Effectiveness and cost effectiveness of automated and semi-automated cervical screening devices: a systematic review of the literature

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Record Status
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Citation

Authors' objectives
1. To systematically review the international evidence for clinical effectiveness (primarily sensitivity and specificity) and cost-effectiveness of introducing automated and semi-automated devices available for cervical screening in New Zealand in place of conventional testing.

2. To consider the above evidence in terms of its applicability to New Zealand's population-based cervical screening programme.

Authors' conclusions
1. Estimates of test sensitivity and test specificity for the new devices could not be reliably determined. The research reviewed here provides no evidence for improved detection of high-grade abnormalities by new devices for cervical screening. New devices should demonstrate clinical effectiveness gains in detecting higher grade abnormalities. High-grade squamous intraepithelial lesions have a much higher probability of progressing to cancer than low grade abnormalities that are likely to regress.

2. Estimates of test sensitivity and specificity were the main source of uncertainty in the economic models investigating the cost effectiveness of new devices. In economic models where improved detection from the introduction of new devices was assumed, the impact of new devices on days-of-life saved was extremely small for women screened at three yearly intervals. Cost effectiveness may be even poorer in New Zealand where more effective rescreening practices are employed for conventional screening.

3. Any increases in sensitivity resulting from the introduction of new devices may come at the cost of decreased specificity. This would lead to increases in false positive results (where slides are read as abnormal when the woman does not have a cervical abnormality). False positives lead to health sector costs of unnecessary diagnosis, treatment and follow-up that may lead to pressure on health services to the detriment of women with true abnormalities. Investigations of false positives also are associated with social and psychological costs for women including inconvenience, discomfort and distress. The potential for increases in false positives would, if realised, have a profound impact on quality of life and the related cost effectiveness of the devices.

4. Higher quality research is required to generate valid estimates of test sensitivity and specificity. Methodological limitations to address include the application of appropriate reference standards for verification of cytological diagnoses, including test negatives. Economic modelling studies will be more meaningful with more valid estimates of test characteristics, and a comprehensive measurement of costs of screening from a societal perspective, including careful investigation of the impact of screening and clinical management on quality of life.

5. It is important that promotional information for new devices is balanced by material for health professionals and for women based on key findings of independent evidence such as found in this report. Additionally, the New Zealand Health Funding Authority/Ministry of Health should investigate legal avenues to restrict advertising making unsubstantiated claims for new devices.
6. The vast majority of missed abnormalities will be detected at subsequent screens for women who are routinely screened appropriately, assuming acceptable levels of smear taking and laboratory performance. Three yearly cervical screening using the conventional Pap smear can be highly effective, preventing 93% of cervical cancer, assuming all eligible women are screened. Therefore, the Pap test should remain the standard of care in population cervical screening.

7. The introduction of new devices for cervical screening cannot be recommended for the New Zealand national cervical screening programme at this time.

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