

# Best Practice Guidelines for the Surgical Treatment of EOS

Michael Glotzbecker MD, Tricia St Hilaire MPH,  
Jeff Pawelek BS, George Thompson MD,  
Michael Vitale MD MPH

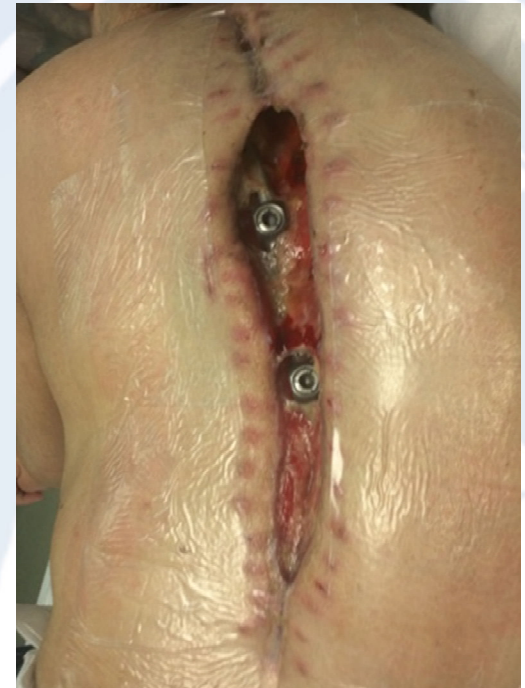
Children's Spine Study Group  
Growing Spine Study Group

# Background

**SSI rate high in EOS**

**Documented variation in treatment**

**Previous consensus approach promising in NM patients**





# High Infection Rate



## VEPTR (10-32%)

**Emans Spine 2005:**

- 3/31 (10%)

**Campbell JBJS 2004:**

- 3/27 (11%)

**Smith et al Spine Deformity 2011:**

- 16/97 (16%)

**Garg Spine 2014:**

- 38/213 (18%)

**Sankar Spine 2010:**

- 6/19 (32%)

## Growing Rods (7-40%)

**Klemme JPO 1997:**

- 5/67 (7%)

**Akbarnia Spine 2005:**

- 2/23 (9%)

**Yang Spine 2011:**

- 5/49 (10%)

**Kabirian JBJS 2014**

- 42/379 (11%)

**Bess JBJS 2010:**

- 15/140 (14%)

**McElroy Spine 2011:**

- 11/80 (14%)

**Sankar Spine 2010:**

- 4/10 (40%)

# Wide Variability in Current Practice

J Child Orthop  
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ORIGINAL CLINICAL ARTICLE

## Surgeon practices regarding infection prevention for growth friendly spinal procedures

Michael P. Glotzbecker · Sumeet Garg ·  
Behrooz A. Akbarnia · Michael Vitale ·  
Tricia St Hillaire · Ajeya Joshi

### 19 question survey

- Survey monkey
- Tested amongst authors prior to sending to group

### Sent to 57 GSSG and CWSDSG members

- 40 responses (70%)



# Is Variability Bad?

## Reducing Variability

- Improves outcomes
- Reduces cost



Lucas FL, Sirovich BE, Gallagher PM, et al. Variation in cardiologists' propensity to test and treat: is it associated with regional variation in utilization? *Circ Cardiovasc Qual Outcomes*. 2010;3:253–260.

Birkmeyer JD, Sharp SM, Finlayson SR, et al. Variation profiles of common surgical procedures. *Surgery*. 1998;124:917–923.

Newman K, Ponsky T, Kittle K, et al. Appendicitis 2000: variability in practice, outcomes, and resource utilization at thirty pediatric hospitals. *J Pediatr Surg*. 2003;38:372–379; discussion 372-9.



# Best Practice Guidelines-High Risk

## Building Consensus: Development of a Best Practice Guideline (BPG) for Surgical Site Infection (SSI) Prevention in High-risk Pediatric Spine Surgery

Michael G. Vitale, MD, MPH,\* Matthew D. Riedel, BA,\* Michael P. Glotzbecker, MD,†  
Hiroko Matsumoto, MA,\* David P. Roye, MD,\* Behrooz A. Akbarnia, MD,‡  
Richard C. E. Anderson, MD, FACS, FAAP & Douglas J. Brockmeyer, MD ||

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**TABLE 4. Final Best Practice Guidelines: Consensus Recommendations to Prevent Surgical Site Infections in High-risk Pediatric Spine Surgery**

	Consensus (%)		
	Total	Strongly Agree	Agree
1. Patients should have a chlorhexidine skin wash at home the night before surgery.*	91	61	30
2. Patients should have preoperative urine cultures obtained and treated if positive.*	91	26	65
3. Patients should receive a preoperative Patient Education Sheet.*	91	48	43
4. Patients should have a preoperative nutritional assessment.*	96	57	39
5. If removing hair, clipping is preferred to shaving.†	100	61	39
6. Patients should receive perioperative intravenous cefazolin.*	91	65	26
7. Patients should receive perioperative intravenous prophylaxis for gram-negative bacilli.*	95	65	30
8. Adherence to perioperative antimicrobial regimens should be monitored (ie, agent, timing, dosing, redosing, cessation).*	96	61	35
9. Operating room access should be limited during scoliosis surgery whenever practical.*	96	61	35
10. Ultraviolet lights need not be used in the operating room.*	87	48	39
11. Patients should have intraoperative wound irrigation.*	100	83	17
12. Vancomycin powder should be used in the bone graft and/or the surgical site.†	91	48	43
13. Impervious dressings are preferred postoperatively.†	91	56	35
14. Postoperative dressing changes should be minimized before discharge to the extent possible.†	91	52	39

\*These interventions reached consensus after the first round of voting.

# Obstacles: Patient Population

Should we just recommend using BPG for high risk?

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## Issues with application:

- Lengthening vs insertion
- Differences in diagnosis (not all neuromuscular)

# Obstacles: Patient Population

**Is it possible in this population?**

- Is the population too diverse?
- Do we have enough literature?
- Should we group GR and VEPTTR?
- Should it include care beyond infection prevention?





# Purpose

**Develop consensus based guidelines  
for treatment of EOS**



# Methods

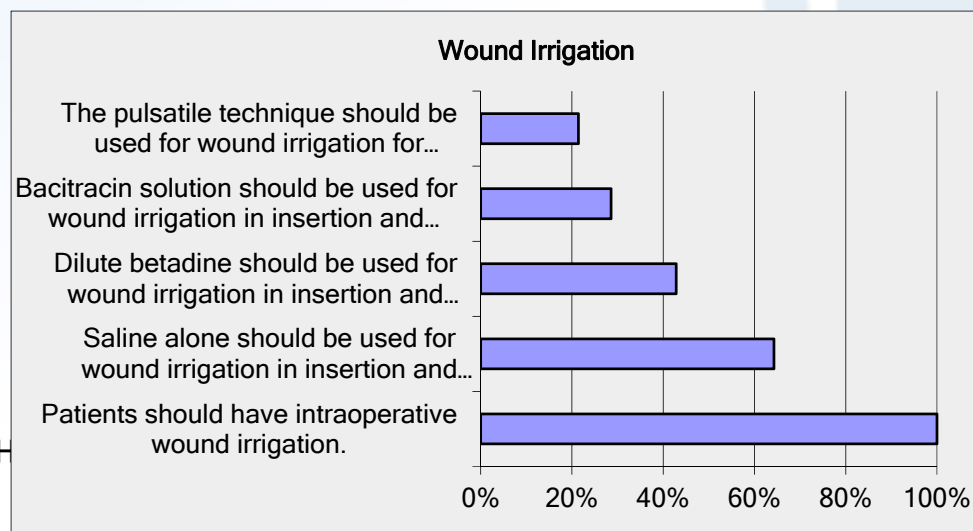
## Systematic approach:

- Systematic literature review
- Current practices survey
- Delphi method
  - Iterative process answering questions and building group consensus through sequential rounds of surveys

# Initial Survey Round

## 57 Statements electronic to 14 Participants

- >80% agreed - 19 (33%)
- <20% agreed - 7 (12%)
- Equipoise - 11 (19%)
- No consensus - 20 (35%)



# Sequential Rounds

**Face to face meeting**  
**Audience Response system**  
**Agreement >80% or <20%**  
**consensus**



# Consensus Obtained-Preoperative

- Chlorhexidine skin wash at home
- Myelodysplasia preoperative urine culture
- NM should have nutritional assessment
- All patients IV cefazolin before insertion or lengthening
- NM patients should have IV gram negative coverage
- Patient Education Sheet
- Pulmonary w/u if history of respiratory problems
- Clipping preferred over shaving



# Consensus Obtained-Intraoperative

- Chlorhexidine skin prep
- Include previous scars in prep
- Adherence to perioperative antibiotic regimens should be monitored
- Soft tissue handling and incision planning important
- Topical Vanco powder for insertion procedure
- Intraoperative wound irrigation
- Limit OR access
- Impervious dressings preferred
- Post op dressing changes minimized



# Equipoise

**MRSA swab**

**Drains for insertions**

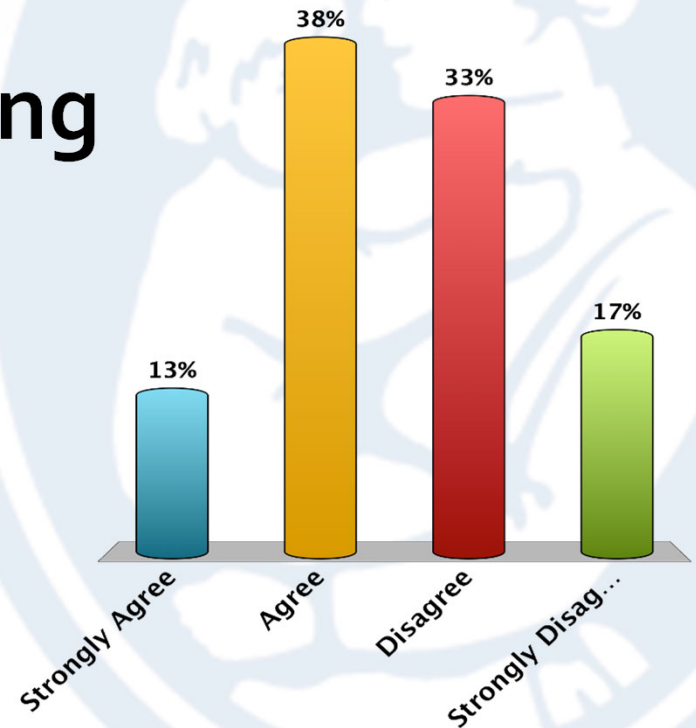
**Vanco for lengthenings**

**Antibiotics after lengthening**

**Dilute betadine**

**Wound sealant**

**....And others**



# Limitations

**Is it possible in this population?**

- Is the population too diverse?
- Do we have enough literature?



# Conclusions

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**Reducing variability may improve outcomes**

**Areas for equipoise present opportunities for future study**



**Boston Children's Hospital**  
Orthopedic Center



**HARVARD MEDICAL SCHOOL**  
TEACHING HOSPITAL



# Thanks

michael.glotzbecker@childrens.harvard.edu



ARVAR  
EACHIN

