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Improving Efficiency and Patient Experience In Emergency Medicine With a Virtual Physician In Triage

Christian Voloshen, Eric Bean, DO, MBA

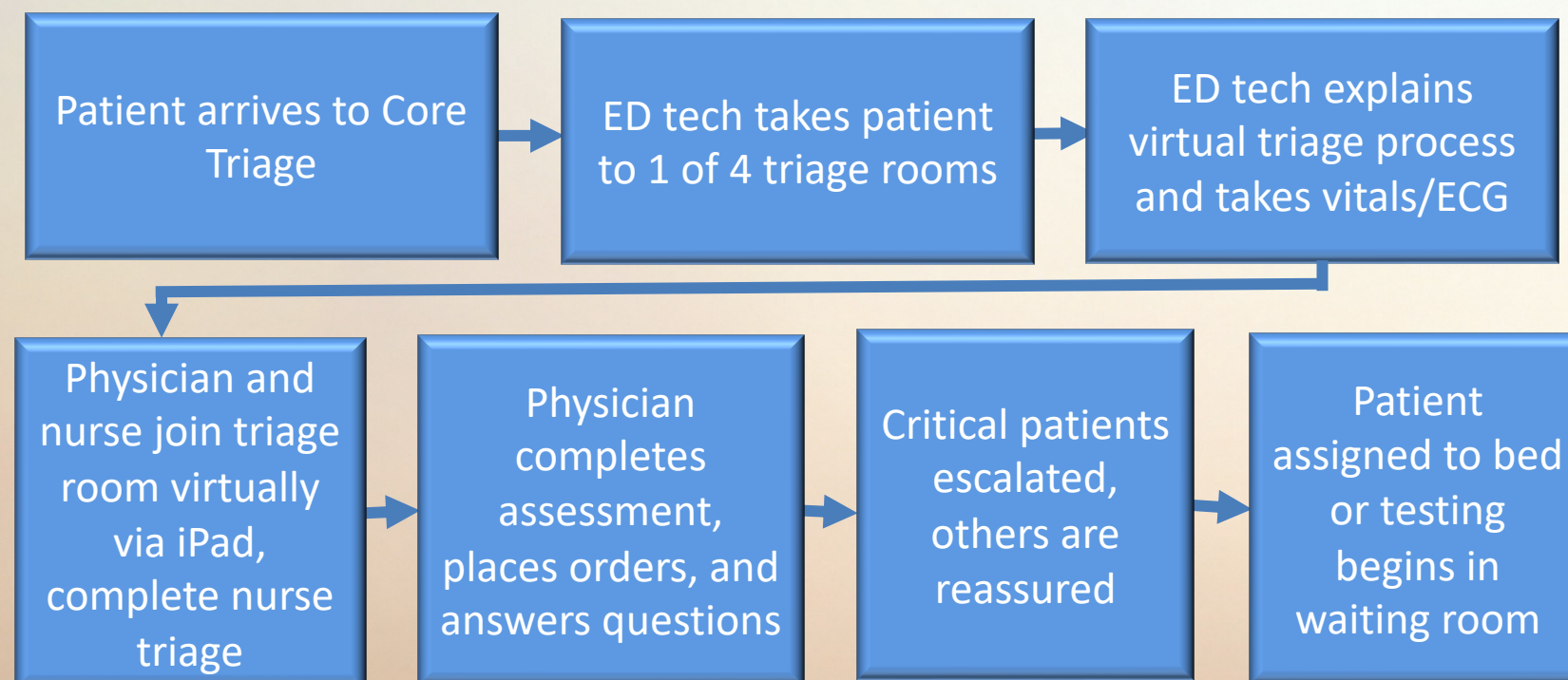
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Background

- **Crowding in the Emergency Department (ED) can lead to negative patient and staff experiences**
 - Increase in Left Without Being Seen (LWBS), associated with negative patient outcomes¹
 - Delays high-acuity patient treatment and increases length of stay²
 - Facilitates burnout in staff and clinical work errors resulting in return visits^{3,4}
- **Virtual Physician in Triage (PIT) is a possible solution to improve system**
 - Allows patients to be seen by physician while still in waiting room
 - Order labs/imaging and read ECGs in triage to facilitate process
 - Ask patient follow-up questions and offer comfort

Methods

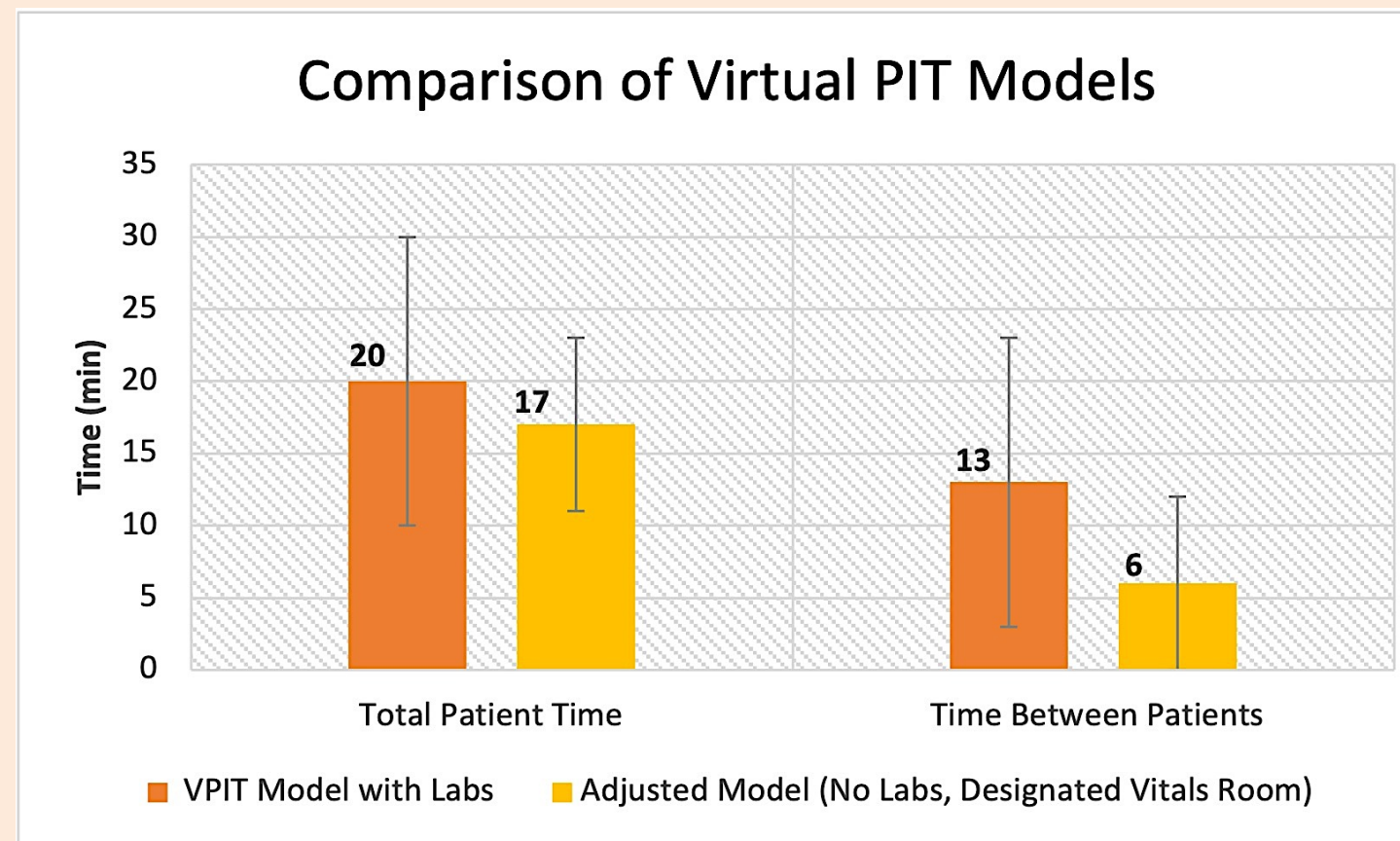
The ED workflow was adjusted in order to implement the Virtual PIT system. A **simplified workflow**⁵ below illustrates major changes. Once adjusted, time studies of the system were conducted.



Results

Over a 6-month period, PIT **reduced** LWBS from 5.35% to 1.79%. The Virtual Model was then adopted, and a trial was run on June 19th, 2023. Two models were run due to high average influx of 18.2 patients per hour in the ED. The adjusted model eliminated labs and reassigned one triage room as strictly vitals.

Figure 1. Comparison of Patient Time in Triage Between Two Models



A time study was also conducted on July 10th, 2023, to determine the **average time for 21 patients** to have vital signs and PIT orders completed.

Table 1. Time Study for 21 ED Patient Vital Signs and Orders

Arrival to Vitals (min)	ECG Order to Collected (min)	Labs Order to Collected (min)	X-Ray Order to Collected (min)
41	88	186	34

Discussion

- **Staffing Issues**
 - Lack of proper staffing was responsible for only one trial and time study being conducted
 - Data likely not representative of system's utility, but offers insight
 - Virtual component allows flexibility and speed in seeing patients
 - Nurses and patients have favorable view of the system
- **PIT Orders**
 - Orders added time to the triage process but decreased LWBS
 - Mixed results with difficulty completing orders in timely manner, especially problematic for labs and ECGs
 - Optimally, orders should be completed when patient is brought back
- **Overall**, the ED deals with capacity issues. Triage can only be so efficient, before lack of space, staffing, and timely diagnostics are **limiting factors**.
- **Patient experience** is central to the ED, and the increased comfort and decreased LWBS from PIT is significant

Future Directions

- **Terminate**
 - Only run labs dependent on Emergency Severity Index (ESI), ex. chest pains
- **Automate**
 - Dedicated, automated vitals station in waiting room
 - Addition to MyLVHN© where patients may answer designated triage questions through mobile devices.
- **Consolidate**
 - Virtual component allows physicians and nurses to work in ED from anywhere
 - Physician and nurse perform triage while ED tech is collecting vitals
- **Outsource**
 - Labs could be outsourced to another vendor (ex. HNL)
 - Have cardiology perform ECGs like radiology for X-rays

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 4. Kim DU, Park YS, Park JM, Brown NJ, Chu K, Lee JH, Kim JH, Kim MJ. Influence of Overcrowding in the Emergency Department on Return Visit within 72 Hours. *J Clin Med.* 2020 May 9;9(5):1406. doi: 10.3390/jcm9051406. PMID: 32397560; PMCID: PMC7290478.
 5. Workflow courtesy of Eric Bean, DO, MBA