

# **PUBLIC** **Health and** **Hygiene**

subject code; 18KP3ZELZA

# unit 1

## Introduction to Public health

1. The sum of all official or governmental efforts to promote, protect, and preserve the people's health. □ What is Public Health?
2. Public Health "The science and art of preventing disease, prolonging life and promoting health and efficiency through organized community effort." -CEA Winslow, 1920 "The process of mobilizing and engaging local, state, national, and international resources to assure the conditions in which people can be healthy" -The Oxford Textbook of Public Health
3. Public Health "The science and practice of protecting and improving the health of the community, as by preventive medicine, health education, control of communicable diseases, application of sanitary measures, and monitoring of environmental hazards." -The American Heritage Dictionary of Public Health
4. Public Health "Public health is what we, as a society, do collectively to assure the conditions in which people can be healthy." -Source: Institute of Medicine Report (IOM). THE FUTURE OF PUBLIC HEALTH. Washington DC: National Academy Press. 1988. Public health is a science and art of saving the lives of millions at once by single decision or intervention.
5. Public Health is many things A System A Profession A Method Government Service The Health of the Public
6. Medical Model Versus □ Public Health Approach Public Health Model
7. Private (Some public) □ Medical care □ Intervention □ Treatment □ Diagnosis □ Individual □ Medical Model □ Public (Some private) □ Human behavior □ Environment □ Interventions □ Health Promotion □ Disease Prevention □ Population □ Public Health Model □ Public Health Approach
8. Core Activities of Public Health 1. Prevents epidemics and the spread of disease 2. Protects against environmental hazards 3. Responds to disasters and assists communities in recovery 4. Prevents injuries 5. Promotes healthy behaviors 6. Assures the quality, accessibility and accountability of health services
9. Monitoring the health status of the population 8. Mobilizing community action 9. Reaching out to link high-risk and hard-to-reach people to needed services 10. Researching to develop new insights and innovative solutions 11. Leading the development of sound health policy and planning Core Activities of Public Health
10. Recognition of tobacco use as a health hazard CDC, 1999 □ Fluoridation of drinking water □ Family planning □ Healthier mothers and babies □ Safer and healthier foods □ Decline in deaths from coronary heart disease and stroke □ Control of infectious diseases □ Safer workplaces □ Motor-vehicle safety □ Vaccination □ Ten Great Public Health Achievements
11. Diabetes □ Cancer □ Obesity □ HIV/AIDS □ Malaria □ Dengue □ Cholera □ Tuberculosis □ Poliomyelitis □ Influenza □ Measles □ Population problems □ Geriatric health problems □ Municipal and hospital waste □ Malnutrition and micronutrient deficiency □ Maternal child health problems □ Environmental pollution □ Non communicable diseases □ Communicable diseases □ Public Health Problems and Diseases
12. Family Health International • United Nation • WHO • WFP • FAO • UNICEF • UNDP □ Marie Stopes International □ Save the Children □ United Mission to Nepal □ CARE □ International □ PLAN Nepal □ Nepal Red Cross □ FPAN □ NFHP □ National □ Public Health Organizations Non Governmental
13. Local development offices ♣ Health training centers ♣ Quality control offices ♣ Community development organizations ♣ Research organizations ♣ Academic institutions ♣ Primary health care institutions Others ♣ Ministry of health and population ♣ Department of health services ♣ Regional training center ♣ Regional health directorate ♣ Public health office ♣ District health office ♣ Public Health Organizations Governmental

## History

Introduction of scientific method □ Rejected supernatural theory of disease □ Hippocratic oath □ Hippocrates (460-370 BC) □ Theory of humors □ Hygiea and panacea □ Aesculapius : symbol of medical profession □ Greece □ Public health in Ancient times

1. Galen (130-205 AD) Disease is due to predisposing, exciting and environmental factors (Epidemiological triad) His teachings remained unquestioned for 1400 years □ Romans inherited the theory from Greeks Sewage disposal Keen sense of sanitation Baths, sewers and aqueducts were constructed Reporting system in place □ Public health in Ancient times

2. Knowledge of dentistry □ Wells and baths in houses □ Drains were covered with slabs □ Elaborate drainage systems were built □ First Urban sanitation systems □ Indus valley civilisation (3500BC to 1500 BC) □ Indian system of medicine
3. Charaka has described the objective of medicine as two fold; preservation of good health and combating disease. □ Indian medicine had a profound impact on Asia □ Dehashuddhi, Manashuddhi, Desashuddhi □ Purity and cleanliness central to Indian medicine (Manu samhita) □ Charaka samhita: Over 500 drugs □ Vedic times: Ayurveda originated □
4. Reached a peak during Gupta times (300-700 AD) □ Medical education in Universities □ Fa Hsien (337–422 AD) described the institutional approach of Indian medicine □ Hospital system was established: Ashokan inscriptions □ Institutional setup was strengthened □ Surgery suffered a setback □ Dominated by Buddhist and Jain teachings □ Ayurveda continued □ Post Vedic times □
5. The following shall be called upon to counteract diseases and epidemics affecting human beings: physicians by using medicines, ascetics by purificatory and expiatory rites and experts by occult means. Making oblations to or organising night festivals in honour of Gods, worship of the God of the Sea, milking cows in cremation grounds and burning effigies are other methods of averting danger of epidemics. {4.3.13-15} □ Hygiene was emphasized □ Human resource aspect of society was a part of private concern □ Public health in Arthashastra (4th century BC)
6. Any doctor treating a severely wounded person or one suffering from unwholesome food or drink shall report the fact to Gopa and the Sthanika. If he makes a report, he shall not be accused of any crime. If he does not, he shall be charged with the same offence (which he helped conceal) { 2.36.10} □ Physicians shall inform the authorities before undertaking any treatment which may involve danger to the life of the patient. If as a result of the treatment, the patient dies or is physically deformed, the doctor shall be punished. { 4.1.56, 57} □ Public Health: control of medical profession
7. Isolation of patients, cleaning of areas with lime, burning of rat infested areas □ Italy was an example of successful measures for epidemic control □ Response was a manifestation of survival of health □ Diseases were widely viewed as inescapable □ Epidemic of plague (black death) in 14th century □ No new knowledge was added □ Saw deterioration of Roman infrastructure □ Public health in middle ages
8. Hydrotherapy, massage, acupuncture □ Hygiene was recognised as determinant of health □ Health is a result of balance between Yin and Yang □ They developed a system of variolation to protect against small pox □ Chinese
9. Discovery of micro-organisms by Leewenhoek led to the grounding of Germ theory of disease □ Edward Jenner □ Semmelweis □ Thomas Sydenham (first distinguished epidemiologist) □ William Harvey: physiology □ Anatomical discoveries by Vesalius □ Theory of contagion □ Renaissance □ Birth of modern Public health
10. Pettenkofer: financial returns of sanitary investment □ Establishment of National Board of Health, envisioning of welfare state □ Sir John Simon: Sanitary act in 1866 □ Concept of State medicine □ Vaccination made compulsory: 1853 □ British public health act : 1848 □ Chadwick's 'Sanitary idea' □ Necessity is the mother of invention □ Industrial revolution □ Renaissance □ The sanitary awakening
11. John Snow and Cholera □ visualised as the evolution of medicine □ Disease has social causes, social consequences and social therapy □ Social pathology concept revived by Alfred Grotjahn (1911) □ Virchow proposed social condition as root cause of typhus epidemic □ Development of germ theory by Pasteur and Koch □ Birth of social medicine
12. Conceptual evolution of Public health Disease Health Social control promotion engineering Health for all phase phase phase phase (1980 onwards)(1880-1920) (1920-1960) (1960-1980)
13. Public health "the science and art of preventing disease, prolonging life and promoting health and efficiency through organized community effort" CEA Winslow (1920)
14. As a result of widespread international cooperation and multi-sectoral approach Dr. D. A. Henderson, who directed the World Health Organization Smallpox Eradication Program □ World declared free in 1980 □ Last case in Somalia in 1977 □ WHO advocated world-wide smallpox control in 1958 □ Eradication of smallpox
15. Concept of epidemiological transition Era of Era of Era of Era of Era of pestilence degenerative delayed receding and man- health and Pandemics degenerative made disease regression famine disease
16. 1911: Indian Research Fund Association □ AIIHPH, Haffkine Institute, Malaria Institute □ 1904: Plague commission □ 1873: Birth and Death registration act □ 1859: Royal commission to investigate Soldier

deaths □ 1835: Medical colleges established □ 1760s: Indian Medical Service □ History of Public health in British India

17. Medicalisation of health □ Setting up of central institutes □ Provision of health centres □ Integration of preventive and curative services □ 1946: Bhore committee report □ 1938: NPC subcommittee (Sokhey committee) □ Undermining of the Indigenous systems □ Infectious diseases rampant □
18. 1961: Mudaliar Committee □ 1955: National Filaria control program □ 1954: National Leprosy control program □ 1953: National Malaria control program □ 1951: first five year plan, BCG vaccination launched □ 1948: India joins WHO, ESI act □ India: Post-Independence era
19. 4 committees for □ Centralised planning with democratic socialism □ Water supply and sanitation in rural areas □ Family planning □ Many vertical programs launched □ 1947- 1967 referred to as Golden period (?) □ Health planning
20. 1994: Surat epidemic □ Beginning of ‘public-private partnerships’ □ DOTS pilot project, RCH launched □ Govt spending fell from 1.3% to 0.9% (of GDP) □ 1990s: Economic liberalisation □ 1983: National Health Policy approved □ 1978: Alma Ata declaration □ 1975: Last Smallpox case reported □
21. lacking in multidisciplinary approach □ Too programme oriented □ Too disease oriented □ Public health found to be □ India ranks 128 in HDI, malnutrition persists □ 2000: Signatory to UN millennium declaration □
22. 2011: Geriatric Health program launched □ 2008: Non-communicable disease Program □ 2006: PHFI established □ Increasing realization of need for inter-sectoral coordination □ NRHM and JSY □ RCH II □ 2005: □ 2003: Tobacco Control legislation □ 2002: National Health Policy launched □ 21st Century

## Nutrition and Health

The word nutrient or “food factor” is used for specific dietary constituents such as proteins, vitamins and minerals. Dietetics is the practical application of the principles of nutrition; it includes the planning of meals for the well and the sick. Good nutrition means “maintaining a nutritional status that enables us to grow well and enjoy good health.” [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Nutrition may be defined as the science of food and its relationship to health. It is concerned primarily with the part played by nutrients in body growth, development and maintenance . ♣ 3

### INTRODUCTION

1. Protein, carbohydrate and fat had been recognized early in the 19th century as energy- yielding foods and much attention was paid to their metabolism and contribution to energy requirements.
2. Classification by chemical composition: - Proteins – Fats – Carbohydrates – Vitamins – Minerals [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Classification by origin: - Foods of animal origin - Foods of vegetable origin
3. CLASSIFICATION OF FOODS  
vegetables, fruits, milk, etc [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Protective foods: ♣ -cereals, sugars, fats, oils etc. ♣ Energy giving foods: ♣ -meat, milk, poultry, fish, eggs, pulses etc ♣ Body building foods:
4. CLASSIFICATION BY PREDOMINANT FUNCTION  
minerals [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ -vitamins ♣ Micronutrients: ♣ -carbohydrates ♣ -fats ♣ -proteins  
♣ Macronutrients: ♣ Organic and inorganic complexes contained in food are called nutrients. They are broadly divided in to: NUTRIENTS . OF THIS 8 AA ARE TERMED “ESSENTIAL” AS THEY ARE NOT SYNTHESIZED IN HUMAN BODY AND MUST BE OBTAINED FROM DIETARY PROTIENS. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ THERE ARE ABOUT 20 DIFFERENT AMINOACIDS WHICH R FOUND IN HUMAN BODY. ♣ PROTEINS ARE MADE OF MONOMERS CALLED AMINO ACIDS. ♣ THEY ALSO CONTAIN SULFUR AND I SOME CASES PHOSPHOROUS AND IRON. ♣ PROTEINS ARE COMPLEX ORGANIC NITROGENOUS COMPOUNDS. ♣ 8 PROTEINS
5. Synthesis of bioactive substances and other vital molecules [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Maintenance of osmotic pressure ♣ Repair and maintenance of body tissues ♣ Body building ♣ 9 Functions of Proteins

6. Net protein utilization (NPU) [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Protein efficiency ratio ♣ Digestibility coefficient ♣ Biological value ♣ 10 Evaluation of proteins The parameters used for net protein evaluation are:
  7. Less than 3.0 g/dl shows severe malnutrition. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Less than 3.5 g/dl shows mild malnutrition. ♣ It should be more than 3.5 g/dl. ♣ Protein nutrition status is measured by Serum Albumin Concentration. ♣ 11 Assessment of Protein nutrition status
  8. Most of the body fat (99 per cent) in the adipose tissue is in the form of triglycerides, in normal human subjects, adipose tissue constitutes between 10 and 15 per cent of body weight. One kilogram of adipose tissue corresponds to 7700 kcal of energy. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ 12 FAT
  9. Butter 60 37 3 [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Soya bean oil 14 24 62 ♣ Corn oil 8 27 65 ♣ Sunflower oil 8 27 65 ♣ Safflower oil 10 15 75 ♣ Groundnut oil 19 50 31 ♣ Cotton seed oil 25 25 50 ♣ Palm oil 46 44 10 ♣ Coconut oil 92 6 2 ♣ Fats fatty acids fatty acids fatty acids ♣ Saturated Monounsaturated Polyunsaturated ♣ Fatty acid content of different fats ( in per cent) ♣ 13 Fats yield fatty acids and glycerol on hydrolysis
  10. 14. Soya bean oil, Leafy greens [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Linolenic acid ♣ Meat, eggs, milk ♣ Arachidonic acid ♣ Sunflower oil Corn oil Soya bean oil Sesame oil Groundnut oil Mustard oil Palm oil Coconut oil ♣ Linoleic acid ♣ Dietary sources of EFA ♣ 14 Essential fatty acids are those that cannot be synthesized by humans
  11. Fats in the body support viscera such as heart, kidney and intestine; and fat beneath the skin provides insulation against cold. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Fats serve as vehicles for fat-soluble vitamins ♣ They are high energy foods, providing as much as 9 kcal for every gram. ♣ 15 Functions of fats
  12. Polyunsaturated fatty acids are precursors of prostaglandins. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Diets rich in EFA have been reported to reduce serum cholesterol and low- density lipoproteins. ♣ vegetable fats are rich sources of essential fatty acids which are needed by the body for growth, structural integrity of the cell membrane and decreased platelet adhesiveness. ♣ 16 The “non-calorie” roles of fat
  13. In developed countries dietary fats provide 30 to 40 per cent of total energy intake. The WHO Expert committee on Prevention of Coronary Heart Disease has recommended only 20 to 30 per cent of total dietary energy to be provided by fats. At least 50 per cent of fat intake should consist of vegetable oils rich in essential fatty acids. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ 17 Fat requirements
  14. Carbohydrate is the main source of energy, providing 4 Kcals per one gram Carbohydrate is also essential for the oxidation of fats and for the synthesis of certain non-essential amino acids [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ 18 CARBOHYDRATE
  15. The carbohydrate reserve (glycogen) of a human adult ♣ There are three main sources of carbohydrate, viz. starches, sugar and cellulose. ♣ 19 Sources of carbohydrates is about 500g. This reserve is rapidly exhausted when a man is fasting. If the dietary carbohydrates do not meet the energy needs of the body, protein and glycerol from dietary and endogenous sources are used by the body to maintain glucose homeostasis. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in)
  16. Dietary fibre which is mainly non-starch polysaccharide is a physiological important component of the diet. It is found in vegetables, fruits and grains. It may be divided broadly into cellulose and non-cellulose polysaccharides which include hemi-cellulose pectin, storage polysaccharides like inulin, and the plant gums and mucilage. These are all degraded to a greater or lesser extend by the micro flora in the human colon [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ 20 Dietary fibre
  17. Vitamins are divided in to two groups: fat soluble vitamins- A, D, E and K and water soluble vitamins: vitamins of the B-group and vitamin C. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Vitamins are a class of organic compounds categorized as essential nutrients. They are required by the body in a very small amounts. They fall in the category of micronutrients. ♣ 21 VITAMINS
  18. The international unit (IU) of vitamin A is equivalent to 0,2 microgram of retinol (or 0,55 microgram of retinal palmitate). [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ «Vitamin A» covers both a pre- formed vitamin, retinol, and a pro- vitamin, beta carotene, some of which is converted to retinol in the intestinal mucosa. ♣ 22 VITAMIN A
  19. It may protect against some epithelial cancers such as bronchial cancers. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ It is antiintencive. ♣ It supports growth, especially skeletal growth ♣ It is necessary for maintaining the integrity and the normal functioning of glandular and epithelial issue which lines intestinal , respiratory and urinary tracts as well as the skin and eyes. ♣ It contributes to the

- production of retinal pigments which are needed for vision lights. ♣ It is indispensable for normal vision.
- ♣23 Functions of Vitamin A
20. Keratomalacia [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Corneal xerosis ♣ Bitot's spots ♣ Conjunctival xerosis ♣ Nightblindness ♣ The signs of vitamin A deficiency are predominantly ocular. They are: ♣24 Deficiency of vitamin A
  21. The nutritionally important forms of Vitamin D in man are Calciferol (Vitamin D2) and Cholecalciferol (Vitamin D3). [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣25 VITAMIN D
  22. Kidney: Increases tubular reabsorption of phosphate [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Bone: Stimulates normal mineralization, Enhances bone reabsorption, Affects collagen maturation ♣ Intestine: Promotes intestinal absorption of calcium and phosphorus ♣26 Functions of vitamin D and its metabolites
  23. Osteomalacia [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Rickets ♣27 Deficiency of vitamin D Deficiency of vitamin D leads to:
  24. Thiamine (vitamin B1) is a water soluble vitamin. It is essential for the utilization of carbohydrates. Thiamine pyrophosphate (TPP), the coenzyme of cocarboxylase plays a part in activating transketolase, an enzyme involved in the direct oxidative pathway for glucose. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣28 THIAMINE
  25. Wernick's encephalopathy is characterized by ophthalmoplegia, polyneuritis, ataxia and mental deterioration [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ infantile beriberi, seen in infants between 2 and 4 months of life. The affected baby is usually breast-fed by a thiamine-deficient mother who commonly shows signs of peripheral neuropathy. ♣ cardiac beriberi ♣ peripheral neuritis, ♣ Beriberi may occur in three main forms: ♣ The two principal deficiency diseases are beriberi and Wernick's encephalopathy. ♣29 Deficiency of thiamine
  26. The requirement of adults vary directly with protein intake. Adults may need 2 mg/day, during pregnancy and lactation, 2.5 mg/day. Balanced diets usually contain pyridoxine, therefore deficiency is rare. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Pyridoxine (vitamin B6) exists in three forms pyridoxine, pyridoxal and pyridoxamine. It plays an important role in the metabolism of amino acids, fats and carbohydrate. ♣30 VITAMIN B6
  27. Vitamin B 12 has a separate biochemical role, unrelated to folate, in synthesis of fatty acids in myelin [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Vitamin B 12 cooperates with folate in the synthesis of DNA. ♣ Vitamin B12 is a complex organo-metallic compound with a cobalt atom. The preparation which is therapeutically used is cyanocobalamin. ♣31 VITAMIN B12
  28. Vitamin B12 deficiency is associated with megaloblastic anaemia (pernicious anaemia), demyelinating neurological lesions in the spinal cord and infertility (in animal species). Dietary deficiency of B12 may arise in the subjects who are strict vegetarians and eat no animal product. At the present time there is little evidence that vitamin B12 deficiency anaemia represents an important public health problem. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣32 Vitamin B12 deficiency
  29. Vitamin C has an important role to play in tissue oxidation it is needed for the formation of collagen, which accounts for 25 per cent of total body protein [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Vitamin C (ascorbic acid) is a water-soluble vitamin. It is the most sensitive of all vitamins to heat. Man, monkey and guinea pig are perhaps the only species known to require vitamin C in their diet ♣33 VITAMIN C
  30. Deficiency of vitamin C results in scurvy, the signs of which are swollen and bleeding gums, subcutaneous bruising or bleeding into the skin or joints, delayed wound healing, anaemia and weakness. Scurvy which was once an important deficiency disease is no longer a disease of world importance. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣34 Deficiency of vitamin C
  31. Pulses [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣ Millets ♣ Cereals ♣35 NUTRITIONAL PROFILES OF PRINCIPAL FOODS The principal food includes:
  32. Cereals (e.g. rice, wheat) constitute the bulk of the daily diet. Rice is the staple food of more than half the human race. Next to rice, wheat is the most important cereal. Maize ranks next to rice and wheat in world consumption. Maize is also used as food for cattle and poultry because it is rich in fat, besides being cheaper than rice or wheat. [www.drjayeshpatidar.blogspot.in](http://www.drjayeshpatidar.blogspot.in) ♣36 Cereals
  33. 37 Assessment of protein in cereals Protein quality: The quality of a protein is assessed by comparison to the "reference protein" which is usually egg protein. Two methods of assessment of protein quality need be mentioned: (i) Amino acid score: It is a measure of the concentration of each essential amino acid in the reference protein. Number of mg of one amino acid per g of protein Amino acid score =

- ..... x 100 Number of mg of the same amino acid per g of egg protein. Net protein, utilization (NPU): Nitrogen retained by the body  
 NPU=.....x 100 Nitrogen intake In calculating protein quality, 1 gram of protein is assumed to be equivalent to 6.25 g of N. www.drjayeshpatidar.blogspot.in
34. PE per cent = Energy from protein x 100 Total energy in diet www.drjayeshpatidar.blogspot.in ♣ The protein content of many Indian foods has been determined and published in food composition tables. One way of evaluating foods as source of protein is to determine what per cent of their energy value is supplied by their protein content. This is known as Protein – Energy Ratio (PE ratio or percentage). ♣ Protein quantity: ♣ 38 Calculating protein quantity of cereals
35. The daily requirement of fat is not known with certainty. During infancy, fats contribute to a little over 50 per cent of the total energy intake. This scales down to about 20 per cent in adulthood. The ICMR Expert Group (1981) has recommended an intake of 20 per cent of the total energy intake as fat, of which at least 50 per cent of fat intake should consist of vegetable oils rich in essential fatty acids. The requirement of essential fatty acids ranges from 3 per cent intake to 6 per cent of energy intake in young children. www.drjayeshpatidar.blogspot.in ♣ 39 Fat requirements from cereals
36. The recommended intake of carbohydrate in balanced diets is placed so as to contribute between 50 and 70 per cent of total energy intake. Most Indian diets contain amounts more than this providing as much as 90 per cent of total energy intake in some cases, which makes the diet imbalanced. www.drjayeshpatidar.blogspot.in ♣ 40 Carbohydrate requirements from cereals
37. Niacin 6.6 mg/1000kcal www.drjayeshpatidar.blogspot.in ♣ Riboflavin 0.6 mg/1000kcal ♣ Thiamine 0.5 mg/1000kcal ♣ The requirements of thiamine, riboflavin and niacin are closely related to energy intake and utilization, and are started in terms of 1000 kcal intake of energy as below: ♣ The recommended dietary allowance of vitamin E is placed at 10 mg of alpha tocopherol equivalents for adult males and 8 mg for adult females. Water soluble vitamins ♣ 41 Other recommended intakes from cereals Fat soluble vitamins
38. We sincerely thank our academic advisor Mrs. Luiza Gharibyan, Associate Professor, YSMU for rendering all kind of academic helps and making us understand that the concept that “health sector alone is responsible for all nutritional ills” has faded away. www.drjayeshpatidar.blogspot.in ♣ The last few slides show the practical application of how the nutrients are present in our daily food and that to what percent cereals are necessary a food. ♣ This lecture deals with the basic nutrients which include proteins, carbohydrate, fats, vitamins and minerals.

### Nutritional deficiency

The process of eating the right kind of food so you can grow properly and be healthy. Nutrients A food or other substance that provides energy or building material for the survival, normal metabolism and growth of a living organism. Deficiency The inadequate up take of any thing is called deficiency.

- Causes of nutritional deficiency 1. Inadequate up take of diet or a specific nutrient or vitamin. 2. Access of a specific nutrient. 3. Malabsorption 4. Disease
- Types of deficiency 1. Mineral deficiency 2. Vitamins deficiency 3. Proteins deficiency 4. Lipids deficiency  
Major minerals deficiencies 1. Deficiency disorder 2. Symptoms 3. Treatment
- Calcium (Ca) Disorders 1. Rickets though caused due to vit. D deficiency. 2. Osteomalacia in adults 3. Osteoporosis 4. Muscular disorders like tetany 5. Skin disorders like tanning of skin  
Symptoms (bone diseases) Abnormal bone shape, bone pain, pigeon breast, board legs, etc  
Muscle Muscle cramps, spasms or tremors
- Treatment 1. Use of Ca rich diet 2. Ca supplementation 3. Vit. D supplementation 4. Sun bath
- Phosphorus deficiency 1. Rickets, Osteoporosis, Osteomalacia  
Symptoms Board legs, soft bones, bone pain etc post like Ca deficiency  
Treatment 1. Use of milk products, egg yolk, legumes, nuts, and whole grains  
2. P supplementation etc.
- Have trouble concentrating. □ Feel short of breath. □ Look very pale. □ Have headaches. □ Be grumpy or cranky. □ Feel dizzy. □ Feel weak and tire out more easily. □ Iron Deficiency Disorders 1. Anemia 2. Colon cancer 3. Fatigue 4. Over menstruation in female etc. Symptoms
- Treatment 1. Use of Iron rich food 2. Iron supplementation etc
- Iodine deficiency Disorders Goiter, Hypothyroid, hair loss etc Symptoms Over growth or regression of thyroid gland Treatment Sea food, iodized salt, milk products
- Goiter



10. Vitamins Deficiency Vit.A Disorders Night blindness, reduced hair growth, loss of appetite, low resistance to infection, dry eyes etc. Treatment Use of milk, butter, eggs, chicken, kidney, liver, fresh oil Vit. A supplementation
11. Vit. B (complex) deficiency Disorders Beriberi, Anxiety, Visual problems, anemia, Mouth sores, Nerve damage etc. Treatment Use of banana, dates, dairy products, fish, figs, s

### Balanced Diet

Energy Where do we get our energy from, and what do we use it for? Our energy is derived from food - whereas plants can produce their own energy from sunlight, we must consume food This food is our raw material - needed to make new substances for: - energy (movement etc...) growth and repair health

Balanced A balanced diet contains the different nutrients in the correct amounts, keeping us healthy. Certain foods are not necessarily 'bad' for us, but eating too much of them could be. Foods contain nutrients: these are substances which provide raw materials for the body (we need nutrients, along with fibre and water for a healthy diet) There are seven different nutrients, and some foods are particular rich in certain nutrients...

Nutrients For a healthy diet we must consume the following nutrients (although the amount we must consume of each varies) Carbohydrates Proteins Fats Minerals Vitamins Fibre Water

Nutrients Nutrients are found within different foods, and they all play important roles within the body

Food In your books draw out two or three examples of different meals you have eaten in the last week, explaining what nutrients are found within E.g. fish and chips would contain: protein, needed for growth and repair (in the fish); and carbohydrates, needed for energy (in the chips (potatoes))

Food Food substances for energy Carbohydrates (e.g. starch and sugar) Fats Food substances for growth & repair Proteins Food substances for health Vitamins Minerals Fibre (made of plant cells) which we cannot eat, but it helps keep our intestines clean Water which is an important solvent in your body, helps cells keep their shape and needed for controlling your bodies temperature (you are ~65% water)!

Balanced Diets Different foods contain different substances - there is no one food that contains all the substances the body needs. Instead you must eat a wide variety of foods - balancing your diet Different people need different amounts of food. You need more food if you are particularly active, are pregnant etc... The amount of energy food contains is measured in kilojoules (kJ) - if you are more active, your kJ intake needs to be greater Nutritional labels tell us what the quantities of nutrients contained within the food

Balancing If we eat too little food, we will use up our store of fat and become too thin. If we eat too much food, especially foods rich in sugar and fat, we will increase our store of fat and become too fat. It is important to balance the amount of food we eat with who we are and what we do. The amount of energy we need from our food depends on our age, our height and how much exercise we get. E.g. a one-year old baby needs 3850 kJ each day to continue to grow, whereas an adult Olympic swimmer in training needs 15,600 kJ each day.

Poor Diet If you have too little of a particular nutrient, we say that you have a deficiency in that nutrient, e.g. fibre deficiency can lead to constipation Mineral deficiencies - e.g. iron deficiency can lead to anaemia (too few red blood cells); iodine deficiency can lead to a swelling in the neck called a goitre Vitamin deficiencies - e.g. vitamin A deficiency can cause blindness; vitamin C deficiency can

cause scurvy (makes the gums bleed); and vitamin D deficiency can cause rickets (legs bow outwards in growing children)

Questions In your own words, answer the following: - Name two sources of protein Why do you need protein in the diet Starch and sugar are examples of what food group Do you think you eat a balanced diet - explain your reasoning and suggest ways to improve your diet Answers: Meat; fish; eggs; cheese; beans; milk Protein makes new cells, helps us grow and repairs our bodies Starch and sugar are carbohydrates

### Nutritional Needs by Age Group

**However, age is not the only factor in determining the level of vitamins, minerals, fluids, proteins and carbohydrates necessary for optimal health. For personalized advice on the nutrition plan that is best for you, talk to your physician or a qualified nutrition professional.**

#### Infancy

The nutritional needs of babies 6 months of age or younger are best met with an exclusive diet of breast milk, according to the American Academy of Family Physicians. Breast milk provides the precise nutrients a baby needs for growth and development. Many babies begin eating solids around the age of 6 months, but breast milk should be the foundation of most babies' diets until at least 12 months. Infant formula can substitute for breast milk when a mother is unwilling or unable to breast feed.

#### Toddlers and Preschoolers

During the toddler and preschool years, adequate nutrient and caloric intake can help children achieve their full potential for development and growth. Many children experience a drop in appetite beginning in their second year, as their rate of growth naturally slows following the rapid increases in infancy. Allow your child to eat as her own hunger dictates. The textbook "Nutrition Through the Life Cycle" notes that young children naturally regulate their own caloric intake

#### School Age Children

In the United States, children are more threatened by over-nutrition than under-nutrition. In over-nutrition, more nutrients are consumed than the amount required for normal growth. "Nutrition Through the Life Cycle" states that almost 20 percent of school age children are overweight <sup>1</sup>☆

. Provide a healthy food environment for your child with an emphasis on fresh fruits and vegetables, which are abundant sources of vitamins and cell-protecting antioxidants. Vitamin E, folic acid and calcium levels are often suboptimal in this age group. Offer whole and enriched grains and plenty of low-fat dairy products to help make sure your child gets enough of these important nutrients.

The nutritional needs of adults vary, based on their levels of activity, gender and health status. As with children, over-nutrition is a bigger risk for adults in industrialized nations than under-nutrition. Health consequences include obesity, diabetes, heart disease and osteoarthritis. Adults working desk jobs must exercise enough to burn the calories consumed. Make sure the calories come from healthy sources, not "empty" treats or sodas. However, the Harvard School of Public Health notes that adults might benefit from a multivitamin supplement with minerals to fill any nutritional gaps that occur with a less-than-optimal diet

#### Older Adults

Decreased muscle mass and a decline in physical activity frequently accompany the aging process. They necessitate a corresponding decrease in calories, advises the Penn State Nutrition & Extension Partnership Project . Older adults should also eat plenty of high-quality, lean protein. Maintaining a protein reserve can help keep muscles strong and provide extra support during times of surgery or declining health..Decreased muscle mass and a decline in physical activity frequently accompany the aging process.

# Unit 2

# Hansen's Disease (Leprosy)



Hansen's disease (also known as leprosy) is an infection caused by slow-growing bacteria called *Mycobacterium leprae*. It can affect the nerves, skin, eyes, and lining of the nose (nasal mucosa). With early diagnosis and treatment, the disease can be cured. People with Hansen's disease can continue to work and lead an active life during and after treatment.

Leprosy was once feared as a highly contagious and devastating disease, but now we know it doesn't spread easily and treatment is very effective. However, if left untreated, the nerve damage can result in crippling of hands and feet, paralysis, and blindness.

- Discolored patches of skin, usually flat, that may be numb and look faded (lighter than the skin around)
- Growths (nodules) on the skin
- Thick, stiff or dry skin
- Painless ulcers on the soles of feet
- Painless swelling or lumps on the face or earlobes
- Loss of eyebrows or eyelashes

Symptoms caused by damage to the nerves are:

- Numbness of affected areas of the skin
- Muscle weakness or paralysis (especially in the hands and feet)
- Enlarged nerves (especially those around the elbow and knee and in the sides of the neck)
- Eye problems that may lead to blindness (when facial nerves are affected)

# How do people get Hansen's disease?

It is not known exactly how Hansen's disease spreads between people. Scientists currently think it may happen when a person with Hansen's disease coughs or sneezes, and a healthy person breathes in the droplets containing the bacteria. **Prolonged, close contact with someone with untreated leprosy over many months is needed** to catch the disease.

You **cannot** get leprosy from a casual contact with a person who has Hansen's disease like:

- Shaking hands or hugging
- Sitting next to each other on the bus
- Sitting together at a meal

Hansen's disease is also not passed on from a mother to her unborn baby during pregnancy and it is also not spread through sexual contact.

Due to the slow-growing nature of the bacteria and the long time it takes to develop signs of the disease, it is often very difficult to find the source of infection.

Hansen's disease (also known as leprosy) is an infection caused by bacteria called *Mycobacterium leprae*. These bacteria grow very slowly and it may take up to 20 years to develop signs of the infection.

The disease can affect the nerves, skin, eyes, and lining of the nose (nasal mucosa). The bacteria attack the nerves, which can become [swollen under the skin](#). This can cause the affected areas to lose the ability to sense touch and pain, which can lead to injuries, like cuts and burns. Usually, the affected skin changes color and either becomes:

- lighter or darker, often dry or flaky, with loss of feeling, or
- reddish due to inflammation of the skin.

If left untreated, the nerve damage can result in paralysis of hands and feet. In very advanced cases, the person may have multiple injuries due to lack of sensation, and eventually the body may [reabsorb the affected digits](#) over time, resulting in the apparent loss of toes and fingers. [Corneal ulcers](#) and blindness can also occur if facial nerves are affected. Other signs of advanced Hansen's disease may include loss of eyebrows and [saddle-nose deformity](#).

Symptoms caused by the disease in the mucous membranes are:

- A stuffy nose
- Nosebleeds

Since Hansen's disease affects the nerves, loss of feeling or sensation can occur. When loss of sensation occurs, injuries such as burns may go unnoticed. Because you may not feel the pain that can warn you of harm to your body, take extra caution to ensure the affected parts of your body are not injured.

If left untreated, the signs of advanced leprosy can include:

- Paralysis and crippling of hands and feet
- Shortening of toes and fingers due to reabsorption
- Chronic non-healing ulcers on the bottoms of the feet
- Blindness
- Loss of eyebrows
- Nose disfigurement





# How is the disease diagnosed?

Hansen's disease can be recognized by appearance of patches of skin that may look lighter or darker than the normal skin.

Sometimes the affected skin areas may be reddish. Loss of feeling in these skin patches is common. You may not feel a light touch or a prick with a needle.

To confirm the diagnosis, your doctor will take a sample of your skin or nerve (through a skin or nerve biopsy) to look for the bacteria under the microscope and may also do tests to rule out other skin diseases.

# How is the disease treated?

Hansen's disease is treated with a combination of antibiotics. Typically, 2 or 3 antibiotics are used at the same time. These are dapsones with rifampicin, and clofazimine is added for some types of the disease. This is called multidrug therapy. This strategy helps prevent the development of antibiotic resistance by the bacteria, which may otherwise occur due to length of the treatment.

Treatment usually lasts between one to two years. The illness can be cured if treatment is completed as prescribed.

If you are treated for Hansen's disease, it's important to:

- Tell your doctor if you experience numbness or a loss of feeling in certain parts of the body or in patches on the skin. This may be caused by nerve damage from the infection. If you have numbness and loss of feeling, take extra care to prevent injuries that may occur, like burns and cuts.

# Hansen's Disease (Leprosy)

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# Dengue

## Characteristics of the *Aedes Mosquito*

- It bites during the day
- It lays its eggs in clean, shady, stagnant water
- One distinct physical feature - black and white stripes on its body and legs



Close-up of an *Aedes* mosquito

- Spread by *Aedes* Mosquito bite
- 4-10 days incubation period
- Fever, Muscle, Bone & Joint pain, Headache, Widespread Rash, Nausea/ Vomiting.
- In severe cases can cause severe Bleeding, a sudden drop in Blood Pressure and Death

Dengue fever is a mosquito-borne disease. that occurs in tropical and subtropical areas of the world. Mild dengue fever causes high fever, rash, and muscle and joint pain. A severe form of dengue fever, also called dengue hemorrhagic fever, can cause severe bleeding, a sudden drop in blood pressure (shock) and death.

# Symptoms

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Many people, especially children and teens, may experience no signs or symptoms during a mild case of dengue fever. When symptoms do occur, they usually begin four to 10 days after being bitten by an infected mosquito. Signs and symptoms of dengue fever most commonly include:

- Fever, as high as 106 F (41 C)
- Headaches
- Muscle, bone and joint pain
- Pain behind eyes
- Might also experience:
  - Widespread rash
  - Nausea and vomiting
  - Rarely, minor bleeding from your gums or nose

Most people recover within a week or so. In some cases, symptoms worsen and can become life-threatening. Blood vessels often become damaged and leaky. And the number of clot-forming cells (platelets) in bloodstream drops. This can cause:

- Bleeding from nose and mouth
- Severe abdominal pain
- Persistent vomiting
- Bleeding under the skin, which might look like bruising
- If severe, dengue fever can damage the lungs, liver or heart.

Blood pressure can drop to dangerous levels, causing shock and, in some cases, death.

## Causes

Dengue fever is caused by any one of four dengue viruses spread by mosquitoes that thrive in and near human lodgings. When a mosquito bites a person infected with a dengue virus, the virus enters the mosquito. When the infected mosquito then bites another person, the virus enters that person's bloodstream.

After recovery from dengue fever, immunity develops to the virus strain that caused infection – but not to the other three dengue fever viruses. The risk of developing severe dengue fever, also known as dengue hemorrhagic fever, actually increases if infected a second or third time.

## Tests and Diagnosis

- Diagnosing dengue fever can be difficult, because its signs and symptoms can be easily confused with those of other diseases – such as malaria, leptospirosis and typhoid fever.
- History of travel to region with dengue outbreak..
- Certain laboratory tests can detect evidence of the dengue viruses, but test results usually come back too late to help direct treatment decisions.

## Treatment and Drug

No specific treatment for dengue fever exists. Drink plenty of fluids to avoid dehydration from vomiting and high fever. Paracetamol (Crocin, others) can alleviate pain and reduce fever. Avoid pain relievers that can increase bleeding complications – such as aspirin (Dispirin), ibuprofen (Brufen) and naproxen sodium (Nepra) If you have severe dengue fever, you may need:

- Supportive care in a hospital
- Intravenous (IV) fluid and electrolyte replacement
- Blood pressure monitoring
- Transfusion to replace blood loss

## Prevention

No vaccine is available

If living in or traveling to areas where dengue fever is common, these tips may help reduce risk of mosquito bites:

- The mosquitoes that carry the dengue viruses are most active from dawn to dusk, but they can also bite at night.
- Wear protective clothing. When going into mosquito-infested areas, wear a long-sleeved shirt, long pants, socks and shoes. Stay in well-screened house.
- Use mosquito repellent.
- The mosquitoes that carry the dengue virus typically live in and around houses, breeding in standing water that can collect in such things as used tires, coolers, open tanks etc. Reduce the breeding habitat to lower mosquito populations.



# JAPANESE ENCEPHALITIS



**SUJATA MOHAPATRA**

## AETIOLOGY:

- *Family:* *Flaviviridae*
- *Genus:* *Flavivirus*
- *Virions:* *Spherical, lipoprotein-enveloped particles being 40-50nm in diameter, 3 structural and 7 non-structural proteins*
- *Genome:* *Single stranded positive sense RNA of molecular weight  $3 \times 10^6$  daltons*
- *Antigenic Structure:*  
*Hemagglutinins, Complement Fixing and Neutralising Antigens*

# OVERVIEW

- **History**
- **Geographical distribution**
- **Epidemiology**
- **Transmission**
- **Pathogenesis**
- **Clinical Signs**
- **Diagnosis and Treatment**
- **Prevention and Control**
- **Nursing Actions**



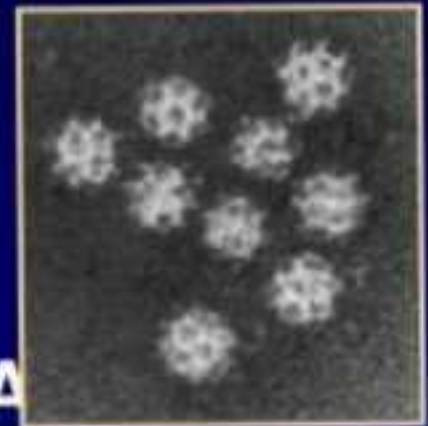
# HISTORY

- **1924: Great epidemic in Japan**
  - 6,125 human cases; 3,797 deaths
- **1935: Virus first isolated**
  - Fatal human encephalitis case
- **1938: Virus isolated from mosquito *Culex tritaeniorhynchus***
- **1940 to 1978**
  - Disease spread with epidemics in China, Korea, and **India**.



# AGENT

- Genus *Flavivirus*
- Otherwise known as group B Arbovirus.
- Single stranded, enveloped RNA virus.
- Transmitted by Culicine mosquitoes.



# Host & reservoir

## ❖ Reservoir/amplifying hosts

- Pigs, bats, Ardeid (wading) birds

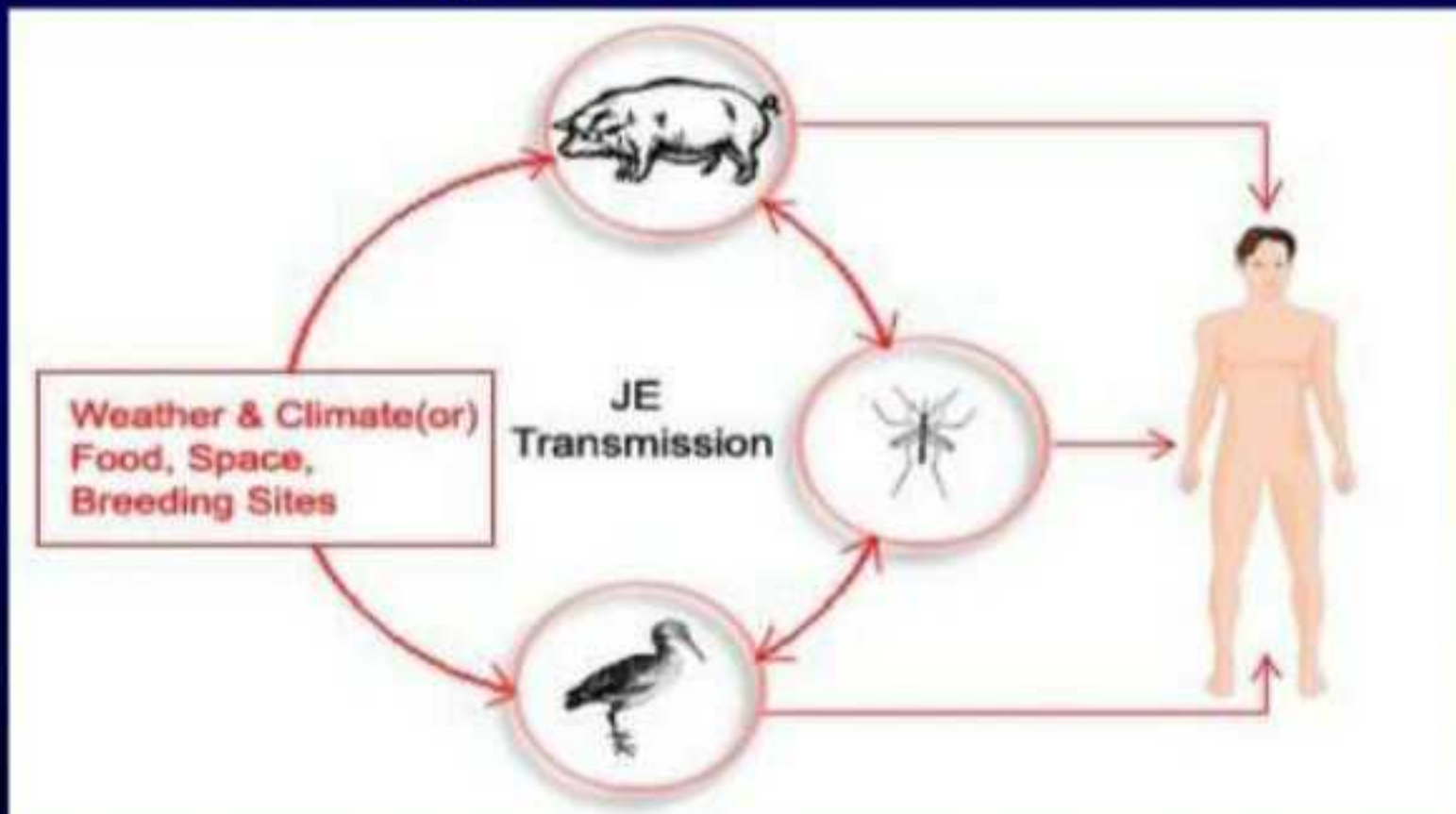
## ❖ Incidental hosts

- Horses, humans, others



# TRANSMISSION

- Vector-borne & **Enzootic cycle**
- **Mosquitoes: *Culex* species:**  
*C.tritaeniorhynchus*



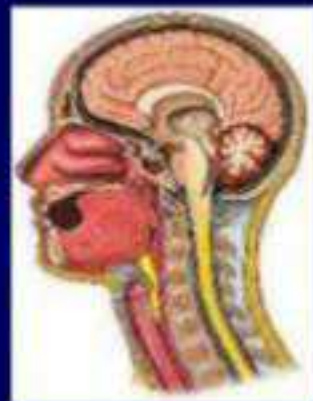
# **PATHOGENESIS**

**Incubation Period 4 to 14 days.**



# CLINICAL FEATURES

- A Prodromal Stage
- An Acute encephalitic Stage
- Late stage & Sequelae



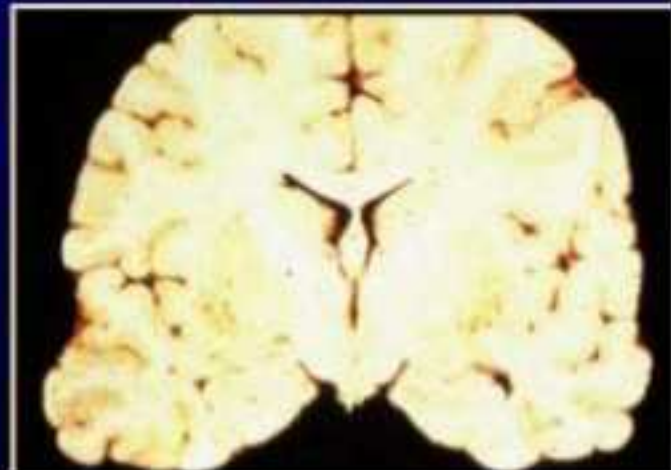
# Prodermal Stage

- Lasts for 1-6 days
- Fever, Rigor
- Headache
- Gastrointestinal problems
- Lethargy
- Malaise



# Acute encephalitic Stage

- Convulsions
- Altered sensorium, unconsciousness, coma
- Tremors in fingers, tongue, eyelids and eyes.
- Abnormal movements of limbs
- Mask like face
- Stiff Neck
- Muscular Rigidity
- Speech impairment



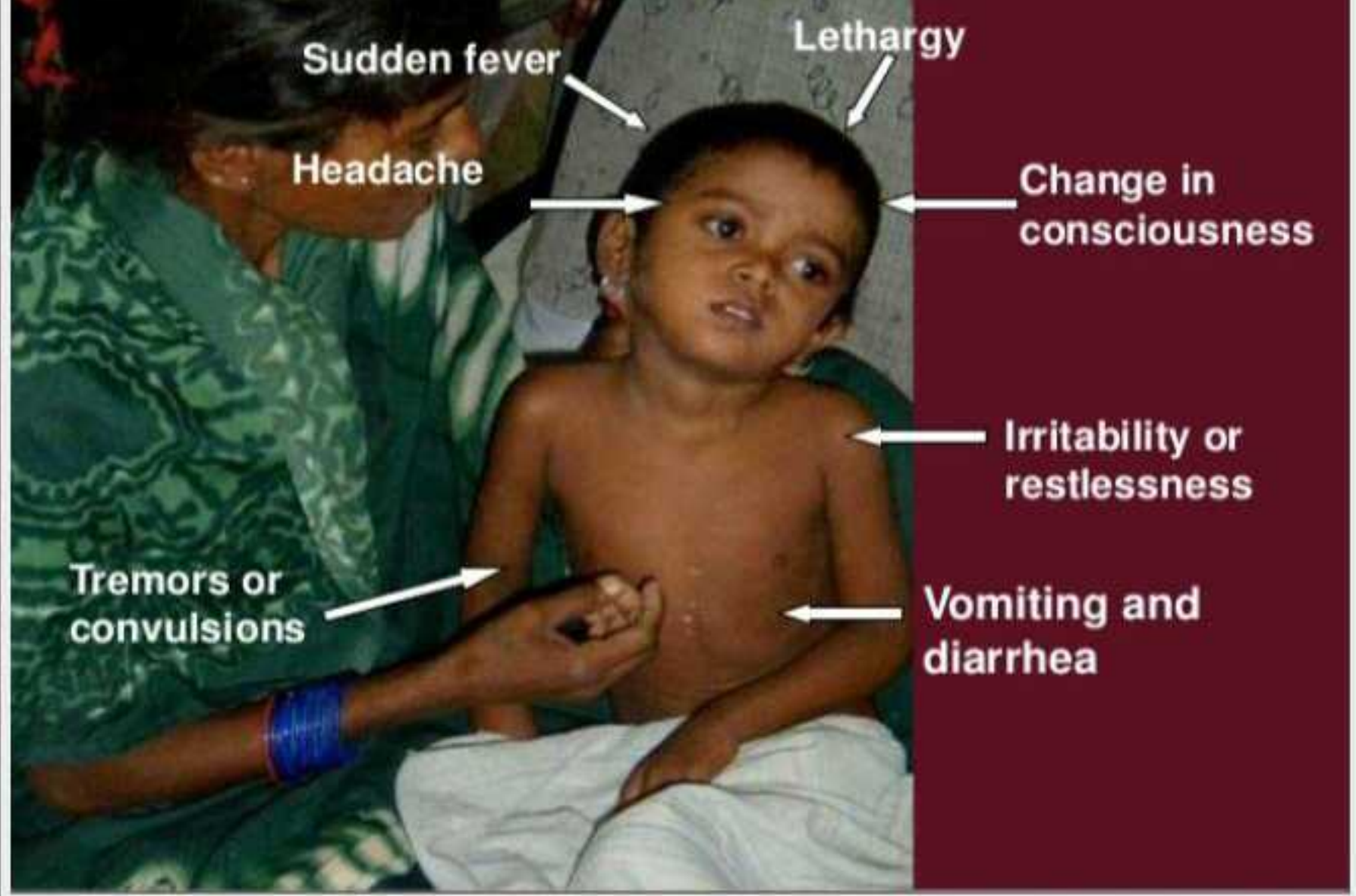
# Late stage & Sequelae

Characterized by the persistence of signs of CNS injury such as,

- Mental impairment.
- Increased deep Tendon reflexes
- Epilepsy, Abnormal movements, Behaviour abnormalities.
- Paresis motor neuron type.
- speech impairment



# Common symptoms of J.encephalitis



Sudden fever

Lethargy

Headache

Change in consciousness

Irritability or restlessness

Tremors or convulsions

Vomiting and diarrhea

# DIAGNOSIS

- History
- CSF analysis: CSF protein is moderately elevated.
- *Serological tests:* These are to detect antibodies to viral antigens.(IgM)
- ELISA



# PREVENTION & CONTROL

# Vaccination

- Vaccination
  - Equine, swine, humans
- Human- Inactivated vaccine (JE-VAX)
- Available under UIP in 83 endemic districts of India.
- **Schedule-** 1-3yr (1<sup>st</sup> dose-4wk-2<sup>nd</sup> dose)
  - Booster doses- every 3 yearly (upto 10-15 year)
  - Subcutaneous (0.5-1ml)
- TRAVELLERS- 0-7-28day (booster in 1 year & every 3 year)**







# Vector Control

- Eliminate mosquito breeding areas
- Adult and larvae control: **ULV Insecticide & PPM.**
- Cover tightly all water containers, wells and water storage tanks.
- Place of accommodation should have mosquito nets; use insecticides or coil incenses to repel mosquitoes.
- Apply **DEET**-containing mosquito-repellents.



# TREATMENT



- ❑ No anti viral drugs have been discovered against JE so far.
- ❑ Supportive treatment only
  - Correction of Blood Sugar
  - Suction-Oxygen
  - IV Fluids & Mannitol
  - IV Anti-Convulsant
  - Inj. Paracetamol

# Nursing Consideration

- Intake-Output Charting.
- Vital Sign Monitoring.
- Strictly observe the client in Convulsion.

## AS CHN

- Assess the immunization status.
- Educate people regarding Vaccination.
- Encourage people for adopting preventive measures.
- Promote early diagnosis & treatment.

# What is HIV?

## **H** -uman

- Found only in humans
- Transmitted among humans
- Preventable by humans

## **I** -mmunodeficiency

- Body lacks ability to fight off infections

## **V** -irus

- Type of germ
- Lives and reproduces in body cells



## “Human Immunodeficiency Virus”

A unique type of virus (a retrovirus)  
Invades the helper T cells (CD4 cells) in the body of the  
host (defense mechanism of a person)

Threatening a global epidemic.  
Preventable, managable but not curable.

# AIDS

**A -cquired;** received, not inherited (does not run in families)

**I -mmuno;** protected from (in this case the system protects the body from disease)

**D -eficiency,** - a lack of

**S-yndrome;** – a group of symptoms or diseases

## WHAT IS AIDS ?...!!

- “Acquired Immunodeficiency Syndrome”
- HIV is the virus that causes AIDS
- Disease limits the body’s ability to fight infection due to markedly reduced helper T cells.
- Patients have a very weak immune system (defense mechanism)
- Patients predisposed to multiple opportunistic infections leading to death.

Opportunistic infections and malignancies that rarely occur in the absence of severe immunodeficiency (eg, *Pneumocystis pneumonia*, central nervous system lymphoma).

Persons with positive HIV serology who have ever had a CD4 lymphocyte count below 200 cells/mcL or a CD4 lymphocyte percentage below 14% are considered to have AIDS.

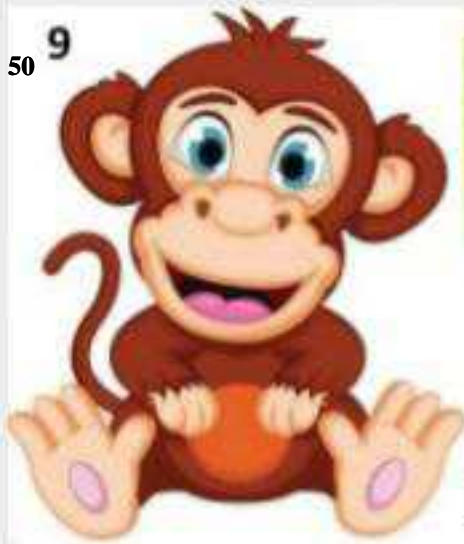


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# HISTORY

- AIDS was first clinically observed in 1981 in the united states
- It was first identified in gay men with no known cause of impaired immunity who showed symptoms
- Now it has been reported virtually in every country in the world
- Since more than 22 million people have died of AIDS.





## ORIGIN

Both HIV-1 & HIV-2 are believed to have originated in non-human primates in Africa & have transferred to humans in 20<sup>th</sup> century

- Chimpanzee is the source of HIV transmission





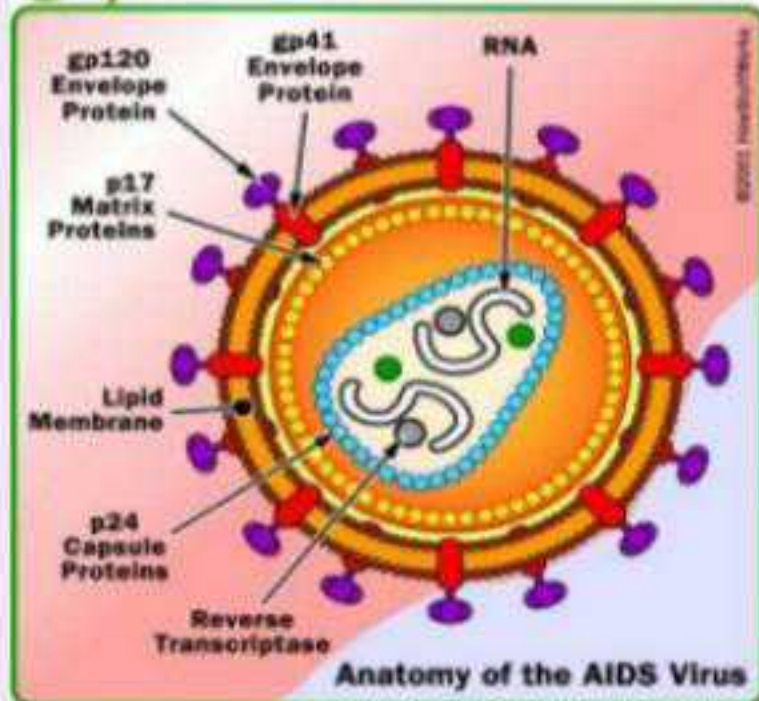
# EPIDEMIOLOGY

- HIV/AIDS is a global pandemic
- As of 2012, approximately 35.3 million people have HIV
- Of these approximately 16.8 million are women & 3.4 million are less than 15 years old.
- South Africa has the largest population of people with HIV of 5.9 million.



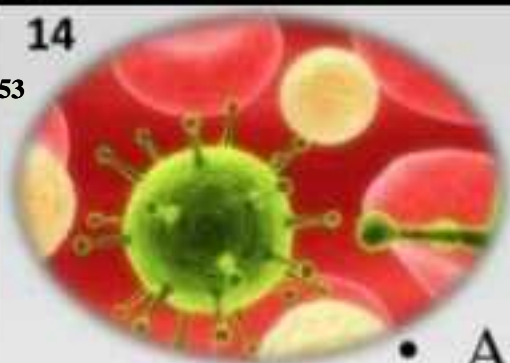
## “THE VIRAL GENOME”

- Icosahedral (20 sided), enveloped virus of the lentivirus subfamily of *retroviruses*.
- Retroviruses transcribe RNA to DNA.



Two viral strands of RNA found in core surrounded by protein outer coat.

Outer envelope contains a lipid matrix within which specific viral glycoproteins are imbedded. These knob-like structures responsible for binding to target cell.

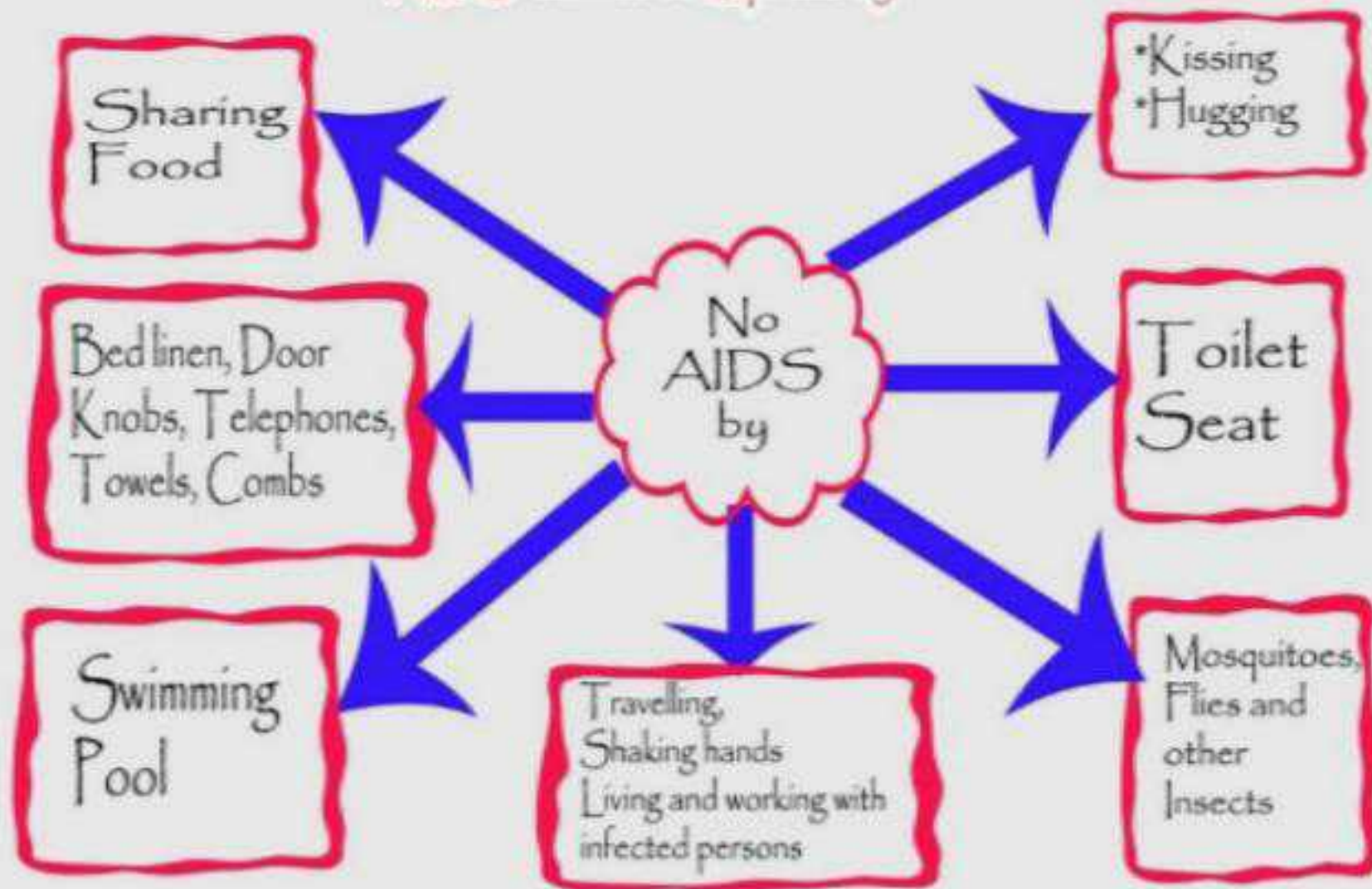


## PATHOPHYSIOLOGY

- After the virus enters in to the body there is a period of rapid viral replication, leading to an abundance of virus in the peripheral blood.
- Massive depletion of CD4<sup>+</sup>T cells
- CD8<sup>+</sup> cell antiviral activity thought it does not eliminate the virus
- HIV leads to AIDS

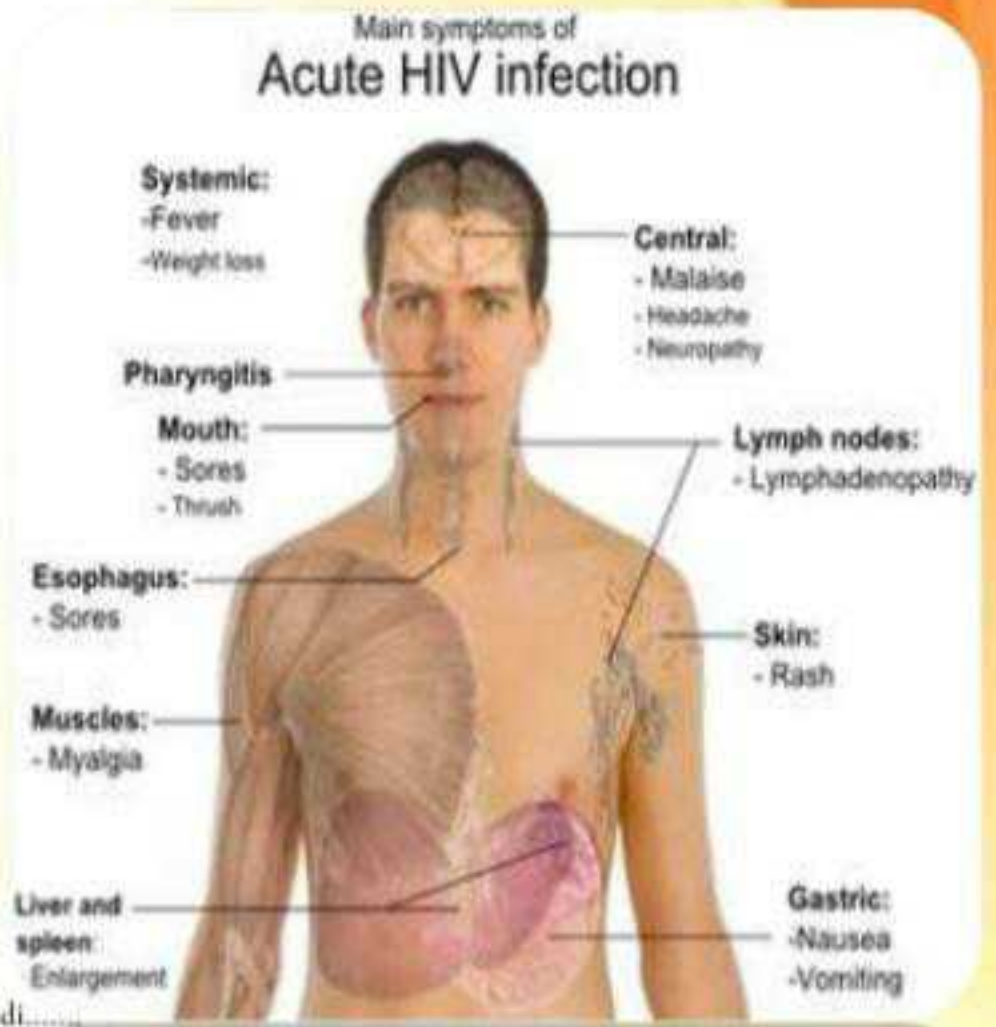


## AIDS cannot be Spread by



# Stage 1 - Primary

- Short, flu-like illness - occurs one to six weeks after infection
- Mild symptoms
- Infected person can infect other people



## Stage 2 - Asymptomatic

- Lasts for an average of ten years
- This stage is free from symptoms
- There may be swollen glands
- The level of HIV in the blood drops to low levels
- HIV antibodies are detectable in the blood





# Stage 3 - Symptomatic

- The immune system deteriorates
- Opportunistic infections and cancers start to appear.



## Stage 4 - HIV $\Rightarrow$ AIDS

- The immune system weakens too much as CD4 cells decrease in number.



# Urine Testing

- Urine Western Blot
  - As sensitive as testing blood
  - Safe way to screen for HIV
  - Can cause false positives in certain people at high risk for HIV



# Oral Testing

- Orasure
  - The only FDA approved HIV antibody.
  - As accurate as blood testing
  - Draws blood-derived fluids from the gum tissue.
  - NOT A SALIVA TEST!



# Antiretroviral Drugs (HAART)

- Nucleoside Reverse Transcriptase inhibitors
  - AZT (Zidovudine)
- Non-Nucleoside Transcriptase inhibitors
  - Viramune (Nevirapine)
- Protease inhibitors
  - Norvir (Ritonavir)

