

## AAIM Perspectives

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# Resident Research Experiences in Internal Medicine Residency Programs—A Nationwide Survey



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Research represents a foundational element of training in medicine. The Accreditation Council for Graduate Medical Education (ACGME) requires that residents participate in scholarly activity, including but not limited to traditional research. Despite this requirement, there is limited information about the research experience of most learners in internal medicine residency programs across the nation.<sup>1-3</sup>

Research training in residency has benefits both for residents and for faculty, including an increase in scholarly success during and after residency, development of academic interests among residents, overall satisfaction in residency training, achievement of proficiency in critical appraisal of literature, and faculty promotion.<sup>4-9</sup> In addition, a robust research experience in residency is a pipeline for physician-scientists. Despite these benefits, numerous barriers to successful implementation of research have been identified, including lack of

curriculum, mentoring, funding, protected time for residents, and faculty.<sup>3,10</sup>

The “life blood” of academic internal medicine includes its learners, in particular, residents. Therefore, in an effort to better understand the research experience for internal medicine residents, we conducted a survey among internal medicine residency programs to examine specific aspects of research experiences for residents. The overarching goal was to describe how internal medicine residency programs promote research experiences and skills among trainees, in an attempt to highlight best practices.

## METHODS

### Survey

Every year the Association of Program Directors in Internal Medicine administers a survey to residency programs nationwide, in an effort to understand issues facing internal medicine residency programs.<sup>11</sup> In 2013 the authors used that yearly survey to ask questions related to the research experience of residents in training. A program-specific hyperlink to a web-based survey was sent from August to November 2013 to all 368 Association of Program Directors in Internal Medicine member

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programs, representing 93.4% of ACGME-accredited internal medicine residency programs nationwide.

The survey included 11 research questions created de novo; the first 4 questions asked about the structure of research experience in their program. The remaining questions were designed to determine research curriculum, methods used in teaching, advanced degrees of residents in the program, mentors, types of research performed, measures of research success, presentations and publications, research support, and quality improvement projects. All research questions can be accessed in [Appendix 1](#) (available online). Program directors had the option of opting out of all or some of the research questions. Survey responses were appended with data from publicly available sources in December 2013 before blinding of program identity for data analysis. Programs were categorized to regions by US Census Bureau definition.<sup>12</sup> The

American Medical Association Fellowship and Residency Electronic Interactive Database Access System Online provided information on program characteristics.<sup>13</sup> Data from ACGME<sup>14</sup> included accreditation information, number of approved training positions, and program director tenure.

## Data Analysis

To assess the representativeness of our sample, we compared programs responding to the resident research survey questions with those programs not responding across the publicly available variables (program type, region, size, program director tenure, and American Board of Internal Medicine program pass rates) using 2-sample *t* tests.

Survey responses were analyzed across 3 categories: programs that have a formal research track, that is, with a curriculum or schedule that differs from the categorical residency and/or a commitment to a research fellowship position at the conclusion of residency training (such as Physician Scientist Training Program [PSTP] or other pathway); programs that either have a formal research rotation or offer research experience to residents with protected time; or programs that do not have a formal research rotation or research experience with protected time but may encourage research.

Types of research experiences were compared by cross-tabulation and a  $\chi^2$  test for categorical variables (percentages) and 1-way analysis of variance to compare

the means of continuous variables. A *P* value  $\leq .05$  is considered statistically significant. Statistical analyses were conducted using Stata version 12.1 software (StatCorp, College Station, Tex).

The study was approved by the Mayo Clinic institutional review board.

## PERSPECTIVES VIEWPOINTS

- We conducted a comprehensive nationwide study to describe the state of research training in internal medicine residencies.
- Considerable differences around the frequency and type of resident research across programs were identified. Notably, the presence of a formal research track led to greater research engagement.
- The ability for programs to provide meaningful research experiences for residents depends on a multitude of factors, including the commitment to scholarship and research.

## RESULTS

The response rate to the research subsection was 65% (252 responders and 139 nonresponders to research questions). A vast majority (91%) of programs that responded to the survey also responded to the research questions. Responders were similar to nonresponders in terms of region, program type, and total number of filled positions and number of participating institutions. The number of hospital beds was higher in nonresponders than responders (*P* < .05) ([Appendix 2](#), available online).

## Program Characteristics

Programs with a research track offered a curriculum or schedule that differed from the standard categorical residency or provided a commitment to residents through a research fellowship position following residency. Of the 47 respondents, 38 (81%) reported having an American Board of Internal Medicine–sanctioned research track, such as a PSTP. The mean number of residents who participated in the track was 3.3 (median 2; range 0–35), with a majority starting the track in postgraduate year 1 (66%).

The vast majority of programs with a formal research track were university-based (*n* = 40; 85%) or US Department of Veterans Affairs–affiliated (*n* = 32; 68%), whereas the majority of programs that offered rotation/protected time without a track were community-based (with or without university affiliation) (*n* = 120, 70%; [Table 1](#)).

## Research Curricula and Teaching Methods

Research curricula and teaching in research varied among programs ([Table 2](#)). Instruction in critical literature appraisal (82%–89%) and basic statistics (75%–79%) was commonly offered, regardless of the presence or absence of a formal track or rotation/protected time. Formal instruction in grant writing and research funding was uncommon, occurring most often in programs with a formal track (17%) and much less frequently in other

**Table 1** Program Characteristics

Characteristic	All Responders (N = 252)	Formal Track (n = 47)	Rotation/ Protected Time (n = 172)	Encourage Research/ No Research Time (n = 33)	P Value
<b>Demographics</b>					
University-based (%)	38	85	30	12	.001
VA present (%)	39	68	34	21	.0001
PD academic rank associate or full professor (%)	65	78	59	69	NS
PD tenure (y), mean (SD)	6.4 (6.6)	6.8 (6.6)	5.9 (6.4)	8.3 (7.9)	NS
Annualized no. of residents with PhD, mean (SD)	1.6 (2.8)	3.1 (3.5)	1.4 (2.6)	0.6 (0.7)	.0001
Annualized no. of residents with MS, MPH, MBA, or other advanced degrees other than PhD, mean (SD)	4.1 (5.2)	6 (7.4)	3.7 (4.5)	3.0 (3.6)	.02

MBA = Master of Business Administration; MPH = Masters of Public Health; MS = Master of Science; PD = program director; VA = US Department of Veterans Affairs.

groups (0%-5%). Lectures and online resources were commonly used as part of the research curriculum. Institution-led lectures were commonly used in all programs to deliver the research curriculum, whereas residency-led lectures were more common in programs with a dedicated research track or rotation.

### Career Guidance and Mentorship

Academic career guidance was offered most frequently in programs with a formal research track (64%) (Table 2). Research mentors seemed to be largely identified by residents (64%-87%) in all programs (Table 3). Mentor selection was mostly either by word of mouth (62%-81%) or by program leadership referral (74%-89%). Websites describing mentors were most common in programs with a formal track (49%) compared with other groups (3%-8%).

### Types of Research Performed

Retrospective chart reviews (88%-94%), quality improvement (QI) (73%-94%), and survey research (58%-79%) were the most frequent types of research performed (Table 4). Randomized controlled trials (53%), secondary analysis of already available datasets (70%), epidemiologic studies (70%), basic science research (77%), and writing up already analyzed data (77%) were more frequent in formal track programs than in other programs ( $P < .05$ ). The most common types of research conducted in formal track programs were basic science (77%), clinical research (50%-94%), epidemiologic research (70%), and QI research (94%).

### QI Research

Quality improvement research was common across all programs (Table 4). Most programs had a physician

**Table 2** Research Curriculum and Teaching Methods

Variable	All Responders (N = 252)	Formal Track (n = 47)	Rotation/ Protected Time (n = 172)	Encourage Research/ No Research Time (n = 33)	P Value
<b>Formal instruction in: (%)</b>					
Critical literature appraisal	88	89	88	82	NS
Basic statistics	75	74	75	79	NS
Study design	59	53	62	52	NS
Academic career guidance	47	64	45	36	.03
Research ethics	46	49	45	48	NS
IRB	56	45	58	61	NS
Manuscript preparation	24	26	26	12	NS
Grant writing	7	17	6	0	.007
Research funding	7	17	5	3	.01
<b>Methods in teaching research (%)</b>					
Residency-led lectures	69	68	73	52	.04
Institution-led lectures	55	57	53	61	NS
Web sites	45	47	47	33	NS

IRB = institutional review board.

**Table 3** Research Mentor

Variable	All Responders (N = 252)	Formal Track (n = 47)	Rotation/Protected Time (n = 172)	Encourage Research/No Research Time (n = 33)	P value
Research mentor (%)					
Trainees identify mentor	81	87	82	64	.02
Assigned to each trainee	27	32	27	21	NS
Assigned to selected trainees	10	6	11	12	NS
Mentor selection process (%)					
PD, APD, CF, CR identify mentor	75	89	74	58	.005
Word of mouth	63	81	62	39	.001
Web sites describing mentors	15	49	8	3	.0001

APD = associate program director; CF = core faculty; CR = chief resident; PD = program director.

(63%-89%) or other faculty member (61%-87%) with QI expertise to lead and teach QI. Sources of support for QI projects and QI research were highest in programs with a formal track and included grant funding available to faculty (32%) and residents (21%) and access to research experts (53%).

### Research Success, Productivity, and Publication

The majority of programs had a formal system to measure success, regardless of type of research experience offered (Table 5). The most common measures of success included regional or national poster presentations (79%-94%) or presentation at a local research day event (56%-68%). Publications seemed to be more commonly used as a measure of success in programs with a formal research track. Academic career choice was rarely used to

measure scholarship across all programs. Abstract presentation was the most common form of research dissemination across all programs (34%-37%), followed by manuscript publication (10%-16%) (Table 5). More than half of programs used resident awards to help measure research success (56%-68%).

### Research Support

The availability of research support was common in programs with a formal track and uncommon in programs with no protected time for research (Table 6). For all programs, departmental funds and research mentor funding were the most common forms of funding, whereas training grants provided a limited source for research support.

More than half of all programs (51%-62%), regardless of the presence or absence of a research rotation, reported that a faculty member (ie, a research director,

**Table 4** Types of Research and QI Project Support

Variable	All Responders (N = 252)	Formal Track (n = 47)	Rotation/Protected Time (n = 172)	Encourage Research/No Research Time (n = 33)	P value
Types of research: (%)					
Retrospective chart reviews	93	94	94	88	NS
QI research	87	94	88	73	.02
Surveys	70	79	70	58	NS
Writing up analyzed data	55	77	53	36	.001
Basic science	33	77	26	6	<.0001
Secondary analysis	43	70	39	24	<.0001
Epidemiology	42	70	38	21	<.0001
RCT	32	53	30	9	<.0001
QI sources of support: (%)					
Funds to engage residents in QI	14	28	13	6	.02
Faculty grants for QI	12	32	8	0	.001
Resident grants for QI	10	21	8	3	.01
Research experts available	36	53	34	33	.05
Physician overseeing QI	76	89	74	63	.03
Faculty with expertise to teach QI	73	87	71	61	.03
Formal QI curriculum	78	98	74	66	.001
Informal QI rounds	92	91	92	97	NS
QI activities disseminated as scholarship	86	91	87	81	NS

QI = quality improvement; RCT = randomized controlled trial.

**Table 5** Research Success

Variable	All Responders (N = 252)	Formal Track (n = 47)	Rotation/ Protected Time (n = 172)	Encourage Research/ No Research Time (n = 33)	P value
Measures of success: (%)					
Abstract regional or national Publication	86	94	85	79	NS
Research day presentation	73	85	72	58	.02
Resident awards	59	68	56	58	NS
Written summary	61	68	61	52	NS
Local presentation	31	49	28	21	.01
Academic career choice	53	49	55	48	NS
No formal system	8	21	5	3	.000
	12	4	14	12	NS
Percentage presented or published over the last year, mean (SD)					
Abstracts	36 (24)	37 (24)	36 (23)	34 (27)	NS
Manuscripts	12 (13)	16 (16)	11 (12)	10 (8)	NS
Book chapters	3 (6)	5 (7)	3 (5)	2 (6)	.04

with protected time) oversaw residency research, regardless of the type of research experience offered.

## DISCUSSION

The acquisition of research skills during residency, an ACGME requirement, is important because it enhances a resident's critical thinking skills. Despite the importance of research skills in residents, few studies have quantified the extent of research training in residency. To our knowledge, ours is the first comprehensive nationwide study to describe the state of research training among a nationwide sample of internal medicine residencies.

We found that the vast majority (87%) of US internal medicine residency programs offered a formal research track or a research rotation/protected time for their residents, consistent with a thematic commitment to research in internal medicine residencies. An earlier study reported that only approximately 30% of internal medicine programs provided protected time,<sup>3</sup> which leads us to conclude that there has been a significant increase in focus on resident research over the last decade, perhaps due to ACGME requirements.

We found that the frequency of performance of research was most common in programs with a formal research track and seemed to be related to specific factors, such as the presence of a research curriculum. Although many programs offered curricula in basic aspects of scholarship and research, in-depth curricular components such as formal instruction in grant writing, research funding, and manuscript preparation occurred almost exclusively in programs with a formal research track. In addition to a more vigorous resident research curriculum, programs with a research track offered more instruction in academic career guidance and had multiple pathways to assist residents in identifying mentors, all of which seemed to support more engagement in research.

Several studies have demonstrated that a research curriculum is critical in promoting resident scholarly activity.<sup>1,15-17</sup> Although residents have identified the lack of a curriculum as one of the most common barriers,<sup>15</sup> only 34% of internal medicine residents reported that their programs had a curriculum to teach research skills, which is consistent with a previous study reporting that only 19%-38% of program directors believed that

**Table 6** Research Support

Variable	All Responders (N = 252)	Formal Track (n = 47)	Rotation/ Protected Time (n = 172)	Encourage Research/ No Research Time (n = 33)	P value
Sources of support: (%)					
Departmental Funds	57	77	55	36	.001
Research mentor funding	33	66	28	9	.001
Training grants	25	23	27	15	NS
No funding	25	9	27	39	.004
Research director					
One faculty member in charge of resident research (%)	53	62	51	52	NS
Percentage protected time, mean (SD)	22 (19)	26 (21)	21 (17)	20 (21)	NS

research skills were adequately taught in their residency programs.<sup>1,3,15</sup> We found that the overall frequency of programs that offered formal instruction in critical research skills (56%-88%) was substantially higher than previously reported, again supporting an increased commitment of internal medicine residency programs to teaching and engaging residents in research.

Many residency programs provided support for a dedicated research director, which is a positive increase from what was previously described,<sup>1</sup> because it was shown that allocating 7 hours per week of time (equivalent to approximately 0.2 full time equivalent) was associated with an increase in resident publications.<sup>18</sup>

Although the types of research projects performed by residents varied widely, most programs reported frequent retrospective and survey research. Basic science research was much more common in programs with a formal research track, which is not surprising because these types of projects are more feasible for residents with substantial previous experience in research and an ongoing commitment to research, such as part of a PSTP.

Consistent with current trends in medicine, QI research seemed to be common. Not surprisingly, programs with a formal track seemed to have the most QI expertise, including a formal QI curriculum. A great majority of QI activities (80%-90%) were disseminated as scholarship. We conclude that QI research is an important opportunity for programs to advance research performed in residency programs.

Interestingly, there did not seem to be a universal measure of success used by training programs. The most common measure of success—utilized by essentially all programs—was regional or national poster presentation. Publications, presentation at departmental research day, or other local presentations were less common metrics of success. Publications as a measure of success seemed to be most commonly used in programs with a formal track or rotation/protected time. More than half of programs used resident awards as success criteria. Of note, academic career choice was largely not used as a measure of success, even among programs with a formal track.

The scholarly output of residents is an important issue for all residency programs. We found that whereas presentation of abstracts was more common, publication of full manuscripts was relatively uncommon. Additionally, research productivity was similar among groups. Two previous cross-sectional surveys reported that resident publication in peer-reviewed journals was low (5%-10%) during residency.<sup>1,3</sup> A subsequent longitudinal study that tracked the publication history of graduates in residency programs affiliated with medical schools reported publication rates at the time of fellowship match of 0.29 and 0.13 articles per resident per year for fellowship-bound and non-fellowship-bound residents, respectively.<sup>5</sup> Both our data and previous data suggest that if publication is an expected outcome of research in residencies, then further efforts will be required.

The average annualized number of residents with a second degree (PhD, MS, MPH, and MBA) was higher in programs with a formal track compared with other groups, which suggests an inherent predisposition not only for residents with more research experience to select research oriented programs to train in, but also that these programs likely more actively recruit candidates with second degrees. Regardless of the selection nuances, holding a second degree seemed to be a strong predictor in research engagement. Whether prior research experience and productivity of residents correlate with research productivity during residency and after completion of residency cannot be determined by our survey.

We recognize strengths and weaknesses of this study. First, the survey completion rate was high at 65%. The survey also included a very diverse set of programs. Because responses were estimates by program directors, there could be recall bias; however, we would emphasize that if this was present, it was likely similar across all participants. Finally, we intentionally only studied internal medicine programs, and thus our results may not be generalizable to other types of programs.

In summary, we have shown that frequency and type of research conducted by residents varied across programs. The presence of a formal research track seemed to lead to great research engagement. In programs with a formal track, noteworthy differences observed compared with other groups included increased research mentor funding, the presence of an identifiable research director, the presence of a research curriculum, targeted recruitment of residents with a second degree, and facilitation of the identification of mentors for residents. On the basis of these findings, we speculate that the ability for programs to provide meaningful research experiences for residents likely depended on a multitude of factors, including the overarching commitment of each institution to scholarship and research.

Given the physician-scientist workforce shortage,<sup>19</sup> we believe it is critical to train more residents, beyond the relatively small number who are in PSTP tracks. We propose that the internal medicine community should enhance research education and opportunities for residents, including development of best practices and establishment of research milestones (ie, similar to the published ACGME milestones).

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## APPENDIX 1. SURVEY QUESTIONS: EVALUATION OF THE RESEARCH EXPERIENCE OF INTERNAL MEDICINE RESIDENTS

We would like to learn more about resident research experiences that are available for residents in your program.

1. Does your program have a formal research track (ie, with a curriculum or schedule that differs from the categorical residency and/or a commitment to a research fellowship position at the conclusion of residency training)?

No (skip to Question 2)  Yes, with a separate postgraduate year (PGY)-1 match  Yes, without a separate PGY-1 match

If yes, please describe:

Type (Check All That Apply)	Percentage of Residents Who Participate (Average over the Last Year)	Starting Year	Type of Research (Check All That Apply)	Format
<input type="radio"/> ABIM-sanctioned Research Pathway such as PSP or other pathways	Please write in	<input type="radio"/> PGY 1 <input type="radio"/> PGY 2 <input type="radio"/> PGY 3	<input type="radio"/> Basic science or translational laboratory bench research <input type="radio"/> Bioethics research <input type="radio"/> Educational research <input type="radio"/> Epidemiologic research <input type="radio"/> Health services research (quality assessment, outcomes research; health policy research) <input type="radio"/> Patient-oriented clinical research <input type="radio"/> Other: _____	<input type="radio"/> Courses for residents in this track alone, conducted by residency <input type="radio"/> Courses for residents in this and other tracks, hospital-based <input type="radio"/> Courses for residents in this and other tracks, university-based <input type="radio"/> Other Please specify <input type="radio"/> Tailored course for residents in this track alone <input type="radio"/> Course for trainees of multiple disciplines <input type="radio"/> A series of courses given elsewhere at your institution <input type="radio"/> Other Please specify
<input type="radio"/> Another Research track at your institution (other than the ABIM-sanctioned Research Pathway) for a selected subset of residents	Please write in	<input type="radio"/> PGY 1 <input type="radio"/> PGY 2 <input type="radio"/> PGY 3	<input type="radio"/> Basic science or translational laboratory bench research <input type="radio"/> Bioethics research <input type="radio"/> Educational research <input type="radio"/> Epidemiological research <input type="radio"/> Health services research (quality assessment, outcomes research; health policy research) <input type="radio"/> Patient-oriented clinical research <input type="radio"/> Other: _____	<input type="radio"/> Courses for residents in this track alone, conducted by residency <input type="radio"/> Courses for residents in this and other tracks, hospital-based <input type="radio"/> Courses for residents in this and other tracks, university-based <input type="radio"/> Other Please specify <input type="radio"/> Tailored course for residents in this track alone <input type="radio"/> Course for trainees of multiple disciplines <input type="radio"/> A series of courses given elsewhere at your institution <input type="radio"/> Other Please specify

ABIM = American Board of Internal Medicine; PSP = Physician Scientist Pathway.

2. Do you have a research rotation that residents are required to take or can take electively?

No (skip to Question 3)  Yes

If yes, please describe:

What Year Does It Start?	Type of Rotation	Length	What Percentage of Residents in Your Program Participates in Any Given Academic Year?
<input type="radio"/> PGY 1 <input type="radio"/> PGY 2 <input type="radio"/> PGY 3	<input type="radio"/> Required <input type="radio"/> Elective	<input type="radio"/> 2 weeks <input type="radio"/> 4 weeks <input type="radio"/> 8 weeks <input type="radio"/> 12 weeks <input type="radio"/> 16 weeks <input type="radio"/> Other	Please write in

3. If you do not have a formal research rotation (if they answer No to 2):

a. Do you give protected time to residents for participation in research? Y N (If No, skip to question 4)

b. (If they answer Yes to 3) When is the protected time for research offered?

- Time during ambulatory rotation
- Time during elective rotations
- Other (Write in free text response) \_\_\_\_\_

4. If there is no formal research rotation or protected time for research

i. Which of the following best describes your program: Check one that applies best

1. Residents are **encouraged** to participate in research, which may or may not include a mentored research project
2. Residents are **required** to participate in research, which may or may not include a mentored research project
3. Residents are **neither encouraged nor required** to participate in research, which may or may not include a mentored research project

5. Please answer the following questions related to the research experience of all categorical residents (not in a track) regardless of the structure of research experience (whether there is a research rotation or protected time allotted for research. Please select all that apply

Formal Instruction Provided by My Program In:	Methods Employed by My Program in Teaching Research Topics	Types of Research Residents in My Program Are Employed In
<ul style="list-style-type: none"> <li><input type="radio"/> IRB approval and requirements</li> <li><input type="radio"/> Basic statistical concepts</li> <li><input type="radio"/> Grant writing</li> <li><input type="radio"/> Manuscript preparation</li> <li><input type="radio"/> Research funding</li> <li><input type="radio"/> Study design</li> <li><input type="radio"/> Critical appraisal of literature such as journal clubs</li> <li><input type="radio"/> Research ethics</li> <li><input type="radio"/> Academic career guidance</li> <li><input type="radio"/> Other (please write in)</li> <li><input type="radio"/> None</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Residency-led lectures</li> <li><input type="radio"/> University based Lectures</li> <li><input type="radio"/> Workshops</li> <li><input type="radio"/> Websites with research related information</li> <li><input type="radio"/> On-line modules</li> <li><input type="radio"/> Individual advising by or exposure to research scientists</li> <li><input type="radio"/> Other (please write in)</li> <li><input type="radio"/> None</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Randomized clinical trials</li> <li><input type="radio"/> Secondary analysis using data sets from completed trials</li> <li><input type="radio"/> Epidemiology (population based data sets)</li> <li><input type="radio"/> Surveys</li> <li><input type="radio"/> Retrospective chart review</li> <li><input type="radio"/> Writing up already collected, analyzed data</li> <li><input type="radio"/> Basic science research</li> <li><input type="radio"/> Quality improvement /hospital systems research</li> <li><input type="radio"/> Other (please write in)</li> </ul>

IRB = institutional review board.

6. If residents in your program participate in mentored research activities, what type(s) of research mentorship(s) are offered? (Select all that apply)
- a. A mentor is assigned to each trainee by the program—skip to Question 8
  - b. A mentor is assigned to selected trainees, only
  - c. Trainees identifies their own mentor, based on interest
  - d. Other (please specify\_\_)
7. How do residents choose research mentors (if you answered c or d for Question 6) ? (Select all that apply)
- Word of mouth
  - Chief residents or senior residents advice
  - Research director links residents and mentors
  - Websites describing mentors' research interests
  - Program director (PD) or associate program director (APD) advise residents
  - PD or APD assign mentors to residents
  - Core faculty advise residents
  - Other (please specify\_\_)
8. How does your program measure success of residents doing research?
- Written summary of research
  - Presentation within the program to peers and faculty
  - Presentation at Departmental Research Day
  - Abstract presentation at a regional or national meeting
  - Manuscript publication
  - Resident awards at regional or national meetings
  - Career choice in clinical or laboratory research in an academic center
  - No formal system is in place to measure program success
  - Other (please specify\_\_)
9. On the basis of your experience over the last academic year, what percentage of your categorical residents (not in a track)?
- a. Presented abstracts in regional or national meeting? Please write in
  - b. Published peer reviewed manuscripts? Please write in
10. What are the sources of support for resident research in your program?
- Departmental/Divisional funds
  - Funding provided by the research mentor
  - Institutional funding, through training grants
  - Other (specify)
  - We do not provide funding for resident research
11. Please write in an average annualized number for a typical incoming class with the following advanced degree(s):
- a. PhD
  - b. MS, MPH, MBA, or other masters
  - c. JD or other

12. Is there are faculty member who is given protected time to take charge of overall success of residents' research experience?
- Yes
  - No
- If yes, please describe the person who oversees the research experience for residents in your program

Person Who Oversees the Program	Percentage Effort Given to This Faculty
<input type="radio"/> Core teaching faculty (PD, APD, or other)	<input type="radio"/> ≤5%
<input type="radio"/> Basic science faculty	<input type="radio"/> 6%-10%
<input type="radio"/> Chief resident	<input type="radio"/> 11%-20%
<input type="radio"/> Other	<input type="radio"/> 21%-30%
	<input type="radio"/> 31%-50%
	<input type="radio"/> ≥50%

13. The Alliance for Academic Internal Medicine Research Committee is interested in identifying best practices for research during residency to disseminate in the form of a follow up publication. We are particularly interested in hearing more about programs that have developed innovative research rotations or curricula. If you are interested in providing more information about research experiences during residency, please contact Dr. Nacide Ercan-Fang (E-mail: [ercan001@umn.edu](mailto:ercan001@umn.edu); Phone: 612-467-4414)

Thank you

## APPENDIX 2. PROGRAM CHARACTERISTICS BY SURVEY RESPONSES TO RESIDENT RESEARCH QUESTIONS

Variables	Responder	Nonresponder
Percentage (no.) of programs	65 (252)	36 (139)
Census regions (%)		
MW	24	19
NE	35	33
S	25	30
UI	1	4
W	15	13
Program type (%)		
Community-based	6	13
Community-based, university-affiliated	51	53
Military	2	3
University	38	30
Total no. of filled position, mean ± SD	65 ± 3	59 ± 3
Total ACGME approved positions, mean ± SD	69 ± 23	113 ± 39
No. of participating institutions, mean ± SD	2.8 ± 0.16	2.5 ± 0.2
VA present (%)	39	61
PD tenure (y), mean ± SD	6.4 ± 0.4	6.4 ± 0.6
Total no. hospital beds for all hospitals, mean ± SD	503 ± 141	1062 ± 504

ACGME = Accreditation Council for Graduate Medical Education; PD = program director; SD = standard deviation; VA = Veterans Administration Hospital.