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# Clinical breast examination for asymptomatic women

## Exploring the evidence

**BACKGROUND**

Clinical breast examination (CBE) is often offered as a component of the well woman check or carried out at the request of an asymptomatic woman. In these cases the examination is a screening procedure, as opposed to a diagnostic CBE in a symptomatic woman.

**OBJECTIVE**

This article examines the evidence for screening CBE.

**DISCUSSION**

Screening CBE should involve informed consent. A negative examination does not exclude the presence of breast cancer and women should be aware of this. There have been no randomised controlled trials of CBE alone, only trials comparing CBE with mammography for the detection of breast cancer. While there is a low sensitivity (54%) for CBE, the specificity is high (94%). It is unlikely that these figures are discussed with patients. There are different methods of CBE, and these are described in the literature without a firm evidence base as to effectiveness. However, evidence does suggest that practice on models and retraining help improve clinicians' skills.

**Case example**

Mary B, 42 years of age, requests a well woman check. She says she would like a breast examination. There is no family history of breast cancer and she is not aware of any breast problems. At the practice meeting the nurse asks whether clinical breast examination (CBE) should form part of the check and what, if any, information she should give women before performing what she feels is a screening test.

**Well woman screening is an accepted part of general practice services. Checks are carried out by health professionals including general practitioners and practice nurses. Screening may involve one or more of the following components: blood pressure, weight measurement, cholesterol and glucose levels, breast examination, cervical smear and vaginal examination. The evidence base for such screening tests varies; in particular routine breast examination and bimanual vaginal examination of asymptomatic women do not appear to fulfil the necessary criteria for adoption of these strategies as screening tests. The Wilson criteria for screening state that a screening test should accurately identify a high proportion of patients with early disease.<sup>1</sup>This article looks at the evidence for CBE of asymptomatic women: screening CBE as opposed to diagnostic CBE.**

Thirty years ago Frame and Carlson critically reviewed all screening tests offered to patients as periodic (usually annual) health checks. They recommended that only health screening shown to be of proven effectiveness should be performed. They stated that there was insufficient evidence to recommend a clinician's breast examination to screen for breast cancer.<sup>2</sup> In 1993 Carney et al<sup>3</sup> highlighted how what constitutes a 'check up' varies between doctors, and between doctors and patients. In the study, 59 primary care physicians reviewed asymptomatic 55 year old women requesting 'check ups'. Of note, 65% of physicians provided a clinical breast examination (CBE) and another 20% did so only when prompted by the patient. While not all GPs may offer CBE opportunistically, many will perform CBE at the request of the patient. Do patients fully understand the significance of being told that the examination is 'normal' or that 'no abnormalities have been found'?

## Literature review

We searched MEDLINE, Google and the Cochrane database using the terms 'clinical breast examination', 'breast screening' and 'breast examination'. We also examined textbooks. Many papers dealt only with mammography. Many recent American papers drew heavily from a 1999 paper by Barton et al.<sup>4</sup> This is not a systematic review: a Cochrane review of 2003 found no randomised trials of clinical breast examination.<sup>5</sup>

A 'normal' CBE does not rule out disease, but certain abnormal findings greatly increase the probability of breast cancer. Screening mammography combined with CBE appears to give better results.<sup>4</sup> Clinical breast examination alone has never been compared in a clinical trial with no screening; only with mammography.<sup>6</sup> A comparison of CBE with no screening is unlikely to happen now on ethical grounds, yet this would provide evidence for the usefulness or not of CBE in countries where regular screening mammography is unavailable or too expensive for the general population. As mammography is only recommended in perimenopausal or postmenopausal women, the effectiveness of CBE alone in younger women also needs to be explored, although in this age group the incidence of disease is much lower: 75% of cases of breast cancer develop in women 50 years of age and over. However, in younger women breast cancers are likely to be larger and more aggressive than in older women.<sup>6</sup>

Clinical examination textbooks disagree as to when a breast examination should be performed. Talley and O'Connor state that: 'breast examination is a vitally important part of the general physical examination'.<sup>7</sup> Macleod implies that breast examination is for symptomatic women only.<sup>8</sup> A recent Australian textbook on women's health advises examination of the breasts from the age of 40 years by a clinician because, while CBE only detects 50% of breast cancers present and screening mammography detects 90%, it is possible that CBE may pick up some of the 10% not detected by mammography.<sup>9</sup> However, this advice is contrary to a general practice guide to women's health that states that further research is required before CBE can be recommended as a screening tool.<sup>10</sup> Such research should be a 'randomised controlled trial comparing clinical

breast examination with no screening at all'.<sup>10</sup> This recommendation is based on the results of the Canadian Breast Screening Study that compared screening via mammography and CBE with screening via CBE alone. After 13 years follow up there was no statistical difference in the pickup rates of breast cancer or of mortality between the two groups.<sup>11</sup> However, this study suggested that CBE is more sensitive in women aged 40–49 years than older women; in contrast to mammography. Most screening guidelines therefore synthesise the research either with a recommendation that CBE complements mammography<sup>12</sup> or they do not recommend CBE at all. For example the recommendations of The Royal Australian College of General Practitioners (RACGP) do not include breast examination as a routine screening procedure. Note is made that CBE has not been shown to reduce breast cancer mortality but is recommended in women who are at increased risk, in conjunction with mammography.<sup>13</sup> Routine breast examination is also stated not to be indicated in asymptomatic women starting hormonal contraception or during use,<sup>14</sup> although many GPs will remember being advised to do this in the past, and an American text from 2002 recommends a breast examination for adolescent girls before starting the combined oral contraceptive pill.<sup>15</sup> However, it is important to understand in greater depth the use and limitations of CBE as a screening tool, particularly for those women who decline or cannot undergo mammography, and for those patients who request CBE.

## Screening for breast cancer

When considering the nature of screening tests for breast cancer, there are important areas to explore (*Table 1*). With breast screening, the clinician is aiming to pick up early cancers that will need to be surgically removed in combination with possible radiotherapy and chemotherapy. In the early stages of the disease, treatment is likely to be more effective and women have more options. The rationale behind the screening is that larger tumours have a poorer prognosis than smaller tumours.<sup>16</sup> However, the potential for cure is much less than in the cervical smear program. Women used to having cervical smears taken regularly may not understand the difference between the two screening tests

unless adequately counselled.

With breast cancer screening, the total preclinical phase (TPCP) must be taken into account. This is the period from when the cancer first starts until it is detected by symptoms. The detectable preclinical phase (DPCP), part of the TPCP, is the period during which the cancer is detected by screening in asymptomatic patients. The ideal screening test is one that detects a cancer early in the DPCP and which can be followed by treatment to reduce mortality. Mammography screening is associated with a longer DPCP than CBE.<sup>17</sup> However, picking up breast cancer early may not reduce overall mortality but rather increase the time that a woman lives with the diagnosis. 'As screening advances the time of cancer diagnosis survival rates will appear to improve, even if screening does nothing to delay the time of death'.<sup>17</sup>

We have known for many years that breast screening tends to detect cancers that are relatively slow growing and are biologically more favourable<sup>18</sup> with a longer DPCP. Faster growing and more malignant cancers are more likely to occur within screening intervals, being detected by women themselves.

## The effectiveness of screening

Before mammography was widely available, CBE did pick up breast cancers, however there is no evidence that this reduced mortality from the disease compared to women presenting with breast symptoms. Barton et al<sup>4</sup> carried out a systematic review of CBE in 1999. They list 110 references spanning the years 1967–1999. As early as 1975, researchers were querying the validity of clinical examination and mammography as screening tests.<sup>19</sup> The data synthesis in the Barton review raises questions about the studies reported and the authors address these in their article. From the studies CBE was found to detect between 3 and 45% of breast cancers missed by screening mammography. Barton et al feel that some of the discrepancy in these results may be due to a lack of clarity as to what type of CBE was carried out, as this is rarely mentioned in the research findings: there is a 'lack of consistent and standardised examination techniques'.<sup>4</sup> However, we must also question the reliability of the mammography and ask whether these

results would be the same today. The conclusion from this review is that there is indirect evidence supporting the effectiveness of CBE as a screening tool.

McDonald et al<sup>20</sup> published a literature review in 2004, but specifically state that they were only looking at the contribution of CBE to screening rather than its effectiveness in reducing breast cancer mortality. Their review of more recent literature (2000–2003) than the Barton paper quotes three studies showing that 4.6–5.7% of cancers were identified solely by CBE, while another study from 2003 gives a figure of 10.7%. Thus the percentage is lower than the 45% given by some older studies further highlighting the technical advances in mammography. McDonald et al<sup>20</sup> also suggested that in some older studies it is not clear if the patients examined were asymptomatic. Many women request CBE because of breast changes they had noted.

Shen and Parmigiani<sup>21</sup> used decision analysis based on a microsimulation model to look at the added value, if any, of CBE in combination with mammography. Using data from various sources such as screening and clinical trials, and focusing on women over 40 years of age, they compared results in relation to quality adjusted life years (QALYs) and cost. They concluded that the most cost effective screening was a combination of biennial mammography and annual CBE from 50–79 years of age, but that CBE alone should not replace mammography.

While there is a low sensitivity (54%) for CBE, the specificity is quite high (94%) according to Barton et al.<sup>4</sup> The figures of the American National Breast and Cervical Cancer Early Detection Program (NBCCEDP) from 1995–1998 are comparable: sensitivity 58.8% and specificity 93.4%.<sup>22</sup> Sensitivity is affected by patient age, size of tumour, ethnicity, body weight, menopausal status and hormone use, varying 17–88%.<sup>22</sup> Experience and training of the clinician is also a factor (see below). The high specificity of CBE denotes few false positives and this figure is higher than that seen with mammography.<sup>23</sup> However, the range for false negatives raises the question of what a woman should be told if CBE does detect no abnormalities.

### Technique and duration

The CBE may include inspection and palpation. Standard examination textbooks do not give evidence for the techniques they describe. A 1985 study of doctors' examination techniques on silicone breast models found that 40% had no discernible pattern of examination.<sup>24</sup> Barton et al<sup>4</sup> recommend an examination sequence based on work by Pennypacker et al,<sup>24</sup> whose research looked at training through the use of breast simulators.

Clinical breast examination usually starts with inspection but the importance of this is unproven, particularly in respect to changing position and leaning forward.<sup>4</sup> A 1982 study of a series of 296 breast cancers detected on examination found that only 1% was discovered by retraction alone and 3% by visible nipple abnormalities, leaving 96% discovered only by palpation. However, the position of the women for inspection is not noted.<sup>26</sup>

While palpation may also be carried out in the upright and oblique positions, studies suggest that 96% of masses are palpable when the patient is supine.<sup>27</sup> An interesting variation of position was published in a letter from a 'country doctor' in America who describes his technique with the patient seated on the edge of the examination couch, with her hands on the stirrups and leaning forward at a 45° angle so that the breast tissue falls away from the chest wall.<sup>28</sup>

Palpation is carried out with the palmar surface of the middle three fingers,<sup>78</sup> although Pennypacker recommends using the pads of the three middle fingers.<sup>25</sup> The breasts are examined by feeling the four quadrants of the breast<sup>7</sup> or are considered as the face of a clock and each hour is examined from the outside toward the nipple.<sup>8</sup> These techniques consider the breast as a circular organ whereas other clinicians describe it as a rectangle or pentangle, an area demarcated by the second and sixth ribs, the lateral border of the sternum and the mid-axillary line.<sup>17</sup> These methods are in contrast to Barton et al<sup>4</sup> who recommend that palpation begins in the axilla and continues in parallel lines up and down the breast from the midaxillary line to the sternum and down as far as the bra line. They call this the 'vertical strip' pattern or 'lawnmower' technique. Each area of the breast is examined by making small circles as 'if following the edge of a dime'.<sup>4</sup> Only Barton et

al specify that three pressures are used at each spot: light, medium and deep.<sup>4</sup>

Textbooks make no mention of how long a breast examination should take. The systematic examination recommended by Barton et al is said to take at least 3 minutes per side.<sup>4</sup> Saslow et al<sup>29</sup> follow the method of Barton et al. However, they state that they intentionally do not stipulate a duration as the time can decrease with increased proficiency, and patient factors impact on the examination: quality is more important than quantity.

### Factors affecting CBE accuracy

The bigger a breast lump the easier it is to detect. Larger lumps are likely to be felt by women themselves. Health professionals are concerned with detecting small lumps or subtle changes occurring in the breasts of 'asymptomatic' women. Studies confirm that hard lumps near the surface of the breast are more easily palpated than soft, deep lumps, although the sensitivities calculated were based on the examination of silicone breasts rather than patients.<sup>30</sup> Tumours smaller than 0.5 cm are unlikely to be clinically palpable.<sup>31</sup>

There are differences in the feel of pre- and post-menopausal breasts on CBE, with the former likely to be denser with a characteristic 'lumpiness'; this also affects detection of cancer by mammography in younger women. Women with lumpy breasts affect the specificity of CBE, as more false positive results occur in this group.<sup>32</sup> It is harder to detect lumps in obese women, but CBE is more sensitive in Asian women, which may be related to their tendency to have smaller breasts than caucasian women.<sup>33</sup> We would expect that clinicians who regularly examine breasts, and are able to cope with some uncertainty, are more likely to define lumpiness on examination as a normal finding and not investigate every woman with this characteristic; however, there are no papers which specifically discuss this. However with models, clinicians have been shown to have less detection sensitivity when examining the simulation of premenopausal breast tissue compared to postmenopausal, which raises the question of the usefulness of CBE in this population, who are not targeted by mammography screening. The highest sensitivity

of CBE appears to be in women aged 50–59 years, ie. those targeted for the mammography screening program, while it is lowest in women aged 40–49 years.<sup>33</sup> As with mammography, women who are taking hormone therapy are less likely to have breast lumps detected.<sup>34</sup>

**Training**

Medical students learn to perform CBE by means of clinical teaching associates with normal breasts. Further training is required with models as these allow students to feel breast

lumps as small as 3 mm.<sup>24</sup> Moreover, once a lump has been palpated in facilitated conditions, it is more likely that one will be felt in 'real life'. A survey of health professionals providing breast checks in Oregon, USA, in 2000, reported that 80% were interested in receiving further instruction in technique as part of continuing professional development.<sup>35</sup>

Silicone breast models are available that contain lumps varying in size, hardness and depth in tissue. Practising examination on these models was shown over 20 years ago to increase

lump detection rate and that the improved skills resulting from such practice translates well to examining patients.<sup>36</sup> However, many smaller lumps will be benign. A more recent study involving nurse practitioners showed that training with models significantly decreases the size of lump detectable on CBE and that nurses from all levels of experience benefit from such training.<sup>37</sup> Training of clinicians may account for a 27–29% difference in sensitivity and 14–33% difference in specificity according to a 1989 study which compared the detection rates by medical residents with those by women.<sup>38</sup>

**Conclusion**

The effect of CBE on mortality from breast cancer is still unclear, making it difficult for GPs to know exactly what to say to women requesting breast examination. Recommendations based on this review are given in *Table 2*. We believe that health professionals who do undertake CBE of asymptomatic women should participate in continuing professional development and training to improve their technique and skill. They should consider the method they use and the time that they take on the examination.

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Table 1. Considerations for CBE as a screening test
<ul style="list-style-type: none"> <li>• Screening tests for breast cancer pick up disease at a much later stage than screening tests for other cancers such as cervical cancer</li> <li>• The accuracy of mammography as a screening test has been open to debate</li> <li>• Age groups for whom mammography and CBE is recommended vary in different countries</li> <li>• How CBE as a screening test should be carried out in practice to improve sensitivity and specificity</li> <li>• Whether clinicians who perform CBE are doing so in a standardised manner and if this is important</li> <li>• The acceptability to women</li> <li>• Informed consent for screening particularly in relation to the problems associated with screening for breast cancer: what should women be told?</li> </ul>

Table 2. Recommendations for CBE
<ul style="list-style-type: none"> <li>• CBE is not required in asymptomatic women before starting or during taking hormonal contraception or hormone therapy</li> <li>• CBE should only complement mammography in women aged 50 years and over</li> <li>• Consider CBE in women aged 40–49 years before entering the mammography target age group; there is no firm evidence at what interval this should take place</li> <li>• Do not offer CBE as a routine part of health care in younger women, but only if the woman requests it</li> <li>• Explain to the woman that a 'normal' examination does not rule out abnormalities such as small lumps that cannot be detected</li> <li>• Rather than saying the examination is normal, say that no abnormalities were detected today</li> <li>• Explain that all lumps are not cancer but that if a lump is found it will need further follow up and investigation</li> <li>• It is difficult to know whether a women should be told that CBE does not reduce mortality from breast cancer, however for true informed consent this should be considered</li> <li>• Explain that CBE does not pick up precancers that can be completely removed, unlike cervical screening</li> <li>• Explain that CBE may pick up cancers earlier than the woman herself would have noticed, but that this does not necessarily reduce mortality from the cancer</li> </ul>

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