

Quality of life of breast cancer treatments and the impact of varying quality of life assumptions on cost-effectiveness

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Introduction

- Breast cancer screening → ↓ breast cancer mortality
→ ↑ quality of life
- Quality adjusted life years (QALYs) (often used in cost-effectiveness analyses)


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graph BT; A[Life years] --> B[Quality adjusted life years (QALYs)]; C[Utility values for life states] --> B;
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- Utility values for breast cancer health states are somewhat outdated and inconsistent
- Which utility values should we use?
- What is the effect of varying utility values on the results of cost-effectiveness analyses?

Aim

- *To establish utility values for breast cancer health states during treatment based on real-world data*
- *To research the impact of varying quality of life assumptions on cost-effectiveness analyses*

Methods

Part 1

- 646 female breast cancer patients receiving surgery in 2015-2021 at Erasmus MC
- Data on age and treatment
- EQ-5D-5L data (Dutch tariff¹)
 - T0 (after diagnosis)
 - T6 (six months after surgery)
 - T12 (twelve months after surgery)

Part 2

- Cost-effectiveness analyses using varying sets of
 - Normative utilities
 - Treatment disutilities
 - Screening and follow-up disutilities

¹Versteegh (2016)

Methods

Normative utilities

- Perfect health (1.0)
- Gender specific¹
- Gender and age specific²

Treatment disutilities

- Stratified by disease stage at diagnosis (early/late/fatal)
- “ “ age and type of surgery
- “ “ age and use of chemo therapy (Y/N)
- “ “ age and use of endocrine therapy (Y/N)
- “ “ age and use of chemo and/or endocrine therapy



From results
part 1

Screening and follow-up disutilities

Sensitivity analyses around disutilities for mammography screening and follow-up³

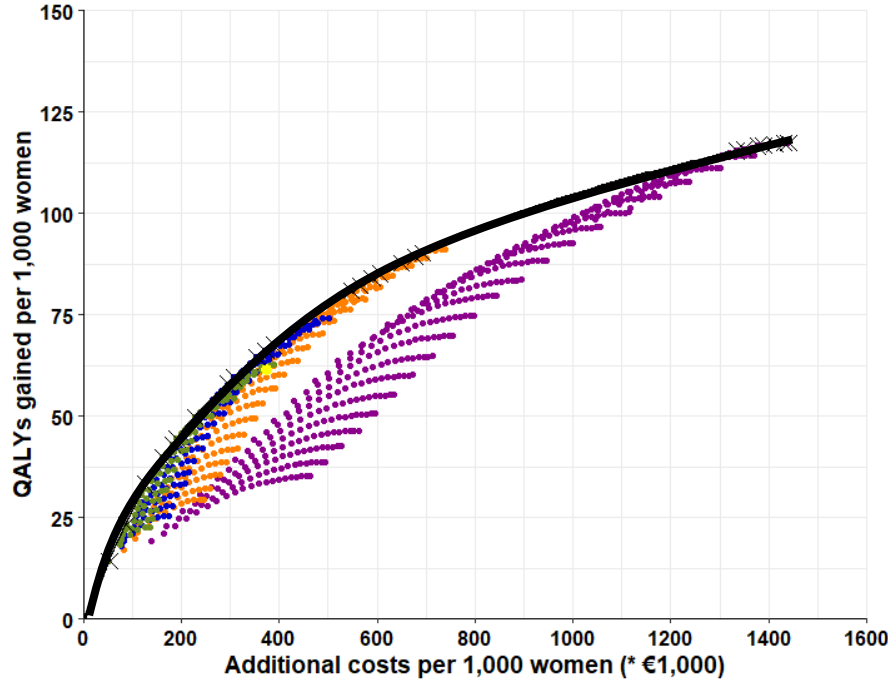
- Mammography: 0.006 for 1 week
- Follow-up: 0.105 for 5 weeks

¹Versteegh (2016)

²Clarijs (2022)

³de Haes (1991)

Methods



Cost-effectiveness analyses¹:

920 BC screening strategies

Varying in:

- Screening interval (1-4 years)
- Starting age (40-60 years)
- Stopping age (64-84 years)

- Annual
- Biennial
- Current
- Quadrennial
- Triennial

Optimal strategy:

Biennial 40 to 76

¹Kregting (2022)

Results

Part 1

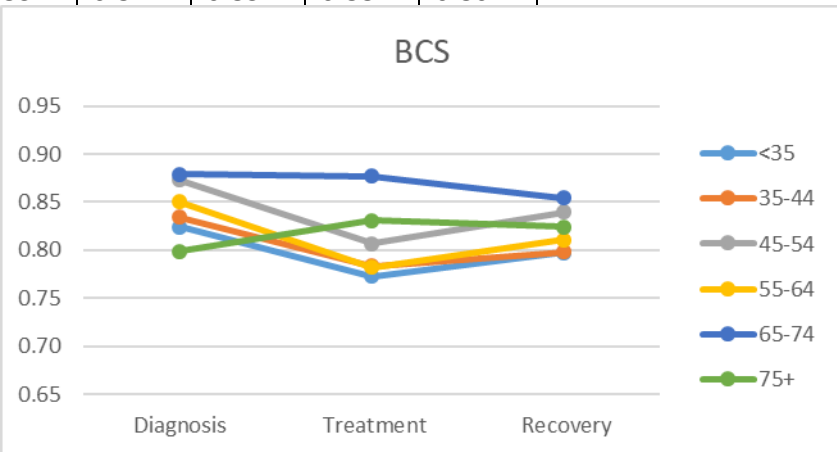
Table with average utility scores stratified by:

- Age groups
 - Treatment type
- for timepoints:
- At diagnosis
 - During treatment
 - During recovery

Utility set name	subcategories	Treatment stage	Age					
			<35	35-44	45-54	55-64	65-74	≥75
Type of surgery	BCS	Diagnosis	0.82	0.83	0.87	0.85	0.88	0.80
		Treatment	0.77	0.78	0.81	0.78	0.88	0.83
		Recovery	0.80	0.80	0.84	0.81	0.85	0.82
	Mastectomy	Diagnosis	0.79	0.82	0.82	0.77	0.80	0.81
		Treatment	0.69	0.78	0.71	0.77	0.77	0.85
		Recovery	0.79	0.80	0.80	0.78	0.73	0.83
	Mastectomy + reconstruction	Diagnosis	0.78	0.87	0.90	0.89	0.81	0.80*
		Treatment	0.76	0.86	0.77	0.81	0.91	0.91*
		Recovery	0.81	0.86	0.84	0.88	0.89	0.89*
	No surgery [†]	Diagnosis	0.65 [†]	0.65 [†]	0.64 [†]	0.64 [†]	0.62 [†]	0.75 [†]
		Treatment	0.65 [†]	0.65 [†]	0.64 [†]	0.64 [†]	0.62 [†]	0.75 [†]
		Recovery	0.65 [†]	0.65 [†]	0.64 [†]	0.64 [†]	0.62 [†]	0.75 [†]
Chemotherapy	Chemotherapy yes	Diagnosis	0.80	0.83	0.87	0.83	0.76	0.75*
		Treatment	0.74	0.79	0.77	0.78	0.74	0.73*
		Recovery	0.80	0.80	0.82	0.80	0.71	0.71*
	Chemotherapy no	Diagnosis	0.79	0.86	0.86	0.83	0.86	0.81
		Treatment	0.81	0.83	0.78	0.78	0.86	0.84
		Recovery	0.87	0.84	0.83	0.81	0.84	0.83
Endocrine therapy	Endocrine therapy yes	Diagnosis	0.81	0.85	0.84	0.85	0.86	0.78
		Treatment	0.75	0.81	0.78	0.77	0.91	0.84
		Recovery	0.77	0.83	0.83	0.80	0.89	0.78
	Endocrine therapy no	Diagnosis	0.79	0.83	0.90	0.81	0.84	0.83
		Treatment	0.74	0.79	0.77	0.79	0.78	0.84
		Recovery	0.83	0.80	0.83	0.83	0.76	0.90
Chemo and/or endocrine therapy	Chemotherapy yes, endocrine therapy no	Diagnosis	0.78	0.78	0.91	0.81	0.74	0.73*
		Treatment	0.74	0.73	0.73	0.80	0.62	0.61*
		Recovery	0.83	0.78	0.81	0.77	0.60	0.59*
	Chemotherapy no, endocrine therapy yes	Diagnosis	0.67	0.85	0.84	0.86	0.87	0.78
		Treatment	0.78	0.79	0.77	0.77	0.91	0.84
		Recovery	0.89	0.87	0.82	0.78	0.89	0.78
	Chemotherapy yes, endocrine therapy yes	Diagnosis	0.83	0.85	0.85	0.84	0.79	0.78*
		Treatment	0.75	0.82	0.79	0.77	0.89	0.88*
		Recovery	0.76	0.82	0.83	0.81	0.86	0.85*
	Chemotherapy no, endocrine therapy no	Diagnosis	0.91	0.87	0.88	0.81	0.86	0.83
		Treatment	0.87	0.85	0.79	0.79	0.80	0.84
		Recovery	0.85	0.83	0.85	0.84	0.78	0.90

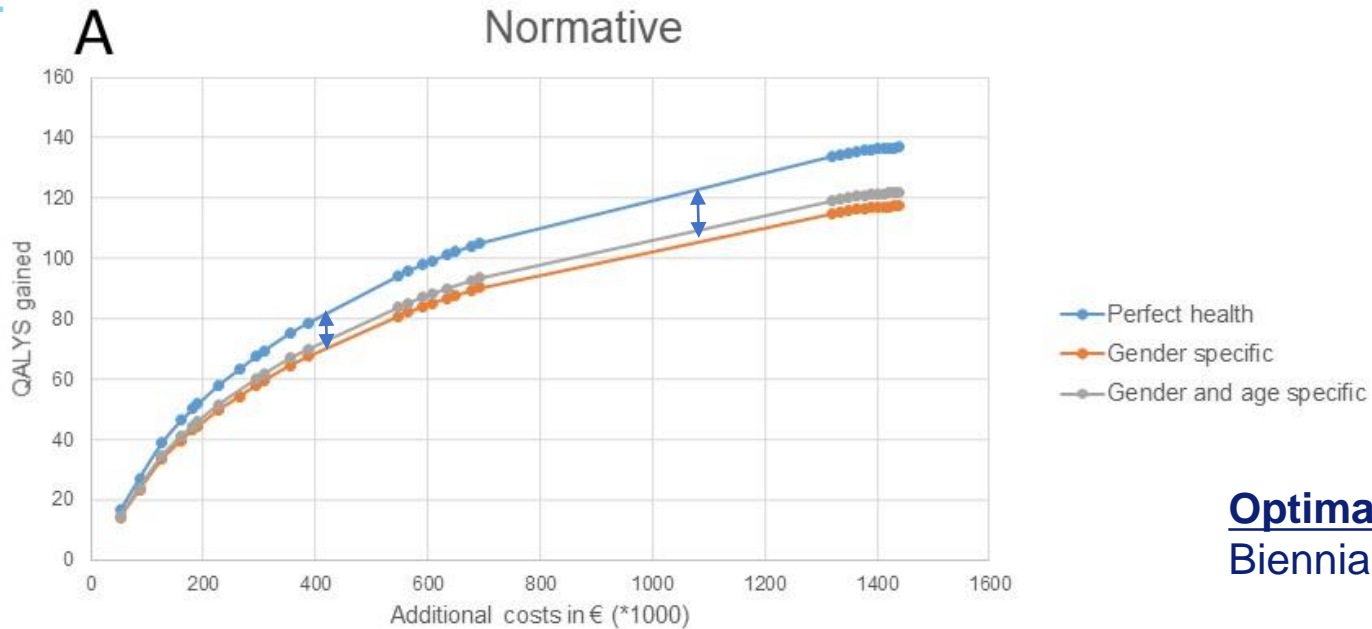
Results

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		Treatment	0.76	0.				
		Recovery	0.81	0.				
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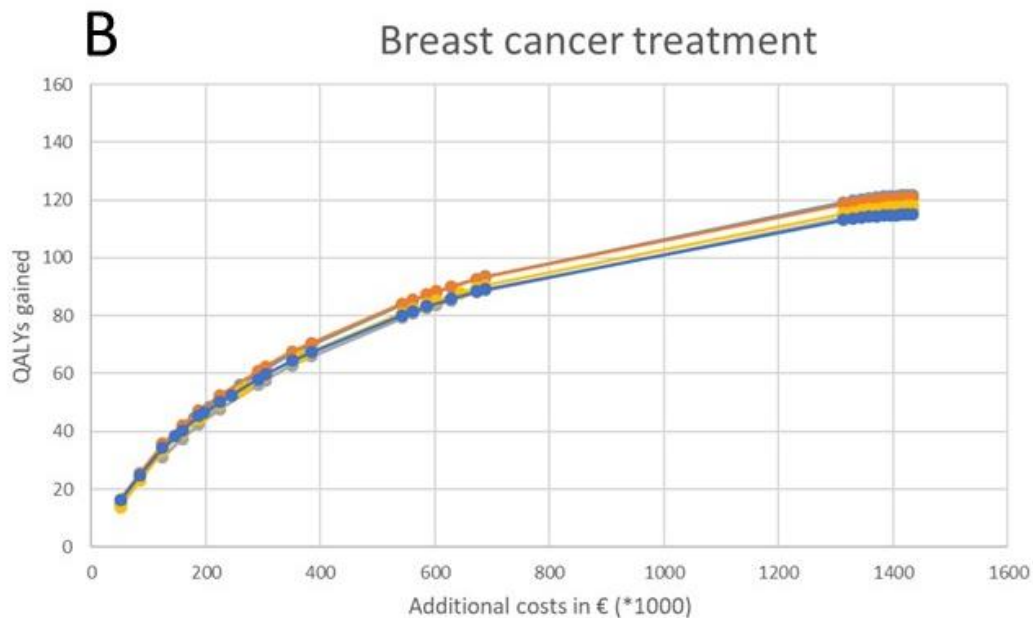
Results

Part 2



Optimal strategy:
Biennial 40 to 76

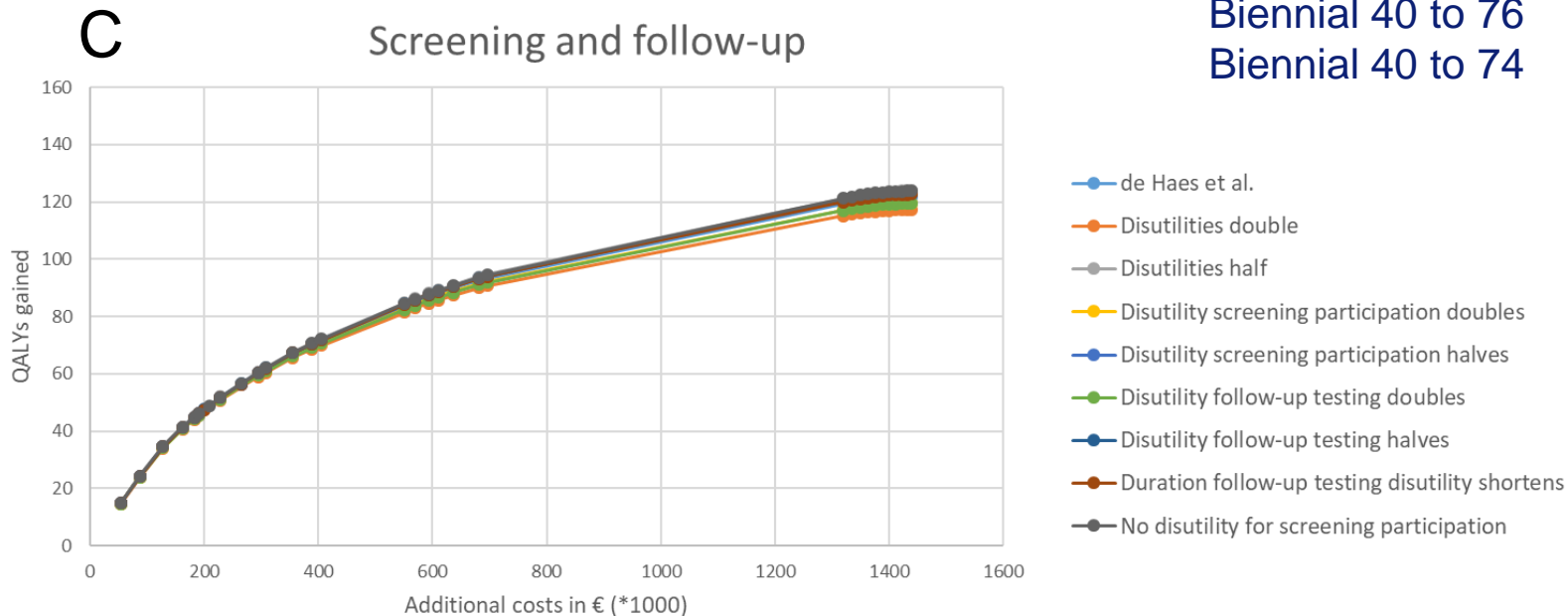
Results



Optimal strategy:
Biennial 40 to 76
Biennial 40 to 74

Results

Optimal strategy:
Biennial 40 to 76
Biennial 40 to 74



Discussion

- Previous studies reported utility values between 0.97 and 1.0 for BC health states (compared to a normative utility of 1)
- Current utility values between 0.71 and 0.91 (compared to gender and age specific normative utilities)
- Differences possibly due to:
 - Timing of the valuation
 - Quality of life instrument used
 - Population asked to value the health states
- Effects on cost-effectiveness:
 - Comparable to Omidvari et al.¹ (different QALY results, but robust efficiency frontiers)
 - Different from de Kok et al.² (different preferred strategies due to changing utility sets)

¹Omidvari (2021) ² de Kok (2018)

Conclusion

This study:

- Provided new data-based utility values for patients with breast cancer stratified by age and treatment options.
- Found that the use of gender and age stratified normative utilities and patient-based breast cancer quality of life parameters stratified by age and treatment, or disease stage are recommended.
- Found that the number of QALYs gained were not sensitive to variations in screening and follow-up utilities.
- Showed that efficiency frontiers and optimal screening strategies were found to be very robust.





Thank you!

Questions?

