Interval cancers (IVCa) are breast cancers being the first in Germany, is aimed to gain experiences with the different review processes of IVCa.

In June 2010, 65 IVCa were identified by record linkage of data from the population-based epidemiological cancer registry in Lower Saxony (KNM) [2] with the date of 25,000 women aged 50 to 69 years, who attended the 2006 mammography screening in one of eight screening units of Lower Saxony. Three independent review processes were undertaken by radiologists working with the mammography reference center (Referenzzentrum Mammographie Nord).

**Methods**

In June 2010, 65 IVCa were identified by record linkage of data from the population-based epidemiological cancer registry in Lower Saxony (KNM) [2] with the date of 25,000 women aged 50 to 69 years, who attended the 2006 mammography screening in one of eight screening units of Lower Saxony. Three independent review processes were undertaken by radiologists working with the mammography reference center (Referenzzentrum Mammographie Nord).

**Table 1**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>True Interval Cancers</th>
<th>False Negative Classification 1</th>
<th>False Negative Classification 2</th>
<th>False Negative Classification 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVCa</td>
<td>37</td>
<td>65%</td>
<td>57%</td>
<td>52%</td>
</tr>
<tr>
<td>False intervals</td>
<td>3</td>
<td>8%</td>
<td>17%</td>
<td>15%</td>
</tr>
<tr>
<td>False negative</td>
<td>9</td>
<td>14%</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>True interval</td>
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<td>34%</td>
<td>20%</td>
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</tr>
<tr>
<td>True positive</td>
<td>0</td>
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</tr>
</tbody>
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**Figure 1**

Window for interval cancers

**Figure 2**

Three review processes of 52 completely documented IVCa:

- **Definitive classification 1**
  - Only screening mammograms
  - Provisional classification: 22 (42%)
  - Definitive classification: 22 (42%)

- **Definitive classification 2**
  - Screening + diagnostic mammograms
  - Provisional classification: 22 (42%)
  - Definitive classification: 22 (42%)

- **Definitive classification 3**
  - Screening + diagnostic mammograms + EKN-data
  - Provisional classification: 22 (42%)
  - Definitive classification: 22 (42%)

**Results**

From 65 IVCa 22 were diagnosed in the first year after screening, 43 in the second year.

In the definitive classification 3 of all 65 IVCa 27 cases (57%) were classified as true interval cancers. The screening mammograms showed ‘minimal signs’ for 6 cases (9%), 9 cases (14%) were false negative diagnoses. Diagnostic mammograms or other diagnostic information were not available for 13 cases (20%). According to the European guidelines these 13 IVCa are categorized as ‘unclassifiable’.

52 completely documented IVCa were compared in the mentioned three review processes. The 13 IVCa with missing diagnostic mammograms were excluded. The results are shown in Figure 2. The proportion of true IVCa increased from 63% (provisional classification 1) to 71% (definitive classification). The specific information from the diagnostic mammograms provided a more valid classification of IVCa with ‘minimal signs’. The proportion declined from 19% to 12%. There were only small differences between the ‘provisional classification 1’ and ‘2’, but the proportion of ‘false negative’ cases was a little bit higher in the second classification (17% vs. 16%).

**Table 2**

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**Discussion**

The results of this pilot study illustrate the importance of diagnostic mammograms for the review process. Actually, it is not possible to make a ‘definitive classification’ of all IVCa because diagnostic mammograms are not available for all cases (in this study 20% were missing). Additionally the record linkage in the cancer registry can not be validated for incorrect matching for these cases.

In the ‘provisional classification 1’ the number of cases with minimal signs is overestimated. A review process only with screening mammograms could lead to an increasing recall rate for healthy women.

Without ‘definitive classification’ there won’t be any comparable results of IVCa-rates and frequencies of false negative diagnoses. In contrast to the Scandinavian and some other European countries, the diagnostic records and mammograms in Germany can only be accessed with the consent of the patient; this will be difficult for the screening program. Alternatively, the government can enact laws to facilitate the transfer of the diagnostic mammograms to the review centers.

**Literature**


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