

Development of a Risk Severity Score Predicting Surgical Site Infection in Early Onset Scoliosis

Michael Vitale, Hiroko Matsumoto, Nicholas Feinberg, John Smith, Amer Samdani, Michael Glotzbecker, Jeff Sawyer, David Skaggs, David Royce, GSSG, CSSG

Disclosures



- Michael G. Vitale: Consultant/Royalties – Stryker, Biomet; Research –SRS, POSNA, CSSG, OSRF, Broadwater; Divisional OMeGA, Biomet; Positions– CSSG, POSNA, IPOS; Travel – Biomet, Fox, CSSG
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Introduction



Pediatric Surgical Site Infections (SSI) lead to:

- Lengthy hospital admissions
- Return to the OR
- Hospital charges for delayed SSI: \$154,537 - \$961,722
- Economic burden: healthcare-related infections cost \$4.5 billion annually



Purpose



Develop a **Risk Severity Score (RSS)** to predict Surgical Site Infection (SSI) in patients with Early Onset Scoliosis

Methods



Setting:

- Retrospective cohort study involving 15 academic institutions (participating in the CSSG registry) between 2002 - 2009

Inclusion Criteria

- Growing spinal instrumentation, lengthenings, and fusion
- Minimum 5 year follow-up

SSI Case Definition:

- 2014 CDC National Healthcare Safety Network Guidelines
 - Superficial (30 days)
 - Deep (90 days)

Results



Of the 171 patients (45% male, 55% female) identified, etiologies included:

1. Congenital (44%)
 2. Neuromuscular (26%)
 3. Syndromic (18%)
 4. Idiopathic (12%)
- The SSI rate was 22.8%

EOS Model

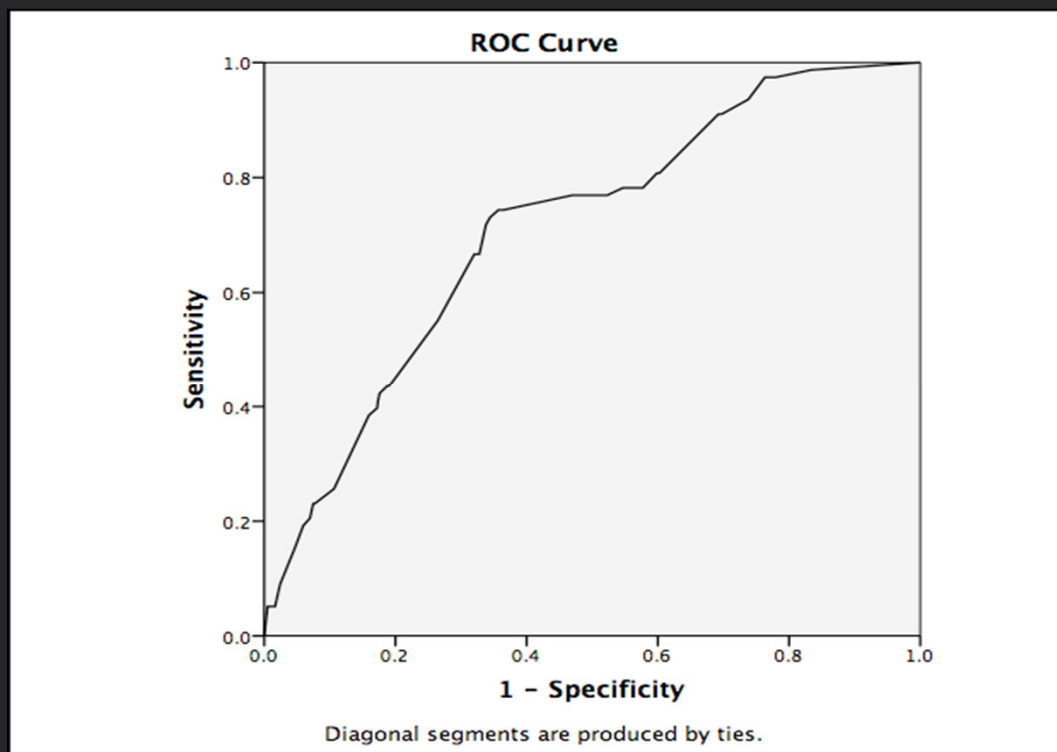


	Beta	Odds Ratio
Congenital Etiology	1.0	2.6
Syndromic Etiology	0.2	1.2
Major Coronal Curve > 70°	0.8	2.3
Hypokyphosis	0.5	1.6
G-Tube	1.5	4.3
Non-ambulatory Status	1.0	2.9
Pulmonary Comorbidity	0.3	1.3

$$\text{Probability of SSI} = \frac{\exp [-4.48 + 0.97(\text{Congenital Etiology}) + 0.16(\text{Syndromic Etiology}) + 0.82(\text{Major Coronal Curve } > 70^\circ) + 0.48(\text{Hypokyphosis}) + 1.47(\text{G-Tube}) + 1.07(\text{Non-ambulatory}) + 0.30 (\text{Pulmonary Comorbidity})]}{1 + \exp [-4.48 + 0.97(\text{Congenital Etiology}) + 0.16(\text{Syndromic Etiology}) + 0.82(\text{Major Coronal Curve } > 70^\circ) + 0.48(\text{Hypokyphosis}) + 1.47(\text{G-Tube}) + 1.07(\text{Non-ambulatory}) + 0.30 (\text{Pulmonary Comorbidity})]}$$

Predictive Ability of Regression Model

- Receiver Operating Characteristic (ROC) curve

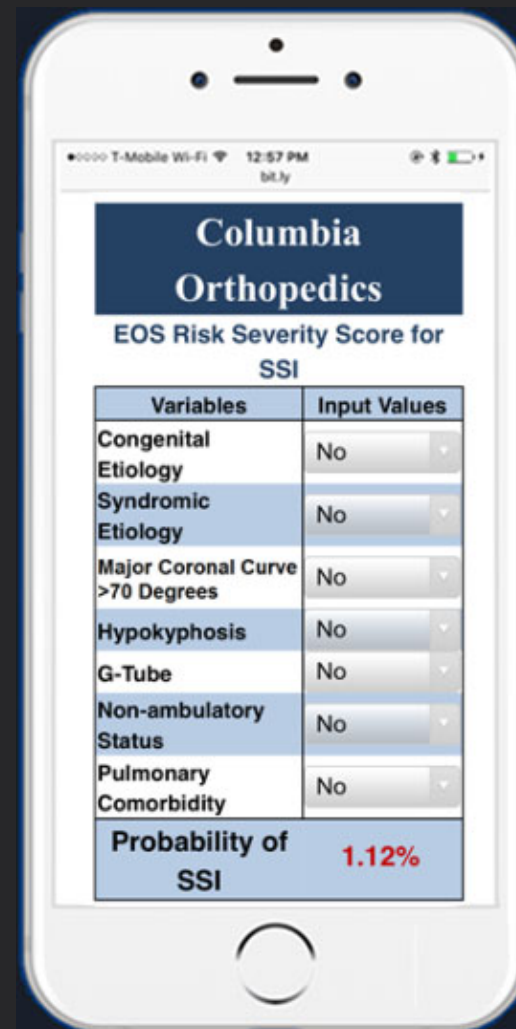


Predictive Ability: 74%



Online RSS Application

- The Risk Severity Score App, is now live:
 - It is based on **patient characteristics**
 - You can now access it online:
 - www.bit.ly/eos-rss



The image shows a smartphone screen displaying the 'Columbia Orthopedics EOS Risk Severity Score for SSI' application. The interface includes a title bar, a table of variables and input values, and a final probability result.

Variables	Input Values
Congenital Etiology	No
Syndromic Etiology	No
Major Coronal Curve >70 Degrees	No
Hypokyphosis	No
G-Tube	No
Non-ambulatory Status	No
Pulmonary Comorbidity	No

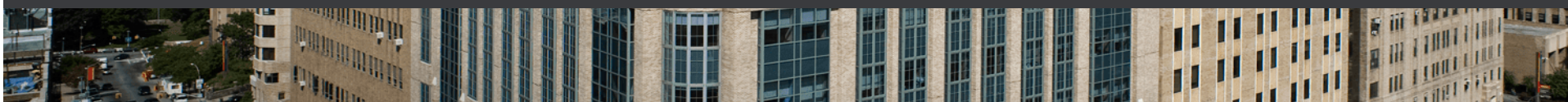
Probability of SSI **1.12%**

Conclusions



- RSS provides a means of predicting SSI risk in the EOS population using known preoperative patient characteristics
 - It will improve shared decision making with patients and families
- RSS also provides an objective metric for fair comparison of quality outcomes based on variable patient complexity.

Thank You



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for kids

Hiroko Matsumoto

hm2174@cumc.columbia.edu



NewYork-Presbyterian
Morgan Stanley Children's Hospital



COLUMBIA UNIVERSITY
DEPARTMENT OF ORTHOPEDIC SURGERY
College of Physicians & Surgeons