronchus, lung cancers
Tuberculosis	2.5	7		7	3.3	Diabetes mellitus
Trachea, bronchus, lung cancers	2.3	8		8	2.1	Hypertensive heath disease
Road traffic accidents	2.2	9		9	1.9	Stomach cancer
Prematurity and low birth weight	2.0	10		10	1.8	HIV/AIDS
Neonatal infections and other	1.9	11		11	1.6	Nephritis and nephrosis
Diabetes mellitus	1.9	12		12	1.5	Self-inflicted injuries
Malaria	1.7	13		13	1.4	Liver cancer
Hypertensive heart disease	1.7	14		14	1.4	Colon and rectum cancers
Birth asphyxia and birth trauma	1.5	15		15	1.3	Esophagus cancer
Self-inflicted injuries	1.4	16		16	1.2	Violence
Stomach cancer	1.4	17		17	1.2	Alzheimer and other dementias
Cirrhosis of the liver	1.3	18		18	1.2	Cirrhosis of the liver
Nephritis and nephrosis	1.3	19		19	1.1	Breast cancer
Colon and rectum cancers	1.1	20		20	1.0	Tuberculosis
Violence	1.0	22		21	1.0	Neonatal infections and other*
Breast cancer	0.9	23		22	0.9	Prematurity and low birth
						weight
Esophagus cancer	0.9	24	Y/ *	23	0.9	Diarrheal diseases
Alzheimer and other dementia's	0.8	25		29	0.7	Birth asphyxia and birth trauma
				41	0.4	Malaria

Leading causes of death, 2004 and 2030 compared (World Health Statistics 2008, WHO)

Source: - WHO, World Health Statistics 2008.



Attributable mortality by risk factor % of total deaths (WHO World Health Risks, 2009)

	Risk factor	Deaths (millio ns)	% of total		Risk factor	Deaths (millions)	% of total
S.No.	World			S.No.	Low income countries*		
1	High blood pressure	7.5	12.8	1	Childhood underweight	2.0	7.8
2	Tobacco use	5.1	8.7	2	High blood pressure	2.0	7.5
3	High blood glucose	3.4	5.8	3	Unsafe sex	1.7	6.6
4	Physical inactivity	3.2	5.5	4	Unsafe water, sanitation, hygiene	1.6	6.1
5	Overweight and obesity	2.8	4.8	5	High blood glucose	1.3	4.9
6	High cholesterol	2.6	4.5	6	Indoor smoke from solid fuels	1.3	4.8
7	Unsafe sex	2.4	4.0	7	Tobacco use	1.0	3.9
8	Alcohol use	2.3	3.8	8	Physical inactivity	1.0	3.8
9	Childhood underweight	2.2	3.8	9	Suboptimal breastfeeding	1.0	3.7
10	Indoor smoke from solid fuels	2.0	3.3	10	High cholesterol	0.9	3.4
S.No.	Middle-income countries*			S.No.	High-income countries*		
1	High blood pressure	4.2	17.2	1	Tobacco use	1.5	17.9
2	Tobacco use	2.6	10.8	2	High blood pressure	1.4	16.8
3	Overweight and obesity	1.6	6.7	3	Overweight and obesity	0.7	8.4
4	Physical inactivity	1.6	6.6	4	Physical inactivity	0.6	7.7
5	Alcohol use	1.6	6.4	5	High blood glucose	0.6	7.0
6	High blood glucose	1.5	6.3	6	High cholesterol	0.5	5.8
7	High cholesterol	1.3	5.2	7	Low fruit and vegetable intake	0.2	2.5
8	Low fruit and vegetable	0.9	3.9	8	Urban outdoor air pollution	0.2	2.5
9	Indoor smoke from solid fuels	0.7	2.8	9	Alcohol use	0.1	1.6
10	Urban outdoor air pollution	0.7	2.8	10	Occupational risks	0.1	1.1





Source: - WHO World Health Risks, 2009. Attributable DALYs by risk factor % of total DALYs) (WHO World Health Risks, 2009)

S.No.	Risk factor	DALYs (millions)	% of total		Risk factor	DALYs (millions)	% of total
	World			S no.	Low income countries*		
1	Childhood underweight	91	5.9	1	Childhood underweight	82	9.9
2	Unsafe sex	70	4.6	2	Unsafe water, sanitation, hygiene	53	6.3
3	Alcohol use	69	4.5	3	Unsafe sex	52	6.2
4	Unsafe water, sanitation, hygiene	64	4.2	4	Suboptimal breastfeeding	34	4.1
5	High blood pressure	57	3.7	5	Indoor smoke from solid fuels	33	4.0
6	Tobacco use	57	3.7	6	Vitamin A deficiency	20	2.4
7	Suboptimal breastfeeding	44	2.9	7	High blood pressure	18	2.2
8	High blood glucose	41	2.7	8	Alcohol use	18	2.1
9	Indoor smoke from solid fuels	41	2.7	9	High blood glucose	16	1.9
10	Overweight and obesity	36	2.3	10	Zink deficiency	14	1.7
S no.	Middle-income countries*			S no.	High-income countries*		
1	Alcohol use	44	7.6	1	Tobacco use	13	10.7
2	High blood pressure	31	5.4	2	Alcohol use	8	6.7
3	Tobacco use	31	5.4	3	Overweight and obesity	8	6.5
4	Overweight and obesity	21	3.6	4	High blood pressure	7	6.1
5	High blood glucose	20	3.4	5	High blood glucose	6	4.9
6	Unsafe sex	17	3.0	6	Physical inactivity	5	4.1
7	Physical inactivity	16	2.7	7	High cholesterol	4	3.4
8	High cholesterol	14	2.5	8	Illicit drugs	3	2.1
9	Occupational risks	14	2.3	9	Occupational risks	2	1.5
10	Unsafe water, sanitation, hygiene	11	2.0	10	Low fruit and vegetable intake	2	1.3

Source: - WHO, World Health Risks, 2009.



World Health Organization made a forecast in 2004 that deaths from cancer will increase significantly, from 7.4 million in 2004 to 11.8 million in 2008, while the number of deaths from heart disease will rise from 17.1 million to 23.4 million in the same period. Meanwhile, death rates for diseases like tuberculosis, HIV and AIDS and malaria will decline, the WHO said. While deaths from HIV and AIDS will rise 0.2 million to 2.4 million by 2012, they are forecast to fall back to 1.2 million by 2030. Non-communicable diseases are likely to account for more deaths by 2030 than infectious diseases such as tuberculosis. About 25 per cent of deaths in the age group of 25- 69 years occur because of heart diseases. In urban areas, 32.8 per cent deaths occur because of heart ailments, while this percentage in rural areas is 22.9.

The three key components of the strategy for prevention and control of NCDs are:

- 1. Surveillance
- 2. Health promotion & primary prevention
- 3. Management

For this the focus has been activities like -

a. Health promotion

b.Modify risk behavior

- c. Monitoring risks
- d. Intervention strategies with their outcomes evaluated

Indian Scenario

With NCDs posing a major public health challenge, it was estimated that in 2005, chronic diseases accounted for 53 percent of all deaths in India (WHO 2005).

India's current epidemic of non-communicable diseases has resulted from increased urbanization, changing lifestyles and increase in life expectancy.





Estimated and projected Burden of Diabetes and CAD, India

Estimated and projected Burden of cancer, India





Estimated and projected deaths due to CAD,India



Estimated proportion of Deaths causes in India (all ages,2005) Estimated proportion of DALYs in India (all ages,2005) *Source:-WHO,2005.*

India: Estimated Diabetic cases- 30 millions (number to go up by 57 million by 2025) is now home to the largest population of diabetic cases in the world. About 25 per cent of deaths due to





Diabetes occur in the age group of 25- 69 years (Urban: 32.9 % and Rural 22.9%, all age group, 19%) Regional Variations- Highest in south India (25%) and lowest in central region (12%)

Top ten causes of death in India (ages 25 to 69 as %)						
Rank	Cause of death	Male	Female	Total		
1	Cardiovascular Diseases	26.3	22.5	24.8		
2	Respiratory Diseases	10.1	10.4	10.2		
3	Tuberculosis	11.4	8.3	10.1		
4	Malignant And Other Tumors	7.8	11.8	9.4		
5	III Defined Conditions	4.8	6.0	5.3		
6	Digestive Disease	6.1	3.5	5.1		
7	Diarrhoeal Disease	4.0	6.6	5.0		
8	Unintentional Injuries	5.0	4.1	4.6		
9	Intentional Self Harm	3.3	2.6	3.0		
10	Malaria	2.4	3.4	2.8		
(All Age	(All Ages As %)					
Rank	Cause of death	Male	Female	Total		
1	Cardiovascular Diseases	20.3	16.9	18.8		
2	Respiratory Diseases	9.3	8.0	8.7		
3	Diarrhoeal Disease	6.7	9.9	8.1		
4	Perinatal Conditions	6.4	6.2	6.3		
5	Respiratory Infections	5.4	7.1	6.2		
6	Tuberculosis	7.1	4.7	6.0		
7	Malignant And Other Tumors	5.4	6.0	5.7		
8	Senility	4.0	6.5	5.1		
9	Unintentional Injuries	5.2	4.5	4.9		
10	III Defined Conditions	4.6	5.0	4.8		

Source: - Indian Council of Medical Reasearch (ICMR), 2005.

India suffers the highest loss in potentially productive years of life due to deaths from cardiovascular disease in people aged 35-64 years (9.2 million years lost in 2000). By 2030, this loss is expected to rise to 17.9 million years. Health Information of India, 2005 has identified six key sets of "risk factors" responsible for a major share of adult non-communicable disease morbidity and premature mortality.



Indicators for NCD:

Areas	Indicator /Measurements		
Alcohol	 Alcohol, abuser/Dependent Alcohol, consumer Alcohol, Mean/Median/percentile 		
BMI/Overweight/obesity	 BMI/overweight/obesity Prevalence Mean body mass index 		
Blood pressure	 Blood pressure mean Blood pressure, Raised 		
Cholesterol	 Cholesterol, Mean Cholesterol, Raised 		
Diabetes	 Diabetes prevalence Mean blood glucose level 		
Diet	 Fruit and vegetable 		
Physical activity	 Physical activity median /mean Physical activity Prevalence 		
Oral health	 Oral health-CPI Oral Health-DMFT 		
Stroke	 Stoke prevalence 		
Tobacco	 Tobacco use Prevalence 		

Epidemiological Determinants:

The six risk factors responsible for non- communicable disease related morbidity and mortality are-

- 1. Cigarette use and other forms of smoking
- 2. Alcohol abuse
- 3. Failure or inability to obtain preventive health services (e.g., for hypertension control, cancer detection, management of diabetes)
- 4. Life- style changes (e.g., dietary patterns, physical activity)
- 5. Environment risk factors, (e.g., occupational hazards, air and water pollution, and possession of destructive weapons)
- 6. Stress factors.



Risk Factors, Level of prevention and Management of NCDs



Modifiable risk factors for Non communicable diseases:

General Environmental Exposures:-

- Physical environment ambient air quality water quality
- o Occupational and work site
- Food safety and availability
- o Social environment
- o Cognitive education
- o Cultural education
- o Access to health services
- Availability of public health and community services

Personal Environmental Exposures

- o Nutrition and Obesity
- o Dietary intake
- o Micronutrient adequacy
- $\circ \quad \text{Caloric balance} \quad$
- o Smoking (and tobacco use)
- o Physical Activity
- o Alcohol/Drug abuse
- Non Modifiable Risk Factors for Non-Communicable Diseases:
 - o Genetic endowment
 - o Monogenetic
 - Gene-environment interactions

The prevalence of risk factors for non-communicable (NCD) in India is as following:

- Tobacco use (40 percent men, four percent women)
- o Low fruit and vegetable intake (69 percent men, 75 percent women)
- Obesity (19 percent men, 28 percent women)
- High cholesterol (33 percent men, 35 percent women)
- Hypertension (20 percent men, 22 percent women)
- Underweight (21 percent men, 18 percent women)



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases Risk factors are generally more prevalent in south Indians compared with north Indians. For example, the prevalence of high cholesterol was 21 percent in north Indian men compared with 33 percent in south Indian men, while the prevalence of obesity was 13 percent in north Indian women compared with 24 percent in south Indian women

Tobacco chewing (a risk factor for oral cancers) is a major problem in north Indian men. Bidis (a form of tobacco smoked predominantly in rural areas) are currently not subject to tax.

Approach to Non Communicable Diseases

Monitoring and Surveillance:

Monitoring is the performance and analysis of routine measuring aimed at detecting changes in the environment or health status of population. According to WHO Surveillance is the continuous scrutiny of factors that determine the occurrence and distribution of diseases and other conditions of ill health. Risk factors under Surveillance are tobacco use, alcohol consumption, raised blood pressure (systolic and diastolic), obesity (height, weight, BMI, waist circumferences), diet (low fruit, high fat, added salt), physical in activity, fasting plasma glucose and high serum cholesterol.

The main objectives of surveillance are-

- To provide information about new and changing trends in the health status of a population
- To provide feedback which may be expected to modify the policy and the system itself and lead to redefinition of objectives
- Provide timely warning of public health disasters so that interventions can be mobilized.

Different Surveillance Dimensions:

- Epidemiological surveillance
- Demographic surveillance
- Nutritional surveillance
- Estimating the prevalence of risk factors
- Periodic sample survey in each states (every five years)
- Time trends
- Geographical distribution

For identifying the missing cases and supplementing routine surveillance, *"sentinel surveillance"* is required. The sentinel data is extrapolated to the entire population to estimate the diseases prevalence in the total population.



Monitoring and Surveillance is carried out through:

- National Nutrition Monitoring Programs
- National Cancer Registry Program
- Census of India
- Sample Registry System
- National Sample Survey
- National Family Health Survey

Understanding Natural History of Diseases, levels of prevention and NCD

The goal of medicine is to promote health, to preserve health, to restore health and successful prevention depends upon knowledge of causation, dynamics of transmission, identification of risk factors and risk groups, availability of prophylactic or early detection and treatment measures.

Primordial prevention:



It is prevention of the emergence or development of risk factors population groups in which they have not yet appeared. The main intervention is through individual and mass education.

Primary prevention:

Primary prevention can be defined as "action taken prior to the onset of diseases which

removes the possibility that a diseases will ever occur." It signifies intervention in the pre -pathogenesis phase of diseases or health problem.

The WHO has recommended the following approaches for the primary prevention of chronic NCDs where the risk factors are established.

- Population based strategies for preventing NCDs in whole population
- High risk strategies for target people with identified risk factors.



The two broad areas covered here are:

- Health promotion: "process of enabling people to increase control over, and to improve their health", which includes-
 - Environmental modifications
 - Nutritional intervention
 - Food fortification and nutritional education.
 - Lifestyle and behavioral changes
- Specific Protection
 - Immunization
 - Use of specific nutrients
 - Protection against occupational hazards
 - Avoidance of allergens
 - Control of consumer product quality and safety of foods, drugs and cosmetics.

Secondary prevention: It is an action which halts the progress of diseases at its incipient stage and prevents complications. The specific interventions are early diagnosis (screening tests, case finding programs) and adequate treatment. The health programs initiated by governments are usually at the level of secondary prevention.

Tertiary prevention: It can define as "all measures available to reduce or limit impairments and disabilities, minimizes suffering caused by existing departures from good health and to promote the patients adjustment to irremediable conditions." Tertiary prevention focuses on rehabilitation involving different disciplines like physiotherapy, occupational therapy, speech therapy, audiology, psychology, education, social work, vocational guidance and placement services and dimensions like medical, vocational, social and psychological rehabilitation.





Broad approach to Prevention of Non Communicable Diseases (NCDs):

Health promotion is targeted for healthy, risk free population. Health promotion activities are focused on reducing the risk factors like

- 1. Promotion of Healthy Diet
 - a. Unhealthy diet consists of:
 - i. High intake of salt and oily food
 - ii. Low intake of vegetables and fruits
 - iii. Excess intake of fast foods
- 2. Promotion of physical activity
- 3. Tobacco use
- 4. Alcohol intake
- 5. Stress

Other activities in the program include early diagnosis and appropriate management

for reducing morbidity and mortality for people who suffer from diseases/elevated risks like hypertension, obesity, high blood lipids, raised blood glucose levels and any other symptoms like paralysis, etc.

Risk reduction strategies for prevention of these cannot be dealt in isolation. A multi-sectoral, multi disciplinary and integrated approach is needed for management of Diabetes, Cardiovascular and Stroke.

i. Promotion of Healthy Diet

Suggest adopting healthy options as below:

- Fresh vegetables and fruits
- Fresh lime, butter milk, coconut water, fresh juice, vegetable soup
- Roasted legumes, chana and nuts
- Upma and poha with vegetables
- Besan cheela and vegetable stuffed idlies
- Whole wheat bread, vegetable sandwich, Sprout chat and dal

Unhealthy diet consists of:

- High intake of salt and oily food
- Low intake of vegetables and fruits
- Excess intake of fast/processed foods









Avoid excessive intake of:

- Aerated drinks
- Chips and potato fingers
- Burgers
- Candles and chocolates
- Pizza, Samosa and bread pakora



Given below are key components, which should be emphasized during your community visits and interaction.

What to eat and how much?

- Eat a minimum of 450-500 gms of a variety of seasonal, locally available fresh fruits and vegetables every day
- Eat whole grains, whole wheat roti, whole pulses and partially polished instead of fully polished rice
- Try and eat home made fresh meals rather than packeted food
- Eat small quantity of nuts everday
- Switch from solid to liquid fats. Include a small quantity of mustard oil in your diet
- In case you are a non-vegetarian include 2-3 portions of fish per week
- Try not to add extra salt to food, and limit foods which are high in salt.
- Drink 1-2 glasses of skimmed milk everyday or eat curd made from skimmed milk.

2. Promotion of Physical Activity:

Fats, Oils, Sweets use occasionally Milk Group 2 servings Vegetable Group 3-5 servings Vegetable Group 3-5 servings Fruit Group 2-4 servings Breads & Cereals Group 6 or more servings

Physical activity is an important way of burning excess calories and to remain fit.

Exercise is important:

- To remain fit as it increases resistance to disease
- To prevent heart disease, diabetes, etc.
- To look good as it improves self-image
- To counter anxiety and depression
- To have a sound sleep
- To lower cholesterol
- To control body weight and fat distribution

During your interaction with the community, encourage them to find time for exercise at home, at work or during leisure. Encourage to undertake regular (moderate to vigorous) exercise for 5-7 days per week.





Advise them to start slowly and work-up gradually as given below:

- At least 30 minutes (accumulated) of physical activity per day for protection of cardiovascular diseases and diabetes.
- 45 minutes/day (accumulated) for fitness
- 60 minutes/day (accumulated) for weight reduction

Give some examples of easy, simple and comfortable exercise such as

- Brisk walk
- Cycling
- Jogging
- Swimming
- Dancing
- Playing games/sports, playing with children
- Yogasanas
- Gardening and household chores gardening, washing, mopping etc.

3. Tobacco use:

Single largest preventable cause of deaths and disease

Tobacco kills 8-9 lakh people each year in India. The number is likely to increase many fold in the next 20 years. It is used in various forms, which include cigarette, bidi, hukka, gutkha, zarda, khaini etc.

- Tobacco smoke contains over 4000 harmful and poisonous chemicals such as nicotine, tar, carbon monoxide etc.
- Tobacco in any form is injurious to health.
- Passive smoking is equally harmful.

Hazards of Tobacco:

- Damages almost every organ
- Causes cancers of mouth, throat, lungs, larynx (voice box) and oesophagus (food pipe)
- Causes heart attacks, chronic bronchitis, impotence in men and sterility in women
- Leads to still born or underweight babies
- May lead to loss of vision
- Initiates fast ageing







Quitting tobacco has major and immediate health benefits for all ages

On stopping Tobacco	What Happens
Within	
20 minutes	B.P., pulse rate & body temperature returns to normal
8 hours	The carbon monoxide level in blood drops to normal & oxygen
	level increases to normal
24 hours	Your chances of heart attack decrease
48 hours	Ability to smell & taste is enhanced
72 hours	Lung capacity increases, breathing becomes easier
2 weeks to 3 months	Circulation improves, walking is easier
1-9 months	Ability to clear lungs and reduce infections increase, fatigue &
	shortness of breath decreases & body's energy level increases
5 years	Lung Cancer death risk decreases by 50%
10 years	Lung Cancer death risk drops to the level of a non-smoker

4. Alcohol:

- Leads to liver and heart diseases
- Increases the risk of accidents and untimely death
- Affects family, society
- Main reason for domestic violence/other forms of violence

Don't use alcohol to relieve stress

- Say no to alcohol
- Say no to social drinking







5. Stress Management:

Stress is not a mental illness, but a state of mind. It is a reaction of the body (physical or mental) towards any known situation. As a negative influence, it can result in feelings of disruption, rejection, anger, and depression, which in turn can lead to health problems such as headache, stomach upset, rashes, insomnia, ulcers, high blood pressure, heart disease, and stroke.



Coping with stress:

Encourage community members to adopt following strategies for coping with stress

- Relaxation exercise
- Practicing yoga and meditation
- Acquiring problem solving skills
- Developing hobbies (listening to music)
- Positive thinking
- Social support
- Physical activity
- Organize work/activities in daily life







6. Diabetes:

Encourage following strategies for prevention and control of diabetes:

- Maintain normal body weight
- Healthy nutritional practices
- Regular physical exercise such as brisk walking/jogging
- Avoiding alcohol and smoking
- Control of diabetes and its complications is possible by maintaining.
 - o Normal blood glucose levels
 - o Ideal body weight and bold pressure
 - o Normal blood cholesterol and fats
- All diabetic persons should regularly get their blood glucose estimation, kidney function test, eye check up and foot examination

Diet and diabetes

- 30% of the disease can be controlled with proper diet
- Diet for a diabetic person need not be completely different from a non diabetic person
 - Vegetables should be taken more often like bittergourd, Lettuce leaves, Brinjals, Ladies finger, Cabbage, Cauliflower, Carrot, Soya beans, Drumstick
- Cook the vegetables with minimum oil
- The foods that a diabetic patient should avoid are
 - Sugar in any form- sweets, Ice-cream, Chocolates, Candies etc.
 - High carbohydrate foods like Potatoes, Sweet potatoes etc.
 - o Fried items like Puri and Chat items
 - Fruits high in Sugar content like Banana, Grapes, Mango etc.

Exercise for a Diabetic Patient is very important as it:

- Lowers blood glucose levels quickly
- Improves the ability of the human body to use insulin
- Reduces insulin requirement
- Better control of diabetes; and
- Reduces the risk of heart diseases.





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7. High Blood Pressure: (systolic blood pressure \geq 140 mmHg and diastolic blood pressure \geq 90 mmHg on 2 occasions)

Most often hypertension does not present with any symptom, it is an incidental finding during routine medical checkups. This emphasizes the need for screening for hypertension, some may also present with continuous headache, giddiness, tingling sounds in ears etc. The recent Joint National Committee (JNC) VII classification is as follows –

Blood Pressure Classification	Systolic Blood Pressure (mmHa)	Diastolic Blood Pressure (mmHa)
Normal	< 120	An <80
Prehypertensive	120-139	Or 80-89
Stage 1 Hypertension	140-159	Or 90-99
Stage 2 Hypertension	<u>></u> 160	Or <u>></u> 100



People with high blood pressure usually ask what more can be done to reduce their blood pressure levels. You can give following supplementary information.

Reduce	Avoid	Increase
Weight	Alcohol	 Fruits
 Pre hypertensive factors 	Smoking	
Stress		

How to reduce weight?

- Limit serving size
- Regularize eating habits
- Take food at regular intervals of time
- Eat only when you are feeling hungry
- Do not skip meal

Tips for reducing salt:

- Avoid adding extra salt to food
- Avoid high salt content food such a pickles, chutney, sauces, pappad etc.

Encourage patients with high blood pressure to take medicines regularly and not to stop or change dosage or medicines without medical advice.

8. Heart attack: (Severe Chest pain > 30 minutes, radiating to left arm not relieved by painkillers, nausea, vomiting, sweating etc.)



Warning signs of Heart Attack:

- Pain, pressure or constriction in the centre of the chest for more than 30 minutes
- Nausea, swelling, or feeling faint
- Pain in the jaw, neck, arms, shoulders or back
- Shortness of breath

9. Stroke: (paralysis or numbness of one side of body, difficulty in speech, hearing, reading or writing).

It is an emergency; refer to nearest health facility within one hour (golden period)

Risk factors for Stroke:

Major factors

- High Blood Pressure
- Diabetes
- Heart Diseases
- Smoking
- Alcohol

Secondary factors

- Increased serum cholesterol
- Physical inactivity
- Obesity

Warning signs of Stroke:

- Sudden weakness, paralysis or numbness of the face, arm & leg on one or both sides of the body.
- Loss of speech, or difficulty in speaking or understanding speech.
- Dimness or loss of vision, particularly in only one eye.
- Unexplained dizziness (especially when associated with other neurological symptoms), unsteadiness, or sudden fall.
- Sudden severe headache &/or loss of consciousness.

Cluster strategy in NCD:

What is cluster strategy?

The cluster strategy reflects the response of the cluster to the enormous challenges in the global health agenda and the increasing demands to support countries in addressing various conditions.

Cluster strategy includes:

- Coordinated approach for community level intervention
- Partnerships between medical colleges, state health departments, primary health care services and NGOs.
- Dissemination of health education material.
- Community participation, supportive policy, intersectional action, legislation and collaboration the NGOs and the private sector.



- Providing norms and standards, indicators of diseases and conditions and their determinants, classifications of major conditions, diagnostic criteria and evidence-based prevention and Management guidelines.
- Providing technical support to countries and building national capacity and monitoring progress.
- The development of an agenda for research on conditions of Non communicable and Mental Health concern.
- Strengthening international partnerships for surveillance, prevention, health promotion and management. Networking of national and regional programs.
- Resource Mobilization.
- Establishing and strengthening national policies and plans for the prevention and control of NCDs and supporting the re-orientation of health systems towards more effective healthcare for chronic conditions.

In global response to WHO in the year 2000 for a global strategy member countries in 2008 framed an action plan for 2008-2013 for the prevention and control of the non-communicable diseases.

Risk factor screening in NCDs:

WHO STEPS approach to NCD Risk Factor Surveillance:

The WHO Stepwise approach for NCD risk factor surveillance is a sequential process, starting with gathering information on key risk factors by the use of questionnaires (Step 1), then moving to simple, physical measurements (Step 2), and only then recommending the collection of blood samples for biochemical assessment (Step 3). Each step has core, expanded and optional components. It is a framework which is flexible, resource sensitive and can be modified and adapted for different settings.

1. Smoking/Tobacco:

1.1 billion People worldwide smoke. Among these, about 80% live in low and middle-income communities. By 2020, the tobacco epidemic is expected to kill more people than any single disease. By 2020, tobacco use will cause about 18 percent of all deaths in developed countries and about eleven percent of all deaths in developing countries. Tobacco use is a known or probable cause of about 25 diseases including heart disease; cancer, stroke, chronic obstructive pulmonary disease and digestive tract disease, as well as, has significant adverse effects on pregnancy. Smokeless tobacco use causes oral cancer in the lip, tongue, mouth, and throat areas and digestive system cancers. In India, the use of smokeless and chewed tobacco (zarda or with pan) is common particularly in rural areas. Tobacco is smoked in various forms in India like cigarettes, beedis, hooka, chillum, pipe and all are harmful.



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases Tobacco smoke contains 4000 harmful or poisonous chemicals like nicotine, tar, carbon mono oxide and many others.

Use of tobacco (both smoked and smokeless form) is determined by a pre-tested questionnaire and determines a current user (daily or occasional), past users and non-users.

Definitions (according to 'Guidelines for controlling and monitoring Tobacco epidemics')

Current Smoker/tobacco users: someone who at the times of survey, Smokes/uses tobacco in any form either daily or occasionally.

Daily Smoker/tobacco user: Someone who smokes/uses tobacco at least once day. People who smoke/use tobacco every day with rare exceptions such as not on days of religions fasting or during acute illness are still classified as daily smokers.

Occasional Smoker/ Tobacco user (Non daily smoker / Tobacco user): Someone who smokes / uses tobacco, but not on every day.

The group of **non-smokers** comprises individuals who are **never-smokers** (those who have never smoked at all) and **Ex-Smokers**: People who where former daily smokers but currently do not smokes at all or those who were former occasional smokers, i.e. ex-occasional smokers). They can be sub-classified by:

Time elapsed since quitting

Those who had ever smoked daily, and

Those who never used to smoke daily but only occasionally in the past.

2. Alcohol consumption:

Worldwide, alcohol consumption causes 3% of deaths (1.8 million) annually, which is equal to 4% of the global disease burden. alcohol use causes about 20% to 30% of esophageal cancer, liver disease, homicide and other intentional injuries, epilepsy, and motor vehicle accidents worldwide.

Average alcohol consumption is linked to more than 60 disease conditions including liver cirrhosis, several cancers (liver, laryngeal, esophageal and oropharyngeal cancers), injuries and hemorrhagic strokes. Effects of alcohol consumption can be injuries, accidents and domestic violence.



Definitions:

Current Drinker: Those who consumed 1 or more drinks of any type of alcohol in the year preceding the survey.

Former drinker: Those who have ever drunk alcohol but those who did not consume 1 or more drinks during the year preceding the survey.

Lifetime abstainer: Those who never consumed 1 or more drinks of any type of alcohol

High-risk drinker: those who drink more than 5 (for women 4) standard drinks on any single day.

Note: "standard drink" would be defined keeping in mind local patterns of consumption. The net alcohol content of a standard drink is 10 g. of ethanol.

3. Diet:

Consumption of **fruits and vegetables reduces the risk** of NCDs, like cancers and cardiovascular diseases. Fruits and vegetables are good sources antioxidant, potassium, fiber, and folate having protective effect. Other compounds such as flavonoids, phytates, lycopene, carotenoids, and other phytochemicals in vegetables may also have significant protective effects in reducing NCD risk.

India is experiencing a 'nutritional transition' characterized by, high cholesterol 'fatty' diet and decreased consumption of fruits and vegetables, which is contributing to the advancing epidemic of NCDs.

Low consumption of fruit and vegetables has been identified as a risk factor in the development of a range of chronic diseases including coronary heart disease, stroke and many forms of cancer.

WHO recommends consumption of at least 400 grams of vegetables and fruits per day or 5 servings each of 80 grams of fruits and vegetables per day. One serving= 80 grams standard (translated into different units of cup depending on type of vegetable and standard cup measures. Tubers such as potato and cassava are not included in this recommendation. The questionnaire measures the number of servings of fruits and vegetables consumed per day and the **type of oil or fat** most commonly used for cooking.

4. Physical Inactivity:

Lack of physical activity leads to obesity, dyslipidemia (lower high-density lipoprotein levels), insulin resistance, diabetes mellitus and high blood pressure levels and is a risk factor for coronary heart disease (CHD)



Physical activity levels are assessed using a validated physical activity questionnaire, which focuses on three domains: 1) work related (occupational), 2) transportation to work and 3) leisure time: sports, fitness, recreational and leisure-time exercise.

WHO recommends at least 30 minutes or more of moderate-intensity physical activity like brisk walking on most, or preferably all, days of the week in Indians, which are consistent with the US recommendations.

5. Obesity:

Weight

Weight is related to blood pressure, blood lipids and propensity to develop Type 2 diabetes. Being overweight exacerbates symptoms from osteo-arthritis and is also a risk factor for colo-rectal cancer, uterine prolapse and uterine fibroids and, in pre-menopausal women, for breast cancer. Weight is used to calculate Body mass index (BMI), which is used as an indicator for obesity..

Height

Height is a key variable in the calculation of relative body weight. Height is used to calculate Body mass index (BMI), which is used as an indicator for obesity.

Body Mass Index (BMI)

BMI is used as an indicator of underweight, overweight and obesity. BMI is calculated from height and weight measurements (weight in Kg/ height in metres). Increased BMI is associated with conditions such as hypertension, unfavorable blood lipid concentrations, diabetes mellitus, coronary heart disease, some cancers, gall bladder disease, and osteo-arthritis.

Definitions for categories of relative weight

BMI	Category of relative weight
< 18.5	Underweight
18.5-24.9	Normal weight
25.0-29.9	Grade 1 overweight
30.0-39.9	Grade 2 overweight
≥ 40.0	Grade 3 overweight

Source: WHO Stepwise approach to NCD surveillance



Abdominal Obesity:

Abdominal obesity (measured as waist circumference or waist to hip ratio) is more strongly associated with coronary heart disease than BMI. Waist measurement is taken at the level of midpoint between the inferior margin of the rib and iliac crest in the mid-axillary plane, using a non-stretchable tape, without clothing, that is, directly over the skin (or over light clothing).

Cut-off level for Indians- 90 cms. in males and 85 cms. in females. (South Asia Pacific Guidelines)

5. High Blood pressure:

Raised Blood pressure is an important determinant of risk of cerebrovascular disease, ischemic heart disease, congestive cardiac failure and renal failure. There are also relationships between blood pressure and risk of peripheral arterial disease, retinopathy and abdominal aortic aneurysm. Hypertension is defined as a systolic blood pressure of 140 mm of Hg or greater and/or a diastolic blood pressure of 90 mm of Hg or greater in subjects who are not taking any anti-hypertensive medication. A classification of BP levels in adults over the age of 18 is provided in following table

Category	Systolic (mm of Hg)	Diastolic (mm of Hg)
Normal	<120 and	<80
Prehypertension	120-139 or	80-89
Stage 1 Hypertension	140-159 or	90-99
Stage 2 Hypertension	<u>≥</u> 160 or	<u>≥</u> 100

Definitions and Classification of BP levels (JNC 7)

Controlling and preventing high blood pressure will help to prevent coronary heart disease, paralytic strokes, congestive heart failure and all cause mortality.

The biochemical investigations included in Steps 3, like Blood sugar Blood cholesterol, though desirable, would not be included in the first phase of the NCD Risk factor surveillance under IDSP.



Chapter 2: Obesity: Introduction:

Obesity, defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size (hypertrophic obesity) or an increase in fat cell number (hyperplastic obesity) or a combination of both.

Facts about overweight and obesity:



WHO's latest projections indicate that globally in 2005

approximately 1.6 billion adults (age 15+) were overweight and at least 400 million adults were obese. WHO further projects that by 2015, approximately 2.3 billion adults will be overweight and more than 700 million will be obese. At least 20 million children under the age of 5 years were overweight globally in 2005.

What causes obesity and overweight?

The fundamental cause is an energy imbalance between calories consumed on one hand, and calories expended on the other hand. Overweight and obesity are attributable to a number of factors including:

- Increased intake of energy-dense foods that are high in fat and sugars but low in vitamins, minerals and other micronutrients; and
- A trend towards decreased physical activity due to the sedentary nature of work, changing modes of transportation, and increasing urbanization.

What are common health consequences of overweight and obesity?

- Cardiovascular disease (mainly heart disease and stroke) already the world's number one cause of death, killing 17 million people each year.
- Diabetes –rapidly becoming a global epidemic, WHO projects that diabetes death will increase by more than 50% worldwide in the next 10 years.
- Musculoskeletal disorders especially osteoarthritis.
- Some cancers (endometrial, breast and colon).

Childhood obesity is associated with a higher chance of premature death and disability in adulthood.



How can the burden of overweight and obesity be reduced?

Overweight and obesity, as well as their related chronic diseases, are largely preventable.

At the individual level, people can:

- Achieve energy balance and a healthy weight
- Limit energy intake from total fats and shift fat consumption away from saturated fats to unsaturated fats;
- Increase consumption of fruit and vegetables, as well as legumes, whole grains and nuts;
- Limit the intake of sugars; and
- Increase physical activity at least 30 minutes of regular, moderate-intensity activity on most days.
 More activity may be required for weight control.

Initiatives by the food industry to reduce the fat, sugar and salt content of processed foods and portion sizes, to increase introduction of innovative, healthy & nutritious choices, and to review current marketing practices could accelerate health gains worldwide.

WHO's strategy for preventing overweight and obesity:

Adopted by the World Health Assembly in 2004, the WHO Global Strategy on Diet, Physical Activity and Health describes the actions needed to support the adoption of healthy diets and regular physical activity.

The strategic objectives are to: advocate for health promotion and chronic disease prevention and control; promote health, especially for poor and disadvantaged populations; slow and reverse the adverse trends in the common chronic disease risk factors; and prevent premature deaths and avoidable disability due to major chronic diseases.

Burden of Disease:

According to WHO India Estimated Overweight and obesity (15+Age/25+ BMI) prevalence 20.10% and 18.10% in males and females respectively by 2010. It is increased in comparison to 2002 as 15.0% and 13.75 in males and females respectively.





Source: - WHO India

Figure: - Prevalence of overweight or obese in India, 2002-2010

Epidemiological Determinants:

- 1. Genetic and Family tendency
- 2. Personal attributes like Age and Sex
- 3. Psychological (emotional disturbances, boredom, sadness, stress or anger)
- 4. Physical (Slow Metabolism)
- 5. Endocrine problems (Cushing syndrome, growth hormone deficiency)
- 6. Life style Modifications (Physical Inactivity, Eating Habits, Alcohol, Smoking and Drugs)

Assessment Tools for Obesity:

1. **Body weight.** An adult weighing 10 per cent more than the standard weight is overweight and 20 per cent more is obese.

% body weight excess of normal	Degree of obesity
25	Mild
50	Moderate
75	Severe
100	Very severe

2. Body mass index. Also called Quetlet Index. This index does not require any standard tables BMI = Weight (Kg)/Height² (m)

Grading of obesity can be done based on BMI

Underweight	<18.5
Normal	18.5-22.9
Overweight	23-24.9
Obese	≥ 25

3. Waist circumference. It is the most practical tool a clinician can use to evaluate a patient's abdominal fat before and during weight loss treatment.



High risk waist circumference

Men: > 40 inches (> 102 cm) Women: > 35 inches (> 88 cm)

4. **Ponderal Index.** The ponderal index is the ratio of height to the cube root of weight. This index is given by the formula

PI = Height (inches) / $\sqrt[3]{}$ weight (lbs)

An index less than 13 is associated with obesity

5. **Waist to Hip ratio**. The predominant distribution of fat in an obese person, whether in the upper part or the lower part of the body, may determine the disease pattern.

The normal ratio = Waist/Hip = 0.7

But with upper body obesity the ratio is 0.85 in women and greater than 1.0 in males. Abdominal obesity does not always go hand in hand with overweight or obesity.

6. Broka's index. The formula for Broka's index is

Height (cm) – 100 = ideal weight (kg)

This measurement is easy to calculate and accurate. **Treatment**

- a. Drugs: Anti-obesity drugs may be taken to reduce appetite or inhibit fat absorption. Drugs should be reserved as a second line of management and should be considered only when insulin resistance, impaired glucose tolerance, hepatic steatosis, dyslipidaemia or severe menstrual dysfunction persists in spite of lifestyle interventions.
- b. Surgical treatment: In severe cases, surgery is performed or an intragastric balloon is placed to reduce stomach volume and/or bowel length, leading to earlier satiation and reduced ability to absorb nutrients from food.

Management:

Dietary management: - Dieting is the mainstay of treatment & prevention for obesity.

Tips on reducing:

- 1) Determine your ideal body weight
- 2) Follow your diet plan strictly with patience
- 3) A gradual reduction of 2-3 kg is desirable in a month
- 4) Drink plenty of water
- 5) Do not starve yourself (take plenty of free foods)



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 Regular brisk walk / exercise on minimum half an hour should be an essential part of your routine

Foods allowed and avoided in obesity:

Foods Avoided	Free Foods
All sugars (honey, jaggery, ice cream, Murraba etc.)	Coffee/tea (without sugar)
All fats (butter, cream, ghee, fried foods).	Lemon water
Foods rich in starch (potato, arbi, sharkandi, chaukandar , zimik	Salads
and maida, corn flour)	
Fruits (mango, grapes, chikoo, banana)	Tomato, cucumber, onion,
	raddish,
All nuts (khajur, kishmish, akhrot, peanuts.)	Green leafy vegetables
Alcoholic drinks	Zeera water
Sweetened fruit juices	Chutney's
Aerated soft drinks	Clear soups
	Diluted khatti lassi
	chach

Menu plan (1200 kcal): Anti Obesity Diet-

Time of meal	Plan	Quantity
Early Morning	Lemon water/plain water	1-2 glasses
	Теа	1 cup(100 ml)
Breakfast	Milk	1 cup (with sugar)
	Porridge (Dalia)	1 small bowl (25 gm raw)
Mid morning	Fruit 1 piece (80 -100 gm)	
Lunch /dinner	Clear soup	1 bowl
	Salad	1 plate
	Chapatti	2
	Green leafy vegetable	1 bowl
	Skim curd / dhal	1 bowl (100 ml)
Evening tea	Теа	1 cup (without sugar)
	Sprouts with vegetables	1serving (30 gm raw)

Total oil to be used = 15-20 ml /day



Use missi Atta for chapatti

Use combination of oils for cooking (ghee: refined oil: mustard oil: olive oil in a ratio of 1:1:1:1) **Note:** Chicken =100 gm /cottage cheese (paneer) = 20 gm can be taken once /twice a week instead of dhal / curd in the diet plan.

Prevention-

Obesity prevention has two objectives:

- To achieve a healthy weight.
- To maintain that healthy weight.

Physical activity enhancement: - This is an important part of weight reducing treatment regular physical exercise is the key to increased energy expenditure. Combining increased physical activity with a good diet will significantly increase your chances of losing weight successfully and permanently.

Health Promotion Interventions: Community level interventions include advocacy to increase physical activity at schools and at home through the creation of environments that support physical activity.

Obesity Associated Health Risk:

Obesity & Overweight is a significant contributor to health problems. It increases the risk of developing a number of diseases including:

Greatly Increased	Moderately Increased	Slightly Increased
NIDDM	CHD	Cancer (breast cancer in post-menopausal women,
		endometrial cancer, colon cancer)
Gallbladder disease	Hypertension	Reproductive hormone abnormalities
Dyslipidaemia	Osteoarthritis (Knees)	Polycystic ovary syndrome
Insulin resistance	Hyperuricaemia and	Impaired fertility
	gout	
Breathlessness		Low back pain due to obesity
Sleep apnea		Increased risk of anesthesia complications
		Fetal defects associated with maternal obesity



Chapter 3: Diabetes:

Introduction

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin, or alternatively, when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar. Hyperglycemia, or raised blood sugar, is a common effect of uncontrolled diabetes

and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels.

Some facts about diabetes-

- 180 million people suffered and a million People died from diabetes (2005)
- 80% of diabetes deaths occur in low and middleincome countries.
- Half of diabetes deaths occur in people under the age of 70 years; 55% of diabetes deaths are in women.



- Diabetes deaths will increase by more than 50% in the next 10 years

Common Consequences of diabetes:

- Diabetic retinopathy
 - After 15 years of diabetes, approximately 2% of people become blind, and about 10% develop severe visual impairment.
- Diabetic neuropathy
 - Affects up to 50% of people with diabetes. Combined with reduced blood flow, neuropathy in the foot increases the chance of foot ulcers and eventual limb amputation.
- Diabetes is among the leading causes of kidney failure.
 - o 10-20% of people with diabetes die of kidney failure.
- Diabetes increases the risk of heart disease and stroke.
 - 50% of people with diabetes die of cardiovascular disease (primarily heart disease and stroke).
- The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes.


Burden of Disease:

	2010	2030
Total world population(Billions)	7.0	8.4
Adult population(20-79 years, billions)	4.3	5.6
Diabetes		
Global prevalence (%)	6.6	7.8
Comparative prevalence (%)	6.4	7.7
Number of people (millions)	285	438
IGT		
Global prevalence (%)	7.9	8.4
Comparative prevalence (%)	7.8	8.4
Number of people (millions)	344	472

Source: - International Diabetes Federation, 2009

According to WHO India and ICMR, Type 2 diabetes cases were 28 million and 40.9 million in 2007 and 2009 respectively and are expected to increase more than 60 million cases by 2017. percentage of diabetic patient (20-79 years) 7.1% in 2010 and 9.3% projected in 2030.In 2010 Impaired glucose tolerance (20-79 years) patient is 5.5 % .New cases of type 1 diabetes in children (under14) 4.2 (New cases/1,00,000population/Year) in 2010. Total death attributable to diabetes (20-79 Years) is 1,007,642 in 2010.

Classification of Diabetes Mellitus:

Type of diabetes-

- a. **Type 1 diabetes** (previously known as insulin-dependent or childhood-onset) Symptoms: Polyuria, Polydipsia, constant hunger, weight loss, vision changes and fatigue
- b. **Type 2 diabetes** (formerly called non-insulin-dependent or adult-onset) results from the body's ineffective use of insulin.90% fatal
- c. Gestational diabetes is hyperglycemia which is first recognized during pregnancy.

Diabetes mellitus is a heterogeneous clinical disorder with numerous causes. Two main classifications of diabetes mellitus exist, Idiopathic and Others.





Characteristics of common clinical types of Diabetes

Features	Type 1 Diabetes	Type 2 DM	PDDM	FCPD
Usual age of onset(Years)	5-30	35-65	10-30	10-30
Sex	M:F=1:1	F>M, in India M>F	M>F	M>F
Prevalence	1% in India	90-95% of all DM	50% of young onset DM Tropical developing countries	Within Tropics
Genetic	Hereditary+StrongHLAassociation	Hereditary +++ No HLA association	Not established	Not established
Nutrition	Non obsess	Often obese, particular Indians	Invariability emaciated	Lean, emaciated
Unusual onset	Rapid	Slow Insidious	Intermediate	Slow, Abdominal colic in many
Ketosis	Prone	Not prone	Not prone	Not Prone
Islet cell Antibodies	Present within one year of onset	Absent	Not established	Absent
Insulin lack	++++	+/-	++	++
Insulin resistance	Rare, secondary when present	+++ particularly in obese,	+++	++
Insulin requirement	low to moderate	low moderate & high	High	Moderate
Sulphonylurea	Unresponsive	Responsive	Unresponsive	Rarely responsive
Common causes of death	Nephropathy, CHD, Ketoacidosis, hypoglycemia	CHD, Nephropathy,, stroke Disease, Gangrene	Infection, lack of treatment	Lack of treatment



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases Note: - PDDM (Protein Deficient Diabetic Mellitus) and FCPD (Fibrocalculous Pancreatic Diabetes) are Malnutrition Modulated Diabetic Mellitus (MMDM)

Type 1 DM:

The type I diabetes develops from beta- cell destruction that may ultimately lead to severe insulin deficiency in which 'insulin is required for survival" to prevent the development of ketoacidosis coma and death.

Symptoms-

- Low BMI
- Persistent enuresis
- Abdominal pain and Vomiting
- Dehydration

Type 2 DM

High Risk factors-

- First degree relative with Type 2 DM
- High risk ethnic group: Asian Indians, Micronesians, Polynesian
- Glucose Intolerance / Impaired fasting glucose
- Obesity and visceral adiposity

Symptoms-

- Increased percentage of body fat
- Hyperglycemia
- Macro vascular and micro vascular complications
- Hypertension
- Dyslipidaemia

- Prostration
- Drowsiness and coma
- Upper respiratory or chest infections

- Endocrinopathy(Cushing's, Acromegaly)
- Diabetogenic drugs (e.g. corticosteroids)
- Physical Inactivity (Sedentary life style)
- Low birth Weight
- Cigarette Smoking
- Osmotic symptoms(Weakness, weight loss, muscle pain)
- Delayed healing of wounds
- Develop furuncles
- Vulvo-vaginitis
- Premature cataract

Type 2 diabetes can result from genetic defects that cause both insulin resistance and insulin deficiency. There are two main forms of type 2 diabetes:



- 1. Late onset associated with obesity.
- 2. Late onset not associated with obesity.

There is a strong correlation between obesity and the onset of type 2 diabetes with its associated insulin resistance. Many children are obese and are developing type 2 diabetes at an alarming epidemic rate. The metabolic syndrome is a clustering of atherosclerotic cardiovascular disease risk factors, one of which involves insulin resistance characteristic in type 2 diabetes.

Impaired Glucose Tolerance (IGT):

According to the World Health Organization Impaired Glucose Tolerance is defined as "Two-hour glucose levels of 140 to 199 mg per dL (7.8 to 11.0 mml) on the 75-g oral glucose tolerance test. A patient is said to be under the condition of IGT when he/she has an intermediately raised glucose level after 2 hours, but less than would qualify for type 2 diabetes mellitus. The fasting glucose may be either normal or mildly elevated."

Key features

- Insulin resistance
- Hyperinsulinaemia
- Visceral and Central obesity
- Glucose intolerance fasting plasma glucose>6.1 umol/1
- Dyslipidaemia (TG>200 mmol/L)
- Hypertension >140/90 mmHg.
- Atherosclerosis

Symptoms

- Dehydration (dry mucous membranes)
- Constipation
- Muscle weakness
- Dizziness

Increased intracranial pressure

Hypotension

Cerebral edema

- Diagnosis
 - Urine sugar and ketone test
 - Oral Glucose Tolerance Test (OGTT) also called "Glucose Challenge" test.
 - Blood glucose tests {Fasting plasma glucose (FPG) }
 - ECG
 - Adrenal Function Tests



Clinical Approach to a Patient-

The clinical presentation in diabetes will vary widely depending on the type of diabetes and age of patient. **Commonest Presenting Symptoms**

- Polyuria
- Polyphagia
- Polydypsia
- Easy fatigability

Genetic Syndromes Associated with DM-

- Down syndrome
- Klinefelter's Syndrome
- Turner syndrome
- Wolfram syndrome
- Huntingtion'chorea

Weight loss

- Giddiness
- Muscle pains
- Paraesthesias

Diagnostic value for the oral Glucose Tolerance Test			
ll)			
Whole Blood		Plasma	
Venous	Capillary	Venous	
>110	>110	>126	
>180	>200	>200	
Impaired Glucose Tolerance (IGT)			
<110	<110	<126	
120-180	140-200	140-200	
Impaired Fasting Glycaemia (IFG)			
101-110	101-110	111-125	
<120	<140	<140	
	Glucose Tolerance II) Whole Blood Venous >110 >110 >180 (IGT) <110 120-180 (IFG) 101-110 <120	Glucose Tolerance Test Whole Blood Capillary Venous Capillary >110 >110 >180 >200 (IGT) <110	



Physical Examination:

- Anthropometric data like height, weight, waist- hip ratio, fat-fold thickness.
- General examinations for common DM skin changes ,hair loss, prominent veins, callus formation, cracks ,fissures, ulcers in foot, retina examination, tests of autonomic functions,
- General examinations for type 2DM- nape of the neck, axillary folds, groins, bilateral parotid enlargement and brownish spots on the shins.

Diagnosis-

Blood glucose estimation

Measurement of blood glucose is the method of choice for diagnosis of DM.

Parameters of Monitoring In DM			
Test Performed	Purpose	Indications	
Urine Glucose	To assess glycaemic control	Routine check-up, assess the efficacy of treatment	
Urine ketones	To rule out ketosis or ketoacidosis	Period of poor of metabolic control & in presence of infection & stressful situation	
Blood Glucose	To assess glycaemic control	For diagnosis of DM, Assess the efficacy of treatment. For changes in therapy	
Self- monitoring of Blood glucose	Urgent estimation of blood glucose	Intensive insulin therapy, peri -operative state, pregnancy, severe infection	
Glycosylated hemoglobin	Estimation of glycaemic control over the preceding of three month	Diagnosis especially in pregnancy, routinely in all patients every 3 month	
Serum fructosamine	Estimation of glycaemic over the past 15 days	Pregnancy	
Urine for microalbuminuria	To detect early nephropathy	Early detection of nephropathy	

Management in DM:

Goal of Diabetes management

- Individualization of treatment regimen
- Achievement of metabolic status at normal or close to normal as possible (Blood glucose & lipid concentration)
- Adherence to a sound, realistic and appropriate diet and exercise
- Achievement and maintenance of normal or reasonable body weight
- Attainment of normal quality of life
- Prevention of acute complications and an attempt towards prevention or progression of chronic complications
- Patient education for successful long-term management



 Diet therapy consists of maintenance of proper nutrition and monitoring of total number of calories ingested and individual food sources.

General Guidelines for Diet in DM-		
Energy (calories)	25-30 calories/kg L.B.W. Reduce calories in obese and increase in	
	underweight	
Protein	0.8g/Kg body weight.	
Fats	20-25% of total calories	
Saturated	6-7% of total calories	
MUFA	6-7% of total calories	
Cooking Oil	0.5 Kg/ month/person	
	Cholesterol per day -300 mg/day	
Carbohydrates	55-60% of total calories	
Fruits	Fresh fruits up to 400g/day. Avoid juices	
Dietary fibre	30-40g/day preferably from natural sources.	
Common salt	Up to 6-8 g/day. Reduced intake to 4g/day in presence of hypertension	
	and heat problems.	
Condiments and spices	Included in diet plan provides antioxidants, trace elements, minerals	
Alcohol	Avoid if possible. If not, drastically restrict.	
Tobacco	Avoid smoking or its use in any from	

- Attainment of optimal body weight results in marked reduction of hyperglycaemia and increase in target cell response to insulin .Ideal body weight (IBW) of a person calculated by IBW (in kg) = (Height in cm 100) x 0.9
- Exercise is an important aspect of the management .It helps to improve glycaemic control by increasing insulin sensitivity, maintaining body weight, reducing cardiovascular risk factors and inducing a sense of well-being.
- Oral Hypoglycemic agents (OHA) are used in type 2 DM in the event of failure of diet and exercise.

Different Classes of OHAs are

- Sulphonylurea (glimeperide, gliclazide, glipizide)– Stimulate insulin secretion in a biphasic action
- o Biguanides(metformin)- Suppression of hepatic gluconeogenesis
- Alpha glucoisidase inhibitors –Delays the digestation and absorption of carbohydrates in the gut by inhibiting alpha glucosidase enzymes in proximal small intestine
- Meglitinides(repaglinide)- stimulates insulin secretion from pancreatic beta cells



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases Insulin sensitizers (Thiazolidinedione derivatives ,Pioglitazone) – promote glucose uptake in skeletal muscle and adipose tissue

Insulin

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Insulin is a natural <u>hormone</u> made by the <u>pancreas</u> that controls the level of the sugar glucose in the blood. Insulin permits cells to use <u>glucose</u> for energy. Cells cannot utilize glucose without insulin.

Human Insulin is manufactured by two process Semi-synthetic human insulin (enzyme modified porcine insulin) and Recombinant DNA techniques (biosynthetic human insulin).

Types of Insulin-

Insulin is divided into 3 major categories

- a. Short acting soluble crystalline zinc insulin.
- b. Long acting (Lente insulin is a mixture of 30% semi lente with 70% ultra lente insulin).
- c. Intermediate acting Neutral Protamine Hagedorm or Isophane (NPH)
- Site of Injection:
 - o Thighs-outer aspect
 - Upper arms deltoid region
 - o Anterior abdominal wall
- Techniques of injection

Insulin is administered sub cutaneously and so the injection must be given perpendicular to the skin with the short hypodermic insulin needle or if the patient is thin ,into the raised skin fold. Insulin is absorbed quicker from certain sites and hence insulin injection must be administered in same region but at a different spot to decrease day to day variability.

- Adverse effects of Insulin therapy
 - o Insulin allergy and antibodies
 - Lipo-hypertrophy

- o Hypoglycemia
- o Weight gain

o Insulin edema



How can the burden of diabetes be reduced? Prevention-

- Achieve and maintain healthy body weight.
- Be physically active at least 30 minutes of regular, moderate-intensity activity on most days. More activity is required for weight control.
- Moderate blood glucose control. People with type 1 diabetes require insulin; people with type 2 diabetes can be treated with oral medication, but may also require insulin;
- Blood pressure control
- Foot care.
- Screening for retinopathy (which causes blindness);
- Blood lipid control (to regulate cholesterol levels);
- Screening for early signs of diabetes-related kidney disease.

Strategies for prevention of Diabetes:

Strategy	Intervention	Aim
Primordial prevention	Health promotion	Preventing the birth of DM susceptible individual
	Genetic counseling	
Primary prevention	Lifestyle modification	Modification of environment triggers of diseases
	Specific protection	onset and preventing onset of diabetes
Secondary prevention	 Early diagnosis and 	Early detection of diseases and treatment to
	prompt treatment	reduce complications
Tertiary prevention	Disability limitation	Prevent progression of complications
	Rehabilitation	Improve quality of life

Tertiary prevention strategies for Complications of Diabetes:

- Retinopathy :- Fluorscein angiography and Laser photo coagulation
- Nephropathy:- Dietary regulation and renal transplantation
- Neuropathy :- lifelong surveillance of feet and foot care
- Cardiovascular:- Life style modification, Specific drug therapy and Angioplasty
- Cerebro-vascular:- Reconstructive surgery
- Peripheral vascular:- Angiography and Bypass grafts

Cost-effective interventions that are feasible in developing countries such as India include:

- Blood glucose control (type 1 Diabetics require insulin; type 2 Diabetics can be treated with oral medication, but may also require insulin)
- Blood pressure control



- Foot care
- Screening for retinopathy
- Blood lipid control to regulate cholesterol levels
- Screening for early signs of diabetes-related kidney disease.

Special considerations:

- Patient care includes monitoring symptoms to ensure that fluid balance
- Record fluid intake and output carefully.
- If the patient is dizzy or has muscle weakness, keep the side rails up and assist him with walking.
- Monitor urine specific gravity between doses. Watch for a decrease in specific gravity
 accompanied by increasing urine output, indicating the recurrence of polyuria and necessitating
 administration of the next dose of medication or a dosage increase.
- If constipation develops, add more high-fiber foods and fruit juices or add mild laxative such as milk of magnesia.
- Provide skin and mouth care; apply petroleum jelly, as needed, to cracked or sore lips.
- Before discharge, teach the patient how to monitor intake and output. Refer the family for counseling if necessary.

Complications:

Diabetic Ketoacidosis (DKA):

Biochemical features of DKA			
Blood pressure	1	Urea	↑
Plasma ketone	↑	Potassium	↑ ↓
рН	. ↓	Haematocrit	↑
Bicarbonate	↓	WBC count	↑
PCO	¥		

Clinical features:

Signs	Symptoms
 Hyperpnoea Hypothermia Acetone breath Dehydration Hyporeflexia 	 Polyuria Polydipsia Weakness, nausea and vomiting Abdominal pain Anorexia and headache



Management of DKA:

Specific	General
 Insulin and correction of water& electrolyte balance remain the stay Intravenous infusion of isotonic saline Blood glucose is monitored every second hourly until it reaches 250mg per dl Serum potassium concentrations monitoring 	 Antibiotic cover Gastric aspiration is required if vomiting persists Catheterization of urinary bladder Oxygen is administered when PO₂ is less than 80 mm Hg Central venous pressure monitoring

Prevention:

- Alert when patient presents with evidence of dehydration, hyperventilation, polyuria and polydipsia.
- During infection increase insulin dose
- A palatable diet given along with insulin and adequate fluid intake
- If the child does not retain fluid it is advisable to hospitalize.

Chronic Complications:

Chronic complications of Diabetes Mellitus		
Macroangiopathy	Coronary heart diseases, CVD, Peripheral Vascular disease	
Microangiopathy	Retinopathy, nephropathy, dermopathy	
Neuropathy	Peripheralpolyneuropathy, mononeuropathy, Amyotrophy,	

DM & Pregnancy:

In pregnancy maternal fasting glucose levels are low and there is a state of accelerated starvation. Maternal fetal glucose transfers in further facilitated by in hence maternal lipolysis. Lipolysis makes these women prone to diabetic ketoacidosis. Women with pre existing type1 & type 2 diabetes have progressive deterioration in their glucose tolerance due to the physiological decrease in insulin sensitivity.

Pre Gestational diabetes

Problems of the Infant born to Diabetic Mothers:-

- Congenital malformations
- Fetal Death

- Macrosomia
- Hypoglycaemia



- Hyaline membrane diseases(RDS type 1)
- Wet Lung Syndrome (RDS type 2)

- Renal Vein thrombosis
- Hyperbilirubinaemia
- Hypocalcaemia

Effect of Diabetes on pregnant mother

- Diabetic retinopathy and nephropathy
- Pregnancy induced hypertension (Pre Eclampsia)

Diabetic diet:

Instructions

- 1) Weight should not exceed your expected ideal weight.
- 2) Do not starve yourself. You may take free foods from the list.
- 3) Divide whole day's ration into 5-6 meals of equal quantity rather than having 2-3 major meals.
- 4) Exercise should be a part of daily routine but any additional physical activities arising on any particular day should be adjusted through diet on treatment.
- 5) Feats and fast should be avoided.
- 6) Cereals should be consumed in prescribed amounts; use of mixed whole grain cereal is desirable.

Dietary instructions for diabetic patient

Free foods	Foods in prescribed	Foods prohibited	Foods avoided
	amounts		
Plain tea	Wheat flour	Organ meat	Ice creams
Coffee	Gram flour	Liver	Puddings
Lemon water	Rice	Kidney	Mango
Clear soups	Beans	Heart	Banana
Plain aerated soda	Milk	Brain	Custard apple
Vinegar	Curd	Sausages	Raisins
Diluted khatti lassi	Paneer	Bacon	Grapes
Cucumber	Chicken	Salami	Sapota (Chikoo)
Tomato	Fish	Pork	Khajur
Raddish	Meat	Egg	Dry fruits
Bittergaurd	Fruits	Sugar	Nuts
Green leafy vegetables	vegetables	Jaggery	Starchy foods
Salads(without oily dressings)		Honey	Cakes
		Glucose	Pastry and Maida
		Syrups	Fried foods
		All sweets	Pickles
			Alcohol, Wine



Sample menu: Diabetic diet 1

Calories: - 1300 kcal Protein: - 60 gm Carbohydrates: - 170 gm Fat: - 33 gm Sample menu: Diabetic diet 1

Time of meal	Menu	Quantity
Early morning	Теа	1 cup (without sugar)
Breakfast	Toned milk	1 up
	Bread slices	2
	Or	
	Missi roti (stuffed)	1
	Curd	1 bowl
Mid morning	Citrus fruit (sweet lime/ orange/	1
	mausambhi)	1 bowl (raw 30 gm)
	Sprouted dhal /kale channe	
· · · · ·	(with salad vegetables)	
Lunch/dinner	Salad	Ad lib
	Missi chapatti	1/1
	Green vegetable	1 bowl
	Dhal/chicken/curd	1 bowl/200 gm/1 bowl
Evening tea	Теа	1 cup (without sugar)
	High fiber biscuits	2
	Paneer	30 gm

Sample menu: Diabetic diet 2

Calories: - 1600 kcal Protein: - 66 gm Carbohydrates: - 223 gm Fat:-20 gm (visible) Sample menu: Diabetic diet 2

Time of meal	Menu	Quantity
Early morning	Теа	1 cup (without sugar)
Breakfast	Toned milk Bread slices/vegetable sandwich/poha with vegetable/stuffed vegetable idli/ Or Missi roti / stuffed chapatti (leafy	1 cup 2 /1 / 30 gm raw / 2
	Curd Butter	1 1 bowl 10 gm
Mid morning	Citrus fruit Sprouted (dhal /kale channe) (with salad vegetables)	1 1 bowl (raw 30 gm)
Lunch/dinner	Salad Missi chapatti Green vegetable Dhal/chicken/curd	Ad lib 2/3 1 bowl 1 bowl/200 gm/1 bowl
Evening tea	Tea High fiber biscuits(Atta biscuits) Paneer	1 cup (without sugar) 2 30 gm

Sample menu: Diabetic diet 3



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Non - Communicable Diseases

Calories: - 1900 kcal Protein: - 70 gm Carbohydrates: - 232 gm Fat:-20 gm (visible) Sample menu: Diabetic diet 3

Time of meal	Menu	Quantity
Early morning	Теа	1 cup (without sugar)
Breakfast	Toned milk Bread slices/vegetable sandwich/poha with vegetable/stuffed vegetable idli/ Or	1 cup 2 /1 / 30 gm raw / 2
	Missi roti / stuffed chapatti (leafy vegetable, cauliflower etc) Curd	1 1 bowl
Mid morning	Citrus fruit (sweet lime, orange,mausambhi etc) Sprouted (dhal /kale channe) (with salad vegetables)	1 piece (80-100 gm) 1 bowl (raw 30 gm)
Lunch/dinner	Salad Missi chapatti Green vegetable Dhal/chicken/curd	Ad lib 3/3 1 bowl 1 bowl/200 gm/1 bowl
Evening tea	Tea High fiber biscuits Paneer	1 cup (without sugar) 4 30 gm

Low protein diabetic diet:

Sample menu:

Calories: 1800 kcal Fats: - 25gm (visible) Protein: - 44 gm t:

Low	protein	diabetic	diet
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Time of meal	Menu	Quantity
Early morning	Теа	1 cup (without sugar)
Breakfast	Toned milk Bread slices /vegetable sandwich / poha with vegetables Butter	1 cup(without sugar) 2 /1/30 gm raw 10 gm
Mid morning	Fruit Poha (with salad vegetables)	1(80-100 gm per serving) 1 bowl (raw 25 gm)
Lunch	Salad Chapatti Fried rice Green vegetable Curd	Ad lib 1 1 serving (35 gm raw weight) 2 bowls ½ bowl(125 gm)
Evening tea	Tea Paneer	1 cup (without sugar) 25 gm
Dinner	Chapatti Vegetable curry Potato vegetable Dhal	2 1 serving 1 serving (125 gm) ½ serving (15 gm raw)

Special instructions:

- Please stick to the amount of foods prescribed on the diet.
- To make the food palatable flavorings and seasoning like illachi, dal chini, pudina, garlic, ginger • may be added.
- Potatoes may be taken in vegetables, in mixed forms. Normal fat allowance may be maintained •



Chapter 4: Cardiovascular Diseases:

Introduction:

Cardiovascular Disease (CVD) includes dysfunctional Conditions of heart, arteries and veins that supply oxygen to vital life– sustaining areas of the body like brain, heart itself and other vital organs

CVDs are the number one cause of death globally: more people *die annually from CVDs than from any other cause.*



An estimated 17.1 million people died from CVDs in 2004, representing 29% of all global deaths. Of these deaths, an estimated 7.2 million were due to coronary heart disease and 5.7 million were due to stroke.

Low- and middle-income countries are disproportionally affected: 82% of CVD deaths take place in lowand middle-income countries and occur almost equally in men and women.

By 2030, almost 23.6 million people will die from CVDs, mainly from heart disease and stroke. These are projected to remain the single leading causes of death. The largest percentage increase will occur in the Eastern Mediterranean Region. The largest increase in number of deaths will occur in the South-East Asia Region.

Fact:

- In 1999 CVD contributed to a third of global deaths.
- In 1999, low and middle income countries contributed to 78% of CVD deaths.
- By 2010 CVD is estimated to be the leading cause of death in developing countries.
- Heart disease has no geographic, gender or socio-economic boundaries.

Burden of disease:

According to the WHO, in India number and deaths of CVD cases were 38,041,090 (90% CHD) and 2,089,508 in 2005 and it will be projected 67,071,981 (95% CHD) and 3,420,752 in 2015 respectively.

Over 80% of the world's deaths from CVDs occur in low- and middle-income countries.

People in low- and middle-income countries are more exposed to risk factors leading to CVDs and other non communicable diseases and are less exposed to prevention efforts than people in high-income countries.





Estimated cases of Coronary Heart Diseases in India Source: - NCMH Burden of Diseases in India, 2005

People in low- and middle-income countries who suffer from CVDs and other non-communicable diseases have less access to effective and equitable health care services which respond to their needs (including early detection services).

As a result, many people in low- and middle-income countries die younger from CVDs and other non communicable diseases, often in their most productive years.

CVDs and other non communicable diseases contribute to poverty. For example, catastrophic health care expenditures for households with a family member with CVD can be 30 per cent or more of annual household spending.

Heart disease, stroke and diabetes are estimated to reduce GDP between 1 and 5% in low- and middleincome countries experiencing rapid economic growth, as many people die prematurely. For example, it is estimated that over the next 10 years (2006-2015), China will lose \$558 billion in foregone national income due to the combination of heart disease, stroke and diabetes.

CVD in developing countries:

Economic transition urbanisation, industrialisation and globalisation bring about lifestyle changes that promote heart disease. The risk factors include tobacco use, physical inactivity, and unhealthy diet. Life expectancy in developing countries is rising sharply and people are exposed to these risk factors for



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases longer periods. Newly merging CVD risk factors like low birth weight, folate deficiency and infections are also more frequent among the poorest in low and middle income countries.

Social and economic consequences:

Clinical care of CVD is costly and prolonged. These direct costs divert the scarce family and societal resources to medical care. CVD affects individuals in their peak mid life years disrupting the future of the families dependant on them and undermining the development of nations by depriving valuable human resources in their most productive years. In developed countries lower socioeconomic groups have greater prevalence of risk factors, higher incidence of disease and higher mortality. In developing countries as the CVD epidemic matures the burden will shift to the lower socioeconomic groups.

What are cardiovascular diseases?

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels and include:

- 1. Coronary heart disease
- 2. Cerebrovascular disease
- 3. Peripheral arterial disease
- 4. Rheumatic heart disease
- 5. Congenital heart disease
- 6. Deep vein thrombosis and pulmonary embolism
- 7. Heart attacks and strokes

What are the risk factors for cardiovascular disease?

Behavioral risk factors are responsible for about 80% of coronary heart disease and cerebrovascular disease.

The three basic risk factors are:

- a. Unhealthy Diet
- b. Physical Inactivity and
- c. Tobacco use.

All these may lead to raised blood pressure, raised blood



glucose, raised blood lipids, and overweight and obesity; these are called 'intermediate risk factors'.



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases There are also a number of underlying determinants of CVDs, or, if you like, "the causes of the causes". These are a reflection of the major forces driving social, economic and cultural change – globalization, urbanization and population ageing. Other determinants of CVDs are poverty and stress.

Cardiovascular disease (CVD) is a leading cause of global morbidity and mortality and is responsible for one-in-three deaths. The majority of the 32 million individuals who develop heart attacks and strokes every year have one or more cardiovascular risk factors: hypertension, diabetes, smoking, high blood lipids or physical inactivity. Most of these CVD events are preventable if meaningful action is taken against these risk factors. Too frequently, however, the focus is on single risk factors, rather than on comprehensive cardiovascular risk. For CVD prevention and control activities to achieve the greatest impact, a paradigm shift is required from the **"treatment of risk factors in isolation**" to "**comprehensive cardiovascular risk management**". To facilitate this shift, the World Health Organization (WHO) developed this CVD-Risk management package through an iterative process with collaborating experts.

In addition to the above, the package:

Enables cardiovascular risk management (in low-resource settings), through affordable approaches and rational resource allocation;

Promotes evidence-based non-pharmacological treatment and the use of cost-effective generic drugs for managing cardiovascular risk;

Empowers patients and their families to cope with a long-term illness through self-management protocols;

Informs policy makers of the need and feasibility of managing cardiovascular risk in less well-resourced settings.

WHO CVD-Risk Management Package:

The package designed primarily for the management of cardiovascular risk in individuals detected to have hypertension through opportunistic screening, can also be adapted for use with diabetes or smoking as entry points. The minimum conditions that characterize the three scenarios, in terms of the skill-level of the health worker and the diagnostic and therapeutic facilities and health services available, are described below. Before implementing the package, the health-care centers in primary, secondary and tertiary health-care levels should be categorized into one of the three scenarios, depending on the level of available facilities. Thereafter, the respective protocols and referral pathways should be used for CVD risk assessment and management. Furthermore, the tools of the package may need to be adapted to local needs.



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Non - Co	ommunicab	ole Di	iseases
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Resource	Scenario-1	Scenario-2	Scenario-3
required/			
availability			
Human resource	Health worker	Medical Doctor or	Medical Doctor with specialist
		Nurse	care
Equipments	Stethoscope	Stethoscope	Stethoscope
	BP instrument	BP instrument	BP instrument
	Measuring tape	Measuring tape	Measuring tape
	Weighing scale	Weighing scale	Weighing scale
	Test tubes	Test tubes	ECG machine
	Burner	Burner	Ophthalmoscope
	Strips for urine sugar	Strips for urine sugar	Blood chemistry analysis
		and albumin	support
			Test tubes
			Burner
			Strips for urine sugar
Generic drugs	Thiazide diuretics	Thiazides	Thiazides
	Metformin(optional)	Angiotensin converting	Angiotensin converting
		enzyme inhibitors	enzyme inhibitors
		Calcium channel	Calcium channel blockers
		blockers	Betablokers
		Betablokers	Aspirin
		Aspirin	Insulin
		Metformin	Metformin
			Glibenclamide
			Statins (cost?)
			Angiotensin blockers (cost?)
Other facilities	Referral	Referral	Specialist care
	Maintenance &	Maintenance &	Maintenance & Calibration of
	Calibration of BP	Calibration of BP	BP instrument
	instrument	instrument	



How can the burden of cardiovascular diseases be reduced?

Heart disease and stroke can be prevented through- healthy diet, regular physical activity, avoiding tobacco smoke, engaging in regular physical activity, choosing a diet rich in fruit and vegetables and avoiding foods that are high in fat, sugar and salt, and maintaining a healthy body weight.

Strategic priorities of the WHO Cardiovascular Disease program:

The WHO Program on Cardiovascular Diseases (CVD) is concerned with prevention, management and monitoring of CVD globally. It aims to develop global strategies to reduce the incidence, morbidity and mortality of CVD by-

- 1. Effectively reducing CVD risk factors and their determinants
- 2. Developing cost effective and equitable health care innovations for management of CVD
- 3. Monitoring trends of CVD and their risk factors

Goal of the WHO Global Strategy:

To effectively control of CVD risk factors and to reduce the burden of the fast growing cardiovascular disease (CVD) epidemic; particularly in developing countries.

Key intervention areas:

- i. Reduce major CVD risk factors and their social and economic determinants through community based programs for integrated prevention of NCDs.
- ii. Development of standards of care and cost-effective case management for CVD.
- iii. Global action to enhance the capacity of countries to meet the health care needs of CVD.
- iv. Developing feasible surveillance methods to assess the pattern and trends of major CVDs and risk factors and to monitor prevention and control initiatives.
- v. Developing effective inter-country, inter-regional and global networks and partnerships for concerted global action.

Types of Cardiovascular diseases:

(1) Hypertension

Hypertension or high blood pressure is a <u>chronic</u> medical condition in which the systemic arterial <u>blood</u> <u>pressure</u> is elevated. It is the opposite of <u>hypotension</u>.



Classification:

(1) **Primary:** Essential hypertension refers to high blood pressure for which no medical cause can be found. About 90–95% of cases of hypertension related to it.

(2) <u>Secondary: hypertension</u> are caused by identify conditions that affect the kidneys, arteries, heart, or endocrine system. The remaining 5–10% of case included in <u>Secondary hypertension</u>.

Epidemiological Determinants- Essential hypertension is the most prevalent hypertension type that predisposes individuals to heart disease, <u>peripheral vascular disease</u>, and <u>strokes</u>. Types of heart disease that may occur include: myocardial infarction, heart failure, and <u>left ventricular hypertrophy</u>.

Although no direct cause has been identified, there are many risk/ trigger factors such as:-

- Stress
- Potassium deficiency (<u>hypokalemia</u>) and salt (sodium) sensitivity
- <u>Alcohol</u> intake

- Vitamin D deficiency
- Obesity/<u>metabolic disorder</u>
- <u>Sedentary lifestyle</u> and Smoking
- Pre-eclampsia during pregnancy

Symptoms:

Symptoms of Primary hypertension are associated with:-

- Headache
- Drowsiness
- <u>Confusion</u>

- Vision disorders
- <u>Nausea</u> and
- Vomiting

Diagnosis and Treatment:

- a. Blood pressure measurement- three separate readings at least one week apart
- b. Complete history and physical examination.
- c. Identification of underlying cause based on risk factors and other symptoms, if present.
- d. Blood bio-chemistry- cholesterol, creatinine, blood urea, total lipids, blood sugar.
- e. Radiography, ECG

Prevention:

Lifestyle changes may help prevent your blood pressure:

- Avoid smoking.
- Dietary interventions <u>DASH diet</u> (Dietary Approaches to Stop Hypertension)- rich in fruits, vegetables and low-fat or fat-free dairy products, reducing total and saturated fat intake (reducing salt, increasing potassium, alcohol avoidance, and multi factorial diet control)
- Exercise regularly for 30 minutes on most days.
- Keep your blood sugar under control.
- Lose weight if you are overweight.
- Manage your stress.



(2) Ischemic Heart Disease:

Ischemic heart disease is defined as myocardial impairment due to imbalance between coronary blood flow and myocardial requirement. The commonest cause of IHD is atherosclerotic coronary artery disease. Imbalance between supply and demand in left ventricular hypertrophy due to aortic valve disease and hypertrophic cardio-myopathy.



Burden of Ischemic Heart Disease 2004 Source:-Assessment of Burden of NCD, ICMR, 2006

Epidemiological Determinants-

- Heredity
- High cholesterol
- Tobacco
- Obesity and High-fat diet
- High blood pressure (hypertension)
- Diabetes
- Physical inactivity
- Emotional stress and Type A personality (impatient, aggressive, competitive)

Symptoms-

The most devastating sign of coronary heart disease is abrupt, unexpected cardiac arrest. The common symptoms include-

- Chest pain on exertion (angina pectoris), which may be relieved by rest.
- Shortness of breath on exertion & Irregular heartbeat.



- Jaw pain, back pain, or arm pain, especially on left side, either during exertion or at rest.
- Palpitations (a sensation of rapid or very strong heart beats in your chest).
- Dizziness, light-headedness, or fainting
- Weakness on exertion or at rest

Silent ischemia is a condition in which no symptoms occur even though an electrocardiogram (ECG, or heart tracing) and/or other tests show evidence of ischemia. Arteries may be blocked 50% or more without causing any symptom

Diagnosis and Treatment:

- Physical findings related to elevated BP, corneal arcus, Retinal arteriolar changes and aortic stenosis
- ECG monitoring
- Left ventricular Function assessment
- Coronary anatomy assessment
- Stress testing
- Echocardiography

Methods of treatment of IHD:

- Medical treatment
 - Platelet inhibitors
 - Lipid lowering agents
 - Beta blockers(Metoprolol, Atenolol)
 - Calcium channel blockers(Nifedipine, Diltiazem)
 - Potassium channel openers (Nicorandil)
 - Oestrogen replacement
 - Antioxidants
 - Gene therapy
 - Metabolic modulation
- Interventional
 - Percutaneous coronary intervention
 - Surgical revascularization
 - Trans-myocardial laser revascularization
 - Spinal cord stimulation
 - Transcutaneous electric nerve stimulation
- Life style modification
 - Cessation of smoking
 - Exercise
 - Diet
 - Alcohol



Management and Prevention:

Modifying the risk factors: High blood fats, the bad LDL, good HDL, triglycerides, Smoking, Diabetes, High blood pressure, Obesity, Inactivity and Emotional stress

Regular follow-up visits with your health care provider / taker are essential.

(3) Cerebrovascular Diseases (Stroke):

Cerebrovascular disease is a group of brain dysfunctions related to disease of the blood vessels supplying the brain. Disorders of the cerebral circulation include any disease of the vascular system that causes



ischemia or infarction of the brain or spontaneous hemorrhage into the brain or subarachnoid space.



Burden of stroke, 2004. Source:-Assessment of Burden of NCD, ICMR, 2006.

Epidemiological Determinants:

- HEMATOLOGIC DISORDERS
- Atherothromboembolism
- Trauma
- Fibro muscular dysplasia (segmental disorder of small and medium sized arteries)
- Congenital arterial anomalies
- Embolism from arterial aneurysm
- Inflammatory vascular disease (cellular proliferation, necrosis and fibrosis)
- Hypertension (damages the blood vessel lining and endothelium, blood vessels making narrow, stiff, deformed, uneven and more vulnerable to fluctuations in blood pressure.



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- Excessive irradiation of the head and neck can damage intra- and extra cranial arteries
- Dementia
- Cerebral infarction and ischemia (sudden occlusion of an artery supplying the brain
- Occlusion or stenosis (disease of the arterial wall)

Risk factors

- Age and Sex
- Hypertension and Cardiac diseases
- Atrial fibrillation (AF)
- Coronary artery disease
- SMOKING/ ALCOHOL

- DIABETES MELLITUS
- LIPIDS AND OBESITY
- ORAL CONTRACEPTIVE USE
- TRANSIENT ISCHEMIC ATTACKS
- BLOOD VISCOSITY

Symptoms

- Trouble in walking
- Altered movement coordination and disequilibrium
- Sudden confusion or trouble in speaking or understanding. Weakness of facial muscles causing drooling.
- Sudden trouble in seeing with one or both eye, troubled walking, dizziness, loss of balance or coordination
- Aphasia
- Dysarthria (motor speech disorder resulting from neurological injury)
- Apraxia (altered voluntary movements)
- Visual field defect
- Memory deficits (involvement of temporal lobe)
- Disorganized thinking, confusion, hypersexual gestures (with involvement of frontal lobe)
- Anosognosia (persistent denial of the existence of a, usually stroke-related, deficit)
- Altered smell, taste, hearing, or vision (total or partial)
- Drooping of eyelid (ptosis) and weakness of ocular muscles
- Decreased reflexes: gag, swallow, pupil reactivity to light
- Decreased sensation and muscle weakness of the face
- balance problems and nystagmus
- Altered breathing and heart rate
- Weakness in sternocleidomastoid muscle with inability to turn head to one side
- Weakness in tongue (inability to protrude and/or move from side to side)



• Sudden numbness or weakness of the face, arm or leg, especially on one side of the body.

Diagnosis and treatment:

- CT scan for brain hemorrhage
- Conventional angiogram for view the blood vessels
- Carotid Doppler ultrasound for detect decreasing blood flow in the carotid arteries
- ECG for abnormal heart rhythms

Prevention:

Strokes are preventable. The most important thing you can do is to get your blood pressure checked and treated if it is high.

- Treat high cholesterol with diet and exercise and then medication. In people with irregular heart rhythms, such as atrial fibrillation, the use of blood thinners such as warfarin (Coumadin).
- Control diabetes.
- Stop smoking or never smoke.

Rehabilitation:

The rehabilitation process can include some or all of the following:

- Speech therapy to relearn talking and swallowing
- Occupational therapy to regain as much function dexterity in the arms and hands as possible
- Physical therapy to improve strength and walking
- Family education to orient them in caring for their loved one at home and the challenges they will face.







Scenario One: Protocol For counseling on Diet, physical activity

(Non physician health care worker)





Scenario One: Protocol for counseling on cessation of tobacco use the 5 Steps – 5As (Non Physician health care worker/ Medical doctor or specially trained nurse)



* Ideally second follow-up visit is recommended within the same month and every month thereafter for 4 months and evaluation after 1 year. If not feasible, reinforce counseling whenever the patient is seen for blood pressure monitoring.











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Scenario Two: Protocol for CVD- Risk Management (Medical doctor or specially trained nurse)





Scenario Two: Protocol For counseling on Diet, physical activity

(Medical doctor or specially trained nurse)





(4) Rheumatic heart diseases:

Rheumatic heart disease is a complication of rheumatic fever and usually occurs after attacks of rheumatic fever. The incidence of rheumatic heart disease has been greatly reduced by widespread use of antibiotics effective against the streptococcal bacterium that causes rheumatic fever.

 Fainting attacks

Epidemiological Determinants:

• Untreated strep throat.

• Rheumatic fever can damage the heart valves. If the heart valves are damaged, they will fail to open and close properly.

Symptoms:

- Breathlessness
- Fatigue
- Palpitations
- Chest pain, and



Treatment:

Treatment of rheumatic heart disease may include medication and surgery. Medication will aim to avoid overexertion. Surgery may be needed to replace the damaged valve(s).

Prevention:

The best way to prevent rheumatic heart disease is to seek immediate medical attention for a sore throat and not let it progress to rheumatic fever.

Comprehensive and integrated action to prevent and control CVDs-

Integrated approaches focus on the main common risk factors for a range of chronic diseases such as CVD, diabetes and cancer: unhealthy diet, physically inactivity and tobacco use. Examples of population-wide interventions that can be implemented to reduce CVDs include:

- 1. Comprehensive Tobacco Control Policies,
- 2. Taxation to reduce the intake of foods that are high In Fat, Sugar and salt,
- 3. Building walking and cycle ways to increase physical activity,
- 4. Providing healthy school meals to children.

There are several treatment options available.



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases Effective and inexpensive medication is available to treat nearly all CVDs.The risk of a recurrence or death can be substantially lowered with a combination of drugs – statins to lower cholesterol, drugs to lower blood pressure, and aspirin.

Operations used to treat CVDs include coronary artery bypass, balloon angioplasty (where a small balloon-like device is threaded through an artery to open the blockage), valve repair and replacement, heart transplantation and artificial heart operations.

Medical devices are required to treat some CVDs. Such devices include pacemakers, prosthetic valves, and patches for closing holes in the heart.

A substantial number of cardiovascular disease related deaths can be attributed to tobacco smoking, which increases the risk of dying from coronary heart disease and cerebrovascular disease 2–3 fold. The risk increases with age and is greater for women than for men. In contrast, cardiac events fall 50% in people who stop smoking and the risk of CVDs, including acute myocardial infarction, stroke and peripheral vascular disease, also decreases significantly over the first two years after stopping smoking.



Chapter 5: Cancer:

Cancer 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.



Typical phases of cancer development

Source- National Cancer Control Programs – Policies and Managerial Guidelines. World Health Organization. 2^{ed} 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. The common sites of cancer in the world are-

	Rank	World	More developing	Less developing
Male	1	Lung	Lung	Lung
	2	Stomach	Prostate	Stomach
	3	Prostate	Colon/rectum	Liver
	4	Colon/rectum	Stomach	Esophagus
	5	Liver	Bladder	Colon/rectum
Females	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

Incidence of common cancers in 2000 – World, More and Less Developed Countries. **Source- World Cancer** *Report, WHO, IARC, 2003.*




Share in cancer Incidence in 2000 and projections for 2020 in more developed and less developed countries.

Source- National Cancer Control Programs – Policies and Managerial Guidelines. WHO, 2nd Edition, 2002.

National scenario

National Cancer Registry Program (NCRP) was started 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 Cancer Registries (HBCRs)** generating data on cancer in the country under NCRP. PBCRs provide data on cancer incidence, survival and mortality. 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

Some facts on Cancer:

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

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-



Five most common cancers in Men as seen in PBCR in India:

Rank	Bangalore	Bhopal	Chennai	Delhi	Mumbai
1	Stomach	Lungs	Stomach	Lungs	Lungs
2	Oesophagus	Oral cavity#	Lungs	Larynx	Oesophagus
3	Lungs	Tongue	Oesophagus	Prostate	Larynx
4	Hypopharynx	Oesophagus	Tongue	Brain	Oral cavity#
5	Prostate	Hypopharynx	Oral cavity#	Non Hodgkins lymphoma	Prostate

Five most common cancers in Women as seen in PBCR in India:

Rank	Bangalore	Bhopal	Chennai	Delhi	Mumbai
1	Breast	Breast	Uterine cervix	Breast	Breast
2	Uterine	Uterine	Breast	Uterine	Uterine
	cervix	cervix		cervix	cervix
3	Oral cavity#	Oral cavity#	Stomach	Ovary	Ovary
4	Oesophagus	Ovary	Ovary	Gall bladder	Oesophagus
5	Ovary	Oesophagus	Oesophagus	Body ueterus	Oral cavity#

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



Estimated incidence of common Cancers in India, (Female, 2007)

Estimated incidence of common Cancers in India, Male, 2007

Source: - National Health Profile, 2009.





Estimated incidence of common Cancers in India, Current and Projected cases of cancer at India

Key messages

- 1. Cancer is a group of diseases with common characteristics
 - i. Uncontrolled multiplication of cells
 - ii. Tendency for local and distant spread
- 2. Cancer is the cause of 12% deaths worldwide
- 3. PBCRs provide data on cancer incidence and survival
- 4. Incidence of cancer in India is 70-90 per 100,000.
- 5. The most common cancers in India are:
 - i. Cancers of the lungs, stomach, and oral cavity among men
 - ii. Cancers of the uterine cervix and breast among women
- 6. HBCRs provide data on length and quality of survival in relation to site and stage at presentation and management
- 7. 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.

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.



Approach	Cancer	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	Common cancers	Training
treatment		Treatment guidelines
		Infrastructure
		Referral practices
Palliative care	All advanced cancers	Oral morphine availability
		Human resource development
		Community participation

Approaches in cancer control:

Primary Prevention:

Primary Prevention aims to reduce the incidence of disease by risk factor modification. Among the activities for prevention, emphasis should be placed on:

- a. Tobacco control
- b. Health education relating to sexual and reproductive factors associated with cancer
- c. Avoiding alcohol use
- d. Healthy diet
- e. 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 esophagus. 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.

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



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



Source: - NHFS-3, MOHFW, GOI

Cigarettes and Other Tobacco Products Act, 2003: '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[®] May 2003.

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 of 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
Probation of smoking in public places	Offences would be made compoundable with a fine of up to Rs 200
Prohibition of 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 warming in the same language as that use 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 conviction 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 3000 for subsequent convictions

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



Alcohol:

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

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 behavioral 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) as the etiological agent responsible for cervical cancer. Late age at marriage, nulliparity, and late menopause have been linked to breast cancer, but the underlying mechanism is probably uninterrupted exposure to estrogen for prolonged periods in all these cases.

Education regarding sexual hygiene and safe sexual behavior can help. 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. 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, fruits, and fiber reduce risk for cancer.

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.



Infective agent	Cancer	Prevention
Human Papilloma virus	Cancer of the Uterine Cervix,	Safe sexual practices, avoiding
	Oesophageal carcinoma, Anal	multiple sexual partners
	cancer, Penile cancer, Oral cancer	
Hepatitis B and Hepatitis	Hepatocellular carcinoma can occur	Universal precautions, Safe sexual
C virus	from chronic active infection	practices, vaccine for Hepatitis B
Epstein- Barr virus	Burkitt Lymophoma, Nasopharyngeal	No specific interventions
	carcinoma	
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

Infections:

Certain basic measures may help in reducing risk of cancer:

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

Early Detection:

Early detection of cancer at a stage in the natural history where the chance of cure is high, is highly desirable. Early detection 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:

- i. Unexplained change in bowel or bladder habit
- ii. A white patch or ulcer in the mouth that does not heal
- iii. Obvious change in a mole or wart, like rapid increase in size, bleeding or ulceration
- iv. Bleeding from body's orifices e..g. haematuria
- v. Persistent indigestion/ difficulty in swallowing/ difficulty in breathing



- vi. Persistent fever unresponsive to treatment
- vii. Unexplained loss of weight
- viii. Chronic cough or hoarseness of voice especially in a smoker

Screening:

Screening is the presumptive identification of unrecognized 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 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:

Screening should preferably begin at 35 years of age, as at younger ages dysplasia detected through screening rarely progresses to cancer, but adds to program cost in treatment. **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.





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 programs result in the desired results.

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.

a. 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

b. Biochemical Evaluation:

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

C. 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.

d. 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:
 - o Excisional biopsy in small tumors
 - Incisional/ Punch biopsy in skin and mucosal lesions
 - Cone biopsy in uterine cervix
 - o Needle biopsy in bone marrow, solid tumors of abdomen and pelvic organs.

e. Immunological Evaluation based on Tumor markers

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. Some approaches in treatment are-

- a. Surgery
- b. Radiotherapy
- c. Chemotherapy
- d. Palliative care



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

Relative importance of various interventions in different cancers

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

Source- National Cancer Control Programs – Policies and Managerial Guidelines. World Health Organization, 2nd 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.

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
- o Avoid alcohol
- o Promote physical activity
- o Eat plenty of fruits and vegetables
- o Practise Safe sexual behaviour

· Early detection of cancers

- o Breast awareness
- Awareness in community regarding early warning signs of common cancers (Oral/Breast/Cervix)
- o Opportunistic check up for oral, breast and cervical cancer
- o 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
- o Radiological examination
- Pathological examination
- o Diagnostic procedures help us to know:
- o The type of cancer
- o The extent (staging) of cancer
- o 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:

a. 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

Risk factors

Tobacco chewing , alcohol use, betel nut chewing, and chronic trauma to oral mucosa by sharp tooth or ill-fitting dentures.

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.



Leukoplakia

Oral Cancer:

The most common cancer seen in the oral cavity is **squamous cell carcinoma**. It presents as a painless ulcer, mass or fissure . 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.



Projected cases of Oral and Lung cancer at India-

Years		Males		Females		
	Lung cancer	Oral cancer		Lung cancer	Oral ca	ncer
		Tongue	Mouth		Tongue	Mouth
2008	42863	23932	28066	13009	7687	14402
2009	43576	24330	29474	13250	7829	14669
2010	44301	24735	30921	13494	7974	14940
2015	47623	26590	38380	14705	8689	16280

Source: National Health Profile, 2009.



Early detection

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

When to do self-examination:

All habitual tobacco users should do it once a month

How to do it:

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

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.

Diagnosis and staging of oral cancer:

- a. A thorough clinical Examination
- b. Biopsy: Punch or incisional
- c. X-Rays of mandible and para-nasal sinuses
- d. CT scan and MRI



Oral Cancer- Squamous cell



TNM Classification for Oral Cancer

Primary Tumor	Regional lymph nodes	Distant metastases	Stage
T _x : Primary tumor cannot	N _x : Regional nodes cannot	M_x: Distant metastases	0: Tis ₁ N ₀ M ₀
be assessed	be assessed	can not be assessed	I: T ₁ N ₀ M ₀
T₀: No evidence of primary tumor	N₀: No regional lymph nodes	M₀: No distant metastases	II: T ₂ N ₀ M ₀
Tis: Carcinoma in situ	N ₁ : Ipsilateral single node	M₁: Presence of distant	III: $T_3 N_0 M_0$
T ₁ : Tumor<2cm in its	3 cms or less in greatest	metastases	T ₁₋₃ N ₁ M ₀
greatest dimension	dimension.		IV: T₄ N₀₋₁ M₀
T ₂ : Tumor 2-4cm. in greatest dimension	N ₂ :		Any T N ₂₋₃ M ₀ Any T ₁ any N ₁ M ₁
T ₃ : Tumor>4cm. in greatest dimension	a: Ipsilateral single node > 3 cms and <6 cms in		
T₄.(lip): Tumor invades through cortical bone, inferior alveolar nerve, floor of mouth or skin of face.	b: Ipsilateral multiple nodes, none more than 6 cms in greatest dimension.		
T₄a: (oral cavity) Tumor invades adjacent structures e.g. through cortical bone, deep muscle of tongue, maxillary sinus, skin of face.	 c: Bilateral or contralateral nodes, none more than 6 cms in greatest dimension. N₃: Nodes more than 6 cms. 		
T₄b: Tumor invades masticator space, pterygoid plates or skull base and/or encases internal carotid artery.			



Management of Oral Cancer:

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



Flowchart for management of patient with an oral lesion

Key message

- a. Oral cancer is preventable and curable if detected early
- b. Tobacco chewing is the most important risk factor
- c. **Health professionals can** examine oral cavity, Teach Oral self-examination, Ensure prompt referral of patients with suspicious lesions and Provide pain relief and palliative care

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 (HPV) infection, which is a sexually transmitted infection, is the primary cause of this cancer. HPV prevalence increases with multiple sexual partners for either spouse, or 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

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. 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.

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

Source -National Cancer Control Programs – Policies and Managerial Guidelines. World Health Organization. 2rd Edition, 2002.

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.



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Cusco's Speculum and Ayre's Spatula

Requirements

- Examination gloves
- Speculum (Cusco's self-retaining type preferred)
- Ayre's spatula
- Endocervical brush (if available) Glass slide
- Diamond tipped pencil to write on glass slide
- Focusing light
- Coplin's jar
- 95% ethyl alcohol
- Cytology form

Procedure

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, 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.

The smear has to be fixed on the slide immediately after it is prepared. The slide should be immersed in a





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Coplin's jar containing adequate amount of 95%ethyl alcohol. Take out the slide after at least30 minutes, dry it and store it in the slide box.

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

On inspection:

- Normal cervix will have reddish endocervix and paler ectocervix.
- 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, e.g. 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.

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.

VIA Category	Description
Negative	No aceto-white lesions • Transparent lesions or faint patchy lesions without
	definite margins • Nabothian cysts becoming aceto-white • Faint line like aceto-
	whitening at the junction of columnar and squamous epithelium • Aceto-white
	lesions far away from the transformation zone.
Positive	• Distinct, opaque aceto-white area • Margin should be well defined, may or may not
	be raised • Abnormality close to the squamocolumnar junction in the transformation
	zone and not far away from the os.
Invasive	Obvious growth or ulcer in the cervix. Acetowhite area may not be visible because
	of bledding.

Criteria for categorizing VIA test results

Visual inspection with Lugol's lodine:

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.

Biopsy is taken from any such suspicious areas, particularly the squamocolumnar junction.



Visual inspection with Lugol's lodine

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



Further evaluation and management after Pap smear cytology



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

Further evaluation and management after screening by VIA





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 Excisionalprocedure (LEEP). Both are outpatient procedures. Follow-up of patients 6 monthly for 2years is important. Once the tumor has broken through the basement membrane, it penetrates the cervicalstroma 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:

Cervical cancer staging (FIGO)

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

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



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 women 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 (estrogen 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.
- Other factors:
 - Being obese after menopause
 - Physical inactivity: greater risk of having breast cancer.
 - Alcohol intake

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.

Sign and Symptoms

- A lump or thickening in or near the breast or in the underarm area
- A change in the size or shape of the breast
- Dimpling or puckering in the skin of the breast
- A nipple turned inward into the breast
- Discharge (fluid) from the nipple, especially if it's bloody





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 Scaly, red, or swollen skin on the breast, nipple, or areola (the dark area of skin at the center of the breast). The skin may have ridges or pitting so that it looks like the skin of an orange.

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 areola 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.

Diagnosis

- 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 soft-tissue radiography where small radiation dose of 0.1 rads is delivered. With this method it is possible to detect lesions as small as 1 mm.

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:

<u>Stage I</u>: Growth confined to breast, not adherent to pectoral muscles or chest wall **<u>Stage II</u>**: Same as Stage I with affected mobile axillary lymph nodes on the same side.

<u>Stage III</u>: Skin involvement or peau d'orange larger than the tumor but limited to the breast and tumor 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 edema of the arm may be seen.

<u>Stage IV</u>: Skin fixation of the breast, complete fixation of the tumor to chest wall and distant metastases are seen.

Primary Tumor	Regional lymph nodes	Distant metastases
T _x : Tumor cannot be assessed	N _x : Cannot be assessed	M₀: No distant metastases
T ₀ : No evidence of primary tumor	N₀: No palpable regional lymph	M ₁ : Presence of distant
T _{is} : Carcinoma in situ	noues	metastases
T ₁: Tumor 2cm or less in its greatest dimension	N₁: Palpable, mobile, lpsilateral axillary lymph node	
T₂: Tumor 2-5cm. in greatest dimension	N₂: Fixed ipsilateral axillary lymph node	
T₃: Tumor>5cm. in greatest dimension	N ₃ : Ipsilateral internal mammary/supraclavicular lymph nodes.	
T₄: Tumor of any size, with direct extension to		

TNM staging of breast cancer

Management of breast cancer

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



Key messages

- a. Breast cancer is curable if detected early
- b. Health professionals can Create 'breast awareness, offer clinical breast examinations to women aged 40-69 years, reassure all lumps are not cancer, ensure prompt referral and appropriate management and provide pain relief and palliative care.

National Cancer Control Program

The National Cancer Control Program 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 cervix
- Extension and strengthening of therapeutic services including pain relief on a national scale through regional cancer centers, medical and dental colleges

The components of the program are

- Regional Cancer Centers (RCCs): are specialized centers providing comprehensive cancer care to the patients 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.
- Strengthening of other cancer treatment facilities to enhance their cancer treatment facilities through purchase of radiotherapy and other equipment under the Oncology Wing development scheme.



- District Cancer Control Program (DCCP) The focus is on prevention of cancers, early detection, and 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

Role of Health Professionals in NCCP

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

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



Chapter 6: Asthma:

What is Asthma?

Asthma is a common disorder in which <u>chronic</u> <u>inflammation</u> of the bronchial tubes (bronchi) makes them swell, narrowing the airways. <u>Airway</u> narrowing in asthma is due to three major processes acting on the bronchi: inflammation, <u>spasm</u> (bronchospasm), and hyper reactivity (over-reaction of the bronchi to factors that can precipitate asthma).

(Figure A shows the location of the lungs and airways in the body. Figure B shows a crosssection of a normal airway. Figure C shows a cross-section of an airway during asthma symptoms)



Facts about Asthma:

- WHO estimates show that 300 million people currently suffer from asthma. As many as 255 000 people died of asthma in 2005.
- Asthma deaths will increase in the next 10 years if urgent action is not taken. Asthma cannot be cured, but proper diagnosis, treatment and patient education can result in good asthma control and management.
- Over 80% of asthma deaths occur in low and lower-middle income countries.
- Asthma is a chronic disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person.
- Symptoms may occur several times in a day or week in affected individuals. Failure to recognize and avoid triggers can be life threatening and may result in an asthma attack, respiratory distress and even death.
- The number of asthma-related deaths can be reduced by using inhaled corticosteroids.
- Asthma is the most common chronic disease among children.
- The strongest risk are exposure to indoor allergens such as house dust, mites in bedding, carpets and stuffed furniture; pollution and pet dander; outdoor allergens such as pollens and molds; tobacco smoke and chemical irritants in the workplace.
- Asthma triggers can include cold air, extreme emotional arousal such as anger or fear, and physical exercise.



• Asthma is often under-diagnosed and under-treated.

Types of Asthma-

Asthma is clinically classified according to the frequency of symptoms, forced expiratory volume in 1 second (FEV₁), and peak expiratory flow rate. Asthma also be classified as atopic (extrinsic) or non-atopic (intrinsic), based on whether symptoms are precipitated by allergens (atopic) or not (non-atopic).

- Exercise-Induced Asthma
- Nocturnal Asthma
- Occupational Asthma.
- Asthma attack
- Steroid-Resistant Asthma
- Allergic Asthma
- Status Asthmaticus
- Brittle Asthma

Epidemiological Determinants-

- The genes linked to asthma involve the lungs and the immune system. It is well known that the atopic diseases atopic dermatitis, allergic rhinitis and asthma are commonly found in one form or another within families.
- The abnormal development and growth of the lungs can increase a person's risk for developing asthma.
- Poor Immune System
- Non-allergic or non-immunologic exposures in the environment
- Incidence of asthma is highest among low-income populations worldwide



Triggers:

Allergens (specific)	 Foods, such as fish, egg, peanuts, nuts, cow's milk, and soy Year-round dust mites, molds, pets, and insect parts Additives, such as sulfites Work-related agents, such as latex, epoxides, and formaldehyde "Seasonal" pollens
Non allergens mostly irritants (nonspecific)	 Respiratory infections, such as those caused by viral "colds," bronchitis, and sinusitis Drugs, such as aspirin, other NSAIDs (Non Steroidal Anti Inflammatory Drugs), and beta blockers (used to treat blood pressure and other heart conditions) Tobacco smoke Outdoor factors, such as smog, weather changes, and diesel fumes Indoor factors, such as paint, detergents, deodorants, chemicals, and perfumes Exercise, especially under cold dry conditions Work-related factors, such as chemicals, dusts, gases, and metals Emotional factors, such as in premenstrual syndrome

Signs and Symptoms-

- Recurrent wheezing
- Trouble breathing and Chest tightness
- Symptoms that occur or worsen at night
- Symptoms that are triggered by cold air, exercise or exposure to allergens
- Increased nighttime cough
- Cough or wheezing with physical activity
- Tiredness with activities that you normally could complete easily
- Decreases in your <u>Peak Expiratory Flow</u> Rate (PEFR)
- Restless sleep or waking up tired
- Worsening allergy symptoms like persistent runny nose, dark circles under your eyes or itchy, inflamed skin

What diagnostic Tests done for detection of asthma?

- Detailed medical history and physical exam
- Spirometery
- Chest X-rays
- Bronchial Provocation Test (breathe in certain substances to determine if the airways react to them)



Non - Communicable Diseases
 Exercise-Induced Broncho-constriction Test (exercise for a short period of time to determine if the airways react to exercise)

• Routine Pulmonary Function Test

Treatment-

- Prevent ongoing and bothersome symptoms
- Prevent asthma attacks
- Prevent attacks severe enough to require a visit to your provider or an emergency department or hospitalization
- Carry on with normal activities
- Maintain normal or near-normal lung function ,and
- Have as few side effects of medication as possible.



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Treatment for asthma:

Specific treatment for asthma will be determined by your physician based on:

- your age, overall health, and medical history
- extent of the disease
- your tolerance for specific medications, procedures, or therapies
- expectations for the course of the disease
- your opinion or preference

As of yet, there is no cure for asthma. However, asthma can often be controlled with prescription medicines that may help to prevent or relieve symptoms, and by learning ways to manage episodes.

Managing asthma:

People with asthma can learn to identify and avoid the things that trigger an episode, and educate themselves about medications and other asthma management strategies.

According to the most recent Guidelines for the Diagnosis and Management of Asthma, published by the National Heart, Lung, and Blood Institute:

The four parts of continually managing asthma are:

- a. Identify and minimize contact with asthma triggers.
- b. Understand and take medications as prescribed.



- c. Monitor asthma to recognize signs when it is getting worse.
- d. Know what to do when asthma gets worse.

Working with a healthcare professional is the best way to take care of asthma. There are specific guidelines for children from infants to 4 years old, 5 to 11 years old, and 12 and older.

Four components of asthma treatment:

- 1. The use of objective measures of lung function- spirometry, peak flow expiratory flow rate to access the severity of asthma, and to monitor the course of treatment.
- 2. The use of medication therapy designed to reverse and prevent the airway inflammation component of asthma, as well as to treat the narrowing airway.
- 3. The use of environmental control measures to avoid or eliminate factors that induce or trigger asthma flare-ups, including the consideration of immunotherapy.
- 4. Patient education that includes a partnership among the patient, family members, and the physician.

How to avoid asthma triggers:

Many things can trigger an asthma episode, including the following:

- Upper respiratory infections
- Allergies to dust mites, pollens, animal dander, mold/mildew, or cockroaches
- Exercise
- Irritants such as cigarette and other forms of smoke, strong odors and perfumes, fumes from wood stoves or kerosene heaters, and air pollution
- Weather changes

The following is a list of things you can do to limit your exposure to common triggers of asthma.

- Allergies
 - o Dust

Dust Mites. Dust Mites Are Found In Mattresses, Carpets, And Upholstered Furniture. They thrive in warm, humid conditions and feed on the shed scales of human skin. The best way to prevent allergy symptoms caused by dust mites is to limit your exposure.

- o Pollens
- o Animal Dander
- o Mold/Mildew



o Cockroaches

Exercise

Even though exercise is a common asthma trigger, you should not limit your participation in sports/exercise, unless directed by a physician. Exercise is good for your health and lungs. Some forms of exercise such as running long distances and playing basketball may be harder for you to do. Activities such as swimming, golf, and karate are good choices for persons with asthma. However, persons with asthma should be able to participate in most physical activities. Always warm-up prior to exercise and cool down at the end of exercise. Using your reliever medicine 15-20 minutes before starting exercise can be very helpful, as directed by your physician. Talk with your physician about exercise and asthma if this is a problem for you.

Irritants

o Smoke

Do not allow family and friends to smoke anywhere inside the house. Do not allow smoking in the car at any time. Smoke is very irritating in an enclosed area and its odor may be trapped in the car's upholstery for a long period of time and continue to trigger symptoms. When eating out, always sit in non-smoking sections of restaurants. You should also have non-smoking child care providers.

• Strong perfumes/Odors

Avoid things that have a strong smell such as cleaning products, perfumes, hair spray, tar, fresh paint, gasoline, insect sprays, and room deodorizers.

Medicines in Asthma-

In children

Based on the severity of the child's symptoms, the age of the child, and the ability of the child to take inhaled medications the following are the most commonly used medications:

Bronchodilators-Types of bronchodilators are beta-agonists, theophylline, and anticholinergics. These medications come inhaled, in pill form, liquid, or injectables.

Anti-inflammatory

Help to decrease the inflammation that is happening in the airways with asthma, and include two types of medications:

a. Nonsteroidal anti-inflammatory medications (Cromolyn and nedocromil) are two types of nonsteroidal medications that are usually inhaled by the child.



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 Corticosteroids-Some of them are inhaled, while others may be taken as a pill or liquid or even injections.

Anti-leukotrienes

These are a relatively new type of medication, are usually given orally

Asthma in adults

General principles of management

- Step up/down treatment according to disease severity to maintain good control and minimise drug related side-effects.
- Start at the step most fitting to the initial severity of the asthma.
- Treatment plans and goals should be to minimise impact of symptoms on life, reduce reliance on reliever medication and prevent severe exacerbations.
- Self-management education including individualized written asthma action plans.
- Always check concordance with medication/existing action plan, effective inhaler technique and the presence/absence of trigger factors before initiating new drug therapy.
- First choice as add-on therapy to inhaled steroids are inhaled long-acting beta2 agonists (LABAs) such as salmeterol or formoterol

Nondrug treatment

- a. Primary prevention
 - Allergen avoidance,
 - Dietary manipulations
 - Immunotherapy
 - Pollutant avoidance
 - Microbial exposure.

b. Secondary prevention

- Smoking cessation and help provided with nicotine replacement therapy,
- Weight reduction
- Allergen avoidance.
- Immunotherapy.
- **Dietary modifications** (use of probiotics, antioxidants, fish oils/lipid supplements, magnesium) are not currently supported by the guidelines.



Chapter 7: Nutritional Deficiencies:

A. Malnutrition

Malnutrition is by far the largest contributor to child mortality globally, currently present in half of all cases. Underweight births and inter-uterine growth restrictions are responsible for about 2.2 million child deaths annually in the world. Deficiencies in vitamin A or zinc cause 1 million deaths each year. There were 925 million malnourished people in the world in 2010,



an increase of 80 million since 1990, despite the fact that the world already produces enough food to feed everyone 6 billion people and could feed the double 12 billion people.



Source: - FAO, 2008.

Year	1990	1995	2005	2008	2009	2010
Malnourished people in the world (millions)	843	788	848	923	1,023	925
Year	1970	1980	1990	2005	2007	2010



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			NULL	- Commu		iseases
Share of malnourished people in the developing		28 %	20 %	16 %	17 %	16 %
world						

46% of all India children under 5 years old are still underweight - an estimated 200 million children are underweight at any given time, with more than 6 million of those children suffering from the worst form of malnutrition, severe acute malnutrition. Experts estimate that malnutrition constitutes over 22% of India's disease burden, making malnutrition one of the nation's largest health threats.

At the current rate of progress the MDG1 target for nutrition will only be reached in 2042 with severe consequences for human wellbeing and economic.



Prevalence % of stunting, underweight and wasting in different NFHS

Rajasthan: - There has been reduction in malnutrition among children 0-3 years of age from 51% in 1998-99 (NFHS - 2) to 44% in 2005-06 (NFHS - 3). The goal is to reduce it to 25.3 % by 2011. In this state 40.4% of children are underweight 14.0% of the population is undernourished and 8.5% of children who die under the age of 5 die from hunger.




Nutritional Status of Female and Male, Source:-NFHS III (2005-06)

Classification of Malnutrition-



Hazards of malnutrition-

- Stunted growth and poor development.
- low resistance to infection

Prevalence of malnutrition-

The World Bank estimates that India is ranked 2nd in the world of the number of children suffering from malnutrition, after Bangladesh (in 1998), where 47% of the children exhibit a degree of malnutrition.

Prevalence of malnutrition	India	Rajasthan
Stunting (too short for age)	38	34
Wasted (too thin for height)	19	20
Underweight (too thin for age)	46	44
IMR	57 (50-SRS, 2009)	65 (53-SRS, 2009)

Source: NFHS III

Types of malnutrition-

1) Over Nutrition

- I. Metabolic
 - a. Obesity
- II. Toxicosis: vitamins and micronutrients
 - a. Vitamin poisoning)



b. Micronutrient overload:

2) Deficiency-

- I. Vitamin and minerals deficiency
- II. Protein energy Malnutrition
 - a. Kwashiorkor
 - b. Marasmus

PEM is primarily due to-

- 1) Inadequate food intake (food gap) both in quantity and quality.
- 2) Infections
- 3) Poor environmental conditions
- 4) Premature termination of breast feeding
- 5) Adverse cultural practices relating to child rearing and weaning



Malnutrition/ infection cycle

Early detection of PEM-**Features** Marasmus Kwashiorkor **Physical** Always present Obvious Sometime hidden by edema and Muscle wasting fat Severe loss of subcutaneous fat Fast wasting Fat often retained but not firm None Present in lower legs, and Oedema usually in face and lower arms Weight for height Very low Low but may be masked by edema. Sometimes guiet and apathetic Mental changes Irritable, moaning apathetic Clinical Sometimes present Appetite Usually good Poor Diarrhea Often Often(current and past) Diffuse pigmentation, sometimes Usually none Skin changes flaky paint dermatotsis Sparse, silky, easily pulled out Hair changes Seldom Sometimes, due to accumulation Hepatic enlargement None of fat. **Biochemical**



Non - Communicable Dise	eases
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Serum albumin Urinary urea per gram creatinine	Normally or slightly decreased Normal or decreased	Low (<3 g /100 ml blood) Low
Hydroxyproline/ creatinine ratio	Low	Low
Plasma /amino acid ratio	Normal	Elevated

Assessment of malnutrition

Classifications for assessing malnutrition:

1) Gomez classification - The Harvard standard of weight (Jelliffe, 1966) in relation to age at child has been considered for calculation of Gomez nutritional index with following grade of malnutrition:

Grades of malnutrition	Body weight % of Harvard
Normal	90-110%
Grade 1 (mild)	75-89%
Grade 2 (moderate)	60-74%
Grade 3 (severe)	Under 60%

Weight for age (%) = weight of the child/weight of normal child of same age x 100

2) Water low's classification - when the child's age is known, measurement of weight enables almost instant monitoring of growth: measurements of height assess the effect of nutritional status on long term growth.

Water low's classification-

Nutritional Status	Stunting (% height/age)	Wasting (%weight/ height)
Normal	> 95	>90
Mildly impaired	87.5-95	80-90
Moderately impaired	80-87.5	70-80
Severely impaired	<80	<70

Weight /height =	weight of the child	×	100
(%)	Weight of a normal child at same hei	ght	
Height / Age =	Height of the child	×	100
(%)	Height of the normal child at same age	-	

3) Mid Upper Arm circumference-



Non - Communicable Diseases

Arm circumference yields relatively reliable estimation of the body's muscle mass, the reduction of which is one of the most striking mechanism by which the body adjust to the inadequate energy intake. Arm circumference cannot be used before the age of one year; between ages one and five years, it hardly varies.

Mid Upper Arm circumference-

Nutritional Status	MUAC	Colour depicted on MUAC strip
Severe	<11 cm	Red
Moderate	>11 and 12.5 cm	Orange
Mild malnutrition	>12.5 and 13.5cm	Yellow
Satisfactory nutritional status	>13.5cm	Green

Diet in malnutrition

- 1. Use food products available locally.
- 2. Feed the baby for 24 hours.
- 3. Use lactose free diet for the malnourished child suffering from diarrhea.
- 4. For lactose free diet, you can use egg instead of milk.
- 5. Always use a spoon and a bowl for the baby instead of using bottles, as unsterilized bottles are the main source of infection.
- 6. Always while feeding place the baby in mother's lap, don't leave him alone on the bed.
- 7. If diarrhea and vomiting persist, decrease the volume and frequency of feedings, if need arises.
- 8. Feed the baby starting with 75kcal/100 ml 4-5 times a day gradually shifting to 100 kcal / 100 ml after 3-4 days, feeding 7-8 times a day

Recipes:

1. F75

Food product	Quantity	Quantity as per household
		measures.
Milk (cow's or toned daily milk)	25 ml	1/4 bowl (medium sized)
Sugar	3 gm	¹ ∕₂ tsp (leveled)
Murmura powder /wheat flour	5 gm	1 tsp
Vegetable oil	3 gm	¾ tsp
Water	To make volume up to 100 ml	

Energy: 75 kcal/100 ml Proteins: 1.2 gm/100 ml

2. F100

Food product	Quantity	Quantity as per household
		measures.



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Milk (cow's or toned daily milk)	75 ml	1/2 bowl (medium sized)
Sugar	2.5 gm	1/2 tsp (leveled)
Murmura powder	7 gm	1 tsp (slightly heaped)
Vegetable oil	2 gm	½ tsp
Water	To make volume up to 100 ml	

Energy: 100 kcal/100 ml **Proteins:** 2.9 gm/100 ml

3. Besan seera

Food product	Quantity	Quantity as per household
		measures.
Milk (cow's or toned daily milk)	75 ml	1/2 bowl (medium sized)
Jaggery	3 gm	1/2 tsp (leveled)
Besan	5 gm	1 tsp
Vegetable oil	2.5 gm	¹ ∕₂ tsp
Water	To make volume up to 100 ml	

Energy: 100 kcal/100 ml Proteins: 3.25 grams/100 ml

4. Khichri

Food product	Quantity	Quantity as per household measures.
Rice	5 gm	1 tsp
Dhal	6 gm	1 tsp
Sugar	10 gm	2 tsp
Vegetable oil	2.5 gm	½ tsp
Water	As required	

Energy: 100 kcal/50 ml Proteins: 1.82 gm /50ml

Diet for the malnourished child: Personal data: Age: - 8 months Weight -5 kg Sex: - Female Physiological status: - Severely malnourished Socioeconomic status: - Low Income Group

Diet for the malnourished child

Time	Food product	Quantity	Prepared quantity	Energy	Protein
6.00 am	F75	100 ml	1bowl(medium sized)	75	1.2
8.00 am	Potato (boiled	100gm+	1bowl(medium	183	1.67



	mashed and added sugar and oil)	sugar 10 gm+ 5 ml oil	sized)		
10.00 am	Fruit(banana)	100 gm	1	100	1.2
12.00 noon	Boiled egg (1/2)	50 gm	1/2 boiled egg	85	6.65
2.00 pm	Khichri	100 ml	1bowl(medium sized)	100	1.82
4.00 pm	Curd + sugar	125 ml+10 gm	1/2bowl(medium sized)	113	3.87
6.00 pm	Boiled egg (1/2)	50 gm	1/2 boiled egg	85	6.65
8.00 pm	Besan seera	100 ml	1bowl(medium sized)	100	1.21
10.00 pm	F75	100 ml	1bowl(medium sized)	75	1.2
12.00 pm	Milk + glucose biscuits(2)	50 ml+2 biscuits	¹ ∕₂ bowl	119	2
4.00 am	F75	100 ml	1bowl(medium sized)	75	1.2

Energy: 1105 kcal Proteins: 28.67 gm

National Nutrition Programs:

- 1. Integrated Child Development Services:
 - a. Supplementary nutrition.
 - i. Children below 6 years
 - ii. Pregnant and lactating mothers.
 - iii. Women beneficiaries in age group 15-44 years
 - b. Immunization.
 - c. Health check-up.
 - d. Referral services.
 - e. Non-formal pre-school education.
 - f. Nutrition and health Education.
- 2. Special Nutrition Program
- 3. Balwadi Nutrition Program
- 4. Wheat Supplementary Nutrition Program
- 5. Mid Day Meal Program
- 6. Nutritional Anemia Prophylaxis program
 - a. Fortification of salt with iron. A universally consumed dietary article has been identified as a measure to control anemia. Efficacy of fortified salt in both rural~ and urban communities was assessed by a multicentre study and revealed that iron fortified salt when consumed over a period of 12-18 months reduced prevalence of anemia significantly. Accordingly, fortification of salt with iron as a public health approach is piloted in Tamil Nadu and Rajasthan.



- 7. Prophylaxis Program Against Blindness Due to Vitamin A Deficiency
- 8. Goitre Control Program
- 9. National Diarrheal Diseases Control Program
- 10. Baby friendly Hospital initiative (BFHI)

Legislations to protect nutrition:

a. Regulating marketing of breast milk substitutes:-

- i. The infant milk substitute, feeding bottles and infant foods (regulation of production, supply, and distribution) act, 1992 as amended in 2003 (IMS Act)
- b.**Cable television network (regulation) Act:** (prohibit transmission or retransmission of any advertisement to promote directly or indirectly production, sale, or consumption of infant milk substitutes, feeding bottles and infant foods through cable services. It extends to the whole of India. This act supports implementation of IMS Act to all cable service providers of India).

Major Nutrients and Impact on Health in Deficiency & Excesses:

Nutrient	Deficiency	Excess
Calcium	Osteoporosis, tetany, carpopedal spasm, laryngospasm, cardiac arrhythmias	Fatigue, depression, confusion, anorexia, nausea, vomiting, constipation, pancreatitis, increased urination
lodine	Goiter, hypothyroidism	lodine Toxicity (goiter, hypothyroidism)
Unsaturated fat	none	Obesity
Saturated fat	low sex hormone levels	Cardiovascular disease
Food energy	Starvation, Marasmus	Obesity, diabetes mellitus, Cardiovascular disease

Kwashiorkor is an acute form of childhood protein-energy malnutrition characterized by edema, irritability, anorexia, ulcerating dermatomes, and an enlarged liver with fatty infiltrates. The presence of edema caused by poor nutrition defines kwashiorkor. Kwashiorkor was thought to be caused by insufficient protein consumption but with sufficient calorie intake more recently, micronutrient and antioxidant deficiencies have come to be recognized as contributory.



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases **Rickets** is a softening of bones in children potentially leading to fractures and deformity due to vitamin D deficiency, but lack of adequate calcium in the diet may also lead to rickets

Beriberi is a nervous system ailment caused by a thiamine deficiency (deficiency of vitamin B_1) in the diet. Thiamine is involved in the breakdown of energy molecules such as glucose and is also found on the membranes of neurons. Symptoms of beriberi include severe lethargy and fatigue, together with complications affecting the cardiovascular, nervous, muscular, and gastrointestinal systems.

Goitre or **goiter** is a swelling in the thyroid gland, which can lead to a swelling of the neck due to iodine deficiency.

Anemia is a decrease in number of red blood cells (RBCs) or less than the normal quantity of hemoglobin in the blood. However, it can include decreased oxygen-binding ability of each hemoglobin molecule due to deformity or lack in numerical development as in some other types of hemoglobin deficiency.

Marasmus is a form of severe protein-energy malnutrition characterized by energy deficiency.

Starvation is a severe reduction in vitamin, nutrient and energy intake. It is the most extreme form of malnutrition. In humans, prolonged starvation can cause permanent organ damage and eventually, death.

Tetany is the involuntary contraction of muscles, caused by diseases and other conditions that increase the action potential frequency. The usual cause of tetany is lack of calcium, but excess of phosphate (high phosphate-to-calcium ratio) can also trigger the spasms.

- Anemia and diarrhea
- Disorientation
- Goiter
- Loss of reflexes and lack of coordination
- Muscle twitches and scaling & cracking of the lips and mouth

Children - children who are severely malnourished typically experience slow behavioral development, even mental retardation may occur. Even when treated, under nutrition may have long-term effects in children, with impairments in mental function and digestive problems persisting; in some cases for the rest of their lives, Adults, whose severe undernourishment started during adulthood, usually make a full recovery when treated.

Growth and growth measurements:

Normal Weight Gain of Children (Birth to 5 years)

Age

Average Weight gain per month (in grams)



- Birth to 6 Months 600-800
- 7 to 12 months 300 400
- 1 year to 3 years 150 200
- 3 years to 5 years 125-150

Child Growth:

- When a small baby gains weight, grows in height, start or begin to rollover, sit, standup, and walk we say child is growing.
- Optimal child growth occurs only with an adequate food, absence of illness, caring and nurturing, social environment which provides full attention to growing child.
- Child growth is very rapid in first year of life.
- Growing child is healthy child.

Common indicators of malnutrition

Part affected	Attributes
Hair	 lack of lusture easy pluckability dry hair easy falling of hair while combing
Face	 Dryness Develops rashes Develops dermatitis(inflammation of the surface of skin) Nasolabila seborrhea(inflammation of a region of nose) Cracking of lips
Eyes	 Keratinized epithelium of conjunctiva Excessive dryness of conjunctiva due to insufficient secretion. Cornea gets usual bright No lusture Corneal vascularization (blood capillaries conglomerate together.) Bitot's spot
Lips	 Cheilosis angular stomatis Cracking ,crusting and swollen lips
Tongue	 Glossitis Edema Pain Loss of taste Magenta colored tongue(due to niacin deficiency) Crack formation on the tongue
Teeth	 Decay of teeth Fall of quickly Mottling of teeth Chalky white or brownish discoloration of the enamel
Glands	Enlargement of parotid and thyroid glands



Skeleton and muscles	 Enlarged fist , Bending of ribs Bending of bones Muscle wasting Muscular dystrophy

Assessment of nutritional status

Measures	Tools for measuring
Weight	Salter scale
Height	Length board, fiber glass tape.
Age	By records
Mid upper arm circumference	MUAC strips
Skin fold thickness	Calipers
Head circumference	Fiber glass tape
Chest circumference	Fiber glass tape

Growth monitoring:

When to start Growth Monitoring?

- Right from the birth of the child
- Children of 0-3 years age (monthly)
- Children of 3-6 years age (monthly)
- Children at risk of malnutrition
- Children who have not gained the weight for three months

Steps in Growth Monitoring (Five Steps) Steps

- 1. Determining correct age of the child
- 2. Accurate weighing of each child
- 3. Plotting the weight accurately on a growth chart
- 4. Interpreting the direction of the growth curve and recognizing if the child is growing properly
- 5. Discussing the child's growth & follow up action with the mother

How to determine age?

- By recording exact date of birth.
- By different seasons at the time of birth.
- By important events in agricultural cycle.
- By name of the months (Both Indian & Western)
- By phases of moon Poornima, Amavsya)
- National Festivals

How to take weight?

- Hang the scale securely
- Scale should not touch door or wall



- Scale should be at the workers eye level
- Adjust scale to 0 with the basket/trouser
- Take the weight of child with a minimum clothing
- Read the weight to nearest 100 gm

Growth charts

Content of Growth Chart

- Observe growth chart carefully.
- On the extreme top left there is information box.
- Information box contains Name & Sex of child, Mother & Father's Name, Family Survey register number
- The horizontal line indicates age of the child.
- The vertical line represents weight.
- At the bottom 5 steps represents 5 years.
- Each year's step divided into 12 boxes indicates Months of the year.
- First box on the extreme left indicates month of birth and year of the birth.

Need for New Standards (WHO)

- Exclusive breastfeeding for 6 months is normative for growth and development.
- We should know how children should grow but not how they are growing.
- The boys and girls grow differently.
- Children below 6 years have same potential to grow and develop as long as their basic needs of nutrition, environment and health are met:
- Optimal nutrition
 - o Breastfed Infants
 - o Appropriate Complementary Feeding
- Optimal Environment
 - No Microbiological Contamination
 - o No Smoking
- Optimal Health Care
 - o Immunization
 - o Pediatric Routines

Plot the Child's Weight

- Child less than 1 month. : Completed weeks
- Child between 1 month. 1yr : Completed months
- Child more than 1 year : Completed yrs. & months





• Plot the weight on the vertical line only Not in middle of two lines

Growth Charts for Girls and Boys: Chart No 1

Chart No. 2





Management of low birth weight babies:

Principles of management of LBW babies:

- 1) Warmth
- 2) Feeding
- 3) Detection and management of complication (resuscitation, assisted respiration)
- 1) Warmth:
 - Lay newborn on mother's abdomen or other warm surface
 - Dry newborn with clean (warm) cloth or towel
 - Remove wet towel and wrap/cover with a second dry towel
 - Bathe after temperature is stable

For providing warmth alternative method of kangaroo care can be used.

2) Feeding:

- Early and exclusive breastfeeding
- Breast milk = best nourishment
- Already warm temperature
- Facilitated by kangaroo care

Definition of kangaroo care

Early, prolonged and continuous skin-to-skin contact between a mother and her newborn

Benefits of kangaroo care:

- Is efficient way of keeping newborn warm
- Helps breathing of newborn to be more regular; reduce frequency of apneic spells
- · Promotes breastfeeding, growth and extra-uterine adaptation
- Increases the mother's confidence, ability and involvement in the care of her small newborn
- Seems to be acceptable in different cultures and environments
- Contributes to containment of cost— salaries, running costs (electricity, etc.)

Specific management for low birth weight will be determined by baby's physician based on

- Baby's gestational age, overall health, and medical history
- Baby's tolerance for specific medications, procedures, or therapies
- Opinion or preference of the mother.

Care for low birth weight babies often includes:

- Care in the NICU
- Temperature controlled beds
- Special feedings, sometimes with a tube into the stomach if a baby cannot suck
- Other treatments for complications
- Low birth weight babies typically "catch up" in physical growth if there are no other complications. Babies may be referred to special follow-up healthcare programs.

Prevention of LBW babies:



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Prenatal care is a key factor in preventing preterm births and low birth weight babies. At prenatal visits, the health of both mother and fetus can be checked. Because maternal nutrition and weight gain are linked with fetal weight gain and birth weight, eating a healthy diet and gaining the proper amount of weight in pregnancy are essential. Mothers should also avoid alcohol, cigarettes, and illicit drugs, which can contribute to poor fetal growth, among other complications.



Source: - WHO, India, 2006.

B. Iodine deficiency disorders:

lodine is essential for brain development and thyroid function. It is a micronutrient, which the body requires in a very small quantity for growth and survival.

Functions of lodine in the body:

- Required for manufacture of thyroxine (and therefore control of metabolic rate)
- Essential to the normal development of the fetal nervous system
- Protect against the effects of radioactivity
- A required component of healthy connective tissue

The term "goiter" simply refers to the abnormal enlargement of the thyroid gland. It is not cancer. Goitre is an enlargement of the thyroid gland in the front of the neck. Associated with the over production or underproduction of thyroid hormones.

Types

- **Diffuse small goiter** This is the place where the entire thyroid gland swells to a larger size. It also feels smooth to touch.
- **Nodular goiter** This is the place where the certain sections of nodules of thyroid gland swells, it feels lumpy to touch.

Causes-

Iodine deficiency



Graves' disease

Risk factors include:

- Age over 40 years
- Family history of goiter
- Living in an area where people do not get enough iodine
- Not getting enough iodine in the diet

Symptom:

The main **symptom** is a swollen thyroid gland.

- A visible swelling at the base of your neck
- Coughing
- Hoarseness
- Difficulty in swallowing
- Difficulty in breathing
- Feels depressed and emotionally disturbed most of the time.
- Unable to concentrate.
- The person having goiter felt tired and sleep excessively.
- Constipation is the main symptom of goiter.

Effects of iodine-deficiency	sources of iodine	Need of lodine in the diet
 Dry skin, Brittle nails and hair, Iodine deficiency also leads to weight gain, Fatigue, Increased blood cholesterol levels, Mental retardation and brain damage Goiter Hypothyroidism 	 Cereals, Pulses and fresh foods. Dairy milk, Seafood, Poultry, Iodised salt 	 200-220 mcg/d for pregnant women, 250-290 mcg for lactating women, 50-90 mcg/d for infants younger than 1year, 90-120 mcg/d for children aged 1-11 years, and 150 mcg/d for adults and adolescents.

How is iodine deficiency diagnosed?

One of the best ways to detect iodine deficiency is a 24-hour urine collection test or random iodine- tocreatinine urine test. A thyroid function test is also done to check the TSH levels.



- A hormone test (T3, T4 & TSH)
- An antibody test
- Ultrasonography and thyroid scan

Prevention: Even though lodine Deficiency Disorders cannot be cured, they can be easily prevented. This is done through the consumption of foods rich in iodine such as –

- 1. Iodized or iodated salt.
- 2. Seafood and Seaweed
- 3. Eggs, Meat and Dairy Products
- 4. Cereals and Green Leafy Vegetables (depending on the amount of iodine present in the soil they were grown in)
- 5. Iodine Supplements (usually recommended for pregnant women)

Treatment:

- Radioactive iodine to shrink the gland
- Surgery (thyroidectomy) to remove all or part of the gland
- Small doses of Lugol's iodine or potassium iodine solution

Complications:

- Hypothyroidism
- Hyperthyroidism
- Thyroid cancer

Chapter 8: Accident & Injuries:

Introduction:

An accident has been defined as "an unexpected, unplanned occurrence which may involve injury". A WHO Advisory Group in 1956 defined accident as an "unpremeditated event resulting in recognizable damage" According to another definition, an accident is that "occurrence in a sequence of events which usually produces unintended injury, death or property damage".

According to National Crime Records Bureau overall India reported 418 accidental deaths a day in 2009 and road accidents killed 348 a day (1.3 lakh). Death in road accidents increased by 7.3% during 2009 compared to 2008







Number of Deaths Due to different accidents in India, 2007-2008 Source: - National Health Profile, 2009.

Number of Deaths Due to different accidents in India, 2007-2008, *Source: - National Health Profile, 2009.*

Cases and deaths due to Road Accidents during 2009			
	No. of cases	No. of deaths	
India	415855	126896	
Rajasthan	23704	9045	

Source: Accidental deaths and suicide In India, 2009, National Crime Records Bureau.

Accidents represent a major epidemic of non-communicable diseases in the present century.

Types:

Road Traffic Accidents:

In many countries motor vehicle accidents rank first among all fatal accidents. During 2002 there were almost 1.19 million deaths from road accidents in the world.

Major determinant for road traffic accidents:-





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- Large number of pedestrians and animal share the roadway with fast moving and slow moving (e.g., bullock carts) vehicles.
- Large number of old poorly maintained vehicles.
- Large numbers of motor cycles, scooters, and mopeds
- Low driving standards
- large number of buses, often overloaded
- Widespread disregard of traffic rules
- Defective roads, poor street lighting, defective layout of cross roads and speed breakers
- Unusual behavior of men and animals

Domestic Accidents:

By domestic accidents is meant an accident which takes place in the home or in its immediate surroundings, and, more generally all accidents not connected with traffic, vehicles or sports. The most frequent causes of domestic accidents are-

- Drowning
- Burns
- Poisoning
- Falls
- Industrial Accidents

Railways accidents: With the increase in number of trains and passengers, the increase in the number of accidents and causalities resulting there from is not unexpected. The main factor involved in railway accidents is human failure.

Violence:

Some of the risk factors for violent behaviors are:-



- Exposure to violence and societal acceptability of violence as a mean to solve problems, whether across international borders, on the street, or around the home, may spill over into real behavior,
- Easy availability of lethal weapons like fire-arms significantly increases the possibility of both fatal and non- fatal injuries,
- Consumption of alcohol and other drugs is linked to almost 2/3 of cases of violence
- Violence due to war and political unrest is fairly common in several countries.
- Psychological determinant

Preventions:



- Safety education:
- Promotion of safety measures-
 - Seat belts- The use of seat belts reduces the number of fatalities and non- fatal injuries by approximately 50 percent each. They should be made compulsory for cars, light trucks and similar vehicles.
 - Safety helmets-They reduce the risk of head injury by 30 percent on an average and that of fatalities by 40 per cent.
 - Leather clothing and boots- Leather clothing reduces risk of extensive superficial soft-tissue injury. Leather boots can, to some extent, protect the lower legs and feet and their use should therefore be encouraged.
 - Others- These comprise use of door locks, proper vehicle design, use of laminated highpenetration resistances windscreen glass, etc.
- Check on alcohol and other drugs:
- Planning, organization and management of trauma treatment and emergency care services
- Elimination of causative factors likes improvements of roads, imposition of speed limits, marking of danger points, reduction of electric voltage, provision of fire guards, use of safety equipment in industries, safe storage of drugs, poison and weapons etc.
- Enforcement of laws
- Medical rehabilitation and occupational rehabilitation to prevent reduce or compensate disability and thereby handicap.



Chapter 9: Other Non-communicable Diseases:

Tetanus:

Tetanus is caused by the bacterium *Clostridium tetani*, the spores of which are widespread in the environment. The disease is caused by the action of a neurotoxin, produced by the bacteria when they grow in the absence of oxygen, e.g. in dirty wounds or in the umbilical cord if it is cut with a non-sterile instrument.

Symptoms:

Tetanus is characterized by muscle spasms, initially in the jaw muscles. As the disease progresses, mild stimuli may trigger generalized tetanic seizure-like activity, which contributes to serious complications and eventually death unless supportive treatment is given.

- Irritability,
- Muscle cramps,
- Sore muscles,

Weakness.

- Swallowing
- Lockjaw
- Muscle spasms

- Treatment:
 - Antibiotics, including penicillin, clindamycin, erythromycin, or metronidazole
 - Bed rest with a non-stimulating environment (dim light, reduced noise, and stable temperature)
 - Medicine to reverse the poison (tetanus immune globulin)
 - Muscle relaxers
 - Sedatives

Prevention:

Primary immunization: For primary immunization in adults, tetanus toxoid is given in two doses 4 to 6 weeks apart, with a third dose 6 to 12 months later. Booster doses are recommended every 10 years to ensure the maintenance of protective antitoxin levels.

Maternal and neonatal tetanus:

Maternal and neonatal tetanus have been among the most common lethal consequences of unclean deliveries and umbilical cord care practices. When tetanus develops, mortality rates are extremely high, especially when appropriate medical care is not available.

And yet, maternal and neonatal tetanus deaths can be easily prevented by hygienic delivery and cord care practices, and/or by immunizing mothers with tetanus vaccine



The MNT Elimination Initiative aims to reduce the number of maternal and neonatal tetanus cases to such low levels that MNT is no longer a major public health problem. Unlike polio and smallpox, tetanus cannot be eradicated (tetanus spores are present in the environment worldwide), but through immunization of pregnant and **Child Bearing Age Women** (CBAW) and promotion of more hygienic deliveries, MNT can be eliminated (defined as less than one case of neonatal tetanus per 1000 live births in every district)

A Challenge

In 1988, WHO estimated that 787,000 newborns died of neonatal tetanus (NT). Thus, in the late 1980s, the estimated annual global NT mortality rate was approximately 6.7 NT deaths per 1000 live births - clearly a substantial public health problem.

In 1989, the 42nd World Health Assembly called for elimination of neonatal tetanus by 1995.

The following year, the 1990 World Summit for Children listed neonatal tetanus elimination as one of its goals, and the goal was again endorsed by the 44th World Health Assembly in 1991.

Due to slow implementation of the recommended MNT elimination strategies, the target date for MNT elimination was postponed to 2000. In 2000, when the global elimination goal had still not been reached, the Initiative was re-constituted (see below) and elimination of maternal tetanus was added to the goal with a 2005 target date.

WHO estimates that in 2008 (the latest year for which estimates are available), 59,000 newborns died from NT, a 92% reduction from the situation in the late 1980s. The same year, 46 countries still had not eliminated MNT in all districts.

While progress continues to be made, by December 2010, 39 countries have not reached MNT elimination status. Activities to achieve the goal are on-going in these countries, with many likely to achieve MNT elimination in the near future.

The Strategies

The recommended strategies for achieving Maternal and Neonatal Tetanus MNT) elimination includes:

- a. Strengthening routine immunization of pregnant women with tetanus toxoid vaccine (TT)
- b. TT Supplementary Immunization Activities (SIAs) in selected high risk areas, targeting women of child bearing age with 3 properly-spaced doses of tetanus toxoid
- c. Promotion of clean deliveries
- d. Reliable NT surveillance



Achieving the elimination

- In many countries, immunization against tetanus is routinely given to pregnant women, usually during antenatal care contacts. Routine immunization with TT is reported as TT2+; countries report achieved coverage annually to WHO and UNICEF
- In areas where immunization fails to reach a substantial proportion of pregnant women, TT SIAs may be required. This is known as the "high-risk approach". All child-bearing aged women living in high risk districts (HRDs) are targeted with 3 properly spaced doses of tetanus toxoid (TT) through specially organized Supplementary Immunization Activities (SIAs).
- Clean deliveries (deliveries in health facilities and/or assisted by medically trained attendants)
- Surveillance It is estimated that less than 10% of NT cases and deaths are actually reported

Countries that have succeeded in eliminating MNT must:

- Ensure that the majority of pregnant women are immunized against tetanus (at least >80%)
- Ensure high coverage with tetanus toxoid-containing vaccines in infancy (such as DTP), and consider introducing **child booster doses**. **School-based immunization** can be an efficient and effective strategy to deliver booster doses of tetanus-containing vaccines (and other vaccines).
- Ensure access to and use of **clean delivery practices** (5 Cs-clean surface, clean hands, clean Blade, clean cord, clean tie)
- Maintain and improve **NT surveillance** to monitor continued elimination and identify areas where MNT is still occurring.





Chapter 10: NCD related Health Programs in India

1. National Cancer Control Program:

Cancer is an important public health problem with 8 to 9 lakh cases occurring every year. At any point of time, it is estimated that there are nearly 25 lakh cases in the country. Every year about 4 lakh deaths occur due to cancer. 40% of the cancers in the country are related to tobacco use. Data from population based registries under the National Cancer Registry Program indicate that the leading sites of cancer among men are cancer of oral cavity, lungs, oesophagus and stomach and among women are cancer of uterine cervix, breast and oral cavity. Cancers namely those of oral and lungs in males and cervix and breast in females account for over 50% of all cancer deaths in India.

National Cancer Registry Program (NCRP)

For data base of cancer cases, National Cancer Registry Program (NCRP) was initiated in 1982 by ICMR. There are two types of registries; Population Based Cancer Registry and Hospital Based Cancer Registries, which was started in January 1982. At present we have 21 Population-based registries and 6 Hospital-based registries all over the country. In 2001, data from all cancer registries and all medical colleges were collated for the "Development of an Atlas of Cancer in India") to have an idea of patterns of cancers in several other parts of the country, including those not covered under the NCRP.

Goals & Objectives of NCCP

- 1. Primary prevention of cancers by health education specially regarding hazards of tobacco consumption and necessity of genital hygiene for prevention of cervical cancer.
- Secondary prevention i.e. early detection and diagnosis of cancers, for example, cancer of cervix, breast and of the oro-pharyngeal cancer by screening methods and patients' education on self examination methods.
- 3. Strengthening of existing cancer treatment facilities, which are woefully inadequate.
- 4. Palliative care in terminal stage of the cancer.

Evolution of NCCP

- 1975-76 National Cancer Control Program was launched with priorities given for equipping the premier cancer hospital/institutions. Central assistance at the rate of Rs.2.50 lakhs was given to each institution for purchase of cobalt machines.
- 1984-85 The strategy was revised and stress was laid on primary prevention and early detection
- 1990-91 District Cancer Control Program was started in selected districts (near the medical college hospitals).



2000-01 Modified District Cancer Control program initiated.

2004 Evaluation of NCCP was done by National Institute of Health & Family Welfare, New Delhi.

2005 The program was further revised after evaluation.

Existing Schemes under National Cancer Control Program (NCCP) as on 1st June 2008 {w.e.f. 1st January 2005}:

- Recognition of New Regional Cancer Centers (RCCs): to enhance the cancer treatment facilities across the country and reduce the geographical gap in the country in the availability of cancer care facilities, New Regional Cancer centers are being recognized. A one-time grant of Rs. 5.00 crores is being provided for New RCC's.
- 2. **Strengthening of existing Regional Cancer Centers:** A one-time grant of Rs.3.00 crores is provided to the existing Regional Cancer Centers to further strengthen the cancer care services.
- 3. **Development of Oncology Wing:** Government Hospitals & Government Medical Colleges are provided with a grant of Rs. 3.00 crores for the development of Oncology Wing.
- 4. District Cancer Control Program: The DCCP will be implemented by a nodal agency, which may be a Regional Cancer Centre or Government Medical College or Government Hospital with radiotherapy facility. A cluster of 2-3 districts are taken up for prevention, early detection, minimal treatment and provision of supportive cancer care at district levels. A grant-in-aid of Rs. 90.00 lakhs spread over a period of 5 years is provided per DCCP proposal..
- Decentralized NGO Scheme: A grant of Rs. 8000/- per camp will be provided to the NGOs for IEC activities. The funds are released through a Nodal agency which could be a Regional Cancer Centre or Government Medical College or Government hospital with radiotherapy facilities.

Achievements (as on June 2008)

Regional Cancer Centers:

As of now, there are 27 Regional Cancer Centers, including 6 NGOs, providing comprehensive cancer care services. Outreach and research activities in prevention and treatment of cancers are carried out by these centers.

Oncology wing:



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases Support has been given to 82 institutes in both Government Medical Colleges and Government Hospitals for development of Oncology wing. At present there are 246 institutions with radiotherapy facilities across the country, including the 27 Regional Cancer Centers.

District Cancer Control Program:

The District Cancer Control Program, which has been developed to initiate awareness and early detection activities at the district level; are in place in 28 districts at present.

IEC Activities:

Health education for prevention and early detection of cancers is given importance in every scheme under the National Cancer Control Program. The program supports activities of health magazine 'Kalyani' and telecast by Prasar Bharti targeting especially those living in the most populous States.

2. National Diabetes Control Program:

Burden of Disease-

The worldwide prevalence of diabetes is 4% (1995), estimated to increase to 5.4% in 2025. Prevalence in most Western communities is estimated as 2% - 5%. It is now known that some developing countries it may reach 10% or even 20%. Indian studies showed prevalence of diabetes mellitus ranging from 2.1% in New Delhi to 12.4% in Kerala and rural areas showed lower rates. Heart disease in diabetes is 21.4%, neuropathy 17.5%, peripheral vascular disease 6.3%-30% (Bal 2002) Retinopathy 19.0%, and Microalbumina 26.3% (Pradeep 2002). A diabetic patient spent Rs. 4510 per year and for foot care the cost increase to Rs. 7200 per year (Sobhana 2000,2001).

Program-

Based on these alarming figures Government of India started National Diabetes Control Program on pilot basis during 7th Five year plan in 1987 in some districts of Tamil Nadu, J & K and Karnataka, but due to paucity of funds in subsequent years this Program could not be expanded further in remaining years. However, a sum of 12 lakh during 1995096 was allocated for the Program. In 1997-98 an allocation of one crore was made.

Objectives-

1. Prevention of diabetes through identification of high risk subjects and early intervention in the form of health education;



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- 2. Early diagnosis of disease and appropriate treatment with reference to high risk group;
- 3. Prevention of acute and chronic metabolic, cardiovascular, renal and ocular complication;
- 4. Provision of equal opportunity for physical attainment and scholastic achievement for the diabetic patients;
- 5. Rehabilitation of those partially or totally handicapped diabetes people.
- 3. National Mental Health Program:

Burden of Disease

The World Bank report (1993) revealed that the Disability Adjusted Life Year (DALY) loss due to neuropsychiatric disorder is much higher than diarrhea, malaria, worm infestations and tuberculosis if taken individually. According to the estimates DALYs loss due to mental disorders are expected to represent 15% of the global burden of diseases by 2020.

During the last two decades, many epidemiological studies conducted in India, show that the prevalence of major psychiatric disorder is about the same all over the world. The prevalence range from the 18 to 207 per 1000 with the median 65.4 per 1000; and at any given time, about 2 -3 % of the population, suffer from seriously, incapacitating mental disorders or epilepsy. Most of these patients live in rural areas remote from any modern mental health facilities. A large number of adult patients (10.4 - 53%) coming to the general OPD are diagnosed mentally ill.

Program

The Government of India has launched the National Mental Health Program (NMHP) in 1982, keeping in view the heavy burden of mental illness in the community, and the absolute inadequacy of mental health care infrastructure in the country to deal with it.

Aims

- i. Prevention and treatment of mental and neurological disorders and their associated disabilities.
- ii. Use of mental health technology to improve general health services.
- iii. Application of mental health principles in total national development to improve quality of life.

Objectives

- a. To ensure availability and accessibility of minimum mental health care for all in the foreseeable future, particularly to the most vulnerable and underprivileged sections of population.
- b. To encourage application of mental health knowledge in general health care and in social development.



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c. To promote community participation in the mental health services development and to stimulate efforts towards self-help in the community.

Strategies

- a. Integration mental health with primary health care through the NMHP;
- b. Provision of tertiary care institutions for treatment of mental disorders;
- c. Eradicating stigmatization of mentally ill patients and protecting their rights through regulatory institutions like the Central Mental Health Authority, and State Mental health Authority.

Mental Health care

- 1. The mental morbidity requires priority in mental health treatment
- 2. Primary health care at village and subcentre level
- 3. At Primary Health Centre level
- 4. At the District Hospital level
- 5. Mental Hospital and teaching Psychiatric Units

District Mental Health Program-

Components

- a. Training programs of all workers in the mental health team at the identified Nodal Institute in the State.
- b. Public education in the mental health to increase awareness and reduce stigma.
- c. For early detection and treatment, the OPD and indoor services are provided.
- d. Providing valuable data and experience at the level of community to the state and Centre for future planning, improvement in service and research.

The National Mental health Program was perceived in 1982

The problems that were marring the spirit and substance of NMHP were-

- i. Poor financial allocations for Mental Health
- ii. Non-availability of trained manpower
- iii. Awareness for treatment of mental disorders
- iv. Execution of Health Programs by States without a uniform approach towards nature of services and level of service delivery

A District Mental health program was launched in one district each of Rajasthan, Assam, AP and TN based on the community based mental health service model developed by NIMHANS (known as "Bellary Model") which integrates Mental Health with Primary Health Care. Subsequently it as extended to 7 more districts in 1997-98, another 5 districts in 1998-99, 6 districts in 1999-2000, and 2 in 2001-02 with the result that 22 districts in 27 States were operating the Mental Health Program at the end of 2002.



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The **District Mental Health Program** has a community-based approach, which includes following activities-

- i. Training of a Mental Health Team in each of the identified nodal institution
- ii. Increasing awareness about Mental Health problems
- iii. Enabling community to identify mental disorders through support from OPD & IPD services and follow up of cases
- iv. Creating a data base for future planning of services and research

Positive steps initiated for Mental Health are-

- a. Enactment of Mental Health Act of 1987 for taking care of Human Rights of Mental patients
- b. Keeping a vigil over all Mental hospital, by Gol and Human Rights Commission
- c. Creation of a Central Mental Health Authority and a State Mental Health Authority in 25 States/UTs
- d. Developing guidelines on minimum standards of care by NIMHANS for uniform execution

Areas in Mental Health stressed under tenth 5-year plan are-

- a. Effective coverage of entire country through District Mental Health Program
- b. Modernization of Mental Hospitals
- c. Upgrading Psychiatric Departments in Medical colleges and increasing the course content at UG/PG levels
- d. Strengthening Mental Health Authority at State & Central level
- e. Research & Training in Community Mental Health, Substance abuse and Adolescent Mental Health

The 11th Plan with an Rs1000 cr. allocation for mental health proposes to cover the remaining 500 districts by the end of the Plan period. However, mental illness is a progressive disorder; for every 100 districts covered each year, there will be a backlog of districts without mental health services.

4. National Program for prevention of Visual Impairment and Control of Blindness (1976)

Started as National Trachoma Control Program in 1963, the program was renamed as National Program for prevention of Visual Impairment and Control of Blindness in 1976.

The National surveys (1973-75) have estimated 12.5 million people to be suffering from economic blindness with a visual acuity of <6/60. (2.2)





SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases million became economically blind each year). Children almost makeup for 25% of total blind in the country

Extent of the problem-

In India nearly 12 million people are blind, the major proportion of which remain in rural, remote and underserved areas. According to WHO estimation, by the year 2020 the number of people who are blind and visually impaired will be twice the current level unless aggressive and innovative approaches are taken. India is committed to reduce this burden of blindness by adopting the strategies advocated for vision 2020-' THE RIGHT TO SIGHT."

Prevalence Rate-

The prevalence rate of blindness in India was 1.38% (ICMR, 1974). 1.49% (GOI/WHO, 1986-89) during 1999-01 survey in 15 districts of the country indicated that 8.5% of 50+ populations are blind. Prevalence rate of blindness reduced from 1.1% (2001-02) to 1 % (2006-07) (NPCP, 2006-07).

With a Goal of reducing the Blindness prevalence from 1.4% to 0.3% by 2020; a centrally sponsored program was started with following objectives-

Major causes for Blindness-

Of the total,			
Cataract:	80.1 %	Corneal opacities:	1.55%
Refractive errors:	7.35%,	Trachoma:	3.9%
Aphakia:	4.6%	Other causes:	4.25%
Glaucoma:	1.7%,		

Objectives-

- 1. To bring down the prevalence rate of cataract blindness from 1.49% to 0.8% by the year 2007.
- 2. To provide high quality of eye care to the affected population.
- 3. To expand coverage of eye care to the affected population.
- 4. To expand coverage of eye care services to the under-served areas.
- 5. To reduce the backlog of blindness by identifying and providing services to the affected population.
- 6. To develop institutional capacity for eye care services by providing support for equipment and material and training personnel.



11th Plan Objectives (2007-12)

- To reduce the backlog of blindness through identification and treatment of blindness.
- To develop Comprehensive Eye care facilities in every District.
- To develop Human Resources for providing eye care services.
- To improve quality of service delivery.
- To secure participation of Voluntary Organizations/Private Practitioners in eye care.
- To enhance Community awareness on eye care.

11th Plan Strategies (2007-12)

- Decentralize implementation of the scheme through District Health Societies (NPCB)
- Reduction in the backlog of the blind persons by active screening of the population above 50years, organizing screening eye camps and transporting operable cases to eye care facilities.
- Involvement of voluntary organizations in various eye care activities.
- Participation of community and Panchayati Raj Institutions in organizing services in rural areas.
- Development of eye care services and improvement in quality of eye care by training of personnel, supply of high-tech ophthalmic equipments, strengthening follow up services and regular monitoring of services.
- Screening of school age group children for identification of treatment of refractive errors with special attention in underserved areas.
- Public awareness about prevention and timely treatment of eye ailments.
- Special focus on illiterate women of rural areas. For this purpose there should be convergence with various ongoing schemes for development of women and children.
- To make eye care comprehensive, besides cataract surgery, provision of assistance for other eye diaseases like diabetic retinopathy, glaucoma management , laser techniques, corneal transplantation, vitreoretinal surgery, treatment of childhood blindness etc.

Program Strategy-

- 1. Strengthening Service delivery
 - a. Improving physical, technical and managerial capabilities of all Health institutions and selected NGOs
 - b. Setting norms for service delivery
 - c. Emphasis on vision restoration through quality surgery, after care, follow up, provision of IOL
 - d. Camp approach to cover Rural and Tribal areas on priority
- 2. Developing Human resource for eye care
 - a. Training of Ophthalmic personnel, besides teachers, volunteers and functionaries of Primary health care system
- 3. Promoting outreach activities



- 4. Increasing Public awareness
- 5. Developing institutional capacity
 - a. Management training
 - b. Developing collaborative mechanism
 - c. Introducing monitoring and feedback mechanisms

Activities:

- 1. Strengthening of eye care infrastructures in the state.
- 2. Improvement of quality of eye care services by training of eye care personnel.
- 3. Provision of modern equipments instruments and other commodity assistance by GOI.
- 4. Provision of vehicle.
- 5. Increased no of cataract surgery.
- 6. Abolition of outreach camps.
- 7. Introduction of cataract surgery with IOL implantation.
- 8. Involvement of NGOs. Component activities under NPCB:
- 9. Cataract surgery.
- 10. School eye screening.
- 11. Eye donation and Eye Banking.
- 12. Training and capacity building of ASHAs to orient them towards Blindness control program as well as create a core group of field functionaries who will initiate and create awareness on blindness control program at the village level.
 - a. IEC and EYE health education at all levels to be undertaken. and referral for eye care

Implementing agencies-

District Blindness Control Society (DBCS) Composition of DBCS-

Chairman	: District Collector
Vice chairman	: Chief Medical & Health Officer
Members	: Medical Superintendent. of District hospital
	District Education Officer
	Representatives of NGOs
	President of IMA
	Ophthalmic surgeon of Mobile surgical unit
	An eminent practicing Ophthalmologist
Member secretary	: District Blindness Control Coordinator

Functions of DBCS

1. Plan, Implement and Monitor activities related to Blindness control



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- 2. Draw list of voluntary agencies/ private hospitals/ NGOs & involve in Blindness control
- 3. Coordination with Health & other departments
- 4. Raise funds and monitor use of funds

Indicators:

- 1. Cataract operation in bi-lateral Blind
- 2. Cataract surgery in Female.
- 3. Cataract surgery in SC/ST population.
- 4. Cataract surgery in different facilities
- 5. Cataract surgery in different age groups.
- 6. Initiatives that will be integrated into the Blindness Control Program:
- 7. Free surgery for cataract cases in rural areas.
- 8. Free transportation for patients of unreached areas.
- 9. Free medicine for all types of eye ailments.
- 10. Free spectacles for post operative care.
- 11. Free spectacles for poor school students.
- 12. All backlog cataract cases would be treated.
- 13. All schools would be covered for SES.
- 14. All children would be given Vitamin-A supplementation and immunization coverage.
- Modern and advanced treatment would be available in all Medical College Hospitals and District Hospitals,
- 16. Two Eye Banks to be established.
- Establishment of one RIO (Regional Institute of Ophthalmology) in one of the medical colleges.



Achievements:

Performance of Cataract Surgery:

Year	Target	Achievement	% Surgery with IOL
2002-03	4000000	3857133	77
2003-04	4000000	4200138	83
2004-05	4200000	4513667	88
2005-06	4513000	4905619	90
2006-07	4500000	5040089	93
2007-08	5000000	5404406	94
2008-09	6000000	57.88 ¹	
2009-10	6000000	45.50 ¹	
2010-11	6000000	29.36 ²	91 ²

Source:¹ State Wise Progress as on 30.09.2010 ,NRHM and² Performance of Catract Surgery During 2010 -11 www.mohfw.nic.in/nrhm.htm

Rajasthan:

Performance of Cataract Surgery ups to Dec 2010:96991{94144- IOL} (300000-Target)

% IOL: 97%

School Going Children (till Dec. 2009)

Screened: 445744

Detected with Refractive Errors: 11832

Provided Free Glass: 7717

Source: www.mohfw.nic.in and Pragati Prativaden 2009-10



5. National Iodine Deficiency Disorders Control Program:

Launched as National Goiter Control Program in 1962, the program simply focused on iodized salt.

The operational and logistics punctuations prevailed. Prevalence of goiter did not change. The problem was reassessed by ICMR and findings indicated that -

 Goiter is just not restricted to Goiter- belt in Sub-Himalayan region but is prevalent in other areas also (Gujarat, Maharashtra, Punjab, MP, Kerala, Assam and AP).



- ii. Iodine deficiency is not restricted to endemic Goiter and/ or Cretinism but has wider implications in form of deaf mutism, mental retardation and impaired cognitive functions.
- iii. 200 million are exposed to risk of IDD (61 M with Goiter, 2.2 M have cretinism, 6.6 M mild neurological disorder)

The program was re-baptized as National Iodine Deficiency Disorders Control Program, in 1992.

Problem Statement-

World's single most significant cause of preventable brain damage and mental retardation. 261 million suffering from brain damage (10 million cretins). 130 countries, 13% of world's population.9 million persons affected.2.2 billion people live in ID areas. 167 million at risk of IDD Goiter- 54.4 million, IDD mental/motor handicaps- 8.8 million. 1984-86: ICMR multi centric study (14 districts in 9 States, Goiter prevalence 21.1%, Endemic cretinism: 0.7%). India: 263 of 324Districts are Goiter endemic. 200 million people are estimated to be living in goiter endemic regions. 51% HH consuming iodized salt (State of World's Children, 2009-UNICEF).

Surveys in 310 districts of 28 States and 5 Union territories by DGHS, ICMR and State Health departments has revealed that out of 324 districts surveyed, 263 districts have IDD prevalence of > 10%, 200 million people are at a risk of IDD and 71 million people are suffering from Goiter and other iodine deficiency related disorder.

Chronology of developments in lodine deficiency:

1962: NGCP launched

- 1984: Policy of Universal salt Iodization (USI)
 - : Private sector to produce iodized salt
- 1992: NGCP renamed as NIDDCP
- 1995: Independent survey evaluation of USI in MP, New Delhi and Sikkim
- 1997: Sale and storage of common salt banned



1998-99: NFHS II (71% using iodized salt)

13th Sept 2000: ban on sale of common salt lifted by the Gol, States continued the ban

Spectrum of IDD

Fetus:	Abortion, Still Birth, Congenital Anomalies, Prenatal mortality, Infant
	mortality, Neurological cretinism (mental deficiency, deaf mutism, squint)
Neonate:	Neonatal Goiter, Neo-natal Hypothyroidism

Child and adolescent: Juvenile Hypothyroidism, Impaired Mental function, Growth retardation

Adult: Goiter, Hypothyroidism, Impaired mental function

Classification of goiter

- Grade 1: A mass in the neck with enlarged thyroid, palpable but not visible
- Grade 2: Swelling in the neck that is palpable as well as visible

Program goal-

- 1. Bring down IDD prevalence to < 10% by 2012
- 2. To decrease overall IDD prevalence (goiter) to <5% in the school children 6-12 years.

Program Objective

- 1. Surveys to assess the magnitude of the lodine Deficiency Disorders
- 2. Supply of iodated salt in place of common salt
- 3. Resurvey after every 5 years to assess the extent of IDD and the impact of iodated salt
- 4. Laboratory monitoring of iodated salt and urinary iodine excretion
- 5. Health education and publicity

Program components-

- 1. Survey to identify Goiter endemic areas
- 2. Fortify all edible salt with iodine in a phased manner by end of 8th 5-year plan
- 3. Production and supply of lodized salt to all endemic areas
- 4. IEC
- 5. Re survey of endemic areas after 5 years of iodized salt supply to ascertain impact
- 6. Laboratory monitoring of iodized salt and urinary excretion of iodine

Implementation plan:

• Creating Demand for iodized salt in Community



- Improving Monitoring of quality of iodized salt
- Increasing outlets and access to low cost adequately iodized salt
- Improving iodized salt production
- Advocacy with Policy Makers and Program Managers

Implementing partners-

- a. Ministry of Railways (subsidized transport of lodized salt)
- b. Ministry of Industry (controlling *production* of iodized salt through Salt Commissioner's office)
- c. Ministry of Health (Supervision, monitoring & evaluation besides implementation of PFA Act)
- d. Civil supplies department in States (*Procurement, transportation and supply* of iodized salt to population in endemic areas)

Achievements:

- Salt manufacturing license issued to 930 units, 550 of them are producing iodized salt with capacity of 13 million MT
- b. Production of iodized salt recorded at 49.83 million MT in 2005-06
- c. 26 States have totally banned non-iodized salt, and 2 have banned it partially
- d. 29 States and UTs have established IDD cells
- e. Intensive IEC campaigns using all kind of media has started in all States
- f. Standards for iodized salt have been laid down as 30 ppm at production and 15 ppm at consumption level
- g. A National reference laboratory set up at Bio-Chemistry division of NICD for training
- h. Ban on sale of non iodized salt w.e.f. May 2006, under PFA Act 1954

All this requires is enforcement; education and strengthening iodized salt supply through Public Distribution System and incentive to salt manufacturers. The "Sun" logo on iodized salt packs has already helped in distinguishing it from plain salt.

6. National Program for Prevention and Control of Deafness

Hearing loss is the most common sensory deficit in humans today. As per WHO estimates in India, there are approximately 63 million people, who are suffering from Significant Auditory Impairment; this places the estimated prevalence at 6.3% in Indian population. As per NSSO survey, currently there are 291 persons per one lakh population who are suffering from severe to profound hearing loss




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Non - Communicable Diseases (NSSO, 2001). Of these, a large percentage is children between the ages of 0 to 14 years. With such a large number of hearing impaired young Indians, it amounts to a severe loss of productivity, both physical and economic. An even larger percentage of our population suffers from milder degrees of hearing loss and unilateral (one sided) hearing loss.

Objectives of the Program

- 1. To **prevent** the avoidable hearing loss on account of disease or injury.
- 2. Early identification, diagnosis and treatment of ear problems responsible for hearing loss and deafness.
- 3. To **medically rehabilitate** persons of all age groups, suffering with deafness.
- 4. To **strengthen the existing inter-sectoral linkages** for continuity of the rehabilitation program, for persons with deafness.
- 5. To develop institutional capacity for ear care services by providing support for equipment and material and training personnel.

Components of the Program:

- 1) Manpower training & development
- 2) Capacity building
- 3) Service provision including rehabilitation
- 4) Awareness generation through IEC activities, Monitoring and Evaluation

Program execution & expansion

A pilot phase has been implemented in 25 districts derived from **10 states** and **1 union territory** till March 2008. It is proposed to expand the program to 203 districts by the end of eleventh five year plan. In the current year (2008-09) 35 new districts have been included in the program adding it up to 60 districts. **Rajasthan not included**.



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases 7. National Program for Prevention and Control Of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS)



It is estimated that the overall prevalence of diabetes, hypertension, Ischemic Heart Diseases (IHD) and Stroke is 62.47, 159.46, 37.00 and 1.54 respectively per 1000 population of India. There are an estimated 25 Lakh cancer cases in India. According to the National Commission on Macroeconomics & Health (NCMH) Report (2005), the Crude Incidence Rate (CIR) for Cervix cancer, Breast cancer and Oral cancer is 21.3, 17.1 and 11.8 (among both men and women) per 100,000 populations respectively.

The main preventable risk factors for NCDs are tobacco consumption; poor dietary habits, sedentary life style, stress etc. National Family Health Survey III (2005-06), reported that the prevalence of current tobacco use was 57•0 % among men and 10.8% among women. Over 8 lakh deaths occur every year due to diseases associated with tobacco use. The cancer registry data reveals that 48% of cancers in males and 20% in females are tobacco related and are totally avoidable. Common cancers caused by smoking tobacco are lung, larynx, pharynx and esophagus, while cancers of the mouth, tongue and lip are due to chewing and smoking tobacco.

Accordingly, Govt. of India launched a National Program for Prevention and Control of Cancer, Diabetes, CVD and Stroke (NPCDCS). The NPCDCS program has two components viz. (i) Cancer & (ii) Diabetes, CVDs & Stroke. These two components have been integrated at different levels as far as possible for optimal utilization of the resources. The activities at State, Districts, CHC and Sub Centre level have been planned under the program and will be closely monitored through NCD cell at different levels.



Objectives of NPCDCS:

- 1. Prevent and control common NCDs through behaviour and life style changes,
- 2. Provide early diagnosis and management of common NCDs,
- Build capacity at various levels of health care for prevention, diagnosis and treatment of common NCDs,
- 4. Train human resource within the public health setup viz doctors, paramedics and nursing staff to cope with the increasing burden of NCDs, and
- 5. Establish and develop capacity for palliative & rehabilitative care.

The Strategies to achieve above objectives are as follows:

- a. Prevention through behavior change
- b. Early Diagnosis
- c. Treatment
- d. Capacity building of human resource
- e. Surveillance, Monitoring & Evaluation

The strategies proposed will be implemented in 20,000 Sub Centers and 700 Community Health Centre in 100 Districts across 21 States during 2010-12.

States and Districts covered for pilot Phase

One district in each of the following states covered for pilot Phase

	State	District
1.	Assam	Kamrup
2.	Punjab	Jalandhar
3.	Rajasthan	Bhilwara
4.	Karnataka	Shimoga
5.	Tamilnadu	Kancheepuram
6.	Kerala	Thiruvanathapuram
7	Nellore (tentative).	A.P.



Expected outcomes for the pilot phase

Awareness generated on Healthy Life Styles

- Health promotion at School , Community & work places
- Decrease in the incidence of Non –Communicable Diseases particularly, Diabetes, Cardiovascular Diseases and Stroke.



The approach and service package includes:

Package of Services

In the program, it is envisaged providing preventive, promotive, curative and supportive services (core and integrated services) in Cancer, Diabetes, Cardio-Vascular Diseases (CVD) & Stroke at various government health facilities.

The package of services would depend on the level of health facility and may vary from facility to facility. The range of services will include health promotion, psycho-social counseling, management (out-and-in-patient), day care services, home based care and palliative care as well as referral for specialized services as needed. Linkages of District Hospitals to private laboratories and NGOs will help to provide the additional components of continuum of care and support for outreach services. The district will be linked to tertiary cancer care health facilities for providing comprehensive care.

The Non Communicable Diseases are expensive to treat. National strategies have to focus on prevention and health promotion as key to reduce disease burden. Health education program that promote exercise, weight reduction, early diagnosis, screening are some of the key interventions that need to be promoted at various levels of heath facilities.

The services under the program would be integrated below district level and will be integral part of existing primary health care delivery system, and vertical at district and above as more specialized health care are needed both for cancer component and diabetes, CVD, and stroke.

Packages of services to be made available at different levels under NPCDCS

The service approach is grouped under three components-

- 1. Health promotion for general population
- 2. Disease prevention for high risk group
- 3. Assessment of prevalence of Risk factors



Services available under NPCDCS at different levels

Health Facility	Packages of services
Sub centre/ PHC	 Health promotion for behavior change 2. 'Opportunistic' Screening using B.P measurement and blood glucose by strip method 3. Referral is of suspected cases to CHC
СНС	 Prevention and health promotion including counseling 2. Early diagnosis through clinical and laboratory investigations (Common lab investigations: Blood Sugar, lipid profile, ECG, Ultrasound, X ray etc.) 3. Management of common CVD, diabetes and stroke cases (outpatient and in patients.) 4. Home based care for bed ridden chronic cases 5. Referral of difficult cases to District Hospital/higher health care facility
District Hospital	 Early diagnosis of diabetes, CVDs, Stroke and Cancer 2. Investigations: Blood Sugar, lipid profile, Kidney Function Test (KFT),Liver Function Test (LFT), ECG, Ultrasound, X ray, colposcopy, mammography etc. (if not available, will be outsourced) 3. Medical management of cases (outpatient, inpatient and intensive Care) 4. Follow up and care of bed ridden cases 5. Day care facility 6. Referral of difficult cases to higher health care facility 7. Health promotion for behavior change
Tertiary Cancer Centre (Medical Colleges)	Comprehensive cancer care including prevention, early detection, diagnosis, treatment, minimal access surgery after care, palliative care and rehabilitation

Monitoring, Evaluation, Surveillance and Research

Standard formats for recording and reporting will be prescribed by the Central NCD Cell and will be used by various facilities, District and State NCD Cell. A Management Information System will also be developed to computerize the information. Review meetings of State Program Officers (NCD) will be organized on a quarterly progress to assess physical and financial progress and discuss constraints in implementation of the program.



SIHFW: an ISO 9001:2008 certified Institution Non - Communicable Diseases Responsibility of reporting, flow of information and frequency of reporting is summarized below:

Level	Reporting Form	Person in charge	Reporting to:	Frequency of submission
Sub-centre	Form 1	ANM/MHW	MO I/c NCD Clinic CHC	Monthly
СНС	Form 2 A	MO I/c NCD Clinic	District NCD cell	Monthly
	Form 2 B	MO I/c NCD Clinic	District NCD cell	Monthly
	Form 3 A	DPO (NCD)	State NCD cell	Monthly
District	Form 3 B	MO I/c NCD Clinic	District/ State NCD cell	Monthly
	Form 3 C	DPO (NCD)	State NCD cell	Monthly
State	Form 4 A	SPO (NCD)	National NCD cell	Quarterly
Oldio	Form 4 B	SPO (NCD)	National NCD cell	Quarterly

Institutional framework for the implementation of NPCDCS activities



Technical Resource Groups (TRG)

To provide technical guidance, advice and review the progress of the program for enhancing the quality of implementation of NPCDCS, 2 Technical Resource Groups (TRG) have been constituted, one for cancer component and other for Diabetes, Cardiovascular Diseases and Stroke with following term of references (TORs).



Terms of references for TRG on cancer

- 1. To provide technical inputs for enhancing the quality of implementation of NPCDCS related to cancer.
- 2. To review the operational guidelines from time to time.
- 3. To identify resource centers for providing training to various health professionals
- 4. To advice about training material, strategy and preparation of training plan.
- 5. To advice in preparation of health education material and review the existing material.
- 6. To advice in formulation of protocols and tools for monitoring and evaluation
- 7. To assess the human resource requirement and advice on fill up the deficiencies.
- 8. To develop strategy for integration with NRHM and other NCDs.
- 9. To review the functioning and operational problems regarding radiotherapy units already installed including the trained manpower, infrastructure and radiation safety
- 10. To act as technical advisory body to assess and project the present and the future demands for indigenous manufactured units and their acceptable standards or specifications

Terms of references for TRG on Diabetes, CVD & Stroke

- 1. To provide technical inputs for enhancing the quality of implementation of NPCDCS
- 2. To review the operational guidelines from time to time
- 3. To identify resource centers for providing training to various health professionals
- 4. To advice about training material, strategy and preparation of training plan
- 5. To advice about training material, strategy and preparation of training plan
- 6. To advice in preparation of health education material and review the existing material
- 7. To advice in formulation of protocols and tools for monitoring and evaluation of NPCDCS
- 8. To assess the human resource requirement and advice on filling up the deficiencies.
- 9. To develop strategy for integration with NRHM and other NCDs
- 10. To recommend the proposals for financial assistance under various schemes.







A. Organization Structure

National NCD Cell will be responsible for overall planning, implementation, monitoring and evaluation of the different activities and achievement of physical and financial targets planned under the program. The National NCD cell shall function under the guidance of Program in-charge from the Ministry of Health & Family Welfare and will be supported by the identified officers/officials from the Directorate General of Health Services.

Organization Structure of National NCD Cell

Technical Wing	Administrative Wing
Deputy Director General	Additional Secretary /Joint Secretary
CMO (Cancer)	Director (NCD)
CMO (Diabetes & CVD)	Under Secretary (NCD)
CMO (Geriatric care)	Under Secretary (NCD)
Consultants	Section officer

Activities at District NCD cell:

- 1. Opportunistic screening
- 2. Detailed investigation
- 3. Outsourcing of certain laboratory investigations
- 4. Out-patient and In-patient Care
- 5. Day Care Chemotherapy Facility
- 6. Home Based Palliative Care
- 7. Planning, Monitoring and Supervision:
- 8. Training of Human Resources
- 9. Financial Management



Global Action plan for NCD, 2008-2013

Objective 1:

To raise the priority accorded to non-communicable disease in development work at global and national levels, and to integrate prevention and control of such diseases into policies across all government departments.

Action:

- a. Assess and monitor the public health burden imposed by non communicable diseases and their determinants, with special reference to poor and marginalized populations.
- b. Incorporate the prevention and control of non communicable diseases explicitly in poverty reduction strategies and in relevant social and economic policies.
- c. Adopt approaches to policy development that involve all government departments, ensuring that public health issues receive an appropriate cross-sectoral response.
- d. Implement programs that tackle the social determinants of non communicable diseases with particular reference to the following: health in early childhood, the health of the urban poor, fair financing and equitable access to primary health care services.

Objective 2:

To establish and strengthen National Policies and plans for prevention of NCDs

Action:

- a. Develop and implement a comprehensive policy and plan for the prevention and control of major non communicable diseases, and for the reduction of modifiable risk factors.
- b. Establish a high level national multi-sectoral mechanism for planning, guiding, monitoring and evaluating enactment of the national policy with the effective involvement of sectors outside health.
- c. Conduct a comprehensive assessment of the characteristics of non communicable diseases and the scale of the problems they pose, including an analysis of the impact on such diseases of the policies of the different government sectors.
- d. Review and strengthen, when necessary, evidence based legislation, together with fiscal and other relevant policies that are effective in reducing modifiable risk factors and their determinants.

Objective 3:



To promote interventions to reduce the main shared modifiable risk factors for noncommunicable diseases: tobacco use, unhealthy diets, physical inactivity and harmful use of

alcohol

Action:

- a. Tobacco control
- b. Promotion of Healthy Diet
- c. Promoting Physical Activity
- d. Reducing Alcohol consumption

Objective 4:

To promote research for prevention of Non communicable diseases

Action:

- a. Invest in epidemiological, behavioral, and health system research as part of national programs for the prevention of non communicable diseases and develop jointly with academic and research institutions a shared agenda for research, based on national priorities.
- b. Encourage the establishment of national reference centers and networks to conduct research on socioeconomic determinants, gender, cost effectiveness of interventions, affordable technology, health system reorientation and workforce development.

Objective 5:

To promote partnership for prevention and control of NCDs

Action:

- a. Establish an advisory group in 2008 in order to provide strategic and technical input and conduct external reviews of the progress made by WHO and its partners in the prevention and control of non communicable diseases [2008–2009].
- b. Encourage the active involvement of existing regional and global initiatives in the implementation and monitoring of the global strategy for the prevention and control of non communicable diseases, and of related strategies.
- c. Support and strengthen the role of WHO collaborating centers by linking their plans to the implementation of specific interventions in the global strategy [2008–2009].
- d. Facilitate and support, in collaboration with international partners, a global network of national, regional, and international networks and programs such as the WHO regional networks for non communicable disease prevention and control.



Objective 6:

To monitor NCDs and their determinants and evaluate progress at Regional, National and Global level

Action:

a. Strengthen surveillance systems and standardized data collection on risk factors, disease incidence and mortality by cause, using existing WHO tools.

Indicators:

- a. Number of countries that have an established unit for the prevention and control of noncommunicable diseases (with dedicated staffing and budget) in the Ministry of Health or equivalent national health authority.
- b. Number of countries that have adopted a multi sectoral national policy for non communicable diseases in conformity with the global strategy for the prevention and control of noncommunicable diseases.
- c. Number of countries with reliable, nationally representative mortality statistics by cause
- d. Number of countries with reliable standardized data on the major non communicable disease risk factors (based on WHO tools).
- e. Number of countries with reliable population based cancer registries.
- f. Number of countries that have excise tax rates of at least 50% of the retail price of a pack of the most commonly used cigarettes.
- g. Number of countries with complete smoke free legislation covering all types of places and institutions, as defined in the WHO Report on the Global Tobacco Epidemic, 2008.
- h. Number of countries with bans on tobacco advertising, promotion and sponsorship, as defined in the WHO Report on the Global Tobacco Epidemic, 2008.
- Number of countries that have incorporated smoking cessation support (including counseling and/or behavioral therapies) into primary health care, as defined in the WHO Report on the Global Tobacco Epidemic, 2008.
- j. Number of countries that have adopted multi sectoral strategies and plans on healthy diet, based on the WHO Global Strategy on Diet, Physical Activity and Health.
- k. Number of countries that have adopted multi sectoral strategies and plans on physical activity based on the WHO Global Strategy on Diet, Physical Activity and Health.
- Number of countries that have developed national food based dietary guidelines. Number of countries that have developed national recommendations on physical activity for health.



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Non - Communicable Diseases

- m. Number of countries that have developed policies, plans and programs for preventing public health problems caused by harmful use of alcohol.
- n. Number of countries with a national research agenda and a prioritized research plan for non communicable diseases and their risk factors in line with WHO's global research Strategy
- o. Number of countries that provide early detection and screening programs for cardio vascular risk.
- p. Number of countries with comprehensive national cancer control programs, covering priorities in prevention, early detection, treatment and palliative care.
- q. Number of countries providing early detection and screening programs for cervical cancer and/or breast cancer.
- r. Number of countries in which patients have access to affordable essential medicines for pain relief and palliative care, including oral morphine.
- s. Number of radiotherapy devices per 100 000 population.
- t. Number of countries in which essential medicines for management of chronic respiratory diseases, hypertension, and diabetes are affordable and accessible in primary health care.
- u. Prevalence of tobacco use among adults aged 25–64 years.
- v. Prevalence of low consumption of fruit and vegetables among adults aged 25-64 years.
- w. Prevalence of low levels of physical activity among adults aged 25–64 years.
- x. Prevalence of overweight/obesity among adults aged 25–64 years.
- y. Prevalence of raised blood pressure among adults aged 25–64 years.
- z. Prevalence of raised fasting blood glucose concentration among adults aged 25-64 years.