Cost analysis of a growth guidance system for EOS in the US: An integrated health care delivery system perspective

Growing Rods vs SHILLA™

Scott J Luhmann MD; Eoin M McAughey MSc; Stacey J Ackerman MSE PhD; David B Bumpass MD; Richard E McCarthy MD

**Sponsored in part by Medtronic. Medtronic was not involved in data analysis or interpretation.*

Disclosures

Scott J Luhmann MD – Medtronic, Stryker, Nuvasive, Orthapedics, Globus Medical, Wolters Kluwer

Eoin M McAughey MSc- Covance

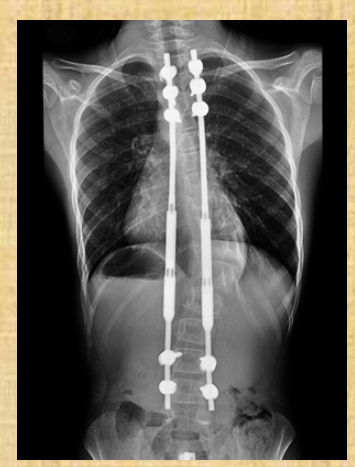
Stacey J Ackerman MSE PhD- Covance

David B Bumpass MD- NASS, Medtronic, Acuity Surgical

Richard E McCarthy MD- Medtronic

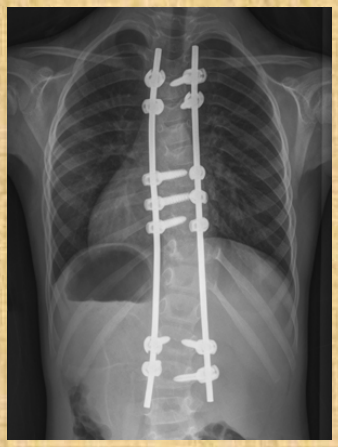
Current operative treatment

- Current primary methods for operative treatment of EOS include:



Traditional Growing Rods: *TGR*

Magnetically Controlled Growing Rods: *MCGR*



Growth Guidance System: *GGS*

Lengthenings

- **TGR** requires repeated invasive surgical lengthenings that risk complications.
- **MCGR** lengthens noninvasively using a hand-held external remote controller.
- **GGS** obviates the need for active, distractive lengthenings.

Goal of Study

- Perform a cost analysis of GGS compared with TGR and MCGR for EOS
  - Taken from perspective of United States integrated health care delivery system
  - Over the complete 6-year episode of care from initial implantation (dual-rod construct) until final spinal fusion

Model methodology

- Based on established method of cost analysis by Polly *et al.* (2016) where MCGR was compared to TGR
- Considered direct medical costs:
  - Initial implantation
  - Revisions due to device failure
  - Surgical site infections
  - Device exchange
  - HCP visits (GGS every 6 months)
  - Rod lengthenings (MCGR every 3 and TGR every 6 months)
  - Removal and final fusion

  } *Cumulative costs (2016 US dollars)*

- Parameters in the decision-analytic model were derived from the most recent peer-reviewed literature – published data.
- Medicare payments were used as a proxy for provider costs.

Model assumptions

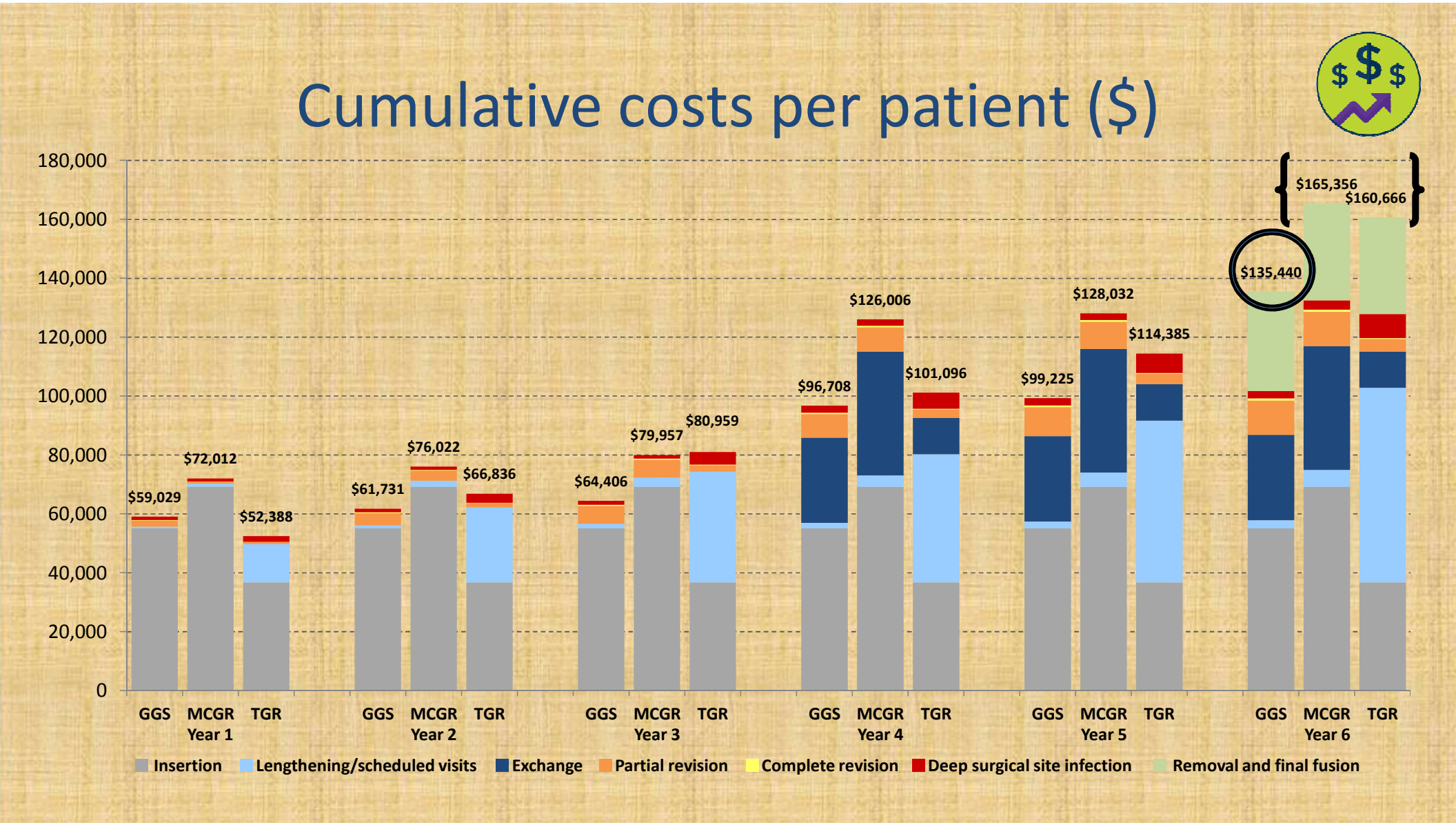
- The model assumes that **clinical effectiveness** (curve correction, increased thoracic height) is **equivalent** across devices
- Additional assumptions:
  - All devices exchanged at 3.8 years
  - Deep SSI require device replacement and intravenous antibiotics
  - Superficial infection requires oral antibiotics (paid by patient)
  - Components replaced in a partial revision are the same across devices

Results over the 6-year episode of care/1ooopts

1. Fewer invasive surgeries GGS vs TGR
2. Comparable # invasive surgeries GGS vs MCGR
3. Deep SSIs for GGS and MCGR substantially lower than TGR
4. Device failures (rod breakages) were least for TGR

Parameter (per 1,000 patients)	GGS	MCGR	TGR
Invasive surgeries	3,436	3,406	14,395
Deep SSIs	83	75	652
Device failures	436	406	395

Cumulative costs per patient ($)



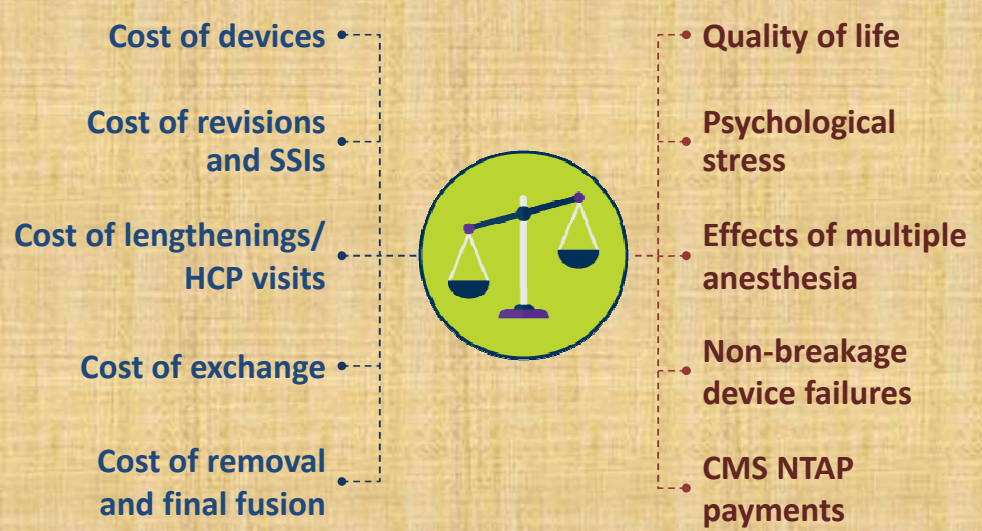
Results: analysis

- Over a 6-year episode of care GGS had lower cumulative costs, saving an estimated **16% vs TGR** and **18% vs MCGR**
  - GGS initial insertion and exchange costs were offset by TGR lengthenings
  - MCGR had the highest initial insertion and exchange costs
  - Results were sensitive to changes in construct costs, rod breakage rates, months between lengthenings, and TGR lengthening setting of care.

Cost analysis to support decision-making

Limitations

- This is a cost analysis, not a cost-effectiveness analysis
- Not considered:
  - Family disruption for lengthenings
  - Psychological stress of children and parents
  - Effects of multiple anesthetics on children
  - Compromised health-related quality of life associated with lengthenings
  - MCGR rods that failed to lengthen



* If considered would lend more power to these findings

Conclusion

- From US integrated health care delivery system perspective,
  - **GGS** can provide a cost saving compared to **TGR** by obviating the need for repeated invasive surgical lengthenings that risk complications, such as deep SSIs
  - **GGS** can provide a cost saving vs **MCGR** due to reduced construct costs with a comparable rod fracture and deep SSI rate

Thank You
from Arkansas

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