

MEDICAL EDUCATION/MEDICAL STUDENT

## Documentation of quality improvement exposure by internal medicine residency applicants

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**Background:** Quality improvement (QI) has become an essential component of medical care in the United States. In residency programs, QI is a focus area of the Clinical Learning Environment Review visits conducted by the Accreditation Council for Graduate Medical Education. The readiness of applicants to internal medicine residency to engage in QI on day one is unknown.

**Purpose:** To document the reporting of QI training or experience in residency applications.

**Methods:** Electronic Residency Application Service applications to a single internal medicine program were reviewed individually looking for reported QI involvement or actual projects in the curriculum vitae (CVs), personal statements (PSs), and letters of recommendation (LORs). CVs were also reviewed for evidence of education in QI such as completion of Institute for Healthcare Improvement (IHI) modules.

**Results:** Of 204 candidates shortlisted for interview, seven had QI items on their CVs, including one basic IHI certificate. Three discussed their QI work in their PSs, and four had recommendation letters describing their involvement in QI. One applicant had both CV and LOR evidence, so that 13 (6%) documented QI engagement.

**Conclusion:** Practice of or instruction in QI is rarely mentioned in application documents of prospective internal medicine interns.

Keywords: *internal medicine; internship and residency; graduate medical education; quality improvement*

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Quality improvement is a hallmark of institutional integrity.

Zack Emery, DO

This response by a then senior medical student to an open-ended question about quality improvement (QI) suggests that medical students have opportunities to reflect on QI activities witnessed during their training. The Accreditation Council for Graduate Medical Education has chosen QI as a focus area of its Clinical Learning Environment Review program (1), thus potentially increasing the exposure of medical students to QI activities during clinical rotations and adding to QI instruction provided in individual medical school curricula. However, the preparedness of applicants to internal medicine residency to engage in QI on day one is unknown. Therefore, the purpose of this study is to document the reporting of QI training or experience in residency applications. We hypothesized that there is no difference in QI ‘uptake’ – mention of practice or instruction – by location of medical school, that is, United States versus international.

### Methods

Electronic Residency Application Service (ERAS) applications of candidates shortlisted for interview at a single internal medicine program in 2014–2015 were reviewed individually looking for reported QI involvement or actual projects in the curriculum vitae (CVs), the personal statements (PSs), and letters of recommendation (LORs). CVs were also reviewed for evidence of education in QI, such as completion of Institute for Healthcare Improvement (IHI) modules. Applicant data available from ERAS included date/year of birth; sex; scores on steps 1, 2, and 3 of the United States Medical Licensure Examination (USMLE) and medical school of graduation. Medical school of graduation was categorized as being in or outside the United States. Match status was obtained from the National Resident Matching Program R3 site in June 2015.

### Setting

Applications to a community-based categorical internal medicine program in northeastern United States were reviewed per institutional policy. The internal medicine

residency program has existed since 1958 and has nine residents in each of the 3 years of training. Publicly available advice to applicants for 2014–2015 included the following:

1. Applications were only accepted through ERAS.
2. US clinical experience was preferred but not required.
3. Graduation from medical school within 5 years or advanced postgraduate degree/training was required.
4. Visa sponsorship was available.

### Analysis

Descriptive statistics were generated using SAS version 9.4. Chi-square and Fisher's exact tests were used to compare discrete variables. A *p*-value of 0.05 was considered statistically significant.

The study was exempted from review by the local Institutional Review Board.

### Results

Demographic data are presented in Table 1. Of the 204 applicants selected for interview, seven had QI items on their CVs, including one basic IHI certificate. Three discussed their QI work in their PSs, and four had recommendation letters describing their involvement in QI. One applicant had both CV and LOR evidence; thus 13 (6%) documented QI engagement. These 13 included four US seniors/medical graduates (USMGs) (12% of 34) and nine international medical graduates (IMGs) (5% of 170). Three of the four USMGs reported their QI exposure in their CVs, whereas the other was reported in an LOR.

All seven applicants with QI items on their CV matched in the same (2015) season. This was true for three of the four applicants whose QI exposure was only recorded by LOR and one of the three who only reported QI work in their PSs.

**Table 1.** Demographic data of study cohort (*N* = 204)

Item	<i>n</i>	Mean ± SD, or frequency <sup>a</sup> (%)
Age	204	28.62 ± 2.67
Male	126	62%
Female	78	38%
USMG	34	17%
IMG	170	83%
USMLE Step 1 Score	199	232.72 ± 15.48
USMLE Step 2 Score	200	237.29 ± 15.00
USMLE Step 3 Score	110	214.55 ± 11.33

<sup>a</sup>Frequencies rounded to the nearest whole number.

USMLE = United States Medical Licensure Examination, USMG = US seniors/medical graduate, IMG = international medical graduate.

There was no statistically significant difference in QI exposure by medical school location (*p* = 0.16). Neither applicant age (among age categories ≤25, 26–30, 31–35, and >35) nor gender was associated with a difference to QI exposure (*p* = 0.701 and 0.567, respectively).

### Discussion

This study suggests that a large fraction of applicants to internal medicine residency do not clearly document experience of, or training in, QI in their applications. In a recent survey of students at one US medical school, 47% of respondents said they had received instruction in QI (2); the survey did not differentiate between formal and informal exposure. Available literature suggests that QI curricula vary across US medical schools (3, 4). However, the value ascribed by individual students to QI experience and the ability to articulate such experience during residency application has not been studied hitherto.

The level of exposure of IMGs to QI concepts before they start US residencies is not known. Several IMGs obtain clinical experience at US facilities prior to residency, but such rotations may or may not present them with opportunities to engage in QI. This may relate in part to a dearth of clinicians that can communicate QI concepts and experience to their mentees. In addition, formal QI instruction to intending residents who are not seniors in US medical schools may not be readily available. Considering that one quarter of US residents are IMGs (5), encouraging them to become familiar with QI concepts before entering residency can potentially hasten improvements in US healthcare.

Does documentation of QI experience play a role in the match success of an applicant? This cannot be determined from this study. However, the CV may be the best document in which to chronicle QI exposure.

To our knowledge, this is the first report on documentation of QI exposure by residency applicants. This study thus provides a basis for comparison with similar studies that may arise from different applicant populations, specialties, and time periods.

Our study has notable limitations. Documentation of QI exposure may not be a sufficiently sensitive proxy for QI experience prior to residency. The actual knowledge or understanding of QI concepts was not tested formally for any applicants. This study was carried out at a single internal medicine program with a small number of vacancies for interns; however, the ERAS materials used were likely sent to multiple programs nationwide by each applicant.

### Conclusion

Practice of, or instruction in, QI is rarely mentioned in application documents of intending interns. Further

studies can enunciate this finding in diverse residency settings and over different time periods.

### Conflict of interest and funding

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