



# Impact of a Push Notification System for Key Results on Emergency Department In-process Times

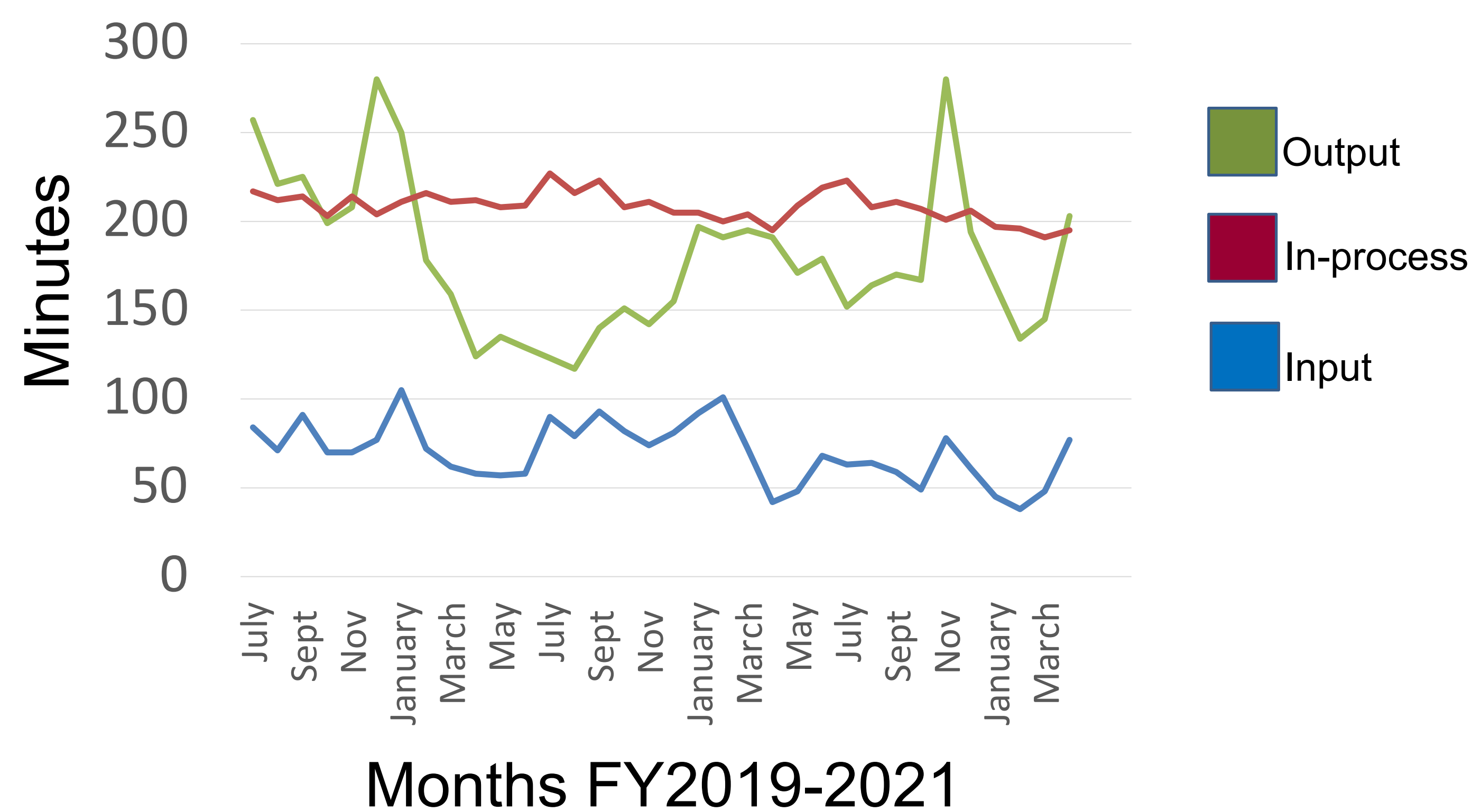


JA Allan MD, WA Satz MD and KE Schreyer MD

## Background

Emergency department (ED) throughput can be divided into three components: input, in-process, and output. In-process times, from physician evaluation to disposition, are most under the control of the ED physician, albeit with influence from ancillary departments, such as radiology and the clinical laboratory. At the study institution, previous data has shown a lack of variability in ED in-process times, as seen in figure 1 below. We sought to evaluate the impact of the use of a push notification (PN) system for key results on in-process times and hypothesized that the push notification system would improve traditionally stagnant in-process times.

Figure 1: ED input vs in-process vs output time.



## Study Design

- Prospective analysis of ED in-process times across a three hospital academic tertiary care health system in a 10-day preliminary study period.
- Automated and provider selected PN were generated from the electronic medical record (EMR) and notifications were sent directly to providers' cellular phones.
- Utilization of PN and in-process times were compared before and after implementation.

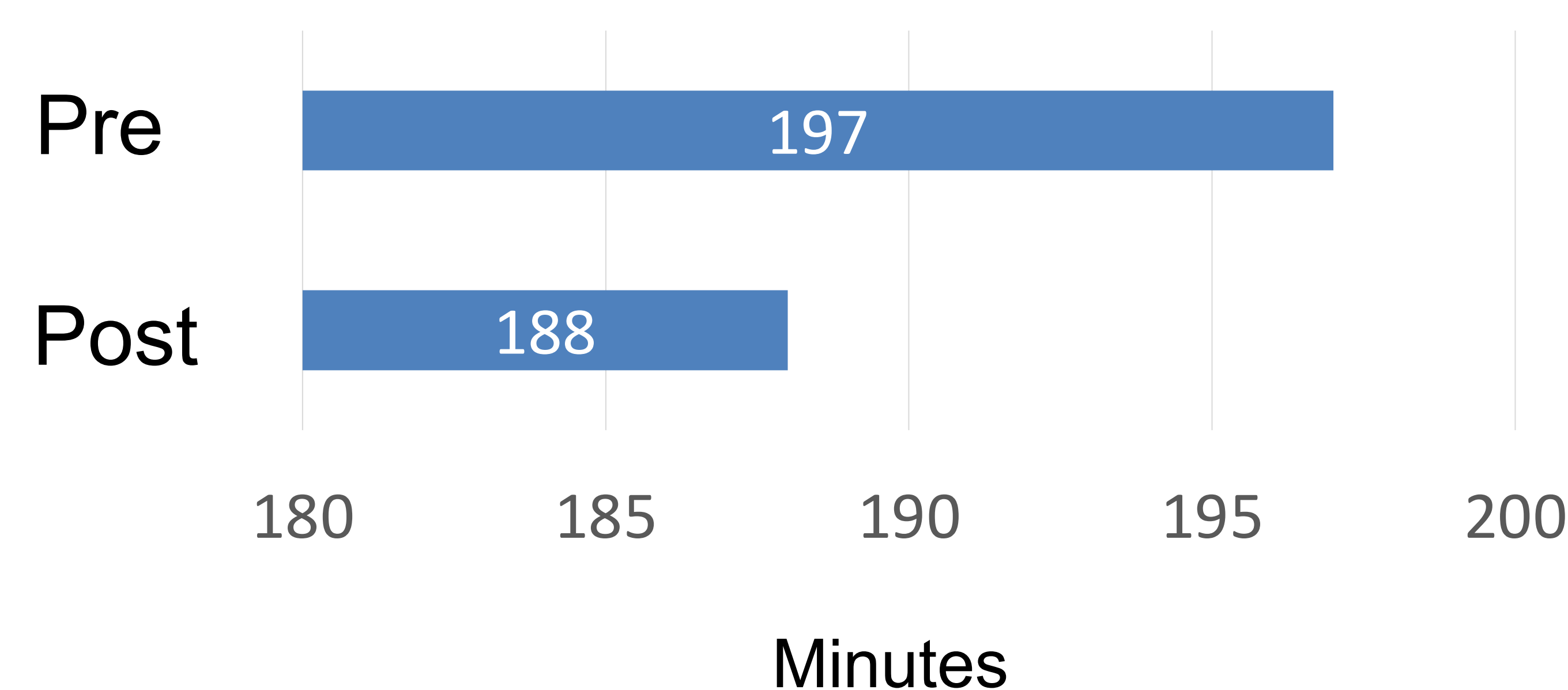
## Results

Table 1 and 2: Most common results generating a push notification to providers.

Laboratory Result	Number PN Received
Troponin	39
COVID-19	12
CMP	10
BMP	9
Beta HCG	6
CBC, D-dimer, Lactate, Lipase, UA	5
CK	4
BNP, Urine HCG, VBG	3
UDS	2
Ethanol, HIV, Mg, Salicylate, Tylenol, Urine Fentanyl	1

Imaging Result	Number PN Received
CT (unidentified)	204
CT Abd/Pelvis	27
Chest XR	12
CT Head	14
CTA Chest	5
CT Chest	4
Extremity XR	3
CT Neck, CT Urogram	1

Figure 2: Pre and Post Intervention In-Process Times



## Preliminary Conclusion

- Preliminary data analysis determined that 404 PN were sent over the first ten days of the study period. Of those, 199 were selected by providers, while 205 were automated.
- The majority of PN were for radiologic studies (computed tomography and x-ray). The most common laboratory test reviewed via a PN was a troponin.
- Nineteen unique providers utilized the PN system, nearly one quarter of the health system ED providers.
- Overall, in this urban, academic health system, providers quickly adapted to the use of a PN system for key results. Early evaluation of the notification system showed a dramatic improvement in ED in-process times.

## Future Directions

- Similar studies have been completed within other health systems and demonstrated expedited care times over a longer study period, but have only examined PN for a small number of laboratory or imaging results.
- Data collection at this institution will continue, allowing providers to opt into PN for any chosen key results that are deemed, within the specific patient care context, to have significant impact on disposition timing. Further analysis will determine if the improved in-process times continue.

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