Business Project: Using network-meta analysis to inform the transition probabilities of a cost-effectiveness analysis

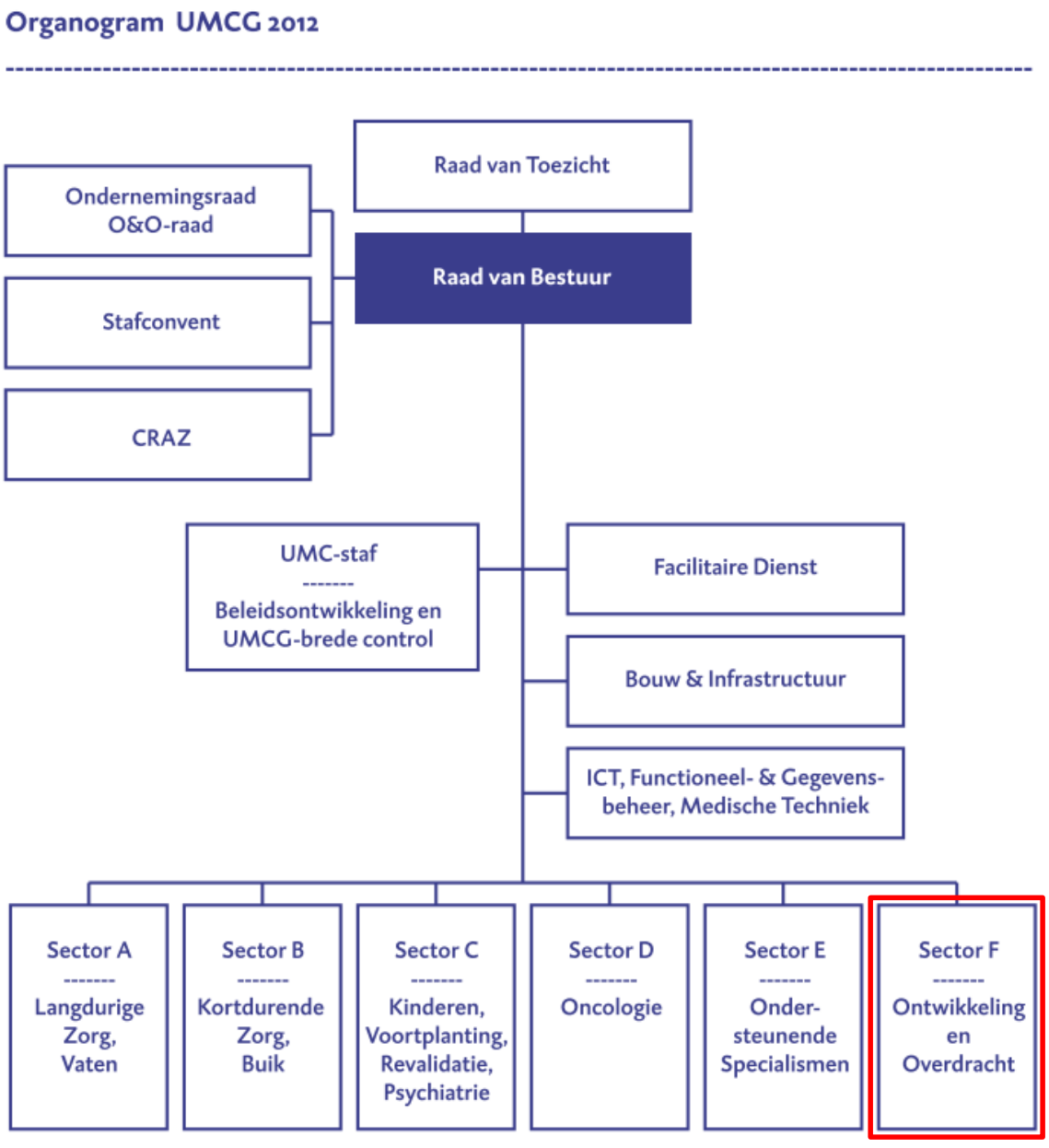
Bob Goeree[1]

[1]University of Groningen

September 25, 2014

Outline

Context of ADDIS



Context of ADDIS

DISEASE AREAS			
Pulmonary epidemiology (Boezen)	Cardiovascular epidemiology (Hillege)	Lifestyle medicine in obesity & diabetes (Corpeleijn/Stolk)	Cancer epidemiol (De Bock)

METHODOLOGICAL AREAS			
Medical statistics & decision making (V.d. Heuvel)	Genetic epidemiology (Snieder)	Health technology assessment (Krabbe)	Population based studies (Smidt/Stolk)

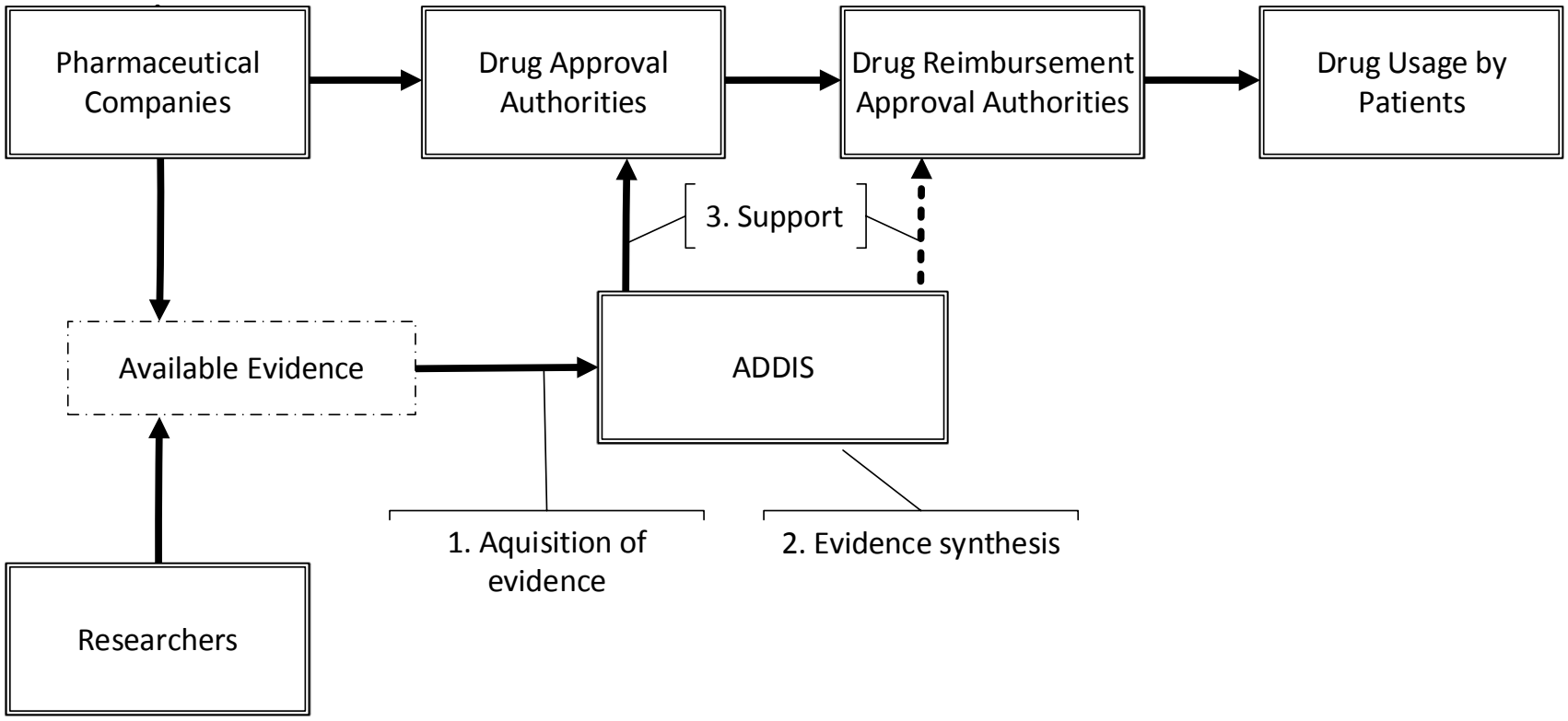
ADDIS

Research group

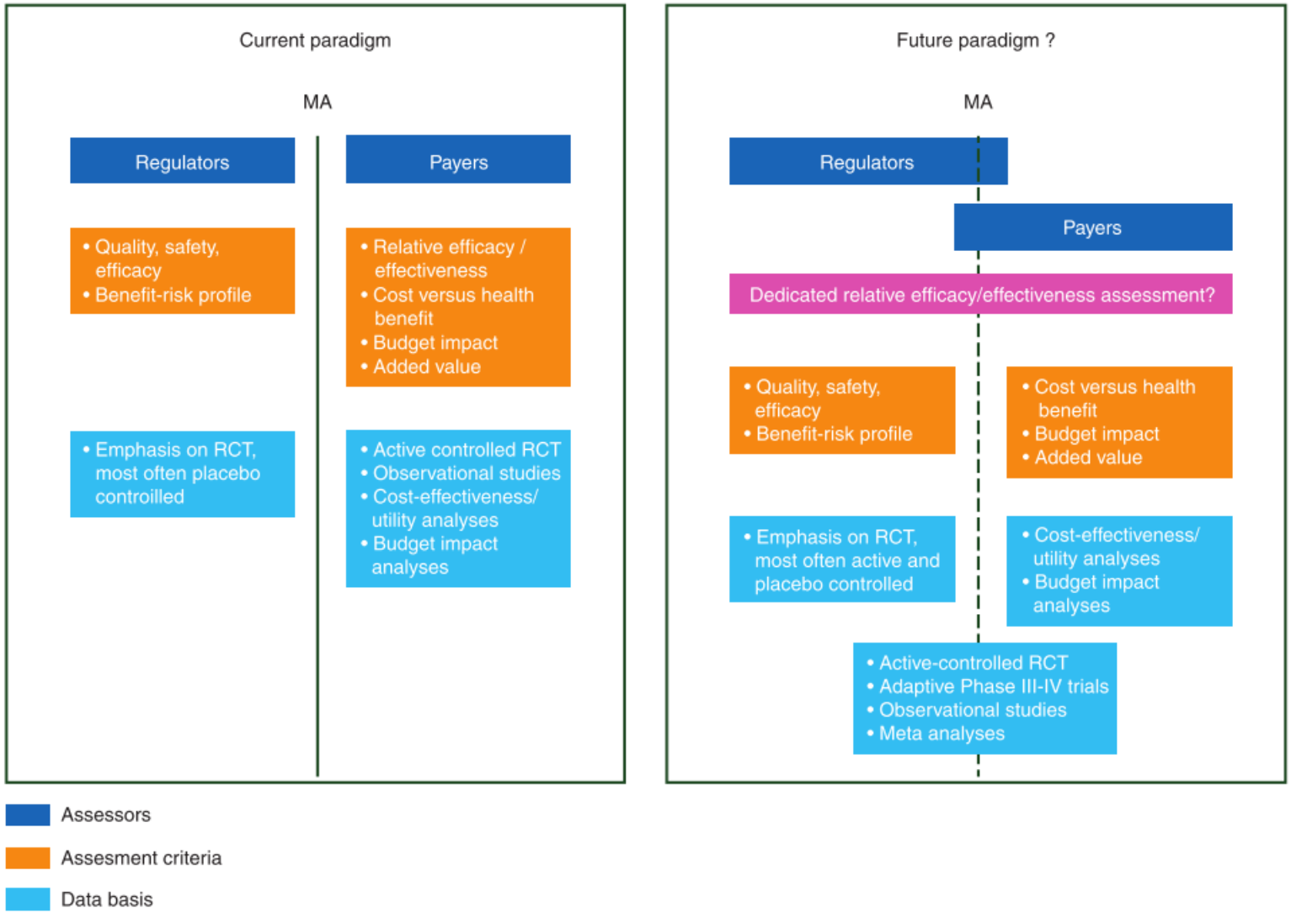
Is funded by grants

Aims to construct software that supports decisions regarding the use of medicine

Context of the project



Future paradigm



Problem statement

"In order to expand its potential customer base, ADDIS wants to support decision makers concerned with both the market access and reimbursement decisions. Therefore the current program needs to be extended to allow support for both these decisions."

Added value

Computations are complex, however always follow a certain flow which can be automated.

As of now, practitioners tasked with performing these analyses use a series of disconnected tools which is time consuming and does not allow for validation of these analysis.

Coming these analyses is largely unexplored terrain, the prototype should serve as a blueprint.

Approval - Efficacy analysis

Drugs are tested in Randomized Controlled Trials (RCTs).

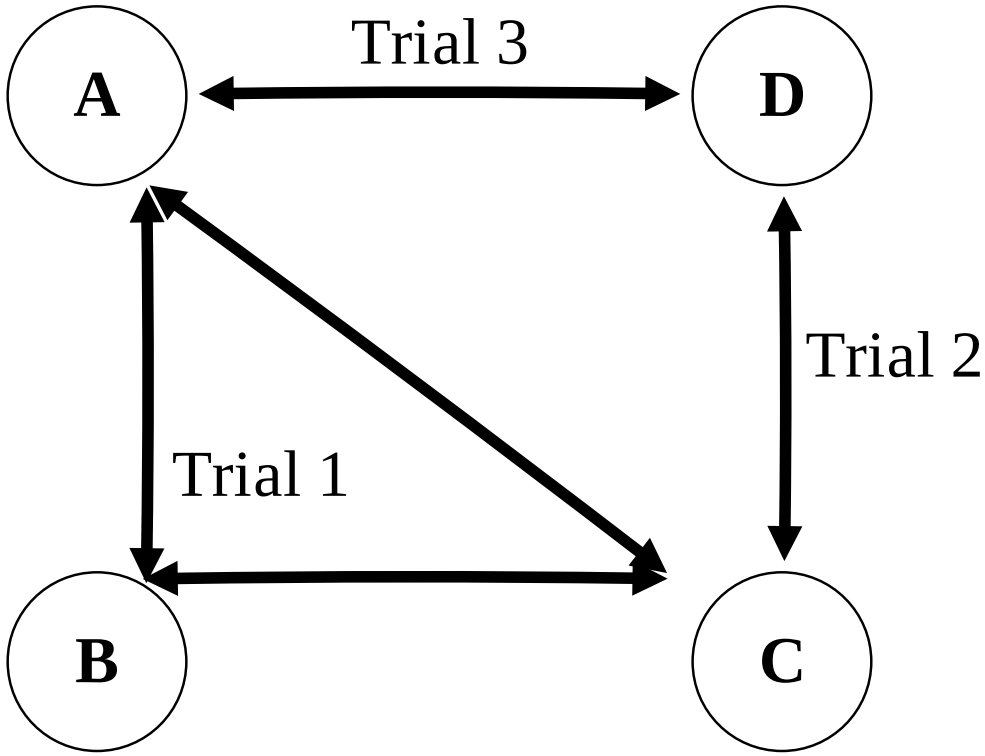
Reports outcomes as is, added value as measured over RCT duration.

Measures responders vs non-responders. Reported as a relative effect.

Ideally tested head-to-head (in the same trial), however often this is not the case.

Trial network example

One of the main strengths of ADDIS



Reimbursement - Cost-effectiveness analysis

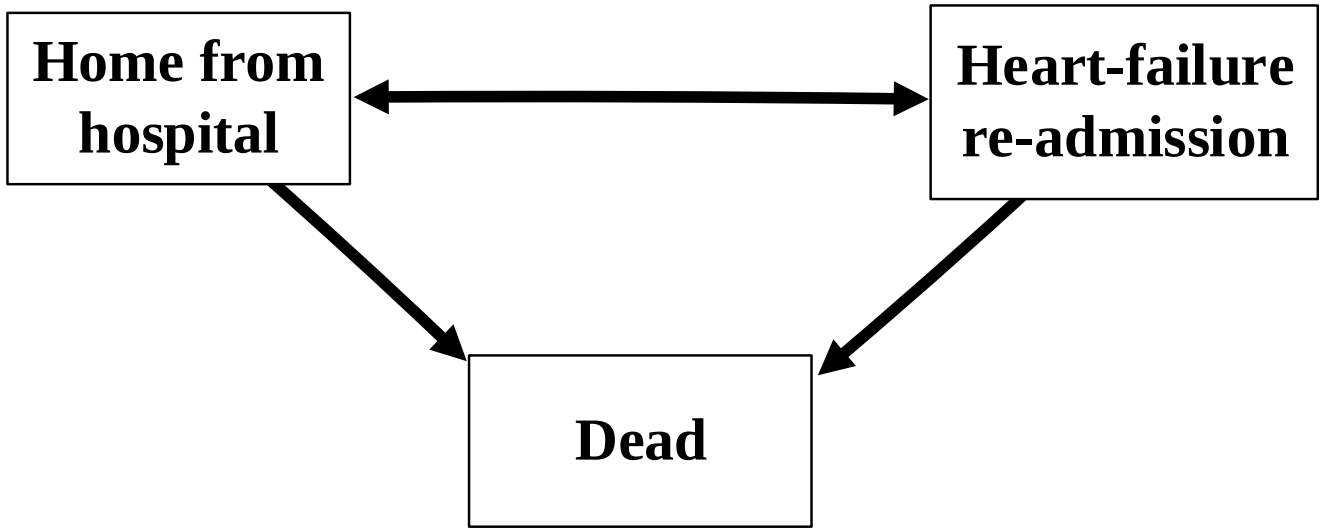
Instead of reporting outcomes as is, extrapolates for future effects.

To do this creates a so called State Transition Model (STM).

STM consists of several mutually exclusive states between which a patient can travel during simulation.

Based on time spend in each state effects and costs are measured.

State Transition Model example



Combining

Main problem: efficacy analysis is based on time-to-event data, e.g. 314 days until hospital re-admission.

On the contrary, STMs are usually based on discrete cycle times, e.g. steps of one year.

Two options: Rescale time-to-event data to discrete cycle times, or construct a time-to-event STM.

Vertical modeling

Vertical modeling takes the premise of a time-to-event STM.

During simulation, first calculates time-to-event, afterwards the transition is handled separately.

Results from the efficacy analysis can be included as covariates.

Implementation steps

Build software that allows to construct a time-to-event STM.

Build a user interface.

Results best shown with a live demo, in which we go more in-depth.

Limitations

Does not address patient heterogeneity.

Only a select set of modeling choices available.

All inputs are just numbers. Ideally inputs are derived, in an automated way, from the available (clinical) evidence.

When you take the premise of automatically deriving inputs, how can you place the results from the efficacy analysis on the correct sojourn time / departure rate covariate?

Questions

Thank you for your attention!

Any questions?