



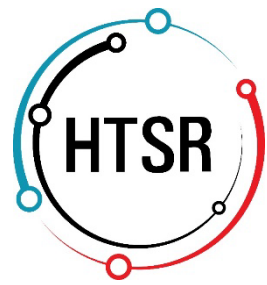
Health Technology Assessment

LoaD Annual Meeting

October 3, 2023

Erik Koffijberg

**UNIVERSITY
OF TWENTE.** | Health Technology
& Services Research



Healthcare is becoming unaffordable

Donderdag 21 september 2023 | Het laatste nieuws het eerst op NU.nl



Zorgpremie stijgt door en is in 2024 weer 12 euro per maand hoger

Door Thijs Rösken

19 sep 2023 om 15:30
Update: 2 dagen geleden

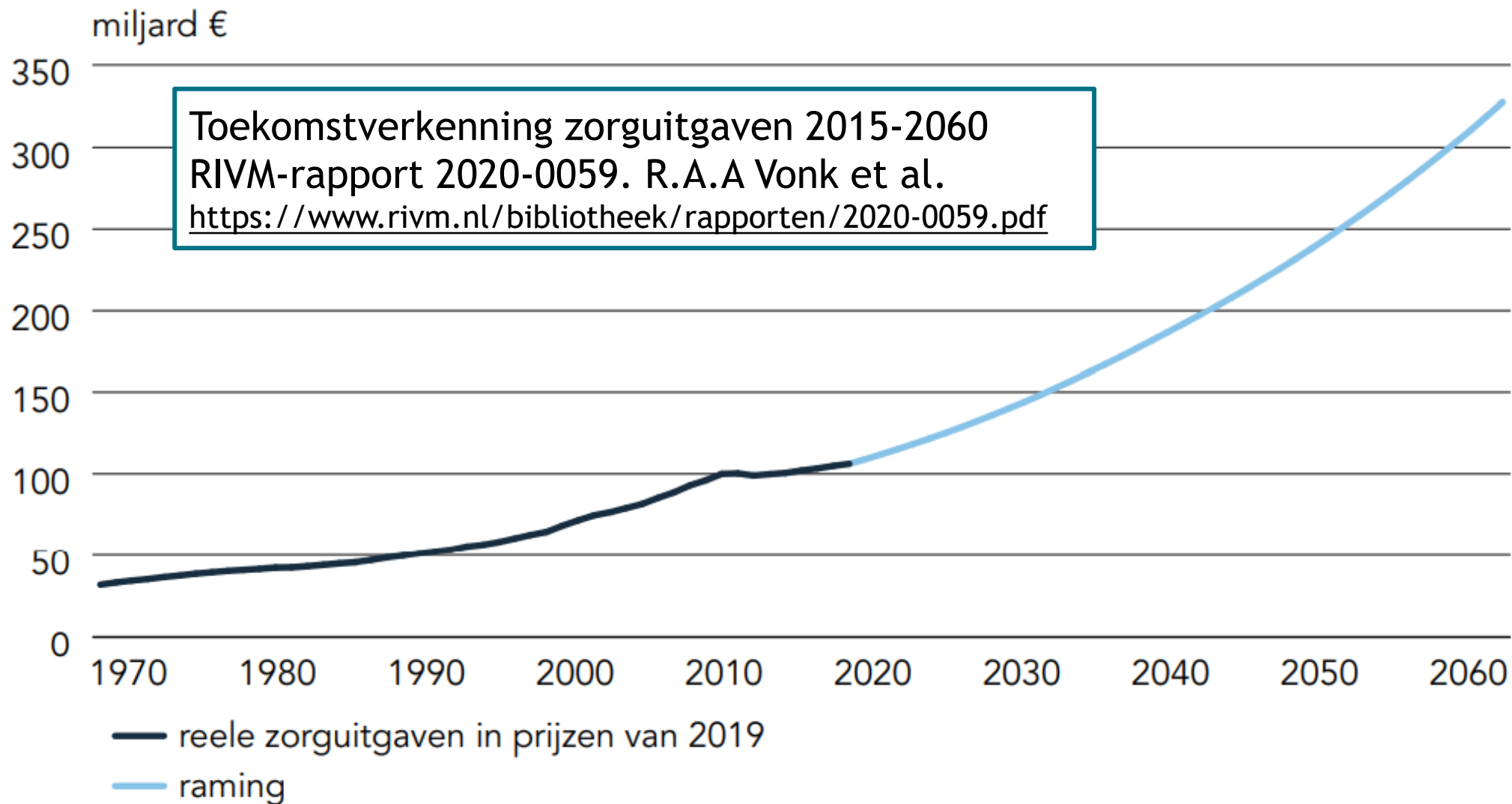
 1.4K reacties

 Delen

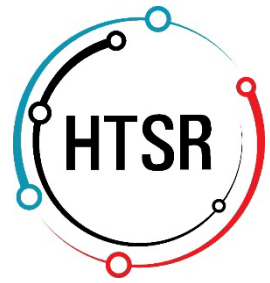
Het demissionaire kabinet verwacht dat de premie voor de basiszorgverzekering in 2024 weer 12 euro hoger is dan dit jaar. Volgens het ministerie van Volksgezondheid komt de premie waarschijnlijk op 149 euro per maand uit.

Healthcare is becoming unaffordable

Figuur 3.2 Raming van de totale reële zorguitgaven tot 2060 (miljarden euro's)

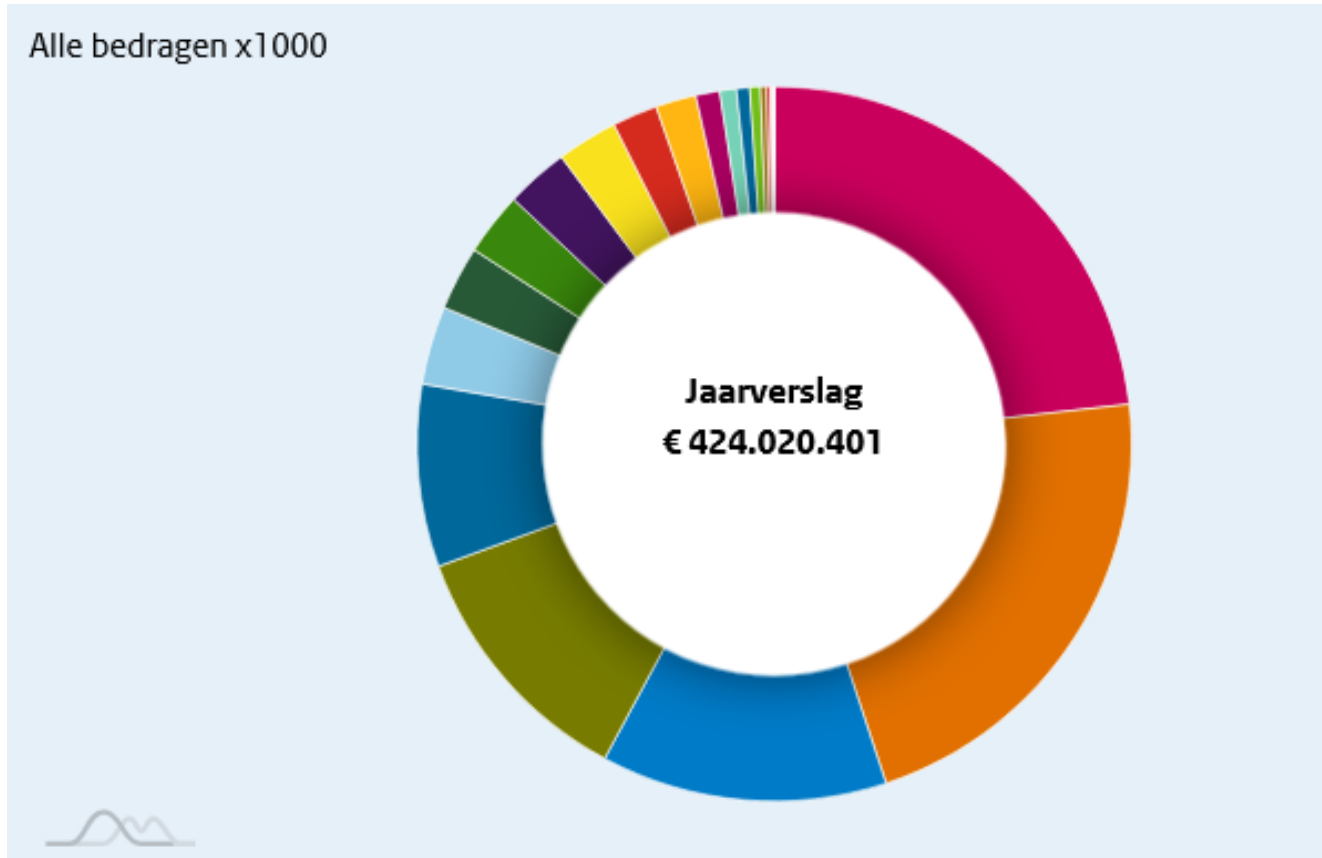


Bron: Vonk et al. 2020.



Opportunity costs are unacceptable

<https://www.rijksfinancien.nl/visuals/2021/jaarverslag/uitgaven>



125 billion Euros was spent on healthcare in 2021

Jaarverslag 2021	€ 424.020.401
Sociale Zaken en Werkgelegenheid	€ 98.487.398
Volksgezondheid, Welzijn en Sport	€ 92.030.337
Financien en Nationale Schuld	€ 54.873.429
Onderwijs, Cultuur en Wetenschap	€ 49.040.415
Gemeentefonds	€ 35.028.123
Justitie en Veiligheid	€ 14.982.700
Economische Zaken en Klimaat	€ 12.322.701
Buitenlandse Zaken	€ 12.119.027
Defensie	€ 12.080.072
Infrastructuur en Waterstaat	€ 11.670.648
Binnenlandse Zaken en Koninkrijksrelaties	€ 8.667.919
Infrastructuurfonds	€ 7.753.345
Defensiematerieelfonds	€ 4.606.982
Buitenlandse Handel en Ontwikkelingssamenwerking	€ 3.188.330

Healthcare workforce is under huge pressure

WRR rapport (104) 'Kiezen voor houdbare zorg'

<https://www.wrr.nl/publicaties/rapporten/2021/09/15/kiezen-voor-houdbare-zorg>

2021

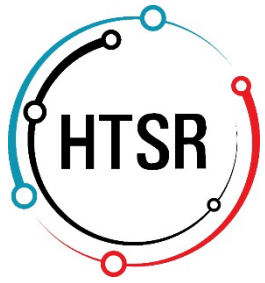


1:6 working
in healthcare

2060



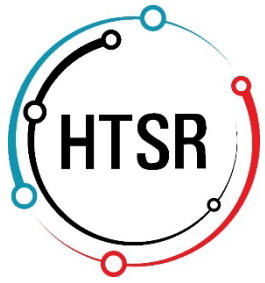
1:3 working
in healthcare



Causes of increasing healthcare demand and healthcare costs

1. Increasing welfare
 - *More money to spend on healthcare that is available*
2. Demographic changes
 - *Population ageing, more elderly*
3. Healthcare innovations (drugs, devices, apps, etc)
 - *Technology push, expensive innovations (R&D)*
4. Increasing demand from patients (Google)
 - *Market pull, shared decision making*
5. Increasing medical capabilities
 - *Prolonged survival, more expensive chronic conditions*
6. Increasing focus on prevention
 - *Prolonged survival, more expensive chronic conditions*

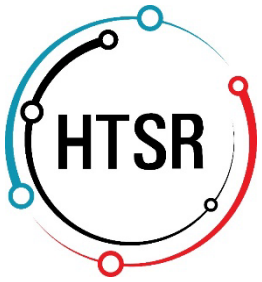
Baumol's disease (1960s)
Healthcare has limited options for increase in labor productivity while costs and salaries increase



Solutions to these problems

- I. Restrict access to expensive innovations that do not provide clear, large, added value
- II. Implement innovations improving healthcare efficiency and saving costs (and reducing the needed care capacity) without compromising health outcomes

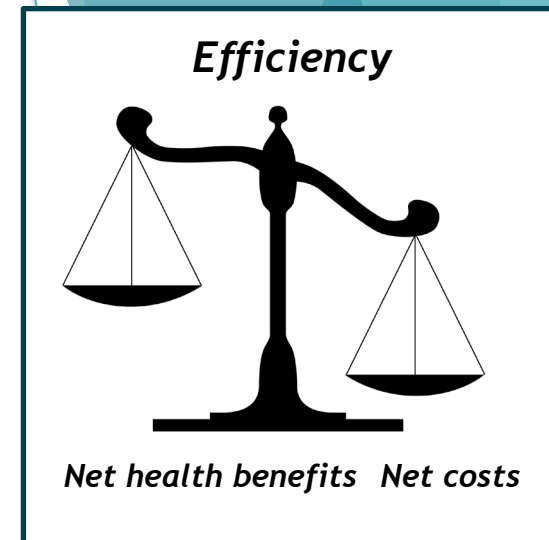
**Both solutions require
quantification methods**



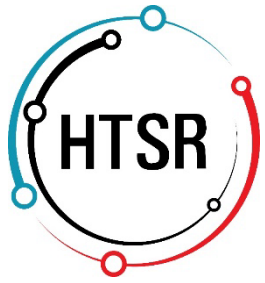
Health Technology Assessment

HTA is a multidisciplinary process that uses explicit methods to determine the value of a health technology at different points in its lifecycle. The purpose is to inform decision-making in order to promote an equitable, efficient, and high-quality health system.*

- For a wide range of goals and interventions / technologies
- Formal, systematic, and transparent process using best available evidence
- Examines all consequences of using an intervention compared to alternatives
- Value dimensions often include safety, clinical effectiveness, health benefits, and costs
- Value can depend on the perspective taken and the decision context
- During the intervention lifecycle: pre-market, during market approval, post-market, through to disinvestment



*The new definition of health technology assessment: A milestone in international collaboration. O'Rourke, B. et al. (2020). International Journal of Technology Assessment in Health Care, 36(3), 187-190.



Health Technology Assessment

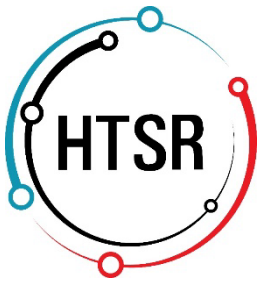
Budgets in healthcare are always constrained

How can we generate the highest impact: how can we use our scarce resources to maximize population health outcomes?

- *Divide care budget across patients and diseases*
- *Divide research budget across diseases and technologies*

Increasingly important

The consequences of implicit decision-making (intuition) or ignoring HTA outcomes in actual decision-making can be huge...



Proton beam therapy

Impact driven decision-making is crucial

nrc>

Tegenvallende cijfers voor peperdure, prestigieuze protonencentra. 'Ontzettend zorgelijk'

Kankerbehandeling Nederland bouwde voor 230 miljoen euro drie protonencentra, maar er zijn niet genoeg patiënten. VWS was gewaarschuwd.

Lucien Hordijk 20 december 2021



When to Wait for More Evidence? Real Options Analysis in Proton Therapy

JANNEKE P.C. GRUTERS,^a KEITH R. ABRAMS,^b DIRK DE RUYSSCHER,^c MADELON PIJLS-JOHANNESMA,^c HANS J.M. PETERS,^d ERIC BEUTNER,^d PHILIPPE LAMBIN,^c MANUELA A. JOORE^{a,e}

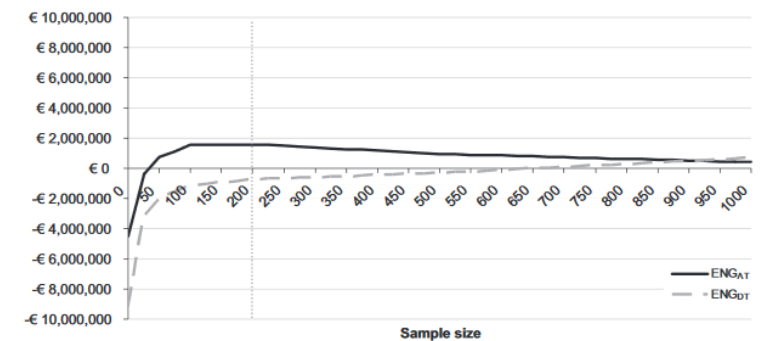
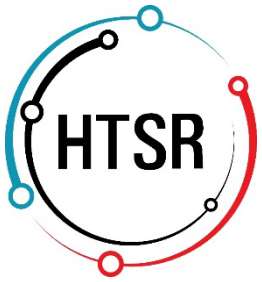


Figure 2. Expected net gain (ENG) for the options to delay and trial (ENG_{DT}) and adopt and trial (ENG_{AT}) for different sample sizes. The gray dotted line marks the optimal sample size (highest expected net gain). Abbreviations: ENG, expected net gain; ENG_{DT} , ENG for the options to delay and trial; ENG_{AT} , ENG for the options to adopt and trial.

Oncologist. 2011;16(12):1752-61.

<https://pubmed.ncbi.nlm.nih.gov/22147003/>



Proton beam therapy

Decisions are typically irreversible in practice



onafhankelijk, multidisciplinair en betrouwbaar

[Artikelen](#) [Dossiers](#) [Gezonde Zorg](#) [Academie](#) [Podcast](#)

JOURNALISTIEK / ONDERZOEKSJOURNALISTIEK /

Marchanderen met bewijs

20 JUNI 2022

Lucien Hordijk

Nederland heeft sterk ingezet op protonetherapie. Via een omweg werd deze kostbare bestralingstechnologie als wetenschappelijk bewezen verklaard. Maar dat had onbedoelde gevolgen. Hoe de radiotherapeuten en het Zorginstituut in een doelredenering verzeild raakten, en niemand nu nog terug kan: een onderzoek van The Investigative Desk

A bed built is a bed filled.
Milton Roemer, 'Bed supply and hospital utilization: a natural experiment', Hospitals 35 (1961), pp. 36-42.



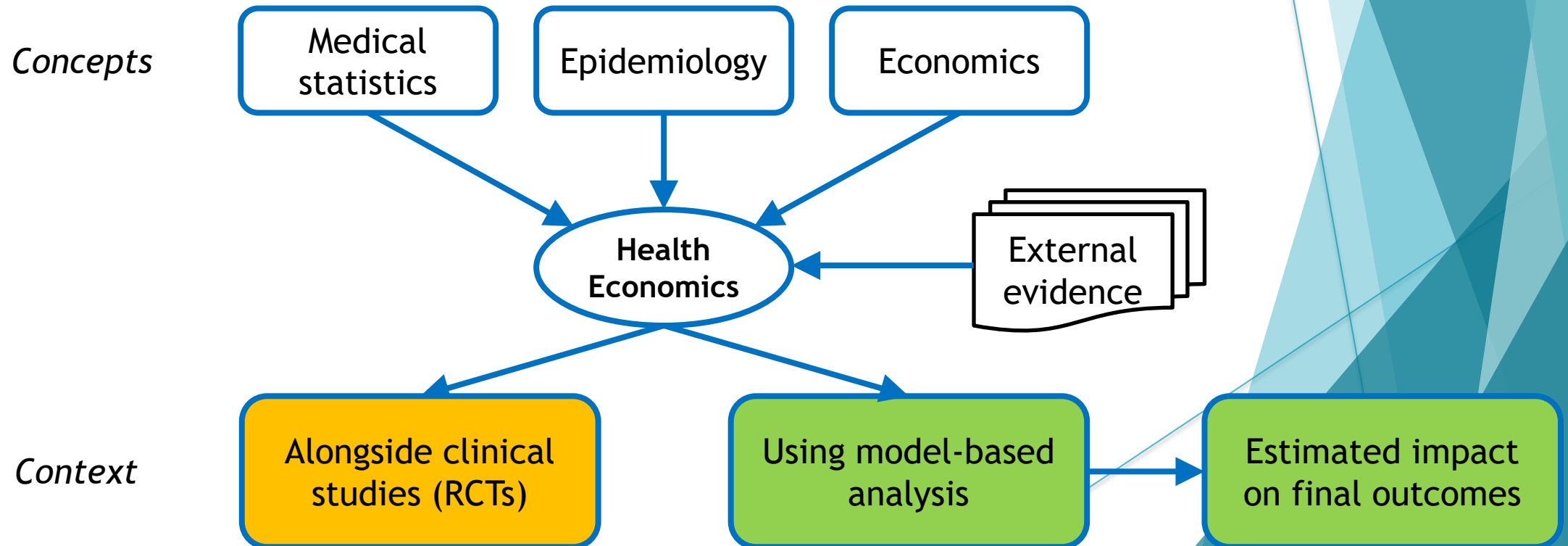
[Informatiekader](#)

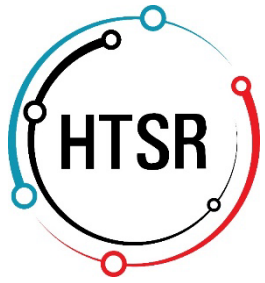


Dit artikel is gepubliceerd in het dossier [Journalistiek](#)

Part of HTA: *Health economic analysis*

Quantitative evaluation of the impact of new health interventions on health outcomes and costs (and care workforce, equity, environment)



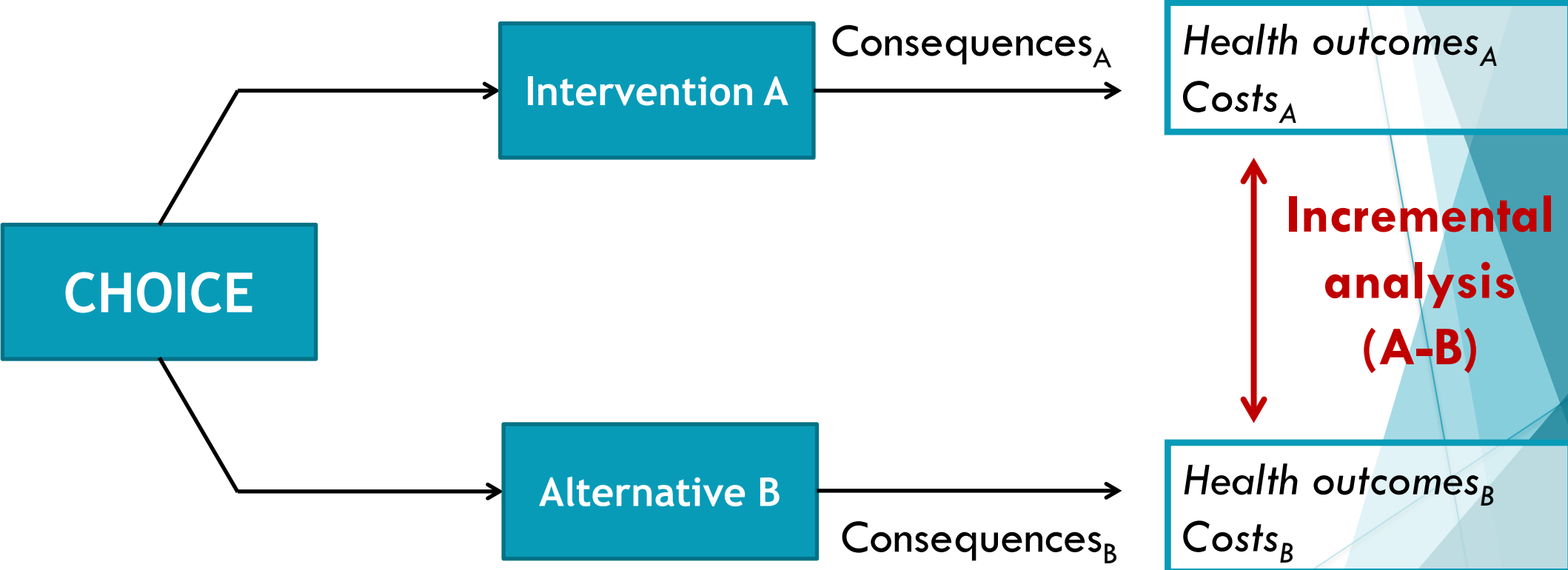


External evidence

- Literature search/review
- Statistical analysis (RCTs, registries, EPRs, uncertainty)
- Data science, machine learning/AI (diagnostics, outcome prediction)
- Process mining (care pathway mapping)
- Costing study (reference prices, resource use)
- Financial/business modeling (DBC, financing streams)
- Preference elicitation (clinicians, patients)
- Expert elicitation (evidence, estimates)
- MCDA (criteria, weights)
- *Evidence synthesis* (meta-analysis/regression)

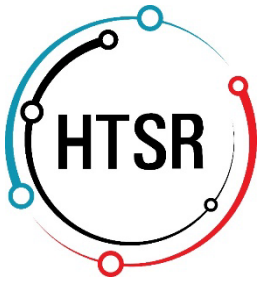
Reflect all intended and unintended consequences of the strategies / interventions to be compared

Conceptual analysis



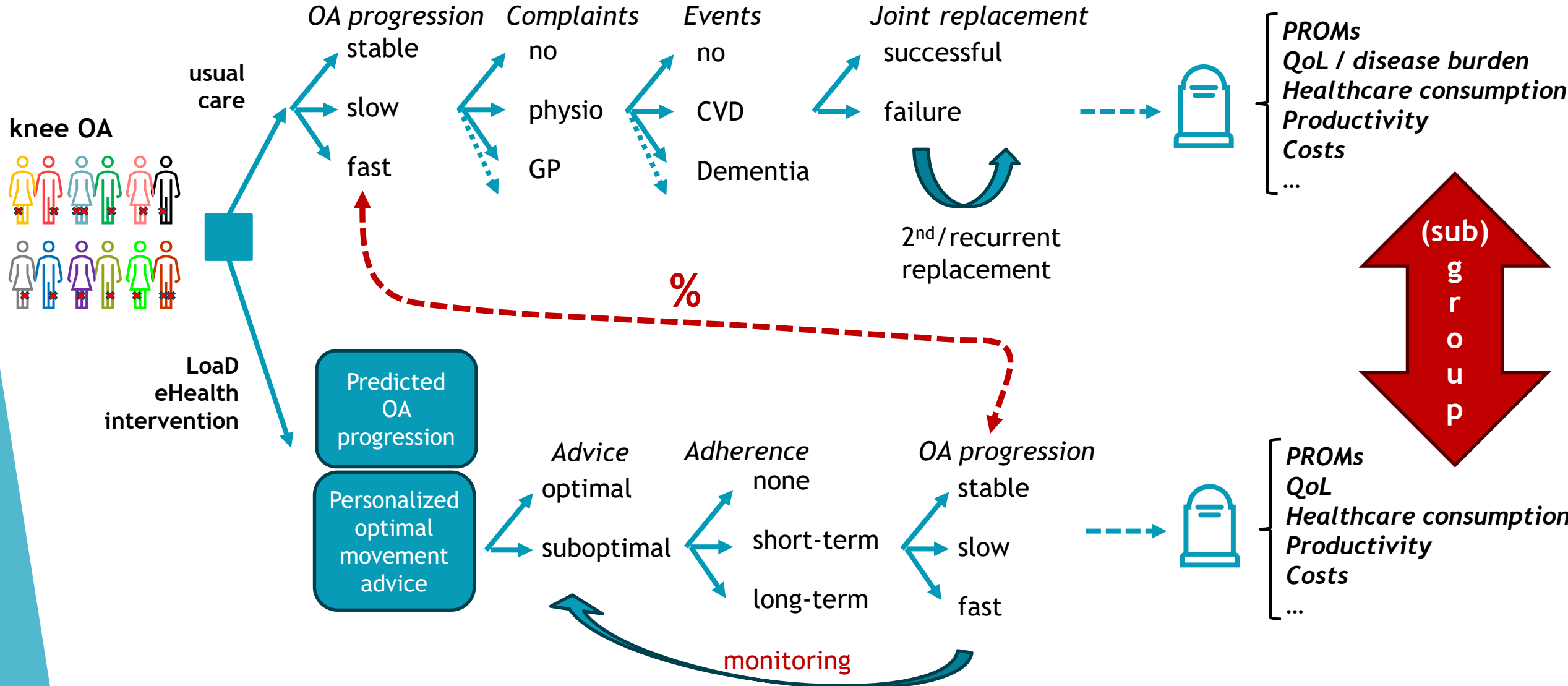
Fundamental choices

- **Timing of evaluation:**
 - *Ideally after proof of efficacy in research setting but before large scale implementation of technology*
- **Comparators:** systematic identification of all relevant alternative interventions (could include ‘watchful waiting’)
- **Perspective:** determines the evaluation outcome
 - *Patient, hospital, insurer, society*
- **Evidence:** state-of-the-art but often still (very) limited
 - *Transparent: explicit about the necessary choices/assumptions*
 - *Scenarios with alternative choices to assess robustness*



Health economic modelling LoAD WP5 – 05.3

Do we actually contribute to reducing the OA burden?



HEA: types of full economic evaluations

- ▶ **Cost-Effectiveness Analysis (CEA)**
 - ▶ *Any kind of (clinical) effectiveness outcome*
 - ▶ *Mostly incomparable across interventions and diseases*
- ▶ **Cost-Utility Analysis (CUA)**
 - ▶ *Health outcomes in quality-adjusted life years (QALYs)*
 - ▶ *Directly comparable across interventions and diseases*

Cost-benefit analysis

Budget Impact Analysis

Societal Return on Investment

CEA/CUA: most important outcome

ICER = Incremental cost-effectiveness ratio

$$\frac{\text{Costs A} - \text{Costs B}}{\text{Effects A} - \text{Effects B}} = \frac{\Delta \text{Costs}}{\Delta \text{Effects}}$$

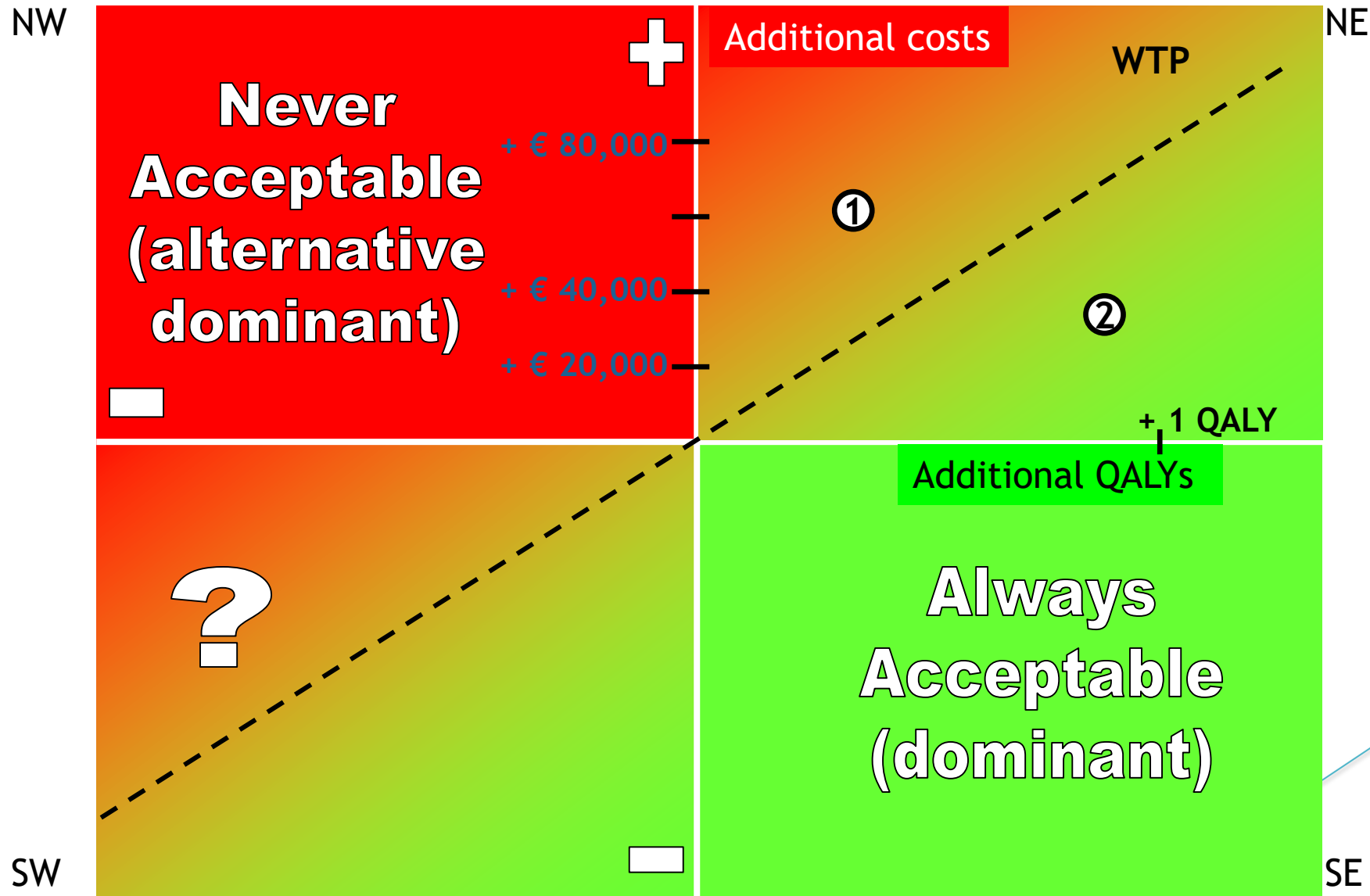
ICUR = Incremental cost-utility ratio

$$\frac{\text{Costs A} - \text{Costs B}}{\text{QALYs A} - \text{QALYs B}} = \frac{\Delta \text{Costs}}{\Delta \text{QALYs}}$$

Typically also with QALYs as effect measure the term ICER is used

CEA/CUA: most important outcome

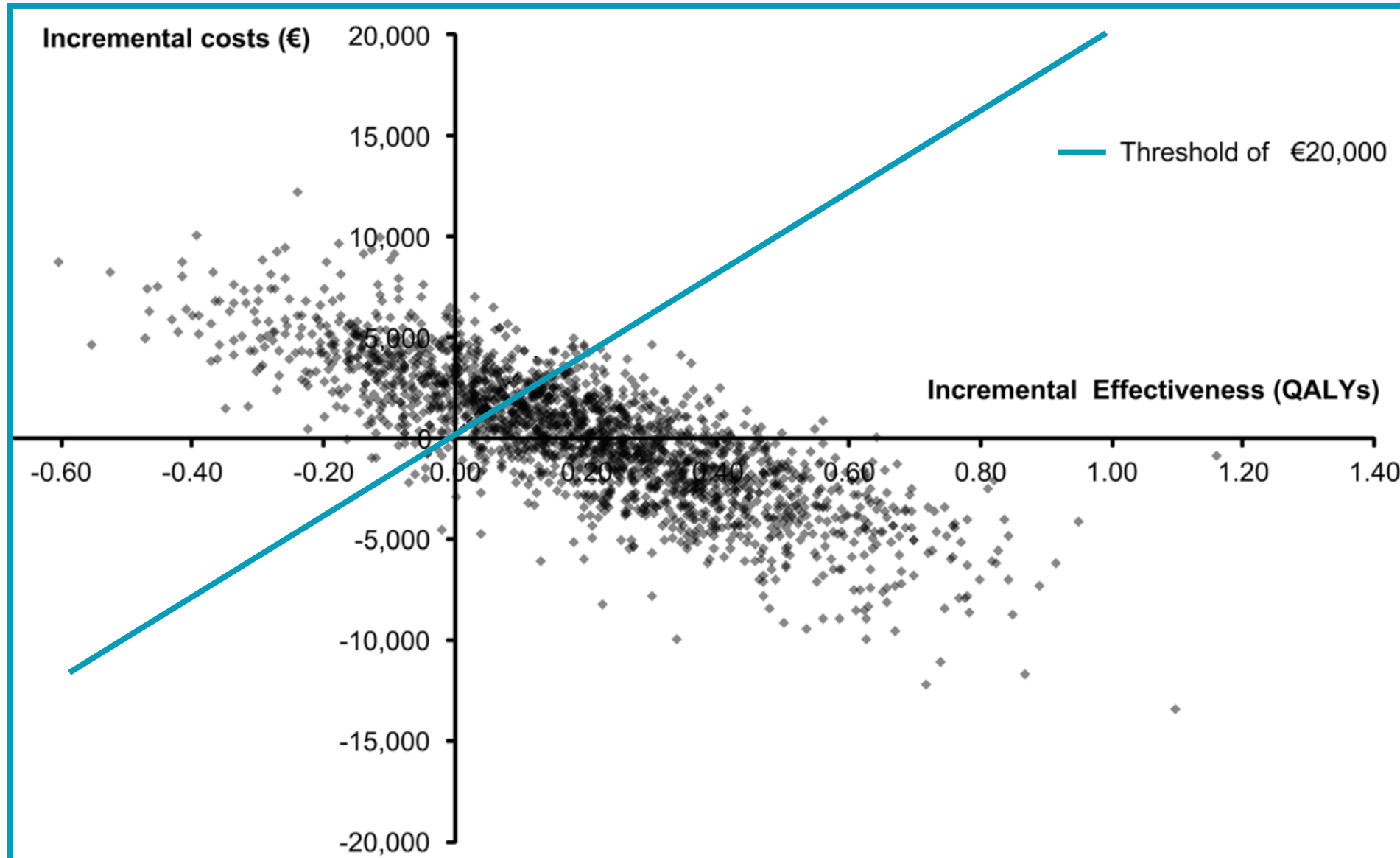
Incremental cost-effectiveness plane



Willingness-to-pay Threshold (WTP)

In the Netherlands WTP depends on disease severity: range from €20,000 to €80,000 per QALY

Example of an incremental cost-effectiveness plane



Uncertainty is explicitly incorporated in the analysis and reflected in the results

- *No p-values*
- *What-if scenarios*
- *Research Prioritization*

Examples of ongoing studies

▶ **Check@Home (NWO)**

Cost-Effectiveness of a nationwide screening program for heart failure, diabetes type 2, and kidney damage using home tests (screening 160,000 Dutch citizens, once)

▶ **AMICUS (NWO/KWF)**

AI in Medical Imaging for novel Cancer User Support – optimizing breast cancer follow-up based on personalized, dynamic risk estimates of recurrence

Interested in HTA?

In Dutch

https://www.4tu.nl/over_4tu/publicaties/4tu-position-paper-dt.pdf

4TU Position paper



Kosten van zorg:
hoe medische technologie kan
bijdragen aan betaalbare zorg

TU Delft Delft University of Technology

TU/e Eindhoven University of Technology

UNIVERSITY OF TWENTE

WAGENINGEN UNIVERSITY & RESEARCH



Health Technology Assessment
& Doelmatigheidsonderzoek in
de gezondheidszorg

Tweedaagse cursus
Woensdagen 29 november en 6 december 2023
Locatie: Utrecht - Lunetten

<https://www.utwente.nl/en/bms/htsr/education/#post-graduate-courses>

FRIDAY 15 DECEMBER 2023 (16.00)

Invitation

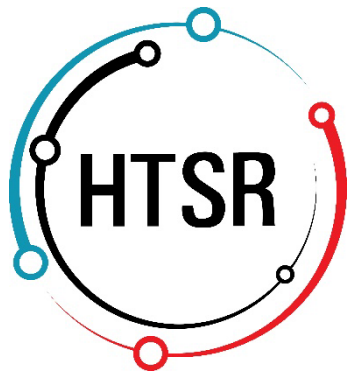
SAVE THE DATE INAUGURAL LECTURE PROF.DR.IR. ERIK KOFFIJBERG IMPACT VAN DIGITALE ZORGINNOVATIES: OPTIMALISATIE DOOR SIMULATIE

Symposium

You are also invited to the symposium (in English) "**The next step in HTA: from evaluation to optimization of value**" preceding the inaugural lecture from 10h30 to 15h30. Further details and the opportunity to register for the symposium will follow.



THANK YOU



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 **<https://www.utwente.nl/en/bms/htsr/>**

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