

Laboratory Utilization in a Pediatric Emergency Department

Baoyi Ma, MMLS, Capstone Advisor: Tami Alpaugh, Ph.D., MLS(ASCP)CM

Abstract

The utilization of laboratory testing plays a critical role in diagnostic and treatment decisions, particularly within the emergency department (ED). Despite the critical function of laboratory testing in patient care, medical laboratory scientists often remain under recognized in the healthcare field, with their contributions frequently overlooked. Although it is frequently claimed that laboratory results influence 70% or more of medical decisions, the accuracy and basis of this assertion remain contentious. Understanding this dynamic is critical to optimizing healthcare delivery in pediatric emergency settings and improving both individual and public health outcomes. The need for efficient treatment and diagnostic decisions in the emergency department, especially in the pediatric emergency department are critical. This study analyzes Pediatric Emergency Department (ED) visits from 1 year (August 2023 to July 2024), focusing on the utilization of laboratory tests. A total of 20,113 visits, with 61.73% involving laboratory tests. These findings suggest that laboratory tests are crucial for certain presentations and many common pediatric conditions.

Background

Laboratory testing is essential for patient diagnosis and monitoring to improve patient and public health. In the Pediatric Emergency Department, healthcare providers encounter a wide range of cases with varying levels of severity. Laboratory testing is aimed to accurately assess and address the treatment for each patient, ensuring timely, accurate diagnostic and treatment decisions. However, the laboratory has poor visibility in the healthcare field compared to other healthcare professions, and medical laboratory scientists are often perceived as engineers who fix medical equipment. It is often quoted that 70% or more of medical decisions are based on laboratory results, however the basis of this claim is challenging to establish. The claim was first published by Forsman at the Mayo Clinic in 1996, indicating that laboratory services 'leverage 60 to 70 % of all critical decision-making such as admittance, discharge, and medication'. Nowadays, the growth in laboratory medicine, technology, and updates on clinical guidelines may affect utilization of the laboratory services in the hospital. There is a need to further evaluate the utilization of laboratory testing for diagnostic and treatment decisions.

Results

Type of Visits	Number of Visits
No Lab Ordered	7698
Lab Ordered	12415
Total	20113

NOTE. A total of 13,115 unique patients. Patients visited multiple times during the year.

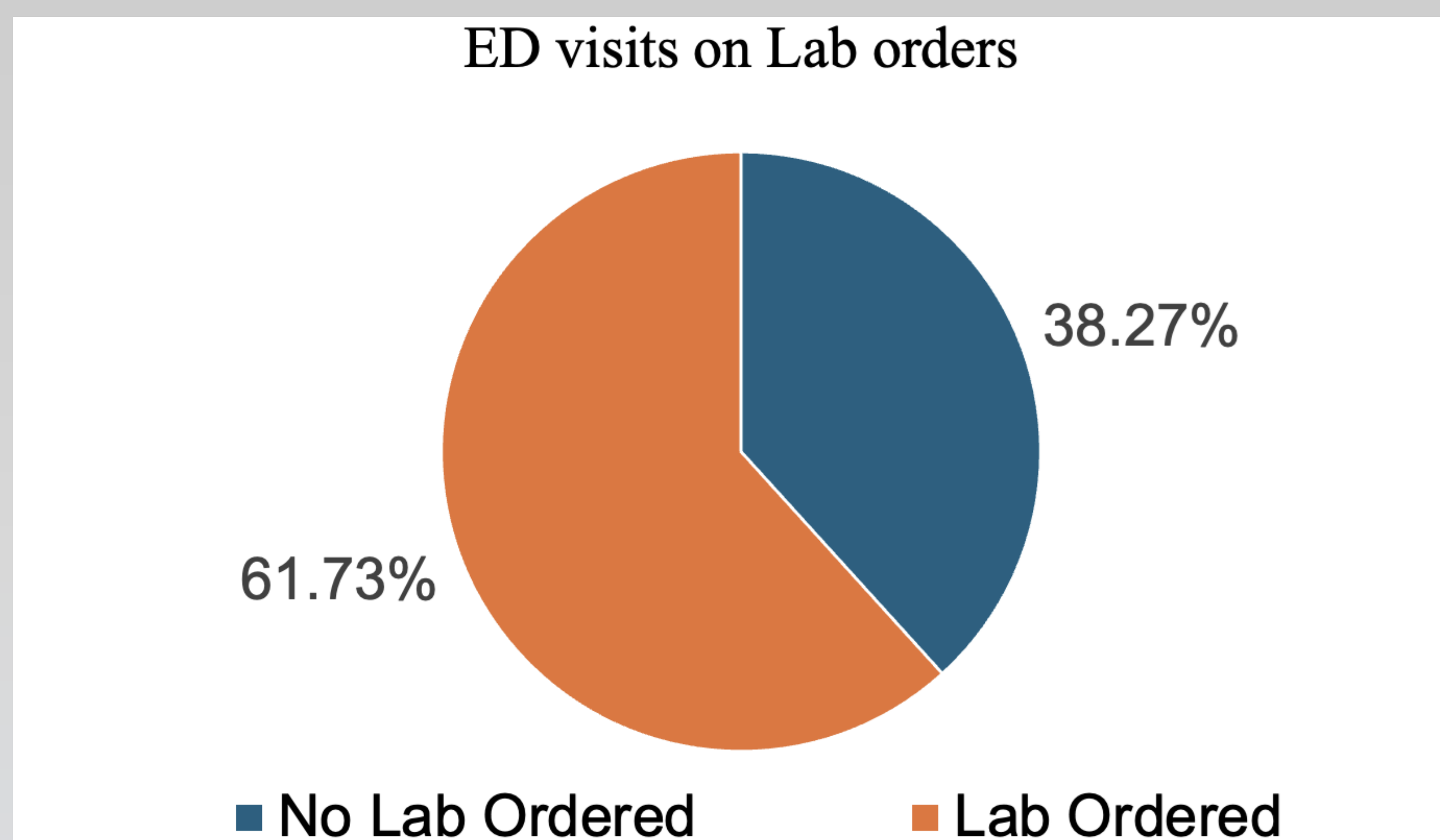


Figure 1 The proportion of laboratory visits in a Pediatric Department

Patients with Lab Testing Ordered		Patients without Lab Testing Ordered	
Reason for Encounter	% of Total ED Encounters	Reason for Visit	% of Total ED Encounter
Fever	19.46 %	Nausea, Vomiting, Diarrhea	8.17 %
Cough	11.87 %	Fever	5.49 %
Nausea, Vomiting, Diarrhea	10.41 %	Otagia	4.66 %
Abdominal Pain	5.53 %	Cough	4.64 %
Pharyngitis	3.91 %	Mental Health, Behavioral Problem	4.43 %

NOTE. 1.1% (224) visits have a blank reason for visit or not entered in the chart. There are 464 reasons for visits during the year.

Acknowledgement

Research was supported by the National Institutes of Health's National Center for Advancing Translational Sciences, grant UM1TR004405. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health's National Center for Advancing Translational Sciences.'

Method

Data selected from August 1, 2023 to July 31, 2024 including records of patients with a visit to the pediatric emergency department at the University of Minnesota Medical Center West Bank Pediatric Emergency department. The data collected will include the patient age, date and time of visit, reason for visit to the pediatric emergency department, laboratory testing ordered during their visit, and discharge diagnosis or admission to hospital diagnosis. This data was collected using BPIC following IRB approval and was de-identified prior to analysis. Data analyzed using Microsoft Excel pivot tables and statistical analysis to evaluate laboratory utilization in the pediatric ED.

Discussion

Between August 1, 2023 and July 31, 2024, 13,115 unique patients visited the Pediatric Emergency Department totalling 20,113 visits. Of these visits, 61.7% had laboratory tests ordered. The 38.3% of visits without laboratory orders included reasons of mental health/behavioral issues or otalgia. These reasons for visit may not need laboratory testing to diagnose, treat, or monitor the patients. After consultation with the laboratory manager of this clinical site, almost half of the patients presenting to the pediatric ED in this study are mental health patients, or patients visiting due to a behavioral issue. Another factor of absence of lab orders could be the refusal by parents or guardians to allow blood collections for testing..

Conclusion

This study highlights the significant role of laboratory tests in the Pediatric Emergency Department, with over 61% of visits involving laboratory testing for diagnosis, treatment, or monitoring. Future studies can expand this initial investigation with data from multiple departments or healthcare facilities, or correlate utilization of laboratory testing based on patient diagnosis.

References

