# SCREENING FOR DISEA

# THE ICEBERG OF DISEASE

*What the physician sees …*

*What the physician does not sees …*

# Ice Berg Phenomenon of Disease

- This concept gives a better idea of progress of d subclinical stages to overt or apparent disease.
- **Submerged portion of Ice Berg:** Represents the disease ( sub clinical cases, carriers and un diag
- **Floating tip:** Represents what the physician see

# SCREENING

- **Definition:**
- The search for unrecognized disease or defect b
  applied tests, examinations or other procedures
  healthy individuals.
- **Concept:**
- Early detection of **“hidden disease”.**
- Conserving physician time for diagnosis and tre
- Techniques to administer simple, inexpensive la
  operate other measuring devices.

# Screening differs from Periodic examination

a. Capable of wide application
b. Relatively in expensive
c. Requires little physician time.
d. Physician is not required to administer the tes interpret it.

# Screening Test VS Diagnostic Tes

## Screening Test

- Done on apparently healthy
- Applied to groups
- Test results are arbitrary and final

## Diagnostic T

- Done on tho and sick
- Applied to s diseases are
- Diagnosis is modified in evidence, di of all evider

# Screening Test VS Diagnostic Test

## Screening Test

- Based on one criterion or cut-off point
- Less expensive
- Not a basis for treatment
- The initiative comes from the investigator or agency providing care

## Diagnostic T

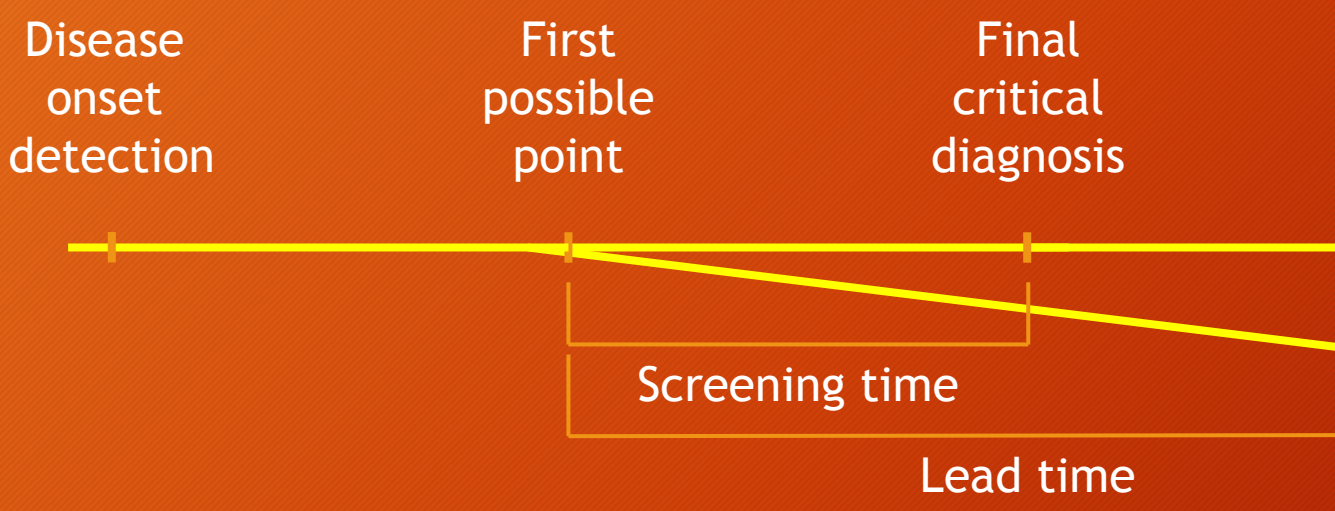
- Based on ev number of s and laborat
- More expens
- Used as a ba
- The initiativ patient with

# Lead Time

- Detection programs should concentrate on those
  the time lag between the disease onset and its
  is sufficiently long to be suitable for population

- **"Lead time"** is the advantage gained by screeni
  between diagnosis by early detection and diagn
  means.

# MODEL FOR EARLY DISEASE DETECTION



# Aims And Objectives

1. Sort out from a large group of apparently heal
   likely to have the disease or increased risk of
   study
2. To bring those who are "**apparently abnorma**
   supervision and treatment.
3. It is carried out in the hope that early diagnos
   treatment favorably alters the natural history
   significant proportion of those who are identif

# POSSIBLE OUTCOMES OF SCRE

Apparently Healthy

(Screening Tests)

Apparently Normal

(Periodic re-scanning)

Ap

(a) Normal

(b) Interme

(c) Abnorm

# Explanation of terms

A. **SCREENING:** Testing for infection or disease in individuals who are not seeking health care fo serological testing for AIDS virus in blood dono screening, premarital screening for syphilis.

B. **CASE- FINDING:** This is use of clinical and or la detect disease in individuals seeking health ca reasons for example, the use of VDRL test to c pregnant women.

# Explanation of terms

**C. DIAGNOSTIC TESTS:** Uses of clinical and or lab
to confirm or refute the existence of disease or t
patients with signs and symptoms presumed to be
disease: for example endo- cervical culture for N.

# USES OF SCREENING

1. Case detection
2. Control of disease
3. Research purposes
4. Educational opportunities

# USES OF SCREENING

## 1. Case Detection: ( Prescriptive screening).

It is defined as presumptive identification of unr
which does not arise from a patient's request e.g
screening.

- In other words people are screened for their ow
- **Specific diseases :**
- Deafness in children
- Breast cancer
- Cervical cancer
- Pulmonary tuberculosis

# USES OF SCREENING

## 2. Control of Disease: (Prospective Screening)

- People are examined for the for the benefits of screening of immigrants from infectious disease
  - Tuberculosis and syphilis to protect home
  - Streptococcal infection to prevent rheum
- The may lead to early diagnosis and more effec

## 3. Research Purposes:

Chronic diseases whose natural history of diseas
( cancer, hypertension).

- To obtain more basic knowledge of such diseases e.g
  provides prevalence estimate
- subsequent screening provides an incidence figure.

## 4. Educational opportunities:

- Screening programs provide opportunities for creati
  for educational health professionals.

# TYPES OF SCREENING

1. Mass Screening
2. High Risk or Selective screening
3. Multiphasic Screening

# 1. MASS SCREENING

- This means the screening of the whole populatio
  for example, all adults. It is offered to all, irres
  particular risk individual may run of contracting
  question ( e.g tuberculosis)
- Indiscriminate mass screening is not useful meas
  backed up by suitable preventive measure that
  duration of illness or alter its final outcome

# 2. HIGH RISK OR SELECTIVE SCR

- Screening is most productive if applied selective groups, the groups defined on the basis of epide research. e.g Screening for Cancer cervix in low group.
- One population group where certain disease te aggravated in the family. By screening the other family,(and close relatives) physicians can dete cases.

# Changing concept…

**New concept:**

Screening of disease to screening for **"risk factor** antedate development of actual disease.

**Example:**

Elevated serum cholesterol : High risk of develop disease.

Risk factors those of pathophysiological nature, t to effective intervention e.g serum cholesterol a

# C. MULTI PHASIC SCREENING

- It is the application of two or more screening te to a large number of people at one time than to separate screening tests for single diseases.
- **Procedure includes:**
- Health questionnaire
- Clinical examination
- Range of measurements and investigations- all v performed rapidly

# CRITERIA FOR SCREENING

- It is based on two considerations:
  - A. **DISEASE** to be screened
  - B. **TEST** to be applied

# A. DISEASE

- **The disease to be screened should fulfill the f before it is considered for screening:**

1. The condition sought should be important hea general prevalence should be high).
2. There should be a recognizable latent or early stage

# A. DISEASE ( contd)

3. The natural history of the condition, including
   latent to declared disease, should be adequate
4. There is a test that can detect the disease prio
signs and symptoms
5. Facilities should be available for confirmation
6. There is an effective treatment

# A. DISEASE ( contd)

7. There should be an agreed on policy concernin
patients

8. There is a good evidence that early detection a
reduces morbidity and mortality

9. The expected benefits of early detection excee
costs.

# B.SCREENING TEST

**The test must satisfy the following criteria:**

1. Acceptability
2. Repeatability
   - Observer Variation
   - Biological ( Subject ) variation
   - Errors related to technical methods
3. Validity ( Accuracy)

# 1. ACCEPTABILITY

- The test should be acceptable to the people at
- In general tests are painful, discomforting or em
  likely to be acceptable to the population.

# 2. REPEATABILITY ( PRECISION, REPRODUCIBILITY)

- The test must give consistent results when repe
  once on the same individual or material, under
- **Reliability depends on three factors;**

a) Observer variation

b) Biological (subject) variation

c) Errors related to technical methods.

# a. Observer variation

All observers are subject to variation (or error)

**Types:**

i. Intra-observer variation

ii. Inter-observer variation

- **Intra-observer variation or Within- observer:**
- If a single observer takes two measurements (e.
in the same subject, at the same time and each
a different result.
- This can be minimized by taking the average of
measurements at the same time

- **Inter-observer variation or between observer**
- This is a variation between different observers subject or material.
- This occurs if observers examines a blood smear parasites, while a second observer examines the finds it normal.

## Common observer errors:

i. Interpretation of x-ray
ii. ECG tracing
iii. Reading of blood pressure
iv. Sudy of histo pathological specimens

## Observer errors can be minimized:

i. Standardization of procedures for obtaining m
classifications

ii. Intense training of all the observers

iii. Making use of two or more observers for indep
assessment

# b. Biological variation (Subject)

- There is biological variation associated with ma
  variables such as blood pressure, blood sugar, se
- **Reasons of fluctuation in same individual:**

i. Changes in parameters observed e.g cervical s
ii. Variation in the way patients perceive their sy
    answer e.g questionnaire administration
iii. Regression to the mean e.g blood pressure in
    in rheumatoid arthritis

# c. Errors related to technical m

- **Repeatability may be affected by variations in method.**

i. Defective instruments

ii. Faulty reagents

iii. Unreliable or inappropriate test

- Where these errors are large, repeatability will single test result may be unreliable

# 3. VALIDITY

- Validity refers to what extent the test accurate
  it puports to measure.
- Validity expresses the ability of a test to separa
  those who have the disease from those who do
- **Example:** Glycosuria VS Glucose tolerance test
- Accuracy refers to the closeness with which me
  agree with **“true values”.**

# VALIDITIY COMPONENTS

1. Sensitivity
2. Specificity

- When assessing the accuracy of a diagnostic test, on
  both.
- Both measurements are expressed in percentages
- These test are usually determined by applying the te
  persons having the disease, and to a reference group
  disease.
- Sensitivity and Specificity together with **"Predictive**
  inherent properties of a screening test.

# THANKS