



Letter

The value of an allergy and clinical immunology rotation at an academic tertiary medical center

Formal Allergy and Immunology (AI) rotations are not mandatory components of most medical school and residency curricula.¹ At the Medical College of Wisconsin (MCW), first- and second-year students receive minimal clinical AI education (2 hours on hypersensitivity disorders; 1 hour on immunodeficiencies) with moderate basic science instruction (9 hours of immunology; 6 hours of pharmacology of AI medications; and a 3-hour pulmonary function laboratory). Students and residents can rotate for varying durations in the combined pediatric/adult AI Clinic.

An AI rotation during residency is known to later influence physicians' attitudes, opinions, and referral patterns.² The effect of an AI rotation on examinations (eg, United States Medical Licensing Examination, American Board of Internal Medicine, or Pediatrics) is unknown. In fact, a study examining the impact of subspecialty electives on board outcomes did not even assess AI.³

At Northwestern University, 25 to 30 medicine residents annually rotate in AI; 3 to 5 per year later apply for an AI Fellowship.⁴ At MCW, approximately 120 students and residents annually complete AI rotations. In the last 5 years of applicants to our Fellowship, 1 to 4 applicants per year (mean, 2.6) graduated from our medical school, and 0 to 3 applicants per year (mean, 1.2) were in residency at our institution. Within the latter group, 83% had rotated in AI. Although an AI rotation presumably increases interest in the AI Fellowship, a direct comparison between AI rotators and non-rotators has never been performed.

We chose to investigate AI rotations because they are not experienced by many,⁵ and the benefits have not been fully elucidated. We hypothesized that formal AI rotations are perceived to be useful for board/licensing examinations, future careers, and inciting interest in AI Fellowship, regardless of rotators' training level and duration of the rotation.

Because no validated survey was available, we created an electronic questionnaire using the Survey Monkey web application (Palo Alto, California; <http://www.surveymonkey.com>) for rotators (eFig 1) and controls/non-rotators (those who never rotated in AI) (eFig 2). We validated the surveys with residents/students (not included in the survey) ($n = 4$), concluding that all questions were comprehensible and unbiased.

In June 2011 and May 2012, all AI rotators ($n = 206$) and controls ($n = 82$) between July 2010 and May 2011 and those between May 2011 and March 2012 received an email with a link to the survey and informed consent. Exemption was obtained from MCW. Bias was minimized via the anonymity of the survey. All rotators had received their rotation evaluation beforehand.

Table 1

Medical student and resident survey responses

	Number Evaluated	Number That Agree (%)	P
An AI rotation is valuable for future licensing and board examinations			
Students	48	35 (73)	.333
Residents	23	20 (87)	
Rotators with ≤5 day rotations	41	29 (71)	.301
Rotators with >5 days rotations	30	25 (83)	
An AI rotation is valuable for future medical careers			
Students	48	30 (63)	.003
Residents	23	22 (96)	
Rotators with ≤5 day rotations	41	25 (61)	.007
Rotators with >5 days rotations	30	27 (90)	
I would consider an AI fellowship based on this rotation			
Students	48	13 (27)	.231
Residents	23	11 (48)	
Rotators with ≤5 day rotations	41	9 (22)	.084
Rotators with >5 days rotations	30	14 (47)	

We used SPSS Version 20 (Armonk, New York) for statistical analysis, and for categorical variables, we performed Fisher's exact test. A P -value of $< .05$ was considered significant.

In total, 94 surveys were received, giving an overall response rate of 33% ($n = 94/288$) (eFig 3). Most were rotators (78%; 22% controls). Students (66%) and pediatric residents (16%) predominated, compared with residents in medicine/pediatrics, internal medicine, and other specialties/unanswered. Most (57%) planned to practice a (sub)specialty, compared with primary care (26%) and "unknown" (17%).

Among rotators, 59% spent 1 to 5 days in AI, whereas the rest rotated 6 to 30 days. More rotations were elective (69%) (31% mandated/assigned as part of a curriculum).

Most rotators believed time in AI was valuable for future licensing/board examinations (77%), although this was enhanced in those that elected for the rotation ($P = .022$). Training level and duration had no effect (Table 1). Of controls, 62% believed an AI rotation would be useful for examinations, a value not different from that of rotators assigned to the rotation.

Most considered rotating in AI valuable for their future medical careers (72%), although this was augmented in those that elected compared with those mandated to participate ($P = .004$). Residents and those rotating for longer than 5 days were more likely to consider the rotation helpful ($P = .003$; $P = .007$) (Table 1). Of controls, 43% thought that the AI rotation would be useful for their career, which was similar to assigned rotators.

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Of rotators, 33% would consider AI Fellowship, and 24% were unsure. Training level and duration did not affect this (Table 1). Most interested were 3rd-year medical students (46%) or 3rd-year pediatric residents (17%). Compared with controls (5%) and elective rotators (40%), assigned rotators (18%) were not necessarily more likely to express interest in AI ($P = .110$; $P = .190$).

Strengths of the rotation included: attending physicians being readily available for staffing (89%), effective teaching (85%), seeing patients independently (80%), and observing procedures (77%). The greatest weakness was variety of illnesses (34%).

To our knowledge, this study is the first to assess the perceived utility of AI rotations on examinations, future careers, and interest in AI Fellowship. With regard to the latter, there is strong concern about maintaining providers in this subspecialty.⁵

Although the response to this non-incentivized electronically delivered survey was low, response rates tend to be lower for Internet surveys.⁶ Moreover, response representativeness is more important than rate.⁶ Our population was representative and had comparable subspecialty interest to other studies.⁷ Finally, we affirm that “free time” for voluntary activities is limited in this population, a problem not new to academic-based surveys.⁸

Other weaknesses included the inability to blind subjects from the intervention, an AI rotation (expectation bias). Ideally, the survey should originate from a central office and include all subspecialty rotations at institutions with and without AI rotations. Also, because most rotators elected for their rotation, their responses implied self-selection bias. We circumvented this by comparing the rotators “assigned” to the rotation to the controls. Finally, questions were asked about the “presumed” benefits of an AI rotation, which required speculation. Future studies should examine the relationship between alleged benefit and performance on measurable outcomes and application to AI Fellowship.

We have elucidated that most medical students and residents deem an AI rotation useful for upcoming examinations. For medical careers, of which most expressed interest in subspecialties, utility is enhanced when rotations are longer than 5 days and during residency. It could be speculated that this is attributable to the closeness of residents to their final career and the disease burden of atopic conditions.⁹

There was impressive interest in AI Fellowship, especially when considering the few training positions.¹⁰ Unfortunately, interest was not affected by level of training, rotation duration, or experiencing the rotation itself. Further research needs to investigate means of inciting interest in AI, especially with the likely shortage.⁵

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Allergy & Immunology Survey

Introduction

You are being asked to participate in a research study from the Division of Allergy and Immunology at the Medical College of Wisconsin. You have been asked to participate because you recently rotated in the clinic. Your participation is entirely voluntary and confidential and will consist of answering the following 13 questions, which will take less than 5 minutes.

The purpose of this study is to assess the value of the Allergy and Immunology rotation based on (1) level in medical school and/or residency and (2) duration of the rotation. The results will be disseminated to other academic institutions to improve Allergy/Immunology rotations. The risk of participation is time lost; the benefit is improvements to the Allergy/Immunology rotation; the alternative is to decline participation.

Participation

I agree to participate in this study for the intended use described.

☐ Yes

☐ No

Demographics

1. Status:

☐ M1

☐ Medicine, PGY-3

☐ Medicine/Pediatrics, PGY-4

☐ M2

☐ Pediatrics, PGY-1

☐ Family Medicine Resident

☐ M3

☐ Pediatrics, PGY-2

☐ Psychiatry Resident

☐ M4

☐ Pediatrics, PGY-3

☐ ENT Resident

☐ Preliminary Year Intern, PGY-1

☐ Medicine/Pediatrics, PGY-1

☐ Pediatric Pulmonary Fellow

☐ Medicine, PGY-1

☐ Medicine/Pediatrics, PGY-2

☐ Other

☐ Medicine, PGY-2

☐ Medicine/Pediatrics, PGY-3

Other (please specify)

2. Duration of rotation:

☐ 1-5 days

☐ 6-15 days

☐ 16-30 days

☐ Other

Other (please specify)

3. My Allergy/Immunology rotation was:

☐ Mandatory/assigned

☐ Elective/requested

eFigure 1. This is the survey sent electronically to medical students and residents who rotated in the Allergy and Immunology Clinic.

Allergy & Immunology Survey

4. The Allergy/Immunology rotation is valuable for my future exams (Step II, Step III, ABP, ABIM, etc):

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

5. The Allergy/Immunology rotation is valuable for my future career.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

6. What is your future career?

☐ Primary Care ☐ Subspecialty ☐ Unknown

Medical Subspecialty

7. Are you interested in pursuing a medical subspecialty?

☐ Yes ☐ No

Consider Allergy/Immunology

Would you consider Allergy/Immunology based on this rotation?

☐ Yes
☐ No
☐ Unsure

8. An Allergy/Immunology rotation is essential for an undergraduate and graduate medical education.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Allergy & Immunology Survey

9. The Allergy/Immunology rotation would be most valuable during (check all that apply):

- | | | |
|--|---|---|
| ☐ M1 | ☐ Medicine, PGY-3 | ☐ Medicine/Pediatrics, PGY-4 |
| ☐ M2 | ☐ Pediatrics, PGY-1 | ☐ Family Medicine Resident |
| ☐ M3 | ☐ Pediatrics, PGY-2 | ☐ Psychiatry Resident |
| ☐ M4 | ☐ Pediatrics, PGY-3 | ☐ ENT Resident |
| ☐ Prelim Year Intern, PGY-1 | ☐ Medicine/Pediatrics, PGY-1 | ☐ Pediatric Pulmonary Fellow |
| ☐ Medicine, PGY-1 | ☐ Medicine/Pediatrics, PGY-2 | ☐ Other |
| ☐ Medicine, PGY-2 | ☐ Medicine/Pediatrics, PGY-3 | |

Other (please specify)

10. Strength of the Allergy/Immunology rotation:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Effective teaching	☐	☐	☐	☐	☐
Seeing patients independently	☐	☐	☐	☐	☐
Variety of illnesses	☐	☐	☐	☐	☐
Attendings being readily available for staffing	☐	☐	☐	☐	☐
Observing procedures (skin testing, spirometry, etc)	☐	☐	☐	☐	☐

Other (please specify)

11. Areas that need to be improved in the Allergy/Immunology rotation:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Effective teaching	☐	☐	☐	☐	☐
Seeing patients independently	☐	☐	☐	☐	☐
Variety of illnesses	☐	☐	☐	☐	☐
Attendings being readily available for staffing	☐	☐	☐	☐	☐
Observing procedures (skin testing, spirometry, etc)	☐	☐	☐	☐	☐

Other (please specify)

Allergy & Immunology Survey

If there is anything about the rotation that was not included on the survey, we would welcome comments and suggestions.

Done

Thank you for your participation. You are done with the survey.

Allergy & Immunology Survey (C)

You are being asked to participate in a research study from the Division of Allergy and Immunology at the Medical College of Wisconsin. You have been asked to participate in order to have the opinion of someone who has not rotated in the clinic. Your participation is entirely voluntary and confidential and will consist of answering the following 9 questions, which will take less than 5 minutes.

The purpose of this study is to assess the value of the Allergy and Immunology rotation based on (1) level in medical school and/or residency and (2) duration of the rotation. The results will be disseminated to other academic institutions to improve Allergy/Immunology rotations. The risk of participation is time lost; the benefit is improvements to the Allergy/Immunology rotation; the alternative is to decline participation.

1. I agree to participate in this study for the intended use described.

☐ Yes

☐ No

Allergy & Immunology Survey (C)

2. Demographics

- ☐ M1
☐ M2
☐ M3
☐ M4
☐ Preliminary Year Intern, PGY-1
☐ Medicine, PGY-1
☐ Medicine, PGY-2
☐ Medicine, PGY-3
☐ Pediatrics, PGY-1
☐ Pediatrics, PGY-2
☐ Pediatrics, PGY-3
☐ Medicine/Pediatrics, PGY-1
☐ Medicine/Pediatrics, PGY-2
☐ Medicine/Pediatrics, PGY-3
☐ Medicine/Pediatrics, PGY-4
☐ Family Medicine Resident
☐ Psychiatry Resident
☐ ENT Resident
☐ Pediatric Pulmonary Fellow
☐ Other (please specify)

3. Please rank the following:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
An Allergy/Immunology rotation would be valuable for my future exams (Step II, Step III, ABP, or ABIM).	☐	☐	☐	☐	☐
An Allergy/Immunology rotation would be valuable for my future career.	☐	☐	☐	☐	☐

Allergy & Immunology Survey (C)

4. What is your future career?

- ☐ Primary Care
- ☐ Subspecialty
- ☐ Unsure

5. Are you interested in pursuing a medical subspecialty?

- ☐ Yes
- ☐ No

6. Would you consider Allergy/Immunology?

- ☐ Yes
- ☐ No
- ☐ Unsure

7. Do you intend to rotate in Allergy/Immunology?

- ☐ Yes
- ☐ No
- ☐ Unsure

8. Please rank the following:

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

An Allergy/Immunology rotation is essential for an undergraduate and graduate medical education.

☐☐☐☐☐

Allergy & Immunology Survey (C)

9. An Allergy/Immunology rotation would be most valuable during (you may select more than one answer)

- | | |
|---|---|
| ☐ M1 | ☐ Pediatrics, PGY-3 |
| ☐ M2 | ☐ Medicine/Pediatrics, PGY-1 |
| ☐ M3 | ☐ Medicine/Pediatrics, PGY-2 |
| ☐ M4 | ☐ Medicine/Pediatrics, PGY-3 |
| ☐ Preliminary Year Intern, PGY-1 | ☐ Medicine/Pediatrics, PGY-4 |
| ☐ Medicine, PGY-1 | ☐ Family Medicine Resident |
| ☐ Medicine, PGY-2 | ☐ Psychiatry Resident |
| ☐ Medicine, PGY-3 | ☐ ENT Resident |
| ☐ Pediatrics, PGY-1 | ☐ Pediatric Pulmonary Fellow |
| ☐ Pediatrics, PGY-2 | |
| ☐ Other (please specify) | |

10. Please feel free to add any comments you may have:

Thank you for your time and participation.

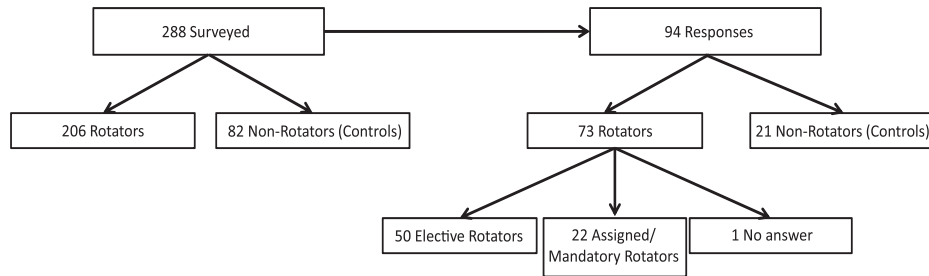


Figure 3. This is a flow diagram depicting the study population, namely rotators (including those who elected for the AI rotation and those who were assigned to the AI rotation) and non-rotators/controls.