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Patient Satisfaction in Ophthalmology: The Impact of Remote Scribes

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Abstract

Purpose: To determine whether remote scribing is associated with patient satisfaction. **Methods:** Physicians were included based on predetermined criteria. For all physicians, Net Promoter Score response data were collected for 3 consecutive months immediately before and 6 months after the transition to remote scribes. Over 2 years, 272 885 responses were analyzed. Patient time spent in the office was also assessed. **Results:** Twenty-three physicians transitioned to remote scribes between March 2022 and September 2023. For participating physicians, the mean Net Promoter Score rating improved from 9.34 to 9.44 ($P = .008$) for "likelihood of recommending physician" and from 9.54 to 9.60 ($P < .001$) for "likelihood of recommending practice." After the transition, the mean time spent in the "primary waiting room" decreased from 14.88 minutes to 13.41 minutes ($P < .001$) and the mean time spent in the "exam room" decreased from 22.89 minutes to 21.22 minutes ($P < .001$). All secondary outcomes improved after the transition. **Conclusions:** After implementing remote scribes and based on Net Promoter Score ratings, patient satisfaction scores improved and patient wait time decreased. Physicians may consider using remote scribes to enhance patient satisfaction and clinical flow.

Keywords

patient satisfaction, wait times, remote scribe

Introduction

Patient satisfaction is a measure of an effective physician–patient relationship. It is a critical metric influencing clinical outcomes, patient retention, treatment plans, and adherence to follow-up appointments.[1–3] Interactions at every step in the appointment process, including the initial scheduling and examination, contribute to the overall patient experience and can affect their satisfaction with the visit.[4]

Factors associated with satisfaction scores include the patients' perception of the physician's conduct and the physician–patient interaction in the office, the accessibility of medical care, and wait times.[5] In particular, waiting for a scheduled appointment is a significant source of patient dissatisfaction in ambulatory care and might even lead to adverse outcomes.[6,7] Strategies used by medical practices to reduce wait times include extending practice hours, relocating photography equipment, offering electronic communication or telephone follow-ups, and creating new scheduling templates through electronic health record (EHR) simulation models[8,9]; however, these are not all-encompassing solutions.

In the wake of the COVID-19 pandemic, new technologies emerged to address the limitations imposed by social distancing. These included tele-ophthalmology and a model of medical scribing called remote scribing.[10,11] A remote scribe is a fully trained medical scribe who works remotely to support the physician in the office. The scribe accesses and populates the medical chart through a secure portal and can hear and directly communicate with the physician during the medical encounter through an earpiece worn by the physician. Although this model likely changes the experience of the office visit, there is a lack of literature examining the effects of implementing remote scribes in clinical practice.

This study assessed the impact of remote scribing on patient satisfaction and patient time spent in the office. Although satisfaction is subjective, a quantifiable patient experience metric is the Net Promoter Score. The score is a composite measure of patient experience that is used in many healthcare settings and medical specialties.[12,13] It consists of a 2-part questionnaire that starts with a rating question, such as "How likely would you be to recommend our service to a friend or colleague?" followed

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by a free-text item that allows patients to provide a rationale for the answer. Although the Net Promoter Score alone may be insufficient for measuring patient experience, it can provide broad insight given its ease of use, understandability, and high completion rate by patients.[14] Using this score as a measure of patient satisfaction, we hypothesized that remote scribing may be associated with improved satisfaction and wait times in the ophthalmology practice.

Methods

Institutional review board/ethics committee approval was obtained according to the Declaration of Helsinki. This retrospective a single-center cohort study at the Retina Group of Washington sought to determine the impact of remote scribe implementation on patient satisfaction and time spent in the office. A total of 272 885 Net Promoter Score responses and patient wait times were analyzed.

All physicians who transitioned from working with in-person scribes to remote scribes between March 2022 and September 2023 were included in the study. Inclusion criteria included physicians who transitioned from working with in-person scribes to remote scribes and who maintained remote scribe use for at least 6 months. Exclusion criteria were new associates with less than 6 months of experience, an average patient load of less than 20 daily, and discontinuous use of remote scribes after the transition.

Remote scribing is defined by 3 characteristics: (1) does not require a person present in the clinic, (2) uses an electronic, virtual, wireless medium to communicate, and (3) fulfills all scribing functions provided by in-person scribing. Retina Group of Washington physicians were trained using a remote interface and received instructions on specific patient and clinic flow preferences.

Patients were alerted to the change and aware that their physician would communicate with a remote scribe through an earpiece. Patients also verbally consented to a remote scribe's participation in the encounter.

Study Design

For all physicians included, Net Promoter Score response data were collected for 3 consecutive months immediately before and 6 months after the remote scribe transition. The transition to using a remote scribe required a minimum 2- to 4-week adjustment period during which the remote scribe was familiarized with clinic flow and personal phrases used by the physician. Two physicians who continued working with in-person scribes served as controls. For the controls, 2 periods of 3 months separated by 1 year were chosen to align with the average transition period of the other physicians and to control for seasonal changes in patient volume and office workflow.

The process for remote scribes and in-person scribes is comparable regarding EHR access because a tablet device is used for in-person scribes. The outcomes for patient satisfaction were scored from 1 through 10. The primary outcomes were the scores for the following questions: (1) How likely would you be to recommend this doctor to your family and friends? (2) How likely would you be to recommend this practice to your family and friends? The secondary outcomes were the scores for the following questions: (1) Were you able to schedule an appointment with the doctor in a timely manner? (2) Were you seen in a timely manner relative to your scheduled appointment? (3) Did this physician answer all your questions? (4) Did the physician explain things in a way you could understand? (5) Did this physician listen carefully to you? (6) Did the physician give you enough information about your condition and treatment options?

For context, Net Promoter Score respondents with ratings of 9 or 10 are promoters, respondents with ratings of 7 or 8 are passives, and respondents with ratings of 6 or less are detractors.[12,14] The final score is calculated by subtracting the percentage of detractors from the percentage of promoters.

In addition, data provided by the practice's EHR (IntelleChart Pro, Nextech) assessed patient time spent in the office. Using EHR clinic flow system data, the time spent at each stage of the office visit was collected as follows: primary waiting, technician screen, optical coherence tomography, photographs, dilation waiting, examination room, checkout, and exit; data were collected for 90-day intervals before and after the transition. Transitions between each stage were recorded immediately on the tablet device by non-scribing ophthalmic technicians. Numerical values were sorted, and outliers in the data were omitted. Data on the time spent in the primary waiting room and examination room were averaged for each physician.

Statistical Analysis

Data were analyzed using the GraphPad Prism 10 statistical software (GraphPad Software). The Levene test was conducted using $\alpha = 0.01$ to determine the homogeneity of variance for all variables. The equality of variances was determined for all variables. The means of each group (pre-scribe vs post-scribe) were compared using the Welch *t* test. Analysis of each of the aggregate datapoints was performed. The 95% CIs were calculated. Statistical significance was set at $P < .05$.

The correlation analysis between Net Promoter Score metrics and the time spent in the office was performed by calculating the Pearson correlation coefficient (r). A power analysis for 2-sample *t* tests with unequal sample sizes was performed using a small effect size (0.3) and $\alpha = 0.05$ to confirm a sufficient sample size in the control group and experimental group in accordance with previously published works on patient satisfaction.[15,16]

Results

Twenty-three physicians transitioned from working with in-person scribes to remote scribes between March 2022 and September 2023. Two physicians continued working with in-person scribes throughout the study and served as controls. The power was near 1.00 across all sample sizes between control data and experimental data, minimizing the likelihood of a type 2 error.

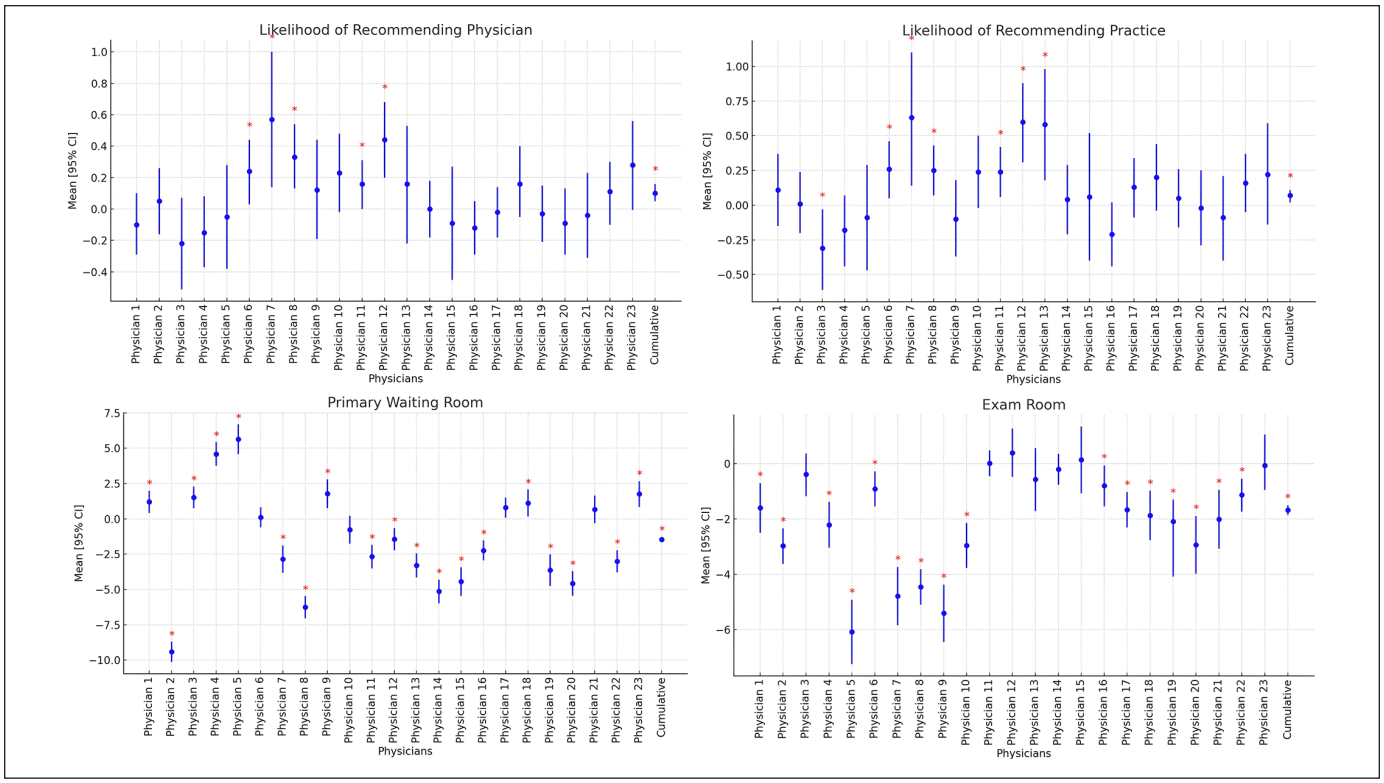

Figure 1. Individual physician data and cumulative values for primary outcomes. The * denotes statistical significance based on $\alpha = 0.05$.

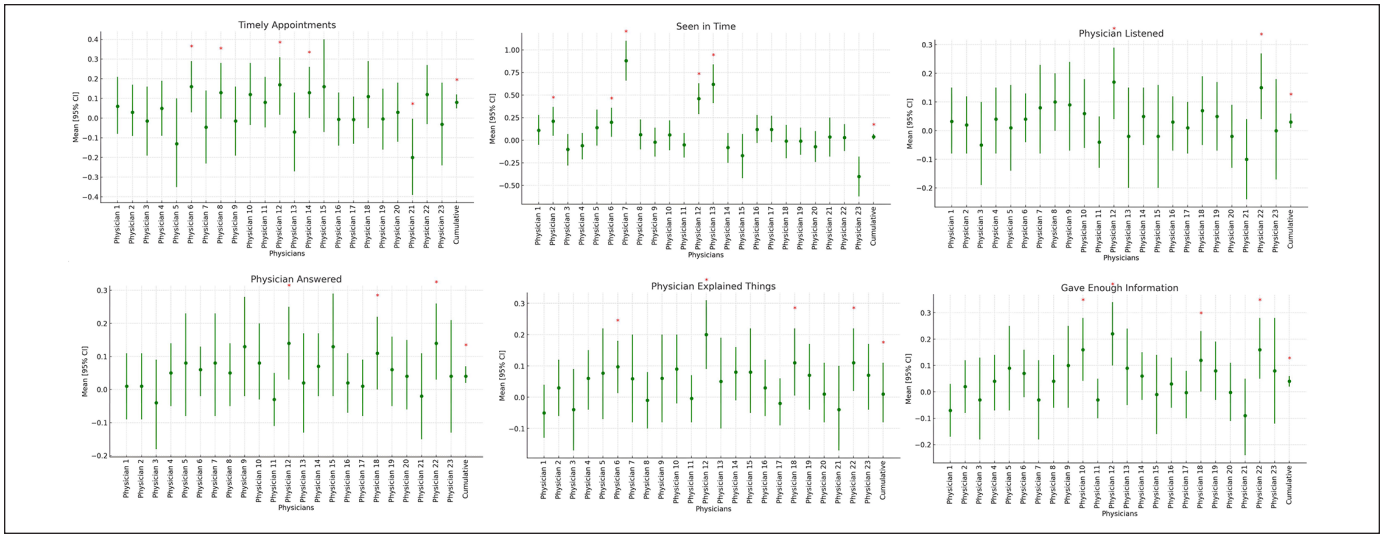

Figure 2. Individual physician data and cumulative values for secondary outcomes. The * denotes statistical significance based on $\alpha = 0.05$.

Net Promoter Score Survey Outcomes

After the implementation of remote scribes, the mean Net Promoter Score rating for "likelihood of recommending physician" improved from 9.34 (n = 5845) to 9.44 (n = 5335) ($P = .008$; 95% CI, 0.05-0.16). The mean rating for "likelihood of recommending practice" improved from 9.54 (n = 5603) to 9.60 (n = 5106) ($P < .001$; 95% CI, 0.02-0.11). Figure 1 shows the individual physician data for primary Net Promoter Score outcomes.

All secondary outcomes improved significantly after the implementation of remote scribes (Figure 2). For "timely appointments," the mean rating improved from 3.26 (n = 6037) to 3.34 (n = 5516) ($P < .001$; 95% CI, 0.05-0.12). For "seen in time," the mean rating improved from 3.46 (n = 6192) to 3.50 (n = 5672) ($P = .024$;

Table 1. Changes in Individual Physician Net Promoter Score Ratings.

Variable	Improved Scores	Worse Scores	Unchanged Scores
Likelihood of recommending practice	6	1	16
Likelihood of recommending physician	5	1	17
Timely appointments	4	1	18
Seen in time	5	1	17
Physician listened	2	0	21
Physician answered	3	1	19
Physician explained things	4	0	19
Gave enough information	4	0	19

Table 2. Primary and Secondary Outcomes for Controls.

Outcome	Mean Difference[a]	95% CI	*P* Value
Primary waiting room	1.06	0.60 to 1.53	<.001[b]
Exam room	−2.90	−3.48 to −2.33	<.001[b]
Likelihood of recommending physician	0.003	−0.11 to 0.12	.96
Likelihood of recommending practice	0.03	−0.13 to 0.18	.74
Timely appointments	−0.03	−0.12 to 0.06	.49
Seen in time	0.14	0.02 to 0.24	.02[b]
Physician listened	0.02	−0.05 to 0.09	.57
Physician answered	−0.006	−0.07 to 0.06	.85
Physician explained things	0.02	−0.04 to 0.08	.57
Gave enough information	0.04	−0.03 to 0.1	.24

[a]Mean difference before and after remote scribe implementation.
[b]Statistically significant based on $\alpha = 0.05$.

95% CI, 0.01-0.07). For "physician listened," the mean rating improved from 3.71 (n = 5793) to 3.74 (n = 4872) ($P = .02$; 95% CI, 0.01-0.06). For "physician answered," the mean rating improved from 3.77 (n = 5762) to 3.81 (n = 5280) ($P < .001$; 95% CI, 0.02-0.07). For "physician explained things," the mean rating improved from 3.80 (n = 5729) to 3.84 (n = 5240) ($P < .001$; 95% CI, −0.08 to 0.11). For "gave enough information," the mean rating improved from 3.71 (n = 5698) to 3.75 (n = 5213) ($P = .002$; 95% CI, 0.02-0.06). Table 1 shows the changes in the ratings after implementing remote scribes for individual physicians.

For physicians who continued using in-person scribes, there was no statistically significant difference in scores on the primary outcomes of "likelihood of recommending physician" and "likelihood of recommending practice" between before and after the period during which other physicians transitioned. The mean scores for "seen in timely manner" increased significantly between the 2 time periods ($P = .02$; 95% CI, 0.02-0.24). There was no significant change in all other secondary outcomes measured (Table 2).

Patient Time Spent in the Office

For patients of physicians who transitioned to remote scribes, there were statistically significant decreases after the transition in the mean time spent in the "primary waiting room" and in the "exam room." The mean time spent in the "primary waiting room" decreased from 14.88 minutes (n = 36231) to 13.41 minutes (n = 36207) after the implementation of remote scribes ($P < .001$; 95% CI, −1.65 to −1.28). Of the 23 physicians, 13 had decreased times, 7 had increased times, and 3 had unchanged times. The mean time spent in the "exam room" decreased from 22.89 minutes (n = 41579) to 21.22 minutes (n = 42879) after the implementation of remote scribes ($P < .001$; 95% CI, −1.85 to −1.50). Of the 23 physicians, 13 had decreased times and 10 had unchanged times. The time spent in the "primary waiting room" was negatively correlated with "likelihood of recommending physician" ($r = −0.454$; $P = .029$) and "likelihood of recommending practice" ($r = 0.432$; $P = .039$) ratings. Pearson correlation coefficients for time spent in the "exam room" and Net Promoter Score metrics were not statistically significant (Table 3).

For patients of physicians who continued using in-person scribes, the mean time spent in the "primary waiting room" increased from 11.12 minutes (n = 3583) to 12.65 minutes (n = 4069) ($P < .001$; 95% CI, 0.60-1.53) (Table 2). The mean time spent in the "exam room" decreased from 28.49 minutes (n = 3997) to 25.88 minutes (n = 4631) ($P < .001$; 95% CI, −3.48 to −2.33). The supplemental materials show additional datapoints for the experimental group's primary and secondary outcomes.

Table 3. Correlation Between Net Promoter Score Ratings and Time Spent in the Office.

Metric[a]	Primary Waiting Room	Exam Room
Likelihood of recommending physician		
r value	−0.454[b]	0.283
P value (2-tailed)	.029	.191
Number	23	23
Likelihood of recommending facility		
r value	−0.432[b]	0.125
P value (2-tailed)	.039	.570
Number	23	23
Timely appointments		
r value	−0.056	−0.135
P value (2-tailed)	.800	.539
Number	23	23
Seen in time		
r value	−0.072	0.179
P value (2-tailed)	.744	.414
Number	23	23
Physician listened		
r value	0.084	0.192
P value (2-tailed)	.702	.381
Number	23	23
Physician answered		
r value	0.266	0.260
P value (2-tailed)	.219	.231
Number	23	23
Physician explained things		
r value	0.078	0.067
P value (2-tailed)	.725	.760
Number	23	23
Gave enough information		
r value	0.060	0.044
P value (2-tailed)	.785	.844
Number	23	23

[a]The *r* values denote the Pearson correlation coefficient. [b]Statistically significant based on $\alpha = 0.05$.

Conclusions

Improvements in primary and secondary Net Promoter Score ratings for physicians who transitioned to remote scribes suggest that high patient satisfaction scores are maintained and may improve after the implementation of remote scribes. Previous studies in ophthalmology clinics report that wait times are associated with patient dissatisfaction.[17–20] Studies in other surgical subspecialty settings also found higher patient satisfaction scores with shorter wait times.[21,22] Moreover, wait time is correlated with patients' perceptions of their care and the credibility of information given by physicians.[6,23,24] In line with these reports, the primary Net Promoter Score ratings in our study increased concurrently with significant decreases in patient wait times for physicians who transitioned to remote scribes.

The effect of remote scribing on Net Promoter Score ratings is validated by our finding that control physicians who continued working with in-person scribes had unchanged scores rather than improved scores on primary Net Promoter Score ratings. Although scores on the "likelihood of recommending physician" and "likelihood of recommending facility" showed no significant changes over time for the control physicians, the mean time that patients spent in the primary waiting room increased. This contrasts with the net decrease in primary waiting room time for patients of physicians who transitioned, supporting our hypothesis that remote scribes might help decrease patient wait times in the office. Both primary Net Promoter Score metrics showed a statistically significant negative correlation with patient wait time, further suggesting that improved Net Promoter Score ratings can be explained at least in part by improved wait times after implementation of remote scribes.

Taken together, the improvement in primary Net Promoter Score ratings for physicians supported by remote scribes may be attributable to reduced patient wait times and earlier patient encounters. Physicians not working with remote scribes saw their patients' wait times increase over the same period and had unchanged primary Net Promoter Score ratings.

Compared with the time spent in the primary waiting room, time spent in the examination room is more likely to reflect the length of the physician–patient interaction. On average, a net decrease in the mean time spent in the examination room was observed for physicians' patients, whether or not the physician transitioned to remote scribes. Although shorter examination room time could raise concerns about reduced physician interaction, our data indicate that patients of physicians who worked with remote scribes had improved scores on survey questions pertaining to their perception of the clinical interaction, such as "physician listened," "physician answered questions," "physician explained things," and "gave enough information." This suggests that the quality of the physician–patient interaction was not compromised by shorter times spent in the examination room and may have even improved with the use of remote scribes. Overall, our findings support that remote scribing may positively influence the efficiency of office visits and the quality of time spent with the physician.

An extrapolation of our study is that the time and resources saved from implementing remote scribes may be reallocated to improve office workflow and the patient experience. Based on the mean decrease in wait time observed in our study, implementing remote scribing in a hypothetical retina clinic of 40 patients per day would save 58.8 minutes a day, or 1176 minutes a month per physician. This hour saved daily could be used to schedule additional patients, increase the capacity to accept urgent add-on patients, be reallocated to more complex patient–physician encounters, or simply result in an earlier clinic end time. Alternatively, incorporating this time into a work break or longer lunchtime would positively affect a wide range of physician well-being and performance outcomes.[25,26]

The costs of training remote scribes may be lower than those of in-person scribes because the latter often undergo in-house

training and onsite orientation and often require supervision but have traditionally high rates of turnover.[27,28] Thus, remote scribes may allow the practice to maximize its training resources. Remote scribing could address commonly identified problems in an outpatient practice, including inadequate staffing, limited resources, and high demand in underserved areas,[29] to be at least partly addressed by the downstream benefits of remote scribing.

Multiple medical specialties have adopted remote scribes, and a few recent studies have reported its benefits.[30–34] In an orthopedic practice, remote scribe services allowed for the completion of documentation during patient visits and decreased the total documentation time without compromising patient satisfaction survey scores.[32] Asynchronous remote scribing is also associated with decreased EHR time metrics, such as time per appointment, note time per appointment, and total average EHR time.[34] Furthermore, the literature supports that decreased time spent on EHR-related tasks prevents physician burnout, limits physician errors and omissions of pertinent information during the examination, and improves clinic flow.[30–32] The in-person tasks required for medical scribes may also serve as barriers to efficient EHR management. To our knowledge, the effect of remote scribing on patient satisfaction in ophthalmology practice has not previously been assessed. Thus, our study adds to the existing literature on the potential benefits associated with remote scribe use.

One limitation of this study is that it was performed at a single practice with limited geographic spread. The patient experience in the metropolitan Northeast region of the United States, where most of our offices are located, may not accurately reflect the experience of those in more underserved or rural areas. Because this is a retrospective study, confounding variables such as a variation in staffing, the physical capacity of the office, the type of office visit, and the demographics of physicians who chose to work or not work with remote scribes could not be controlled for and may have contributed to changes in the outcome measures. There could also be bias or inconsistencies in recorded patient wait times as a result of variability in the documentation process. In addition, the Net Promoter Score may not be adequate as a standalone metric for assessing patient satisfaction,[14,17] and it is limited in detecting a meaningful change in satisfaction given the uniformly high baseline score ratings even before implementation of remote scribes.[35,36]

This retrospective study evaluated the impact of remote scribing on patient satisfaction in a large retina practice. The transition to remote scribes was associated with improved patient satisfaction scores, as measured by the Net Promoter Score benchmarking tool, in the setting of shortened patient wait time. Thus, high patient satisfaction was maintained after the transition to remote scribes. Further research is needed to understand which components of the remote scribe model are primary drivers of improvements in clinic workflow and patient experience in ophthalmology practices. It is also important to identify physicians who are early and effective adopters of remote scribing and who may help their practices with training and implementation.

There is a transition period during the implementation of a new structure to clinical practice that may pose challenges, including IT troubleshooting and scribes who were previously in-person switching to a new role. Meeting these challenges requires flexibility and a willingness to adjust by physicians and office staff. Finally, no single solution fits all practices. The optimum balance between practice efficiency and patient satisfaction likely relies on the comfort and experience of practice leadership to implement new strategies, such as remote scribing, and the willingness of physicians and staff to adopt those strategies and technologies.

Authors' Note

Drs. Lee and Du contributed equally as first authors. Dr. Ali is co-senior author.

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Ethical Approval

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the institutional review board.

Statement of Informed Consent

Informed consent was obtained from all persons involved in the study.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of the article.

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Supplemental Material

Supplemental material is available online with this article.

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