

{predictNMB}

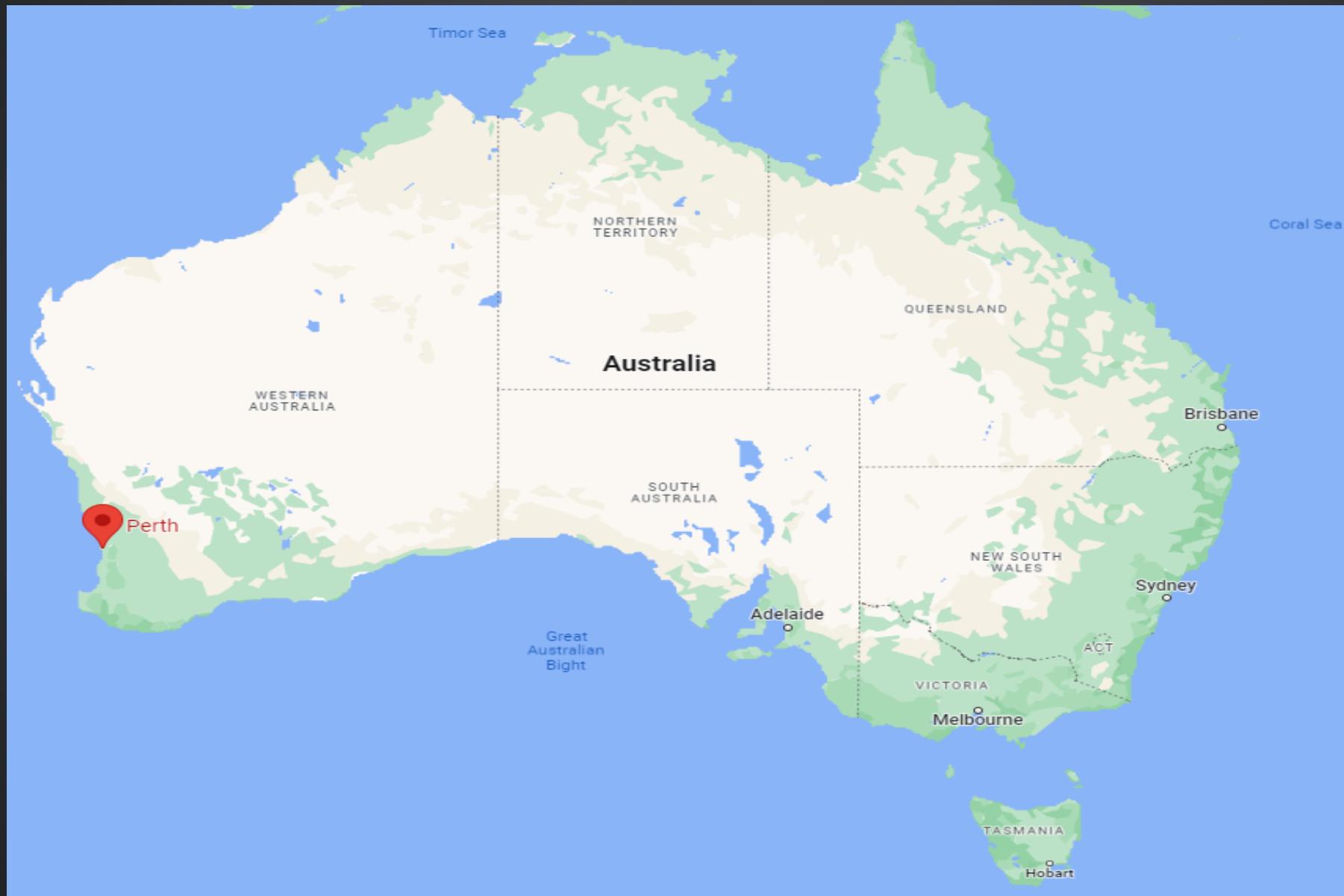
Rex Parsons

THE NEXT HOUR OF YOUR LIFE

- Who am I?
- Who are you?
- What is a clinical decision support system?
- Why we should consider costs and use `{predictNMB}`
- **THE ENTIRE FIELD OF HEALTH ECONOMICS**
- coding with `{predictNMB}`

WHO AM I?

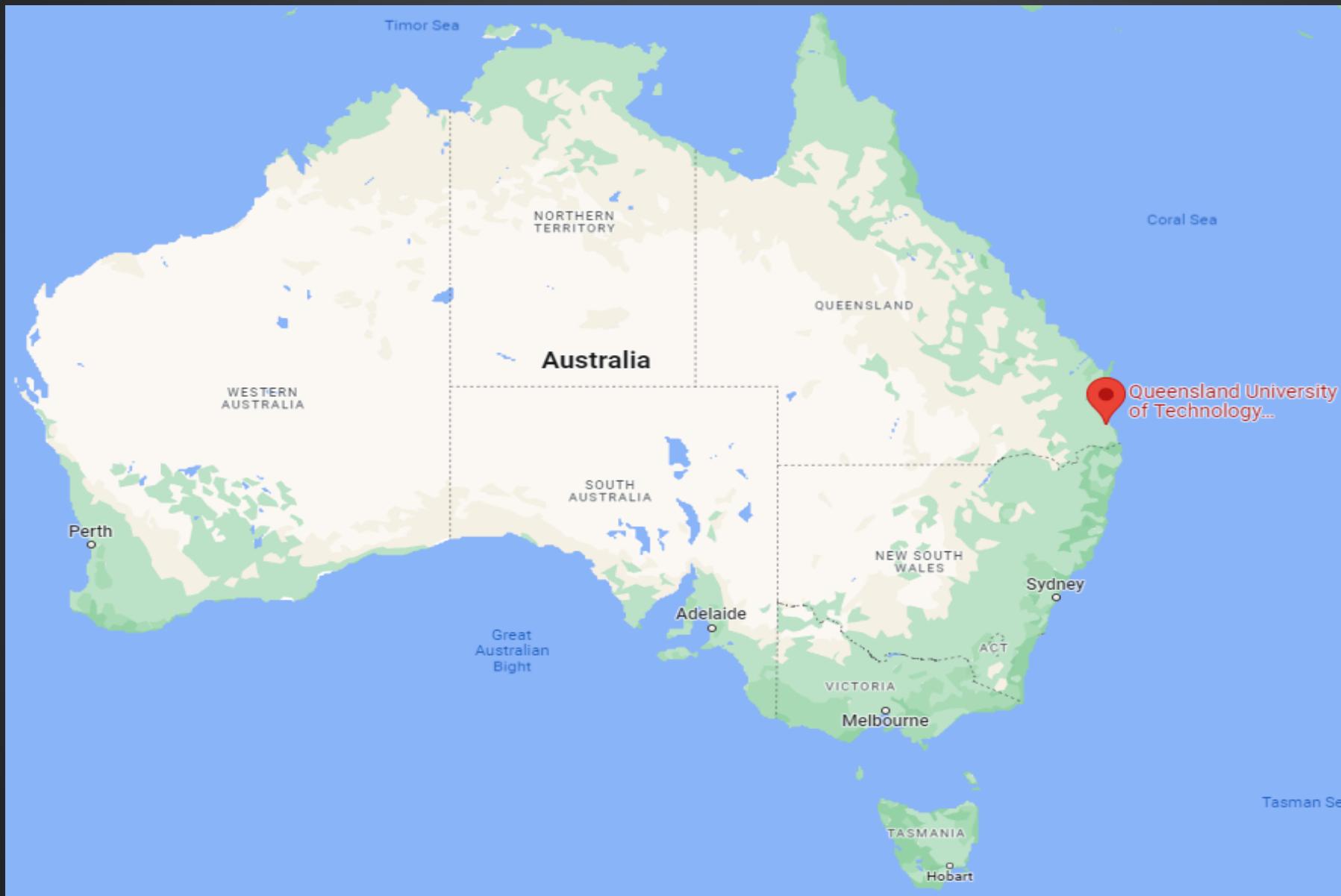
WHO AM I?



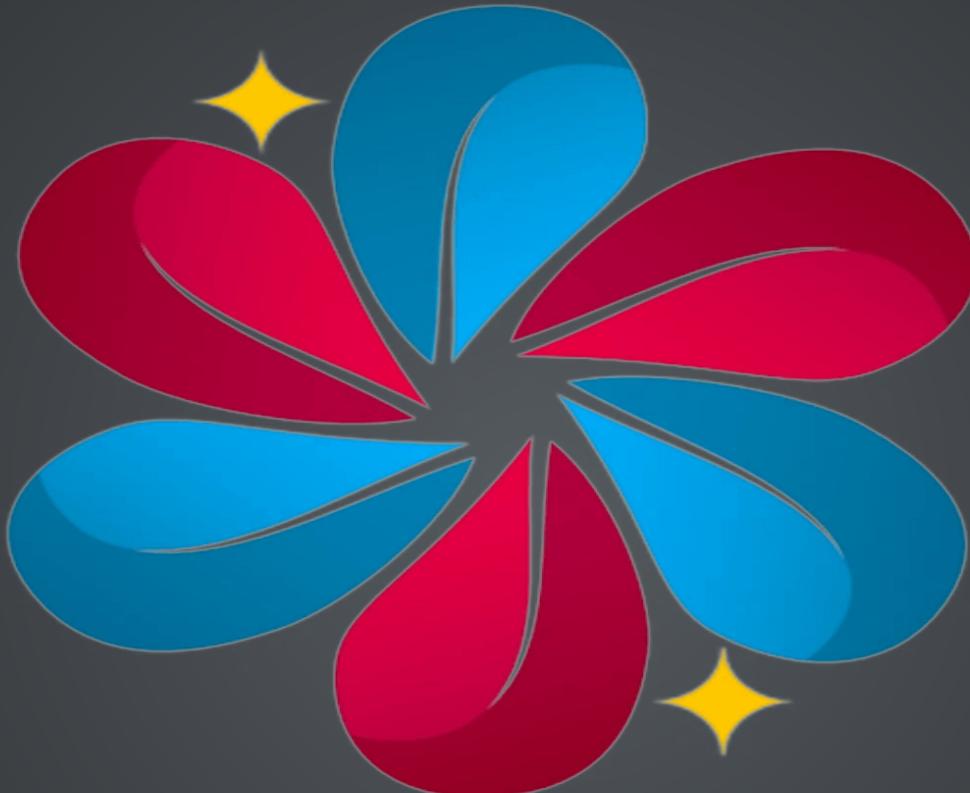
WHO AM I?



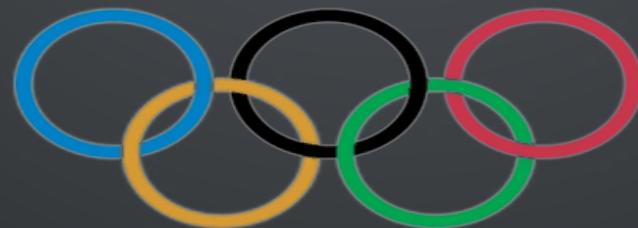
WHO AM I?



WHO AM I?



BRISBANE 2032



WHO AM I?



WHO AM I?



Australian Centre
for Health Services
Innovation



Currently: PhD Candidate and Senior Research Assistant at AusHSI (QUT)

predictNMB Team:

- Rex Parsons
- Adrian Barnett
- Robin Blythe
- Steven McPhail^(Supervisor)
- Susanna Cramb^(Supervisor)



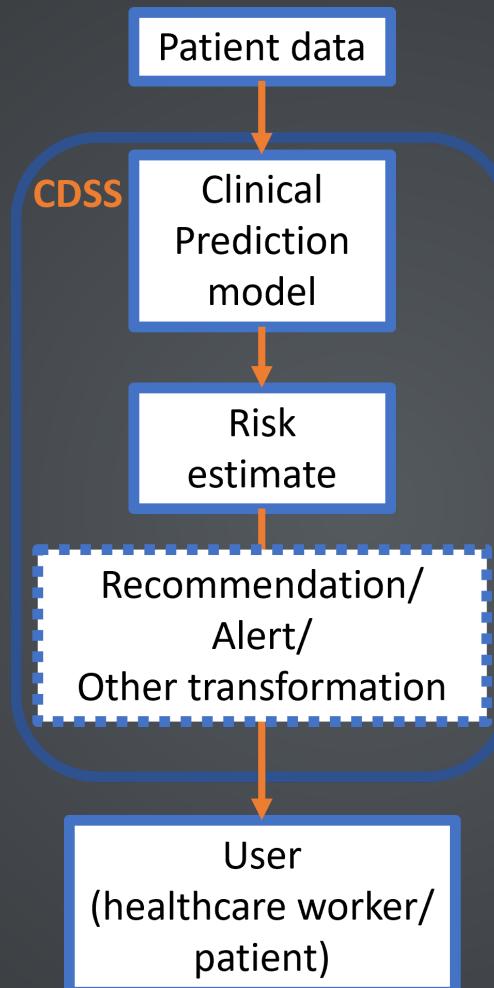
WHO ARE YOU?



GO TO
[menti.com](https://menti.com/81733591)
ENTER THE CODE
8173 3591

**WHAT IS A CLINICAL
DECISION SUPPORT
SYSTEM?**

WHAT IS A CLINICAL DECISION SUPPORT SYSTEM?



ANNALISE.AI'S CHEST X-RAY DECISION SUPPORT

- Assesses chest x-ray for 124 possible outcomes
- Ranks outcomes and communicates risk to user
- Highlights areas of image that are influential to risk estimate
- clinical prediction model
- reduces/prioritises information
- model interpretation for better decision (?)



WHAT IS A CLINICAL PREDICTION MODEL?

DIAGNOSTIC



WHAT IS A CLINICAL PREDICTION MODEL?

PROGNOSTIC



WHAT IS A CLINICAL PREDICTION MODEL?

PROGNOSTIC



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WHY WE SHOULD CONSIDER COSTS AND

WHY WE SHOULD CONSIDER COSTS AND USE {predictNMB}



Maarten van Smeden

@MaartenvSmeden

...

Blame the leaky clinical prediction modeling pipeline



Not fit for purpose

- Wrong target population
- Expensive predictors
- Discrepancies between development and use
- Complexity/transparency

No validation/impact

- Poor development
- Insufficient reporting
- Incentives
- If done, usually small studies

Regulation/implementation

- MDR
- Soft- and hardware
- Model updating
- Quality control

Not adopted

- User time
- No prediction needed

WHY WE SHOULD CONSIDER COSTS AND USE {predictNMB}

You're a health service manager wanting to prevent falls at your hospital

Before you go about evaluating a falls prediction model within a CDSS to assign patients to a falls prevention programme...

Will this be cost-effective or are my healthcare \$\$\$ best spent elsewhere?

This depends on:

- Model performance
- Prevalence of falls
- Cost of falls
- Intervention effect & cost

WHY WE SHOULD CONSIDER COSTS AND USE {predictNMB}

You're a clinical prediction model developer

You're asked to make a clinical prediction model for inpatient falls to be used in a decision support tool but...

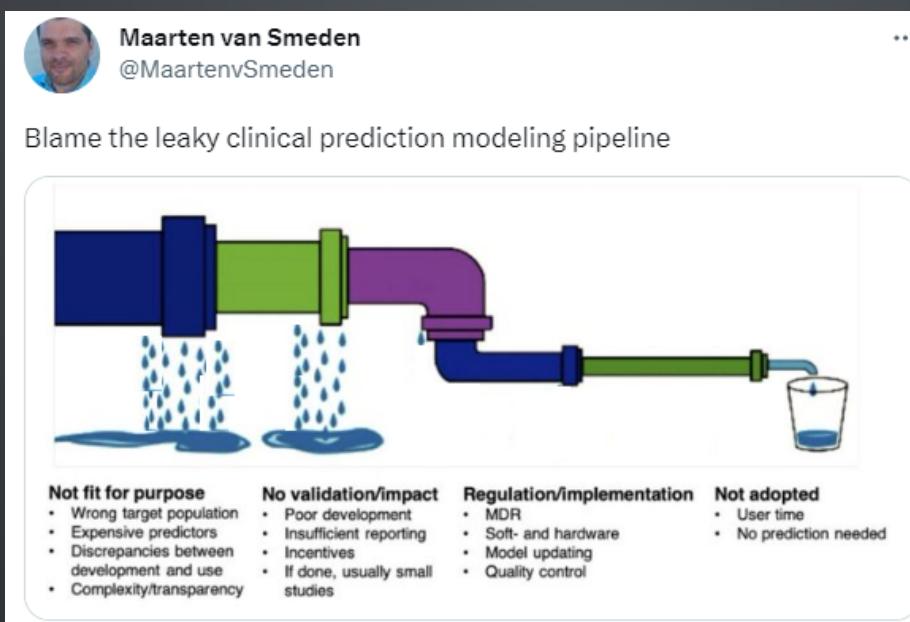
The intervention that they have available is *barely effective*, very expensive and you know that existing models in similar healthcare settings only have an AUC of 0.7...



WHY WE SHOULD CONSIDER COSTS AND USE {predictNMB}

{predictNMB}

- User provides inputs for setting & intervention (w/ uncertainty)
- Simulates & evaluates clinical prediction models within CDSS
- Estimates patient benefit and healthcare costs



**THE ENTIRE FIELD OF
HEALTH ECONOMICS**

THE ENTIRE FIELD OF HEALTH ECONOMICS



WHAT YOU NEED TO KNOW...

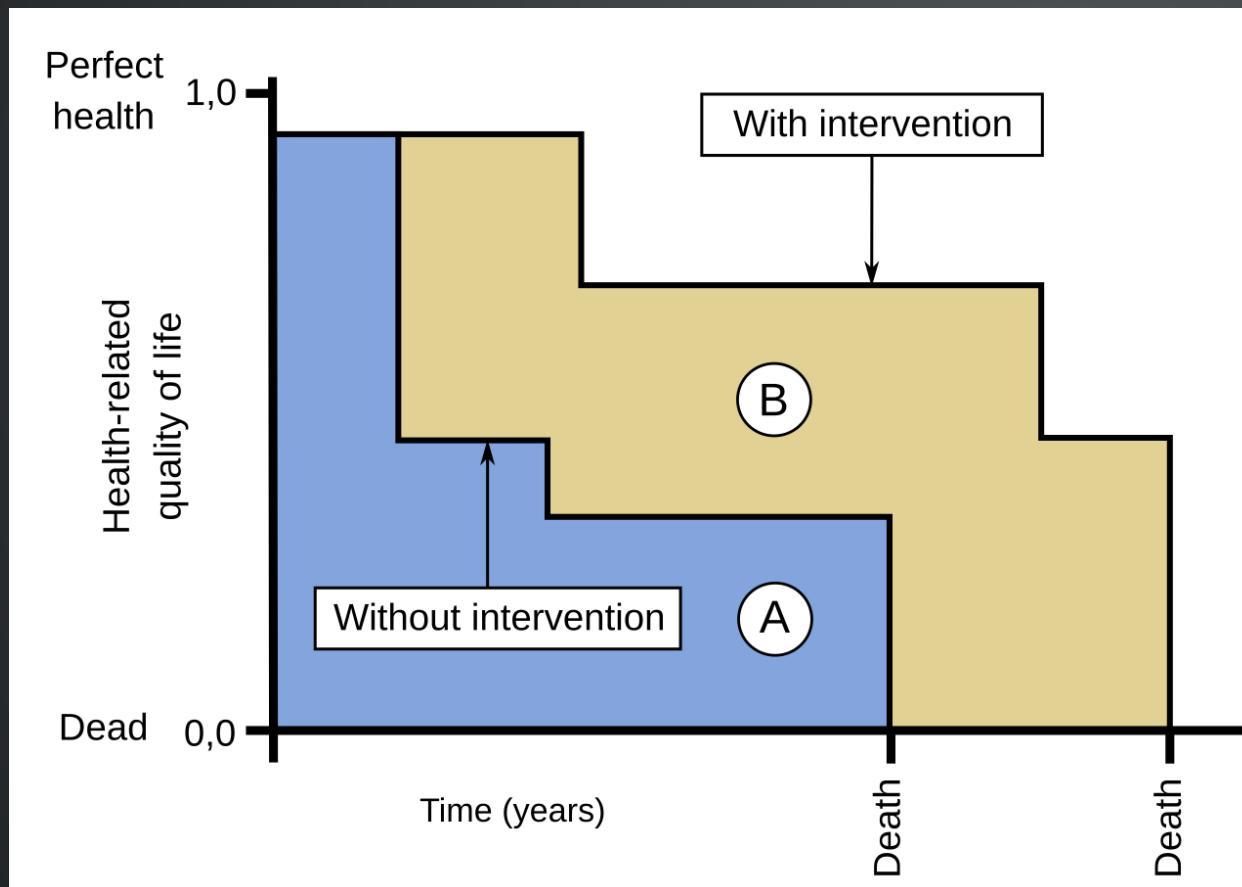
- Healthcare systems are resource constrained
- Health economics concerns how best to allocate resources to areas of greatest benefit



JAKE-CLARK.TUMBLR

QUALITY-ADJUSTED LIFE YEARS (QALYS)

Generic measure of disease burden that considers quality and duration of life



WILLINGNESS-TO-PAY (WTP)

“The maximum price at or below a customer would pay for a product”

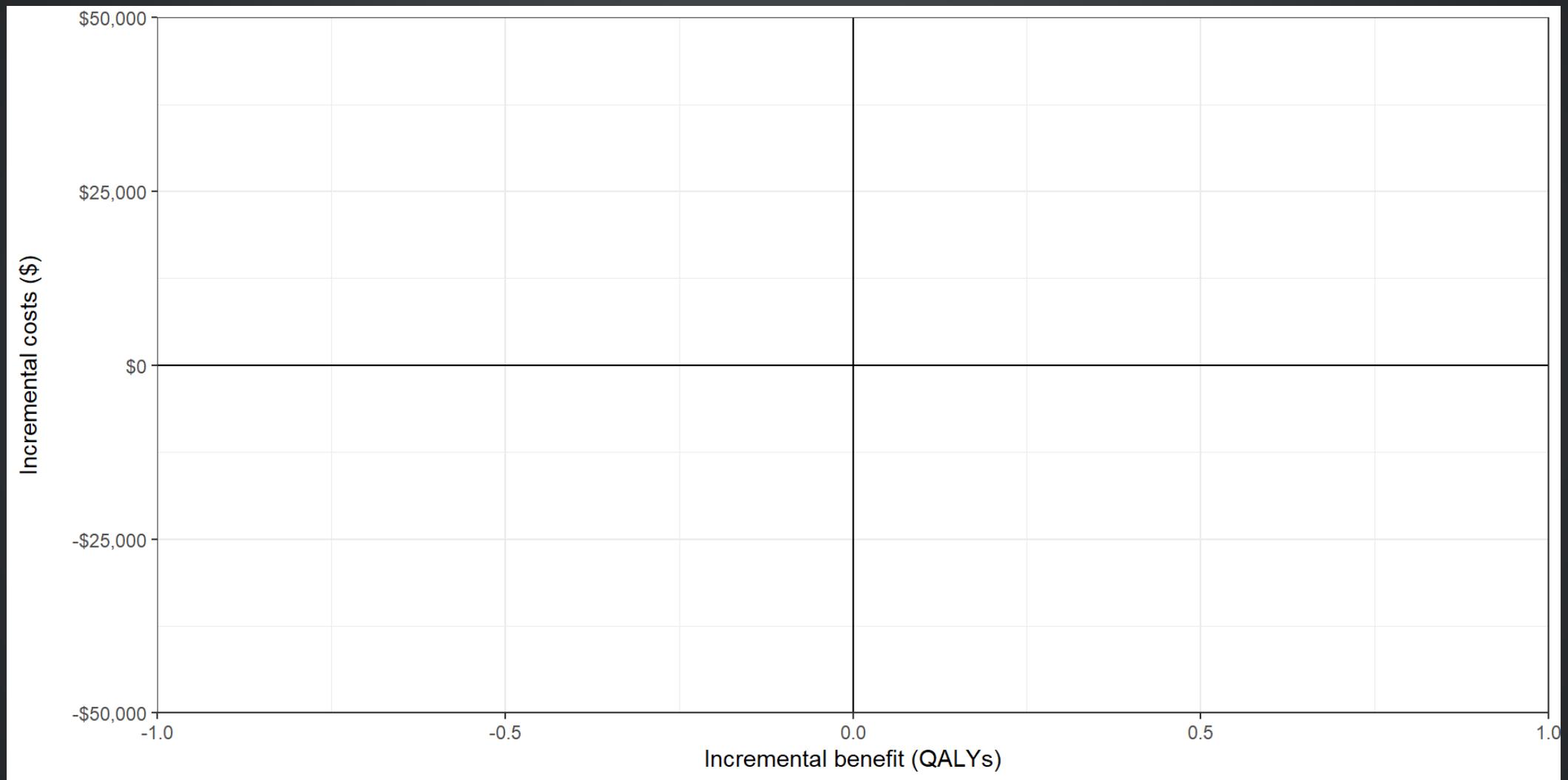
AKA

“The price at which a healthcare payer is willing to pay for an additional quality-adjusted life year”

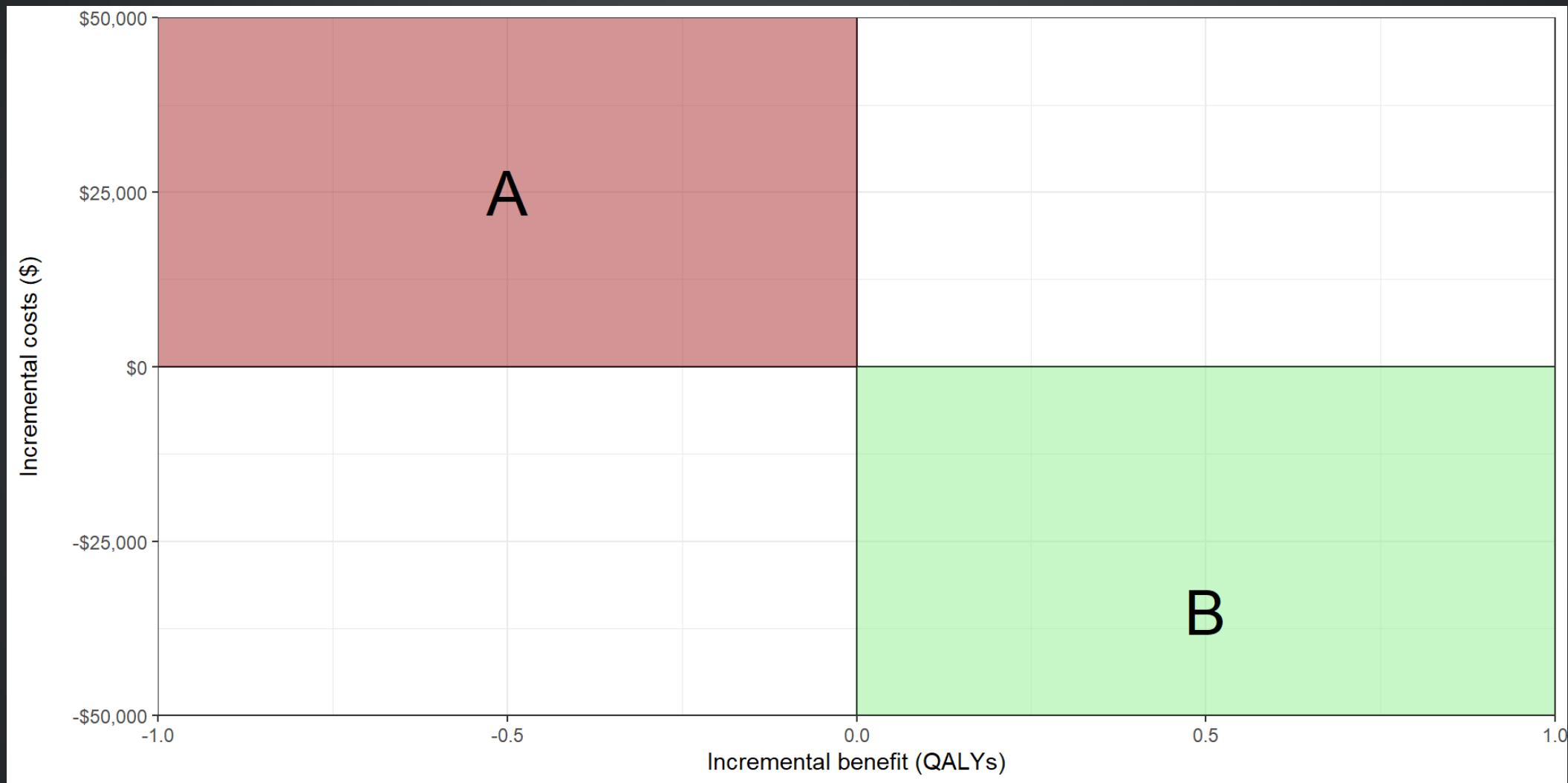


COST-EFFECTIVENESS PLOT

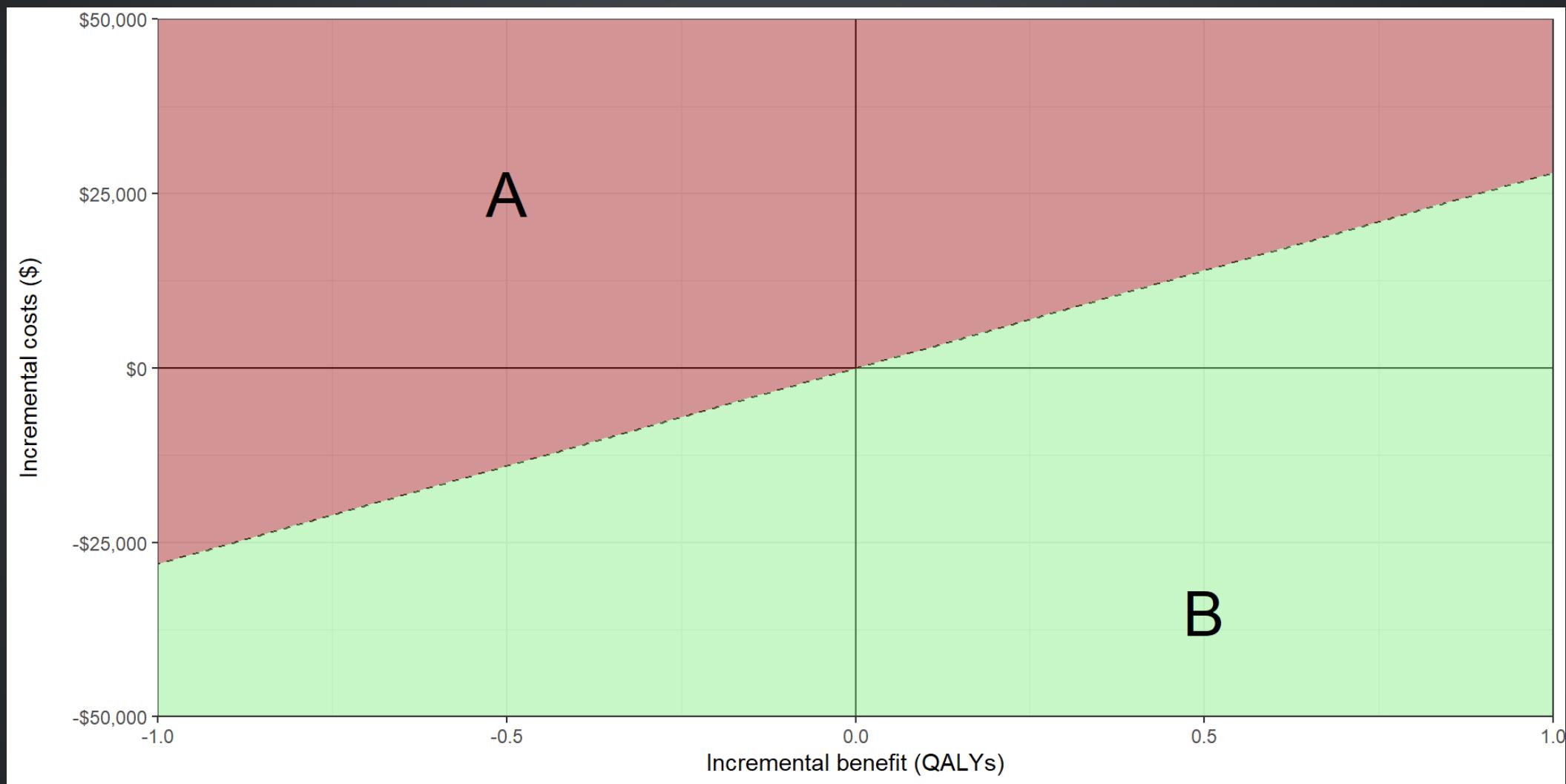
COST-EFFECTIVENESS PLOT



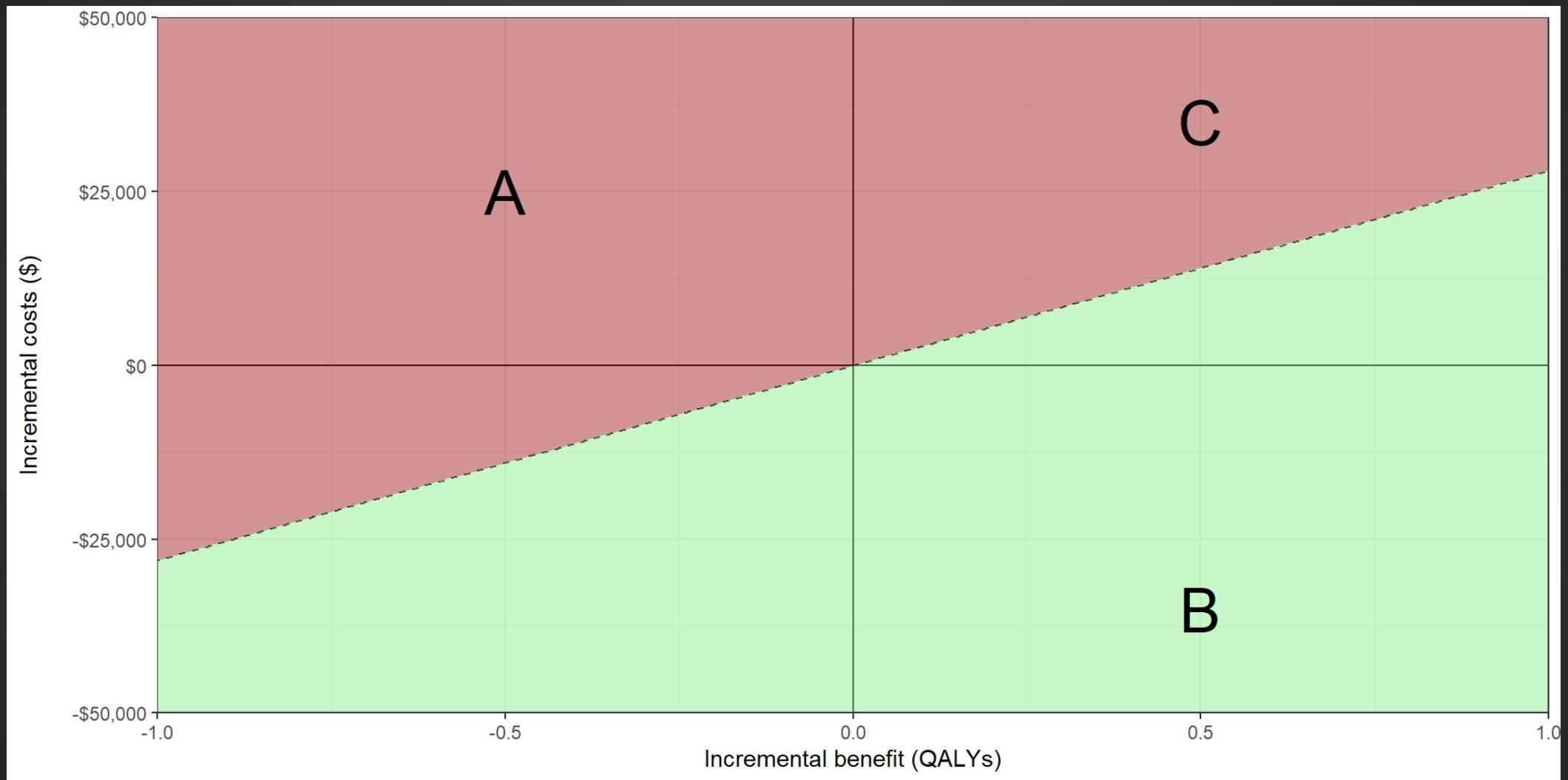
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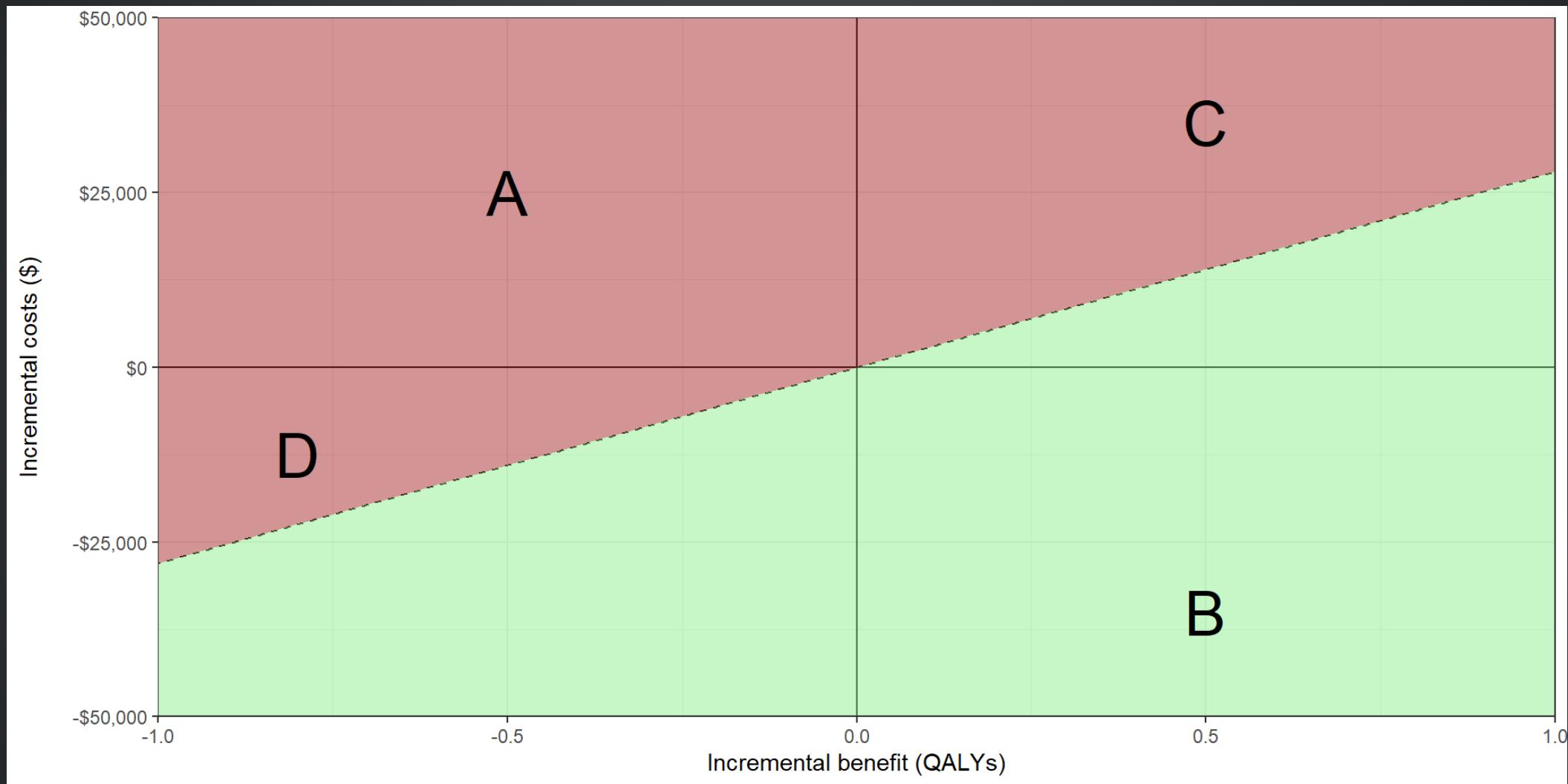
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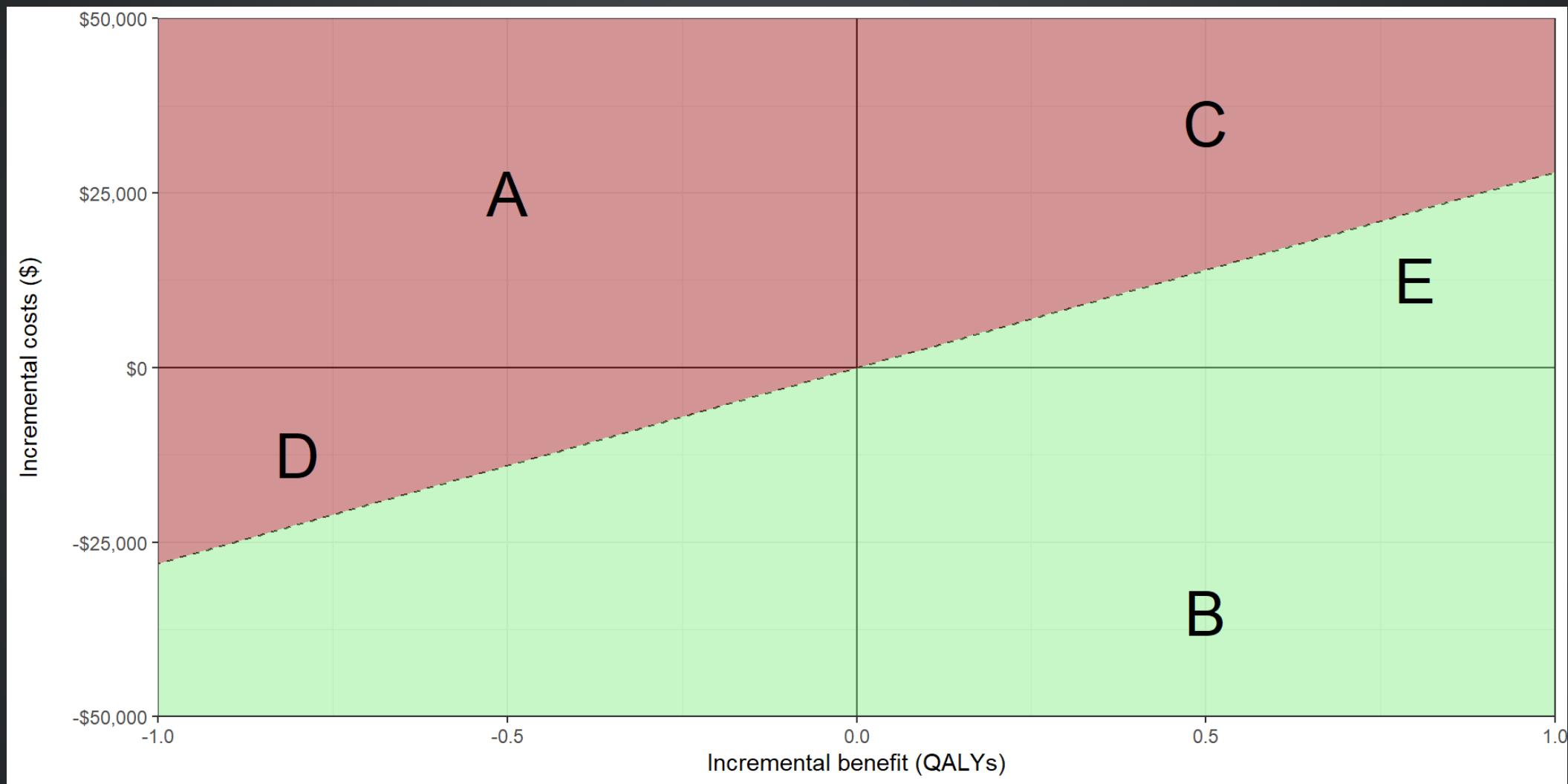
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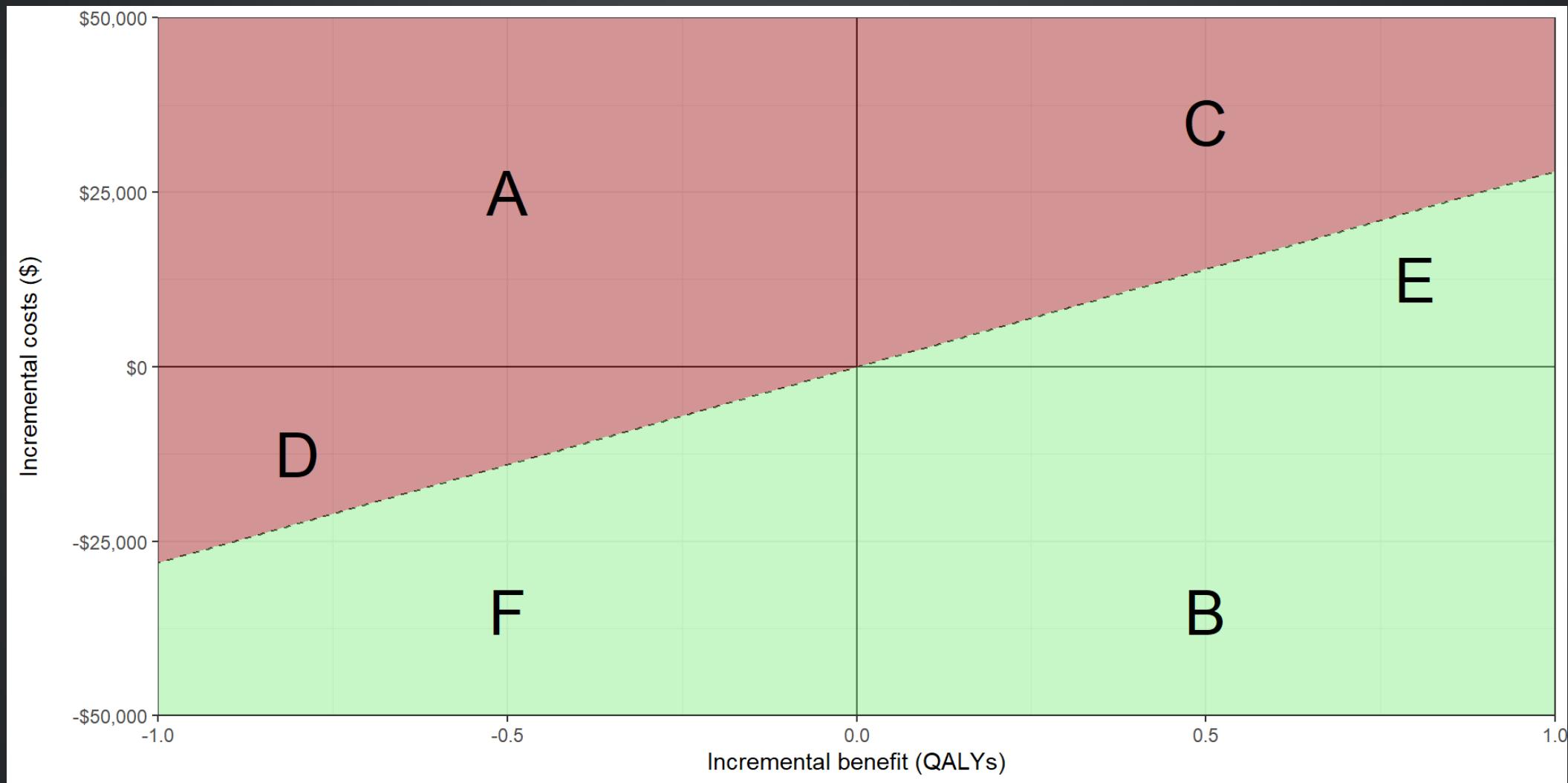
COST-EFFECTIVENESS PLOT



COST-EFFECTIVENESS PLOT



COST-EFFECTIVENESS PLOT



(INCREMENTAL) NET MONETARY BENEFIT

NMB: Summary of benefit in monetary terms

$$NMB = QALY \times WTP - Cost_{treatment}$$

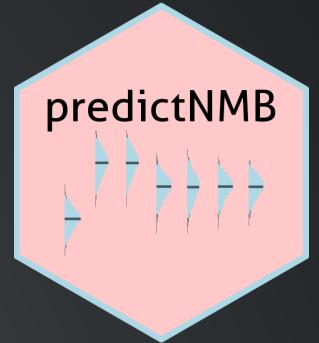
INB: Difference in NMB between two strategies

$$INB_{treatment} = NMB_{treatment} - NMB_{ref}$$

{predictNMB}

{predictNMB}

What is the expected health economic benefit of using a given (hypothetical) CDSS?



docs.ropensci.org/predictNMB/

