False positives in online HIV testing services:

Managing and communicating risk

Suzanne Tang, Stuart Amos-Gibbs, Adam Black, Paula Baraitser, Gillian Holdsworth
Online testing for chlamydia, gonorrhoea, HIV and Syphilis
HIV testing algorithm

Test 1

- Negative
- These tests should have the highest specificity

Reactive

- Test 2 on same or different platform
- This test should have the highest sensitivity

Test 3 on a different platform

Positive
Test 1

Reactive

This test should have the highest sensitivity

Test 2 on same or different platform

These tests should have the highest specificity

Test 3 on a different platform

Positive
What is the positive predictive value of a reactive result in UK populations using online sexual health services?
July 2015 - November 2018

Adequate samples 99,319

Reactive 1041 (1.05%)

Reported results of confirmatory testing 704 (74.2%)

<table>
<thead>
<tr>
<th>Positive Status</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>True positive, New diagnosis</td>
<td>29</td>
<td>(4.1%)</td>
</tr>
<tr>
<td>True positive, Previously diagnosed</td>
<td>218</td>
<td>(31%)</td>
</tr>
<tr>
<td>False positive/Negative</td>
<td>457</td>
<td>(64.9%)</td>
</tr>
</tbody>
</table>
Positive predictive value – the probability that subjects with a positive screening test truly have the disease

\[
\frac{\text{true positives}}{\text{true positives} + \text{false positives}} \times 100 = 35\%
\]

Scenario 1
Includes known positives
Positive predictive value – the probability that the subjects with a positive screening test truly have the disease

\[
\frac{\text{number of true positives}}{\text{true positives + false positives}} \times 100 = 5.9\%
\]

Scenario 2 excludes known positives
False positive rate

Proportion of all true negatives that yield a positive result

False positive rate = \frac{\text{False positives}}{\text{False positive + true negative}}

= \frac{475}{475 + 98278} = 0.46\%
Online HIV testing

29 new HIV diagnoses

457 people manage a reactive result that is subsequently confirmed negative
More blood?

More numbers?

More communication?

Rapid completion of algorithm?

6-35% of reactives will be confirmed positive
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