



# CWIS Chest Wall Injury Summit 2023

Oral Presentation Abstract Submission

**Name** Madeline D'Aquila  
**Credentials** BS  
**Preferred email address** madelinedaquila@vt.edu  
**Name of work institution** Virginia Tech Carilion School of Medicine

## Additional authors:

	Full Name	Credentials	Email address	Mobile or WhatsApp number
Author/Presenter 2	Carl J. Buchholz	MD	cjbuchholz@carilionclinic.org	
Author/Presenter 3	Daniel I. Lollar	MD	dilollar@carilionclinic.org	

**Title of Presentation** External validation of novel Revised Intensity Battle (RIB) Score and comparison of static rib fracture scoring systems

## Background

Rib fractures are the most common injury sustained after blunt thoracic trauma. Several predictive static scoring systems have been proposed, but few have been externally validated. This study aims to compare and externally validate the previously developed novel Revised Intensity Battle (RIB) Score against other proposed scores for predicting mortality, upgrade to the intensive care unit (ICU), unplanned intubation, and number of days spent on a ventilator.

## Methods

An external validation data set was assembled retrospectively in order to confirm the utility of RIB Score as a clinical triage tool in adult patients with rib fracture. In total, 1493 adult patients admitted to a Level 1 trauma center between January 2019 and January 2022 with at least one rib fracture were included in our cohort. The following rib fracture scores were calculated for each patient using trauma registry data: RIB Score, Injury Severity Score, Rib Fracture Score, Chest Trauma Score, and Battle Score. Descriptive statistics were provided for demographic variables and risk factors for patient outcomes which included mortality, ICU upgrade, unplanned intubation, and ventilator days. Score performance was assessed by area under the receiver operating characteristic curves.

## Results

Of the 1493 patients who met inclusion criteria, 64.1% were male with a mean age of 59.1 years and a 13.6% incidence of chronic obstructive pulmonary disease. On average, patients had 3.6 ribs fractured with a 9.6% frequency of flail segment, and 6.5% of patients required a chest tube. Overall, 239 patients (16%) experienced one or more of the investigated outcomes. Generally, scores performed best at predicting mortality and ventilator days. The RIB Score best predicted 'any complication' (AUC = 0.735)

and 'greater than seven ventilator days' (AUC = 0.771) amongst the rib scores.

## **Conclusion**

The RIB Score represents an externally validated triage score for patients with rib fractures and compares favorably against other static scoring systems. Utilizing the novel RIB Score as a triage tool can lead to optimization of clinical management by stratifying patients who may benefit from neuraxial anesthesia, aggressive respiratory therapy, direct ICU admission, and surgical fixation. Next steps include prospective investigation of whether pairing these interventions with this novel scoring system improves outcomes.