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What the public learns about screening and diagnostic tests through the media

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Introduction

Screening of healthy groups in the population and diagnostic testing on suspicion of disease are fundamental components of health care delivery and disease prevention. As the general media is an important source of health information for consumers, accurate and balanced reporting is essential. Media reporting of diagnostic tests is skewed towards screening tests, particularly cancer screening and the quality of coverage appears poor (1-3). However, there are no data on how well the media cover stories about diagnostic tests used to confirm disease. The statistics used to quantify diagnostic test accuracy (sensitivity, specificity, and the predictive value of positive and negative tests) are difficult to understand, so conveying this information to the public is a challenging task for journalists (3-4). In this Perspective, we review stories written about diagnostic and screening tests in the Australian media and propose a checklist to aid journalists covering these topics.

The quality of media reporting on screening and diagnostic tests

The Australian Media Doctor website (<http://www.mediadoctor.org.au>) rates health news stories (5) using validated 10-item rating instruments (<http://www.mediadoctor.org.au/content/ratinginformation.jsp>). We identified 1581 medical news stories between June 2004 and February 2011, of which 113 reported on screening tests and 72 on diagnostic tests. Most stories addressed the novelty of the test (80% rated as satisfactory) and avoided disease mongering (90%). Fifty-seven per cent of stories covered diagnostic options but only 36% of stories discussed the evidence behind the test's claims and 24% quantified diagnostic accuracy. Potential harms of testing were covered in only 29% and 26% mentioned costs. A minority of stories (38%) included independent expert comment to interpret the claims and provide context for the reader. Overall, news coverage of screening tests was superior to that of diagnostic tests (difference in mean proportion of items scored satisfactory 9%; 95% CI for difference 3 -15%).

What needs to change?

Our experience, and that of others (1-3), suggests seven main areas where media reporting of diagnostic tests should improve to provide better quality information to the public:

1. Early Phase Research: Some of the worst stories we rated were about early phase or poorly substantiated science. An example is the promotion of thermography for detection of breast cancer in young women (Story 1 in Box 1). In contrast, the 3rd story in Box 1 highlights the value of good reporting. Pharmaceutical products have a highly regulated and well-understood development pathway, but this is not the case with new diagnostic tests. It can be difficult for a non-expert to judge the relevance of the research and the validity of the claims.
2. Test Accuracy: Most stories did not provide quantitative information on the accuracy of the tests; where this was provided it was usually confined to sensitivity - the capacity of the test to detect the disease. Improved sensitivity is often a central claim of stories about new diagnostic tests.

However, journalists need to consider the consequences of a wrong diagnosis, or failing to be diagnosed with a serious disease. Researchers should talk to the media in terms of the predictive values of a positive or negative test; these vary with the prevalence of the disease in the population being tested. A positive predictive value of 98% means that only 2% of positive results are false positives; however a PPV of 32%, as reported in one trial of PSA for prostate cancer screening, means that 68% of positives in that population were incorrect (6), surely a matter of great public interest.

3. Harms of Testing: Harms are frequently overlooked and include complications of the testing procedure and the consequences of false positive or false negative results. False positives can lead to anxiety, additional testing, unnecessary procedures and treatments, all with attendant adverse effects (1,2). Screening of healthy populations creates new problems. Sensitive tests can detect very early manifestations of disease that may regress, remain subclinical or progress so slowly that it is never of clinical importance. (7,8). Early identification does not always improve clinical outcomes, and patients have died as a consequence of treatment (8).
4. Impact on Disease Management: Few media reports in our analysis described how a new diagnostic test will influence management of a disease. An example in Box 1 concerns the identification of individuals at risk of Alzheimer's disease. If treatments are not available, patients will be told that they have a serious disease with no prospect of treating this condition, compromising their quality of life [1-3, 5]. In the case of early detection of Parkinson's disease, the last story in Box 1 did a much better job. We encourage journalists to ask about the availability of effective treatments for patients who test positive, and whether earlier diagnosis improves clinical outcomes.
5. Expert Advice: Because the methodological and statistical concepts in diagnostic testing can be challenging (3,4) it will often be helpful if journalists ask an independent expert to comment on the quality of the research behind claims about new tests and to interpret research findings. The STARD checklist provides guidance on reporting of studies of diagnostic test accuracy (9). We think clinical epidemiologists should make themselves available for this task – perhaps by being rostered to science media centres that are developing in a number of countries (eg www.sciencemediacentre.org and www.expertguide.com.au). We recognise that the modern media work to very short deadlines and content experts will have to give priority to these requests.
6. Genetic Testing: Journalists need to be particularly cautious when writing stories concerning genetic testing and should always seek independent expert opinion. Genetic testing is an increasingly important field with tests being promoted directly to the public. In the USA, it has been estimated that testing for 480 traits is now on offer (10). Many of these claim to be predictive of characteristics other than susceptibility to disease (eg creative, linguistic, musical or athletic abilities). Marketers of genetic tests appear to frequently misrepresent their utility as the science of genetic testing is complex and initial research findings are often not reproducible (10).

7. Costs: Our review found the majority of the stories did not adequately address the costs of diagnostic testing. These may fall on the healthcare system where it is publicly funded, or on individuals or their insurance providers. Some genetic tests are promoted directly to consumers and may cost hundreds of dollars. It is important to understand the budgetary impact of a new test or screening program and where this will be felt.

Checklist for journalists writing about tests used in screening and diagnosis

Box 1 lists questions we recommend journalists ask when presented with claims about new tests. If the research is in the pre-clinical phase it is important the journalist makes this clear to readers (Question 1). If the test is currently used or under clinical testing, the journalist should ask about its value compared to any existing tests, the level of evidence supporting it, the type of test (screening or diagnostic) and the rate of false positive and negative results (Questions 2 to 7). Journalists should consider the adverse consequences of applying diagnostic tests to low risk populations (Questions 5 to 7). From our experience, informants may adopt an advocacy position, emphasizing the superior accuracy of the test, or any other advantages, and downplaying other aspects. Questions 2 to 5 deal with claims of improved diagnostic accuracy and the real benefits to patients. We believe it is difficult for most journalists to evaluate the methodological quality of studies of diagnostic test accuracy. Reports of good studies will comply with the STARD guidelines and journalists should ask their informant whether this is the case (Question 6) (9).

Conclusions

Consumers increasingly are involved in clinical decisions. The public needs access to accurate and balanced information on options available to them. This includes screening and diagnostic choices as well as treatments. The mainstream media remain a major source of information for the public about new medical advances. Efforts to improve media coverage of new treatments should extend to new diagnostic and screening tests, as well as the plethora of genetic screening tests that are entering the market.

Box 1 Examples of good and bad reporting of diagnostic tests in the Australian media

	Headline	Media Outlet	Claim	Criticisms	Score
1	"New scanner aims to detect breast cancer in young women "	West Australian, (Seven West Media) June 2009	"In an Australian first, WA researchers are testing a simple scanner that could allow GPs to pick up early breast cancers, particularly in younger women who cannot have mammograms"	Inappropriate promotion of an untested technology(thermography) for a low risk group of individuals with no consideration of the consequences of false positive or false negative results	10%
2	"Alzheimer's can be predicted with '100 per cent accuracy'"	The Australian, (News Corporation) August 2010	"Alzheimer's disease can be predicted with up to 100 per cent accuracy years before its onset using biomarkers found in spinal fluids, a study says."	Reported sensitivity only; no consideration of false positive rates, or the consequences of false positive diagnoses or the availability of effective treatment	22%
3	"Breast 'tests' could offer false sense of security"	Sydney Morning Herald (Fairfax Media) Sept 2010	"Cancer specialists warn that private clinics offering unproven breast screening methods as a "safe" alternative to mammograms could be putting women's lives at risk. "	This story pointed to the lack of scientific evidence for thermography, in particular randomised trials, in comparison to mammography. Strong independent comment pointed to the consequences of missed diagnosis	89%
4	"Parkinson's test warning"	Herald Sun (News Corporation) April 2007	"Melbourne researchers have developed a breakthrough blood test that can detect Parkinson's disease, even in those with no symptoms."	The article quantifies the test accuracy, spells out possible adverse effects, addresses availability and explains the importance of having an effective treatment in the event that the diagnosis is made earlier.	100%

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Box 1: Questions journalists should ask about new diagnostic tests

1. Is the test ready for human use or is this early research?
2. Does it replace an existing test? If so, what are the advantages of this test over the old one (improved accuracy, fewer side effects)?
3. Will the test be used to screen a healthy population or to confirm a clinical suspicion of disease? If the former, what will the false positive rate in the target population be?
4. What are the consequences of a false positive or negative test? Will the patient receive further tests or procedures and what are the adverse effects of these?
5. What is the value to the patient of earlier diagnosis? Are there treatments which given earlier will improve prognosis?
6. How good is the evidence supporting the claims about the test? Does research reporting on test accuracy comply with the STARD checklist? (9)
7. Is expert comment needed to put the information in context and assess claims made by researchers or marketers? This is particularly important when genetic tests are being promoted directly to the public.
8. What is the cost of the test? Who will pay for it?
9. Does the informant stand to benefit directly from positive media coverage? Do they have ties to the research or a sponsoring company?