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Evaluation, monitoring and stepwise improvement of cervical cancer screening

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The start in the Netherlands

- Cervical cancer screening has suffered from the lack of Randomised Controlled Trials.
- In the Netherlands, a pilot study was conducted, with every three years invitations between ages 35 and 53.
- The same invitation schedule was subsequently used for the national screening protocol.

Evaluation for stepwise improvement

- Reducing adverse screening effects
 - Enhancing favorable screening effects
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Organization, advice and decision making

- Multidisciplinary evaluation group for the pilot regions. Until 1990.
 - Review and actions (protocols, financing, etc.), Health Insurance Board (CVZ), 1990 onwards.
 - Steering group, multidisciplinary. Cocomba, CVZ.
 - Recently, the National Institute of Public Health (RIVM) has taken over the steering and organization role.
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Methods and data of evaluation

- Registration of invitations, smear results, follow-up, final histological diagnosis and cancer incidence and mortality (Screening registry, Cancer Registry, Death registration CBS).
 - Epidemiological analysis , cost analysis, health effect analysis
 - Cost-effectiveness calculations for comparing alternatives
 - Reporting and discussion in advisory and decision context
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Some interesting findings from the evaluation

1. Non-attenders to screening were at increased risk.
2. The risk in women born before 1930 is higher than in more recent birth cohorts.
3. Progression of pre-invasive lesions to cancer is age-dependent, with more cancer developing at older ages.
4. The mean duration of screen-detectable disease and the sensitivity of the Pap-smear were estimated from the British Columbia (Canada) data.

Sources: 1-3. van Oortmarssen GJ, Habbema JD. Br J Cancer 1991, 4. van Oortmarssen GJ and Habbema JDF. Int J epi 1995, 5. Thesis: van Ballegooijen M. Rotterdam, Erasmus University, 1998

Cost analysis

Based on Dutch organization charts, file studies and tariffs:

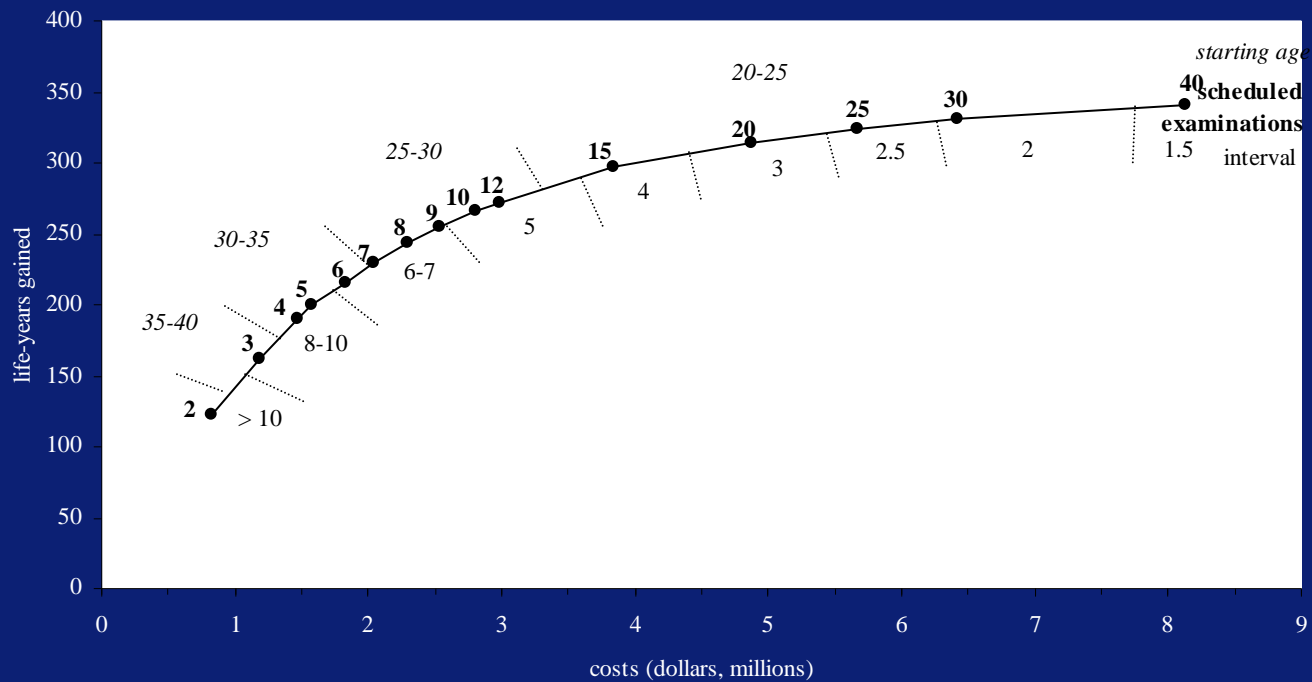
- Costs of organization, screening, follow-up, treatment (pre-invasive/invasive/advanced disease)

Detailed studies:

- Costs of pap smear, colposcopy

(Source: Koopmanschap et al. Soc Sci Med 1990, updates in later reports)

Cost-effectiveness analysis for better screening schedule: Efficient frontier



Source: van den Akker-van Marle et al. JNCI 2002

Cost-effectiveness analysis for better screening schedule

Before:

The program cost €15.000 per life years gained (screening interval 3 years, between 35-53 years)

Decision:

New screening program was implemented (screening interval 5 years, between 30-60 years)

After:

The program cost €9.000 per life years gained (screening interval 5 years, between 30-60 years)

Source: van Ballegooijen et al. Cervical cancer screening programme: age ranges and intervals. An updated cost-effectiveness analysis (In Dutch), 1993

Reducing false positives

Before:

10% Borderline/Pap2

Decision:

New pathology guidelines aimed to improve the specificity of the Pap smear

After:

2% Borderline/Pap2

Source: Rebolj et al. Int J Cancer 2007

Less repeat smears

Before:

8% repeat smear due to lack of extra-cervical cells (7%) and inadequate quality (1%)

Analysis:

No significant difference between proportion of pre-invasive lesions detected after negative smears with and without extra-cervical cells.

Decision:

No repeat after Pap smear without extra-cervical cells.

After:

1% repeat smear (due to inadequate quality)

Discouraging opportunistic smears

Before:

- Smears in target population with interval <2 years: 26% of all smears
- Smears taken before 30 years of age: 106.000

Decision: No reimbursement anymore of preventive smears taken outside of the regular screening.

After:

- Smears taken before 30 years of age: 28.000 (-74%)

Improving attendance to screening

Before:

Participation rate: 40%, 5-year coverage: 69%

Decision:

Implementation of measures to increase attendance

After:

Participation rate: 66%, 5-year coverage: 77%

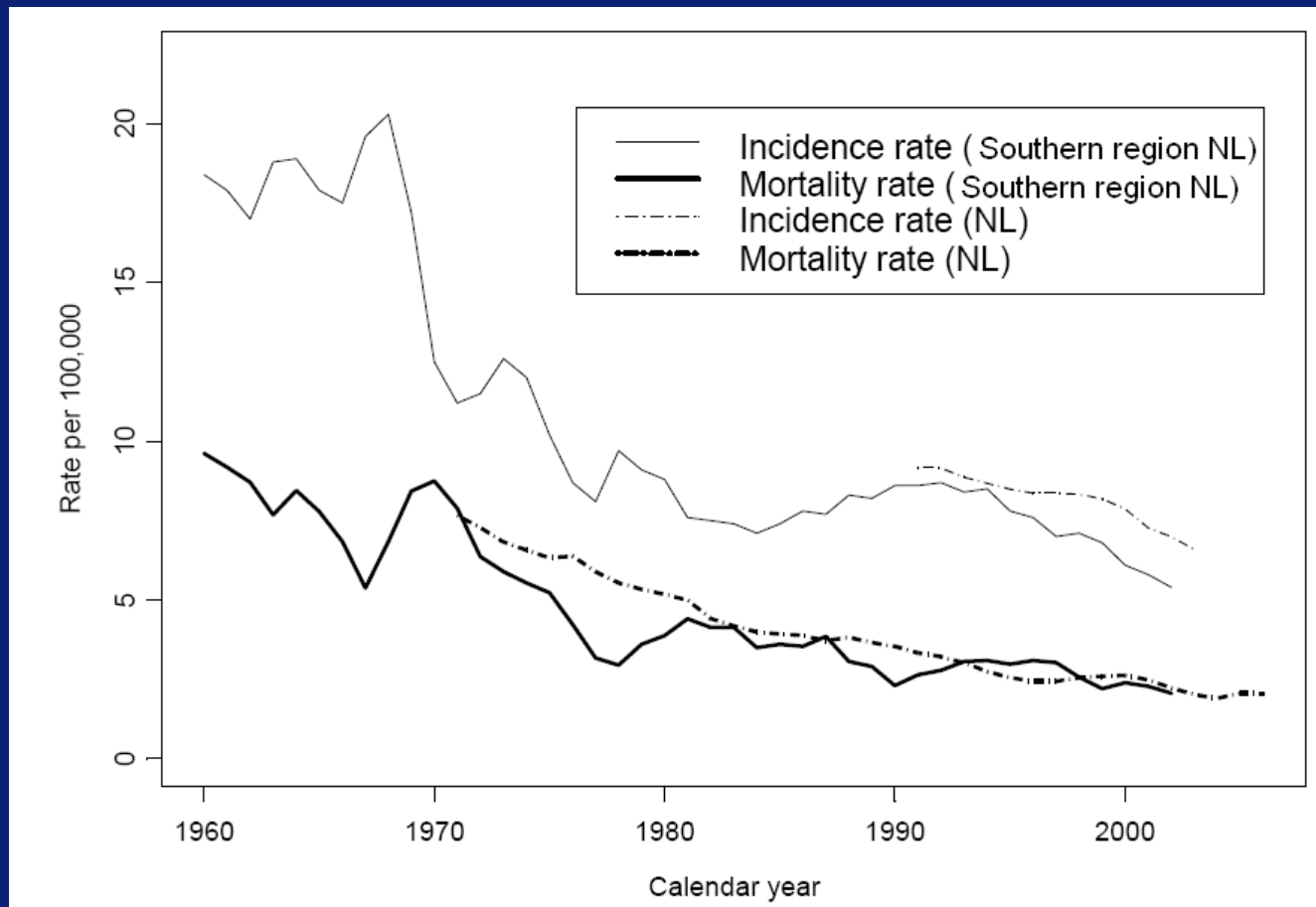
Compliance during follow-up after borderline/Pap2 smears much improved

Before: Timely follow-up: 47%

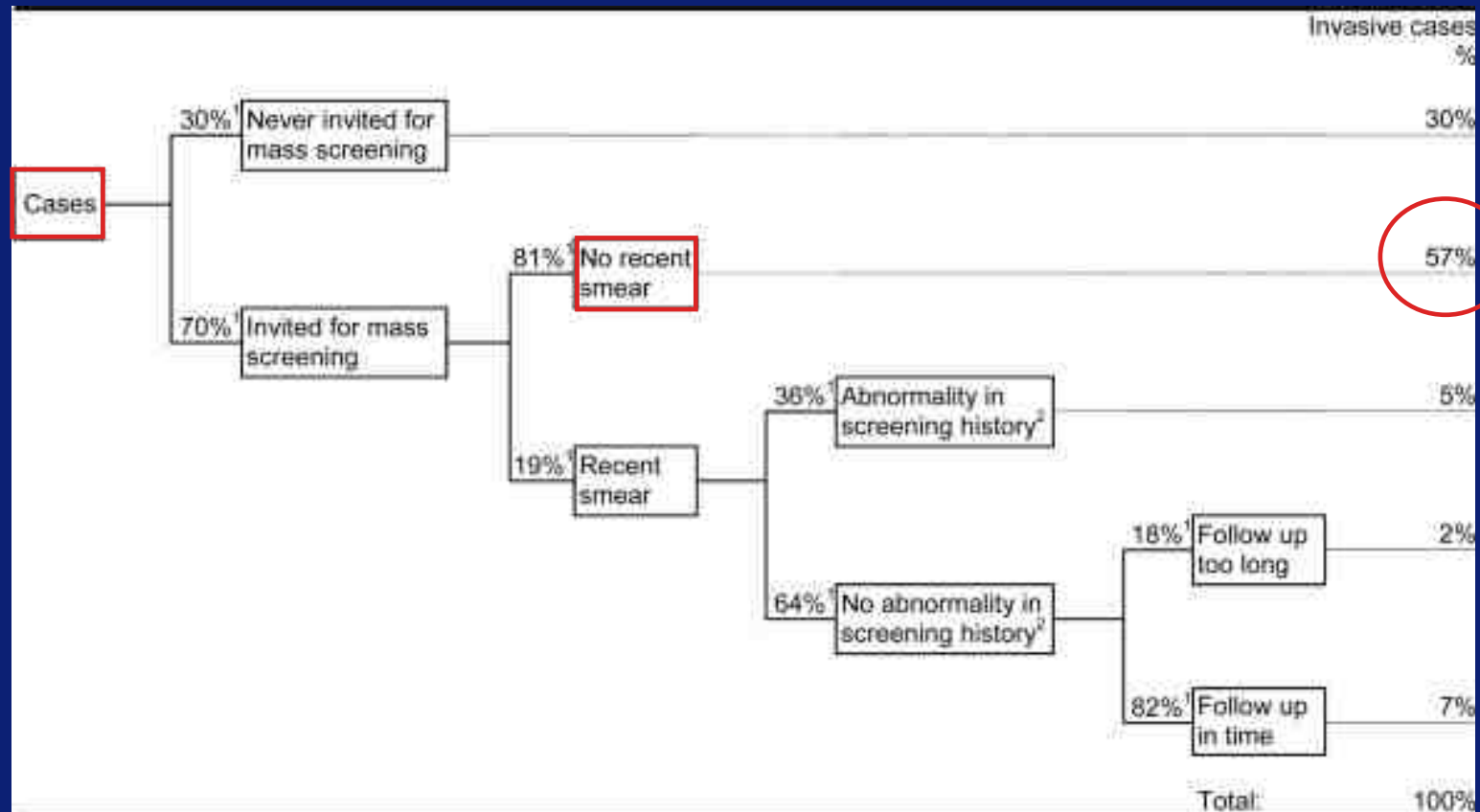
Decision: Better organization; reminders/monitoring

After: Timely follow-up: 86%

Effect evaluation: downward trend in cervical cancer mortality and incidence in the Netherlands

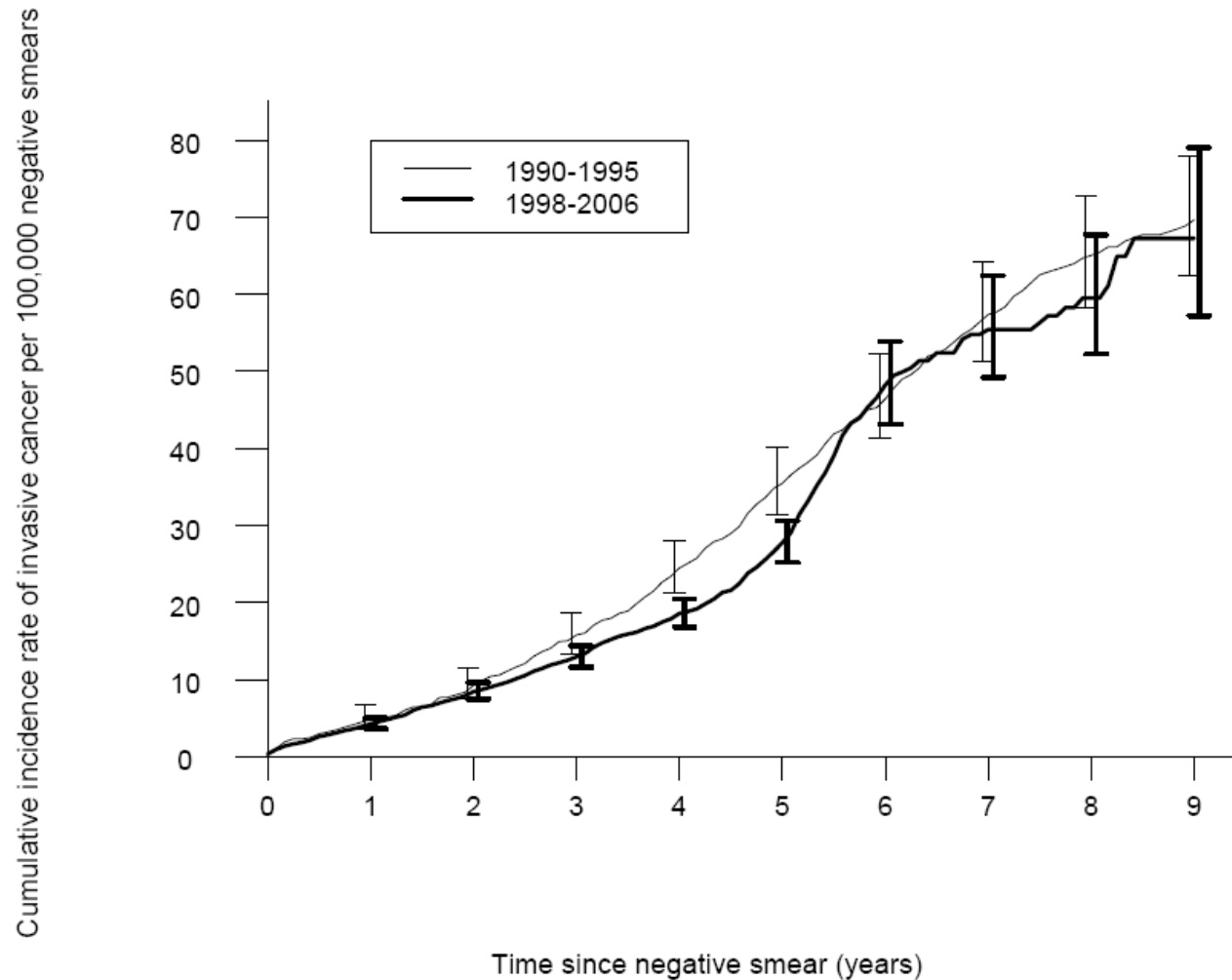


Effect evaluation: most cervical cancer cases missed because of non-participation



(Source: Bos et al. Int J Cancer 2006)

Effect evaluation: risk for cervical cancer after a negative smear same for 3-year and 5-year interval



Source: Rebolj et al.
Int J Cancer 2008

Evaluation of current developments in screening

Cost-effectiveness analysis of:

- HPV test in stead of pap-smear for primary screening
 - Thin Layer Cytology
 - Automatic screening
 - Self testing
 - Vaccination in combination with screening
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Conclusions

- Exciting and dynamic area of prevention
 - Evaluation and monitoring with impact on decision making is possible
 - Registration of important items is a prerequisite
 - Good organization, communication and consensus are crucial
 - Modeling and cost-effectiveness are important hta methodologies
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