**Evaluation of breast cancer screening with mammography**

<table>
<thead>
<tr>
<th>Age range (years)</th>
<th>Reduction in breast cancer mortality</th>
<th>Efficacy</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>40–44</td>
<td>Inadequate</td>
<td>Limited</td>
<td></td>
</tr>
<tr>
<td>45–49</td>
<td>Inadequate</td>
<td>Limited</td>
<td></td>
</tr>
<tr>
<td>50–69</td>
<td>Sufficient</td>
<td>Sufficient</td>
<td></td>
</tr>
<tr>
<td>70–74</td>
<td>Inadequate</td>
<td>Sufficient</td>
<td></td>
</tr>
</tbody>
</table>

**Possible adverse effects**
- Mammmography screening detects breast cancers that would not have been diagnosed if the women had not been screened (overdiagnosis).
- The risk of radiation induced cancer from mammography in women aged 50 years and older is substantially outweighed by the reduction in breast cancer mortality from mammography screening.
- Having a false-positive mammogram has short-term negative psychological consequences.

**Cost-effectiveness**
- There is a net benefit from inviting women aged 50-69 years to service mammography screening.
- Mammography screening for women aged 50-69 years can be cost-effective in countries with high breast cancer incidence.
- Breast cancer screening can be cost-effective in low- and middle-income countries.

**Evaluation of breast cancer screening with other imaging techniques**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Reduction in breast cancer mortality</th>
<th>Increase in the detection rate of cancers</th>
<th>Reduction in the rate of interval cancers</th>
<th>False-positive screening outcomes (decrease / increase)</th>
<th>Increase in the radiation dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjunct ultrasound in women with dense breasts and negative mammography</td>
<td>Inadequate</td>
<td>Limited</td>
<td>Inadequate</td>
<td>Sufficient</td>
<td>No data</td>
</tr>
<tr>
<td>Mammography with tomosynthesis (dual acquisition) compared to mammography alone</td>
<td>Inadequate</td>
<td>Mostly of invasive cancers</td>
<td>Inadequate</td>
<td>Limited</td>
<td>Sufficient</td>
</tr>
</tbody>
</table>

**Evaluation of breast cancer screening in high-risk women**

<table>
<thead>
<tr>
<th>High risk</th>
<th>Reduction in breast cancer mortality</th>
<th>Sensitivity (increase / decrease)</th>
<th>Specificity (increase / decrease)</th>
<th>Incremental detection rate</th>
<th>Increase in false-positive outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRCA1/2 mutation</td>
<td>Adjunct MRI</td>
<td>Adjunct MRI</td>
<td>Adjunct MRI</td>
<td>No data</td>
<td>No data</td>
</tr>
<tr>
<td>High familial risk (no BRCA1/2 mutation)</td>
<td>No data</td>
<td>Adjunct MRI</td>
<td>Adjunct MRI</td>
<td>CBE (+ adjunct MRI)</td>
<td>No data</td>
</tr>
<tr>
<td>Personal history of breast cancer</td>
<td>No data</td>
<td>Mammography *</td>
<td>Mammography *</td>
<td>Adjunct ultrasound</td>
<td>Adjunct MRI (+ mammography + ultrasound) *</td>
</tr>
<tr>
<td>LCIS or atypical proliferations</td>
<td>No data</td>
<td>Mammography *</td>
<td>Mammography *</td>
<td>Adjunct MRI</td>
<td>Adjunct MRI</td>
</tr>
</tbody>
</table>

*compared to women without similar high risk

CBE: clinical breast examination; LCIS, lobular carcinomatosis in situ; MRI, magnetic resonance imaging

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The IARC Handbooks of Cancer Prevention - Volume 15: Breast Cancer Screening

B. Lauby-Secretan, C. Scoccianti, D. Loomis, F. Bianchini, L. Benbrahim-Tallaa, V. Bouvard, K. Straif

On behalf of the IARC Handbook vol. 15 Working Group

**Working Group Members**

Nehmat Housami, Australia
Vessela Kristensen, Norway
Anthony M. Miller, Canada
Raul Murillo, Colombia
Eugenio Paci, Italy
Julette Patrik, United Kingdom
You-Lin Qiao, China
Agnieszka Rogal, France
Nereo Sennan, Italy
Surendra S. Shastri, India
Robert A. Smith, USA
Marit Sollijer, Norway

David B. Thomas, USA
Elisabeth Wrederpass, Norway
Invited specialists
Sylvia H. Heywang-Köbrunner, Germany
Martin J. Yaffe, Canada

IARC Participants
David Forman
Larry von Kann
Rengaswamy Sankaranarayanan

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- Tables of all evaluations from Volumes 1-15
- Working Procedures updated based on Preamble from IARC Monographs
- Working Procedures and other related documents
- The IARC Handbook of Cancer Prevention Series

**Evaluation of breast cancer screening by physical examination**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Reduction in breast cancer mortality</th>
<th>Shift in the stage distribution of tumours detected towards a lower stage</th>
<th>Reduction in the rate of interval cancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical breast examination</td>
<td>Inadequate</td>
<td>Sufficient</td>
<td>No data</td>
</tr>
<tr>
<td>Teaching breast self-examination</td>
<td>Inadequate</td>
<td>No data</td>
<td>Inadequate</td>
</tr>
<tr>
<td>Practising breast self-examination competently and regularly</td>
<td>Inadequate</td>
<td>No data</td>
<td>No data</td>
</tr>
</tbody>
</table>

**Key:**
- Green: Sufficient evidence for a beneficial effect
- Yellow: Limited evidence for a beneficial effect
- Red: Inadequate evidence for a beneficial effect
- Blue: Sufficient evidence for an adverse effect
- Orange: Limited evidence for an adverse effect
- Pink: Inadequate evidence for an effect

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