Early Detection and Diagnosis
Screened data bases
Pubmed 2018 - 2021
Medline 2018 - 2021
Cochrane 2018 - 2021

Guidelines
S3 Diagnostik, Therapie und Nachsorge des Mammakarzinoms:
European Commission Initiative on Breast Cancer (ECIBC)
European guidelines on breast cancer screening and diagnosis
2015 ACS Update Breast Cancer Screening for women at average risk
IARC Handbook 2016
European Commission 2016
(http://ecibc.jrc.ec.europa.eu/recommendations/list/3;Update 24.11.2016, Abruf 20122016)
Screened: Metaanalyses/ Systematic reviews / RCT / Cohort studies


12. Walter LC, Schonberg MA Screening mammography in older women: a review. JAMA 2014;311(13):1336-1347


Early Detection in Asymptomatic Women
Digital Breast Tomosynthesis

<table>
<thead>
<tr>
<th>LOE</th>
<th>GR</th>
<th>AGO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>A</td>
<td>+</td>
</tr>
</tbody>
</table>

Replacing FFDM by synthetic MG in addition to DBT

The complete DBT dataset of images has to be available for judgment / reporting, the synthetic mammography only is not sufficient.

* Sign. higher sensitivity, heterogeneous specificity, and higher costs [machine, evaluation, archiving] of DBT in comparison to Full-Field Digital Mammography (FFDM)
Dose reduction due to calculated synthetic 2D mammography (SM) instead of FFDM

7. Albert US, Schreer I; Arbeitsgruppe der Stufe-3-Leitlinie Mammakarzinom.[S3 guideline breast cancer: update on early detection,


Breast cancer mortality reduction

<table>
<thead>
<tr>
<th>Metaanalyses</th>
<th>RR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case-Control Studies</strong></td>
<td></td>
</tr>
<tr>
<td>Broeders et al Screening Mx</td>
<td>0.46 (0.4 – 0.54)</td>
</tr>
<tr>
<td>Corr. for self selection</td>
<td>0.52 (0.42–0.65)</td>
</tr>
<tr>
<td>Invited for screening</td>
<td>0.69 (0.57–0.83)</td>
</tr>
<tr>
<td><strong>Incidence-based Mortality Studies</strong></td>
<td></td>
</tr>
<tr>
<td>Broeders et al Screening Mx</td>
<td>0.62 (0.56–0.69)</td>
</tr>
<tr>
<td>Invited to screening</td>
<td>0.75 (0.69–0.81)</td>
</tr>
<tr>
<td><strong>Randomized Clinical Trials</strong></td>
<td></td>
</tr>
<tr>
<td>Gotsche and Jorgenson Screening Mx</td>
<td>0.81 (0.74–0.87)</td>
</tr>
<tr>
<td><strong>ECIBC</strong></td>
<td></td>
</tr>
<tr>
<td>Screening MX</td>
<td></td>
</tr>
<tr>
<td>45-49</td>
<td>0.88 (0.76 - 1.02)</td>
</tr>
<tr>
<td>50-69</td>
<td>0.77 (0.66 - 0.90)</td>
</tr>
<tr>
<td>70-75</td>
<td>0.77 (0.54 - 1.09)</td>
</tr>
</tbody>
</table>

# Breastcancer: incidence and mortality

## Annual incidence of breast cancer and mortality in the EU (GLOBOCAN 2012)

<table>
<thead>
<tr>
<th>Age</th>
<th>Incidence / 1000</th>
<th>Mortality / 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 to 44</td>
<td>1.2</td>
<td>0.1</td>
</tr>
<tr>
<td>45 to 49</td>
<td>1.7</td>
<td>0.2</td>
</tr>
<tr>
<td>50 to 69</td>
<td>2.7</td>
<td>0.5</td>
</tr>
<tr>
<td>70 to 74</td>
<td>3.0</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Siu AL, on behalf of the U.S. Preventive Services Task Force
Screening for Breast Cancer: U.S. Preventive Services Task Force

### Mammography-Screening
**Benefit and Harm**

Data background: Breast Cancer Surveillance Consortium Registry Data per 10,000 Women screened over 10 years

<table>
<thead>
<tr>
<th>Age</th>
<th>40-49</th>
<th>50-59</th>
<th>60-69</th>
<th>70-74</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer death avoided (CI 95%)</td>
<td>3 (0-9)</td>
<td>8 (2-17)</td>
<td>21 (11-32)</td>
<td>13 (0-32)</td>
</tr>
<tr>
<td>False-positive (n)</td>
<td>1212</td>
<td>932</td>
<td>808</td>
<td>696</td>
</tr>
<tr>
<td>Breast biopsies (n)</td>
<td>164</td>
<td>159</td>
<td>165</td>
<td>175</td>
</tr>
<tr>
<td>False-negative (n)</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>

**Recommendations International**


MRI-Screening:


Early Detection (normal risk)
Clinical Breast Examination (CBE)

As stand alone procedure

- Self-examination
  - Oxford LoE: 1a
  - Oxford GR: A
  - AGO: -*

- Clinical breast examination (CBE) by health professionals outside checkup for cancer
  - Oxford LoE: 1a
  - Oxford GR: C
  - AGO: -*

- Clinical breast examination (CBE) by health professionals during checkup for cancer
  - Oxford LoE: 1a
  - Oxford GR: B
  - AGO: ++

- Medical palpation by blind / visually impaired persons
  - Oxford LoE: 3b
  - Oxford GR: C
  - AGO: -

CBE because of mammographic / sonographic lesion
  - Oxford LoE: 5
  - Oxford GR: D
  - AGO: ++

CBE in combination with imaging
  - Oxford LoE: 1a
  - Oxford GR: A
  - AGO: ++

* May increase breast awareness

Combined DM + DBT + US + MRI


US-Axilla +FNA/CNB

MRT
13. Health Quality Ontario. Magnetic Resonance Imaging as an Adjunct to Mammography for Breast Cancer Screening in Women at Less

Reviews CESM:

CESM Originalarbeiten:
3. Tennant, S.L., et al., Contrast-enhanced spectral mammography improves diagnostic accuracy in the symptomatic setting. Clin Radiol,
Combined DM + DBT + US + MRI

US-Axilla +FNA/CNB
Biopsie
2. Lourenco AP, Mainiero MB Incorporating imaging into the locoregional management of breast cancer. Semin Radiat Oncol 2016;26(1)

MRT


Reviews CESM:
6. Lobbes MBI, Heuts EM, Moossdorff M, van Nijnatten TJA. Contrast enhanced mammography (CEM) versus magnetic resonance imaging (MRI) for staging of breast cancer: The pro CEM perspective. (1872-7727 (Electronic)).

**CESM Originalarbeiten:**


Breast-CT:


### Sensitivities CEM (contrast enhanced Mammography)

<table>
<thead>
<tr>
<th>Author</th>
<th>N</th>
<th>MCG</th>
<th>CESM</th>
<th>MRI</th>
<th>US</th>
<th>Analysis</th>
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<tbody>
<tr>
<td>Dromain 2011</td>
<td>110</td>
<td>78</td>
<td>92</td>
<td></td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Fallenberg 2014</td>
<td>118</td>
<td>77.9</td>
<td>94.7</td>
<td></td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Mikhtiar 2014</td>
<td>60</td>
<td>93.2</td>
<td>91.7</td>
<td></td>
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<td>Per patient</td>
</tr>
<tr>
<td>Lobbes 2014*</td>
<td>113</td>
<td>96.9</td>
<td>100</td>
<td></td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Perez 2015 ECR</td>
<td>98</td>
<td>78</td>
<td></td>
<td>66</td>
<td></td>
<td>Per lesion</td>
</tr>
<tr>
<td>Luczynska 2014</td>
<td>152</td>
<td>91</td>
<td>100</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Jochelson 2012</td>
<td>52</td>
<td>81</td>
<td>96</td>
<td>96</td>
<td></td>
<td>Per patient</td>
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<tr>
<td>Fallenberg 2013</td>
<td>80</td>
<td>81</td>
<td>100</td>
<td>97</td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Fallenberg 2016</td>
<td>155</td>
<td>81</td>
<td>94</td>
<td>95</td>
<td></td>
<td>Index Per Lesion</td>
</tr>
<tr>
<td>Lalj 2016*</td>
<td>199</td>
<td>93</td>
<td>96.9</td>
<td></td>
<td></td>
<td>Per patient 10 reader</td>
</tr>
<tr>
<td>Tennant 2016</td>
<td>100</td>
<td>84</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Luczynska 2016</td>
<td>116</td>
<td>90</td>
<td>100</td>
<td>92</td>
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<tr>
<td>Xing 2019</td>
<td>235</td>
<td>91.5</td>
<td>91.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CESM is comparable to MRI regarding index, a bit inferior for additional lesions * Recall from Screening

### CESM Originalarbeiten:
### Pre-therapeutic Staging

<table>
<thead>
<tr>
<th>Oxford</th>
<th>LoE</th>
<th>GR</th>
<th>AGO</th>
</tr>
</thead>
<tbody>
<tr>
<td>History and clinical examination</td>
<td>5</td>
<td>D</td>
<td>++</td>
</tr>
</tbody>
</table>

Only in case of high metastatic potential and/or symptoms and/or indication for (neo-)adjuvant chemotherapy and/or antibody-therapy:

- CT scan of thorax / abdomen
- Bone scan
- Chest X-ray
- Liver ultrasound
- Further investigation in case of additional suspicious lesions (e.g. liver-MRI, CEUS*, biopsy etc.)
- FDG-PET or FDG-PET-CT** FDG-PET-MRI**
- Whole body MRI

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**Statement: history and physical examination**

1. GCP

**Statement: high metastatic potential / symptoms**

27. Roszkowski N, Lam SS, Copson E, Cutress RI, Oeppen R. Expanded criteria for pretreatment staging CT in breast cancer. LiD - 10.1093/bjsopen/zraa006 [doi] LiD - zraa006. (2474-9842 (Electronic)).