



# Examining Costs and Outcomes in the Management of Pediatric Lateral Neck Infections



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## Abstract

**OBJECTIVES:** Review outcomes and costs for pediatric patients hospitalized with deep lateral neck infections.

**STUDY DESIGN:** Retrospective case series.

**METHODS:** Patients were reviewed to measure outcomes and determine hospital costs for children 18 years old or younger treated for lateral neck infections between January 2014 and May 2016. Demographics, length of stay, type and number of imaging studies obtained, number of procedures, hospital readmission, and hospital cost were determined.

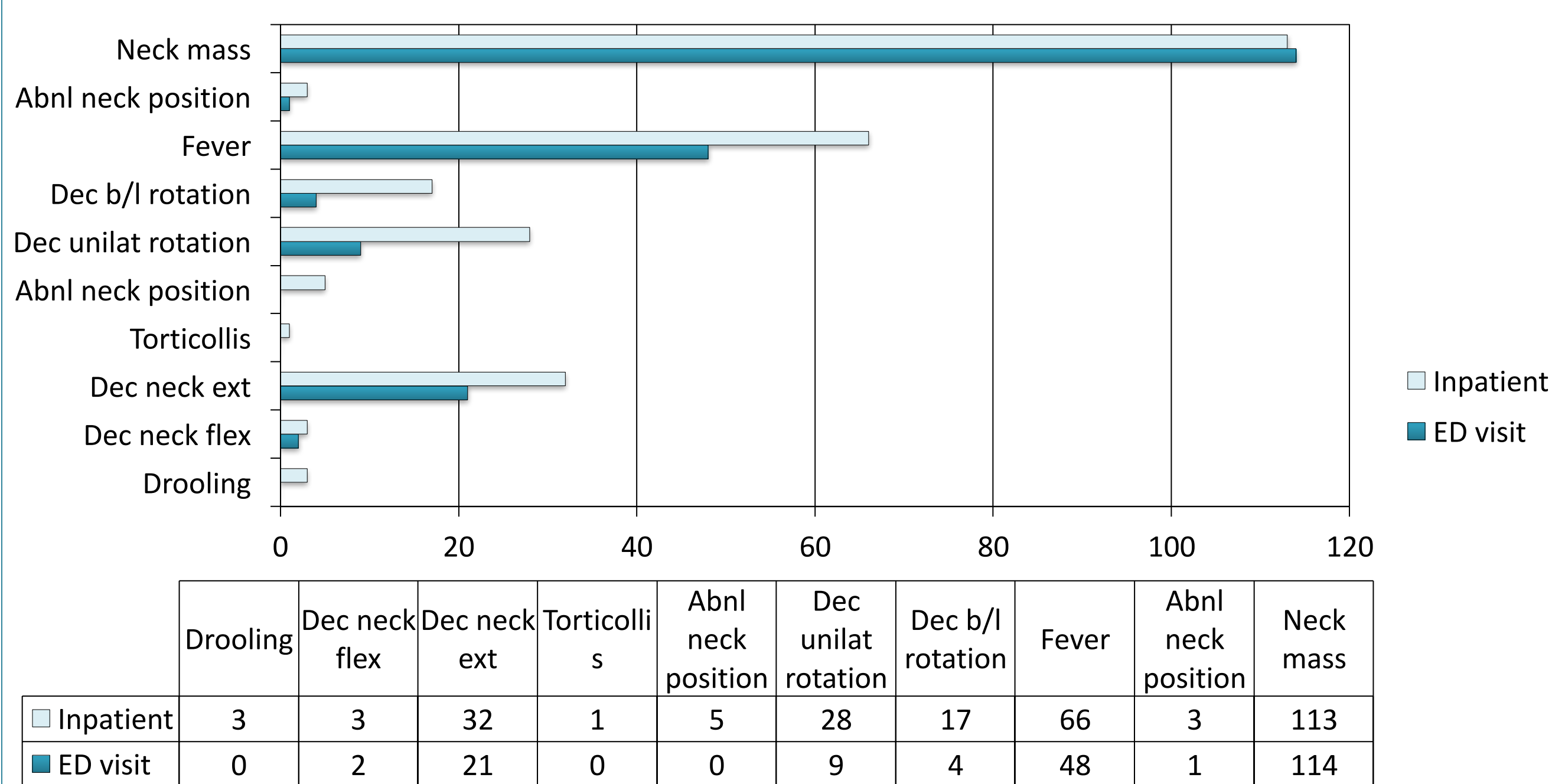
**RESULTS:** The study screened 524 patients; 263 of these met inclusion criteria. Inpatient admission occurred in 135 patients (51%) and discharge from the Emergency Department (ED) in 128 patients (49%). For those patients admitted: the mean length of stay was 64.1 ± 3.5 hours, only 7 (5.2%) patients did not receive imaging, and for those patients who received imaging, 41 (32.0%) received ultrasound on initial evaluation and 87 (68.0%) underwent CT as the primary imaging modality. There were 13 (9.6%) cases of a retropharyngeal infection that was concurrently identified. Drainage was performed in 65 patients (48.1% of inpatients). Readmission was required in 8 patients (5.9%). The mean cost per hospitalized patient was \$6,216 ± \$323 and was \$524 ± \$3 for patients discharged from the ED. For ED patients 71% of total cost was attributed to the ED itself and 61% of inpatient cost was directly attributed to the floor (in contrast with pharmacy, lab, imaging, etc).

**CONCLUSIONS:** Lateral neck infections are a common cause for hospital admissions in the pediatric population and this study demonstrates a significant financial impact on the health care system. Identifying ways to reduce unnecessary costs for these visits would improve the value of care for these patients.

## Introduction

- Lateral neck infections are common in the pediatric population, yet there is no published guideline regarding management<sup>1</sup>
- Several studies have been done regarding management of lateral neck abscesses, but these do not include patients without a formed abscess<sup>2</sup>
- This study investigates the natural history of lateral neck infections and the major drivers of cost of care of these patients

Figure 1 - Presenting Symptom(s)



## Methods and Materials

This study was approved by the Institutional Review Board at the University of Utah. A retrospective case series of pediatric patients was reviewed to measure presentation, outcomes, and determine hospital costs of treatment between January 2014 and May 2016. We identified patients for inclusion using the following ICD-9 and ICD-10 codes: 289.3 (lymphadenitis, unspecified), 682.1 (cellulitis and abscess of neck), 683 (acute lymphadenitis), I88.9 (nonspecific lymphadenitis, unspecified), L02.11 (Cutaneous abscess of neck), L03.221 (cellulitis of neck), and L03.222 (acute lymphangitis of neck). Demographics, presenting symptoms, length of stay, type and number of imaging studies obtained, number of procedures, hospital readmission, and hospital cost were determined.

## Results (cont)

- The study screened 524 patients; 263 of these met inclusion criteria.
- **Inpatient admission** occurred in 135 patients (51%)
  - The median length of stay was 64.1 ± 3.5 hours
  - Average cost was \$6,216 ± \$323, 61% of the total cost was attributed to the inpatient floor itself
  - 65 patients required drainage
    - 51 (37%) cases required drainage in the OR
    - 14 (10.4%) of patients required image guided needle drainage
  - 41 (32%) patients received ultrasound on initial evaluation (PUS)
  - 87 (68%) underwent CT as the primary imaging modality (PCT)
- **An Emergency Department visit** alone occurred in 128 patients (49%)
  - Average cost was \$524 ± \$3, 71% of this cost was attributed to the ED
- A secondary retropharyngeal abscess or infection was encountered in 13 patients (5%).
- Readmission was required in 8 (5.9%) patients

Figure 2 - Average Cost - ED visit only

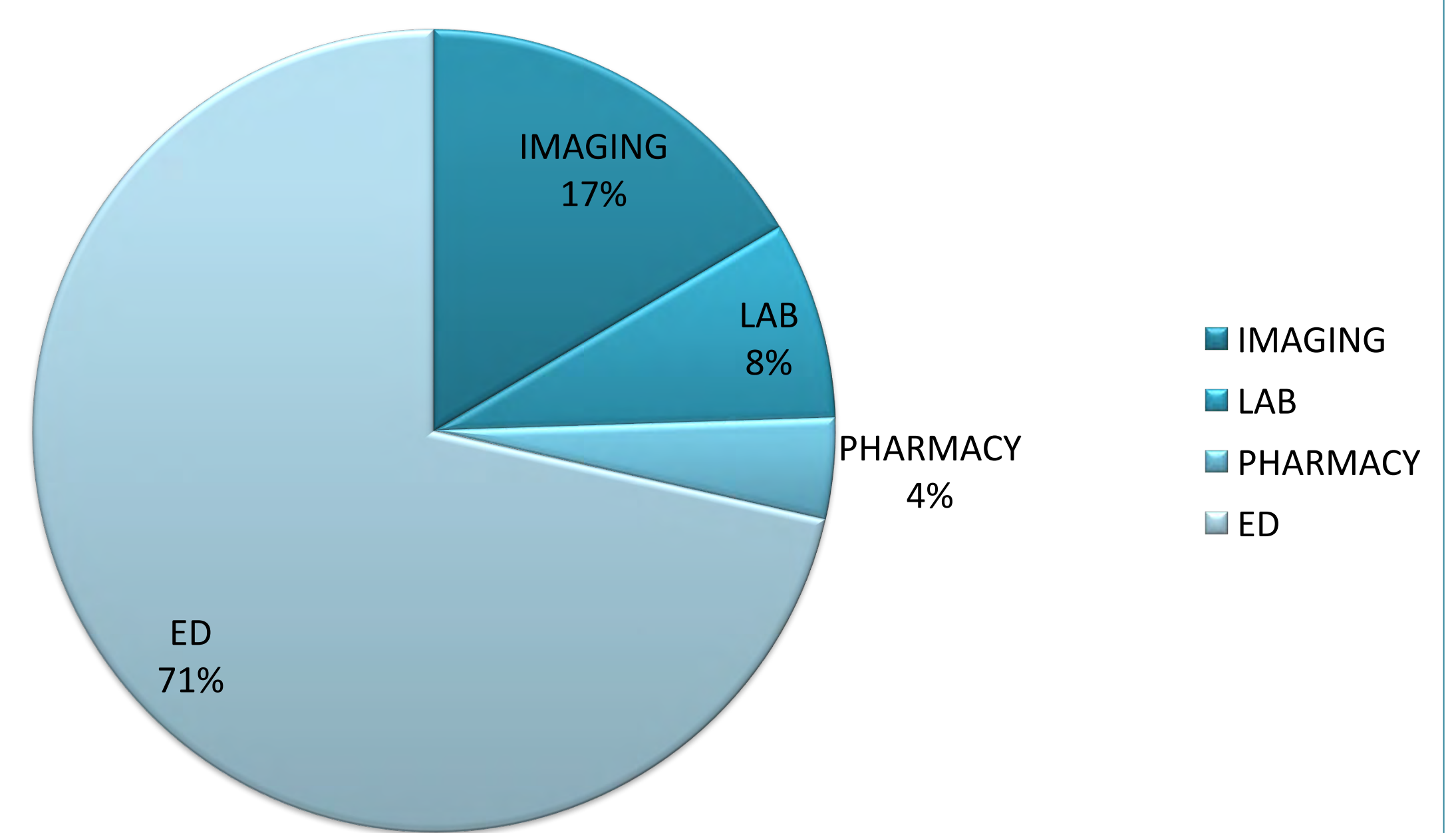
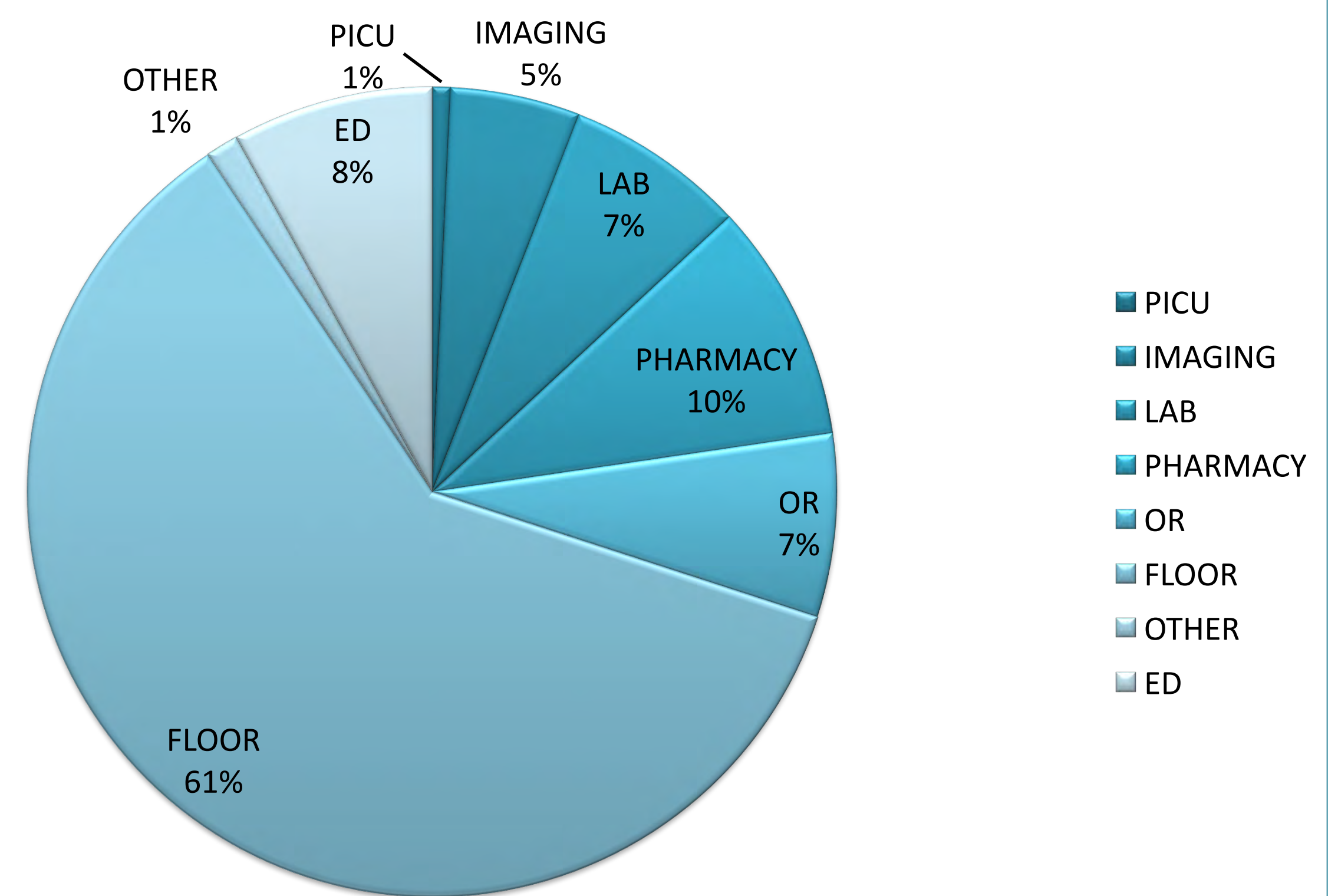


Figure 3 - Average Cost - Admitted Patients



## Discussion and Conclusion

Lateral neck infections are a common cause for hospital admissions in the pediatric population and this study demonstrates a significant financial impact on the health care system. The largest expenditure category was the inpatient floor costs and these costs directly correlate with the length of stay. Identifying ways to effectively screen for patients who require admission against those who do not can reduce unnecessary costs and improve the value of care. Within the ED, imaging plays a large role in the process as it may reassure (or concern) the provider, prompting inpatient admission and/or surgical consultation. Further investigation into this area may be an area for improvement as more accurately completing an initial diagnosis and thus appropriate triage can lead to significant cost variations in case.

## Contact

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## References

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2. Sauer, M.W., et al., *Acute neck infections in children: who is likely to undergo surgical drainage?* Am J Emerg Med, 2013. **31**(6): p. 906-9.