Learning Objectives

Evaluation of screening tests via:

– Sensitivity
– Specificity
– Predictive values
Sensitivity: ability of screening test to identify diseased people or % of diseased people who were positive in the test

\[ Sensitivity = \frac{TP}{Diseased} \times 100 \Rightarrow TP\% \]

Percentage of false negatives: % of diseased people who were negative in the test (% of missed cases)

\[ FN\% = \frac{FN}{Diseased} \times 100 \Rightarrow 100 - Sn \]
Test +

Test -

TP

FN

All

Diseased

Diagnosis

DISEASED
Specificity: ability of screening test to identify healthy people or % of healthy people who were negative in the test

\[ \text{Specificity} = \frac{TN}{\text{Healthy}} \times 100 \Rightarrow TN\% \]

Percentage of false positives: % of healthy people who were positive in the test

\[ FP\% = \frac{FP}{\text{Healthy}} \times 100 \Rightarrow 100 - \text{Sp} \]
Diagnosis

<table>
<thead>
<tr>
<th></th>
<th>FP</th>
<th>HEALTHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test +</td>
<td></td>
<td></td>
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<tr>
<td>Test -</td>
<td></td>
<td>TN</td>
</tr>
</tbody>
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All Healthy

Mustansiriyah 2017
Sensitivity & specificity

- Each test has its own Sn & Sp
- We can change the cut-off point of the test to change its validity
- Any change in sensitivity leads to opposite change in specificity, and visa versa
- The relation is reciprocal
Predictive value of positive test:
% of people with +ve test who have the disease (diagnostic power of the test)

\[
Pr(+) = \frac{TP}{All\ Positives} \times 100
\]

Predictive value of negative test:
% of people with -ve test who are healthy

\[
Pr(-) = \frac{TN}{All\ Negatives} \times 100
\]
Diagnosis

DISEASED

HEALTHY

Test +

TP

FP

Test -

All positives

Mustansiriya 2017
10000 children screened for visual defects by Snellen chart. 288 referred to hospital and 90 of them given eyeglasses. If you know that visual defects prevalence among children is 1%. Find out test validity?

10000 x 1% = 100 cases of visual defects

Sn = TP/ diseased  % = 90%
Sp = TN / healthy  % = 9702/9900  % = 98%

Visual defect    normal

+ve test

-ve test