

## **POSITION STATEMENT ON OVER-DIAGNOSIS FROM MAMMOGRAPHY SCREENING**

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**Developed by National Breast Cancer Centre  
Endorsed by the Cancer Institute NSW and The Cancer Council Australia**

*Based on published evidence to October 2007.*

Mammography screening has been shown in field trials to reduce death rates from female breast cancer.<sup>1-11</sup> This reduction has been estimated by an Expert Group of the International Agency for Research on Cancer to approximate 35% among 50-69 year old women who participate in regular screening.<sup>12</sup> Evaluation of mammography screening services introduced in many countries following these trials, including BreastScreen services in New South Wales and South Australia, indicates mortality reductions of a similar magnitude to those seen in the trials.<sup>13-17</sup>

These mortality reductions come at a cost, in that women can experience anxiety when screened, and some have further investigations of screen-detected abnormalities that are not found to be cancer.<sup>12</sup> Another cost would be the treatment of cancers that may never have been found during the lifetime of the woman, had there not been a screening test. Diagnosis of these cancers has been referred to as “over-diagnosis” and their treatment as “over-treatment”.<sup>12, 18</sup>

Breast screening is designed to bring forward the date of diagnosis of breast cancer to improve prospects for cure. As defined, “over-diagnosis” includes all instances where women with screen-detected cancers are destined to die earlier of other causes before their breast cancers would have arisen in the absence of screening. Extreme examples include women with screen-detected cancers who die prematurely from road accidents or other acute causes, or who are at risk of early death from heart disease or other chronic diseases. In addition, there would be screen-detected cancers that would not progress for many years because of their biology.<sup>12</sup>

It is not possible with present methods to distinguish at an individual person level the sub-set of cancers that would not progress to a symptomatic stage within a women’s lifetime, if left untreated.<sup>12</sup> The presence of “over-diagnosis” is assessed by statistical inference in groups of women, which does not help interpretation at the individual person level. Moreover, statistical inferences vary substantially, depending on the underlying statistical assumptions used in the analysis, all of which carry a measure of uncertainty.<sup>12</sup>

The original mammography trials provided differing estimates of the extent of “over-diagnosis” of invasive breast cancers.<sup>19-26</sup> Estimates ranged from negative values to a high of around 10% of diagnoses, but with a midpoint (median) of around 2% to 3%. That is, about 2% to 3% of diagnosed cancers may have been lesions that would not have progressed if left untreated. When ductal carcinoma in situ (DCIS) is added, the midpoint becomes about 9%.<sup>19-21, 23-26</sup>

Estimates of “over-diagnosis” also have come from other sources, including further follow-up analyses of trial data, observational data from screening services, and data from simulation studies.<sup>27-47</sup> Again, estimates vary widely, depending on assumptions made in the estimation process, from negligible values to estimates of 30% or more, but

with a midpoint of about 7% to 8% for combined DCIS and invasive cancer, and with a plausible range between 5% and 13%.

A reasonable conclusion from all data available is that the majority of breast cancers found in well-organised screening programs would be progressive lesions that would become symptomatic within the woman's lifetime if left untreated. It is likely that about 90% fall into this category, although a figure as high as 95% is plausible.

This leaves a sub-set that could be left untreated, if they could be identified with certainty. While it may not be possible to identify women destined to die prematurely before they would become symptomatic, it may be possible to identify the sub-set of cancers that are likely to be non-progressive, or to progress very slowly. Research is underway, including molecular and genetic research, to find means of identifying this sub-set of cancers.<sup>48-57</sup>

The evidence is clear that mammography screening significantly reduces death rates from breast cancer by enabling earlier and more effective treatment.<sup>1-17</sup> Further research is needed to maximise treatment benefits and reduce the potential for "over-treatment".<sup>58</sup>

### Summary statement

Mammography screening significantly reduces death rates from breast cancer by enabling earlier and more effective treatment.

The vast majority of breast cancers found through screening are progressive lesions that would become symptomatic within the woman's lifetime if left untreated. It is likely, however, that there is a sub-set of cancers that may be non-progressive or progress so slowly, that they would not have been otherwise found in the woman's lifetime. Diagnosis of these cancers has been referred to as 'overdiagnosis' and their treatment as 'overtreatment'.

Estimates of the size of this sub-set vary widely and are dependent on a range of assumptions as we do not know what the incidence of breast cancer would be today without the introduction of the BreastScreen Australia program.

Research is underway, including molecular and genetic research, to find means of identifying this sub-set of cancers.

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