

Does Distance Matter? Presence of a CT scanner within the ER department and its Effect on ER Patient Throughput



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OBJECTIVE

- We hypothesize that a CT scanner in the ER will decrease the time between imaging requisition and completion, and final patient disposition for specific, comparable diagnoses
- This will shorten CT workup times and as a result:
 - ✓ Improve ER workflow and patient wait times
 - ✓ Could improve outcomes of hyperacute diagnoses
 - ✓ Minimize patient transport to reduce risk of injury¹

METHODS

ER visit and CT data collected retrospectively from 1767 consecutive, abdominal imaging requests from Ottawa Hospital: Civic and General ER

Examples of Included Indications:

Trauma and cancer patients excluded

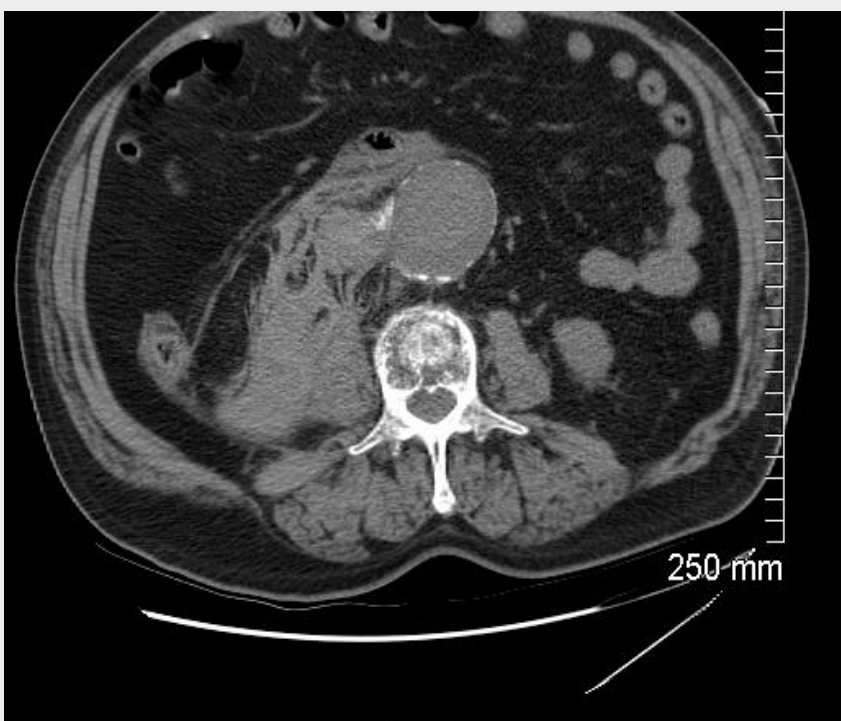
Patients were stratified based on Civic v.s. General ER

Civic ER (n = 775)

General ER (n = 920)

Patients were stratified based on indication, requirement of oral contrast, radiologist training level, and time of day when the scan was completed

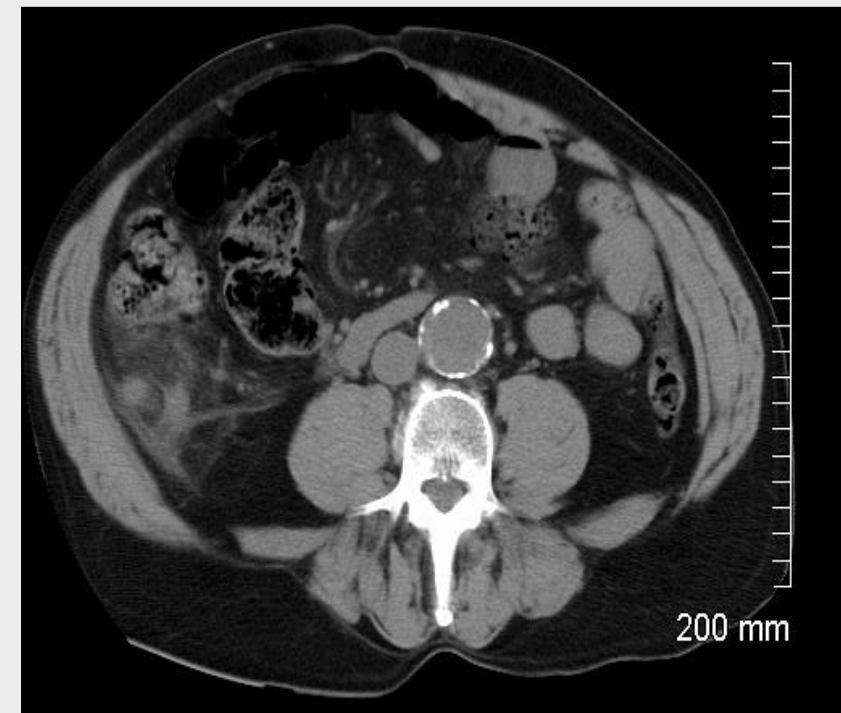
Hyperacute: Ruptured AAA with blood in retroperitoneum



Acute: Ischemic Bowel with SMV Thrombus



Subacute: Acute Appendicitis



- Comparison between
- 1) Time the CT requisition was received to time the CT scan was done
 - 2) Time from CT scan completion to the time the CT was reported preliminarily by a resident/fellow, or verbally reported by staff to ER
 - 3) Time from CT requisition to time of final patient disposition

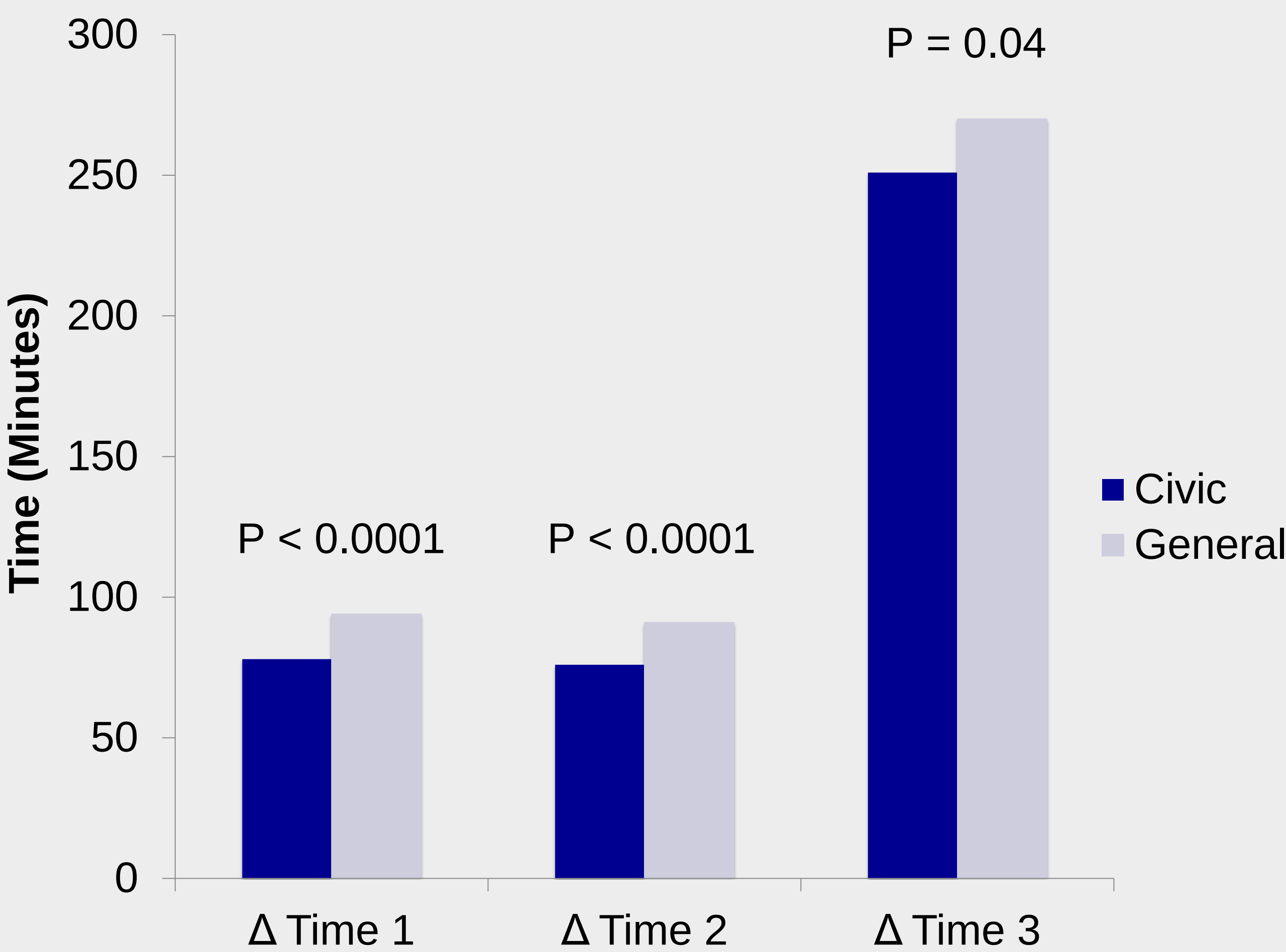
RESULTS

Table 1 – Descriptive Characteristics of Both Hospitals

Variables	General	Civic
Patient Count	920	775
Age (years)	58.38 (17.93)	60.05 (17.99)
Gender		
Male	460 (46.75)	438 (49.32)
Female	524 (53.25)	450 (50.68)
Outcomes		
Normal & discharged	384 (40.81)	314 (35.36)
Abnormal & discharged	205 (21.79)	227 (25.56)
Admitted	181 (19.23)	159 (17.91)
Admitted but unrelated to CT findings	83 (8.82)	104 (11.71)
Acute surgery	86 (9.14)	80 (9.01)
Died (within 48 hrs)	2 (0.21)	4 (0.45)

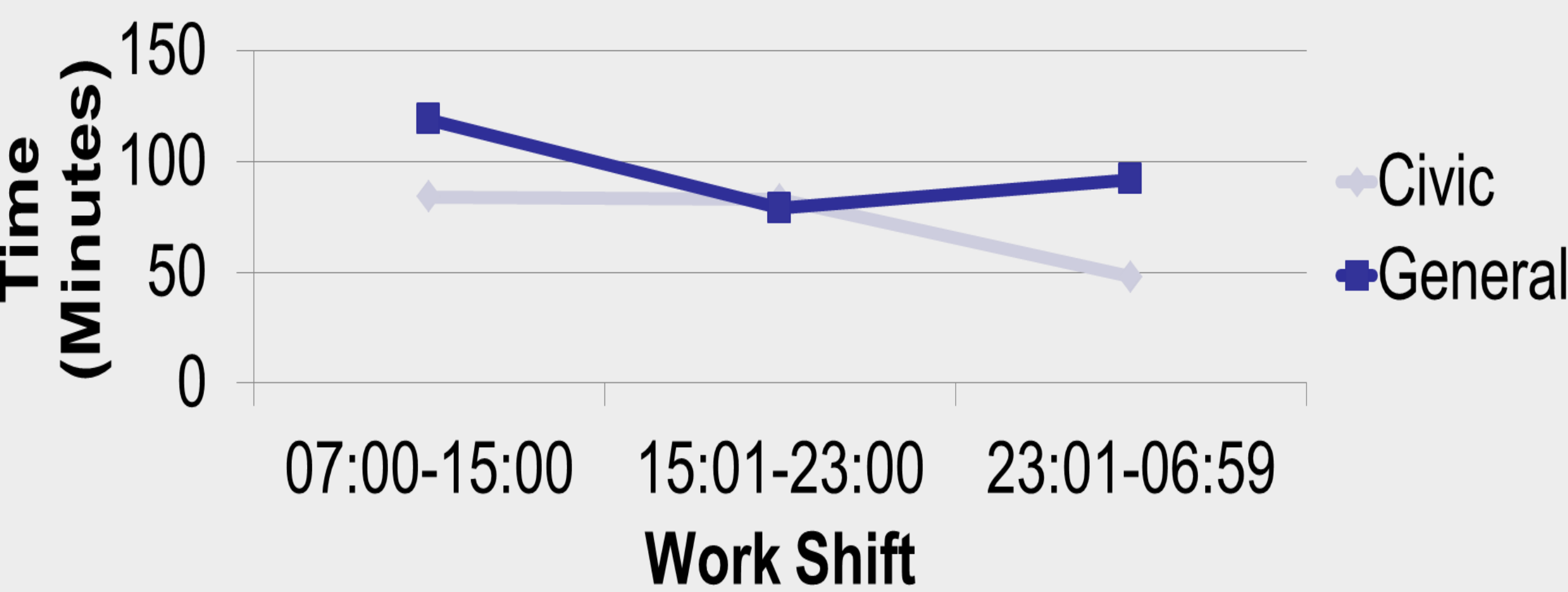
Patient populations were equivalent.

Figure 1 – CT Scanner within ER Department vs Radiology Department from CT Fax Requisition to Patient Disposition



The approximate difference in average times between hospitals for: CT requisition to CT completion (ΔTime 1), CT completion to preliminary or verbal report (ΔTime 2), and from CT requisition to final disposition (ΔTime 3), are 16 (P<0.0001), 15 (P<0.0001), and 19 minutes (P<0.04), respectively. Consistently, times were significantly shorter when the CT scanner was placed within the ER department instead of the radiology department.

Figure 2 – Work Shift and CT Time Requisition to Completion



CT completion times were significantly shorter at the Civic for 07:00-15:00 and 23:01-06:59 work shifts (both P<0.0001, respectively).

DISCUSSION

Strengths:

- Hospitals have same administration, CT Techs, ER staff, radiologists and residents
- Dedicated ER radiologist in both centers
 - Resident overnight (5:00-8:00 on Weekdays, Weekends 8:00-8:00) with staff support

Limitations:

- Cannot account for extrinsic radiological factors (accidents, weather, OACIS/computer malfunctions etc.)
- Variation in Workload – particular day in ER may have high volume of patients or low number of staff, including porters
- Technological issues – Preliminary or final reporting time not always present
- Cost of CT scanner (\$175,000 - \$300,000)

CONCLUSION

1) Increase Patient Throughput

- ✓ Decrease patient wait-times without compromising care²:
- ✓ Decreases patient anxiety & improves caregiver experiences in ER²

2) Improves Patient Safety¹

- Prior studies have shown that patient transport increases risk of injury and unnecessary complications

3) Improves Cost-Effectiveness

- ✓ Increase # of patients seen in the same time period
- ✓ Increase # of available ER beds
- ✓ REACT Trial³ estimates £635 per trauma patient saved

REFERENCES

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- Saltzher, T. P., Goslings, J. C., Bakker, F. C., Beenen, M. O., Meijssen, K., Asselman, F. F., Reitsma, J. B., and Dijkgraaf, M. G. W., (2013). Cost-effectiveness of trauma CT in the trauma room versus the radiology department: the REACT trial. *Eur Radiol*. 23:148-155.