School of Medicine

Data Science to Patient Value (D2V) NavLab
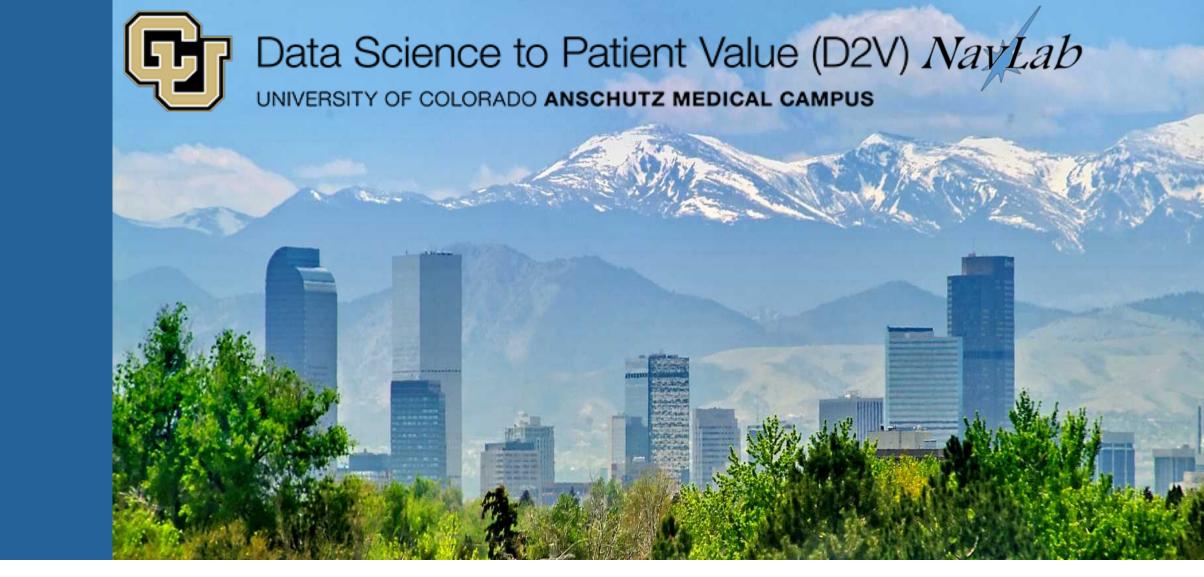UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS

Association of a Systems-Based Morbidity & Mortality Conference with Shorter Completion Times for In-hospital ECGs

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BACKGROUND

Morbidity and Mortality conference (M&M) is an opportunity to review adverse events in the larger context of care design and delivery systems.[1]

After a "near-miss" patient safety event related to timely performance of an in-hospital ECG, the Cardiology division at the University of Colorado held a M&M to review ECG processes with clinicians, staff and stakeholders.

Shortly after the M&M, semi-monthly meetings were instituted between two clinicians (AL, TA) and the director of ECG technicians (AW). While no systematic changes to in-hospital ECG performance were adopted, the importance of timely ECG completion was emphasized to technical staff.

In light of greater stakeholder and clinician engagement, we hypothesized that M&M would be associated with reduced ECG completion times.

METHODS

Data were collected for all ECGs performed at **University of Colorado Hospital** (UCH) from January 1, 2017 to June 30, 2018.

Completion times for ECGs were calculated by the difference between requested time (start) and collection time (finish).

The **primary outcome** of interest was average daily ECG completion time for all order priorities.
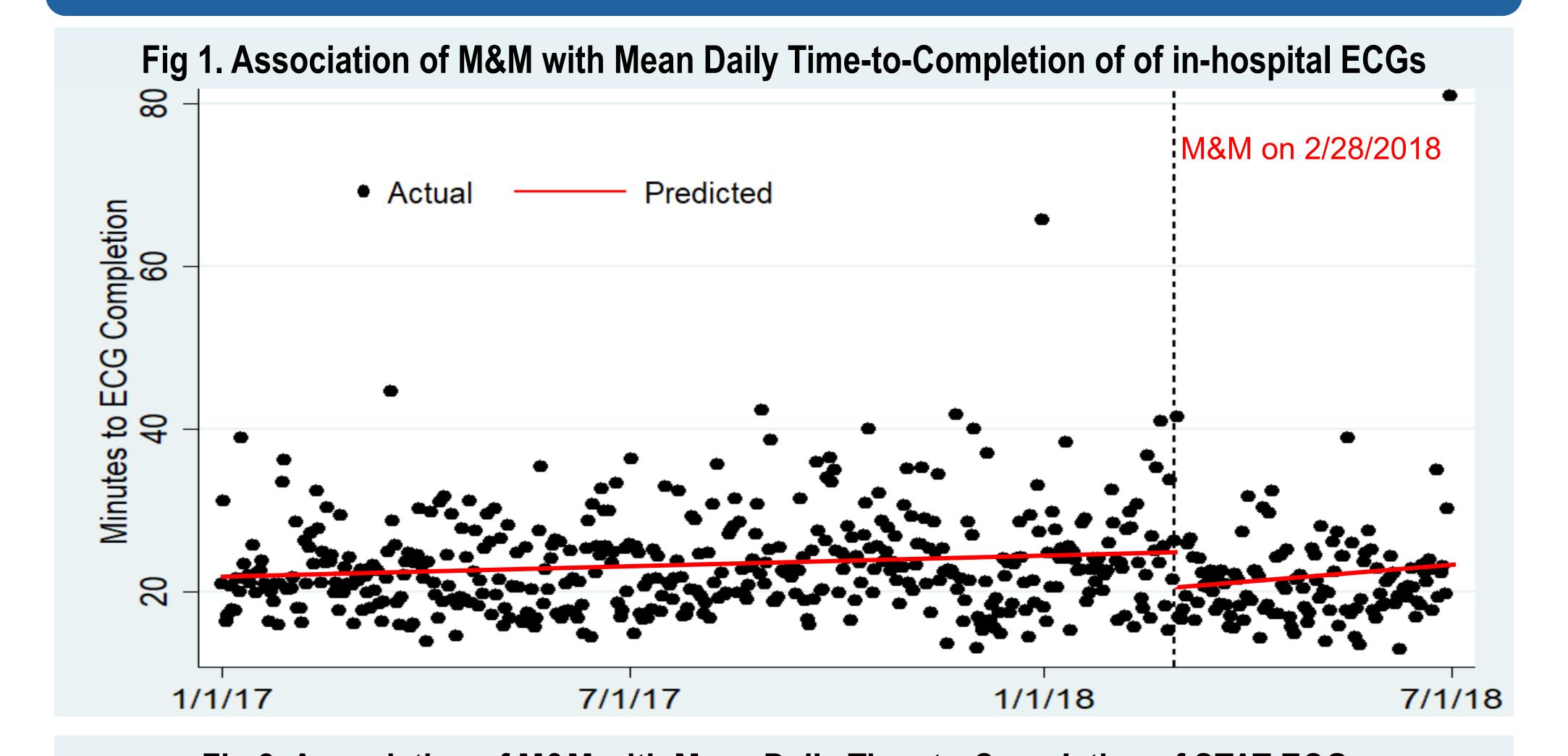
Secondary outcomes included average daily ECG completion time for STAT priority ECGs and daily percentage of STAT ECGs with completion times exceeding 20 minutes.
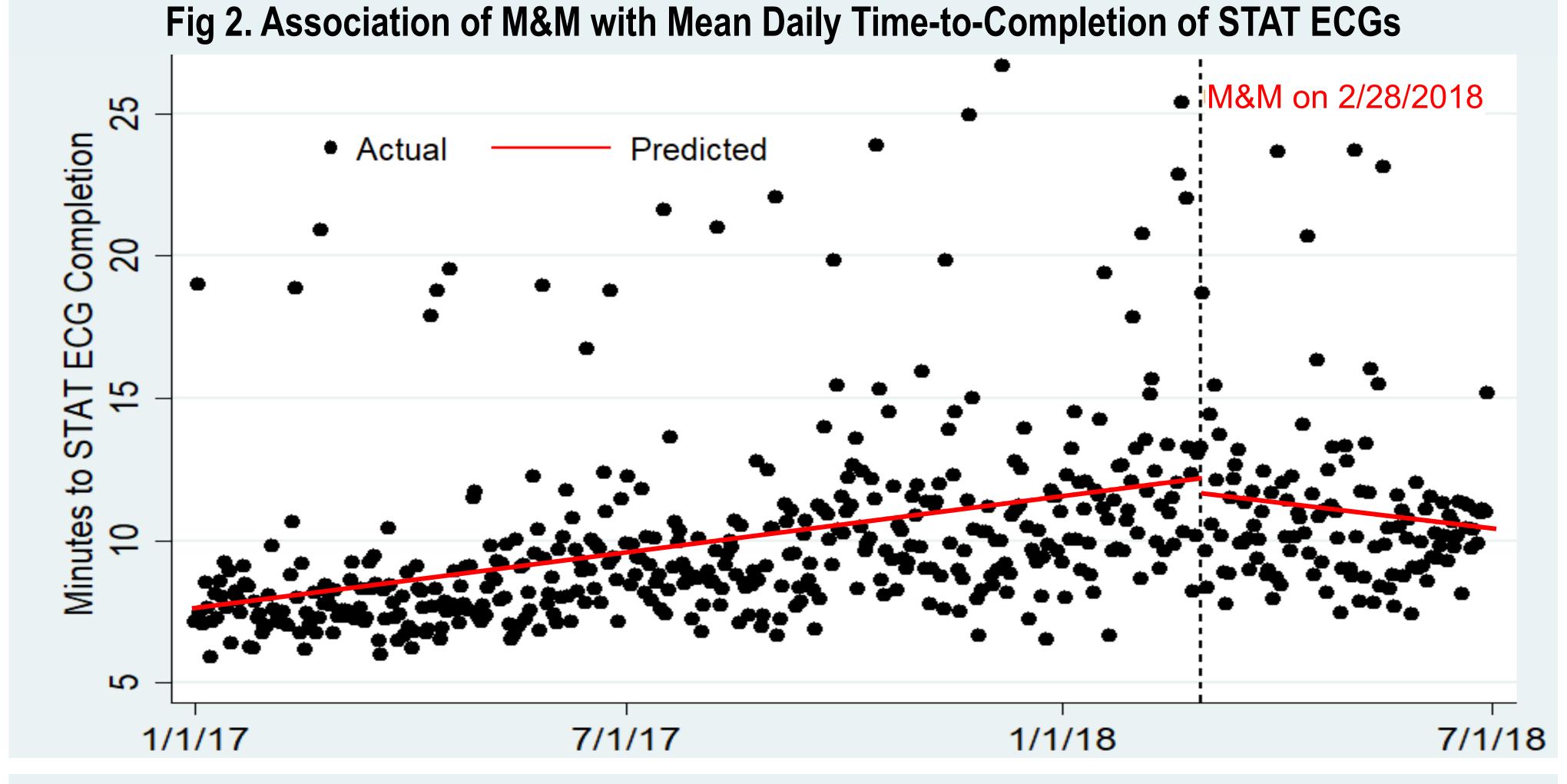
An **interrupted time series analysis** was conducted to estimate the immediate and ongoing impact of the M&M conference (February 28, 2018) on primary and secondary outcomes.
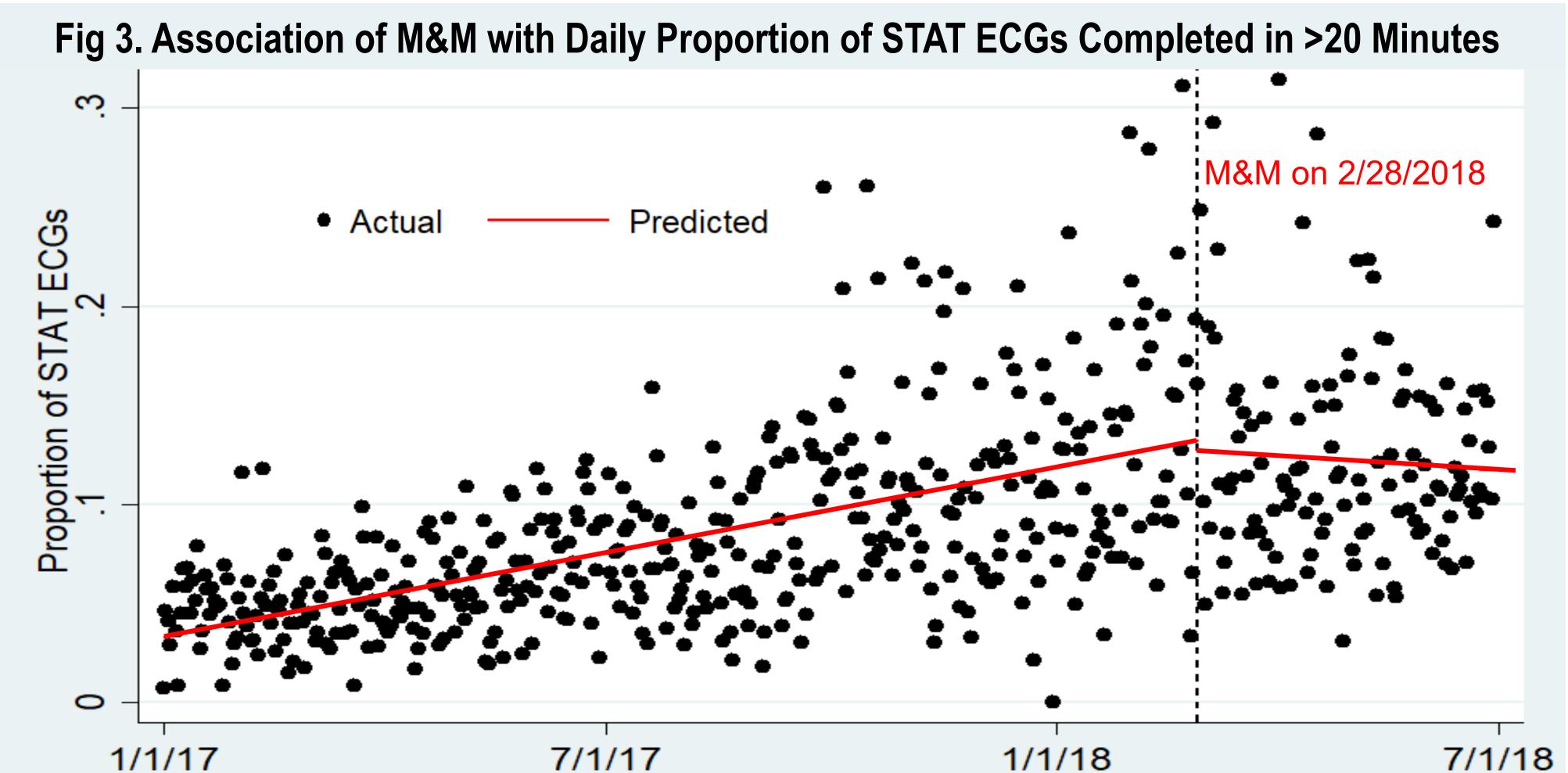
Why Does This Matter?

- Delays in ECG acquisition are known to contribute to delayed diagnosis and treatment of in-hospital ST-segment elevation myocardial infarction (STEMI).[2]
  - There are relatively few published attempts to reduce ECG completion times among hospitalized patients.[3]
- Adoption of so-called "systems-based" M&M conferences have been shown to augment patient safety culture and lead to more quality improvement initiatives.[4]
  - No studies to date demonstrate that systems-based M&M conferences actually improve processes or outcomes of care.

FIGURES

Fig 1. Association of M&M with Mean Daily Time-to-Completion of of in-hospital ECGs

Fig 2. Association of M&M with Mean Daily Time-to-Completion of STAT ECGs

Fig 3. Association of M&M with Daily Proportion of STAT ECGs Completed in >20 Minutes

RESULTS

- The M&M conference was associated with an immediate reduction in the primary outcome of average daily ECG completion time from 21.9 minutes to 17.5 minutes. Illustrated by **Figure 1.**
  - ❖ 20.1% absolute reduction, p=0.0006).
- There was no immediate change in average daily completion times for STAT priority ECGs or percent of STAT priority ECGs that took greater than 20 minutes to complete.
- However, over the next 100 days after the M&M conference, average daily completion times for STAT priority ECGs declined from 9.9 minutes to 7.9 minutes. Illustrated by **Figure 2**.
  - ❖ 20.2% absolute reduction, p=0.001
- Approximately 8% of STAT priority ECGs took longer than 20 minutes before M&M but, 100 days after the conference, 5% of STAT ECGs took more than 20 minutes. Illustrated by **Figure 3**.
  - ❖ 3% absolute reduction, p=0.001

CONCLUSIONS

- A systems-based M&M conference was associated with significant improvements in ECG completion times.
- Stakeholder engagement and process review are critical elements of a systems-based M&M conference.

KEY REFERENCES

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