

Do Residents Matter? An exploratory study on the impact of residents on practice patterns in an academic Emergency Department

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Background

- Variation exists in ordering practice in the Emergency Department
- This variation could be due in part to the presence of learners^{1,2,3}
- Previous research is inconclusive on the impact of learners, and whether or not learner experience (PGY level) has differential impact.
- It is unclear whether the impact of residents on emergency department practice patterns is different if the residents are early or late stage of their education or when in an academic center.
- In addition, it is unclear if attendings' perceptions of their own productivity levels with and without the presence of a learner are accurate.

Aims & Hypotheses

1. To determine if a difference truly exists in resident practice patterns throughout their three years of residency (PGY1, PGY2 and PGY3)
2. To determine attending practice patterns and any changes resulting from the presence of a learner
3. To determine the accuracy of attending physician perception of their practice patterns

We hypothesized that (1) resident practice patterns evolve throughout training, with higher productivity later in residency (2) attendings would practice differently in the presence of a learner and (3) that they would be able to accurately perceive their own practice changes

Method

- Systematic retrospective analysis of electronic medical records (EMR) data extracted by a trained data abstractor
- N= 86,000 visits to our urban academic level 1 trauma center Emergency Department (ED) between July 1, 2017, and June 30, 2018.

Analysis: EMR data (n=45,379) was analyzed utilizing ANOVA and Chi square tests to compare practice patterns of PGY1, 2 and 3 residents and attendings alone vs with a resident. Dependent variables were: orders for CT imaging for patients presenting with one of the top 3 chief complaints (abdominal pain, chest pain or shortness of breath), disposition time variability and utilization of cardiology consultation with a chief complaint of chest pain.

- The emergency medicine attending physician group (n=45) was individually administered a self report practice survey via REDCap

Analysis: The survey data was analyzed with a t test comparing actual EMR data with perceptions of ordering levels (sample n=40). Post hoc analyses were also performed for significant ANOVA results.

Results

1. Significant differences exist in resident practice patterns throughout three years of residency with those differences summarized below (Fig 1 and 2)

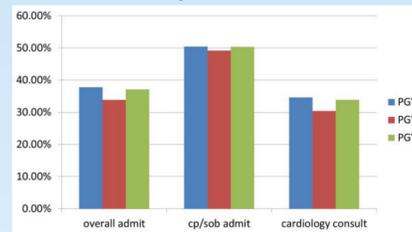


Figure 1: No significant difference in rates of CT use in patients with abdominal pain ($p=.1438$), PGY3 utilized CT for cp/sob significantly more ($p=.0336$) PGY2 had the lowest CT rate overall ($p<.0001$)

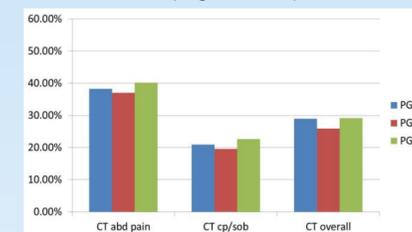


Fig 2. PGY 2 admit significantly less patients ($p<.0001$), there was no significant difference in admission rates for patients with cp/sob ($p=.6261$), PGY3 consult cardiology significantly more ($p=.0011$).

2. The presence of learners led to a significant difference in practice patterns for attendings for multiple studied parameters (Table 1)
 - There was no significant difference with a learner present on CT ordering rates for abdominal pain ($p=.614$), nor admissions of patients complaining of chest pain or shortness of breath ($p=.2714$),

	Attending Alone	Learner Present
Overall CT ($p<.0001$)	22.98%	27.79%
CT chest pain /Shortness of Breath($p=.0362$)	18.84%	21.05%
CT Abdominal Pain ($p=0.614$)	41.39%	38.74%
Cardiology Consult ($p=.0005$)	18.2%	21.89%
Chest pain /Shortness of Breath admit ($p=0.2714$)	48.5%	49.4%
Overall admit ($p<.0001$)	26.06%	35.99%
Disposition time ($p<.0001$)	2.87 hours	3.33 hours

Table 1: Summary of EMR practice patterns by rate of order and disposition time

3. Attendings were not correct in the majority of their perceptions of practice patterns and the effects of residents
 - Significant difference ($p<0.05$) in perception of change with a learner present when compared to EMR data for cardiology consultation rates, CT rates overall, overall admission rates, disposition time and CT use for chest pain or shortness of breath.

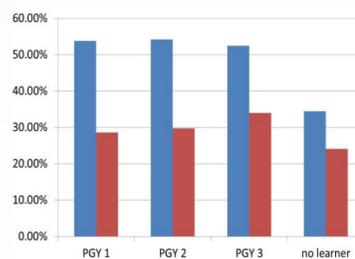


Figure 3: Perceptions from self report survey compared to EMR for cardiology consult

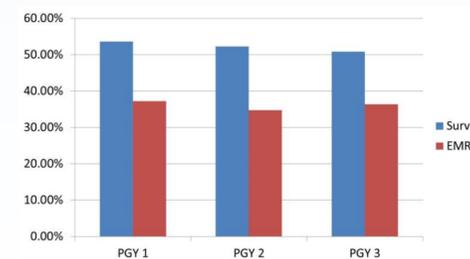


Figure 4: Perceptions from self report survey compared to EMR data for admission rates

Discussion

- We found variability of practice patterns amongst PGY level ($p<0.05$) regarding disposition time, acuity of patients seen by level of learner, utilization of cardiology consultation and CT imaging orders in patients with chief complaint of chest pain or shortness of breath
 - Of the groups the PGY2 class had the most significant differences noted when compared to other learners
- Attending practice patterns varied significantly ($p<0.05$) when practicing independently (without a resident) showing decreased admission rates, higher volume of lower acuity patients, shorter time to disposition, less utilization of imaging for chest pain or shortness of breath and less cardiology consultation
- There was consistent overestimates of the impact of learners on increase in ordering.

Conclusion

- Our study demonstrates variability amongst emergency medicine residents in the care of patients
- Attending physicians are practicing differently when without a learner.
- However, their perceptions of precisely *how* different they practice were not accurate
- The awareness of these findings could be utilized to guide the education and efficiency of the residents to streamline care to be more similar amongst the group as well as aligning care with the practice pattern of experienced physicians.
- Further adjustment for breakdown of acuity by learner could lead to greater understanding of inter-learner differences shown in our study

Future Research

- assess effects of any changes in altering education on practice patterns or outcome
- assess influences on practice patterns such as physical layout, staffing, educational platform

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