

## Original Article

## Physician leadership and hospital ranking: Expanding the role of neurosurgeons

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**Abstract****Background:** Empirical studies that explore whether hospitals with physician leadership perform better than hospitals led by nonphysician managers are scarce. This study looks at the leaders currently being hired by hospitals in the Arab World and explores whether chief executive officers (CEOs) in hospitals ranked higher are typically physician leaders or nonphysician managers. Furthermore, we discuss whether physicians, especially neurosurgeons, are equipped to lead hospitals and healthcare institutions worldwide.**Methods:** The “Ranking Web of World Hospitals” by Cybermetrics Lab, 2017, was used. A dataset on CEOs in the top 50 hospitals and the bottom 50 hospitals in the Arab World was constructed. Independent samples *t*-test and regression equations were conducted, and *P* values <0.05 were considered statistically significant.**Results:** A total of 283 hospitals were ranked. Among the top 50 hospitals, 54% of the CEOs were physicians, whereas the remaining were nonphysician managers. Among the bottom 50 hospitals, 74% of the CEOs were physicians, whereas 26% of the CEOs were nonphysicians. Interestingly, physician leadership was significantly associated with lower hospital ranking (bottom 50 hospitals) in the Arab World (*P* = 0.0031).**Conclusion:** This article does not establish that nonphysician managers make more effective leaders when compared with physicians, but it starts an empirical course. For better evaluation of hospital leadership qualities, a new hospital ranking system must be created that focuses on patient satisfaction and perception of quality. Physician leaders, especially academic neurosurgeons, are an extraordinary leadership source, combining sound management with high medical standards. With the right academic training, neurosurgeons can play an increasingly significant role in addressing the challenges facing healthcare today.**Key Words:** CEO, hospitals, leadership, managers, physicians, ranking

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## INTRODUCTION

The current healthcare environment in the Arab World has become extremely intricate, with increased demands to establish an equilibrium between quality and cost, and technology and humanity.<sup>[38]</sup> Physicians, especially neurosurgeons, are now often forced to integrate with healthcare plans and other providers for whom concepts such as teamwork and cost-efficiency are of utmost importance.<sup>[36]</sup> These challenges, among others, in the healthcare system necessitate special leadership.

For long, it has been hypothesized that hospitals perform better when they are led by physicians.<sup>[13]</sup> A 2011 study showed that hospitals positioned higher in the US News and World Report's "Best Hospitals" ranking are led, disproportionately, by physicians, who – in addition to their administrative duties – are committed to treatment of the patient and prevention of illness.<sup>[21]</sup> In the United Kingdom, it was found that hospitals with the most physician involvement in management affairs performed 50% higher on drivers of performance, such as effectiveness of overall management, performance management, and leadership compared with hospitals with little physician leadership.<sup>[8]</sup>

The physician leaders' clinical background gives them more credibility with the medical staff than nonphysician managers; physicians are more likely to respond well to physician leaders, especially on issues of medical management.<sup>[9]</sup> Although most physicians inherently possess the character traits necessary for leadership such as honesty, compassion, and passion, few possess the technical competencies, such as strategic planning, financial/economic knowledge, and organizational principles.<sup>[36]</sup>

In the Arab World, there are no empirical studies that assess the claim that hospitals with physician leadership perform better than when they are led by nonphysician managers. To establish a clear relationship between leadership and organizational outcomes is challenging because many of the conditions required for an unambiguously causal analysis cannot be met. Therefore, this study looks at the leaders currently being hired by hospitals in the Arab World and explores whether chief executive officers (CEOs) in hospitals ranked higher in the Arab World are typically physician leaders or nonphysician managers. Furthermore, the discussion expands with the aim of answering the following questions:

1. Are hospital ranking systems reliable?
2. Who should run hospitals?
3. Can physicians run hospitals?
4. Can neurosurgeons lead hospitals?
5. What makes neurosurgeons good hospital leaders?

## MATERIALS AND METHODS

### Study design

This empirical study looks at the CEOs in the top and bottom ranked hospitals in the Arab World – determining whether those hospitals ranked higher or lower in the league table are more likely to be headed by physician leaders or nonphysician managers. To do this, one particular ranking is used, namely, the "Ranking Web of World Hospitals" by Cybermetrics Lab, 2017.<sup>[34]</sup> The study constructs a dataset on CEOs in the top 50 hospitals and the bottom 50 hospitals in the Arab World. The data used in this study were acquired through public sources and from hospital websites; thus, for this study no further ethical approval was necessary.

### Data collection

The "Ranking Web of World Hospitals" is an initiative of the Cybermetrics Lab, a research group belonging to the *Consejo Superior de Investigaciones Científicas* (CSIC), the largest public research body in Spain.<sup>[34]</sup> The Cybermetrics Lab is devoted to the quantitative analysis of the Internet and Web contents especially those related to the processes of generation and scholarly communication of scientific knowledge. The Lab, using quantitative methods, has designed and applied indicators that allow the measurement of the scientific activity on the Web.<sup>[34]</sup> The cybermetric indicators are useful to evaluate science and technology and they are the perfect complement to the results obtained with bibliometric methods in scientometric studies.<sup>[1,2,11,29,30,32,43]</sup>

The unit for analysis is the institutional domain, so only hospitals with an independent web domain are considered. If an institution has more than one main domain, two or more entries are used with different addresses. Names and addresses were collected from both national and international sources, including "Hospitals Worldwide," among others.<sup>[34]</sup>

Hospital activity is multidimensional and this is reflected in its web presence. Therefore, the best way to build the ranking is by combining a group of indicators that measure these different aspects. Almind and Ingwersen proposed the first Web indicator, "Web Impact Factor" (WIF), based on link analysis that combines the number of external inlinks and the number of pages of the website, a ratio of 1:1 between visibility and size.<sup>[3]</sup> This ratio is used for the ranking but adding two new indicators to the size component: number of documents, measured from the number of rich files in a web domain, and number of publications being collected by Google Scholar database. The four indicators were obtained from the quantitative results provided by the main search engines [Table 1].

Next, data were collected on each hospital CEO. To do this, we used hospitals' websites and, on some occasions,

**Table 1: The four webometrics used in “Ranking Web of World Hospitals” (visibility, size, rich files, and scholar), their method of processing, their weight, and their criteria of use**

Indicators	Processing	Weight	Criteria
Visibility	The total number of unique external links received (inlinks) by a site can only be confidently obtained from Yahoo Search, Live Search, and Exalead. For each engine, results are log-normalized to 1 for the highest value and then combined to generate the rank.	50%	The number of external inlinks received by a domain is a measure that represents visibility and impact of the published material, and although there is a great diversity of motivations for linking, a significant fraction works in a similar way as bibliographic citation.
Size	Number of pages recovered from four engines: Google, Yahoo, Live Search, and Exalead. For each engine, results are log-normalized to 1 for the highest value. Then for each domain, maximum and minimum results are excluded and every institution is assigned a rank according to the combined sum.	20%	The inclusion of the total number of pages is based on the recognition of a new global market for academic information, so the web is the adequate platform for the internationalization of the institutions. A strong and detailed web presence providing exact descriptions of the structure and activities of the university can attract new students and scholars worldwide.
Rich files	After evaluation of their relevance to academic and publication activities and considering the volume of the different file formats, the following were selected: Adobe Acrobat (.pdf), Microsoft Excel (.xls), Microsoft Word (.doc), and Microsoft PowerPoint (.ppt). These data were extracted using Google and merging the results for each file type after log-normalizing in the same way as described before.	15%	The success of self-archiving and other repositories related initiatives can be roughly represented from rich file and Scholar data. The huge numbers involved with the pdf and doc formats means that not only administrative reports and bureaucratic forms are involved. Excel and PowerPoint files are clearly related to academic activities.
Scholar	Google Scholar provides the number of papers and citations for each academic domain. These results from the Scholar database represent papers, reports, and other academic items	15%	

personal contact with institutions (in the form of a request for the name of the CEO). Each CEO was classified into one of the two categories – physician leaders and leaders who are nonphysician managers. To qualify as a physician leader, by this study’s criterion, a CEO must have been trained in medicine and obtained a Doctor of Medicine (MD) degree, or its equivalent (MBBS).

### Data analysis

To establish whether the top 50 hospitals or bottom 50 hospitals in the rankings are more likely to be led by physicians or professional managers, we used an independent samples *t*-test and regression equations to compare percentages. *P* values <0.05 were considered statistically significant for all analyses. All statistical analyses were performed with GraphPad Prism.

## RESULTS

A total of 283 hospitals were ranked in the Arab World. Hospitals ranking between 1 and 50 were considered the top 50 hospitals, and those ranking between 234 and 283 were considered the bottom 50 hospitals.

Saudi Arabia had the highest number of top 50 hospitals with 17 hospitals ranked, followed by the UAE with 11 top 50 hospitals. Saudi Arabia also had the highest number of bottom 50 hospitals with 7 hospitals ranked, followed by the UAE and Tunisia, with 6 hospitals each [Table 2].

Among the top 50 hospitals in the Arab World, 54% of the CEOs were physicians, whereas 46% of the CEOs were

nonphysician managers. Among the bottom 50 hospitals in the Arab World, 74% of the CEOs were physicians, whereas 26% of the CEOs were nonphysicians [Figure 1]. Physician leadership was significantly associated with lower hospital ranking (bottom 50 hospitals) in the Arab World (*P* = 0.0031) [Table 3].

## DISCUSSION

Our results are cross-sectional associations and use one particular hospital-quality ranking. This means that they have important limitations. Therefore, the findings do not prove that nonphysician managers make more effective leaders than physicians. Potentially, they may even reveal a form of the reverse – assortative matching – in that the bottom hospitals may be more likely to seek out physicians as leaders. Arguably, however, better hospitals will have a wider pool of CEO candidates to choose from, because of the extra status and wealth that they attract.<sup>[21]</sup> This makes the fact established in this article an interesting one. The study’s results show that hospitals in the Arab World positioned lowest in the “Ranking Web of World Hospitals” have made judgments that differ from those hospitals higher up: on average they were more likely to hire physician leaders as CEOs.

### Hospital ranking systems

The results of this study differ from what has been reported in the literature. Goodall found that US hospitals positioned higher in a widely used media ranking, “US News and World Report” (USNWR), are more likely to be led by medical doctors rather than managers.<sup>[21]</sup>

**Table 2: The number of ranked hospitals in each Arab country as per the "Ranking Web of World Hospitals" by Cybermetrics Lab, 2017 (n=283)**

Country	Number of top 50 hospitals	Number of bottom 50 hospitals
Algeria	0	1
Bahrain	1	1
Comoros	0	0
Djibouti	0	0
Egypt	5	4
Iraq	0	1
Jordan	2	0
Kuwait	3	2
Lebanon	4	5
Libya	0	4
Mauritania	0	0
Morocco	3	5
Oman	0	0
Palestine	1	0
Qatar	1	2
Saudi Arabia	17	7
Somalia	1	1
Sudan	0	1
Syria	1	4
Tunisia	0	6
UAE	11	6
Yemen	0	0

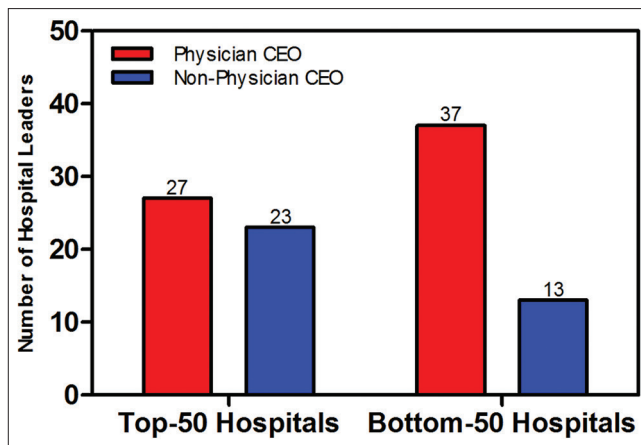
**Table 3: The association between physician and nonphysician leadership and hospital ranking in the Arab World; hospital rankings provided by Cybermetrics Lab's "Ranking Web of World Hospitals," 2017**

	Top 50 hospitals	Bottom 50 hospitals	P
Physician CEO	27 (54%)	37 (74%)	0.0031*
Nonphysician CEO	23 (46%)	13 (26%)	
Total	50 (100%)	50 (100%)	

CEO: Chief executive officer. \*P<0.05 are significant

Many others have also suggested that placing physicians into leadership positions can result in improved hospital performance and patient care.<sup>[8,9,12,13,15,25-27,38,39]</sup> We believe that the conflicting measures of hospital quality and ranking systems can explain this difference.

In our study, we use the "Ranking Web of World Hospitals" to assess hospital performance based on cybermetric indicators that are useful to evaluate science and technology metrics.<sup>[1,2,11,29,30,32,43]</sup> These are assessed by exploring the hospital's web domain including visibility, size, rich files, and scholar data. Empiric measures including mortality and morbidity rates, number of procedures performed, and their rate of success along with the patients' satisfaction are not considered. Therefore, this ranking table cannot be viewed as an



**Figure 1: Physician CEOs versus non-physician CEOs in the top-50 and bottom-50 hospitals in the Arab World, as per the "Ranking Web of World Hospitals" by Cybermetrics Lab, 2017. Physician leadership was associated with bottom-50 ranking in the Arab World (p=0.0031)**

entirely reliable measure of quality. Other popular rankings, like USNWR, do cover survival and other care-related indicators; however, its rankings rely heavily on reputational measures, like "expert opinions."<sup>[10]</sup> These measures take up 30% of the score on which the hospitals are ranked. "Patient safety" takes only 5% of the overall score.<sup>[10]</sup> Sehgal<sup>[37]</sup> argues that the relative standings of the top 50 hospitals in USNWR largely reflect the subjective reputations of those hospitals. Moreover, little relationship exists between subjective reputation and objective measures of hospital quality among the USNWR top 50 hospitals.<sup>[37]</sup> In addition, many small nonteaching hospitals are not included in the USNWR rankings, which can ultimately alter the results obtained by Goodall *et al.*

The "Ranking Web of World Hospitals" used in our study includes all hospitals – regardless of size – in the Arab World that have a website domain. Many of the bottom 50 ranked hospitals were single-specialty centers, primary care centers, and polyclinics with few staff members and employees. However, the top 50 ranked hospitals were mostly academic medical centers that provide tertiary care in multiple disciplines and specialties. These centers often have hundreds of physicians, staff members, and employees. Therefore, it makes more sense that bigger hospitals will have a larger online presence, more web files, and more scholarly material associated with it. Consequently, academic medical centers will naturally rank higher when cybermetric and scientometric indicators are considered. However, with the variety of indicators used among different ranking systems, the question remains: what is the basis on which hospitals should be ranked?

If we advocate the "patient first" perspective that is the major driving force of physicians, then hospitals whose

system satisfies the needs of patients more should be ranked higher. Academic medical centers and large teaching hospitals are not the benchmark by which other hospitals should be measured. A successful small hospital with good doctors and pleasant staff but no academic superstructure should be ranked adequately if its patients are satisfied with its services. The “patient first” ideal is a well-known principle in nearly every physician; however, in some places, administrations and politics come before the patient, as do other subjective factors. Moreover, the choice of the patient is often physician-related and not hospital-related. When a patient, a family member or a friend needs medical consultation, they look for the best physician available. If they go to the highly ranked hospitals, they do so with the hope that the best physicians are there as well; the hospital building or the administration *per se* are not the main concern of the patient. Nevertheless, it is unnecessary that the best ranked hospitals have the best physicians.

Current ranking metrics fail to address the patients’ needs or reflect measures of their satisfaction. Objectively determining the best hospital is hard and is almost impossible to quantitate.<sup>[4]</sup> Nonetheless, using rating systems as heuristic devices to assess healthcare providers has become common,<sup>[35]</sup> and it has been shown to influence consumers’ behavior.<sup>[33]</sup> Our study uses the “Ranking Web of World Hospitals” classification because it is the only one established to include hospitals in the Arab World.

### Who should run hospitals?

In the Arab World, politics, religion, and familial descent often play a role in dictating to whom the hospital leadership position is assigned. As the “provider of healthcare services” is an important and powerful position within the governance system, politics often overthrow academia and expertise.<sup>[16,17]</sup> For example, many leadership positions in high ranked hospitals in some Arab kingdoms are occupied by royal family members, who are not physicians. In more democratic Arab countries, where the healthcare system is privatized, private hospitals are owned and directed by professional managers. When the government directed these hospitals to become the center of care, insurance companies and governmental agencies paid all the money to the hospitals for health services. Therefore, professional managers became in control of the finances and, ultimately, power. With this model of hospital leadership, there is loss of insight into the needs of the patient, and the gap between hospital leaders and physicians widens. However, to maintain the position of power, professional managers supplant their deficiencies by hiring consultants to tell them what to do, which is usually a waste of money and resources.

Hence, back to the question: “who should run hospitals?” We believe that physicians are the most equipped to

run healthcare institutions as they can stir the hospital policies toward their longstanding principle: “patients first.” Goodall’s theory of “expert leadership” proposes that just as highly cited scholars make better presidents of research universities,<sup>[20,22,23]</sup> and ex-NBA stars make better NBA basketball coaches,<sup>[18]</sup> physicians can make better hospital leaders.<sup>[21]</sup> They understand how they can create the optimal work environment through appropriate goal-setting, evaluation and support. These factors are positively associated with workers’ well-being and performance.<sup>[19]</sup>

### Can physicians run hospitals?

Many would argue that the absence of managerial leadership competencies among the physicians who hold key positions in bottom-ranked hospitals is the reason why these hospitals ranked low. Indeed, physicians may be competent in the arenas of education, clinical care, and research; nonetheless, they may have little or no training in areas such as organizational behavior, management, finance, and marketing – a set of competencies increasingly more germane to their daily responsibilities.<sup>[5]</sup> However, we established early on that the ranking systems currently in use are flawed and no perfect ranking system exists to objectively state which hospital is the best. Therefore, the argument on which this claim is made is weak.

It is interesting that 7 of the top 10 hospitals ranked in 2018-2019 (USNWR) for neurology and neurosurgery are led by physicians.<sup>[41]</sup> In fact, physicians have been documented to lead some of the best hospitals and centers in the world. The Mayo Clinic and Cleveland Clinic hospitals are ranked as the best hospitals in the United States, according to the 2018–2019 USNWR.<sup>[42]</sup> The CEOs of both are highly skilled physicians, a neurologist and a cardiothoracic surgeon, respectively. Both institutions have been physician-led since their inception around a century ago. Because of this leadership model, the Mayo Clinic and the Cleveland Clinic occupy the first and fourth positions for neurology and neurosurgery, respectively.<sup>[41]</sup> Therefore, this establishes that physicians are capable of successfully leading a healthcare institution.

The issue is not with the physician’s knowledge or capabilities but with the physician’s goals. Some physicians might regard running a hospital as an administrative task, not a serious scholarly or intellectual endeavor. Physicians may also fear that assuming greater leadership responsibility would threaten their clinical commitment.<sup>[24]</sup> Nonphysician hospital CEOs do not provide care for patients and are free from this intellectual elitism demonstrated by some physicians. Other physicians may also judge that if they do not continue to care for patients, many years of hard work in medical school and residency will have been for naught. Some may feel unqualified for leadership.<sup>[44]</sup>

It is important to note that the patient is the customer in the healthcare business. Bloom *et al.*<sup>[7]</sup> report that it is the proportion of managers with a clinical degree that had the largest positive effect on hospital performance. This success is largely due to physician leaders' decision-making processes, which is often made through the lens of the clinical delivery model.<sup>[40]</sup> Physicians address the business and market needs that are required to be successful, while having a clinical background reflective of their training and expertise. Some may argue that professional managers can grow a clinical perspective in their management approach; however, they have not trained and lived in that world.

Many believe that with the current health challenges facing the Arab World, professional managers and physicians are forced to collaborate; however, it has been documented in similar settings that the willingness and ability for managers and physicians to work together is actually eroding.<sup>[6]</sup> One of the most notable features of a physician-led hospital is the peer-to-peer trust that exists among clinical colleagues. The automatic sense of trust and understanding based on a shared background probably creates a stronger dynamic than between physicians and professional managers.<sup>[40]</sup>

### Neurosurgeons as hospital leaders

Neurosurgery is an elite tertiary specialty that necessitates advanced technology and can only be practiced in hospitals. Furthermore, comprehensive care centers need neurosurgeons to treat the most critically ill patients, like those with acute cerebrovascular disease, brain tumors, or traumatic brain injury. Thus, both neurosurgeons and hospitals need each other. However, the question remains: have neurosurgeons, specifically, proven themselves to excel as hospital leaders?

Neurosurgeons are culturally known to be highly self-motivated, dedicated to excellence, and autonomous in their way of work. They are often the first to advance quality initiatives and can be leaders in helping organizations adapt to the changing healthcare environment.<sup>[28]</sup> Therefore, having neurosurgeons as hospital leaders will provide high-quality and efficient care and support for education and research. In Canada, The Montreal Neurological Institute (The Neuro) was founded and headed by renowned neurosurgeon Dr. Wilder Penfield, in 1934. The Neuro has grown to be the largest specialized neuroscience research and clinical center in Canada and one of the largest in the world. In Germany, renowned neurosurgeon Dr. Madjid Samii founded and presided over the International Neuroscience Institute. The multidisciplinary center in Hanover is famous to provide care of the highest quality for diseases of the nervous system. The success of this model led Dr. Samii to replicate it in Iran, where he founded and presided the largest research center and hospital for the

neurosciences in the world.<sup>[31]</sup> In the United States, the Barrow Neurological Institute is one of the world's largest and busiest neurological disease treatment and research institutions and is consistently ranked as one of the best neurosurgical training centers in the United States; the institute's CEO and president is a neurosurgeon.

Neurosurgeons have a long history of excellence in healthcare leadership positions. In 1946, upon his return to Madrid, Spain, Dr. Sexto Obrador, pioneering Spanish neurosurgeon, started and developed several neurosurgical departments across the country. Most notably, Obrador was responsible for developing the emblematic *Hospital de La Paz*, which was famous for having one of the best neurosurgical services in the world. Dr. Alfonso Asenjo, pioneering Chilean neurosurgeon, founded the Institute of Neurosurgery and Brain Research of the University of Chile, serving as its Director. His institute was famous in the 1950s for being way ahead from the rest of the world. Another example is Dr. Manuel Velasco-Suarez, pioneering Mexican neurosurgeon, who constructed and organized the National Institute of Neurology and Neurosurgery of Mexico in 1964. The Institute has trained, in the past 50 years, hundreds of doctors from Mexico, Central and South America, Asia, and Europe. The center is among the largest and most comprehensive centers in the world. Other neurosurgeons have also proven their credentials in leadership positions at large and prominent hospitals worldwide.<sup>[14]</sup>

### What makes neurosurgeons good hospital leaders?

We established that the leader should understand medicine well and must be aware of what physicians do on a daily basis. We also established that physicians, particularly neurosurgeons, can be good hospital leaders. Two questions follow: what makes a good hospital leader? And where can we find good hospital leaders?

A good hospital leader is decisive, fair, truthful, and a seeker of excellence. He or she does not compromise on the "patient first" principle or tolerate anything that stands in the way of what is best for the patients.

Where do we find those leaders? Successful leaders are found mostly as heads of highly stressful and demanding specialties. These personnel have proven themselves by building successful practices and leading teams of people to achieve great outcomes. Moreover, they are generally highly regarded by their peers and the society they live in. Physicians of less-demanding specialties may not be used to dealing with high-stress situations or taking decisive verdicts. This can lead to compromise in matters related to the "patient first" principle.

Much of this is personality-driven. Like the craft of neurosurgery, certain character traits and technical skills are symbiotic and essential for excellent

leadership to face the rigors of uncertainty and change governing healthcare today. Successful neurosurgeons are strong decision-makers and fine executors by virtue of their training and practice. The systematic training involved in becoming a neurosurgeon develops inherent qualities and permits the acquisition of technical competencies that include strategic and tactical planning, persuasive communication, negotiation, financial decision-making, team-building, conflict resolution, and interviewing. These skills require training, akin to that of academic neurosurgery, and are necessary for the success and development of a 21<sup>st</sup>-century healthcare institution. In addition, neurosurgeon leaders, with their boastful skillset, are likely to set high standards for hiring. Subsequently, this leads to better outcomes and increased patient satisfaction and perception of quality.

## CONCLUSION

It has been shown that hospitals positioned lower in a media ranking in the Arab World are more likely to be led by physicians rather than professional managers. However, given the difficulty of creating objective hospital performance measures, it is necessary to be cautious in analyzing empirical work.

A new hospital ranking system must be developed to focus on the “patient” in the healthcare environment. The metrics will typically answer the basic question of “what is the best place to go to when the patient is sick?” This system will also evaluate the leadership qualities of the persons who are leading such institutions and determine whether the leaders’ backgrounds are usually medical or nonmedical in nature.

Neurosurgeons are advised to obtain the academic training necessary for excellence in leadership so that the physician community may once again lead and direct the healthcare enterprise. Hospitals and academic medical centers need to be pulled out of the political and religious power struggles and debates that govern many countries in the Arab World, and patient satisfaction and quality of care must be prioritized.

Management education must become an integral part of all medical education, and medical schools and residency programs must designate leadership as a field of scholarly concentration so that interested and capable learners have opportunities to pursue further studies.

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## Conflicts of interest

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