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

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HERS program
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HERS program

- Health Education Research Scholarship

- Year long program to guide new researchers in the art of educational research

- MERC earned

- Develop a research project from start to finish

- Goal of publication
Background

• Minimal prior research on the effects of residents
  • Older studies, community ED
    • No change cost of care with residents (1992)\(^1\)
    • No change in ancillary test utilization (1998)\(^2\)
  • Conflicting data
    • No change in number of patients seen, 43K volume (2010)\(^3\)
    • Increase in patients/hour seen when a resident was present, uncertain if varies with level of learner (2014)\(^4\)

• Variation exists in ordering practice in the Emergency Department
  • Potential pros: educational/experiential growth of learner
  • Potential cons: cost, test utilization, time spent

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Research Question

• How do residents impact practice patterns in a large academic level 1 trauma center Emergency Department?

• Are attending physicians aware of practice pattern changes when a learner is present?
Aims & Hypotheses

1. To determine if a difference truly exists in resident practice patterns throughout their three years of residency (PGY1, PGY2 and PGY3)
   – Resident practice patterns evolve throughout training

2. To determine attending practice patterns and any changes resulting from the presence of a learner
   – Attendings practice differently in the presence of a learner

3. To determine the accuracy of attending physician perception of their practice patterns
   – Attendings accurately perceive their own practice changes and the effects of a learner
Method

• N= 86,000 visits to our urban academic level 1 trauma center Emergency Department (ED) between July 1, 2017, and June 30, 2018
  • EMR data (n=45,379)

• Emergency medicine attending physician group was individually administered a self report practice survey via REDCap (n=45)

• Exclusions: Patients cared for by an attending provider who did not complete REDCap survey, PA/NP/off service resident patients
Method: Analysis

• t test, ANOVA, Chi²
• Dependent variables
  – Orders for CT imaging for patients presenting with one of the top 3 chief complaints (abdominal pain, chest pain or shortness of breath)
  – Admission rates for all patients and those with chest pain/shortness of breath
  – Utilization of cardiology consultation with a chief complaint of chest pain.
  – Disposition time variability of overall patients
Results - Learner variation

Time to Disposition in hours (n=45,379)

- PGY1 had longer time to disposition compared to PGY2 or PGY3 (p<0.0001)
- PGY 3 had longer time to disposition compared to PGY2 (p<0.0001)
Results - Learner Variation

Overall Admission Rate (n=45,379)

- PGY2 had lower admission rate when compared to other learners ($p<0.0001$)
Results - Learner variation

CT utilization overall (n=45,379)

- PGY2 ordered less CT overall than other learners ($p<0.0001$)
Results - Learner Variation

CT ordering rates for chest pain/shortness of breath (n=6,479)

• PGY3 order more CT images when assessing patients with chest pain or shortness of breath (*p=0.0336)
Results - Learner Variation

Cardiology Consultation Rates (n=3,721)

- PGY3 had more immediate acuity patients with chest pain than other learners ($p=0.0435$)

- PGY3 had more consultations to cardiology than other learners ($p=0.0011$)

Post Hoc Analysis for Acuity of Chest Pain patients

- PGY3 had more immediate acuity patients with chest pain than other learners ($p=0.0435$)
Results - Learner Variation

• Nonsignificant findings
  – Rates of CT orders for abdominal pain are similar across all learners (n=4,227)
    • $p=0.1348$
    • Average 38%

  – Rates of admission for patients with chief complaint of chest pain or shortness of breath (n=6,479)
    • $p=0.6261$
    • Average 50%
Results – Post Hoc Analysis of Learner Variation

• Acuity

- Urgent patients seen rather equally across PGY2, PGY3, no learner
- PGY1 sees more urgent than the others relative to their own patients seen
## Results – Attending Practice Patterns

<table>
<thead>
<tr>
<th></th>
<th>Attending alone</th>
<th>Learner present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall CT orders</td>
<td>22.98%</td>
<td>27.79%</td>
</tr>
<tr>
<td>(p=&lt;.0001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT cp/sob</td>
<td>18.84%</td>
<td>21.05%</td>
</tr>
<tr>
<td>(p=0.0362)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT abdominal pain</td>
<td>41.39%</td>
<td>38.74%</td>
</tr>
<tr>
<td>(p=0.0614)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiology consult</td>
<td>18.2%</td>
<td>21.89%</td>
</tr>
<tr>
<td>(p=0.0005)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cp/sob admit</td>
<td>48.5%</td>
<td>49.94%</td>
</tr>
<tr>
<td>(p=0.2714)</td>
<td></td>
<td></td>
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<tr>
<td>Overall admit</td>
<td>26.06%</td>
<td>35.99%</td>
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<tr>
<td>(p&lt;0.0001)</td>
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<tr>
<td>Disposition time</td>
<td>2.87 hours</td>
<td>3.33 hours</td>
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<td>(p&lt;0.0001)</td>
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</table>
Results- Attending Perception

- Attendings overestimated the impact of learners on increase in ordering than was present per EMR data ($p<.0001$)
- Admission rate, example consistent with all data
Conclusion

1. Variability exists amongst emergency medicine residents practice patterns

2. Attending physicians are practicing differently when without a learner.

3. However, their perceptions of precisely how different they practice with a learner were not accurate
Discussion: Learner Variation

- Learner variations exist
- Learners overall seeing less non-acute patients

- **PGY1**
  - Longest time to disposition

- **PGY2**
  - Least overall CT rate
  - Lowest overall admission rate
  - Lowest cardiology consult rate
  - Shortest time to disposition

- **PGY3**
  - Most CT consults
  - Highest CT for cp/sob rate
Discussion: Attending Practice Patterns

• Attending practice patterns change when working without a learner
  – Lower admission rates, CT for cp/sob and overall, cardiology consultation rates

• Attendings inaccurately perceived and overestimated the impact of learners
  – Chose similar rates of effect down the line of a survey as if it was an evaluation
  – Truly believe their practice is affected this drastically by learners
Educational Impact

• Awareness of these findings could be utilized to guide the education and efficiency of the residents
  – Zoning/staffing
    • Attendings in triage seeing non-acute patients
    • Department podded
  – Acuity within patient population
  – Focus of education
  – Volume of patients seen
  – Guide staffing for greater educational experience
Future Research

• Determine contributing factors to differences
  – Staffing, layout, education platform
• Determine any changes in practice patterns with awareness of prior data
• Further adjustment for breakdown of acuity by learner in each measured practice pattern could lead to greater understanding of inter-learner differences shown in our study
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