

Nora Y Osman, [Cheryl Schonhardt-Bailey](#),
Jessica L Walling, Joel T Katz & Erik K Alexander
Textual analysis of internal medicine
residency personal statements: themes and
gender differences

Article (Accepted version)
(Refereed)

Original citation:

Osman, Nora Y., Schonhardt-Bailey, Cheryl, Walling, Jessica L., Katz, Joel T. and Alexander, Erik K. (2015) *Textual analysis of internal medicine residency personal statements: themes and gender differences*. [Medical Education](#), 49 (1). pp. 93-102. ISSN 0308-0110

DOI: [10.1111/medu.12487](https://doi.org/10.1111/medu.12487)

© 2014 [John Wiley & Sons Ltd](#)

This version available at: <http://eprints.lse.ac.uk/61767/>

Available in LSE Research Online: April 2015

LSE has developed LSE Research Online so that users may access research output of the School. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LSE Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain. You may freely distribute the URL (<http://eprints.lse.ac.uk>) of the LSE Research Online website.

This document is the author's final accepted version of the journal article. There may be differences between this version and the published version. You are advised to consult the publisher's version if you wish to cite from it.

Textual Analysis of Internal Medicine Residency Personal Statements: Themes and Gender Differences

Address all reprint requests to:

Keywords: Medical Student, Personal Statement, Textual Analysis

Submitted: 2014-02-06

Word count: 3476

Abstract word count: 324

Tables: 2

Figures: 1

Disclosure Statement: All authors report no disclosures relevant to this work.

[Type text]

Abstract

Background: Applicants to US residency training programs are required to submit a personal statement that is flexible but often includes describing their career goals and aspiration. Despite its importance, no systematic research has explored common themes and gender differences inherent to these statements.

Objective: To analyze US applicants' Electronic Residency Application Service (ERAS) personal statements using two automated textual analysis programs, and assess for common themes and gender differences.

Design: Retrospective cohort study.

Setting: National cohort of 2,138 personal statements (containing 1,485,255 words) from applicants to US internal medicine residency programs from 377 national and international medical schools.

Participants: Applicants to ERAS.

Measurements: Mathematical analysis of text segments using a recursive algorithm; internal validation using two different specifications of the text segments.

Results: Five statistically significant thematic classes were identified through independent review by the researchers. These were best defined as: 'the appeal of residency program,' 'memorable patients,' 'healthcare as public policy,' 'science and academia,' and 'family inspiration.' Some themes were common to all applications, however important gender-specific differences were identified. Notably, men were more likely to describe personal attributes and self-promote, while women more frequently expressed the communicative and team-based aspects of doctoring. The results were externally validated with a second software program.

Limitation: Though part of the national pool, data represent applicants to a single specialty at a single institution.

Conclusions: Applying textual analysis to a national cohort, we identified common narrative themes in the personal statements of future US physicians, noting differences between men and women. Together, these data provide novel insight into the dominant discourse of doctoring in

[Type text]

this generation of students applying for further training in U.S. internal medicine residency programs, and depict a diverse group of applicants with multiple motivations, desires, and goals. Furthermore, differences seen in men and women add to the growing understanding of bias in medical education. Training programs may benefit by adapting curricula to foster such diverse interests.

Primary Funding Source: No external funding.

[Type text]

Introduction:

On average over 23000 medical graduates enter the U.S. internal medicine residency match program yearly.¹ This includes applicants both from national and international medical universities. The residency application is standardized and computer-based employing a centralized Electronic Residency Application System (ERAS).² Through this system, students submit a universal application to selected residency programs; application elements include medical school transcripts (grades), standardized test scores, letters of recommendation, a Medical Student Performance Evaluation (MSPE) or “deans’ letter”, and a personal statement. Among the documents in the application dossier, the personal statement is uniquely subjective, although informal guidelines to form and content exist both in the medical literature and on the internet. A simple internet search using the search phrase “how to write an internal medicine residency personal statement” yields thousands of web-based hits. In these primers, students are advised to structure this document to describe individual goals, desires, plans, or inspirations.³⁻⁷ The informal message to students in these guidelines is quite consistent - students are encouraged to declare who they are, and what they hope and plan to become. In short, the personal statement may be viewed as a declaration of student’s perceived professional identity: *who am I, and how do I fit into the culture of medicine around me?*

Perhaps because it is the most individual element of any application, there is ongoing discussion as to how (or if) such personal statements should be used for assessment.⁸⁻¹¹ Existing analyses are limited to surveys of residency program directors^{8,12,13} with results showing that the document is held to varying degrees of importance by interviewers and program directors. The debate around the utility of personal statement has focused primarily on individual statements, with little (if any) consideration given to acquiring a clear understanding of the importance of such statements at the aggregate level. Indeed, it is possible that limitations inherent in individual interpretation may be overcome when aggregate data are analyzed collectively from large cohorts. If available and practical, the ability to analyze themes, detect patterns of thought, or identify other commonalities¹⁴ among thousands of documents may provide valuable insights into the motivating factors influencing developing physicians. Furthermore, a systematic analysis of the language used by applicants may contribute to the growing literature on professional identity as it is learned, internalized and described by students.^{15,16}

[Type text]

Recently, large scale textual analysis, made possible by advances in computational power and software development, has transformed the field of linguistic analysis. Software packages, such as Alceste and T-LAB, have been shown to effectively analyze textual data in the social science arenas of political science, psychology, sociology, and economics.¹⁷⁻²⁴ Such large-scale data analyses are able to combine thousands of documents and generate reproducible findings and conclusions. To date, however, such software has not been widely applied to the field of medicine.

To that end we conducted a comprehensive textual analysis of medical students' internal medicine residency application personal statements. Our goal was to identify common themes among all applicants and to uncover any gender differences in the personal statements. We undertook this project with a view toward exploring the personal statement as a narrative of professional identity as well as the potential influence of gender on the selection of medical specialty, and detection of any latent biases among students, patients and educators²⁵⁻²⁸ that might unwittingly influence the selection process.

Methods:

We collected all ERAS personal statements from students who submitted an application to the Brigham and Women's Hospital (Boston, MA) internal medicine residency program during the academic year 2011-2012. Each personal statement was de-identified leaving only gender and citizenship, and then given a number. All personal statements were collated in consecutive order into a single document (containing ~1.5 million words), hereafter referred to as the 'corpus.' We also divided the data into two gender-based 'corpora.' All personal statements were incorporated into the corpus verbatim, with the exception of certain words which were standardized for the sake of clarity and optimal processing. For example, we replaced words "brother" and "sister" with the word "sibling." Similarly, we replaced any reference to "the patient", or to a specific patients (such as "Mrs. X"), with the word, "Wilson," both for confidentiality as well as for consistency and clarity. A complete list of replaced words can be found in **Appendix I**. None of the changes affected the meaning of any personal statement.

Linguistic analysis of the corpora was performed using 2 independent contextual analysis software programs-- Alceste and T-LAB. These programs are widely used for linguistic analysis

[Type text]

in the social sciences.^{17-24,29} Both software applications analyze the corpus as a single document, systematically identifying ‘elementary contextual units’ (ECU) embedded in the corpus.

Contextual units are defined by the existence of words and phrases which tend to co-occur with high statistical frequency throughout the document. Once identified, the software next groups individual contextual units into classes based upon statistically significant frequencies and the relationships of common words or phrases to each other throughout the document. Importantly, the Alceste and T-LAB software provide no interpretation of linguistic meaning. Furthermore, the programs do not mandate that all words or phrases ‘fit’ into grouped themes.

To identify the proportion of words that can be categorized, each program determines a ‘classification rate’ upon initial data output. These rates may differ between software programs primarily because of their unique attributes. For example, Alceste appears better able to capture more complex linkages between concepts and complex ideas, while T-LAB relies more heavily on characteristic words and short phrases.³⁰ Nonetheless, it was our belief that both analyses were complimentary for the purposes of this investigation, acknowledging that the higher conceptual design of Alceste may result in a lower classification rate in comparison to T-LAB. Words and phrases not classified by the software program are considered unique and without a unifying class, and, therefore, are not described further in this manuscript.

Alceste sorts text segments (ECUs) into groups, or classes, each of which is as homogenous and different as possible from the other classes.³¹ This classification is descending and it follows a recursive algorithm. To clarify, the initial class is comprised of the total set of context units in the corpus. This complete set is then partitioned into further classes, according to internal homogeneity and external dissimilarity relative to other classes. The iterative and descending hierarchical classification method groups the text segments into classes until the default number of iterations fails to produce any further significant divisions. The end product is a hierarchy of classes, or dendrogram. (The initial classification is repeated, using a different length of text segment, and only those segments that match classification in both runs are retained for further analysis.)

Using the final output of the programs, four of the authors (independently and blindly) reviewed reports to interpret the findings. Specifically, each author independently reviewed all ‘contextual units’ which statistically defined each software-identified theme, and provided a

[Type text]

short interpretive summary. Thereafter, four of the five authors discussed their independent findings as a group, agreeing upon the descriptive terminology.

This study was approved by the Partners HealthCare Institutional Review Board. Informed consent from individual applicants was not deemed necessary because the data (personal statements) were de-identified and analyzed as a corpus.

Results:

We analyzed 2,138 personal statements from students seeking residency training upon graduation from one of 377 national and international medical schools, including 126 of 129 LCME-accredited medical schools in the United States and North America. All applicants were applying to internal medicine residency training programs during AY 2012-2013.³² Only US citizens were included in the analysis. Females constituted 47% of the cohort, males 53%. The full corpus contained 1,485,255 words. Using Alceste's internal algorithm without pre-coding or pre-selection as to the number of classes, we obtained an automatic classification of the US applicant corpus into five unique classes, with a 62% classification rate. As a robustness check we employed T-LAB. This software is more flexible (though potentially more subjective) in that it allows the analyst to choose the number of classes desired from the corpus. Setting the number at five, we sought to ascertain whether or not the content of each of these classes matched that of the five classes identified by default with Alceste. T-LAB classified 95% of the corpus into five classes (obtaining a higher classification rate than Alceste in part due to its focus on smaller grammatical contextual units). Both analyses produced classes in which the characteristic words and phrases were judged by four of the authors independently and blindly to convey the same five unique themes. The identified themes were characterized as follows:

- 1) **'Memorable patients'** This class was characterized by influential clinical vignettes detailing the applicant's experience with a sick patient. The vignettes highlighted details of the illness, focusing on specific clinical information, disease states, and acuity.

[Type text]

- 2) **‘Research and academia’** This class was characterized by descriptions of research experience, mentorship, publications and plans for a career with a focus on basic science or clinical research.
- 3) **‘Family Inspirations’** This class was characterized by detailed descriptions of sick family members or of family members employed in the medical profession. Interestingly, the applicant’s father was the most common family member cited.
- 4) **‘Desires from Residency Training Program’** This class depicted what the students sought from the training program. Common themes included academic rigor, professional development, mentorship and being a member of a medical team.
- 5) **‘Healthcare as Public Policy’** This class was characterized by descriptions of community and public health engagement through community service, public policy, disparities work, outreach or patient advocacy. While diverse in content, a consistent theme was the student’s desire to engage with the community and a desire to ‘make a difference’ through medicine.

Next, seeking to identify differences between male and female cohorts, we divided the full corpus into two gender-specific corpora and ran separate analyses with Alceste. The male corpus contained 703,492 words; the female corpus contained 781,763 words. We achieved a robust classification rate of 76% for women and 78% for men, respectively. Alceste identified seven classes for each gender, which were then independently and blindly interpreted by the authors. Interestingly, both similarities and notable differences were detected in the respective female and male cohorts. The gender-specific thematic classes are described in **Table 1**, key words for each class are shown in **Table 2** and examples of representative ECUs (units of text characteristic of a thematic class) are shown in **Table 3** and **Appendix II**. Gender-specific thematic classes underwent hierarchical clustering and a dendrogram was generated to depict their relationships as shown in **Figure 1**.

While both gender cohorts frequently wrote about the **Desires from Residency Training Program**, they did so in different ways. In the male cohort, this class is refined into three

[Type text]

smaller thematic branches (with brackets identifying the percentage of ECUs classified into each theme): a). *“The Appeal of the residency program,”* (11%); b). *“My personal qualities and skills,”* (9%); and c). *“Internal Medicine (IM) as problem-solving”* (19%). Most notably, the sub-class *“My personal qualities and skills”* was characterized by self-promoting text describing personal attributes - a finding unique to the male cohort. In the female cohort, however, the branch divides into just two classes: a). *“The Appeal of residency program,”* (20%); and b). *“IM as problem-solving”* (17%). The divisions and connections between the themes can be seen in the dendrogram in **Figure 1**. Notably, academic rigor is paramount in both cohorts. However, males emphasize clinical excellence, professional development and preparation for fellowship training, while females highlight the opportunity for rigorous training but also the importance of opportunities for interpersonal relationships. Being a member of a team, having a mentor, and sharing one’s own experience with others are important and distinct textual themes in female applicants. In addition, females highlight personal qualities of dedication, perseverance, and hard work in this class.

New gender specific themes were also identified. Specifically, in the branch of the dendrogram linking **Family Inspirations** with **Memorable Patients** in the female cohort, a new class, *“Communicating with patients,”* (11%) describes the impact of emotional and psychosocial interactions with patients. This was not seen in males. In this class, females differentiate expressive/communicative language from their descriptions of **Family Inspirations** and **Memorable Patients**. By contrast, men appear to use emotive language primarily in the context of **Family Inspirations** and not in other classes.

Both **Healthcare as public policy** and **Research and academia** were expressed in both males and females at comparable rates and with no discernible differences in the vocabulary used. In both cohorts, these themes were closely linked branches on the dendrogram, suggesting a thematic connection between academic research and community health/public policy. It is worth noting as well that these branches of the dendrogram come off the branch with *IM as problem solving* and **Desires from Residency Training Program** and are not associated with the emotive language of **Family Inspirations** and **Memorable Patients** (**Figure 1**).

Discussion:

[Type text]

Although both formal and informal guidelines for personal statements exist, this required ERAS component remains the least standardized of all application components. In contrast to the transcript, board scores or MSPE, the personal statement is uniquely personal and, as such, large scale assessment or interpretation have proven challenging. Consequently, its importance in the application dossier has long been debated.^{8,9} Our goal in this study was to apply textual analysis software to a large dataset of personal statements in order to clarify the way applicants express their individual attributes and motivations for residency training. We sought to explore and understand the themes expressed in the statements and to uncover any gender-specific differences. Finally, we hoped to learn about the personal statement as a narrative of the self and a student's developing sense of professional identity as a medical doctor (Monrouxe 2009).

In our first analysis, we identified five common themes that encompassed up to 95% of the combined text. Such themes may not prove completely surprising, as the broad categories addressed by medical students in their personal statements may be predictable to some extent.^{12,33} However when men and women were analyzed separately, gender-specific themes were identified, providing insight into differing views of the motivations and aspirations of the next generation of physicians. Men more commonly write about personal qualities and skills suggesting that men are more likely than women to itemize their accomplishments (“self-promote”). This phenomenon has similarly been observed in other professional settings.³⁴ In contrast, women are more likely than men to speak about the emotional aspects of doctoring, both in their relationships with patients and as members of a team. Our data also show that men and women may emphasize and value different aspects of their residency training. While men focus on high-quality training and clinical preparation for their future opportunities, women often pair this with an equally important desire to be part of a medical team with strong mentorship. Other authors have piloted the use of textual analysis in the field of medical education. A study investigating applicants to the Dartmouth Medical Center radiology residency program described textual themes from their Medical Student Performance Evaluation (MSPE) – the Dean's letter.³⁵ That study similarly revealed differences between genders, though the study data set was smaller, and the study software differs from the programs used in this study. Such pilot data also suggest that gender differences may influence medical training to an extent not previously appreciated. This concept is not novel. Indeed, there is extensive literature on the role that gender plays in the medical school learning environment, as well as career

[Type text]

decisions and the professional workplace. Some have suggested that implicit bias in our educational milieu or gender-specific societal norms may influence the acculturation and sense of self in male and female students differently.^{28,36-38} Our analysis suggests that there are subtle yet important differences in how men and women describe themselves in their residency application personal statements. This, in turn, may reflect differences in trainees' sense of self, their professional identities, and their place in their chosen professional community.

A strength of our investigation is its inclusion of a large number of applicants from 377 national and international medical schools. Furthermore, we analyzed our cohort using two independent and widely used textual analysis programs. Importantly, results were similar, suggesting robustness to our findings. Together, the depth and breadth of this analysis allows our data to be generalized to many internal medicine training programs throughout the United States.

We acknowledge, however, the limitations to our investigation. Importantly, as both Alceste and T-LAB detect only patterns in word frequency and co-occurrences, the programs are unable to apply meaning to the findings. In this study, we sought to overcome subjective bias to this process by having 4 authors blindly interpret the software output independently before consensus was reached. However, some subjectivity to this analysis remains. We also acknowledge that textual analysis is a methodology still in its infancy, and hence its theoretical and statistical underpinnings are open to debate. Nonetheless, both programs used in our analysis have been applied extensively in the social science fields without apparent bias.

Another limitation related to our methodology lies in what is computationally excluded from the analysis. There may exist rare yet important themes raised by a small number of applicants which go unidentified because they are not statistically significant. Similarly, some themes may be less coherent or more nuanced and thereby less easily captured by textual analysis. We acknowledge that Alceste obtained classification rates of only 76% and 78% for females and males, respectively. This means the residual text is left unclassified. However, we used a supplemental software package to mitigate this problem while also trying to improve the classification rate with the help of other modelling methods (e.g., topic modelling). We plan to further implement such processes in future studies. We also note that our study cohort included only US citizens applying to a single US training program. However, with over 2,000 personal statements representing 377 medical schools included in our corpus, it is likely our analysis remains sufficiently robust for analysis, and representative of the typical US medical student

[Type text]

applicant. We acknowledge that such data may be difficult to translate outside the North American training paradigm.

Future studies including and analysing demographic and ethnic information on applicants with grouped analysis would add to this ongoing discussion but may pose some challenges. Specifically these data are self-reported in ERAS and thus prone to inconsistency regarding terminology and response rate. Finally, given the nature of ERAS data, we are not yet able to study and compare “successful” applicants, i.e., those who match in their preferred programs, without violating confidentiality.

In conclusion, through the novel use of two textual analysis programs in this study of a 1.5-million-word corpus representing a large proportion of US residency applicants, we describe a new understanding of medical student desires and perspectives as they seek to continue their training. We also describe an analysis of the personal statement as a narrative of the professional self/identity. Our findings have important implications for residency training programs. Notably, gender balance is now nearly established within most internal medicine residency training programs. However, standard curricula may not have been adapted to meet all of the needs, desires and expectations of such a diverse applicant pool. While core competencies are (and should be) expected of all trainees, our data depict the importance of acknowledging that societal gender expectations, as well as the possibility of gender differences in the expression of future goals may influence medical training to an extent not before understood. These differences may have important implications on the selection of training programs by students and of students by programs.³⁹

It should be noted that while our findings may reflect actual differences in desires, motivations or goals, we must also consider the possibility that they reflect the more insidious issue of differential use of language by men and women. As has been widely discussed and studied, men and women use language differently, with normative “masculine” and “feminine” identities expressed through word choice, emphasis and content.^{40,41} Indeed, these subtle differences in language may play an intangible but important role in acculturation, identity formation, specialty selection and professionalism. Acknowledging and understanding this phenomenon on a population basis may allow the selection process and training curricula to be

[Type text]

improved, modified, and refined in ways that will improve medical education and thereby medical care.

As has been discussed in the medical education literature, medical education is not only about mastering content, but also about internalizing and projecting a professional identity as a physician.^{15,16,42,43} In fact, a thorough understanding of how students think of themselves as physicians may be both a comment on their own professional identity and also a reflection of what they believe is valued by the community they have chosen. As such, our textual analysis of the personal statement, a personal document composed *by* the student *for* the intended professional community adds to the growing understanding of the question of what it means to be a doctor to today's graduating students.

1. AAMC. Residency Applicants by Specialty and Medical School Type, 2013.
2. Alesina A, Rosenthal H. Partisan Politics, Divided Government, and the Economy. Cambridge: Cambridge University Press; 1995.
3. Writing Your Personal Statement. (Accessed at <https://www.ama-assn.org/ama/pub/about-ama/our-people/member-groups-sections/minority-affairs-section/transitioning-residency/writing-your-personal-statement.page>.)
4. Arbelaez C, Ganguli I. The personal statement for residency application: review and guidance. *Journal of the National Medical Association* 2011;103:439-42.
5. Olson DP, Oatts JT, Fields BG, Huot SJ. The residency application abyss: insights and advice. *The Yale journal of biology and medicine* 2011;84:195-202.
6. Heitz JW. Making the personal statement more personal. *Journal of clinical anesthesia* 2012;24:75.
7. McNamee T. In defense of the personal statement. *Annals of internal medicine* 2012;157:675.
8. Max BA, Gelfand B, Brooks MR, Beckerly R, Segal S. Have personal statements become impersonal? An evaluation of personal statements in anesthesiology residency applications. *Journal of clinical anesthesia* 2010;22:346-51.
9. White BA, Sadoski M, Thomas S, Shabahang M. Is the evaluation of the personal statement a reliable component of the general surgery residency application? *Journal of surgical education* 2012;69:340-3.
10. Ferguson E, James D, O'Hehir F, Sanders A, McManus IC. Pilot study of the roles of personality, references, and personal statements in relation to performance over the five years of a medical degree. *BMJ* 2003;326:429-32.
11. Crane J, Ferraro C. Selection Criteria for Emergency Medicine Residency Applicants. *Academic Emergency Medicine* 2000;7:54-60.
12. Johnstone RE. Describing oneself: what anesthesiology residency applicants write in their personal statements. *Anesthesia and analgesia* 2011;113:421-4.

[Type text]

13. Taylor CA, Weinstein L, Mayhew HE. The process of resident selection: a view from the residency director's desk. *Obstetrics and gynecology* 1995;85:299-303.
14. Segal S, Gelfand BJ, Hurwitz S, et al. Plagiarism in residency application essays. *Annals of internal medicine* 2010;153:112-20.
15. Monrouxe LV. Identity, identification and medical education: why should we care? *Medical education* 2010;44:40-9.
16. Monrouxe L, Poole G. An onion? Conceptualising and researching identity. *Medical education* 2013;47:425-9.
17. Bruno A, Galuppo L, Gilardi S. Evaluating the reflexive practices in a learning experience. *European Journal of Psychology of Education* 2011;26:527-43.
18. Kronenberger N, Wagner W. Keywords in Context: Statistical Analysis of Text Features. In: Gaskell MWBG, ed. *Qualitative Researching with Text, Image and Sound: A Practical Handbook* London: Sage Publications; 2000.
19. Noel-Jorand MC, Reinert M, Bonnon M, Therme P. Discourse analysis and psychological adaptation to high altitude hypoxia. *Stress Medicine* 1995;11:27-39.
20. Noel-Jorand MC, Reinert M, Giudicelli S, Dassa D. A new approach to discourse analysis in psychiatry, applied to a schizophrenic patient's speech. *Schizophrenia research* 1997;25:183-98.
21. Noel-Jorand MC, Reinert M, Giudicelli S, Dassa D. Schizophrenia: The Quest for a Minimum Sense of Identity to Ward Off Delusional Psychosis. *The Canadian Journal of Psychiatry* 2004;49:394-8.
22. Schonhardt-Bailey C. Measuring Ideas More Effectively: An Analysis of Bush and Kerry's National Security Speeches. *PS: Political Science and Politics* 2005;38:701-11.
23. Schonhardt-Bailey C. *Deliberating American monetary policy : a textual analysis*. Cambridge, MA: MIT Press; 2013.
24. Schonhardt-Bailey C, Yager E, Lahlou S. Yes, Ronald Reagan's Rhetoric was Unique - But Statistically, How Unique? *Presidential Studies Quarterly* 2012;September.
25. van Tongeren-Alers M, van Esch M, Verdonk P, Johansson E, Hamberg K, Lagro-Janssen T. Are new medical students' specialty preferences gendered? Related motivational factors at a Dutch medical school. *Teaching and learning in medicine* 2011;23:263-8.
26. Diderichsen S, Johansson EE, Verdonk P, Lagro-Janssen T, Hamberg K. Few gender differences in specialty preferences and motivational factors: a cross-sectional Swedish study on last-year medical students. *BMC medical education* 2013;13:39.
27. Andersson J, Salander P, Hamberg K. Using patients' narratives to reveal gender stereotypes among medical students. *Academic medicine : journal of the Association of American Medical Colleges* 2013;88:1015-21.
28. Risberg G, Johansson EE, Hamberg K. A theoretical model for analysing gender bias in medicine. *International journal for equity in health* 2009;8:28.
29. Schonhardt-Bailey C. *From the corn laws to free trade : interests, ideas, and institutions in historical perspective*. Cambridge, Mass.: MIT Press; 2006.
30. Schonhardt-Bailey C. Looking at Congressional Committee Deliberations from Different Perspectives: Is the Added Effort Worth It? In: *Deliberating American Monetary Policy, Appendix IV*. Cambridge, MA: MIT Press; 2013:<http://mitpress.mit.edu/books/deliberating-american-monetary-policy>.
31. Schonhardt-Bailey C YE, Lahlou S. . Yes, Ronald Reagan's Rhetoric was Unique - But Statistically, How Unique? *Presidential Studies Quarterly* 2012.
32. National Residency Match Program Historical Reports. 2013. (Accessed at <http://www.nrmp.org/match-data/nrmp-historical-reports/>.)
33. Smith EA, Weyhing B, Mody Y, Smith WL. A critical analysis of personal statements submitted by radiology residency applicants. *Academic radiology* 2005;12:1024-8.
34. Maliniak D, Powers R, Walter B. The Gender Citation Gap in International Relations. *International Organization* 2013:1-34.

35. Isaac C, Chertoff J, Lee B, Carnes M. Do students' and authors' genders affect evaluations? A linguistic analysis of Medical Student Performance Evaluations. *Academic medicine : journal of the Association of American Medical Colleges* 2011;86:59-66.
36. Risberg G, Hamberg K, Johansson EE. Gender awareness among physicians--the effect of specialty and gender. A study of teachers at a Swedish medical school. *BMC medical education* 2003;3:8.
37. Risberg G, Johansson EE, Hamberg K. 'Important... but of low status': male education leaders' views on gender in medicine. *Medical education* 2011;45:613-24.
38. Risberg G, Johansson EE, Westman G, Hamberg K. Attitudes toward and experiences of gender issues among physician teachers: a survey study conducted at a university teaching hospital in Sweden. *BMC medical education* 2008;8:10.
39. Hill E, Vaughan S. The only girl in the room: how paradigmatic trajectories deter female students from surgical careers. *Medical education* 2013;47:547-56.
40. Holmes J. *Gendered Talk at Work: Constructing Gender Identity Through Workplace Discourse*. Massachusetts: Blackwell Publishing; 2006.
41. Roter DL, Hall JA, Aoki Y. Physician gender effects in medical communication: A meta-analytic review. *JAMA* 2002;288:756-64.
42. Clandinin J, Cave MT, Cave A. Narrative reflective practice in medical education for residents: composing shifting identities. *Advances in medical education and practice* 2011;2:1-7.
43. Weaver R, Peters K, Koch J, Wilson I. 'Part of the team': professional identity and social exclusivity in medical students. *Medical education* 2011;45:1220-9.

Table 1: Descriptions of the most common thematic classes in female and male applicants. Based on blinded and independent review by 4 authors, a title and synopsis of each thematic class was defined.

Classified E.C.U.s	Females 76% (= 6133)	Males 78% (= 7028)
Distribution of Classes (%), with descriptions of the characteristics of each class.	<p>1 (21%) <i>Memorable patients</i> Influential clinical vignettes characterized by detailed descriptions of the patients and their illnesses, as well as the applicant interactions with ill patients</p> <p>2 (17%) <i>Field of IM as problem-solving</i> Descriptions of the appeal of internal medicine as a field, highlighting the intellectual challenge, the problem-solving, the complexity and the depth. Women also focus on interpersonal connection and communication with patients.</p> <p>3 (20%) <i>Appeal of residency program</i> Descriptions of the appealing attributes of internal medicine residency training programs. Women describe here the opportunity both for rigorous training and for interpersonal relationships – mentorship, team member, educator. Some descriptions of personal attributes: dedication, hard work.</p> <p>4 (11%) <i>Communicating with patients</i> Influential clinical vignettes characterized by the emotional/psychosocial aspects of doctoring, highlighting communication and interactions with patients as the important features.</p> <p>5 (13%) <i>Healthcare as public policy</i> Descriptions of internal medicine as part of a broader field of public, community and international medicine highlighting community health, disparities, outreach and patient advocacy.</p> <p>6 (9%) <i>Family inspirations</i> Descriptions of experiences with family members, either family illnesses or family members in the medical field.</p> <p>7 (9%) <i>Science and academia</i> Descriptions of scientific research and academic research careers.</p>	<p>1 (21%) <i>Family inspirations</i> Descriptions of experiences with family members, either family illnesses or family members in the medical field.</p> <p>2 (21%) <i>Memorable patients</i> Influential clinical vignettes characterized by descriptions of the patients and their illnesses</p> <p>3 (19%) <i>Field of IM as problem-solving</i> Descriptions of the appeal of internal medicine as a field, highlighting the intellectual challenge, the problem-solving, the complexity and the depth. Men focus on intellectual pursuits opportunity for further training.</p> <p>4 (11%) <i>Appeal of residency program</i> Descriptions of the appealing attributes of internal medicine residency training programs. Men focus on academic rigors, clinical excellence and preparation for further training.</p> <p>5 (12%) <i>Science and academia</i> Descriptions of scientific research and academic research careers.</p> <p>6 (9%) <i>“My personal qualities and skills”</i> Descriptions of the personal attributes of the applicant such as dedication, hard work, industriousness.</p> <p>7 (7%) <i>Healthcare as public policy</i> Descriptions of internal medicine as part of a broader field of public, community and international medicine highlighting community health, disparities, outreach and patient advocacy.</p>

[Type text]

TABLE 2: TOP RANKING CHARACTERISTIC WORDS FOR THEMATIC CLASSES

FEMALES	MALES
<p>Class 1: Memorable patients “Wilson”; “diagnosis”; “history/histories”; “admitted”; “symptom (s)”</p>	<p>Class 1: Family inspiration “father(‘s)”; “mother(‘s)”; “life(‘s)”; “parent(s)”; family(ies)”</p>
<p>Class 2: IM as problem-solving “internal medicine”; relationship(s)”; “patient(s)(‘s)”; “intellectual”; “problem”</p>	<p>Class 2: Memorable patients “Wilson(‘s)”; “diagnosis”; “admitted/admitting”; “history”; “symptom(s)”</p>
<p>Class 3: Appeal of residency program “residency program”; “residency”; “look(ing)”; “train(ing)”; “academic”</p>	<p>Class 3: IM as problem-solving “internal medicine”; “field”; “relation”; “complex”; “intellectual”</p>
<p>Class 4: Communicating with patients “say/said”; “down”; “moment(s)”; “sit(ting)/sat”; “go(ing)/went”</p>	<p>Class 4: Appeal of residency program “residency program”; “academic(s)”; “residency”; “train/training”; “program”</p>
<p>Class 5: Healthcare as public policy “health/y”; “healthcare”; “community(ies)”; “public health”; “underserved”</p>	<p>Class 5: Research and academia “research”; “cell(s)”; “biology/biological”; “project(s)”; “science(s)”</p>
<p>Class 6: Family inspiration “father(‘s)”; “parent(s)”; “school(s)”; “sibling(s)”; “mother(‘s)”</p>	<p>Class 6: “My personal qualities and skills” “commitment”; “asset”; “dedication”; “hard”; “ethic(s)”</p>
<p>Class 7: Research and academia “research”; “science(s)”; “university”; “biology/biological”; “project(s)”</p>	<p>Class 7: Healthcare as public policy “policy/policies”; “health”; “public health”; “healthcare”; “local”</p>

[Type text]

TABLE 3: TOP FIVE RANKING CONTEXT UNITS FOR THEMATIC CLASSES

(Names and academic institutions are anonymized [“Wilson”, “medical university X”, “doctor X”].)

FEMALES	MALES
<p style="text-align: center;">Class 1: Memorable patients</p> <p>It was February of my third year when I first met Wilson in the hospital. Wilson was a 69 year-old woman with a history of hypertension, diabetes, coronary artery disease, hypothyroidism, and bipolar disorder presenting with a two month history of severe chronic back pain. As I devised her assessment and plan in the emergency room, I initially found it difficult to sort through her various problems. Her neurologic exam was completely normal but she was severely bradycardic and had a low grade fever with a significant leukocytosis.</p> <p>During an overnight shift a woman patient came to the hospital with altered mental status, signs of dehydration, symptoms of polydipsia and polyuria and a history of urinary tract infection for the past few days. Putting this information together I determined a blood glucose level should be performed STAT and I mentioned that to my attending physician. Diabetic hyperosmolar syndrome was diagnosed and she was admitted to the medicine ward with appropriate treatment. The following day I found out that she was one of the patients in the ward I was assigned to.</p> <p>On the second day of my ICU rotation, wilson, a male in his mid 40s who suffered from morbid obesity, heart failure with a preserved ejection fraction, chronic kidney disease and obesity hypoventilation syndrome presented to the hospital in hypercarbic and hypoxemic respiratory failure in the setting of respiratory splinting after falling and injuring his side the week prior to admission. He required intubation shortly after he was admitted to the ICU, and bilateral pulmonary infiltrates on imaging studies prompted our team to treat Wilson for both community acquired pneumonia as well as</p>	<p style="text-align: center;">Class 1: Family inspiration</p> <p>Unfortunately, he collapsed outside the front door of my parents’ home and died literally in my mother’s arms. I remember getting the call from my younger sibling telling me he died. The only thing I could say before hanging up was ok, and I was on the next flight home to San Francisco from Chicago. It was surreal. I had spoken to my father just two days prior because he wanted to talk to me about feeling fatigued for the past week, and update me on some of the things his doctors were doing for him.</p> <p>That was all it took to get my tears flowing again, because I realized that there was nothing I could do, nothing anyone could do to save her. In retrospect, I came to realize that this moment had defined me as a person. I had felt so helpless. I hated that feeling, knowing that there was nothing I could do to help her. I was a teenager at the time, but I still felt like a child, unsure of myself and my future. But from that point on I was determined to change that, to take charge and shape my life into one that had a purpose.</p> <p>Some would say that my passion for medicine is an autosomal dominant trait. After all, if you take a glance at my lineage, my great grandfather, my grandmother, three of my aunts, my uncle, and both of my parents are physicians, not to mention, my younger sibling just got into medical school. My father is an anesthesiologist and is frequently on call. He often gets called in for emergencies after hours. When I was about ten years-old, I remember receiving a phone call from the hospital on one of these nights.</p> <p>Wilson was a vibrant 29 year-old woman who loved travel and top 40s music. She was also dying of ovarian cystadenocarcinoma and only had</p>

[Type text]

<p>decompensated heart failure.</p> <p>Wilson whose medical history included uncontrolled diabetes, end stage renal disease, congestive heart failure, and hypertension had taken a turn for the worse after a below the ankle foot amputation procedure complicated with tracheotomy. What began as hospital acquired pneumonia became a case of septic shock complicated with multiple organ failure, hemodialysis, mechanical ventilation, critical illness polyneuropathy, and several months of continuous monitoring in the ICU. I became personally invested in his care, and it was through Wilson's case that I first truly saw the wonders possible in the field of medicine.</p> <p>The patient is refusing to talk to the resident, and refusing blood work. She is lying in bed not willing to answer any questions; also refusing physical exam and vitals said the note for Wilson. Wilson was a patient admitted for post menopausal vaginal bleeding and renal failure secondary to bilateral hydronephrosis. She refused placement of retrograde ureteral stents, biopsy of a pelvic mass, and hemodialysis based on incomplete information about her condition. My first meeting with her, as a nephrology consult, ended as soon as it began, when she dismissed me. I came back to talk to her, this time making sure I approached her in a way where I would address all her concerns.</p>	<p>months to live. The lessons that wilson's health taught me about pathology have faded. What I do remember is what Wilson taught me about living and about dying. I stayed after hours and came in on weekends to sit and talk with her, especially when her family could not be around. I was determined to not let someone so young face death alone.</p> <p>When I woke up the next morning, he was gone. Before I was born, my father was diagnosed with nasopharyngeal cancer. By the time I was six, it had taken his life. Up to that point, I spent much of my childhood in hospitals accompanying him for chemotherapy. I remember the peculiar smell, the beeping machines, and the frantic wards. They all reminded me of his suffering, and at a young age, I developed an aversion to hospitals. To me, the image of doctors and hospitals represented losing lives, losing my father, rather than saving them.</p>
<p style="text-align: center;">Class 2: IM as problem-solving</p> <p>I learned to appreciate art and believe that medicine, likewise, is a timeless art with a noble purpose: to complete what nature has left unfinished. The merging of clinical expertise, moral acumen, and great depth and breadth of knowledge in internal medicine makes up the art of medical practice. This field has everything I am looking for, as it is intellectually stimulating in its immensity and complexity of its various fields, with diagnostic challenges that each patient with a unique constellation of medical problems presents and the opportunity</p>	<p style="text-align: center;">Class 2: Memorable patients</p> <p>My decision was made roughly a month into my internal medicine clerkship during the case of a male named Wilson. Wilson was a 30 year-old male with a medical history significant for infection with HIV, who was transferred to our hospital from an outside facility with acute liver failure and rapidly worsening acute kidney injury. Despite extensive workup by experienced specialists, no clear etiology could be found. Upon meeting Wilson for the first time, I remember being immediately struck by his severe</p>

[Type text]

to **closely interact** with **patients**, to **build** long, **trusting relationships** with them.

The **privilege** to **interact** with **patients and families** and **learn** about **their** stories during my **internal medicine clerkship** made **each** day **different and exciting** despite the long hours involved. Beyond the humanistic considerations, I **find internal medicine** to be one of the **most challenging and dynamic fields**. The **intellectual challenge of a diagnostic** work up is both **exciting and rewarding**. I **enjoy** working as **part of a medical team** and I am **attracted** by the **variety of learning** opportunities in both **inpatient and outpatient settings**.

Throughout medical school I **enjoyed many of** my clinical rotations, **and** while I **found aspects of each appealing**, **internal medicine** was what **truly** captivated **me**. I was **drawn** to **internal medicine** as the **best fit** for my **broad** interests as well as my **analytical approach** to diagnosis **and problem solving as part of a** collaborative effort. Taking my **internal medicine clerkship**, I was confident that I had **found a specialty** that **encompassed the range of medical problems** I **enjoyed** handling and the **intimate patient interactions** I desired.

Medicine itself is ever **changing and learning** new details about the **pathophysiology and management of** diseases is **exciting**. **Patients** themselves **all** have a **unique** story. **Learning to from a trusting relationship** with **each individual is a challenge** I look forward to. I **also** believe the detail **oriented**, quick **yet** organized environment of **internal medicine fits** my **personality and abilities**. This is a **challenging specialty** because of the **constant** need for alertness **and** preparedness, but **because of** my experience as an emergency medical technician I now **thrive** in this environment.

Along with direct **patient care**, the **integration of pathophysiology, microbiology, and pharmacology** found in **internal medicine** suits my preferences **and** professional objectives. **Meaningful patient** encounters I have had have helped **me appreciate and** further **understand** the **importance of** the opportunity I have been given to

jaundice, **followed several minutes** later by palpation of **the largest liver** and spleen I **had** ever felt.

His blood pressure was 150/ 80, but what caught my eye was **his** darkened skin around **the** neck. I **examined** it closer and **thought** it was velvety and thickened. **The 50 year-old male presented with complaints** of epigastric **pain**, nausea and vomiting **occurring over the past 6 months** and denied **alcohol** or **medication** use. **His signs** of acanthosis nigricans and **his obese physical status** prompted me to **check his blood** lipid and sugar levels which **sure enough revealed** evidence of **diabetes** and hyperlipidemia respectively.

On a sweltering Thursday **afternoon** at a **county indigent hospital**, I connected **with a** patient I'll call **Wilson**, a bright, wizened **male with a systolic blood pressure** of 220. **He** wore a maroon plaid shirt **with more holes than fabric**, shared **his recent diagnosis** of **lung cancer**, and **described a long history** of **hypertension, diabetes**, and bipolar disorder. **He** shook **his head** when I asked if **he had** ever taken a medicine **with a name ending** in "pril", **though he asked** for an **example** before I excused myself to **formulate a plan** and **find** my resident.

One of the more memorable patients was **Wilson**, a young patient **admitted** for **diabetic ketoacidosis**. In **the emergency room**, the most **likely** precipitant of **his diabetic ketoacidosis** was assumed to be **insulin** non compliance given **his history**. As **the first one** to see the patient in **the ICU**, I **noticed** during a careful **physical exam** a small bandage **on the patient's forearm**, which **revealed** draining pus. Upon further **questioning**, **Wilson** stated that it originated **from a peripheral intravenous site** during **the previous admission**.

During my internal medicine **rotation**, an **elderly male presented with** infrequent syncope that **had** been **worsened** by a **recently added** diuretic. **A detailed workup** revealed no **clear cause to the illness**. **The medical treatment** was both **simple** and **obvious**: discontinuation of **the diuretic**, which **subsequently resolved his symptoms**. **However,**

[Type text]

<p>serve others. Solving challenging problems in a systematic approach and being able to help others, has reaffirmed my love and commitment for this field. In medical school I have demonstrated compassion and empathy in my service to others and worked effectively as part of a team to achieve common goals.</p>	<p>I found that I was particularly intrigued by this case because his pathophysiology was not concrete: we could not see the disease happen, and we could only develop a theoretical mechanism that fit with his symptoms and findings.</p>
<p style="text-align: center;">Class 3: Appeal of residency program</p> <p>I am confident that internal medicine will afford me the opportunity to fulfil both the academic and interpersonal goals I wish to achieve as a physician. I look forward to continuing my training as a medical resident and applying my strong work ethic and dedication to my residency program and future specialty. Thank you for your consideration.</p> <p>I am interested in pursuing a fellowship in hematology/ oncology after the completion of my internal medicine residency. As I continue on my journey through medicine, I look to the challenges ahead as opportunities to learn and grow both personally and professionally. I promise to bring a positive attitude, enthusiasm, and overall commitment to excellence in my training. Thank you for your consideration.</p> <p>I am excited about my residency training in internal medicine, as it is the next step in my journey towards a career in academic medicine. Throughout residency, I plan to seek out opportunities to further expand my knowledge and skills. My residency training will allow me to continue to strive towards the ideals of a great physician.</p> <p>... and I feel extraordinarily fortunate to have mentors who not only provide me with didactics and medical pearls but also embody the qualities that I most admire: clinical acumen, compassion, integrity, and unparalleled communication skills. While I am seeking an internal medicine residency program that offers robust clinical training, diverse research opportunities, and strong fellowship placement, I am</p>	<p style="text-align: center;">Class 3: IM as problem-solving</p> <p>Of all the medical specialties I believe there is none as complete as internal medicine. Internal medicine covers a wide range of pathologies, organ systems, knowledge of the disease process, and integrates them into one. The expertise of the internist allows him/ her to manage and treat a broad spectrum of illnesses. I am drawn to the challenge of internal medicine because it requires a high level of problem solving. This is a specialty that provides variety, and allows you to maintain diverse interests and to combine them to build on your skills.</p> <p>This knowledge not only satisfied my curiosity but also allowed for the proper future management of the patient. Furthermore, I am thrilled by internal medicine's ability to balance between routine and diversity in patient care. Additionally, the ability to specialize in a particular aspect of medicine or manage a broad spectrum of illnesses and the capacity to employ my health promotion and disease prevention education are also unique characteristics that I desire. With my various life experiences, I have been able to develop skills essential to internal medicine.</p> <p>The vast range of such extreme human experiences is a unique facet of medicine that makes all other choices seem dull in comparison. Having personally experienced the triumphs and failures of medicine, it is the human stories of medicine that keep me digging deeper down this rabbit hole. Unsurprisingly, I find myself gravitating towards the same aspects in internal medicine. The problem solving skills I honed as an engineer make me a good fit for the diagnostic process</p>

[Type text]

<p>also seeking a program where enthusiastic and committed mentors hold residents to the standard of caring for patients as the ideal physician would.</p> <p>I want to be that kind of doctor, and an excellent one at that. I aspire to training in the United States, where medical education is the best available. An internal medicine residency program that offers a strong academic foundation is what I seek. I desire entrance to a program that prepares residents to be professional internists through high levels of training and teaching opportunities. Success in such a program will require hard work, diligence, and determination, just as I believe compassion and motivation, added to a high quality residency program, will mould me into an excellent internist.</p>	<p>often required in this specialty.</p> <p>It is at this time that my devotion to the medical field began to develop. The ability to assist individuals and my community gave me true satisfaction, influencing my decision to seek further education within the medical field. Internal medicine is the truly fundamental aspect of the practice of medicine. It provides for the distinctive combination of patient interaction, diagnosis and long term disease management. The patient physician partnership is core to this discipline, allowing for the unique opportunity to educate, as well as learn from, one's patients.</p> <p>At the same time, I also discovered numerous similarities between the creativity and critical thinking skills integral to both the culinary arts and academic medicine. The creative process that is involved in cooking is precisely what attracted me to the field of culinary arts. The creation of a dish draws upon knowledge of each ingredient alone, which is then extrapolated into an idea of how they would work in unison to create something unique. Understanding how various elements work together is even more complex and interesting in internal medicine.</p>
<p style="text-align: center;">Class 4: Communicating with patients</p> <p>The room hummed as we sat together, palm to palm, fingers intertwined. And finally, I gave her what she had been searching for all along: it is alright to say no more: no tubes, no chest compressions, no extraordinary measures. That is entirely alright. She squeezed my hand and smiled. When I returned to her room later that night, she had clear wishes: she did not want a feeding tube. She did not want aggressive measures. When I turned to leave, she reached for my hand and held it, thank you.</p> <p>From that point on, I no longer yelled. I no longer told her that her relatives were dead when she asked about them. Instead, they were on</p>	<p style="text-align: center;">Class 4: Appeal of residency program</p> <p>I hope my residency will prepare me for a future career in an academic setting that allows ample opportunity for teaching. Ultimately, I feel well prepared to undertake my future career in internal medicine.</p> <p>I am eager to enter an inspiring internal medicine residency program that will accommodate the necessary training required to work in either a private practice, teach in an academic hospital setting, or compete for fellowship. I also wish for a welcoming and supportive environment where the staff, faculty, and residents work together as a team. In addition to make my future career in medicine possible, I</p>

[Type text]

<p>vacation in Cyprus. I sat with her more often. I took the time to eat my meals with her and make sure she ate enough. When she was anxious to leave, I went with her for a walk. By age 17, I finally knew how to care for someone with dementia. Unfortunately, there wasn't much time left to put my new knowledge into practice.</p> <p>I excused myself to say goodbye and give her a hug as she left. I remember how humbled I felt as she hugged me and said she would miss our daily visits. As I walked away I could see my mother watching through the glass window of the courtyard; no longer peeking behind a cracked door. Her pride was clearly visible through the smile on her face.</p> <p>It was 12: 45 in the afternoon; I parked my car in front of her office. I put on my new white coat as I made my way to the front door. I took a deep breath as I rang the bell with sweaty hands. I always get nervous on my first day of clinical rotations. As I entered, about 5 little kids with their mothers waited to be called. I wondered if she would ask me why I had arrived 15 minutes earlier than what was written on schedule, but I always like to be on time for work.</p> <p>It was hard to stay composed and not let my emotions take over. While my mind was in a haze trying to comprehend what just happened, a small hand gently tapped my shoulder. It was Wilson's youngest daughter, standing there with sympathy flowers in her hand, and tears in her eyes. She wanted to say good bye and thank me for everything I had done for her mother. To know that I was able to comfort someone through one of the most difficult times in their life is what attributes to my passion.</p>	<p>seek a residency program that would allow me to continue developing into the physician that I aspire to become.</p> <p>In addition, I hope to join a program that emphasizes medical education, for both residents and students, and contains ample exposure to cutting edge research to prepare me for a career in academic medicine.</p> <p>I look ahead to the next phase of my training with great excitement and strong commitment and will always welcome the opportunity of research and learning during my residency training. In pursuing this opportunity at your program I intend to take full advantage of the residency program in internal medicine, which has attracted me due to its outstanding reputation in academics, excellent patient care, community outreach and strong healthcare system that will make me a caring, competent and empathetic physician.</p> <p>I am seeking a residency program with an excellent reputation in patient care, clinical teaching, and academic medicine that will train me as a well rounded physician and provide mentors for my interests in education and infectious diseases.</p>
<p style="text-align: center;">Class 5: Healthcare as public policy</p> <p>These experiences added greatly to the foundation with which I approached my outreach and leadership activities over the years. Through volunteering at the free clinic and working on health</p>	<p style="text-align: center;">Class 5: Research and academia</p> <p>My interest in science began long before I matriculated into the medical scientist training program at medical university. As an undergraduate, I developed a love for basic research working in a</p>

[Type text]

awareness in the Dominican Republic, I had the privilege of **servicing** those with **limited access to** care while gaining **insight** into **factors** that perpetuate **poverty** and inequality. As a **leader** of the **American Medical Student Association** at medical school, I arranged workshops **on health** reform and **advocacy** so that my **peers** and I could learn more about how **policies** are **shaped** and how we as **providers** can get **involved in** the discourse.

I **advocated for** financing transportation, mental **health services**, and **primary care** because **these factors** enhance **healthcare access** and **improve** medication adherence **for** people living with **HIV** and **AIDS**. During **masters in public health** coursework, this same multifactorial **perspective helped** me engage **in community** based research **on** racial cancer care **disparities**, lesbian, gay, bisexual, transgender, and queer **women's health needs**, and black men's **preventive health behaviors**. I **worked** with research teams that translated **community** voices to **health promoting policies** and **interventions**.

...**Low income** Latino families **to address** the **disparities in development** and educational achievement that **exists** between children of different ethnic and **socioeconomic backgrounds**. **These experiences** continued **to strengthen** my desire **to work** with **underserved populations** and **to strive to develop strategies to** alleviate the **burden on our society's** most **vulnerable** individuals. The culmination of my commitment **to my community** as well as my passion **for** teaching resulted **in the creation** of the town farmer's market and **nutrition** seminars **to help** promote **healthy** lifestyle choices **for obesity prevention among** the

These early **experiences** with hardship **shaped** my lifelong commitment **to aiding vulnerable** individuals and **populations through** clinical **service** and research. During medical school, I sought opportunities **to lead** and **serve locally** and **globally**. As **co president** of my class, I was **involved in** decisions **regarding curriculum**, scheduling, and **student activities**. **Through** representation, I strived **to improve** the academic **experience** of my **peers**. As a **student member**

chemical **lab** analyzing pottery from the 2400 year-old shipwreck, Kyrenia. **During** my **PhD years at** medical **university**, I further **developed** my passion for **science** while **studying cardiovascular biology**. I **decided** to **focus** my efforts on **research** that not only **enhanced** the field but could **translate to novel therapies**.

During my first year **in medical school**, I **began** working **in a basic science laboratory in leukemia research**, and had the opportunity to be mentored **by** a pioneer **in** the field of **cancer genetics**. **In her lab**, I **studied** how micro ribonucleic **acids** interact with the **resultant** fusion **proteins** of chromosomal translocations and affect **cell** proliferation, a complex process **which** contributes to leukemogenesis. now, **in my transition to clinical research**, I **focus** on how patients with high risk myeloid **disorders** vary **in their response** to chemotherapy and hematopoietic **stem cell transplantation**.

During college and **graduate school**, I **performed basic biomedical research** examining the **molecular mechanisms** of **clinical** disease. While **completing** my dissertation for my **PhD**, I **began** to **focus** more on the **clinical implications** of my **research projects**, nurturing my desire **to translate** the often esoteric **discoveries** from the **bench** to the **bedside**. As a **result**, even before matriculating into **medical school**, I envisioned a career **in** academic medicine, where I would see patients, generate **clinical** questions that could be addressed **by basic research** and **develop novel therapeutics** to put into **clinical** practice.

After I joined the **lab**, I have become very adept **at the techniques used** to **study T cells** from patients' **tumor tissues**. One of the **projects** I worked on was to figure out the **biological** differences **between** the CD8 cytotoxic **T cells** that were infused into responders vs. non responders to **this therapy**. Using a **novel** bioinformatics approach to **analyze** our **gene** microarray **data**, I was able to **discover** the **key biologic mechanism** that explained the association of a CD 8 **T cell marker** and positive **clinical response**.

....**direct** contribution to or co **authorship** of three **publications in** peer

[Type text]

<p>of the hospital ethics committee, I consulted on hospital policy regarding advance directives and on medical ethics cases that directly influenced patient care.</p> <p>Surprisingly, there was no longitudinal medical Spanish curriculum at medical school so I co directed a student led effort to create a course that would run alongside the preclinical curriculum. Beyond improving my language skills, I also sought out opportunities to learn about programs dedicated to providing care to the Spanish speaking population. During my third year, I chose to do my weekly primary care clinic in a community health center in one of Boston's low income, Spanish speaking neighbourhoods.</p>	<p>reviewed clinical journals, on topics in cardiovascular pathophysiology, neuropharmacology, and islet cell transplantation, first author presentation of two clinical research studies at annual national clinical conferences, one was a study in cardiology; the second applied neurophysiology and electromyography to intraoperative monitoring, master of arts degree in applied physiology from columbia university, new york, new york focusing on cardiovascular physiology and including graduate courses in statistical data analysis 92nd percentile national board of medical examiners, NBME, part 2 score footnote, 2, grade point average of 3.</p>
<p style="text-align: center;">Class 6: Family inspiration</p> <p>I was born in a refugee camp and raised in a trailer park with my grandparents, several aunts, uncles, and cousins in one home. I grew up on welfare. Some of my family members were heavily involved in gangs and drugs, and I became accustomed to frequent night time police raids. Despite this, I can proudly say that I was able to prioritize my education from a young age, and I am the first of my family to obtain higher education and will be the first doctor.</p> <p>Motivation to become a doctor was rooted in my earliest childhood memories. Growing up in two different continents and spending a part of my life in Europe has made me the confident and open minded person I am today. Living in India was a joy, being an army officer's daughter, I had the advantage of traveling all over the continent throughout my childhood. From an early age, I wanted to pursue a career in medicine from watching and living with the various people I encountered on my travels.</p> <p>I was born and raised in Karachi, Pakistan, where nearly every kid dreams of becoming a doctor, and I was one of them. But with most kids the dream starts fading as they grow older. I was one of the few</p>	<p style="text-align: center;">Class 6: "My personal qualities and skills"</p> <p>Should you give me the chance and privilege to be one of your residents I will bring with me diligence; hard work; responsibility and integrity. I also promise not to fall short of your expectations. Hoping that you will open the opportunity for me to realize my dreams, I remain. Thank you for your time and consideration. Sincerely, applicant_name, MD</p> <p>I also learned the importance of ensuring that a patient had the necessary social services to provide a secure place to stay after hospital discharge. Throughout the years, medicine has become more than just a career path for me. It has given me an avenue to practice the values I have acquired during my upbringing to help me achieve my ultimate goal of providing for others. Medicine has also given me a sense of purpose that makes me eager to actualize these values and my learned skills. I am confident that I would be an asset to your internal medicine residency program, and I thank you for your consideration.</p> <p>I now know that the next step in pursuing this goal and my dream of practicing in the United States and effectively contributing to</p>

[Type text]

<p>to stick to my dreams not only because of my childhood obsession but also because of my growing fascination with human physiology, the creation and sustainability of life, and the endless mystery of the human body.</p> <p>Looking at where I am today, I am surprised. When I was growing up I was uncertain of what I wanted to pursue as a career, but watching my older sibling go through medical school influenced my decision to also pursue medicine. Up until high school he struggled with a learning disability, which was disheartening since his dream was to become a doctor. He decided, however, to go to medical school despite discouragement from his professors. Although others did not think it was possible, he successfully completed his program and today is working as an internist.</p> <p>I grew up in a suburb of Washington, DC in an area heavily populated by diplomatic families from the many embassies in the city. Being surrounded by the children of diplomats meant that I had friends from all over the world; there were more than 35 different languages spoken at my high school. Having exposure to so many cultures at a young age is absolutely what sparked my curiosity about the world. My very first trip abroad during my senior year was to Egypt to visit family friends, and I was immediately hooked.</p>	<p>translational research is to complete an internal medicine residency in this country. I am determined to become a successful physician scientist, and I strongly believe that your program has the qualities I am looking for in an internal medicine residency program, one that allows for personal and professional growth while improving my knowledge of medicine. I believe my clinical and research background, along with my extremely strong work ethic and passion for patient care, makes me the ideal candidate for the position.</p> <p>I am emotionally and professionally prepared for the responsibility of an internal medicine resident. My personal qualities and experience will enable me to succeed and be a valuable asset to the profession and the community. After a long and winding path of education, I am determined to pursue a career with great challenge, commitment, and satisfaction.</p> <p>I have the ability to work well with others, connect with patients as well as staff, and bring a positive and professional work ethic. I can quickly learn skills and am able to adjust to a changing environment. I believe that these attributes and my personality would make me an excellent member of the staff.</p>
<p style="text-align: center;">Class 7: Research and academia</p> <p>Before medical school I spent two years at national cancer institute, working in the lab of doctor X, designing peptide specific antibodies to cancer related proteins, with the potential application of their use as early detection biomarkers or as drug targets. And in the summer of 2010, after my first year of medical school, I returned to national cancer institute to investigate the role of micro ribonucleic acids in the response to interferon treatment/ in hepatocellular carcinoma under doctor X.</p>	<p style="text-align: center;">Class 7: Healthcare as public policy</p> <p>Based in a local community center, the clinic was founded by fellow medical students from X and staffed by undergraduate, graduate, and medical students throughout the city. In my role as co chair of the branch of the charm city clinic known as the health resource center, I helped to determine the most pressing medical needs and healthcare access difficulties for residents in local neighborhoods. I networked with healthcare providers and clinics to volunteer their services at the clinic. Further, I aided in establishing health insurance and primary care homes for clients through local, state, and federal programs.</p>

[Type text]

In **college**, I continued to explore within **clinical research** by working on **studies** in geriatric psychiatry and eventually **writing** an honors **thesis** in neuroendocrinology and women's health. As a medical student, I wanted to return to the **basic sciences** and spent the **summer** after my first **year** working on **novel** in-utero hematopoietic **stem cell** transplantation **techniques using** animal **models**. I also dabbled into the experimental **design** process by **writing** an informal **literature review** **identifying new cellular targets** that could improve engraftment rates of transplanted **cells**.

The **main focus** of my **thesis research**, however, **used** transgenic mice to generate a **model** of **cancer stem cell** initiated, highly metastatic squamous **cell** carcinoma. **Using this model I identified** a micro ribonucleic acid that **regulates cancer stem cells** and metastasis in squamous **cell** carcinoma. I have had the opportunity to present both my **thesis research** and the work on fanconi anemia **at a number of national** and international **meetings**. After completing my **PhD**, I have continued to remain involved in **clinical** and **translational research**.

Upon matriculating into the program, I grasped the opportunity to **pursue a PhD in immunology under** the **direction** of doctor X. I was uniquely challenged in my **thesis research** to create a **new model** of **human** neuronal maturation in the **laboratory using human** embryonic **stem cells**. The **lab** had no prior expertise in **this** field; however, I was **fortunate** to collaborate with doctor Y **at the university X** to create **this novel** system of exploring **human** neuronal innate immune system **function**.

During my **undergraduate years**, I worked in a microbiology **research lab** **studying** the lethal malignant brain **tumor** gene. Intrigued by the **practical applications** of **research**, I developed an **interest** in practicing medicine. In **medical school**, I further delved into my **fascination** for **research** and its **potential applications** by **studying** induced pluripotent **stem cells at medical school** and obesity induced hepatic inflammation **at X university**. As an artist learns **new techniques** to **enhance** artwork, I learned critical thinking skills,

I collaborated with professors in **Harvard's** department of **healthcare policy** to incorporate **student** written cases into the **health policy curriculum**. I also **worked** to expand the **group's national** network of **chapters** and to **organize** an **annual** conference, convening more than 100 **student leaders** from across the **country** to discuss the role of **health policy in medical student** and resident education. Fortuitously, my involvement in **improve healthcare** paved the way **for** an introduction to **Porter**, a **strategy** professor from **Harvard business school** who has studied the **healthcare delivery system** extensively.

Moreover, years of entrenched **behavior resisted** the assistance of **social workers** and of occupational therapists, and this was not limited to the **homeless**, but **included** many **population groups** for whom a life of learned **behavior** had irrevocably **impacted** on their **health**. I hope to **undertake** training in internal medicine and **primary care** to not only help individual patients, but to also better understand those **factors** that engender adverse **health outcomes**. Such training would allow me to be an advocate **for** patients and to contribute to the **creation** of **policy** that might **improve community health**.

With that in mind, I became **chair** of the X **California student chapter** of the **American** college of physicians and journeyed to Washington on three occasions to lobby congress and CMS on **issues** ranging from the patient **centered medical** home to **accountable** care **organizations**. I pursued a **master** of **business administration** and **worked as a** **summer** associate at X consulting LLP to redesign ambulatory **clinics** at a **leading** academic **center**. At X consulting, I standardized processes to reduce wait times, create open **access** scheduling, and **improve** care **coordination**.

In the following **summer**, I lived in **rural** southwestern Uganda **for 3** months where I conducted a **community** needs **assessment** in a region deeply **affected** by **HIV/ AIDS**. In an **effort** to mitigate the pernicious effects of the epidemic and potentiate the **local community's** response, **I co founded a non profit organization**. We responded to a request

[Type text]

determination, and devotion **while** working in the **research lab**.

from the **community** and **created** the first internet **center** in the district as a means to stimulate the **local economy**.

[Type text]

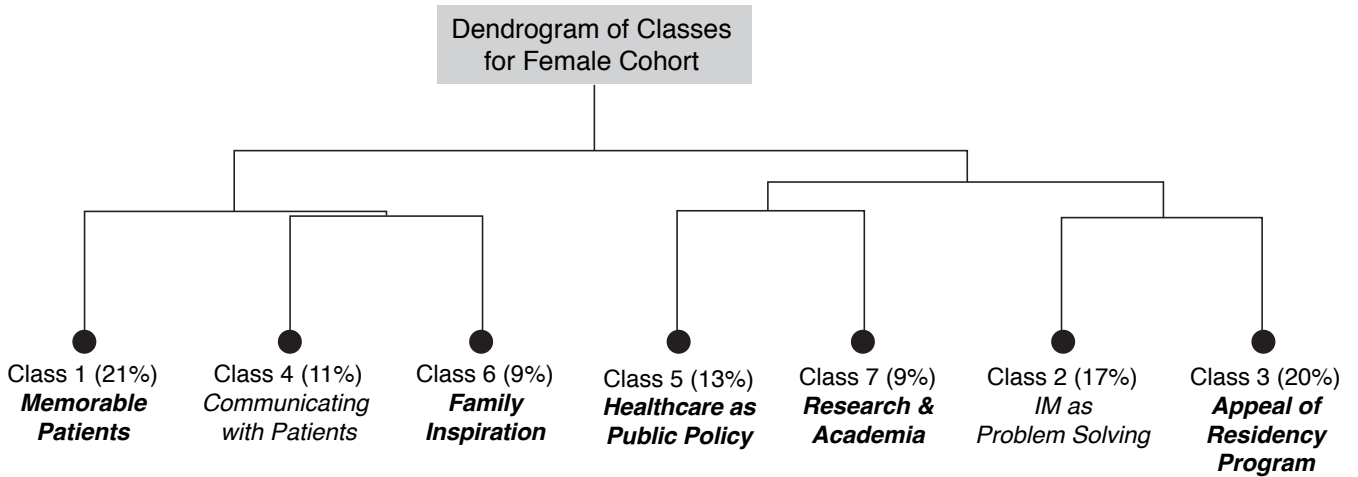
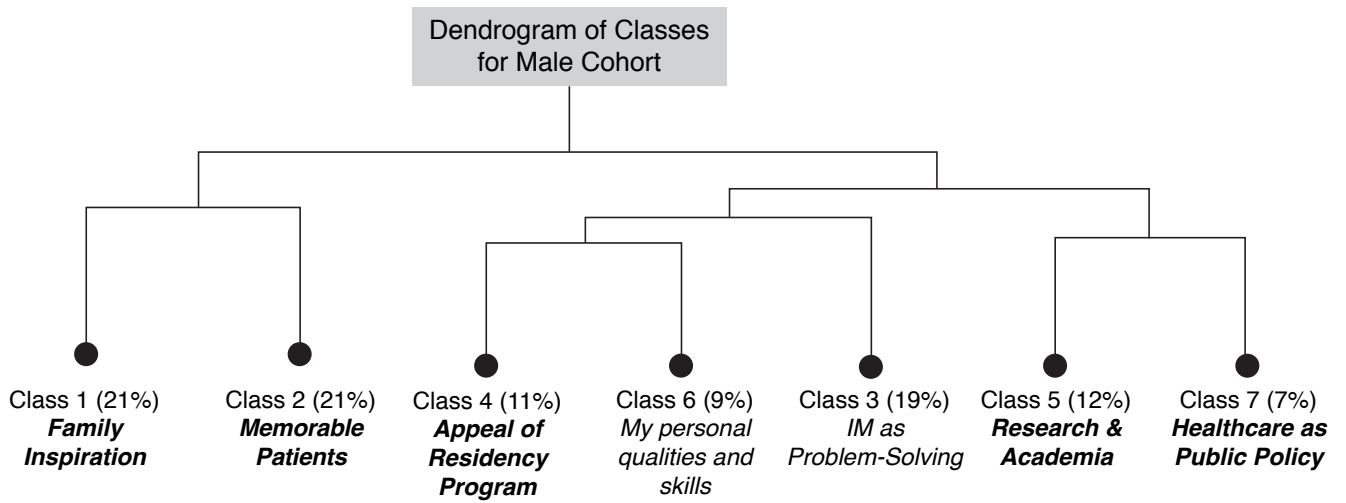


FIGURE 1: DENDROGRAMS OF THEMATIC CLASSES FOR EACH COHORT