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# Comparison and Outcome Analysis of E.M. Resident Evidence-Based Medicine Questions

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## Published In/Presented At

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## Background

Evidence Based Medicine (EBM) is fundamentally important to treat patients. There is minimal data describing how emergency medicine (EM) residents incorporate EBM in their clinical questioning strategy

## Problem Statement

This retrospective project seeks to determine how EM residents document comparison (C) and outcome (O) within their EBM questions.

## Methods

- EM residents were asked to submit EBM logs on shift in the Emergency Department (ED).
- Postgraduate years (PGY) 1 through 4 were included.
- Logs were submitted by residents via New Innovations™.
- Information provided in the logs included: chief complaint, discharge diagnosis, ED or hospital course, clinical question, clinical question answer, and method for obtaining an answer.
- Logs were subsequently analyzed via the Fresno rubric of Population-Intervention-Comparison-Outcome (PICO), which was defined by Ramos et al, BMJ, 2003.
- Table 1 demonstrates an adaptation of the Fresno rubric analyze the C and O of each log.

## Results

Over the span of 7 years (2013-2020), a total of 10,450 logs were collected from residents. 10,401 logs were included in the final analysis after 45 logs were removed due to blank submissions or submissions of singular letters. An additionally 4 logs were removed as they were exact replicas of previous questions. Table 2 represents the final scores obtained from all 10,401 logs. Scores in each category ranged from 0 to 3. Overall, the score for C for all residents was 0.27. The score for O for all residents was 0.73.

The score for outcome was higher compared to the score of comparison. Both categories demonstrated very high numbers of zero scores. Specifically, 9282 submissions receiving a score of zero for comparison.

## Discussion

A reasonable explanation as to why results are lower than expected is due to the fact that EM residents are often pressed for time. Therefore, the latter portions of questions, comparison and outcome, may be neglected. Residents would benefit from education on the importance of inclusion of comparison and outcome in EBM questions. This will allow residents to tailor treatments to each patient as part of values-based patient centered care. Additionally, residents will have these educational lectures at their disposal to use whenever possible. Self-directed learning will hence be efficient and thorough as residents continue their training from PGY1 to PGY4.

## Conclusions

The data yielded from this study can used to guide EM resident education. Specifically, educational lectures will be made based on frequently asked topics.

**Table 2: PICO Analysis of EM Resident Clinical Questions using the Fresno Rubric Demonstrating Average Score and Score Distribution**

| | Population (Max 3) | Intervention (Max 3) | Comparison (Max 3) | Outcome (Max 3) | Total Score (Max 12) |
|---|---|---|---|---|---|
| **Overall** | 2.077 | 1.708 | 0.267 | 0.733 | |
| (10,401 = 100% total) | 0 = 2114<br>1 = 238<br>2 = 2782<br>3 = 5267 | 0 = 2350<br>1 = 1966<br>2 = 2452<br>3 = 3633 | 0 = 9282<br>1 = 88<br>2 = 404<br>3 = 627 | 0 = 6512<br>1 = 1031<br>2 = 1981<br>3 = 877 | 4.785 |
| **PGY 1** | 2.156 | 1.670 | 0.291 | 0.733 | |
| (2554, 24.6% of total) | 0 = 454<br>1 = 72<br>2 = 649<br>3 = 1379 | 0 = 574<br>1 = 530<br>2 = 616<br>3 = 834 | 0 = 2250<br>1 = 25<br>2 = 118<br>3 = 161 | 0 = 1611<br>1 = 229<br>2 = 498<br>3 = 216 | 4.850 |
| **PGY 2** | 2.085 | 1.707 | 0.275 | 0.735 | |
| (2552, 24.5% of total) | 0 = 495<br>1 = 58<br>2 = 733<br>3 = 1266 | 0 = 582<br>1 = 487<br>2 = 580<br>3 = 903 | 0 = 2274<br>1 = 16<br>2 = 99<br>3 = 163 | 0 = 1569<br>1 = 298<br>2 = 478<br>3 = 207 | 4.802 |
| **PGY 3** | 2.101 | 1.726 | 0.245 | 0.709 | |
| (2210, 21.2% of total) | 0 = 437<br>1 = 45<br>2 = 585<br>3 = 1143 | 0 = 500<br>1 = 394<br>2 = 528<br>3 = 788 | 0 = 1984<br>1 = 24<br>2 = 89<br>3 = 113 | 0 = 1412<br>1 = 203<br>2 = 421<br>3 = 174 | 4.781 |
| **PGY 4** | 1.987 | 1.729 | 0.256 | 0.748 | |
| (3085, 29.7% of total) | 0 = 728<br>1 = 63<br>2 = 815<br>3 = 1479 | 0 = 694<br>1 = 555<br>2 = 728<br>3 = 1108 | 0 = 2274<br>1 = 23<br>2 = 98<br>3 = 190 | 0 = 1920<br>1 = 301<br>2 = 584<br>3 = 280 | 4.720 |
| **Male** | 2.053 | 1.708 | 0.262 | 0.742 | |
| (6833, 65.7% of total) | 0 = 1428<br>1 = 170<br>2 = 1844<br>3 = 3391 | 0 = 1550<br>1 = 1287<br>2 = 1602<br>3 = 2394 | 0 = 6117<br>1 = 50<br>2 = 258<br>3 = 408 | 0 = 4262<br>1 = 671<br>2 = 1298<br>3 = 602 | 4.766 |
| **Female** | 2.122 | 1.709 | 0.277 | 0.715 | |
| (3568, 34.3% of total) | 0 = 686<br>1 = 68<br>2 = 938<br>3 = 1876 | 0 = 800<br>1 = 679<br>2 = 850<br>3 = 1239 | 0 = 3165<br>1 = 38<br>2 = 146<br>3 = 219 | 0 = 2250<br>1 = 360<br>2 = 683<br>3 = 275 | 4.823 |

**Table 1: Sample Standardized Phrases Used to Score Resident On-Shift Clinical Questions as Adapted from Ramos et al (BMJ 2003)**

| Score | Intervention/Comparison | Outcome |
|---|---|---|
| 0 | No mention | No mention |
| 1 | "Imaging"<br>"Management"<br>"Tool" or "System"<br>Treatment<br>Exam<br>"Control" of (symptom) | Outcome<br>Effective, Benefit, Utility<br>"Improved"<br>Safety<br>Prognosis<br>"Disposition" |
| 2 | Specific type of imaging (i.e. CT)<br>Follow-up<br>Medication class (i.e. antibiotics)<br>Type of symptom control | Treatment of (disease)<br>Improvement of (symptom)<br>Control of (entity)<br>Specific disposition (i.e. admit)<br>Side effect/adverse effect<br>Patient satisfaction |
| 3 | Specific imaging of specific anatomy (i.e. CT head)<br>POCUS, bedside ultrasound<br>Specific test (i.e. EKG, echo, CBC)<br>Specific intervention (i.e. proning, nerve block, suturing) | Morbidity, mortality or another patient-oriented outcome<br>Change in specific disposition<br>Specific effect/adverse effect |

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