SCREENING CONCEPTS SIMPLIFIED

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WHAT DO AIRPORTS AND SCREENING TESTS HAVE IN COMMON?

Clinicians and patients alike experience difficulty coming to grips with the concept of screening tests. This issue has become much more focused in recent years because of the application of complex screening tests in prenatal care. Particularly difficult has been the understanding of the triple screen test or Maternal Serum Screening (as it is sometimes called) for the detection of Down's Syndrome and neural tube defects (NTD).

This difficulty surrounds the explanation of a screening test, the difference between it and a diagnostic test, and the interpretation of test results. Specifically, patients may have difficulty grasping why an individual with a negative screening test for a condition may still have the condition, or how it is possible to have a positive screening test and be free of the disorder. A possible approach to the explanation of screening tests to patients is given in this brief report.

The screening test can be described as being like security testing which occurs at airports. The focus of this security screening is to assess the likelihood that an individual is carrying a lethal weapon. The hood through which everyone must walk is a **screening** test for such weapons. If the alarm goes off, a second test will be necessary. The security agent scans those with a positive test to identify the source of the positive alarm. This deliberate mapping of all areas of the body is the **diagnostic** test. It is only considered positive if a weapon is found. This diagnostic test is much more deliberate and more detailed than the simple screening procedure of walking through the scanner.

Let us now follow two people who go through the scanner to explain these concepts:

- Mr. A.B. walks through the hood, and the alarm is not activated. His screen is negative. Mr. A.B. will not have any further testing. The likelihood is that Mr A.B. does not have a weapon. A small possibility does exist that he is carrying a gun that is so well concealed that it avoided detection. This is akin to the birth of a Down's baby, even though the screening tests failed to reveal its presence.
- Mr. B.C. walks through the hood, and the alarm goes off. His screen is positive. Mr. B.C. must have the diagnostic test despite the inconvenience. Most people whose screen is positive will not be carrying a weapon but rather something else, like a watch, which causes the alarm to sound. The same often happens to women whose triple screen test is positive.

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More sensitive diagnostic tests show that no problem exists, but while waiting for their results they are naturally inconvenienced and very worried.

The level at which the screening test is considered positive can be adjusted. In the airport, we would wish to reduce the irritation of a falsely positive screening test. This can be done by raising the threshold for the alarm to be activated. In doing so, the likelihood of identifying a weapon is reduced. In the airport, missing a weapon will have serious repercussions, therefore, the alarm is set to go off at a low level. This means many more people have to go through the inconvenience of more testing.

In the context of triple screening, the initial cut-off (similar to the airport screening) is set very high and many individuals have positive results. This ensures that a high proportion of those women carrying a baby with Down's Syndrome or NTD will be detected by the screening test. However, it also means that many women will have to go through the diagnostic test who do not, in fact, have a baby with Down's Syndrome or NTD.

This analogy drawn from a common life event is suggested as a useful way to explain a complex phenomenon encountered in medical practice. We believe that this simple description has the potential to increase the likelihood that screening tests will be offered and understood because of the clarity it brings both to the physician and the individual.

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