Economic aspects of breast cancer screening

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Economic aspects

- History
- Organisation
- Cost effectiveness
- Applicability
15 June 1987

Mammography screening at this moment is the only cost effective screening in breast cancer, if we can meet certain criteria on organization and financing.

We expect that 500 deaths will be saved... because of this program

Start: 50-69

Interval: 2 years
Cost-effectiveness

April 1990

- Expected effects
- Material and immaterial costs
- Optimal ratio in different scenarios
- Uncertain factors
- Information required
• Microsimulation model - MISCAN
  van Oortmarssen, de Koning and colleagues
• CE ratios
• Compared to situation without a screening programme
Selected screening policy

Basic variant

- Women aged 50 – 69
- 10 invitations
- 2-yr screening interval
- MISCAN estimates 1990 - 2017
## Selected screening policy

<table>
<thead>
<tr>
<th>Category</th>
<th>Basic</th>
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<th>Difference</th>
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<tbody>
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<td>Costs</td>
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<tr>
<td>Screening</td>
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Selected screening policy

**Basic variant**

- 466 million
- 61,000 life-years gained
- Cost per life-year gained: 7.650 (≈ 3.500 Euro)
- Cost per QALY: 8.100 (≈ 3.700 Euro)

- MISCAN estimates 1990 - 2017
QALY - other interventions

- Preventing cervical cancer: 26 QALY per baby
- Other interventions: 65 QALY
Economic aspects

• History
• Organisation
• Cost effectiveness
• Applicability
Organisational framework

Ministry of Health, Welfare and Sport

National Institute for Public Health and the Environment
The Dutch way of screening

- Dutch screening act
- Strict separation from health care
- Different funding - taxes vs premiums
- Lowest referral rates in the world
- Daily quality control & monitoring
Screening

Taxes

Health care

Premiums

H 1

H 2

H 3

H 4

GP
Organisation

9 regional foundations
64 screening units
LETB
Rotterdam

LRCB
Nijmegen

Audit, Quality Control, Evaluation
Economic aspects

- History
- Organisation
- Cost effectiveness
- Applicability
• 16.5 million inhabitants
• 8.2 million women
• 13,800 new cases of breast cancer in 2006
• 8,000 in the age group 50-74
• 20 year breast cancer screening
• 82% participation
• 4,000 screen-detected cancers in 2006
<table>
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<tr>
<td>Referred</td>
<td>18 per 1000</td>
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<td>Breast cancer</td>
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<tr>
<td>False positive screening test</td>
<td>12.5 per 1000</td>
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<td>Interval cancer</td>
<td>1.0 per 1000</td>
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LETB / NETB 2008
# Screening outcomes - international

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<tr>
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<th>UK</th>
<th>USA</th>
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<tbody>
<tr>
<td>Referred</td>
<td>18 per 1000</td>
<td>36</td>
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<td>5.5 per 1000</td>
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<tr>
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<td>12.5 per 1000</td>
<td>30</td>
<td>76</td>
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<tr>
<td>Interval cancer</td>
<td>1.0 per 1000</td>
<td>≈ 1.0</td>
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LETB / NETB 2008  Based on J Med Screen 2005;12:50-54
Total National Budget for “prevention” (early detection):

200 Million €

49 Million €

Breast cancer screening (2007)
Costs from 1997 on (in Euro)

Herceptin N=2000
National costs for
- Coordination,
- Quality assurance,
- Evaluation,
- 3 € per screen (7%)

(LETB, 2005)
Cost per life year saved

- 3500 Euro - Breast Cancer Screening
- 8000 Euro - FOBT Screening Colon Cancer
- 12500 Euro - Cervical Carcinoma Screening
- 20000 Euro - Dutch limit (in screening)
The Dutch screening goes digital
Digitization costs

- National costs for digitization per screen
  - €3,61 per investigation
- All-in: 64 digital mammographs, 30 reading stations, 57 mobile units

2004: € 49.30
2007: € 53.36
Costs from 1997 on (in Euro)

- Total costs (million Euro)
  - Totaal / total
  - Per onderzoek / per screen
  - Gecorrigeerd / adjusted

- Per screen (Euro)

- Costs in 1997: €3,61
€ 3500 per life-year gained

500 lives saved
Balance?

- Cost
- Effectiveness
- Digital Test
- A priori chance
Economic aspects

• History
• Organisation
• Cost effectiveness
• Applicability
Applicability – other countries

CE-ratio euro / LY gained

- Germany: 9600
- Spain: 7125
- France: 4950
- United Kingdom: 2900
- The Netherlands: 3400

De Koning, Eur J Radiol 2000;33:32-7
Applicability – other countries

Cost-effectiveness is influenced by:

• Age-specific incidence
• All-cause life expectancy and temporal trends of major epidemics
• Population age structure
• Availability, effectiveness and costs of treatment
• Health system costs of screening

Brown et al, Health service interventions for cancer control in developing countries, Disease Control Priorities Project
Applicability – other countries

START SMALL,
SCALE UP SMART

Brown et al, Health service interventions for cancer control in developing countries, Disease Control Priorities Project
“Starting small might entail applying an initial (pilot) program to a limited age range that is estimated to yield the most benefits per resource use”

“Programs can later be extended (wider age groups, more frequent screening) after analysis of the initial program indicating that the incremental cost-effectiveness of these extensions would be favourable”

Brown et al, Health service interventions for cancer control in developing countries, Disease Control Priorities Project
Thank you for listening!