Section 1: NHMRC Statement: Thermal Imaging for Early Breast Cancer Detection

The *National Health and Medical Research Council Act 1992* requires the National Health and Medical Research Council (NHMRC) to inquire into and advise the community on matters relating to the improvement of health, and the prevention, diagnosis and treatment of disease (section 7(1)(a)).

The purpose of this statement is to advise the Australian public of NHMRC's view on the available evidence concerning the use of thermal imaging as an early detection test for breast cancer, and to provide information about the detection of early breast cancer for women without symptoms. This may assist the Australian community to make informed decisions about their health care. The statement is based on the National Breast and Ovarian Cancer Centre* position statement *Statement on the use of thermography to detect breast cancer* (the NBOCC statement).

This statement is designed to provide information based on the best evidence available at the time of publication to assist in decision-making. The Statement is valid for 5 years, unless the NHMRC deems that sufficient changes to the body of evidence require the statement to be updated or revoked before this time.

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The National Health and Medical Research Council (NHMRC) does not recommend the use of thermography for early breast cancer detection or screening. Recently, there has been an increase in the promotion of thermography to assess women for early signs of breast cancer. NHMRC is concerned that breast thermography is marketed to women of all ages, in some cases as an alternative to mammography, when there is no compelling evidence to demonstrate that it is effective for early detection or screening[1].

Breast thermography, also known as thermal breast imaging and digital infrared thermal imaging (DITI), is a technique that produces 'heat pictures' of the breast. The rationale for thermography in breast imaging is that the skin overlying a malignant breast lesion [cancer] can be warmer than that of surrounding areas[2].

[1] Australia and New Zealand Horizon Scanning Network 2009. *National Horizon Scanning Unit Emerging Technology Bulletin: New and Emerging technologies for breast cancer detection,* available at http://www.horizonscanning.gov.au/

[2] National Breast and Ovarian Cancer Centre 2010. *Statement on the use of thermography to detect breast cancer*, available at http://canceraustralia.nbocc.org.au/our-organisation/position-statements/statement-on-use-of-thermography-to-detect-breast-cancer.

* In July 2011, the National Breast and Ovarian Cancer Centre amalgamated with Cancer Australia to form a single national agency, Cancer Australia.

The NBOCC statement noted that "studies have shown that a tumour has to be large (several centimetres in diameter) before it can be detected by thermography"[3,4]. By contrast, NBOCC noted that "screening mammograms have the ability to detect breast cancer at a much smaller size; therefore reducing the number of deaths from breast cancer. Less than 50% of breast cancers detected by screening mammography have an abnormal thermogram[4]".

BreastScreen Australia provides free mammograms every two years and targets women 50-69 years, as this is the age group in which the evidence of benefit is greatest. Women aged 40-49 and 70 years and over are also eligible to attend. For more information or to make an appointment for a screening mammogram, call BreastScreen Australia on 13 20 50, or visit www.cancerscreening.gov.au.

Screening mammography is for women who do not have any symptoms of breast cancer. Women of any age, who notice a change in the look or feel of their breast, should report to their general practitioner without delay for assessment of the symptoms. The triple test approach to investigation of symptoms ensures the highest accuracy for detection of breast cancer; this includes clinical examination, imaging tests such as a mammogram and ultrasound, and biopsy. For more advice on breast awareness and early detection of breast cancer visit the Cancer Australia website: www.canceraustralia.nbocc.org.au

Section 2: Consumer Focused FAQs

Is thermography safe to use?

Thermography does not cause immediate harm to women; however current published evidence shows that it produces more false positive results compared with mammography[5]. A false positive result means that the test is positive for cancer, when in fact a woman does not have cancer. False positive results can lead to unnecessary investigation and testing and anxiety, which can cause harm and distress to women.

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[3] Homer MJ 1985 'Breast Imaging: Pitfalls, controversies and some practical thoughts' *Radiological Clinics of North America* 23: 459-471, from National Breast and Ovarian Cancer Centre 2010. *Statement on the use of thermography to detect breast cancer*, available at http://canceraustralia.nbocc.org.au/our-organisation/position-statements/statement-on-use-of-thermography-to-detect-breast-cancer.

[4] Martin JE 1983 'Breast Imaging techniques, mammography, ultrasonography, computed tomography, thermography and transillumination' *Radiological Clinics of North America* 21: 149-153, from National Breast and Ovarian Cancer Centre 2010. *Statement on the use of thermography to detect breast cancer*, available at http://canceraustralia.nbocc.org.au/our-organisation/position-statements/statement-on-use-of-thermography-to-detect-breast-cancer.

[5] Kontos, M; Wilson, R; and Fentiman I; 2011 'Digital Infrared thermal imaging (DITI) of breast lesions: sensitivity and specificity of detection of primary breast cancers' *Clinical Radiology* 66 (2011) 536-539

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Evidence also shows that thermography produces more false negatives compared with mammography[4]. A false negative result occurs when a test result shows that a woman does not have cancer when in fact she does. This can delay diagnosis and treatment of cancer. Detection of breast cancer while it is still small and confined to the breast provides the best chance of effective treatment for women with the disease.

If thermography is not effective for early breast cancer detection or screening, why is it available?

Technologies such as thermography are available for certain uses because they have been approved for use by the Therapeutic Goods Administration. However no thermal imaging technology products have been approved by the Therapeutic Goods Administration for use as a test for breast cancer. Investigations by the Therapeutic Goods Administration and the Australian Competition and Consumer Commission have found that some thermal imaging devices have been advertised and used for applications not approved by the Therapeutic Goods Administration, including breast cancer detection. The devices have been removed from the Australian Register of Therapeutic Goods which means that further supply is prohibited. Clinics that have been using these devices have also been informed[6].

I'm not eligible for a free mammogram from BreastScreen Australia. What can I do?

In women under 40, there is currently no evidence that population-based screening mammography is effective for the early detection of breast cancer[7]. Cancer Australia recommend that for women in this age group who have not developed any symptoms and who do not have an increased risk of breast cancer, awareness of how their breasts normally look and feel and prompt reporting of any new or unusual changes to their general practitioner is the best method for early detection[8]. In fact, it is recommended that women of all ages, regardless of whether they attend for mammographic screening, are aware of the normal look and feel of their breasts and talk to their general practitioner if they notice a change.

What should I do if I am at increased risk of developing breast cancer?

[6] Australian Competition and Consumer Commission 2011. *Beware of unproven breast imaging technologies, say ACC, Cancer Council and TGA* available at http://www.accc.gov.au/content/index.phtml/itemId/991876/fromItemId/142.

[7] National Breast Cancer Centre 2004. *Early Detection of Breast Cancer.* Available at http://canceraustralia.nbocc.org.au/our-organisation/position-statements/early-detection-of-breast-cancer

[8] Cancer Australia 2009. *What you can do to find breast cancer early: women younger than 40 years* available at http://canceraustralia.nbocc.org.au/breast-cancer/awareness/younger-than-40-years.

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Some women may be at increased risk of developing breast cancer due to a family history of the disease or other factors. For women of all ages who are at increased risk of developing breast cancer, it is recommended that an individualised surveillance program be developed in consultation with the woman's general practitioner.

Are there any other ways to screen for breast cancer?

In 2009, a detailed review was undertaken to identify any new and emerging technologies for the early detection of breast cancer as part of the review of the BreastScreen Australia Program. The review looked at 7 technologies, including thermography and electrical impedance. The review found that there is insufficient evidence to support the use of technologies other than mammography for breast cancer screening[1].

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