

# Stop the Scanning: CT Scans and Radiation Risk in Pediatric Trauma Patients.

Carly Crowder

USF MCOM- LVHN Campus, [carly.crowder@lvhn.org](mailto:carly.crowder@lvhn.org)

Catherine Zimel

Marybeth Browne MD

Lehigh Valley Health Network, [Marybeth.Browne@lvhn.org](mailto:Marybeth.Browne@lvhn.org)

Follow this and additional works at: <https://scholarlyworks.lvhn.org/select-program>



Part of the [Medical Education Commons](#)

---

## Published In/Presented At

Crowder, C. Zimel, C. Browne, M. (2017, March). *Stop the Scanning: CT Scans and Radiation Risk in Pediatric Trauma Patients*. Poster Presented at: 2017 SELECT Capstone Posters and Presentations Day. Kasych Family Pavilion, Lehigh Valley Health Network, Allentown, PA.

This Poster is brought to you for free and open access by LVHN Scholarly Works. It has been accepted for inclusion in LVHN Scholarly Works by an authorized administrator. For more information, please contact [LibraryServices@lvhn.org](mailto:LibraryServices@lvhn.org).

# Stop the Scanning: CT Scans and Radiation Risk in Pediatric Trauma Patients

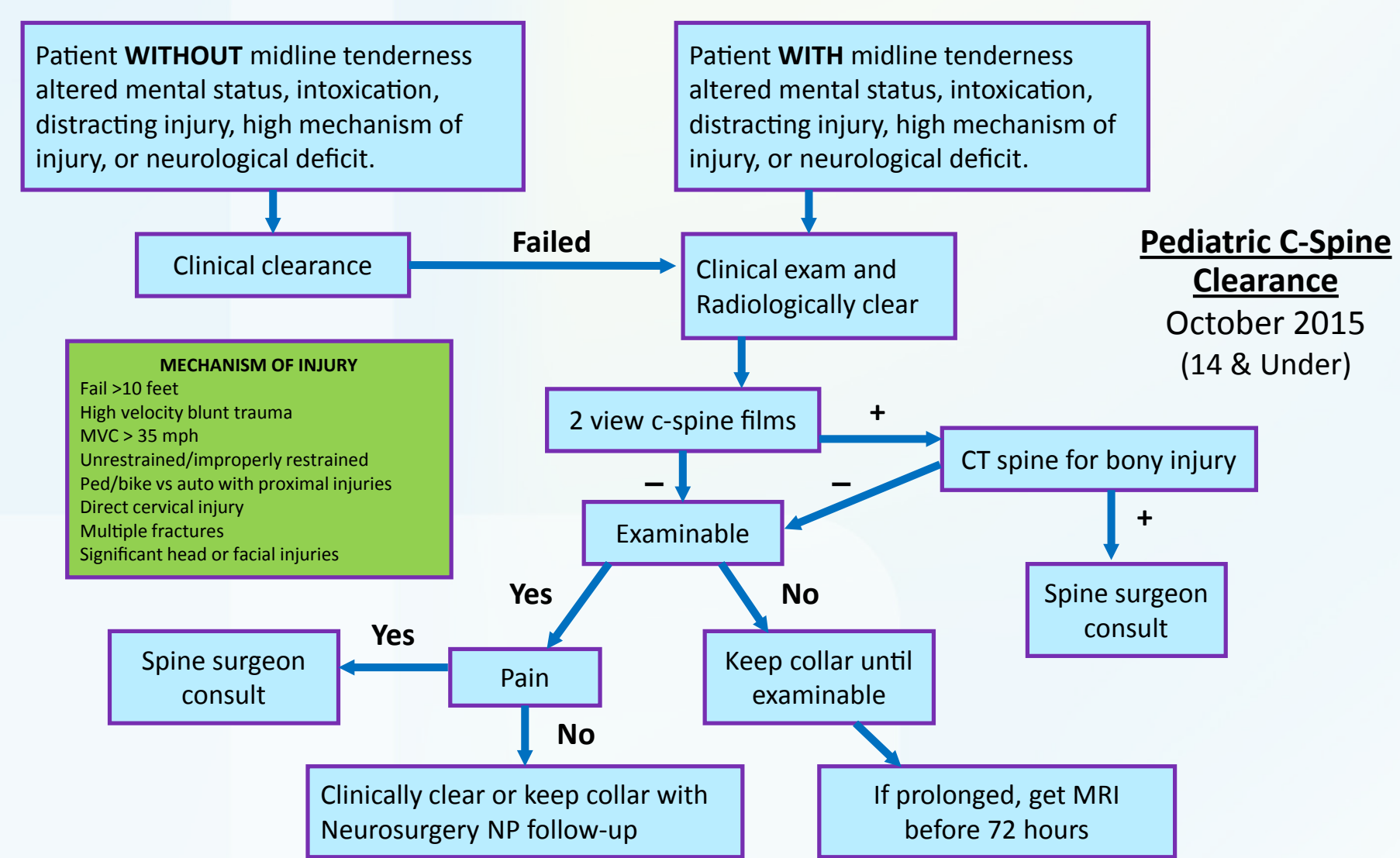
Carly Crowder, Catherine Zimel, Marybeth Browne MD

Department of Surgery, Division of Pediatric Surgery

Lehigh Valley Health Network, Allentown, PA

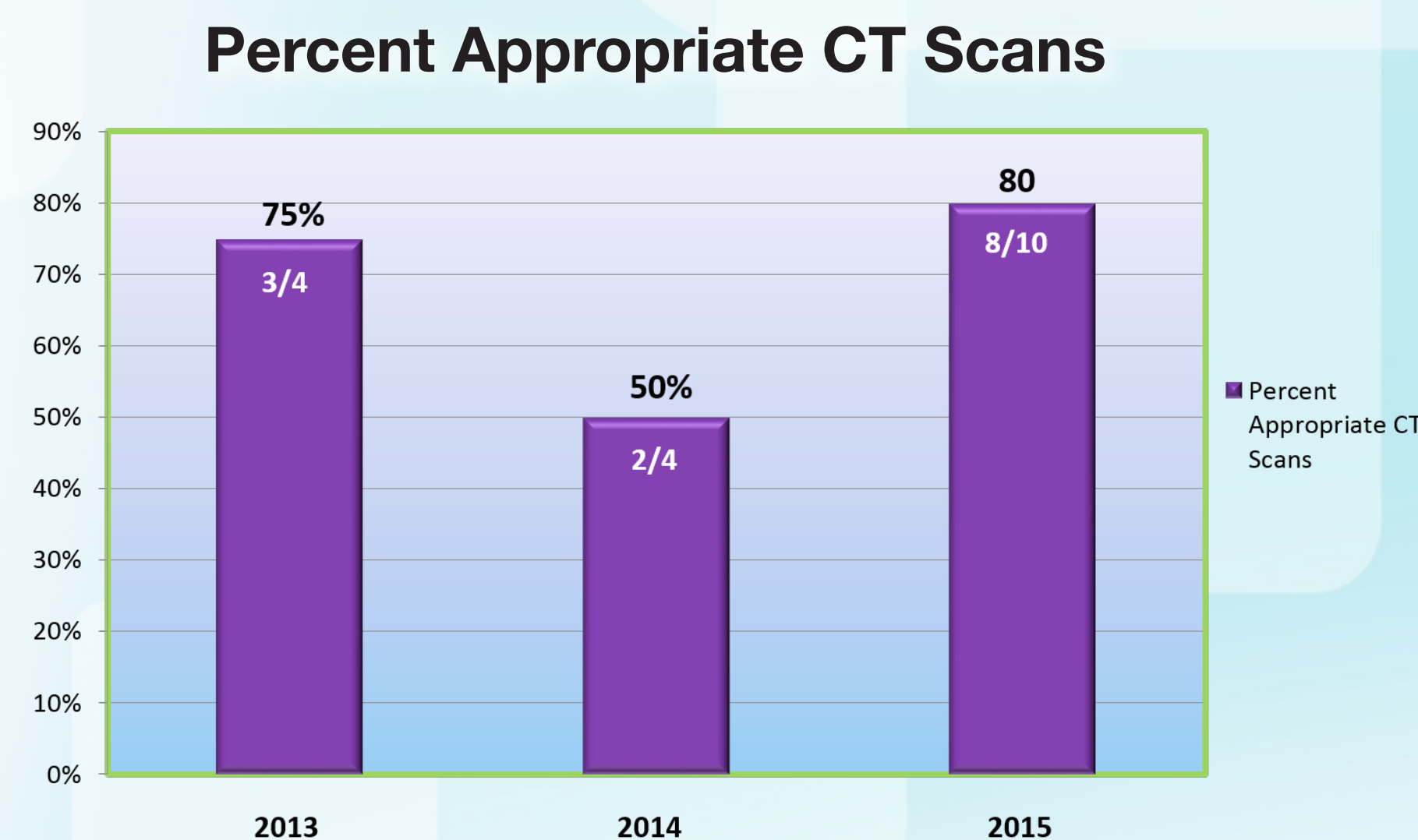
## Background

- Concern has grown regarding pediatric radiation exposure, especially radiation dose delivered by Computed Tomography (CT)
- LVHN was found to over utilize CT scans, which prompted the development of a pediatric trauma CT quality initiative
- Quality initiative included the development of a pediatric c-spine clearance algorithm, educating providers on appropriate CT usage, and implementation of clinical quality case reviews.



## Results

- Number of CT scans increased from 4 to 10 from 2013 to 2015, however the appropriateness of scans increased to 80%



## Discussion

- Appropriateness of CT scans improved after education and guideline implementation
- Rate of CT scans itself is not representative of clinical reasoning
- Proves the usefulness of LVHN's CT quality initiative in decreasing unnecessary radiation exposure to pediatric patients
- Incorporated SELECT competencies including leadership strategies that help in change management
- Knowledge that this LVHN quality initiative, including clinical case review and algorithm development, improved clinical outcomes is generalizable and applicable to many other healthcare settings

## Conclusions and Future Implications

- Proves quality initiatives can increase appropriateness of CT scan usage
- Provides support for the use and final implementation of the pediatric c-spine guideline at LVHN, along with continuation of clinical quality case reviews
- Future study expansion of data review to one year and inclusion of head, chest, and abdominal CT scans

### REFERENCES:

- Scaife E, Rollins M. Managing radiation risk in the evaluation of the pediatric trauma patient. *Seminars in Pediatric Surgery* [serial online]. November 2010; 19(4): 252-256. Available from: MEDLINE with Full Text, Ipswich, MA. Accessed June 30, 2016.
- Macias C, Sahouria J. The appropriate use of CT: quality improvement and clinical decision-making in pediatric emergency medicine. *Pediatric Radiology* [serial online]. September 2011; 41(2): 498-504. Available from: MEDLINE with Full Text, Ipswich, MA. Accessed June 30, 2016.
- Connelly CE, Yonge JD, Eastes LE, et al. Performance improvement and patient safety program (PIPS) guided quality improvement initiatives can significantly reduce CT imaging in pediatric trauma patients. *Journal of Trauma Acute Care Surgery* [serial online]. March 2016. [Epub ahead of print]. Available from: MEDLINE with Full Text, Ipswich, MA. Accessed June 30, 2016.
- Pannu G, Shah M, Herman M. Cervical Spine Clearance in Pediatric Trauma Centers: The Need for Standardization and an Evidence-based Protocol. *Journal of Pediatric Orthopaedics* [serial online]. June 2016. [Epub ahead of print]. Available from: MEDLINE with Full Text, Ipswich, MA. Accessed June 30, 2016.
- Sun R, Skeete D, Wetjen K, et al. A pediatric cervical spine clearance protocol to reduce radiation exposure in children. *Journal of Surgical Research* [serial online]. July 2013; 183(1): 341-346. Available from: MEDLINE with Full Text, Ipswich, MA. Accessed June 30, 2016.
- Mannix R, Nigrovic LE, Schutzman SA, et al. Factors associated with the use of cervical spine computed tomography imaging in pediatric trauma patients. *Academic Emergency Medicine* [serial online]. September 2011; 18(9): 905-911. Available from: MEDLINE with Full Text, Ipswich, MA. Accessed June 30, 2016.
- Baker SP, O'Neill B, Haddon W Jr, Long WB. The Injury Severity Score: a method for describing patients with multiple injuries and evaluating emergency care. *J Trauma*. 1974; 14:187-196.
- Hale DF, Fitzpatrick CM, Doski JJ, Stewart RM, Mueller DL. Absence of clinical findings reliably excludes unstable cervical spine injuries in children 5 years or younger. *J Trauma Acute Care Surg*. 2015; 75:943-948.
- MacPhee M. Strategies and tools for managing change. *J Nurs Adm*. 2007; 37: 405-413.
- Al-Abri RK. Managing Change in Healthcare. *Oman Med*. 2007; 22: 9-10.

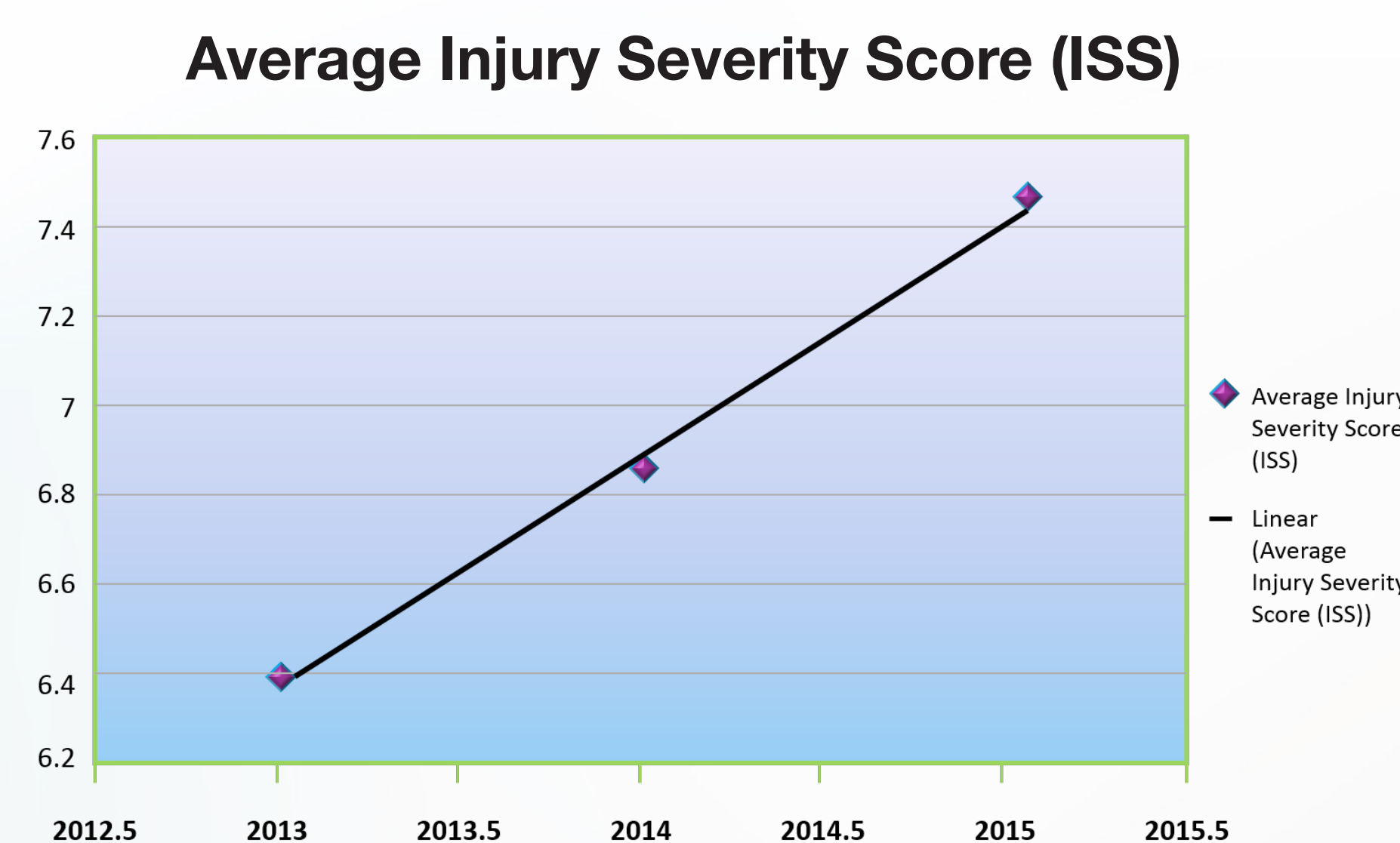
## Problem Statement

This project aims to assess the impact of LVHN's quality initiative on CT utilization in pediatric trauma patients by tracking appropriateness and number of c-spine CT scans as the major outcome measures.

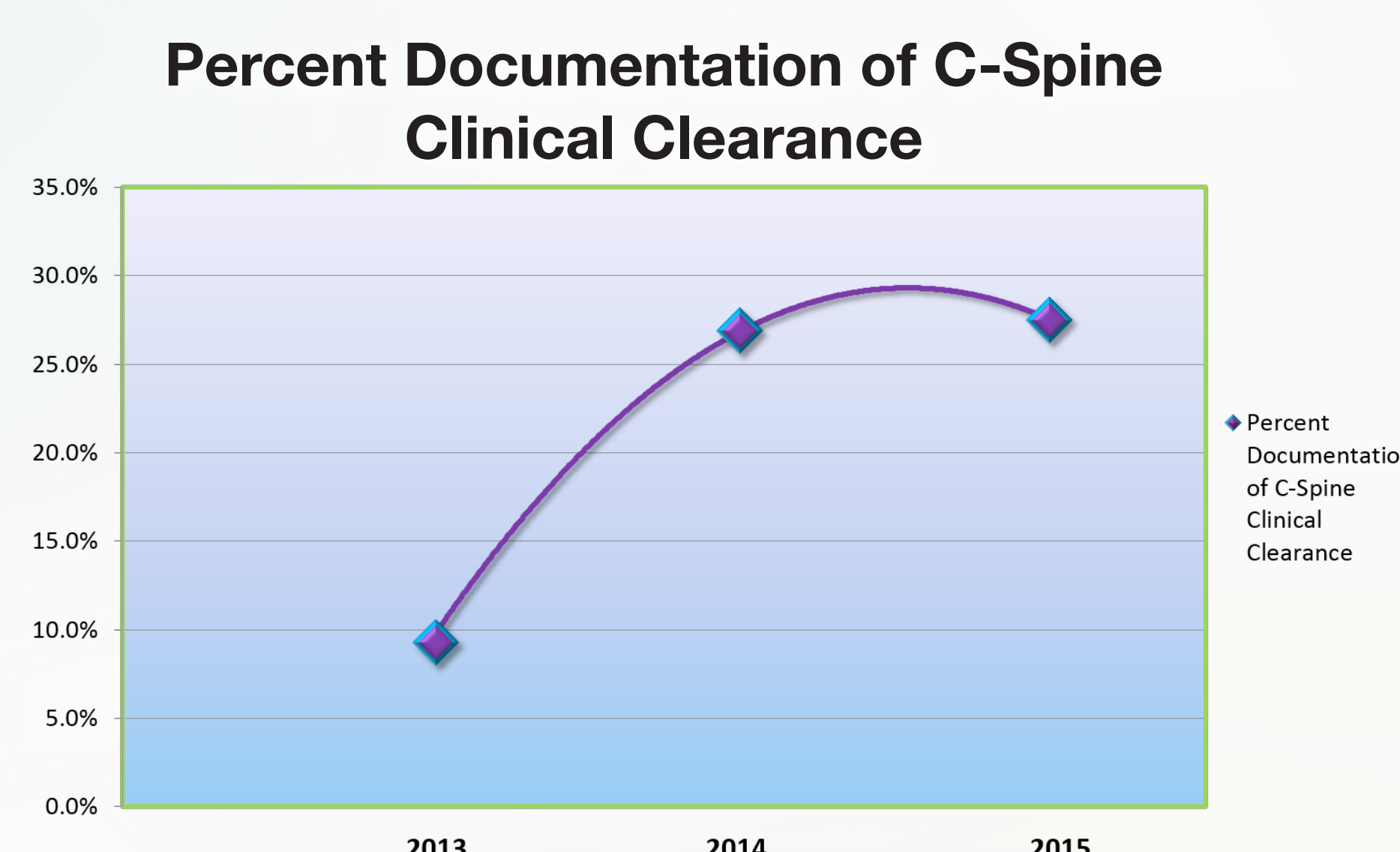
## Methodology

- Retrospective cohort study, review of data from both the Level I trauma registry based at LVH-Cedar Crest and individual chart review identifying patients admitted via trauma alert or code red  $\leq 14$  years of age with an H&P note on file
- Study period included June - August of 2013, 2014, and 2015
- 87 pediatric trauma patients met the above criteria for inclusion in the study; 10 patients excluded due to no H&P note on file

- Average Injury Severity Score (ISS), an anatomical scoring system used to grade injury severity in patients with multiple injuries, also was higher in 2015 (7.5) than in 2013 (6.4)



- Documentation of clinically cleared c-spines also improved from 2013 to 2015 starting at 9.5% (2/21) and increasing to 27.5% (11/40)



© 2017 Lehigh Valley Health Network