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**Abstract title:** **Breast cancer screening in older women**

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**Background:** In upcoming decades, an increasing proportion of breast cancer patients will be elderly. It has been assumed that diagnosis at an earlier stage through screening programs could improve prognosis. However, elderly may be at risk for over diagnosis due to screening programs, and consequently unnecessarily at risk for possible harmful effects of cancer treatment. In The Netherlands, the upper age limit of the screening program was extended from 69 to 75 years in 1998. However, it remains unclear whether the mass screening program has a beneficial effect in women aged 70 years and older.

If a screening program is effective, it can be expected that the incidence of early stage breast cancer increases, while the incidence of advanced stage cancers decreases. According to several studies, this is the most appropriate method to investigate the efficacy of a screening program in population-based data, as studying mortality rates as an indicator for the effect of screening programs can lead to several forms of bias. Therefore, we investigated the effect of the implementation of the screening program on the stage distribution of incident breast cancer in women aged 70–75 years in the Netherlands.

**Materials and Methods:** The Netherlands Cancer Registry was used to include all patients aged 70–75 years who were diagnosed between 1995 and 2011 with invasive or in situ breast cancer. Time trends of incidence rates of different tumor stages were analyzed in linear regression analyses with the incidence rate of both early stage (0, I and II) and advanced stage (III and IV) breast cancer as the outcome, and year of diagnosis as the independent variable.

**Results:** Overall, we included 25,414 patients aged 70–75 years at diagnosis. The incidence of early stage tumors significantly increased after extension of the upper age limit to 75 years in 1998 (260 cases per 100,000 women in 1995 up to 382 cases per 100,000 women in 2011, p for trend = 0.03), while the number of advanced stage breast cancers did not significantly change (59 cases per 100,000 women in 1995 to 53 cases per 100,000 women in 2011, p for trend = 0.2).

**Conclusions:** The extension of the upper age limit to 75 years has not led to a decrease of advanced stage breast cancer, while the number of early stage tumors strongly increased. This implies that the effect of screening in elderly women is limited and leads to a large proportion of over diagnosis. Until new studies in this specific group have been performed, we propose that the decision to participate in the screening program should be personalized based on remaining life expectancy, functional status and patients' preferences.

**No conflict of interest.**

**Keywords:**

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