



Optimization of COLDS scoring system: A pre-anesthetic risk assessment tool

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INTRODUCTION

- Upper respiratory tract infections (URIs) in the pediatric population are frequently encountered in the perioperative setting.
- The COLDS score was developed by Lee and August as a way to risk stratify pediatric patients with upper respiratory infections.
- Previously we showed this score to have a good predictive value for perioperative respiratory complication (AUC=0.69).
- This study aimed to optimize the current COLDS score to yield better predictive value.

METHODS

- Patients 6 years old and under presenting for any type of procedure were included.
- Exclusion criteria: endotracheal tube or tracheostomy and patients with congenital heart disease.
- Survey given to anesthesia providers providing care to eligible patients to assess URI symptoms pre-, intra-, and post operatively and evaluate for any anesthetic complications.
- We attempted to improve the predictive ability of the scoring system by changing the key from a 1, 2 and 5 score for each category to one determined by obtained by logistic regression.
- We also attempted to improve the predictive ability of COLDS by weighting each of the 5 categories that compose the COLDS Score by logistic regression.
- Cox proportional hazards model to predict the likelihood of any perioperative respiratory complication and a negative binomial model to predict the number of expected perioperative respiratory complications with a given COLDS score.

	1	2	5
C	None	Mild URI confirmed by parent and/or congestion, rhinorrhea, sore throat, sneezing, low fever, dry cough	Moderate/Severe Toxic appearance, purulence, wet cough, abnormal lung sounds, lethargy, high fever
O	>4 weeks	2-4 weeks ago	<2 weeks ago
L	None	Mild RSV, mild intermittent asthma, chronic lung disease >1 year old, loud snoring	Moderate/Severe Moderate persistent asthma, infant with chronic lung disease, OSA, pulmonary hypertension
D	None or facemask	LMA or other supraglottic	Endotracheal tube
S	Other (including pressure equalizing ear tubes)	Minor airway surgery Tonsillectomy, adenoidectomy, flexible bronchoscopy, dental extractions	Major airway surgery Cleft palate, rigid bronchoscopy, maxillofacial

Table 1. The COLDS Score, from Lee, B. J. and August, D. A. (2014), COLDS: A heuristic preanesthetic risk score for children with upper respiratory tract infection. *Pediatric Anesthesia*, 24: 349–350.

RESULTS

- Data was collected on 536 patients over 6 months.
- Re-keying of the COLDS score improved AUC to 0.70, while reweighting the COLDS score categories improved the AUC to 0.71.
- Logistic regression model- terms for onset and surgery type were not significant. Removing these from the COLDS score (CLD score) yielded an AUC of 0.70.

Table 2. Optimized COLDS score key based on regression analysis

Original scoring key	Optimized Key				
	C	O	L	D	S
1	1	1	1	1	1
2	2.45	0.76	1.38	1.93	0.79
5	5.09	-0.26	2.49	1.97	1.68

Table 3. Changes in AUC with rekeying, reweighting

	AUC
Original COLDS score	0.69
Re-keyed COLDS score	0.70
COLDS score with weighted categories	0.71
CLD Score	0.70

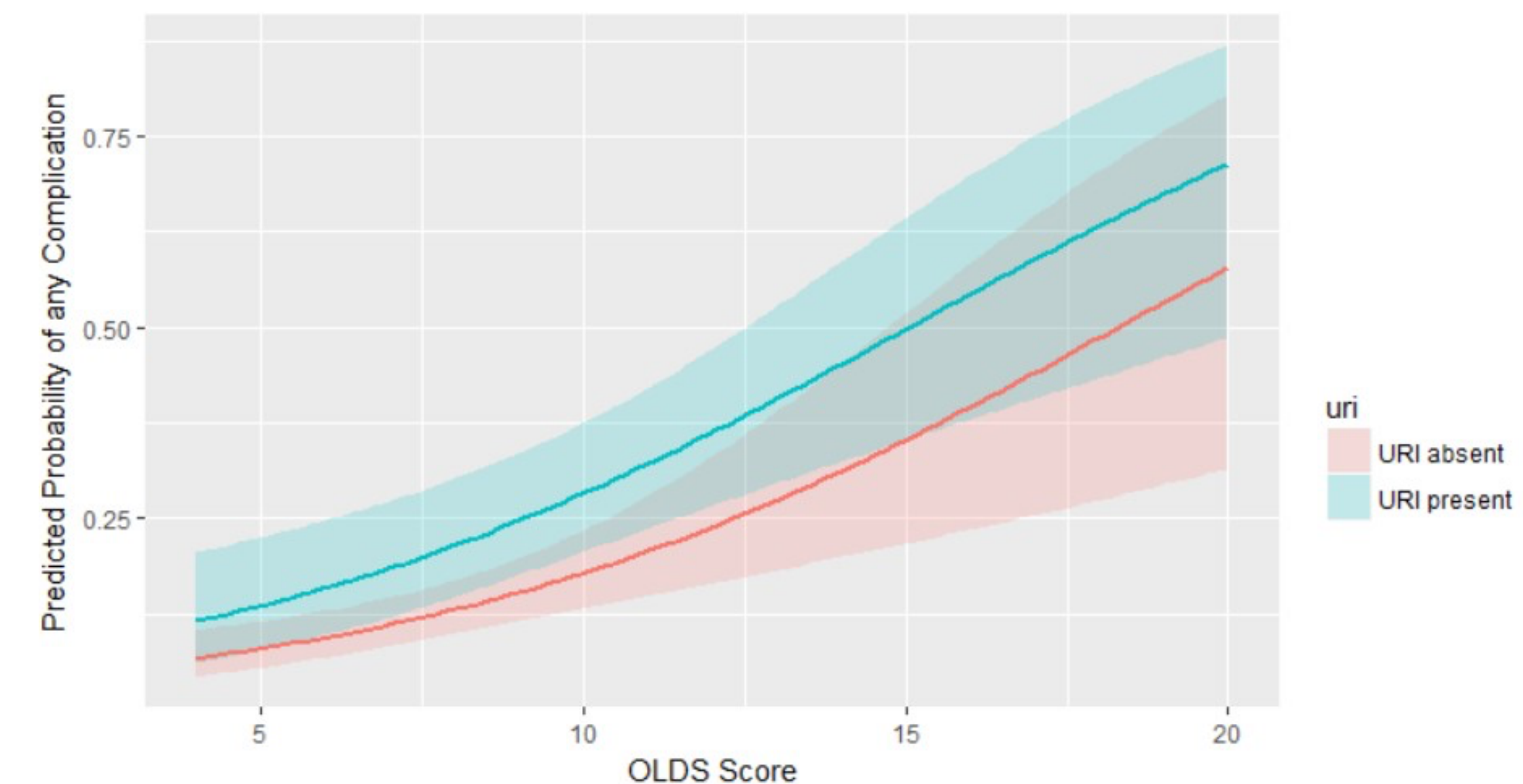


Figure 1. OLDS Score vs Predicted Probability of Any Complication

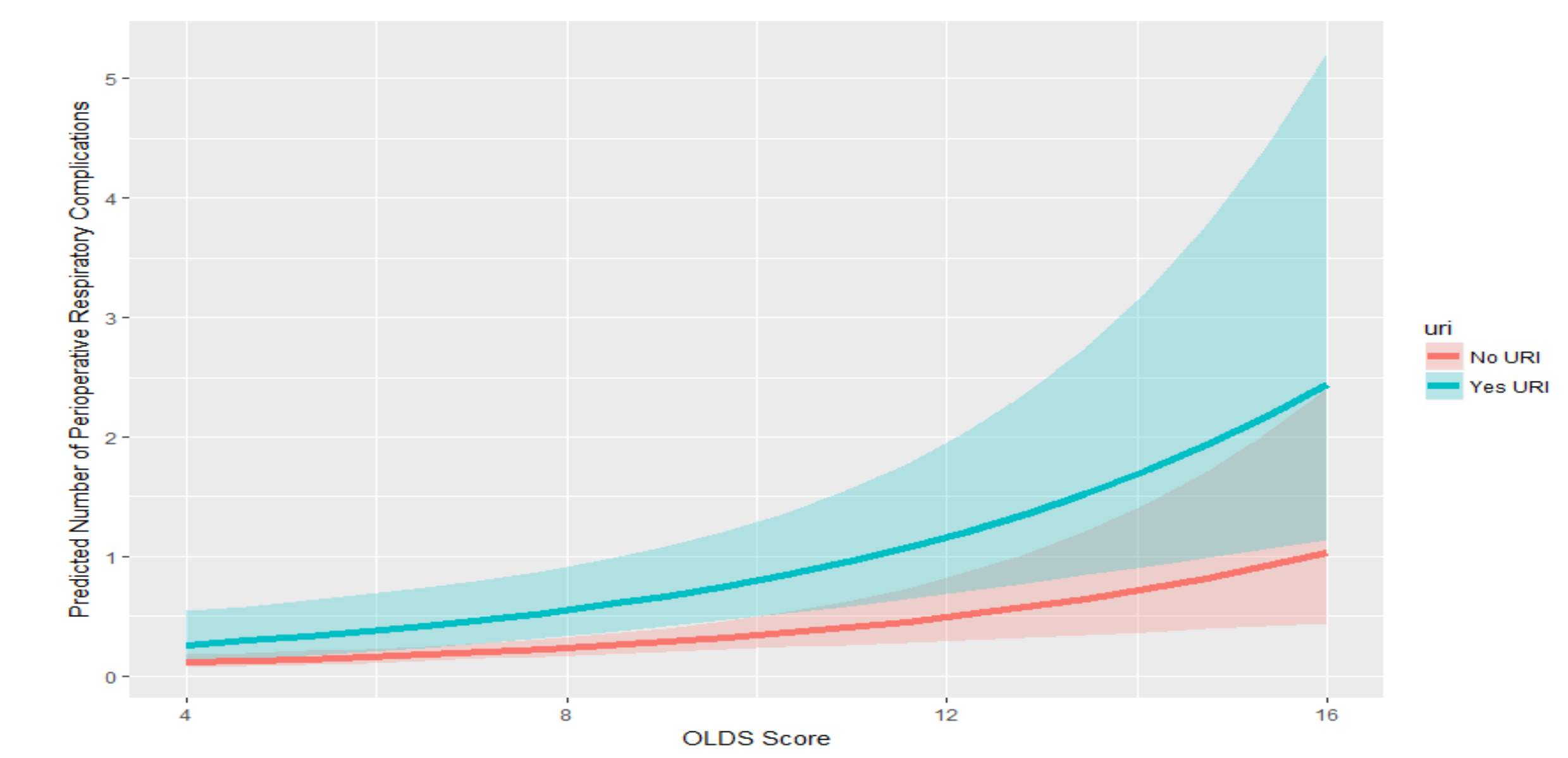


Figure 2. OLDS Score vs Predicted Probability of Perioperative Respiratory Complications

DISCUSSION

The re-keying of the COLDS score greatly increased the complexity of the scoring system without commensurately improving its predictive value, so the 1, 2, 5 scoring key is good as it stands. Reweighting the categories did improve its predictive value. The predictive models presented may be useful as teaching tools for providers to their families about the expected increase in risk of a respiratory complication when the patient has had a recent URI. Additionally, this validated scoring system can be a useful decision-making tool for practitioners.