

Determinants of hematology-oncology trainees' postfellowship career pathways with a focus on nonmalignant hematology

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Key Points

- Hematology-oncology fellowship graduates spend a relatively small proportion of their time practicing nonmalignant hematology.
- Factors that may increase interest in nonmalignant hematology include better access to mentors and improved opportunities for career growth.

Nonmalignant hematologic conditions are extremely prevalent and contribute significantly to the global burden of disease. The US health care system may soon face a shortage of specialists in nonmalignant hematology. We sought to identify factors that lead hematology-oncology fellows to pursue (or not to pursue) careers in nonmalignant hematology. Cross-sectional, web-based survey distributed to 149 graduates of a hematology-oncology fellowship program at a large academic medical center between 1998 and 2016. Eighty-six out of 149 graduates responded (57.7%); most (59 [68.6%]) practice at an academic medical center. Respondents spend a mean of 61% of their time in clinical practice, 23.7% conducting research, 5.2% in education, and 5.2% in administration. Those in clinical practice spend a mean of 52.1% of their time in solid tumor oncology, 37.5% in hematologic malignancies, and 10% in nonmalignant hematology; only 1 spent >50% of time practicing nonmalignant hematology. Factors most significantly affecting choice of patient population included clinical experience during fellowship and intellectual stimulation of the patient population/disease type. Factors that could have most significantly influenced a decision to spend more time in nonmalignant hematology included increased exposure/access to role models and mentors and opportunities for better career growth/advancement. Fellowship graduates spend >50% of their time in clinical practice, but almost none spend a significant amount of time practicing nonmalignant hematology. Given the growing number of patients with nonmalignant hematologic conditions and a possible future provider shortage, medical trainees should be encouraged to pursue careers in nonmalignant hematology.

Introduction

Nonmalignant hematologic conditions such as thrombotic disorders and anemia are extremely prevalent and contribute significantly to the global burden of disease.^{1,2} In most cases in the United States, academic fellowship training programs in hematology are combined with training in medical oncology. While the American Board of Internal Medicine (ABIM) specifies that trainees seeking dual certification must complete a minimum of 18 months of full-time clinical training, including 6 months in “non-neoplastic hematological disorders,” the Accreditation Council for Graduate Medical Education (ACGME) provides no specific requirement for a certain amount or percentage of fellowship time to be dedicated to training in nonmalignant hematology.^{3,4} Because training programs are accredited based on specific ACGME requirements and the ABIM requirements are not a formalized component of programs' accreditation process, the extent to which programs follow the more stringent ABIM curriculum for minimum time in nonmalignant hematology (and the quality of such training) is uncertain.

As a result, the US health care system may soon face a shortage of specialists with the knowledge and expertise to manage patients with complex nonmalignant hematologic conditions. It is therefore important to identify factors that lead hematology-oncology fellows to pursue (or not to pursue) careers in nonmalignant hematology.

Many factors influence the postfellowship career choices of medical subspecialty graduates. Prior research has demonstrated that, as reported by training program directors, >60% of hematology-oncology fellowship graduates entered private practice, while 20% pursued an academic career with a clinical research focus, 8% an academic career with a laboratory focus, and 8% an academic career as a clinician educator.⁵ Factors such as presentation and publication of research, mentorship, and lifestyle have been correlated with postfellowship career choice.⁶

Despite prior research in general outcomes of hematology-oncology fellowship graduates, little is known about factors influencing hematology-oncology trainees' choices regarding careers in nonmalignant hematology. The program directors' survey found that <6% of graduates of adult training programs pursued careers in nonmalignant hematology, but there was little discussion of factors involved in this career choice.⁵ Others have noted a decline in the number of physicians specializing in nonmalignant hematology careers such as care of patients with hemophilia and sickle cell disease,^{7,8} and more recently, a group of hematologists published an overview calling for the need to expand the nonmalignant hematology workforce.⁹

In this project, we surveyed recent graduates of a large academic hematology-oncology fellowship training program to determine postfellowship career pathways, determinants of those choices, and to specifically identify factors that may have influenced fellows' choices to pursue (or not to pursue) careers in nonmalignant hematology. Our belief is that identification of such factors has the potential to lead to future educational and health policy interventions that could expand the number of nonmalignant hematologists available in the health care workforce.

Methods

Study design

A series of questions regarding fellowship graduates' current career pathways was developed. This included questions about practice setting, job satisfaction, time devoted to clinical practice and nonclinical pursuits, percentage of clinical time divided by patient disease condition, factors influencing current clinical practice patterns, and factors that could have led to increased percentage of time spent in nonmalignant hematology (the last 2 with answer choices of "significantly," "slightly," and "not at all"). The final survey tool is available as supplemental Data. This study received exempt status by the Mayo Clinic Rochester's Institutional Review Board.

Study distribution

The survey was translated into an electronically accessible format using Qualtrics software (Qualtrics, Provo, UT). The survey was distributed to all graduates of the Mayo Clinic Rochester Hematology-Oncology Fellowship program whose e-mail contact information was available from the Mayo Clinic alumni office. Of 164 alumni, 151 had available contact information. After e-mailing 151 alumni, 2 "bounceback" e-mails were received, indicating the

Table 1. Background characteristics of survey respondents (N = 86)

	n (%)	Mean (SD)	Median	Range
Age, y	—	45.5 (7.7)	44	33-63
Sex				
Male	62 (72.1)	—	—	—
Female	24 (27.9)	—	—	—
Years from graduation	—	11.2 (7.7)	9.5	1-28
Current practice setting				
Academic medical center	59 (68.6)	—	—	—
Community medical center	17 (19.8)	—	—	—
Private practice	7 (8.1)	—	—	—
Government	1 (1.2)	—	—	—
Other	2 (2.3)	—	—	—

SD, standard deviation.

e-mail on file was no longer valid, and leaving a total of 149 alumni who were e-mailed the questionnaire.

Statistical analysis

The survey data were exported from Qualtrics for analysis. All analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC) and figures were generated using R.¹⁰ Survey responses were summarized using frequencies and percentages for categorical items and descriptive statistics (mean, standard deviation, median, interquartile range [IQR] [25th percentile/quarter 1, 75th percentile/quarter 3], and range) for continuous items. The items regarding time spent on different work activities, degree to which factors influence patient mix or potential to spend more time in nonmalignant hematology, and job satisfaction were compared between sex and age groups (<40 years, 40-50 years, and >50 years) using Kruskal-Wallis tests. Spearman correlation was used to measure the association between time spent in nonmalignant hematology as compared with job satisfaction. $P < .05$ was considered statistically significant.

Results

Participant characteristics

Of the 149 alumni e-mailed the questionnaire, 86 (57.7%) responded. Background characteristics of respondents are shown in Table 1. The median age of the responders was 44 years (range, 33-63 years), and 62 (72.1%) were male. Fifty-nine respondents (68.6%) reported that their current practice was at an academic medical center, 24 (27.9%) reported working in a community center or private practice, and 3 (3.5%) reported that their primary place of work was in other areas (eg, industry and government). There were no significant differences in practice setting based on sex or age.

Practice characteristics

Percentage of time spent on different work activities is shown in Table 2 and Figure 1. Respondents reported spending a mean of 61% of their time in clinical practice (median 65%), mean of 23.7% of their time conducting research (median 12.5%), mean of 5.2% of their time on educational pursuits (median 2.0%), and mean of 5.2% of their time in administration (median 5%). There were no significant differences in activity breakdown based on sex. Percentage of time spent in administration increased with increasing age (mean 5.0% in

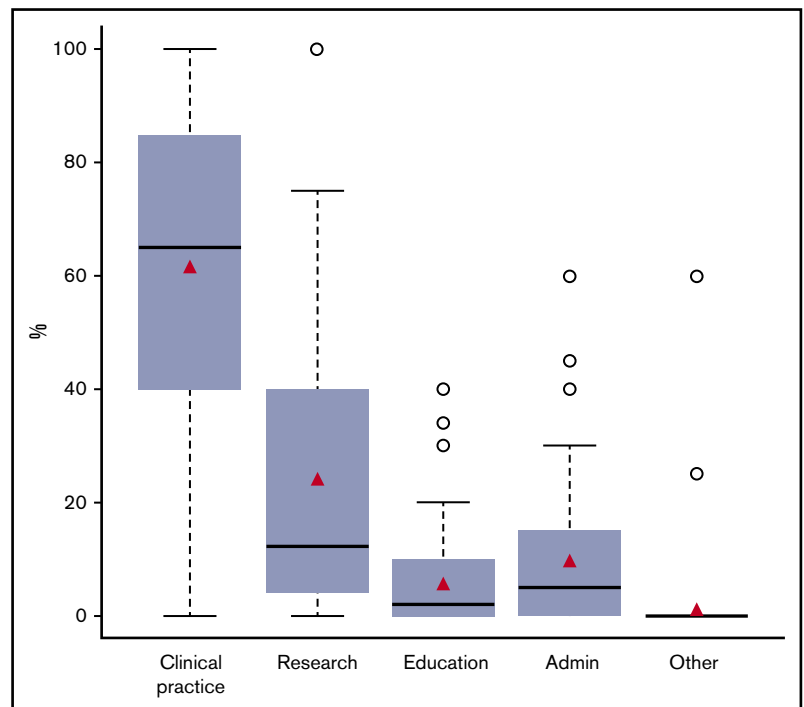
Table 2. Estimated percentage time in work activities

	Mean (SD)	Median	IQR*	Range
Percentage of overall time				
Clinical practice	61.0 (25.5)	65	40, 85	0-100
Research	23.7 (24.4)	12.5	4, 40	0-100
Education	5.2 (7.7)	2	0, 10	0-40
Administration	9.3 (12.2)	5	0, 15	0-60
Other	1.0 (7.0)	0	0, 0	0-60
Percentage of clinical time				
Solid tumors	52.1 (40.7)	60	0, 100	0-100
Hematologic malignancies	37.5 (40.1)	20	0, 90	0-100
Nonmalignant hematologic disorders	10.0 (15.0)	5	0, 15	0-95
Transfusion medicine	0.5 (1.6)	0	0, 0	0-10

*Quartile 1, quartile 3.

those age <40 years, 7.8% age 40-50 years, and 14.7% in those >50 years; $P = .009$). Percentage of time spent on other activities did not differ significantly with age. Respondents who indicated that they were involved in clinical practice ($n = 84$, all those reporting a nonzero percentage of clinical time) reported spending a mean of 52.1% of their time in solid tumor oncology (median 60%), mean of 37.5% of their time in hematologic malignancies (median 20%), and a mean of 10% of their time in nonmalignant hematology (median 5%). Forty-six respondents (54.8%) involved in clinical practice indicated that they spent at least some time practicing nonmalignant hematology (defined as a nonzero percentage of clinical time and a nonzero percentage of time in nonmalignant hematology), but only 1 respondent reported spending >50% of their time seeing patients

Figure 1. Division of activities as reported by survey respondents. Solid horizontal line represents median, and red triangle represents mean. Gray box represents IQR (quartile 1 to quartile 3), and dotted lines represent data falling within a distance of $1.5 \times$ IQR below and above the IQR. Data falling outside of this distance are represented as single points.



with nonmalignant hematologic conditions. There were no significant differences in clinical practice categorization based on sex or age.

Further analysis based on practice setting is presented in Table 3 and characterizes difference in responses based on respondents from academic vs nonacademic practice settings. Those in nonacademic settings spent a majority of their time in clinical practice and little time in research or other pursuits; those in academic settings spent significantly more time in research ($P < .0001$) and education ($P = .009$) and significantly less time in clinical practice ($P < .0001$). Of note, those in nonacademic practice settings spent a significantly larger percentage of their time seeing patients with nonmalignant hematologic disorders than those in academic settings (average, 18.1% vs 6.3%; $P < .0001$).

Factors affecting career choice

Respondents reported a number of factors that affected the type of patients they see most often in their current clinical practice. Responses are shown in Figure 2. Factors influencing patient type most strongly included clinical experience during fellowship (with 81% reporting this significantly influenced patient type) and perceived intellectual stimulation of the patient population/disease type (78.6% reported significant influence). Of the factors discussed in the survey, potential for financial compensation had the least influence on patient type, with 73.5% reporting this did not influence their decision at all. Responses based on age are shown in Figure 3. Responses differed significantly based on age for both financial compensation and personal factors. A total of 88.9% of those >50 years reported that financial compensation had no influence on the type of patients they currently see compared with 80.0% of those age 40 to 50 years and 50% of those <40 years ($P = .004$). Conversely, only 22.2% of those >50 years reported that personal factors had significant influence on the type of

Table 3. Differences in respondent characteristics based on practice setting

	Academic (n = 59)	Nonacademic (n = 27)	P
Age, y	46.4 (7.5)	43.5 (7.9)	.10
Sex (% female)	28.8	25.9	.78
Percentage of time devoted to			
Clinical practice	50.6 (20.6)	83.8 (19.9)	<.0001
Research	31.0 (23.0)	7.7 (19.4)	<.0001
Education	6.7 (8.6)	2.0 (3.4)	.009
Administration	10.5 (13.6)	6.6 (8.0)	.45
Other	1.5 (8.5)	0.0 (0.0)	.33
Percentage of patients with			
Solid tumors	47.9 (47.8)	61.3 (12.9)	.67
Hematologic malignancies	45.6 (45.8)	19.3 (8.2)	.74
Nonmalignant hematologic disorders	6.3 (15.2)	18.1 (11.1)	<.0001
Job satisfaction	85.5 (10.0)	76.9 (14.3)	.005

Values represent mean (SD) unless otherwise indicated.

patients they currently see compared with 57.7% of those <40 years ($P = .0005$). There were no significant differences in responses based on sex. Respondents practicing in an academic setting were significantly more likely to report that intellectual stimulation, their research, a supportive mentor, and potential for

career growth influenced the type of patient population they see, whereas those in nonacademic settings were significantly more likely to identify potential for financial compensation, personal factors, and job choices available when searching for a job as influential.

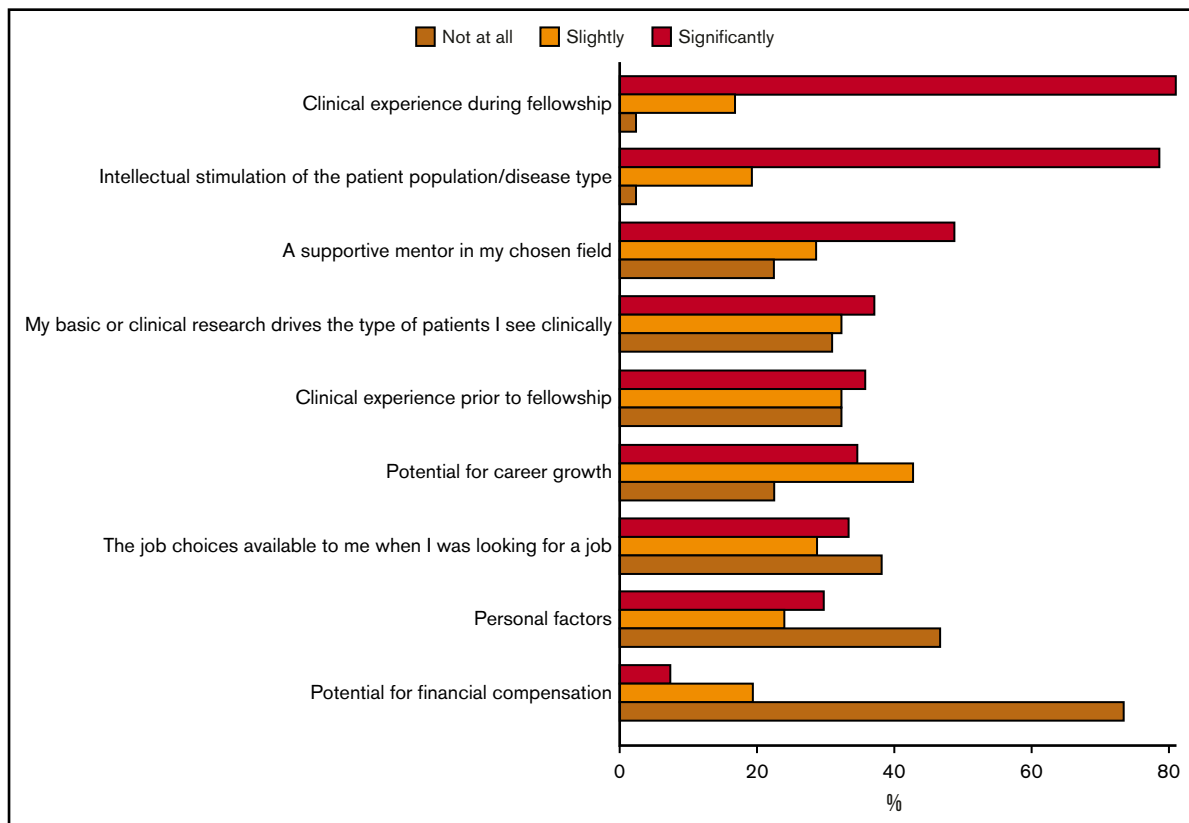


Figure 2. Percentage of respondents indicating that each factor listed in the vertical column influences the type of patients they currently see in clinical practice significantly (red), slightly (orange), or not at all (brown).

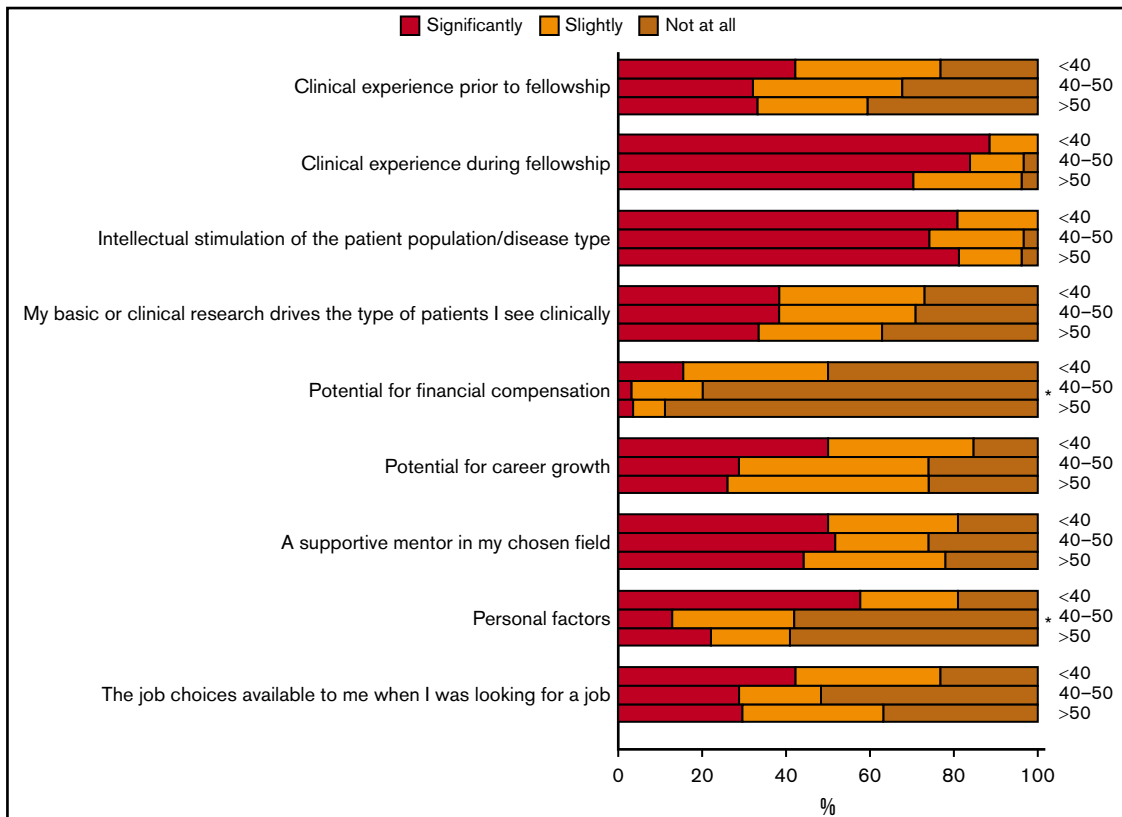


Figure 3. Age-based differences in response regarding impact of each factor on the type of patients that respondents currently see in clinical practice. Responses marked with an asterisk (*), including potential for financial compensation and personal factors, differed significantly based on age.

Factors influencing a career in nonmalignant hematology

Figure 4 shows the degree to which respondents indicated that each of these factors could have positively influenced them to pursue a career in nonmalignant hematology. The 2 factors that may have had the largest positive influence were increased exposure/access to role models and mentors in nonmalignant hematology (32.1% responding significantly and 27.4% responding slightly) and opportunity for better career growth/advancement (26.8% significantly and 25.6% slightly). Financial compensation was least likely to have made a difference (61.9% responding not at all). There were no significant differences in responses based on age or sex. There were no differences in those practicing in academic settings vs nonacademic settings with the exception of the potential for better financial compensation, which was cited as more influential in those in nonacademic settings.

Career satisfaction

Overall, respondents involved in clinical practice reported a median job satisfaction level of 85 on a scale of 0 to 100. Men reported being more satisfied than women (median satisfaction, 85.5 for men and 80.0 for women; $P = .04$). There were no differences in satisfaction level based on age. Those who practice nonmalignant hematology reported a slightly, but not significantly, lower job satisfaction rate as compared with those who do not practice nonmalignant hematology (median 81.5 vs 87.0, $P = .14$). There was no correlation between the percentage of time spent on

nonmalignant hematology and reported job satisfaction among those practicing nonmalignant hematology (Spearman correlation = 0.05, $P = .75$).

Discussion

We surveyed graduates of a large academic hematology-oncology fellowship program spanning an almost 20-year time period and found that the majority of respondents practice in an academic medical center and spend most of their time in clinical practice. Clinical time is most often spent in the practice of solid tumor oncology and only a very small amount (median of 5%) in nonmalignant hematology. Only 1 respondent reported a clinical career primarily focused on nonmalignant hematology. Clinical experience during fellowship and intellectual stimulation experienced with the particular patient population of choice were the factors that most significantly affected career pathways; although younger physicians were significantly more likely to indicate that potential for financial compensation and personal factors affected their career decisions. Respondents indicated that increased exposure/access to role models and mentors and opportunity for better career advancement were the factors that may have made the largest positive impact on choosing a career more focused on nonmalignant hematology.

These results are largely consistent with other studies examining practice patterns and career choices of hematology-oncology fellowship program graduates. Similar to the study by Horn et al, a majority of the graduates surveyed practice at an academic medical

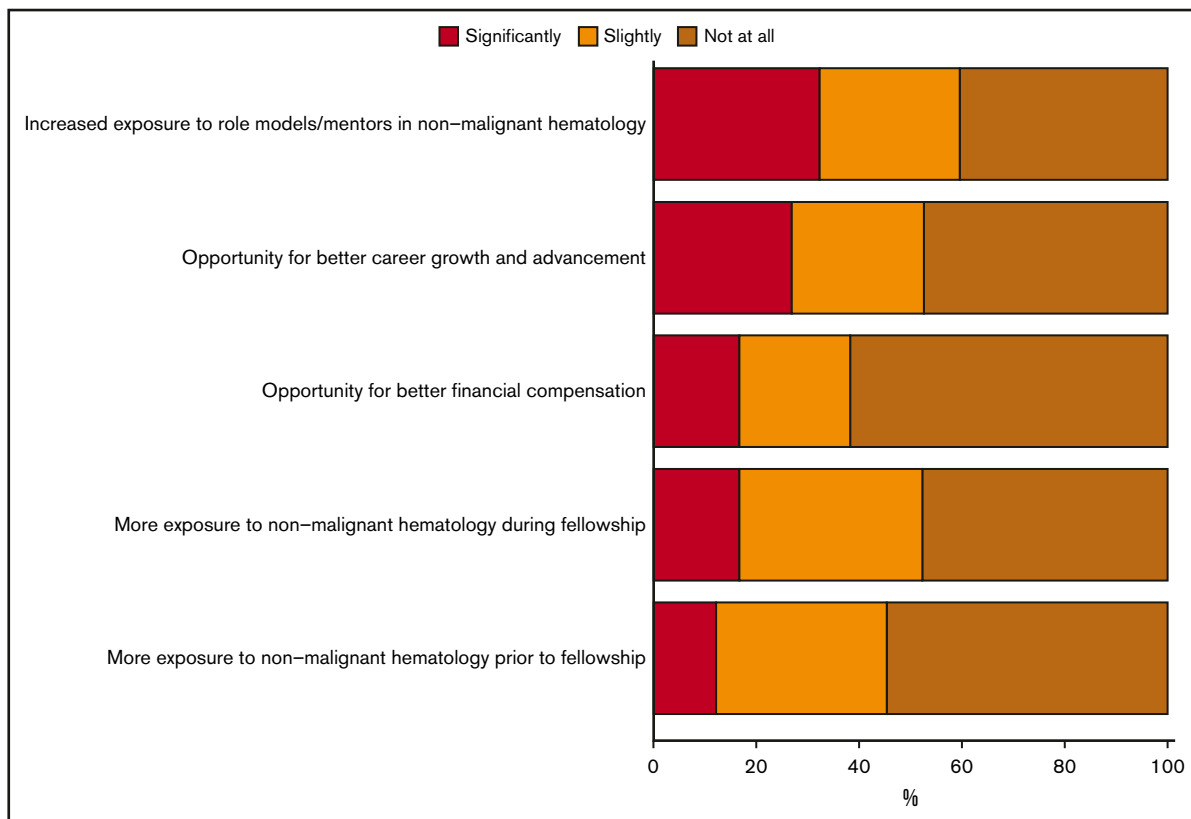


Figure 4. Percentage of respondents indicating that each factor listed in the vertical column could have made a positive influence on time spent in nonmalignant hematology significantly (red), slightly (orange), or not at all (brown).

center (68.6% in our study vs 60% in the Horn et al study).⁶ This is a somewhat higher percentage than the 36% reported in the American Society of Hematology (ASH) program directors' survey, though the time spent in nonmalignant hematology was similar (median 5% in our study; 4.6% to 5.8% of graduates in the ASH survey).⁵ In a comparative population of graduates of blood banking/transfusion medicine subspecialty training programs, 6% were involved in the practice of clinical hematology.¹¹ We also note the interesting finding that nonmalignant hematology is practiced more often in the nonacademic setting than the academic setting, as this has not to our knowledge previously been discussed in the literature. Based on this finding, it seems likely that commonly encountered conditions such as anemia, thrombocytopenia, and disorders of thrombosis/hemostasis are first referred to hematologists practicing in the community rather than at academic medical centers and therefore the importance of a solid educational foundation in nonmalignant hematology for all fellowship graduates cannot be understated.

Our findings are also consistent with prior literature regarding factors influencing career choice and highlight the significance of clinical experiences, intellectual stimulation, and the importance of mentoring relationships. Medical students reported being more likely to choose a career in internal medicine based on favorable clinical experiences in internal medicine rotation and favorable feelings about caring for the internal medicine patient population.¹² Internal medicine residents reported making subspecialty choices based on intellectual stimulation and diagnostic challenge of their

intended patient population.¹³ Systematic reviews of the literature regarding both trainees and staff physicians indicate that intellectual stimulation and influence of role models and mentors had important influence on career pathways and choices.^{14,15}

Differences in results based on participant age and sex were also noted, and these findings have both similarities and differences to previous reports in the literature. Younger graduates reported a higher impact of personal factors on choosing to see particular types of patients. This is similar to studies of medical students observing trends over time favoring a higher percentage of graduates entering fields with "controllable lifestyles"^{16,17} and similar to findings in a large group of graduates in the United Kingdom, where younger graduates indicated that "hours/working conditions" and "domestic circumstances" had a larger influence on career choice than older graduates.¹⁸ However, in this study, younger respondents were less likely to report a large influence of "eventual financial prospects" on career choice, whereas in our study, younger graduates reported a more significant influence of potential for financial compensation than for older graduates. Overall, women were less satisfied with their careers than men, a finding also observed among National Institutes of Health K08 and K23 award recipients and practicing cardiologists.^{19,20}

The major strength of this study is the focus on nonmalignant hematology, which to the best of our knowledge has not been examined to this level of detail in prior literature. While the prior fellowship directors' survey queried respondents about percentage of time their graduates spent in nonmalignant hematology,

our results strengthen these prior findings given that we both asked respondents directly about their division of time and also asked respondents what could have positively impacted them to spend more time in nonmalignant hematology. This provides a backbone for further interventions to increase the hematology workforce, which is certainly desirable.

Although this study allowed for a focused discussion of career choice with regards to nonmalignant hematology, there are several possible weaknesses and areas for improvement. First, recall bias is certainly possible, especially in response to more subjective questions regarding factors influencing career choice and influence, and especially for older graduates with more temporal distance since such decisions were made. We did perform additional analyses based on year of graduation (before 2000, 2000-2005, 2006-2010, and 2011 or later) and found no significant differences in any of the factors regarding extent of different influences on type of patient population seen with the exception of “personal factors” which was more likely to significantly affect choice in those graduating most recently (2011 or afterward), though such an analysis cannot fully assess recall bias across time. Second, this was a single-center study of graduates of an academic hematology-oncology program and therefore may not be generalizable to graduates of smaller community-based programs, training programs with different structure, or those in other geographic locations (nationally and internationally). Third, given that there was some imbalance in respondent sex (fewer female than male respondents), our results may be underpowered to detect the true magnitude of differences between men and women with respect to career satisfaction. Additionally, while we found no significant differences between men and women in all other categories, response skewing and small sample size could lead to reduced ability to detect such differences.

Additionally, specific question wording and/or factors not included within the scope of the survey questions may have impacted career choice. For example, the question of “mentoring” did not assess specific types of mentoring, which can take many forms (traditional “dyadic” as well as group mentoring, distance mentoring, and others)²¹ and influence multiple areas including, but not limited to, clinical skills, research productivity, and personal development.^{15,22} More detailed surveys or interview-based studies could further investigate the impact of specific types of mentoring relationships on career choice and outcomes. Another area for more detailed investigation is that of “personal factors.” In this survey, we did not specify a certain type of personal factor, and therefore responses were based on each individual’s interpretation of a personal factor, which could range from spousal career options to location of other family members to childcare requirements or many others. Further studies could address individual aspects of personal/lifestyle choices in more detail. Additionally, the finding that younger physicians were more likely to report that personal factors significantly influenced career choice and also to report that potential for financial compensation was of more importance deserves further exploration. This may reflect the unique characteristics of the millennial generation reported in the literature including an increased emphasis on finding passion and meaning in a career and an interest in work–life balance and avoiding burnout.^{23,24}

Given the growing need for hematologists, the small percentage of time spent in nonmalignant hematology is of concern. Over 10 years ago, the authors of the ASH program directors survey noted a similar concern and stated that “The discipline of hematology must strive to maintain and enhance its visibility and leadership in the fields of thrombosis, hemostasis, and vascular medicine by encouraging trainees to consider these areas of clinical and research foci.”⁵ Unfortunately, there appears to have been little progress over the intervening 10 years. There have been many recent scientific advances in nonmalignant hematology, including long-acting clotting factors, gene therapy, and other new treatments for hemophilia,²⁵⁻²⁷ direct oral anticoagulants and their reversal agents for management of thrombosis,^{28,29} and P-selectin blockade for pain management in sickle cell disease.³⁰ However, without a workforce of specialists in nonmalignant hematology, the ability to bring these advances to the bedside will be significantly compromised.

Based on the responses from this study regarding the importance of mentorship in career choice, we believe that increased recruitment of role models and mentors in nonmalignant hematology and promotion of supportive, productive, and nurturing mentor–mentee relationships possible during training is an essential intervention. For example, at our own institution prior to 2013 our hematology-oncology fellowship had a “mentorship program” in place for many years, but mentors were assigned randomly to incoming fellows at the beginning of the first year. Starting in fall 2013, the fellowship assistant program director and another key clinical faculty developed a formalized mentorship program in which 2 members of the fellowship committee (one hematologist and one oncologist) meet with fellows in the fall of their first year and discuss their research interests, experiences, and career goals based on a formal Career Development Template completed in advance of the meeting. The faculty members then suggest several potential mentors (based on disease-specific interest, career goals, and personality match) and offer introductions to those individuals. The fellows set up meetings with the mentors and often choose one (or several). The fellows then meet again with the 2 members of the fellowship committee in the spring of their first year and the fall of their second year to track research and professional progress.

Because this program was enacted relatively recently, it may be too early to see whether this formalized mentoring program has had a significant impact on the self-reported factors involved in career choice. However, we did compare pre- and post-2013 responses for the specific question regarding “A supportive mentor in my chosen field” as an answer to the question of “To what extent did the following influence your decision to see the type of patients you usually see?” and found that 60% responded “significantly” after 2013 vs 45% prior to 2013, possibly indicating some improvement in this area with respect to strength of mentorship, though the difference was not significant.

Additionally, increased early clinical exposure to nonmalignant hematology, with efforts to highlight the intellectual excitement of the field, should be a goal not only in fellowship but also for medical students and internal medicine residents. It is of concern that medical school hematology course directors often report obstacles to teaching including difficulty recruiting teachers, lack of well-defined course content, and inadequate institutional support in terms of funding and allocation of time.^{31,32} We would highly

encourage institutional and national efforts to define educational objectives in medical school hematology courses and provide support for medical educators in hematology. At the residency level, it may be helpful for the ACGME to specify a minimal training time (similar to the ABIM requirement for a minimum of 6 months in nonneoplastic hematology) or at a minimum to require a specific training module in nonmalignant hematology as a component of residency programs' ACGME accreditation process. This approach has gained some success in an anesthesia residency program, in which institution of a structured hematology and transfusion medicine curriculum led to improved in-training examination scores in hematology.³³ Further efforts could be made at both the medical student and resident level to emphasize the intellectual stimulation inherent to nonmalignant hematology (especially as this was cited as a major factor in career choice). At our institution, we have recently made changes to our inpatient internal medicine residency training program, decreasing (though not omitting) resident rotations on inpatient hematologic malignancy services and requiring that all residents participate in a newly developed hematology rotation comprised of 2 weeks on inpatient hematology consults (many of which deal with nonmalignant conditions such as thrombosis, hemostasis, and cytopenias) and 2 weeks in the outpatient hematology clinic (coagulation medicine and general nonmalignant hematology). Resident satisfaction has improved with this change (Carrie Thompson, Mayo Clinic Rochester, oral communication, December 2016), and although it remains to be seen whether the new curriculum will lead to increased recruitment of residents into nonmalignant hematology careers, if successful, then this model has the potential to be expanded to other institutions.

Finally, leaders in hematology should take advantage of ongoing efforts targeting increased public awareness of nonmalignant hematologic conditions, including ASH's Sickle Cell Disease Initiative³⁴ and the National Blood Clot Alliance's Stop the Clot initiative³⁵ as a way to attract medical trainees with an interest in public health and public policy to careers in nonmalignant hematology. Research funding and mentored career development initiatives from institutions such as the National Institutes of Health and the National Heart, Lung, and Blood Institute, whose priorities include several nonmalignant hematologic conditions such as sickle cell disease and anemia, may provide young investigators with the support required to help launch successful careers in nonmalignant hematology.³⁶ Such interventions all have the potential both to increase the nonmalignant hematology workforce and ultimately

improve the care of patients with nonmalignant hematologic conditions.

Conclusion

Based on survey responses from >20 years' worth of graduates of a large academic hematology-oncology fellowship program, we conclude that while a majority are involved in clinical practice, only a very small minority spend a significant amount of time practicing nonmalignant hematology. Respondents indicated that increased exposure to role models and mentors and increased opportunity for career growth and development could have positively influenced them to pursue careers in nonmalignant hematology. Given the significant number of patients with nonmalignant hematologic conditions and the growing number and complexity of options for treatment of these conditions, a shortage of nonmalignant hematologists could have a profound negative impact on the US health system. We propose several ways to increase recruitment to nonmalignant hematology including increased early access to mentoring relationships, earlier clinical exposure to nonmalignant hematology during medical training, and involvement of trainees in public health and policy initiatives focused on care of patients with nonmalignant hematologic conditions.

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Authorship

Contribution: A.L.M. and S.D.G. designed the study; A.L.M. and S.J. collected and analyzed the data; A.L.M. wrote the manuscript; S.J., J.M., and S.D.G. critically reviewed and edited the manuscript; and all authors approved the final version as published here.

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