ISSN 2472-1972

Leadership Training in Endocrinology Fellowship? A Survey of Program Directors and Recent Graduates

Mark W. True,[1] Irene Folaron,[1] Jana L. Wardian,[2] Jeffrey A. Colburn,[1] Tom J. Sauerwein,[2] Darrick J. Beckman,[1] Joseph K. Kluesner,[1] Joshua M. Tate,[1] Sky D. Graybill,[1] Richard P. Davis,[1] Andrew O. Paulus,[1] David R. Carlsen,[1] and Jack E. Lewi[1]

[1]Endocrinology Service, San Antonio Military Medical Center, Joint Base San Antonio–Ft. Sam Houston, Texas 78234; and
[2]Diabetes Center of Excellence, Wilford Hall Ambulatory Surgical Center, Joint Base San Antonio–Lackland, Texas 78236

Context: There is growing recognition that more physician leaders are needed to navigate the next era of medicine.

Objective: To determine current opinions about leadership training in endocrinology fellowship programs.

Design/Participants: Twenty-seven-question survey addressing various aspects of leadership training to current nationwide fellowship program directors (PDs) and fellowship graduates since 2010.

Intervention: In partnership with the Endocrine Society, the electronic survey was advertised primarily via direct e-mail. It was open from March through July 2016.

Main Outcome Measures: The survey addressed leadership traits, importance of leadership training, preferred timing, and content of leadership training.

Results: Forty-six of 138 PDs (33.3%) and 147 of 1769 graduates (8.3%) completed the survey. Among PDs and graduates, there was strong agreement (>95%) about important leadership characteristics, including job knowledge, character traits, team-builder focus, and professional skills. PDs (64.5%) and graduates (60.8%) favored teaching leadership skills during fellowship, with PDs favoring mentoring/coaching (75.0%), direct observation of staff clinicians (72.5%), and seminars (72.5%). Graduates favored a variety of approaches. Regarding topics to include in a leadership curriculum, PDs responded that communication skills (97.5%), team building (95.0%), professional skills (90.0%), clinic management (87.5%), strategies to impact the delivery of endocrinology care (85.0%), and personality skills (82.5%) were most important. Graduates responded similarly, with >80% agreement for each topic. Finally, most PDs (89%) expressed a desire to incorporate more leadership training into their programs.

Conclusions: Our survey suggests a need for leadership training in endocrinology fellowships. More work is needed to determine how best to meet this need.

Freeform/Key Words: leadership, training, fellowship, survey, program directors, graduates

There is growing recognition that more physician leaders are needed to navigate the next era of medicine. Multiple organizations, including the American College of Physicians, the American Association of Physician Leadership, and the Alliance for Academic Internal Medicine, are offering more training opportunities for those interested in leadership [1–3], but those who attend are typically poised for or already in traditional leadership positions.

Abbreviations: ACGME, Accreditation Council for Graduate Medical Education; APDEM, Association of Program Directors in Endocrinology, Diabetes and Metabolism; PD, program director; RRC, residency review committee.

Received 28 November 2016
Accepted 3 February 2017
Early Release 9 February 2017

Due to the increasingly complex health care environment, many are advocating for broader exposure to leadership concepts for all physicians throughout the spectrum of physician training, beginning as early as medical school [4]. However, in an examination of the medical literature, there appears to be only a handful of medical schools and graduate medical education programs that have begun leadership training programs for their students [5–8].

Within our subspecialty, there is a current and projected shortage of endocrinologists nationwide [9]. This shortage is compounded with the rise in incidence in diabetes, obesity, osteoporosis, and other common endocrine diseases [10–12]. One approach to this predicament is to consider expanding the role of an endocrinologist beyond the purely clinical realm and into the broader role of a leader. Within a clinic, this could involve leading a team to include midlevel providers in addition to traditional support staff. In a broader sense within a health care system or a region, this could mean being a driver of best practices among those who manage routine endocrine disorders.

In the US Air Force's endocrinology fellowship program in San Antonio, we recognized the need for leadership training for fellows due to the nature of assignments for our graduates. Oftentimes, they must function as solo endocrinologists at major medical centers immediately upon graduation from fellowship. In addition to needing to know how to manage a clinic and ancillary staff, they have to function as practice guideline champions of several major endocrinology diseases (diabetes, osteoporosis, common thyroid disorders) in which most patients are managed at the primary care level. We found that if we only focused on meeting Accreditation Council for Graduate Medical Education (ACGME) requirements and passing the board certification examination, we would not be adequately preparing our fellows for many of the tasks they would be facing. Therefore, we started incorporating a 4-week leadership block in our curriculum, and we began to adapt activities throughout the fellowship to develop leadership qualities. Acknowledging that the Military Health System is unique in that all of its fellowship graduates continue to work within our system, we sought to understand how nationwide program directors and recent graduates perceived leadership training. Thus, the aim of this survey was to assess current opinions regarding incorporating leadership training into endocrinology fellowship curricula.

1. Methods

Our team at San Antonio Military Medical Center developed a 27-question leadership training survey. Endocrine Society staff members and several committee members reviewed the survey for content and made suggestions for improvement. The survey consisted of questions addressing several broad categories: fellowship demographics, problems encountered in the field of endocrinology, ideal leadership traits, leadership skills needed by endocrinologists, preferred timing of leadership training, previous leadership training experiences, preferred content of leadership training, and desire for leadership training tools. Endocrine Society staff members converted the survey to an electronic format and distributed it via e-mail to current endocrinology fellowship program directors and fellowship graduates since 2010. The Endocrine Society sent the initial e-mail invitation in March 2016, and made several follow-up e-mail invitation attempts during the following month. The Association of Program Directors in Endocrinology, Diabetes and Metabolism (APDEM) advertised the project at its annual meeting in April 2016, and the APDEM president and Endocrine Society's Clinical Endocrine Education Committee chair sent a follow-up e-mail encouraging participation in the survey. Additionally, an ENDO television interview at ENDO 2016 was broadcast at the conference and on YouTube and provided background information about the survey [13]. The survey closed in July 2016. The Endocrine Society staff collected the survey responses and forwarded the data to our team for analysis.

This study was primarily a descriptive study to assess perceived attitudes toward leadership training for endocrinology fellows. The data were analyzed using SPSS version 19. Frequencies for all questions were conducted. There were $<10\%$ missing data. Primarily, program director responses were compared and contrasted with the recent endocrinology

graduate responses. Data were analyzed to determine where concordance and discordance were observed.

2. Results

Of the national fellowship program directors, 46 out of 138 completed the survey for a response rate of 33.3%. Of recent graduates, 147 out of 1769 responded for an 8.3% response rate. Among the graduates who responded, most were working as faculty members in an academic center (39.6%), nonacademic hospital systems (20.8%), or in private practice (20.8%). Most of the graduates who responded graduated either in 2014 (25.2%) or 2015 (34.8%).

Program directors and recent graduates responded similarly about the demographics of their fellowship programs. Most respondents described that most programs had one or two fellows in each year group (67.4%) and served one or two hospital systems (76.1%), with most referrals coming from general internists (59.0%). Referred patients are typically seen within 1 month (67.0%) in most programs. Fellows in most programs work regularly with midlevel providers (65.2%).

A. Traits and Roles of Effective Physician Leaders

As seen in Fig. 1, all program directors (54.5% strongly agree; 45.5% agree) agreed that knowledge of the job (knowledge about regulations, technology, budget/finance, and personnel system) was an important characteristic of effective physician leaders. Furthermore, 97.8% of program directors (80% strongly agree; 17.8% agree) agreed that personal character traits (*e.g.,* integrity, honesty, courage, charisma, motivation, creativity, innovation, flexibility, balance of confidence/humility, emotional intelligence, and commitment) were traits of an effective physician leader. Additionally, having a team builder focus (others-focused, empowerer,

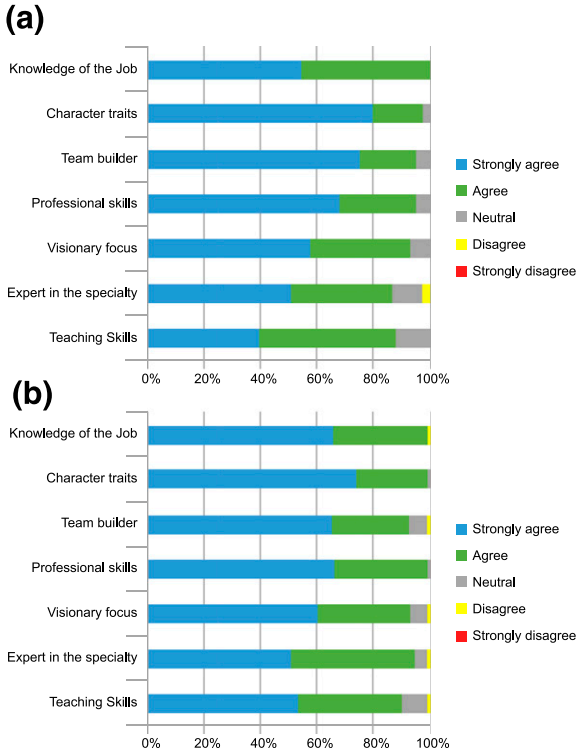

Figure 1. Survey question: In your opinion, the following characterize an effective physician leader: (a) program director responses; (b) recent graduate responses.

developer of subordinates, mentor, coach, delegator, cultural/interpersonal sensitivity) was agreed to be important by 95.6% (75.6% strongly agree; 20.0% agree), and professional skills (organization, multitasking, planning, communication, decision-making, time management) were of primary importance to 95.3% (68.2% strongly agree; 27.3% agree) of program directors. Recent graduates responded similarly concerning knowledge of the job, character traits, and professional skills. However, 94.5% of recent graduates agreed that expertise in the specialty was a trait of an effective physician leader as compared with 86.7% of program directors.

When asked about the importance of leadership skills, both program directors and graduates overwhelmingly agreed that leadership skills are as important as clinical skills. However, graduates felt more strongly about this, as 81.1% of graduates thought leadership was as important as clinical skills, compared with 59.6% of program directors. Furthermore, 38.5% of program directors thought leadership skills were less important than clinic skills, and only 3.5% thought leadership was not important.

When asked about the importance of leadership training for various types of endocrinologists, program directors were in strong agreement that endocrinologists in traditional leadership positions, such as a division chief or department chair, needed formal training (Fig. 2). Moreover, leadership training was seen as important for endocrinologists in primarily academic positions, as well as academicians who had a combination of other duties (clinical and research). Although recent graduates had similar responses to program directors, 79% felt leadership training was important for practitioners in a group (Fig. 2). Additionally, 66.3% of graduates thought that leadership training was important for all endocrinologists, regardless of their practice, compared with less than half of program directors (48.9%), with many of them responding neutral on this topic (44.4%). Note that about a third of graduates and program directors were neutral concerning leadership training for independent investigators, solo practitioners, and research endocrinologists.

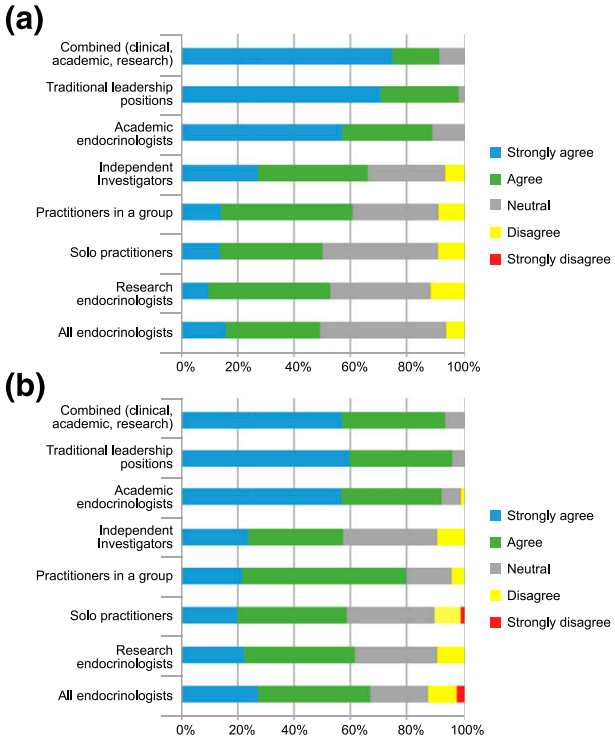

Figure 2. Survey question: Formal leadership training is important for: (a) program director responses; (b) recent graduate responses.

B. Current Processes of Leadership Training

Despite acknowledgment that leadership principles are important for endocrinologists, most fellowship programs do not have a structured leadership curriculum. Leadership training in current fellowships was primarily accomplished incidentally through direct observation of clinical staff (Fig. 3). Others learned through self-directed means or through an organized mentoring program. Graduates reflected that direct observation of their staff and self-directed means of leadership training were beneficial; 41.0% reported that their experience in fellowship helped them prepare for the challenges of their current jobs. However, nearly as many graduates (34.2%) did not feel that their fellowship training adequately prepared them for a leadership role. Recognizing this, 89% of program directors (51.3% strongly agree, 38.5% agree) confirmed that they would like to incorporate more leadership training into their curricula.

C. When and How Leadership Should be Taught

Figure 4(a) shows the responses about the preferred timing of leadership training. Of note, most (64.5%) program directors were in favor of teaching leadership skills during endocrinology fellowship. Furthermore, most recent graduates favored teaching leadership during medical school (60.8%), residency (58.1%), and in an endocrinology fellowship (60.8%). Only 16.1% of program directors and 10.8% graduates responded that it was appropriate only for those interested. Consistent with these results, most [program directors (53.7%) and recent graduates (58.3%)] also strongly agreed or agreed that ACGME Developmental Milestones should be expanded to include a larger leadership focus [Fig. 4(b)].

As shown in Fig. 5, about three-quarters of program directors agreed that leadership skills should be taught through mentoring or coaching (75.0%), direct observation of staff

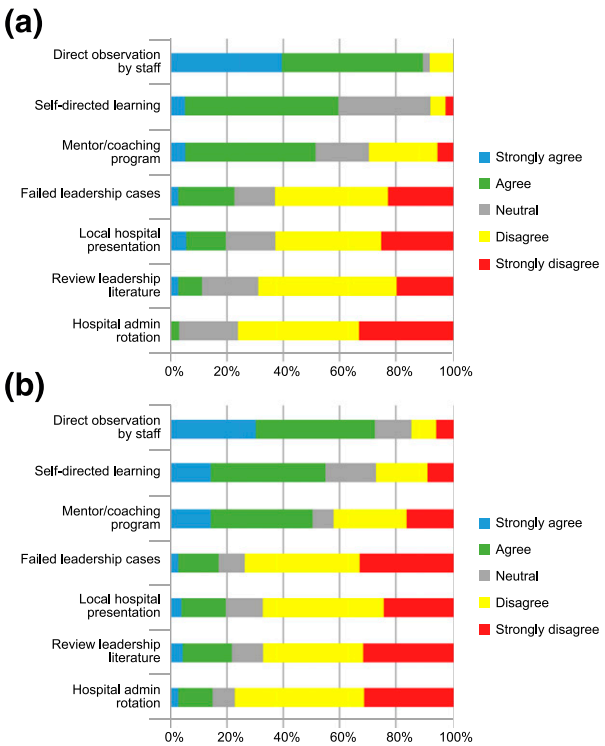

Figure 3. Survey question: My program includes the following types of leadership training: (a) program director responses; (b) recent graduate responses.

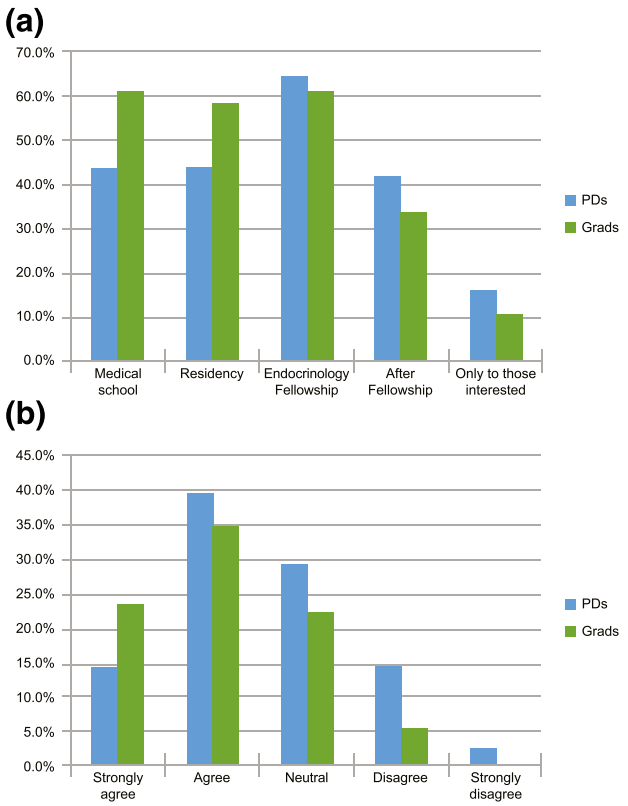

Figure 4. Survey question: (a) When should leadership skills be taught? (check all that apply). (b) ACGME development milestones should be expanded to include a larger leadership focus.

clinicians (72.5%), and leadership seminars (72.5%). Additionally, note that nearly a third of responses from program directors were neutral concerning ways to teach leadership skills. Only 33.3% of program directors thought that a formal rotation with hospital administrators was useful; however, 67.5% of graduates favored this approach. Recent graduates largely favored a variety of approaches to teaching leadership skills. In fact, no approach had <60% agreement from graduates. The most popular were similar to those favored by the program directors: mentoring or coaching (94.1%), direct observation of staff clinicians (91.4%), and leadership seminars (81.5%).

Furthermore, there was agreement about topics that should be emphasized in leadership training (Fig. 6). Communication (97.5%) and team building (95.0%) were topics with the strongest mandate. The vast majority also favored professional skills (90.0%), clinic management (87.5%), strategies to lead/impact the delivery of endocrinology care within the larger health system (85.0%), and personality skills (82.5%). For recent graduates, >80% agreement was observed for each topic of leadership training with the exception of laboratory management.

Finally, program directors indicated a strong interest in incorporating more leadership training into their programs (agree 89%, neutral 9%, disagree 2%), and 96% of them indicated that it would be helpful if the Endocrine Society developed leadership curriculum tools specific to the needs of the field.

3. Discussion

Based on survey responses from program directors and recent endocrinology fellowship graduates, leadership is an important skill to the practice of endocrinology. Intuitively, those

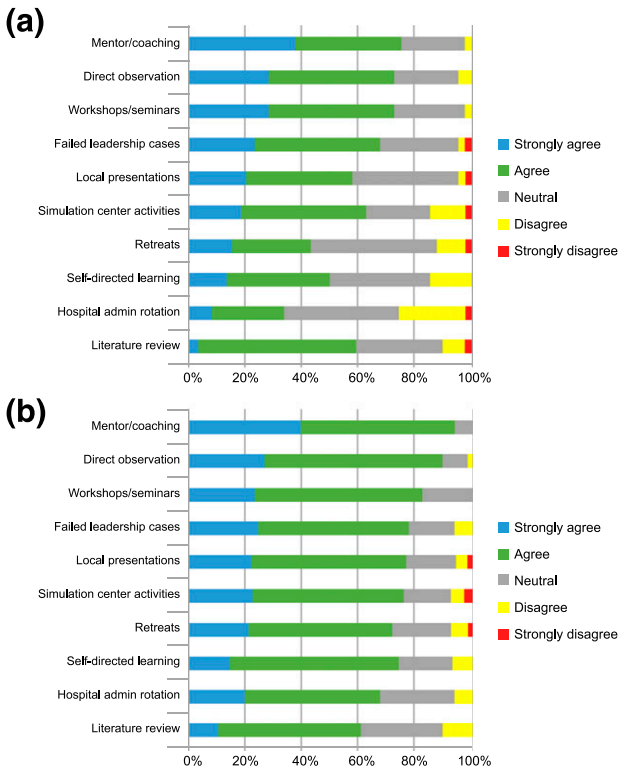

Figure 5. Survey question: How should leadership skills be taught? (a) Program director responses; (b) recent graduate responses.

in traditional leadership roles, such as department chairs, are expected to have been exposed to formal leadership training. However, respondents also thought that endocrinologists in an academic or combined position, roles that involve a larger breadth of interactions, should have leadership training. This comes as no surprise because role modeling appears to have been the traditional way that leadership has been taught, and most still favor this approach. Program directors and graduates clearly valued the means of learning leadership through interpersonal interactions with their clinical superiors or peers, whether it is through direct observation, mentoring, or informal discussions. However, many graduates who responded to this survey did not feel adequately prepared to face some of the leadership challenges beyond their fellowship training. Although one must acknowledge that fellows in training do not necessarily know which direction their careers will take, there seems to be a gap in modern curricula that would better prepare graduates to function as truly independent endocrinologists. Accordingly, both program directors and graduates agreed that including more leadership training in their curricula, perhaps with a more structured approach, would enhance clinical training.

Although many of the respondents identified administrative management skills as one of the desired learning points in a leadership course, many more desired to learn about less tangible aspects of leadership, such as professionalism and communication. In this endeavor, most still favored the means of learning through direct observation or mentoring. However, there was recognition among respondents that there should be other sources from which to learn these leadership skills. Compared with what is currently offered in fellowship curricula, respondents identified other desirable sources of leadership training, such as formal leadership workshops, discussions on lessons learned from leadership cases, and presentations from local institutional or community leaders.

Although there appears to be common acknowledgment in our survey that leadership is an important topic, it is important to note that training in leadership principles is not a requirement in the current model of physician education in the United States. The ACGME Core Competencies (medical knowledge, patient care, professionalism, interpersonal and

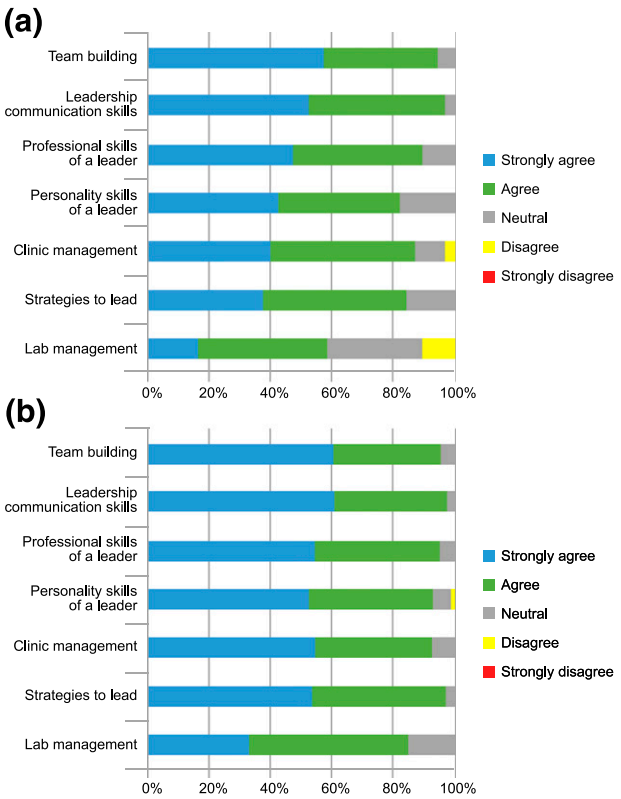

Figure 6. Survey question: Which of the following topics would you emphasize? (a) Program director responses; (b) recent graduate responses.

communication skills, system-based practice, and practice-based learning and improvement) are primarily focused on ensuring that physician graduates have strong clinical skills, appropriate for independent medical practice [14]. Some of the residency review committees (RRCs) have adopted milestones that address leadership skills. For example, the Emergency Medicine RRC has a subcompetency within the ACGME Core Competency of interpersonal and communication skills titled "Team Management: Leads patient-centered care teams, ensuring effective communication and mutual respect among members of the team" [15]. However, with few exceptions, the most RRC subcompetencies, including those in internal medicine and its subspecialties, do not have an explicit leadership expectation for a "ready for unsupervised practice" rating. Rather, leadership within a subcompetency, if mentioned, is typically only an aspirational rating, above and beyond what is required [16, 17]. One could argue that we have a lack of leadership emphasis in our training programs because we are not required to have this emphasis. Understandably, physician training programs in the United States tend to reflect the requirements that are placed upon them. Most survey respondents [program directors (53.7%) and recent graduates (58.3%)] stated that ACGME should adapt its model to include a stronger emphasis on leadership skills.

In contrast, Canada's Royal College of Physicians and Surgeons core competency model (CanMEDS) emphasizes a leader role. The CanMEDS Framework states: "As Leaders, physicians engage with others to contribute to a vision of a high-quality health care system and take responsibility for the delivery of excellent patient care through their activities as clinicians, administrators, scholars, or teachers" [18]. Since 2014, the University of Toronto has hosted the Toronto International Summit on Leadership Education for Physicians. One of its most important guiding principles is "All physicians are expected to be leaders within their clinical practice environment" [19]. Ongoing efforts are underway to formalize a leadership curriculum that will meet the goals of the CanMEDS model. The most recent meeting devoted a discussion about the incorporation of the Canadian national LEADS Framework

(lead self, engage others, achieve results, develop coalitions, and systems transformation) into residency curriculum [20, 21].

There are some examples within the United States of leadership training adaptations in medical education. Our fellowship program, which trains Air Force officers, has incorporated many of the above-mentioned methods of teaching leadership and leadership skills in our annual 4-week leadership block as well as throughout the entire training program. During the 4-week leadership block, staff and fellows review a book on leadership with weekly discussions about how leadership skills are applied and how these principles pertain to current and future clinical/academic settings. Throughout the academic year, we include fellows in leadership discussions ranging from local business issues (including clinic personnel/equipment resources and overall clinical productivity metrics) to larger Air Force Medical Service concerns (including management strategies for regional consults and future manning requirements). We also place fellows into actual leadership roles, especially in the area of impacting health care delivery. For example, our senior fellow serves as a course director and our junior fellows serve as instructors for a biannual conference educating US military medical teams worldwide on evidence-based diabetes care. Additionally, they regularly provide video teleconference presentations on various diabetes topics to military bases worldwide that would otherwise lack access to formal diabetes education. In this effort, they are able to introduce themselves to a national audience, they gain an awareness of the challenges in health care delivery throughout the Military Health System, and they learn how to extend themselves to improve endocrine care outside of their own institutions. This ability to step into a leadership role early helps to provide opportunity for team building, communication, and strategies to lead health care delivery on a larger scale with the guidance of experienced mentors.

Our nation's military medical school, the Uniformed Services University, recognizes the value of introducing leadership fundamentals early in a physician's career. Although the curriculum is designed for military medical officers, the skills, knowledge, and attitudes are applicable to conventional clinical settings in which physicians are expected to anticipate and adapt to uncertainty, make ethical decisions based on the shared values of multiple individuals, and think critically and strategically to provide services in challenging situations. The Leadership Education and Development curriculum is based on the application of what it terms the "4 C's of leadership" (character, competence, context, and communication) across the personal, interpersonal, team, and organizational interactional domains. This program is provided to students through interactive plenary sessions, small group exercises, group discussions, and applied field exercises. Sessions include personality, emotional intelligence, effective communication, difficult conversations, team building, leadership assessment, and organization [5, 22].

The Massachusetts General Hospital has also incorporated a leadership development course into its internal medicine residency program to promote health care quality and cost control. Using a framework built upon a set of nine established best practices for designing effective leadership training interventions, the leadership development course was developed via collaboration with both faculty and internal medicine residents [23]. The goals of this course are to help residents develop basic leadership skills applicable to their clinical work, promote residents' personal and professional development, and build long-term interest in leadership and management. The course is given at the beginning of the residents' second year during an outpatient elective rotation, an important milestone in which physicians in training take on greater leadership responsibilities. The course is 4 weeks in length and consists of weekly 2- to 3-hour large group sessions as well as weekly small group meetings. Discussions include business school–style case studies, videos about leadership, and role playing. Topics include introduction to clinical leadership and leadership styles, authentic leadership, leading with emotional intelligence, and leading clinical teams. Through an internal survey, 94% of residents agreed that they developed a better understanding of different leadership styles. A similar percentage agreed that they developed a better understanding of their strengths and weaknesses as leaders. Importantly, a vast majority of

residents felt that the course prepared them to face interpersonal challenges that arise with team members at all levels and with nonphysician colleagues [8].

A. Limitations

The survey data were collected from a convenience sample; there may be bias as to who chose to take the survey and who did not. It is plausible that only those interested in this topic participated, which would make responses favor the importance of leadership training. Those who did not consider leadership training to be a priority may have elected not to participate in the survey. Additionally, because program directors are in leadership positions, these individuals may have a bias that favors the training of leadership skills because they have chosen that direction in their own careers.

Although the survey response rate of 33.3% for the program directors represents a reasonable sample, the overall graduate response rate was low at 8.3% and therefore may not be representative of how most graduates think about leadership training. Most graduate responses were from 2014 and 2015 (60%), so there is less input from previous graduates. Importantly, note that the graduate responses were very similar to the program director responses, which reinforces the validity of their responses.

B. Future Directions

There are several unknowns remaining at this time that warrant further exploration and discussion. One potential concern is the amount of time required to devote to meaningful leadership training at the potential expense of traditional clinical training requirements. Although most survey respondents indicated that leadership skills are as important as clinical skills, we did not investigate the relative value of leadership to the current ACGME core competencies (*e.g.,* medical knowledge, patient care). Future studies designed to understand this information may help better determine the amount of time that should be specifically devoted to leadership training so that it enhances, rather than detracts from, clinical training. Another trend specific to our field is a shift toward female predominance [24], and there may be unique leadership training considerations in view of this trend. We did not capture the sex of our survey respondents, nor did we address the notion of sex-specific leadership issues in our survey, so this would also be an area of future study. Another need is the development of specific, observable leadership competencies that faculty members can objectively evaluate in trainees, particularly when faculty members themselves may be unfamiliar with basic leadership principles. Finally, uncertainty remains regarding the best design of a leadership curriculum such that it achieves broad applicability to different endocrine career fields, all the while spanning both tangible and intangible aspects of leadership. Further discussion with ACGME is needed to determine how leadership should fit into its current core competency and milestone scheme. Owing to multiple competing requirements, incorporation of leadership training into fellowship programs is unlikely to be universal until it becomes a formal ACGME requirement, and therefore a stated priority. Even so, our survey indicates a need for such incorporation. There are already many opportunities for fellows to practice leadership in the current curriculum, such as leading a team of trainees in the inpatient consult service, conducting a quality improvement or research project, or running an education session for students, but these activities are typically not viewed in terms of their leadership development value. Incorporating a leadership focus may simply be a matter of perspective in how we approach and evaluate these activities. An introductory curriculum describing basic leadership concepts could build the groundwork for this type of evaluation. The training programs described earlier have been able to introduce leadership concepts, laying down a basic expectation that its graduates will be expected to lead. This is a start. The work occurring in Canada may represent a resource that we can emulate. Another area of discussion is how professional specialty organizations, such as the Endocrine Society and APDEM, can best

participate to assist program directors in the development of tools for leadership training. This discussion is ongoing in these organizations.

4. Conclusion

Our survey of endocrinology fellowship program directors and recent graduates indicates a desire for increased leadership training in our fellowships. More work is needed to determine how best to meet this need.

Acknowledgments

We acknowledge the following Endocrine Society staff members for their assistance in coordinating support for the conduct of the Leadership Training Survey: Lucia Tejada, Associate Director, Science and Strategic Initiatives; Amanda Perl, Chief Strategy Officer; and Ailene Cantelmi, former Associate Director, Education and APDEM Staff Director.

Address all correspondence to: Mark W. True, MD, Endocrinology Service, San Antonio Military Medical Center, 3551 Roger Brooke Drive, Joint Base San Antonio–Ft. Sam Houston, Texas 78234. E-mail: mark.w.true.mil@mail.mil; or marktrue16@gmail.com.

Disclaimer: The views expressed in this article are those of the authors and do not reflect the official policy or position of the US Air Force, Department of Defense, or the US Government.

Disclosure Summary: The authors have nothing to disclose.

References and Notes

1. American College of Physicians Leadership Academy. Available at: https://www.acponline.org/meetings-courses/courses-recordings/leadership-academy. Accessed 25 September 2016.
2. American Association for Physician Leadership. Available at: http://www.physicianleaders.org/. Accessed 25 September 2016.
3. Alliance for Academic Internal Medicine Executive Leadership Program. Available at: http://www.im.org/p/cm/ld/fid=1169. Accessed 25 September 2016.
4. Arroliga AC, Huber C, Myers JD, Dieckert JP, Wesson D. Leadership in health care for the 21st century: challenges and opportunities. *Am J Med*. 2014;**127**(3):246–249.
5. Uniformed Services University of the Health Sciences Leadership Education and Development Program. Available at: https://www.usuhs.edu/usulead. Accessed 25 September 2016.
6. Clyne B, Rapoza B, George P. Leadership in undergraduate medical education: training future physician leaders. *R I Med J (2013)*. 2015;**98**(9):36–40.
7. Hartzell J, Wilson R, Yu C, Cohee B, Nelson M. Moving beyond accidental leadership: a graduate medical education leadership curriculum needs assessment. Presented at Accreditation Council for Graduate Medical Education Annual Conference; 25–28 February 2016; Washington, DC.
8. Blumenthal DM, Bernard K, Frase TN, Bohnen J, Zeidman J, Stone VE. Implementing a pilot leadership course for internal medicine residents: design considerations, participant impressions, and lessons learned. *BMC Med Educ*. 2014;**14**:257.
9. Vigersky RA, Fish L, Hogan P, Stewart A, Kutler S, Ladenson PW, McDermott M, Hupart KH. The clinical endocrinology workforce: current status and future projections of supply and demand. *J Clin Endocrinol Metab*. 2014;**99**(9):3112–3121.
10. Centers for Disease Control and Prevention. National diabetes statistics report, 2014. Available at: http://www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf. Accessed 29 September 2016.
11. National Center for Health Statistics. Data brief: prevalence of obesity among adults and youth, 2011–2014. Available at: https://www.cdc.gov/nchs/data/databriefs/db219.pdf. Accessed 29 September 2016.
12. Cosman F, de Beur SJ, LeBoff MS, Lewiecki EM, Tanner B, Randall S, Lindsay R; National Osteoporosis Foundation. Clinician's guide to prevention and treatment of osteoporosis. *Osteoporos Int*. 2014; **25**(10):2359–2381.
13. ENDO TV Interview. Leadership training survey—an Endocrine Society new initiative. Available at: https://www.youtube.com/watch?v=UyzpRvxlIRA. Accessed 5 April 2016.

14. Accreditation Council for Graduate Medical Education. Common Program Requirements. July 2016. Section IV.A.5. Core competencies. Available at: http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_07012016.pdf. Accessed 8 October 2016.
15. Accreditation Council for Graduate Medical Education and American Board of Emergency Medicine. The Emergency Medicine Milestone Project. July 2015. Subcompetency no. 23. Available at: http://www.acgme.org/Portals/0/PDFs/Milestones/EmergencyMedicineMilestones.pdf. Accessed 26 September 2016.
16. Accreditation Council for Graduate Medical Education and American Board of Internal Medicine. The Internal Medicine Milestone Project. July 2015. Subcompetencies nos. 8, 9, and 13. Available at: http://www.acgme.org/Portals/0/PDFs/Milestones/InternalMedicineMilestones.pdf. Accessed 26 September 2016.
17. Accreditation Council for Graduate Medical Education and American Board of Internal Medicine. The Internal Medicine Subspecialties Milestone Project. July 2015. Subcompetencies nos. 9, 10, and 14. Available at: http://www.acgme.org/Portals/0/PDFs/Milestones/InternalMedicineSubspecialtyMilestones.pdf. Accessed 26 September 2016.
18. Royal College of Physicians and Surgeons of Canada. CanMEDS: better standards, better physicians, better care. Available at: http://www.royalcollege.ca/rcsite/canmeds/canmeds-framework-e. Accessed 6 August 2016.
19. Toronto International Summit on Leadership Education for Physicians. Toronto, Canada. October 22, 2014. Report of proceedings. Available at: http://tislep.pgme.utoronto.ca/wp-content/uploads/2014/05/TISLEP2014_Report_of_Proceedings.pdf. Accessed 6 August 2016.
20. Toronto Internal Summit on Leadership Education for Physicians. 2016 Programme. Available at: http://tislep.pgme.utoronto.ca/programme/. Accessed 8 October 2016.
21. LEADS. Health leadership capabilities framework. Available at: http://www.nhlc-cnls.ca/assets/2016%20Ottawa/LEADS_Brochure_2015.pdf. Accessed 8 October 2016.
22. O'Connor FG, Grunberg N, Kellermann AL, Schoomaker E. Leadership education and development at the Uniformed Services University. *Mil Med*. 2015;**180**(4, Suppl)147–152.
23. Blumenthal DM, Bernard K, Bohnen J, Bohmer R. Addressing the leadership gap in medicine: residents' need for systematic leadership development training. *Acad Med*. 2012;**87**(4):513–522.
24. Pelley E, Danoff A, Cooper DS, Becker C. Female physicians and the future of endocrinology. *J Clin Endocrinol Metab*. 2016;**101**(1):16–22.