



Original Article

## The market landscape of online second opinion services for spine surgery

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### ABSTRACT

**Background:** The aim of this study was to identify patient interest in second opinion services online and identify the options patients have in obtaining second opinions from spine surgeons in the United States.

**Methods:** We utilized Google Trends (i.e., search data since 2010) to ascertain the level of interest in receiving second opinions for spinal surgery. In addition, we contacted the top 30 hospitals for neurology and neurosurgery in the U.S. News rankings by phone to obtain information regarding when/how and at what cost they provide second opinions for spine surgery.

**Results:** The cost of the second surgical opinions averaged \$493 ( $\pm$ \$343) USD (range \$90–\$1,300); the time to receive a second opinion averaged 20 ( $\pm$ 19) days (range 1 day–5 months). Remote or “online second opinion” programs charged an average of \$643 ( $\pm$ \$259) USD (range \$100–\$850), and the time to receive an “online second opinion” averaged 14 ( $\pm$ 7) days (range 1–4 weeks).

**Conclusion:** Although second opinions have been shown to be beneficial to patients, ambiguous or high costs and long wait times may serve as barriers for certain groups (i.e., uninsured or underinsured) and potentially diminish the quality of care.

**Keywords:** Online second opinion, Second opinion, Spine surgery

### INTRODUCTION

Second medical opinions may provide patients with a better understanding of their medical condition and empower them to make informed decisions about their health, particularly with respect to surgical treatments.<sup>[6]</sup> However, the market landscape surrounding “online second opinion” services for spine surgery in the United States is not well-studied. With respect to spine surgery, a number of publications have demonstrated incongruence between providers’ indications, and surgical techniques, thus further highlighting the importance of second opinions.<sup>[2,3,7]</sup> One study calculated that there is 75–76% probability of disagreement with treatment choice for lower back pain between any two randomly chosen spine surgeons.<sup>[4]</sup>

Notably, the literature suggests that the majority of patients find that second opinions are beneficial.<sup>[3,5]</sup> In one national second opinion program ( $n = 6,791$  patients) in the United States,

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94.7% of patients were satisfied with their second opinion.<sup>[5]</sup> Another study ( $n = 240$  patients) found 59% of patients rated second, third, or fourth opinion consultations with spine surgeons as “very helpful.”<sup>[3]</sup> In this study, we evaluated the current market for online spine surgery second opinions, along with analyzing the requisite costs, and waiting times.

## MATERIALS AND METHODS

### Analysis using Google Trends

We used the Google Trends database to ascertain the level of interest in receiving second medical opinions for spinal disorders over time. Using the broad search term “second medical opinion,” we received search data in the United States from the last decade; data were normalized by all searches on Google for a given period of time and presented as a “relative interest” value from 0 to 100 (trends.google.com). We also performed significance testing using  $t$ -test for slope of the regression line with an alpha of 0.05 as the significance threshold.

### Analysis of top 30 hospitals – 2019 Neurology and Neurosurgery US News Rankings

The top 30 hospitals from the 2019 Neurology and Neurosurgery US News Rankings were contacted by phone to obtain information about second opinion services for spine surgery in February 2020. We asked: (1) how much does a second opinion consultation cost patients? (2) How long does it take to be seen for a second opinion? (3) Are appointments available in-person, over the phone, or over video call? Is there an “online” second opinion program? and (4) On average, how long does it take to be seen?

### Definition of online or remote second opinion programs

Online or remote second opinion programs were defined as programs that allow patients to send in medical records and imaging, which are then reviewed by a spine surgeon who provides a second medical opinion. We distinguished “online second opinions,” which are typically out-of-pocket services, from in-person, over the phone, or video call consultations with spine surgeons. Data regarding cost, and time to receive an “online second opinion” (e.g., after submitting records and imaging), were obtained from the programs’ websites, or the programs were contacted directly. All data are presented as mean ( $\pm$ standard deviation).

### Definition of wait time and costs for second opinions

We defined “wait time” as the time a patient would need to wait before receiving a second opinion. Costs and wait times for second opinion consultations and “online second opinions” were provided by some institutions as a range.

Therefore, to estimate means and standard deviations, the midpoint was obtained as necessary to calculate an approximate or estimated mean and standard deviation.

## RESULTS

### Internet Google Trends results

We queried internet data from Google Trends using the term “second medical opinion” (2010–2020: United States). Search interest values per month were averaged for each year between 2010 and 2019 [Table 1] and plotted as a function of time, and a  $t$ -test for slope of the regression line was performed [Figure 1]. We found statistically significant increases in the relative interest for the search term “second medical opinion” over the past decade ( $P < 0.0001$ ,  $t = 21.5201$ ) [Figure 1].

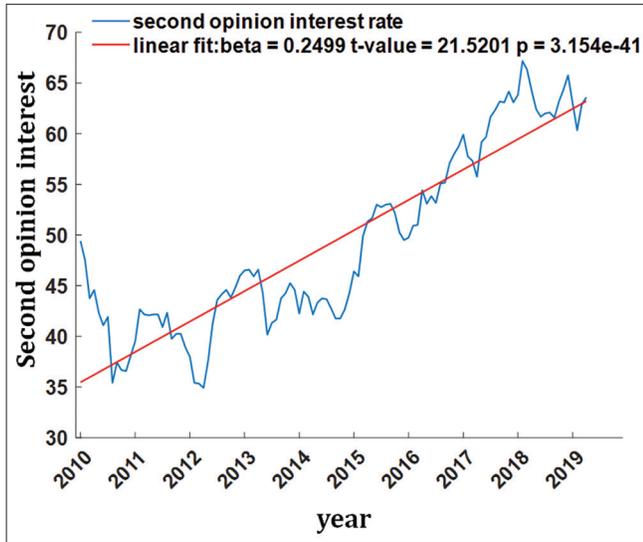
### Analysis of top 30 hospitals – 2019 Neurology and Neurosurgery US News Rankings

For the 30 medical centers in 13 states included in the study, our response rate was 100%; all centers called answered at least one question in the survey [Table 2]. Data obtained included the estimated cost, time to obtain a second opinion, and types of appointments available (e.g., in-person, over the phone, video call, or online) [Tables 2 and 3]. We found that ~97% of hospitals (29/30) provided in-person consultations for patients seeking a second opinion from a spine surgeon. However, 63% (19/30) did not have remote options (phone/video call consultations or “online second opinions”), but provided in-person consultations as the sole choice [Table 3]. Based on ~87% (26/30) of hospitals surveyed, the average wait time for a second opinion was ~20 ( $\pm$ 19) days (range 1 day–5 months) depending on physician availability [Table 2]. Only 13% (4/30) offered or sometimes offered (at the discretion of the treating physician), second opinion consultations over phone or by video call [Table 3]. A minority of medical

**Table 1:** Relative interest in second medical opinions by year from Google Trends.

Year	Relative interest values for “second medical opinion”*
2010	49
2011	40
2012	38
2013	47
2014	42
2015	46
2016	50
2017	60
2018	64
2019	63

\*Scale: 0–100, see methods



**Figure 1:** Relative interest in second medical opinions as a function of year. Blue trace denotes smoothed Google Trends data using a moving average window size of 12 months and a step size of 1 month. Red line denotes a best linear fit. The regression coefficient is 0.2499. Significance testing using *t*-test for slope revealed a significant positive trend of second opinion interest rate, growing at rate of 0.249 units per month ( $P < 0.0001$ ,  $t = 21.5201$ ).

**Table 2:** Summary of in-person second opinion options for spine surgery.

Response rate	100% (30/30)
Mean cost in \$USD	\$493 ( $\pm$ \$343)*
Mean wait time in days	20 ( $\pm$ 19)*
Geographic distribution of hospitals	
West	27% (8/30)
Northeast	33% (10/30)
South	13% (4/30)
Midwest	27% (8/30)

\*Mean ( $\pm$ standard deviation)

centers, 13% (4/30), were not able to provide the estimated time for a patient to receive a second opinion from a spine surgeon [Table 3]. Only one medical center (ranked 26) reported that no second opinion appointments could be made unless an individual spine surgeon was contacted directly and agreed to provide a second opinion [Table 3].

### Estimated cost of second opinions

The estimated mean cost of a second opinion consultation was \$493 ( $\pm$ \$343) (range \$90–\$1,300 USD) [Table 2]; ~33% (10/30) of medical centers were able to provide an exact cost estimate, ~33% (10/30) provided a price range, while ~33% (10/30) were unable to provide the cost of an in-person or phone/video call second opinion consultation [Table 3].

### Online second spinal opinions versus in-person/phone/video call second opinions

In contrast to an in-person or phone/video call second opinion consultation, “online second opinion” programs, whereby spine surgeons review patient imaging and provide a second opinion remotely for an out-of-pocket fee, were also identified. They were available at ~23% (7/30) of medical centers surveyed [Table 3] and the average cost was \$643 ( $\pm$ \$259) USD (range \$100–\$850 USD) [Table 4]. Although insurance was not accepted at any of these “online second opinion” programs, patients with a flexible spending account or health savings account may choose to pay through one of these accounts, and expenses paid through these accounts would not be subject to taxes [Table 4]. The estimated average wait time to receive an “online second opinion,” after submitting medical records and imaging, was ~14 ( $\pm$ 7) days (range 1–4 weeks) [Table 4].

### DISCUSSION

Analysis of Google search Trends demonstrated statistically significant increases in relative interest utilizing the search term “second medical opinion” over the last decade. This may reflect an increased interest from patients for these types of services. From our survey of the top hospitals ranked by Neurology and Neurosurgery US News Rankings, we found considerable variability with respect to the cost of standard second opinion consultations, and “online second opinion” services, along with marked differences in the wait times to receive second opinions.

### Compromised quality with increased costs and delays for second spinal surgical opinions

The cost and time it takes for a patient in the United States to receive a second opinion for a spinal disorder are important considerations when considering patient access to quality care. For instance, if it takes a long period of time for a patient to see a spine surgeon for a second opinion, a patient with severe and/or disabling pain may choose to forgo the second opinion if they were initially told to undergo surgery. Of note, we did not consider the average time it would take a patient to schedule requisite spine surgery, which could significantly delay surgery even further. Moreover, delays, increased costs (e.g., travel expenses and increased uncovered costs), and the major differences in second surgical options must be factored into the equation of “quality of care.”<sup>[2-4,7]</sup>

### Benefit of online/remote second spinal surgical opinions

The potential benefit of online or remote second opinion programs is obtaining a second opinion without the need to travel. Indeed, the COVID-19 pandemic and the increased need for physical distancing have made online second opinions a more appealing option. Although the majority of online

**Table 3:** Spine surgery second opinion options at the US medical centers.

Neurology and Neurosurgery US News Rankings 2019	Hospital	Cost (\$ USD)	Time to receive second opinion	Format(s)	Department	Location
1	Johns Hopkins	700–800	3–7 days	In person	Neurosurgical spine center	Baltimore, MD
2	Mayo Clinic	500–1000	1 week	In person or by phone (depending on physician)	Spine center	Rochester, MN
3	UCSF	In person: 100; online: 700	3 weeks	In person	Spine center	San Francisco, CA
4	New York Presbyterian (Cornell and Columbia)	In person: 1300; online: 800	1-3 weeks	In person, online	Och Spine Hospital	New York, NY
5	Northwestern	500	3-4 weeks	In person	Orthopedics and Neurosurgery	Chicago, IL
6	UCLA	864-1085	1-2 weeks	In person	Spine center	Los Angeles, CA
7	NYU	NA	1 week	In person	Spine center	New York, NY
8	Rush	275-650	3-4 weeks	In person	Spine neurosurgery team/Midwest orthopedics	Chicago, IL
9	Stanford	In person: 697-1081; online: 700	In person: 5 days; online: 2 weeks	In person, online	Spine center	Stanford, CA
10	Cleveland Clinic	In person: 100 for spine surgeon, 55 for NP or PA working with spine surgeon; Online: 800	4 weeks	In person, online	Center for Spine Health	Cleveland, OH
11	Barrow Neurological Institute	In person: 675; online: 100	In person: NA Online: 7-10 days	In person, online	Spine program	Phoenix, AZ
12	Cedars Sinai	275–500	1 week	In person	Spine Center	Los Angeles, CA
13	MGH	In person: NA; online: 850	NA	In person, online	NA	Boston, MA
14	Mount Sinai	NA	Earliest 1 day	In person, video/ phone call (depends on surgeon)	Spine Center	New York, NY
15	UT Southwestern	290–400	1-2 weeks	In person	Spine Center	Dallas, TX
16	Keck Medical Center of USC	500–1000	4 weeks	In person	Spine center	Los Angeles, CA
17	Brigham and Women's Hospital	685	2 weeks	In person	Spine center, Neurosurgery	Boston, MA
18	Baylor St. Luke's Medical Center	300–500	4 weeks	In person	Neurosurgery	Houston, TX

(Contd...)

**Table 3:** (Continued).

Neurology and Neurosurgery US News Rankings 2019	Hospital	Cost (\$ USD)	Time to receive second opinion	Format(s)	Department	Location
19	University of Michigan	NA	8-10 weeks	In person, video/ phone	Neurosurgery	Ann Arbor, MI
20	Barnes-Jewish Hospital	NA	NA	In person	Spine center	Saint Louis, MO
21	Jefferson Health	NA	1 week	In person	Spine program, Neurosurgery	Philadelphia, PA
22	Cleveland Medical Center	In person: 90; online: 550	Earliest 1 day	In person, online	Spine institute	Cleveland, OH
23	Duke University Hospital	175–250	1 day to 2 weeks	In person	Spine center	Durham, NC
24	University of Pittsburgh Medical Center (UPMC)	NA	1 week	In person	Spine center, Neurosurgery	Pittsburgh, PA
25	Hospitals of University of Pennsylvania	NA	1 week to 5 months	In person	Neurosurgery	Philadelphia, PA
26	Huntington Memorial Hospital	NA	NA	NA	NA	Pasadena, CA
27	University of Kansas Hospital	100	1-2 months	In person	Spine center	Kansas City, KS
28	Loyola University Medical Center	160	NA	In person	Spine services	Maywood, IL
29	Montefiore Medical Center	NA	4 weeks	In person	Spine center, Neurological surgery	Bronx, NY
30	UC Davis Medical Center	200–250	1-4 weeks	In person, video call	Spine center	Sacramento, CA

programs provided a written report within 2 weeks, only a subset of patients can afford the cost (e.g., average cost ~\$643 [ $\pm$ \$259], range \$100–\$850 USD). This was more expensive than the average cost of a standard in-person second opinion consultation (~\$493). Notably, although “online second opinion” programs were more expensive, the estimated average wait times for opinion were ~14 ( $\pm$ 7) days; this was lower versus standard in-person second opinion consultations (i.e., 20 ( $\pm$ 19) days). Further, none of the “online second opinion” programs took insurance, thus requiring out-of-pocket payments.

#### Analysis of cost of second spinal surgical opinions

For most patients, costs are covered by insurance companies, and copays vary depending on an individual’s insurance

plan. However, approximately 28 million Americans are uninsured; therefore out-of-pocket costs are very relevant.<sup>[8]</sup> Of interest, ~67% of medical centers either could not provide the specific cost of a second opinion or provide any cost at all. The high or ambiguous costs associated with obtaining a second opinion can serve as barriers for patients in terms of receiving to the highest quality of care.

#### Subset of institutions providing online second spinal surgical opinions (Medical Records, Images Alone)

Seven major academic medical centers provided “online second opinion” services at an average cost of \$643 USD [Table 4] (e.g., patients submitted medical records and imaging studies to a spine surgeon for evaluation). Notably,

**Table 4:** “Online second opinion” programs for spine surgery.

Hospital	Cost	Insurance accepted?	How long to get a second opinion?
Barrow	100	No	7–10 days
Cleveland Clinic	800	No	28 days
Stanford	700	No	14 days
UCSF	700	No	7–10 days
New York-Presbyterian/Weill Cornell	800	No	14 days
University Hospitals Cleveland	550	No	10–14 days
Massachusetts General Hospital	850	No	NA

The Johns Hopkins Hospital had a formal “online second opinion” program which was discontinued; patients now require an in-person appointment to receive a second opinion from a spine surgeon. For these “online second opinion” programs, if a radiologist or pathologist is consulted by the surgeon, the costs increases (e.g., Cleveland Clinic charges \$200 USD if a pathology review was required).

#### Issues of equal access to second spinal surgical opinions

From a health equity perspective, second opinions should be accessible to all patients to maximize quality of care. However, patients with lower education levels and lower socioeconomic status are less likely to seek second opinions.<sup>[1]</sup> Moreover, physicians may be unconsciously biased toward less educated and poorer patients by being less likely to encourage them to seek a second opinion.<sup>[1]</sup> Further, cost is a barrier, varying significantly for online spine surgery second opinions (i.e., \$100–\$850) to in-person opinions (\$90–\$1300), excluding the additional costs for radiology or pathology services.

#### Other arguments for second opinion services

In the future, spine practices and medical centers could take actionable steps to provide greater accessibility to second opinion spinal surgery services, in an effort to standardize the quality of spinal surgical care and improve patient satisfaction.<sup>[2,3,5]</sup> Some specific interventions proposed include educating patients about their right to obtain a second opinion.<sup>[1]</sup> Moreover, other nonspine surgeon physicians (e.g., primary care physicians) treating patients with spinal disorders can be advised to encourage patients to seek a second opinion due to the inherent risks associated with undergoing spine surgery.<sup>[1]</sup>

#### CONCLUSION

There is a paucity of published literature regarding the availability, quality, cost, and efficacy of second opinion

spinal services, which exist in a variety of formats, such as traditional in-person consultations to phone or video call consultations to written second opinions from online programs. Costs and time to receive a second opinion vary widely, and these variables may serve as barriers for patients seeking second opinions, depending on a patient’s geography and socioeconomic status.

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Brian V. Lien and Nolan J. Brown contributed equally.

#### Declaration of patient consent

Patient’s consent not required as patients identity is not disclosed or compromised.

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#### Conflicts of interest

There are no conflicts of interest.

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