MCGR Technique: Economics of Growing Rod Surgery

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GSF Growing Spine Foundation

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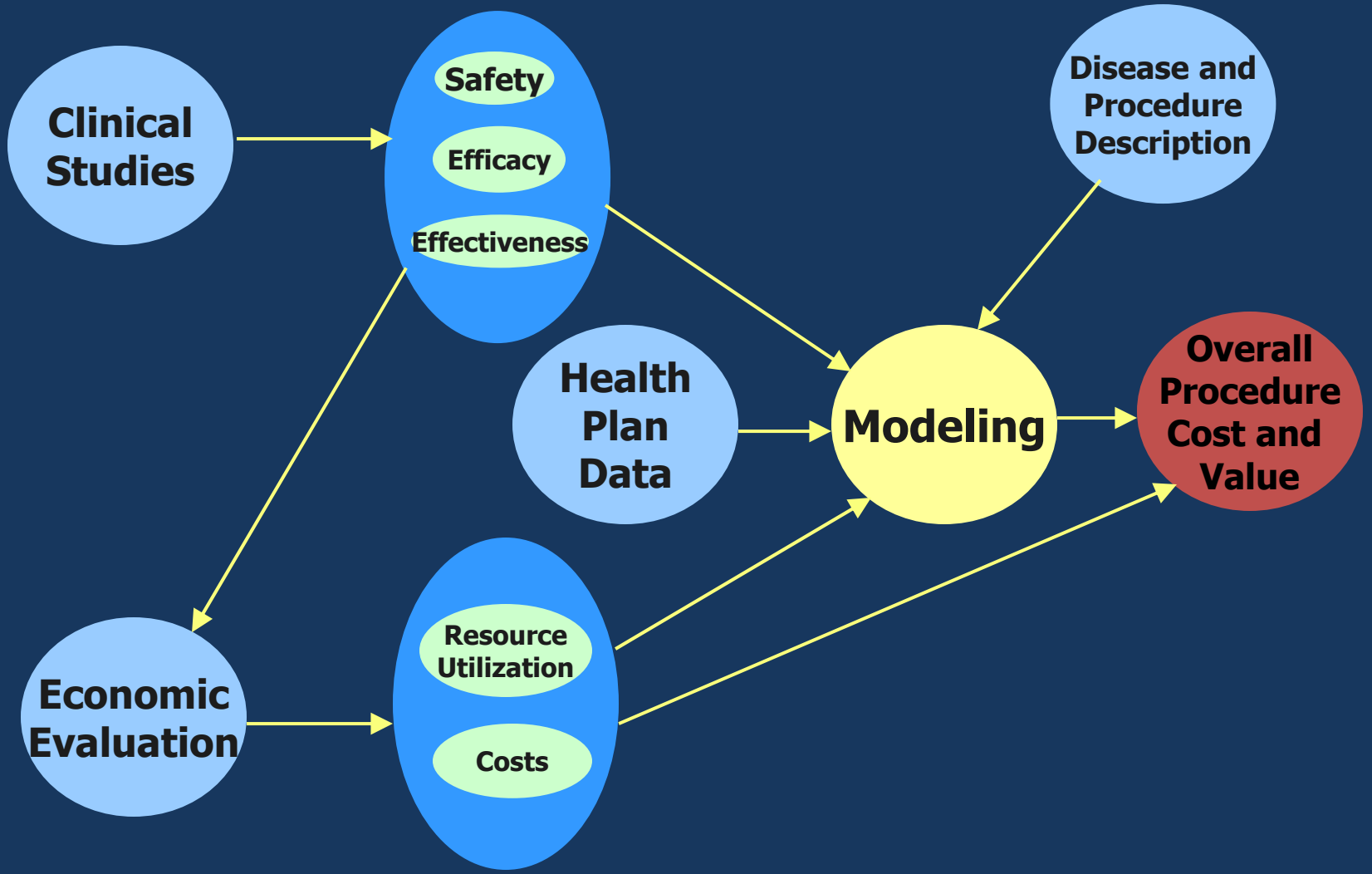
DISCLOSURES

- **David Polly:** *None.*
- Covance Health Care Economics received funding from Ellipse to do this modeling work

What is Modeling?

- Simulation of reality in simple, straightforward manner
- A tool for evaluating the clinical AND economic impact of interventions for a given clinical condition
- Systematic aid to decision-making

"SHOW ME THE VALUE!"



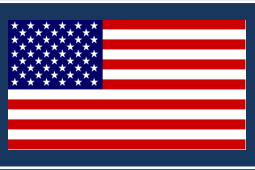
Three Guiding Principles of Models

- Methodologically Sound
- Transparent
  - Calculations
  - Assumptions
  - Data Sources
- User-Friendly

Types of Models

- Cost-of-Illness Models
- Budget Impact Models
- Cost Minimization Models
- Cost-Effectiveness / Cost-Utility Models

Models Used by Different Payers Globally

Country	Type of Models Used by Payers
	Budget Impact Model
	Cost-Effectiveness Model, Budget Impact Model
	Cost-Effectiveness Model, Budget Impact Model
	Cost-Effectiveness Model, Budget Impact Model
	Cost-Effectiveness Model, Budget Impact Model

Budget Impact Models

- Estimates costs only
  - Does not consider effectiveness
- Compares two or more alternatives
- Customize models for health plans (including from a national perspective, if appropriate)
  - Results can be expressed as Per Member per Month, or annual expenditure for a given budget holder.

Perspective

Costs Under Different Perspectives*

Cost Element	Societal	Patient	Payer
Medical care	All medical care costs	Out-of-pocket expenses	Covered payments
Patient time	Cost of all time used	Opportunity cost to patient	None
Informal care giving	All costs	Opportunity cost to caregiver	None
Transportation	All costs	All costs	None
Sick leaves, disability	Admin costs only	Amount received	Amount paid by insurer

* Adapted from Gold MR et al, p.187.

Model Input: Total Time of Surgery

- Includes time to get IV into patient for anesthesia and minutes under anesthesia
  - Average 125 minutes under anesthesia per GSSG database
    - Anesthesia provider fee calculation: (Base Units + Time (in units)) x CF = Anesthesia Fee Amt. This is the physician payment.

    - Payer mix weighted conversion factor = $42.25; calculation: ((private 51.5% x $67.94) + Medicaid 48.5% x $22.6765 x 66%)). [10 base units + 8.33 time units] x $42.25 = $774.44 (If assume 13 base units then total anesthesia fee = $901.19).

Key Cost Drivers

In the sensitivity analysis in the MCGR technique budget impact model, the following factors were key cost drivers:

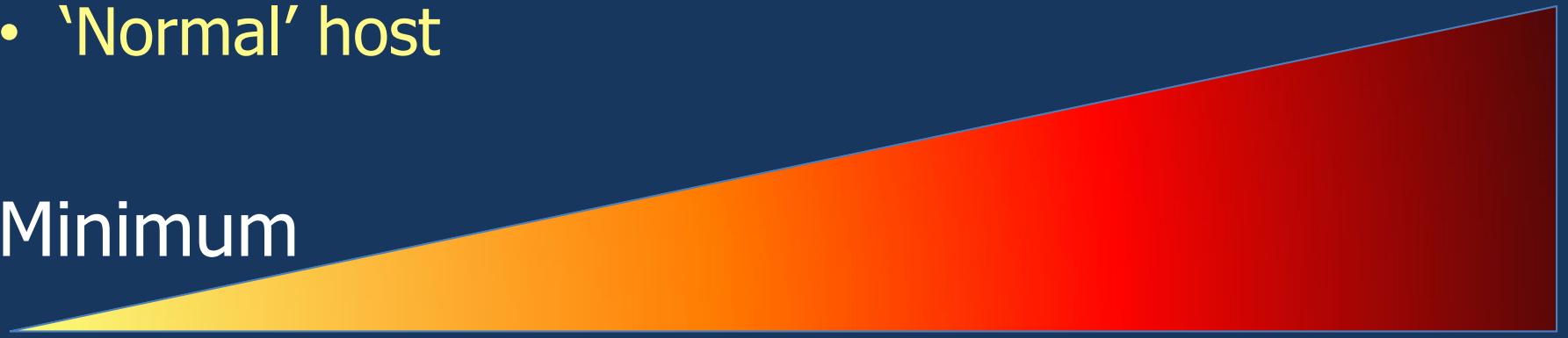
- Infections
- Inpatient vs. outpatient procedure
- Frequency of lengthening
- Type of implant

Cost Driver: Infections

- Stainless steel
- Non-ambulatory
- Multiple revisions (>8)

- Idiopathic cases
- 'Normal' host

Maximum



Minimum

Cost Driver: Inpatient vs. Outpatient

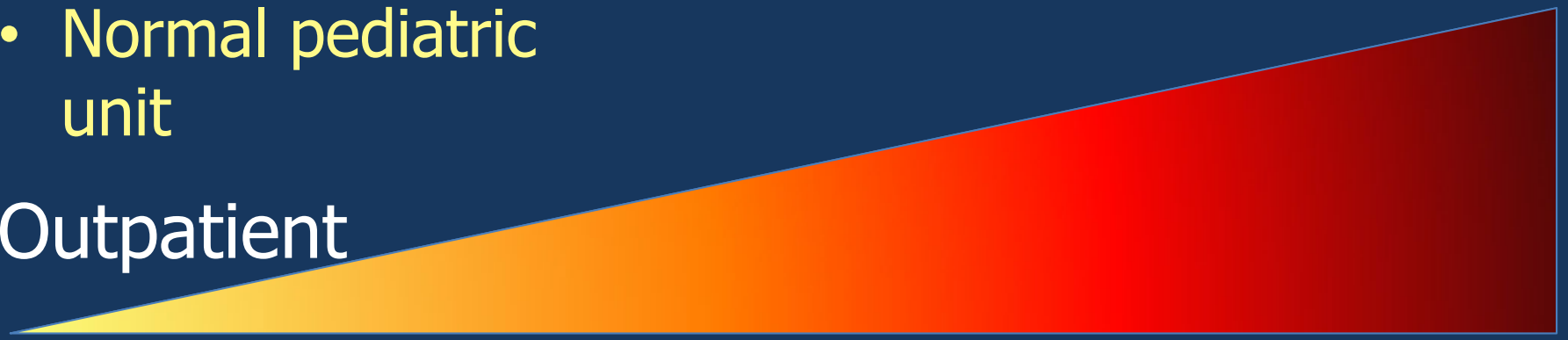
- Epidemiology of site is key

- Strong genetic program
- High syndromic prevalence

- Idiopathic cases
- Normal pediatric unit

Inpatient

Outpatient



Site of Lengthening Procedure

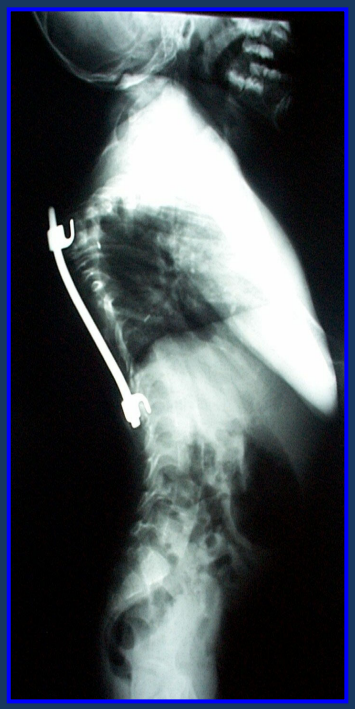
- % TGR pts inpt lengthening
- GSSG query 11/2/14 2,108 lengthening only
  - 949 inpt
  - 805 outpt
  - 354 unknown

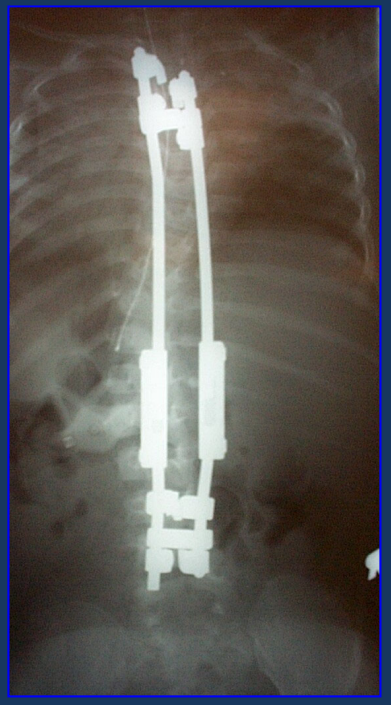
Cost Driver: Frequency of Lengthening

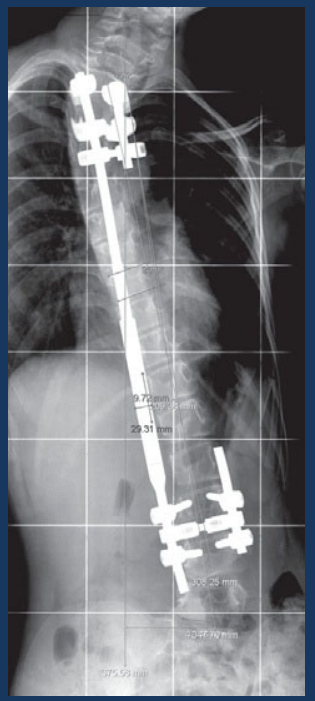
Maximum

Minimum

Cost Driver: Type of Implant



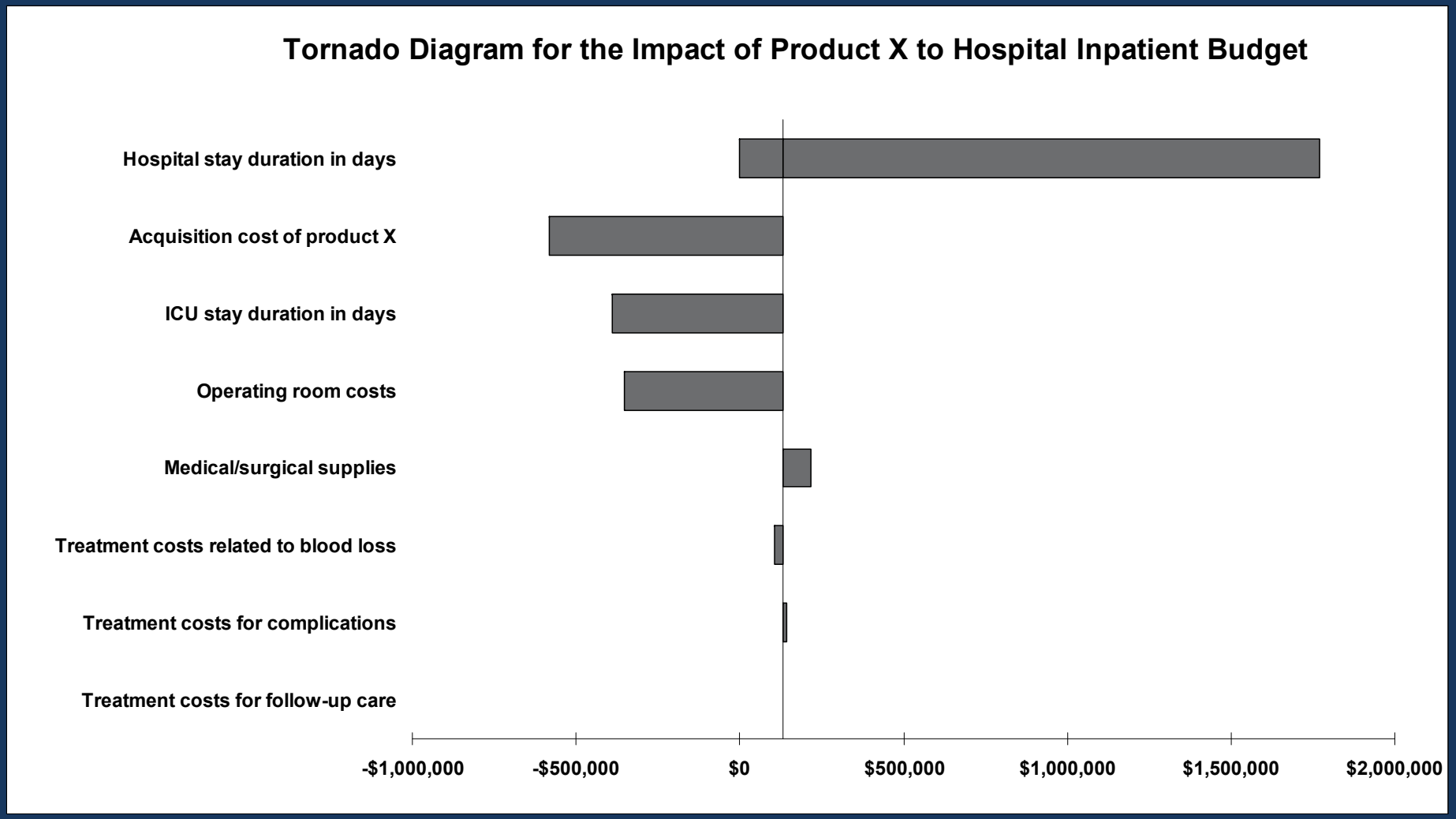




Complex

Simple

Illustration: Tornado Diagram



NICE National Institute for Health and Care Excellence

Putting NICE guidance into practice

Costing statement: The MAGEC system for spinal lengthening in children with scoliosis Implementing the NICE guidance (MTG18)

Published: June 2014

The Committee for the topic was advised that the population of children for whom the MAGEC system would be considered is small, with an estimated 120 children per year in England who may be treated using growth rods. Because of this, it is unlikely that the guidance will result in a significant change in resource use in the NHS.

The External Assessment Centre estimated the insertion costs of MAGEC rods to be £27,400, with an annual lengthening cost of £900. In contrast, conventional growth rods are estimated to cost £15,300 for insertion and £5400 for annual lengthening.

The additional insertion cost of £12,100 for the MAGEC system has a payback period of less than 3 years. Anticipated savings per child after 6 years are estimated to be around £12,000.

Orthopaedics & Traumatology: Surgery & Research 100 (2014) 469–474

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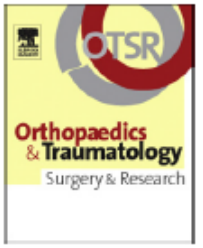

Original article

Direct costs associated with the management of progressive early onset scoliosis: Estimations based on gold standard technique or with magnetically controlled growing rods

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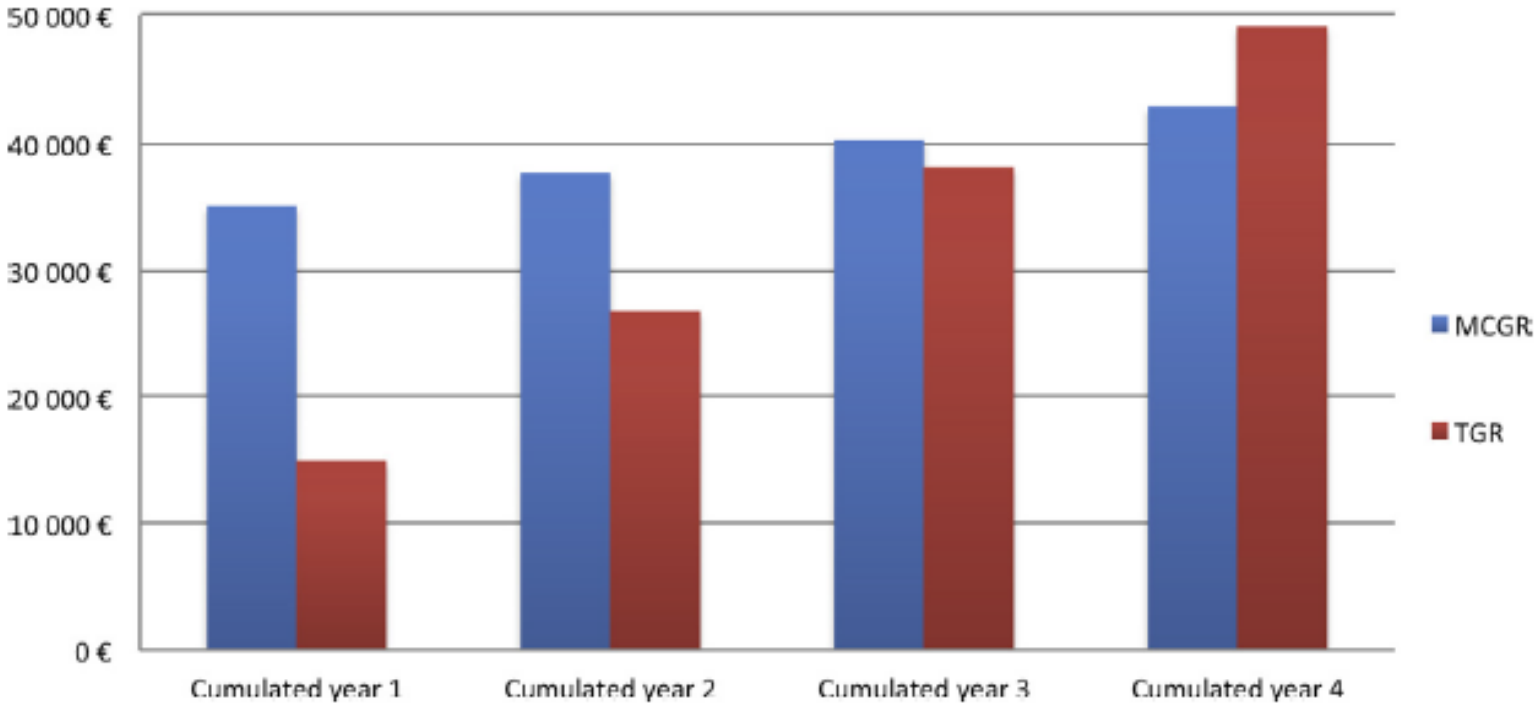

Fig. 1. Cumulated costs over time horizon for traditional growing rod and magnetically controlled growing rod strategies.

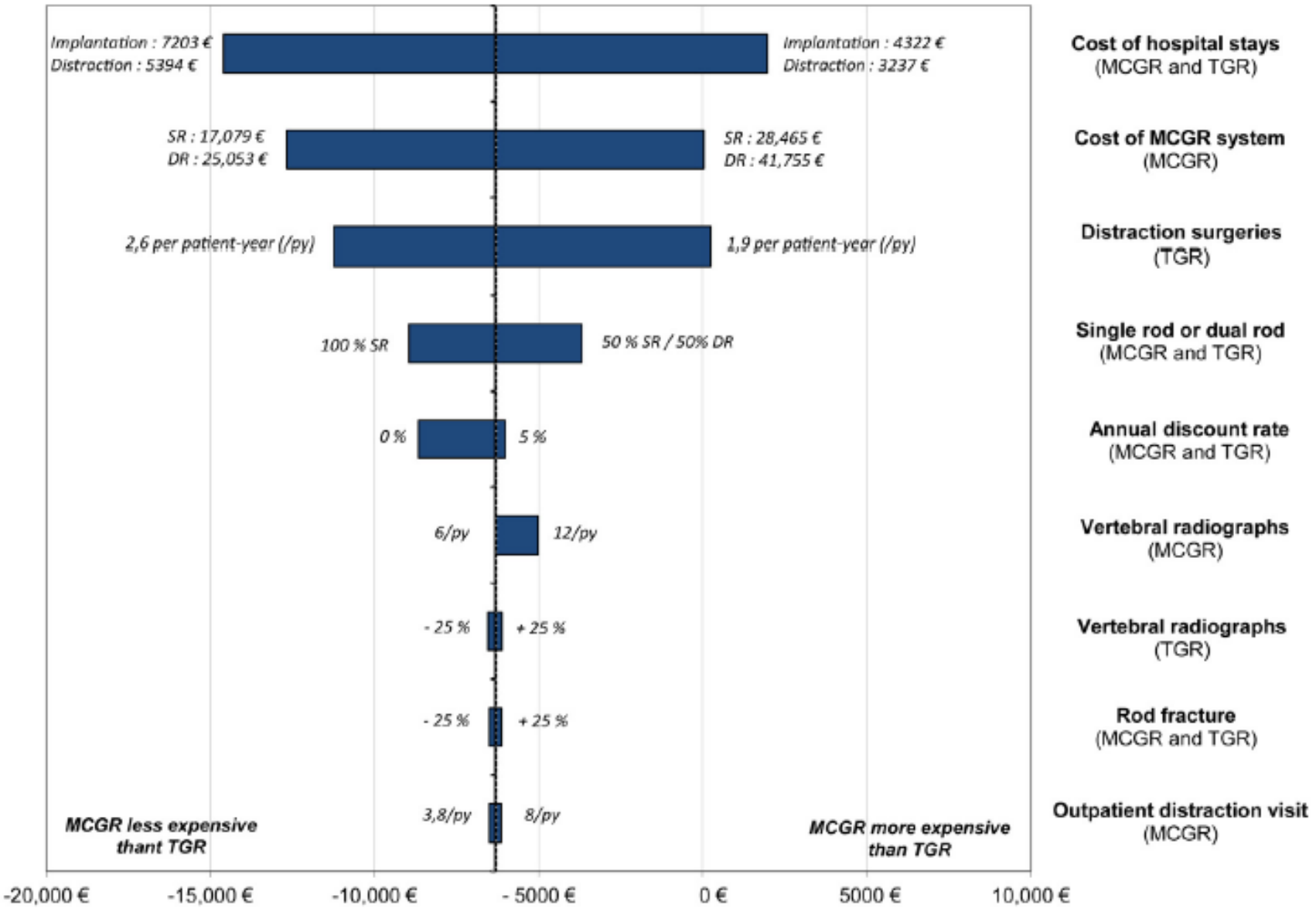

Fig. 2. Tornado diagram assessing sensitivity on cost differential.

Key Cost Drivers

- Cost of hospital stays (from TGR lengthening)
- Cost of implants
  - Single vs dual rods
- Assumed infection rate and rod breakage rates are same between TGR and MCGR
- Rate of implant (MCGR) replacement due to growth will be significant
- Duration of model will have effects as well
  - UK 6 year model France 4 year model
  - US model will be 6 years

What Else Should Be Considered?

- Decreased episodes of general anesthesia
- Perhaps decreased patient and family anxiety
- Potentially increased visits to outpatient clinic
- Effect on number of x-rays?
- Clinical effectiveness?
- If the new technology is cost neutral it is a big win, if it increases costs but has additional definable benefits it is still ok