Medical School Factors That Prepare Students to Become Leaders in Medicine

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Abstract

Purpose
To identify medical school factors graduates in major leadership positions perceive as contributing to their leadership development.

Method
Using a phenomenological, qualitative approach, in August–November 2015 the authors conducted semistructured interviews with 48 medical leaders who were 1976–1999 baccalaureate–MD graduates of the University of Missouri–Kansas City School of Medicine (UMKC). At UMKC, they participated in longitudinal learning communities, the centerpiece for learning professional values and behaviors plus clinical skills, knowledge, and judgment, but received no formal leadership instruction. The

authors subjected interview comments to directed, largely qualitative content analysis with iterative coding cycles.

Results
Most graduates said their experiences and the people at UMKC positively influenced their leadership growth. Medical school factors that emerged as contributing to that growth were the longitudinal learning communities including docents, junior–senior partners, and team experiences; expectations set for students to achieve; a clinically oriented but integrated curriculum; admission policies seeking students with academic and nonacademic qualifications; supportive student–student and student–faculty relationships; and a positive overall

learning environment. Graduates viewed a combination of factors as best preparing them for leadership and excellence in clinical medicine; *together* these factors enabled them to assume leadership opportunities after graduation.

Conclusions
This study adds medical leaders' perspective to the leadership development literature and offers guidance from theory and practice for medical schools to consider in shaping leadership education: Namely, informal leadership preparation coupled with extensive longitudinal clinical education in a nurturing, authentic environment can develop students effectively for leadership in medicine.

The dynamism and mounting complexities of today's health care systems require physicians to assume leadership roles in medicine.[1–3] Accordingly, the Institute of Medicine and other medical associations have highlighted the need to prepare physician leaders.[4–8] In response, some medical schools have offered leadership education to students in various formal and less formal formats.[1,5,9–13] They have studied outcomes of their leadership programs, but their results offer little evidence for the effectiveness of their efforts or best practices.[1,12,14] Furthermore, they have focused only on outcomes measured when students

complete the program.[1,11–14] Long-term follow-up to ascertain students' perspectives on whether and how their leadership preparation transferred to the workplace is, to our knowledge, unavailable despite recommendations for such studies.[12] Additionally, the role that informal leadership education, embedded in students' experiences and organizational culture, plays in students' preparation for leadership is unclear.

To address these gaps in the literature, we followed up with University of Missouri–Kansas City School of Medicine (UMKC) graduates who have attained major leadership positions in medicine. These individuals' actual leadership success in the world of medicine, we reasoned, would enable them to give insights into environmental factors that promote leadership, which medical schools could adopt. Contemporary theory holds that leadership is a journey[15] in which leaders are not necessarily born but also made[16] through exposure to many experiences and practice.[15] Also, experience-based learning theory[17] points to medical school influences that might be involved in this journey, such

as human interactions and progressive participation in a community of practice.[18]

Oriented by this literature and theory on leadership and learning, we explored the following question: What factors during medical school do UMKC graduates who serve in major leadership positions in medicine perceive to have contributed to their leadership development? Study of the insights of these medical leaders is particularly apt because UMKC has never explicitly and formally taught leadership; rather, it stresses the development and graduation of superbly educated clinicians. How, then, we wondered, did these graduates become leaders? Did their medical school experiences contribute to their leadership success and, if so, in what ways?

Method

We sought to garner a rich understanding about the experiences that UMKC graduates in major leadership positions in medicine thought were important in their leadership growth. Accordingly, we adopted a phenomenological, qualitative

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1

approach using semistructured interviews with a preponderance of open-ended questions. The university's institutional review board reviewed and determined this study to be exempt from further review and approval.

Setting

Using a nontraditional form of medical education,[19] UMKC admits students directly from high school into a six-year combined baccalaureate–MD curriculum.[20] From the first week onward, students interact with patients, families, physicians, and other health care providers in small groups. In year 3, each student joins a learning community called a docent team, which is the centerpiece for teaching and learning clinical knowledge, skills, and judgment as well as professional values and behaviors.

The docent team consists of three students from each of the final four years of the curriculum (years 3–6), the docent (the leader, a general internist), and other health care professionals, notably a doctor of pharmacy (PharmD). The docent team attends a weekly continuing ambulatory care clinic and serves an annual two- to three-month inpatient internal medicine rotation.

The student stays on the same docent team until graduation. Within the team, each year 3 student acquires a senior partner who is a year 5 student. They remain partners for two years until the senior partner graduates. Then the junior partner becomes the senior partner for a new year 3 student joining the team. The partners are expected to nurture each other's professional and personal growth, but the senior partner bears the major responsibility for that.

Study sample

We selected study participants from among the 1,664 baccalaureate–MD graduates of the classes of 1976, the school's first graduating class, through 1999, the latest class with sufficient time to rise to major leadership positions in medicine by the time of the study in 2015. We set two criteria for documented leadership achievement for participation in the study:

1. *Type of leadership role:* top administrator; outstanding clinician/patient-care giver recognized for

excellent patient care; productive researcher noted for novel, important contributions to medical knowledge and its applications; and/or excellent educator acknowledged for effective teaching/mentoring; and

2. *Type of institutional affiliation:* substantial national, regional, and/or local medical institution, organization, and/or society including, where relevant, those ranked in published national reports.

See List 1 for examples of leadership roles and institutional affiliations meeting these criteria.

By using AOL Search and inspecting our medical school and university alumni/development office files to find leadership evidence for each of the 1,664 eligible graduates, we found that 213 met our two leadership criteria. We invited 71 (one-third) of these 213 graduates for interviews because we wanted to obtain a sufficient but manageable number of participants in various leadership positions to reach saturation of themes in our qualitative study yet allow for refusals to interview.[21] The senior author (L.A.) chose these 71

graduates by prioritizing graduates with national-level achievements and ensuring that a mix of administrators, clinicians, researchers, and educators in a variety of types of medical institutions would be invited for interviews.

Data collection

We created a semistructured interview guide to collect the data (see Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/A483). This guide began with open-ended questions to elicit factors the graduates thought were important in their leadership development. We asked them to consider factors not only during, but also before and after, medical school to identify a comprehensive set of influences in their leadership growth, without directing them to focus only on medical school factors. The guide also contained follow-up probes so interviewers could clarify graduates' answers and gather additional information as needed.

After initial telephone and/or e-mail contact that included study information and the interview guide, 48 (68%) of the

List 1

Examples of Types of Leadership Roles and Institutional Affiliations Meeting Study Inclusion Criteria for Documented Leadership Achievement Among 48 University of Missouri–Kansas City School of Medicine Baccalaureate–MD Graduates (1976–1999), 2015 Interview Study

Types of leadership roles

- Top administrators: CEO, chief medical officer, president/president-elect, chair/chair-elect, vice chancellor, decanal position;
- Outstanding clinicians/patient-care givers: Received national and/or regional awards, elected/appointed as head of a clinically oriented society, appointed as a named professor for a disease;
- Productive researchers: Received national, regional, and/or local awards; elected/appointed as an officer of a research society; had quality grant, publication, and presentation record; and/or
- Excellent educators: Received national, regional, and/or local awards; elected/appointed head of a national/regional medical education group; appointed to a professorship; appointed to a national accrediting body; edited a required textbook for residents.

Types of institutional affiliations

- Health care institutions with reputations for excellent patient care, including those ranked in national reports;
- Medical schools recognized for medical research and education, including those ranked in national reports;
- Large agencies of the U.S. government involved with health care and medical research (e.g., National Institutes of Health, Centers for Disease Control);
- Large industrial companies related to health insurance, laboratory testing, or pharmaceuticals;
- The U.S. military (e.g., U.S. Army, U.S. Air Force); and/or
- National or regional professional associations/organizations, specialty societies, academies, and/or national organizations devoted to the cure and care of patients with specific diseases.

71 graduates gave interviews. We offered no incentives for participation.

During August–November 2015, four authors (L.A., P.G.C., S.B.H., and J.L.Q.) conducted interviews primarily by telephone, although several graduates opted for face-to-face interviews in private offices at UMKC. At the outset of the interviews, interviewers requested that the graduates verify verbal consent, reviewed with them the information we had about their leadership positions, and asked them to correct and add to that information if necessary. The interviews lasted 30 to 60 minutes. Many graduates discussed their experiences without the need for prompts.

The interviewer recorded the graduate's responses on the interview guide, minus the graduate's name and the names of people or organizations mentioned to ensure confidentiality. After finishing the interview, the interviewer transferred the graduate's comments into electronic form (if notes were handwritten) and assigned a sequential number to each interview that was not linked to the graduate. The resultant document was ready for coding and entry into NVivo version 11 (QSR International, Burlington, Massachusetts) for analysis.

The senior author (L.A.) maintained a separate, locked file listing names of the graduates who participated.

Data analysis

We subjected the interview notes to directed content analysis,[22] which is primarily qualitative in nature, in a multistep process. The analysis began with a loose conceptual framework of possible factors in leadership development derived from the literature[15–18]: dispositions/personality characteristics, experiences of all kinds, and influential people. All interviewers independently reviewed an initial small set of interviews and discussed the utility of the framework for a coding scheme. They found the three categories to be useful starting points for developing codes for themes and subthemes of factors by time period (before, during, and after medical school), but they added several categories. Then, using the coding structure based on this initial review, three authors (L.A., S.B.H., J.L.Q.) analyzed additional interviews

on a rolling basis and modified the coding structure as needed. Next, teams of two interviewers (L.A., S.B.H., and/or J.L.Q.) constantly compared graduates' comments to clarify, merge, add, and/or subtract categories. In the last coding step, two authors (L.A., S.B.H., and/or J.L.Q.) coded each interview according to the final coding structure capturing the factors and subfactors that graduates mentioned. They resolved coding disagreements through discussion. Finally, we entered the resultant codes of factors and subfactors for each interview into NVivo, counted the number of graduates who mentioned each code, and converted the frequency counts into percentages and quantitative statements for reporting results (see Table 1 for definitions).

To validate the results, we sent the interviewees a copy of all results for comment. Seventeen (35%) replied without disagreeing with the findings.

Results

Study participants

Of the 48 interview participants, about half (22; 46%) were women. Similarly, 46% (770) of the 1976–1999 UMKC baccalaureate–MD graduates were women.

As Table 2 shows, most of the graduates held national-level leadership positions; of these, only a few were exclusively national leaders. Most graduates were administrators. However, many held multiple leadership roles not only as administrators but also as leaders in research, patient care, and/or education. Regarding organizational affiliations, many were leaders in academia; many were leaders in professional associations/organizations, specialty societies, academies, and/or disease-focused organizations; and close to half were leaders in health care facilities or health care systems. Relatively few were affiliated with industry and government and few with private practice and the military. But most were affiliated with multiple types of organizations.

Factors in the leadership development of UMKC graduates

Graduates indicated that a combination of factors throughout their careers—experiences, people, and personal

Table 1

Conversion of Frequency Counts Into Descriptive Quantitative Statements for Reporting Results About Medical School Factors Contributing to Leadership Development[a]

Percentage of graduates who mentioned code[b] in their interview comments	Descriptive quantitative statement
≥ 80%	Most of the graduates
60%–79%	Many
Around 50%	Half
Around 40%	Some
Around 20%	Relatively few
≤ 10%	Few

[a]Based on interviews in 2015 with 48 University of Missouri–Kansas City School of Medicine baccalaureate–MD graduates (1976–1999) who attained major leadership positions in medicine.
[b]Medical school factor or subfactor.

characteristics—contributed to their development as medical leaders. Notably, for most of the graduates, their experiences and the people at the medical school were positive influences on their leadership growth:

> UMKC offered multiple role models valuing and living servant leadership. I have tried to do that through my work as chair and researcher/scholar, in volunteerism with various professional societies and groups, and in the entrepreneurship in the companies I helped to develop…. I am committed to generativity [like UMKC's founders and administrators]. (#18)

Medical school, they indicated, (1) reinforced the leadership ideas, experiences, and/or skills they brought with them to medical school; (2) provided contrasts with their previous leadership notions and with the leadership skills they had before entering medical school; and/or (3) introduced them to new perspectives, skills, and opportunities to lead. But for relatively few graduates, their experiences after leaving medical school were at least as influential, if not more so, in their becoming successful leaders.

Medical school factors

The following medical school factors emerged as contributing to the UMKC graduates' leadership development in their opinion, as we describe below and as illustrated in the representative excerpts from our interview notes in Appendix 1:

Table 2

Types of Major Leadership Positions in Medicine Attained by 48 University of Missouri–Kansas City School of Medicine Baccalaureate–MD Graduates (1976–1999), Interviewed in 2015

Type of leadership position	No. (%)
Leadership level[a]	
National	42 (87)
Regional	24 (50)
Local	41 (85)
No. of leadership levels held by graduate	
All three levels	17 (35)
Two levels	25 (52)
One level	6 (13)
Type of leadership role[b]	
Administrator	46 (96)
Researcher	26 (54)
Clinician/patient-care giver	19 (40)
Educator	16 (33)
No. of leadership roles played by graduate	
All four roles	4 (8)
Three roles	18 (38)
Two roles	11 (23)
One role	15 (31)
Type of institutional affiliation[c]	
Academia	32 (67)
Professional association/ organization/specialty society/academy/ disease-focused organization	29 (60)
Health care facility/health care system	23 (48)
Industry	13 (27)
Government	12 (25)
Private practice	4 (8)
Military	3 (6)
No. of types of institutional affiliations held by graduate	
Five affiliation types	1 (2)
Four affiliation types	3 (6)
Three affiliation types	18 (38)
Two affiliation types	19 (40)
One affiliation type	7 (14)

[a]Percentages do not total 100% because most graduates were leaders at multiple levels (e.g., a leader at the national and regional levels).
[b]Percentages do not total 100% because many graduates were in multiple roles as leaders (e.g., a leader in research and patient care).
[c]Percentages do not total 100% because most graduates were affiliated with multiple types of organizations (e.g., a leader in a professional society and in a health care facility).

1. UMKC's learning communities, called docent teams, including (a) the docent, (b) the junior–senior partnerships within the docent team, and (c) team experiences;

2. other features of the educational program, including (a) expectations set for students to achieve, and (b) characteristics of the curriculum, conceptualized more broadly than formal course work on leadership;

3. combined influence of the learning communities and features of the educational program, including expectations for students and curricular characteristics; and

4. other factors, including (a) admission policies, (b) the nature of relationships among students and between students and faculty, and (c) the quality of the overall learning environment.

Learning communities. Most graduates said that features of the school's learning communities, called docent teams, made important contributions to their leadership development.

The docent was identified as an important element of the learning communities that helped graduates become leaders. Most of the graduates found their assigned docent to be influential as a role model for leading a team, interacting with students and colleagues, caring for patients, and demonstrating humanism. The graduates remarked that the docent's role modeling was especially powerful because it was not a one-time event—students could observe the docent's leadership style in a variety of circumstances with a variety of people over several years. They also viewed the docent as a mentor guiding the students' journey toward physicianhood, advocating for students but setting high standards, and providing "tough love." For many graduates, the docent's leadership was an inspiration for their own leadership journey. A few noted that the docent, acting as a sponsor, counseled them to assume student leadership positions, and a few said the docent explicitly discussed how they should lead.

Relatively few graduates stated that their assigned docent did not influence their leadership development. They, however, typically indicated that they found a

docent surrogate in the PharmD on their team or a docent on another team, or in a research adviser, another medical school faculty member, a faculty member in the liberal arts college of the university, or a medical school dean. These graduates described these surrogates as inspirational role models, mentors, and even sponsors.

The junior–senior partnerships within the docent team were another influential component of the learning communities, according to many graduates. They said the partnership was the main place where they learned about leading, because of their senior partner's tutelage, role modeling, mentoring, coaching, and feedback and because of the need to apply and practice what they had learned when they became the senior partner. A few graduates found the partnership system less helpful in learning about leadership.

Team experiences also facilitated subsequent leadership, as more than half of the graduates commented. They said the team was not an ordinary team but one with special characteristics: ongoing and functioning throughout four years. So students, they added, had to learn how to get along with their team members, and the docent team became the place where students learned how to build and be part of an effective team through practice. To help care for patients in the continuing care clinic and on the inpatient service, relationships on the team had to be collegial and cooperative, graduates said. In turn, the team offered support to its members, with older and younger students teaching and helping each other and creating a safe learning environment.

The four-year docent team membership conferred predictable graduated responsibility on students not only to guide their partners, help other team members, and lead but also to assist with patient care until they were ready to reach appropriate autonomy to care for patients. That responsibility for patient care loomed large in their leadership development, graduates commented.

Other features of the educational program. Although most graduates said the learning communities played a critical role in their leadership growth, most graduates also mentioned other

features of UMKC's educational program as factors in becoming leaders.

The expectations set for students to achieve were one of these features, according to most graduates. Many graduates explicitly said the expectation to help and teach each other functioned as a prototype for leading other people because leadership involves helping and teaching others, which graduates equated with the principles of servant leadership.[23] Many also found that the autonomy the school expected them to achieve for their own education—to figure things out for themselves, to challenge and prove themselves, and to become lifelong learners—instilled habits necessary for leadership. Similarly, more than half explicitly remarked that because they were expected to learn from anyone who could teach them—not just physicians but also other health care providers, patients, nonphysician faculty, older students, and peers—they learned how to lead by first listening, which they viewed as a habit of successful leaders. Half of the graduates mentioned that students were expected to take appropriate responsibility for patients, not just on the docent team but also in other clerkships, and they saw this responsibility as contributing to their leadership development.

Characteristics of the curriculum were also significant for subsequent leadership, in the view of most graduates. Many mentioned the emphasis placed on early, broad, and frequent clinical experiences throughout the six-year curriculum. More than half talked about the flexibility of the curriculum that exposed them to many diverse experiences including electives. These graduates thought the diverse experiences nurtured their leadership by broadening their outlook, testing their interests, and enabling them to chart their own educational and career pathways. More than half said the six-year curriculum was advantageous to their leadership development. It gave them the freedom to enroll in formal degree programs, choose longer fellowships, and even change career paths without falling behind in age compared with graduates from more traditional undergraduate medical education programs. However, relatively few saw disadvantages or trade-offs to the six-year curriculum,

particularly when it came to competing for residency spots. Relatively few stated that the shortened curriculum made no difference for their development as leaders.

Some graduates said the continuous integration of the humanities, social sciences, basic sciences, and clinical medicine throughout the combined baccalaureate–MD program helped them expand their views and widen their interactions with a diverse range of people and their leadership styles, especially during international electives. Some graduates noted that the school's nontraditional pioneering curriculum facilitated their leadership development because it validated innovation. They noted that by offering a nontraditional innovative curriculum, school leaders modeled risk taking that complemented these graduates' self-description as strategic risk takers, a characteristic they saw as a hallmark of leaders.

Combined influence of the learning communities and features of the educational program. Many graduates clearly articulated as fundamental to launching their leadership success the combination of their experiences on their docent team, the expectations for students, and curricular characteristics, which together prepared them for outstanding performance during their first year of residency. In turn, the graduates' supervisors and peers saw them as leaders. Accordingly, the graduates received early opportunities for leadership that they were willing, motivated, and able to assume as residents, although they typically did not indicate that they sought out those opportunities.

Other factors. Graduates discussed several other factors contributing to their leadership development. Many mentioned admissions policies that, in their view, deemed academic achievement necessary but insufficient and therefore valued excellence in other areas as well. Most said that the nature of the relationships among students and between students and faculty nurtured their leadership growth by showing them how important supportive, long-term, collaborative relationships were for successful leadership. Many expressed the same sentiment about the

positive quality of the overall learning environment where they found faculty and students who were passionate about teaching, learning, and patient care to be inspiring.

Discussion

UMKC graduates in major leadership positions in medicine found their medical school experiences to be instrumental in their leadership development. They attributed the school's influence to the learning communities (called docent teams; specifically, the docent, the junior–senior partnerships, and team experiences) and other features of the educational program, such as the expectations the school set for them (notably, the graduated responsibility for helping other students and for patient care) and the characteristics of the curriculum (particularly the extensive clinical experiences throughout the six years). They also viewed the admission policies considering both academic and nonacademic achievement; the supportive relationships among students and between students and faculty; and the positive, inspirational quality of the overall learning environment as contributing to their leadership development.

Importantly, experiences in the learning communities and features of the educational program worked together to graduate physicians with outstanding clinical acumen *and* leadership experience that led to leadership opportunities early in residency and beyond. The graduates succeeded as leaders without formal leadership training in medical school in its usual sense. Instead, they received explicit messages about how to lead as clinicians from features of the educational program. Expectations reinforced those messages. The docent teams were the laboratory for learning about leadership along with clinical medicine—first, through observation of inspiring role models and mentors, including the docent and students on the team, and second, through actively practicing leadership while applying the lessons about clinical medicine in an authentic clinical setting over an extended period of time. On the docent team, the students encountered the strong focus on clinical exposure for four years, the support to meet

the school's expectations, and chances to demonstrate achievement of those expectations and practice leadership in clinical situations parallel to those that they would encounter as residents. As expressed in self-determination theory,[24] the school built graduates' confidence and intrinsic motivation by satisfying basic psychological needs for competence, autonomy, and belonging in the context of learning communities, which enabled the graduates to excel early in residency, to be noticed, and to receive offers of leadership positions. The school's environment also apparently fostered characteristics of credible leadership noted in the literature[25]:

1. competent—through a solid medical education;

2. forward-thinking—through exposure to educational innovations plus leaders, faculty, and students willing to take risks with those innovations; and

3. inspiring—through contact with enthusiastic, dedicated peers and educational leaders.

Simply put, the graduates, accustomed to leading, were ready and willing to fill leadership positions as they arose.

Our findings prompt recommendations for other medical schools to consider in shaping leadership programs for their students. In particular, schools would be well advised to include in their programs those experiences our graduates emphasized as important to developing their leadership: longitudinal clinical experiences coupled with informal leadership preparation in authentic settings mimicking future professional environments as students progressively enter a community of practice, where they observe and interact with students, physicians, and other health professionals who act as role models and mentors and where students themselves actively practice the behaviors of role models and mentors. Although the need to learn leadership in authentic settings has been recognized previously,[12] evidence for this recommendation and ideas about how to implement it now come from this study's successful leaders in the world of medicine.

Further, this study's findings should remind medical schools that in their efforts to produce leaders they need to educate students for excellence—in

this case, excellence in clinical medicine—while also offering leadership experiences so that students are optimally prepared to take advantage of leadership opportunities. Our findings also underscore the need for schools to be mindful of the influence that peers (along with faculty) can exert on their fellow students as they join a practice community. Finally, our findings speak to the power that informal but explicit leadership preparation, embedded in students' experiences and the organizational culture, holds for leadership development.

Limitations of studies conducted in one school with dependence on participants' memories, perhaps erroneous, apply to this work. Our selection of a study sample that emphasized formal major leadership achievement may have eliminated from participation graduates who were effective informal leaders and followers—leadership types included in current conceptualizations of leadership. The study design did not explore why our other graduates have not yet become major medical leaders; those graduates presumably encountered the same medical school factors as our graduate leaders. Moreover, because of space limitations, we could not report here the full complement of factors that contributed to the graduates' leadership success, including early influences (e.g., parents and teachers), experiences in residency and the workplace (e.g., participation in formal leadership training), and personal dispositions (e.g., service oriented). Other factors, unidentified and uncontrollable, could also be involved. Yet, this study adds a unique perspective to the literature on leadership because its results reflect real-world outcomes exemplified by leadership achievements of our graduates, and it highlights the role of informal leadership preparation.

Future empirical work could address some study limitations. To verify and better quantify results, we could administer a survey incorporating our findings to a larger group of UMKC graduates who are formal leaders, effective informal leaders, and effective followers in medicine. We need to explore the medical school experiences, career choices, and opportunity structures of our graduates who were not identified as

leaders according to this study's criteria. Repetition of this study, particularly in schools with similar learning communities, might suggest whether the medical school factors found to contribute to leadership development at UMKC are generalizable to other institutions. Exploring how gender, graduation year, and leadership type might influence this study's findings would be instructive. Studying the experiences that the participating graduates considered important before and after medical school along with their personal characteristics would yield a fuller description of how these graduates rose to leadership positions while recognizing the significance that most graduates attributed to medical school factors. More fundamentally, whether the leadership preparation this school provided its graduates will meet future leadership needs in ever-changing health care systems and medicine requires evaluation.

Conclusions

Informal leadership preparation coupled with outstanding longitudinal clinical education in a nurturing authentic environment can develop students effectively for leadership roles in the world of medicine.

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Appendix 1

**Medical School Factors in Leadership Development as Mentioned in Interviews of 48
University of Missouri–Kansas City School of Medicine Baccalaureate–MD Graduates
(1976–1999) Who Attained Major Leadership Positions in Medicine, 2015**

Medical school factors and subfactors	No. (%) of graduates	Illustrative excerpts from interview notes (participant ID)
1. Learning communities	46 (96)	
a. The docent	39 (81)	Best docent in the world, great leader and great role model, [I] aspired to be similar. (#32)
b. Junior–senior partnerships within the docent team	35 (73)	My senior partner was excellent. Her work ethic was superb; her relationships with patients, her patient care outstanding. She was an excellent role model. She demonstrated leadership by expressing her commitment to making things better, by trying to do things differently if it helped the patient. (#7)
		You got to appreciate your senior partner and what they did for you, then you replicated that with your junior partner. (#14)
		The junior–senior partnership [was] most influential for leadership, teaching others. (#21)
c. Team experiences	27 (56)	There was a very strong team spirit that shaped you for leadership. You were on a team for four years, and it was a very strong group. It didn't just come and go like on short rotations. (#14)
		We had a solid experience; it [the team] taught us how teams function effectively, how to relate, how to get along with even those you didn't exactly love; you knew that being a team member they would step up when needed and vice versa. It did that because the team stayed together for four years. (#20)
		Having the same docent and the same senior partner on an ongoing basis and then with regard to you being a senior partner all this happened on an ongoing basis and so you learned leadership and practiced it over time. (#24)
		You were given incremental responsibility for the junior partner; it was planned, consistent, existed through time so you could build a relationship and that is what made it important for leadership. You were in charge and you also were expected to lead a subunit of the team. Older students on the team oriented us to being a partner. All this just didn't happen, it was a formal part of the docent system, and not even like working with a younger student on a clerkship. It was to last through time. (#8)
		Having our own panel of patients … encouraged a sense of development of that process of leadership that becomes natural as we moved throughout the docent group. (#31)
2. Other features of the educational program	48 (100)	
a. Expectations set for students to achieve	45 (94)	
Take responsibility for helping each other	34 (70)	UMKC grooms its students to always be in the teaching mode, to lead. (#6)
Achieve autonomy for one's own education	30 (62)	[The responsibility for educating one's self] definitely was good for my leadership because it taught self-discipline and motivation we need as leaders. (#25)
		The school clearly gave you the sense that you had responsibility for your own path…. A good example—in studying for Boards I noticed some gaps in some areas on the exam. I had the personal responsibility to fill up those gaps. So I talked to people to find out how to get what I needed and I did that. Definitely, the school didn't spoon-feed you the knowledge. That proved to be so very helpful later in life. (#3)
Learn from anyone who can teach students, not just physicians	28 (58)	Another experience between years 2 and 3 was Hospital Team Experience [daily shadowing of nonphysician health providers for several weeks]. That really helped with leadership. I shadowed an EKG technician, and from that learned how to be a servant leader. I learned how hard a lot of people in the hospital like that worked, how you could learn to lead from them. This experience worked, I think, because we were young and it just wasn't a day or two. (#9)
Take responsibility for patients	24 (50)	[I] felt [I] really "owned" my patients on Do Ro [the docent team's inpatient rotation]; having someone rely on you creates a burden of responsibility. (#29)
		The other part that is really important is the disproportionate responsibility for patients that we were given at an early age and continuously. We played a significant role in patient care…. Very definitely this led to leadership opportunities for me. We had a lot of … hands-on experience doing things with patients, performing procedures that arose unexpectedly…. These experiences increased my confidence, increased my responsibility, and led to leadership and leadership opportunities. (#18)
b. Characteristics of the curriculum	44 (91)	
Broad, varied clinical experiences throughout the curriculum	38 (79)	I did love the way the school taught medicine. The focus was on the patient and the clinical [rotations]. You got to apply things right away. You learned how to interact with people in the hospital. Being on call taught you how to think when you were tired. By the time you finished school, you had more clinical experience than chief residents had…. That was helpful in becoming a leader. (#4)
Flexibility of the curriculum supporting students' interests	27 (56)	[The] ability [at this school] to tailor your curriculum helped instill the idea that you could do whatever you needed to do to advance yourself. (#38)
		This program permitted students to be independent, to adjust their curriculum in ways they preferred which fit with [their] independent nature. (#42)

(Appendix continues)

Appendix 1
(Continued)

Medical school factors and subfactors	No. (%) of graduates	Illustrative excerpts from interview notes (participant ID)
Six-year curriculum	26 (54)	The shortened number of years enabled me to do two residencies. I didn't hesitate because I was younger and vigorous and able to do that. And it gave me more years in the saddle so to speak which made me better. Also because you are younger, you might be a little naïve; nobody has told you "you can't do that." There could be a flip side to that, a trade-off. I had no chance to network, say with a fraternity like my son did, and those connections are still important to him. (#17)
Integrated	21 (44)	There was such a broad rich environment. I got to take courses in art and music, to be in the on-call singers, to be in intramural athletics, to play varsity tennis. I loved the way the school intertwined the clinical experience with going back to take humanities on the main campus where I got to meet students in other majors, to enjoy that time as a mini-sabbatical, to learn what made people tick from humanities classes and meeting people outside of medicine. All of that made us better leaders and we could apply those thought processes to the patient/doctor relationship. (#12)
Nontraditional	20 (42)	Well, basically UMKC is not traditional … and from that you see that the status quo does not have to be. Fundamentally, in all ways, that inspired me to think outside the box. I already had that, it just built on who I was and helped me to grow in that way. (#11)
		[I] attribute [my] success as a leader to an ability to tolerate risks such as attending a new innovative medical school…. [My] own focus on innovation is a combination of [my] parents' encouragement, [my] own personality, and attending an innovative and "risky" medical school [because it was new]. (#26)
3. Combined influence of the learning communities and features of the educational program[a]	31 (65)	Also we got incredible clinical experience [in the docent team's inpatient rotations, its clinic, and other experiences]. By the time we graduated we were doing things that interns and residents were doing elsewhere. This was a huge advantage. When I went into residency I was more confident than the others about what I was doing because I had already done them. And my clinical abilities helped me to stand out, to be noticed by faculty, and opened up leadership opportunities for me because I was ready and was not wondering about what to do with patients. (#10)
4. Other factors	—	
a. Admission policies	30 (62)	… [T]he school was looking for well-rounded students and not just the brainy types. (#37)
		The interview selected for certain qualities, like a strong belief that you could do this, you could help people even though you were young, sure that you would spend your life making a contribution…. Also delayed gratification. And the belief—just go ahead and do something. (#22)
b. Nature of the relationships among students and between students and faculty	42 (87)	
Nurturing, helpful, friendly, encouraging	37 (77)	… [T]here were no limits set on you. If you wanted to explore something, you were encouraged to do that. A good example of that was the research project I wanted to do. No one said I couldn't do it. (#16)
		… [P]eople didn't yell at you, didn't make you feel stupid; they were helping to work you through this thing to figure out what you didn't know and get the answer. (#19)
Deep and long-term	29 (60)	Long-term relationships with classmates and friends met at UMKC have served as a source of inspiration. (#27)
Collaborative	25 (52)	There was little arrogance at the school. That helped to make us leaders and [taught] how to work together. (#9)
		It was not competitive, it fostered leadership…. I was able to focus on developing other areas, personality, etc. (#31)
Easy access to school leaders	20 (42)	Very supportive. Every place was an open door. You could easily go talk to the dean or a student coordinator. (#35)
c. Quality of the overall learning environment	32 (67)	There was just a wonderful group of physicians, also people in the dean's office, the career counselor in student affairs, the year 1–2 biology teacher who studied bats (a student advocate), the medical education dean…. They all wanted you to be as good as you could be…. They were people who just lit up when they saw you, they gave us their all and they taught us that and to explore, to be comfortable in doing that. (#13)
		We [my roommate and I] worked very hard together, but we would laugh, take breaks. We helped each other out. And there were lots of good friends in our class that we had. (#15)
		[I] had mentors at every level. [I] recall a physics/chemistry teacher who was very supportive and encouraging … peers were supportive—[my] extended family. [I] knew everyone in [my] class and many remain [my] friends for life. (#40)
		Got the appetite for accomplishments [at the school]. Left with an interest to keep doing it…. Honors General Chem professor…. Remarkable experience. Biochemistry professor was also great—called him decades later to thank [him]…. General physiology professor—Crustiest old bastard in the world…. Those three faculty really stood out as being inspiring. So enthusiastic. Loaded [my] tool box … used their stuff for years. (#34)

[a]Learning communities (docent teams) plus expectations for students (responsibility for helping other students and patient care) along with characteristics of the curriculum (extensive clinical experience over six years).