EARTH: Early assessment of expected return of new innovative medical technologies in hospitals
Study case: telemedicine patient briefcase

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**Background:** Health Economist (HTA, miniHTA, business cases, CEA). **Focus:** telemedicine

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**Setting:**
- 5,5 million, 5 region
- OUH 1/10 of Danish HCS
Imagine...

Agenda
Objective - Context - Methods - Results - Q&A
Hospital Director: We face a similar challenge
• A crowd of new technologies and treatments – good and bad ones
• Costs and effects are unknown, e.g. no information about cost effectiveness before research is finished after 1 – 3 years

**Objective**
To early assess how cost effective (sea-worthy) an innovative medical **technology** is expected to be

- Treatments
- New Devices
- Telemedicine
Hype Cycle Theory

- Technology phases:
  - Invention to (perhaps) effective usage

- Early forecasting (candid expectations up front) may:
  - Identify and eliminate bad projects earlier
  - Shortcut: steer more clear of obstacles – on course
The consequence model - Early decision support can highly impact decisions!

Source: page 35 in (Krogerus 2012)
Methods - Phase 1 to 4

- Literature review:
  1) forecasting theories in pharma/medical device industry
  2) cognitive biases

- Interviews with industry/academic experts

- Retrieve and produce data for validating model

- Develop a forecasting model for IMTs in a pilot stage

- Assess predictive abilities of model

Rare access to data about KPIs over time
Forecasting Theories: Bayesian Methods

• Bayes’ Theorem: combine prior information with current information (evidence) on a quantity of interest

• Must update the captain of the ship frequently and efficiently about all changes to sailing conditions!
Preliminary results from reviews (2/3)

Cognitive biases

- Survivorship bias (technological hype)
- Hindsight bias
- Etc.

Solution

- Take biases into account designing EARTH (help enhance rational predictions / assessments)
- Bayesian Methods makes sure we don’t forget the past (counter hindsight bias by building an “evidence bank” of deviations over time, e.g. for size of target group)

<= Ulysses contracts (not common in economic evaluation - but PAP in clinical research)
Preliminary results from reviews (3/3)

Example: Confirmation-bias

**Essence:**
Synthesize various methods (those you have seen + more to come!) to create an effective early evaluation of technologies in hospitals.
What is new in EARTH? – compared to the evaluation-toolbox used at hospitals today

MiniHTA (hospital based HTA)
- Weak handling of uncertainty / change in knowledge + ”1.shot”-exercise

MAST - Model for ASsessment of Telemedicine
- Remember the consequence model... => Room to augment “preceding considerations”

Conclusion: EARTHs mission is to help hospitals “to kill your darlings” early