Title

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Publication Date

2017-09-01

DOI

10.1016/j.jclinane.2017.06.003

Peer reviewed

HHS Public Access

Author manuscript

J Clin Anesth. Author manuscript; available in PMC 2019 April 25.

Published in final edited form as:

J Clin Anesth. 2017 September ; 41: 92–96. doi:10.1016/j.jclinane.2017.06.003.

Modified open-access scheduling for new patient evaluations at an academic chronic pain clinic increased patient access to care, but did not materially reduce their mean cancellation rate: A retrospective, observational study

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Abstract

Study objective: To determine if open-access scheduling would reduce the cancellation rate for new patient evaluations in a chronic pain clinic by at least 50%.

Design: Retrospective, observational study using electronic health records.

Setting: Chronic pain clinic of an academic anesthesia department.

Patients: All patients scheduled for evaluation or follow-up appointments in the chronic pain clinic between April 1, 2014, and December 31, 2015.

Interventions: Open-access scheduling was instituted in April 2015 with appointments offered on a date of the patient's choosing ≥1 business day after calling, with no limit on the daily number of new patients.

Measurements: Mean cancellation rates for new patients were compared between the 12-month baseline period prior to and for 7 months after the change, following an intervening 2-month washout period. The method of batch means (by month) and the 2-sided Student *t*-test were used; $P < 0.01$ required for significance.

Main results: The new patient mean cancellation rate decreased from a baseline of 35.7% by 4.2% (95% confidence interval [CI] 1.4% to 6.9%; $P=0.005$); however, this failed to reach the 50%

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Disclosures

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.jclinane.2017.06.003.

reduction target of 17.8%. Appointment lag time decreased by 4.7 days (95% CI 2.3 to 7.0 days, $P < 0.001$) from 14.1 days to 9.4 days in the new patient group. More new patients were seen within 1 week compared to baseline (50.6% versus 19.1%; $P < 0.0001$). The mean number of new patient visits per month increased from 158.5 to 225.0 ($P=0.0004$). The cancellation rate and appointment lag times did not decrease for established patient visits, as expected because open-access scheduling was not implemented for this group.

Conclusions: Access to care for new chronic pain patients improved with modified open-access scheduling. However, their mean cancellation rate only decreased from 35.7% to 31.5%, making this a marginally effective strategy to reduce cancellations.

Keywords

Pain clinics; Appointments and schedules; Health services accessibility

1. Introduction

For the increasing number of patients in the United States seeking treatment for chronic pain (i.e., persistent pain of at least 3 to 6 months' duration), access to chronic pain clinics is currently inadequate, with many patients waiting months before they can be seen by a pain specialist [1–3]. This is an important public health issue, as chronic pain is estimated to affect approximately 100 million adults [4]. Delays in adequately treating pain have many detrimental effects, including depression, escalation of pain, disruption to the continuity of care, and decreased health-related quality of life [1,5]. Lack of access to scheduled care also contributes to increased use and overcrowding of emergency departments [6–8]. Furthermore, patients not seen in a timely manner may seek out medical providers not expert in the multi-modal management of chronic pain [9], potentially contributing to the growing opioid epidemic in the United States [10]. Last minute cancellations and "no-shows" are undesirable events, as each occurrence represents a lost opportunity for another patient who otherwise might have been seen by a pain subspecialist.

At the Institute for Advanced Pain Management, an anesthesiologist-directed chronic pain clinic of the University of Miami Health System, historical data informed that approximately 33% of patients scheduled for their initial, comprehensive chronic pain evaluation either failed to show up for their appointment or cancelled with insufficient notice to allow scheduling another patient. In primary care clinics, the "appointment lag time" (i.e., the interval from when a patient requests an appointment to the scheduled date of the visit) correlates with the probability of a cancellation [11–14]. At our clinic, the appointment lag was approximately 2 weeks, which we thought would be amenable to reduction, possibly leading to improvement in the cancellation rate.

A well-studied and effective mechanism to reduce cancellation rates in medical clinics is "open-access" or "advanced access" scheduling, in which patients are seen on the day they call for an appointment, regardless of the reason for their visit [5,15,16,17]. The term has been expanded to include next-day appointment scheduling [5,18,19], because factors such as obtaining insurance authorization, receiving copies of outside medical records, and acquiring imaging studies create logistical problems in some clinic environments, precluding

the ability to see patients the same day they call. Chronic pain clinic scheduling is subject to such constraints.

At primary care clinics with baseline no-show rates >15%, relative reductions of approximately 50% have been realized with the adoption of open-access scheduling [20,21,22]. There are few published studies examining open-access scheduling outside of the primary care setting, and we were unable to find any references in PubMed in which this model has been applied to a chronic pain clinic [23]. Because new patient chronic pain visit appointments are similar in length to those in primary care settings, we hypothesized that changing the scheduling process for our chronic pain clinic to a modified open-access paradigm (i.e., next business day scheduling) would reduce our mean cancellation rate by at least 50%. Thus, we embarked on a 9-month pilot project to determine if this straightforward change in our scheduling process would be effective in reducing cancellations for new patients.

2. Materials and methods

2.1 Study setting and population

Retrospective reporting of the results of our pilot project was approved by the University of Miami Institutional Review Board with a waiver of patient consent. Appointments analyzed were for all patients (i.e., new and established) who were scheduled to be seen between April 1, 2014, and December 31, 2015, in the outpatient chronic pain clinic of the University of Miami Health System. Patients scheduled for interventional procedures (e.g., epidural steroid injections) were not included in the analysis, as these are booked separately, and procedures are performed by a different anesthesiologist than the one seeing clinic patients. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for cross-sectional studies was followed [24].

2.2. Study intervals

The 12-month interval prior to the change in the scheduling process on April 1, 2015, was considered the baseline period. The initial 2 months following implementation of the new system (April 1, 2015, through May 31, 2015) included some patients who had been scheduled prior to the change; thus, these months were excluded from analysis. The final 7 months (June 1, 2015, through December 31, 2015) constituted the open-access study interval. No other interventions designed to influence cancellations were implemented during the study interval. Data were analyzed after the end of the open-access interval.

2.3. Scheduling process

During the entire study interval, patients requested a chronic pain clinic appointment by calling the clinic's scheduling number directly or by filling out an online form from the University of Miami health system website requesting to be seen by a pain specialist. If the latter approach were followed, the scheduling office contacted the patient within 1 business day to book the appointment according to the existing scheduling policy.

Before the implementation of modified open access scheduling, there was a 6-patient daily limit for the number of new patients, and double-booking an appointment slot was only permitted with specific approval from an attending physician. Without such intervention, only open appointment slots were offered, including those for the next business day. The modified open-access system that was implemented allowed new patients to schedule their appointment on any weekday of their choosing, even if all slots were filled, but not earlier than 1 business day in advance (e.g., a Tuesday appointment was possible for a patient calling on a Monday). Same-day appointments were not scheduled because time was needed to obtain medical records, a referral from the patient's primary provider, and insurance authorization for the clinic visit. Appointments were scheduled after verification of insurance coverage, but in anticipation of insurance authorization and receipt of the primary physician's referral form. If authorization or the referral were not received by the business day prior to the appointment, the patient was contacted and the appointment was rescheduled.

During both the baseline and study intervals, if the lag time was at least 3 days, patients were contacted 2 calendar days before their appointment by an automated voice message phone call to remind them of their upcoming visit, with the reminder in English or Spanish based on the language preference recorded during their initial registration. The message included instructions on how to reschedule the appointment, and patients could cancel the appointment by pressing the appropriate number on their phone. Patients were not required to reconfirm their appointment, and there was no penalty, financial or otherwise, imposed for a cancellation.

The clinic was staffed for new patient and follow-up appointments by 1 attending physician per day who was assisted by 0 to 2 residents or fellows. If the patient requested a specific physician, the time to the appointment was limited to that physician's next day in the clinic (i.e., typically within seven days). On the few occasions when the specific physician requested was on leave, the appointment was deferred until the physician returned to work. Patients were initially given a choice of unfilled time slots for the requested day. However, if none of these were convenient for the patient, or if all new patient slots were filled, appointment times that created double-booking were offered. Patients were not told if they were given a double-booked appointment. There was an emphasis placed on distributing patients evenly throughout the day, ideally with no more than 1 extra patient per hour. However, patients were not denied an appointment due to heavy clinic volume. The process of scheduling follow-up appointments was not changed, and these were not double-booked. The software did not apply a fixed limit on the number of new patients permitted per day, but, in practice, the total never surpassed 12 new patients. Staff scheduling was not adjusted based on the anticipated volume on a given day.

2.4. Data source and calculations

Data were obtained from the hospital's electronic health record system database (Epic Systems Corporation, Verona, WI) and included: (1) date when appointment was scheduled; (2) date of appointment; (3) date appointment was cancelled, if applicable; and (4) whether the patient showed up for the appointment.

If a patient failed to show up for his or her appointment, or called within 1 business day to cancel the appointment, we refer to such events as cancellations, as a matter of convenience. Functionally, these are equivalent, because in both circumstances, there would not be sufficient time to fill the appointment slot with another patient. Although the scheduling software allowed new patients to request an appointment up to a year in advance, in practice, the maximum interval was three months, with nearly all new patients requesting appointments within two months of their call.

Lag times were calculated as calendar days. We computed clinic utilization as the ratio of the total number of patients seen (including both new and follow-up visits) to the total number of available appointment slots (with double booked slots counted once). Clinic slots in the scheduling system were 30 min for new patients and 15 min for follow-up patients.

2.5. Statistical analysis

Data were batched by month and analyzed using the 2-sided Student *t*-test (Systat v13 Systat Software, San Jose, CA) [25–31]. The method of batch means accounts for unmeasured correlations among days and has been shown to be appropriate for the calculation of cancellation rates [28]. Lag times, clinic utilization, and mean cancellation rates were compared before and after implementation of modified open access scheduling. We analyzed the follow-up appointments to confirm that these were stationary, as expected, over the entire study interval. Time series trends were analyzed by the Mann-Kendall test [32]. Confidence intervals (CI) for proportions were calculated using the conservative Clopper-Pearson exact method [33]. The z-ratio for the significance of the differences between 2 independent proportions was applied [34]. A P value <0.01 was required for statistical significance.

Power analysis for the 2-group Student *t*-test at $\alpha = 0.01$ for a 50% reduction in the mean cancellation rate from 33% to 16.5% with a standard deviation of 5% indicated that a sample size of 5 months would have 95% power.

3. Results

During the study interval, the new patient mean cancellation rate decreased from the 35.7% baseline to 31.5% (difference = 4.2%; 95% CI 1.4% to 6.9%; $P = 0.005$) (Fig. 1 and Table 1). The measured decrease in the mean cancellation rate for new patient appointments did not reach our threshold of a 50% reduction in cancellations, which would have required an absolute reduction in the mean cancellation rate of 17.8%. Thus, we evaluated the modified open-access intervention as ineffective in materially reducing new patient cancellations.

The established patient mean cancellation rate was unchanged from the baseline of 28.8%, with a difference of 1.6% ($P = 0.17$; Table 1). The established patient appointment lag time was also unchanged from the 22.1-day baseline, with a difference of 0.6 days ($P = 0.47$; Table 1). Although the number of scheduled appointments increased, other potential global changes in the pain clinic to reduce cancellations or decrease appointment lag times did not occur.

We performed 2 secondary analyses to confirm that the change in the scheduling policy had the expected results of decreasing the lag time for new patients and increasing patient access. During the open-access interval, the new patient appointment lag time decreased by 4.7 calendar days from the 14.1-day baseline (95% CI 2.3 to 7.0 days; $P < 0.001$; Table 1). During open access, 18.1% (95% CI 16.4% to 19.9%) of patients scheduled an appointment within 2 business days of their call versus 7.2% (95% CI 6.2% to 8.3%) during the baseline interval ($P < 0.001$). During open access, 50.6% (95% CI 48.3% to 52.9%) of patients scheduled an appointment within 1 week of their call versus 19.1% (95% CI 17.6% to 20.8%) during the baseline interval ($P < 0.0001$).

The mean number (standard deviation) of new patients seen per month increased, from 102.2 (20.1) to 153.9 (18.7) between the baseline and open-access period (Figure; $P = 0.0004$). Follow-up patients evaluated per month also increased, from 260.7 (18.7) to 322.0 (34.1) between the 2 periods (Figure; $P = 0.002$). The expected changes in lag time and new patient access were thus in the expected direction.

4. Discussion

Implementation of a modified open-access scheduling process for our pain clinic did not result in a material improvement in the mean cancellation rate for new patient evaluations. The absolute reduction of 4.2% was not meaningful from a managerial perspective, and the relative reduction in cancellations (11.8%) fell far short of our 50% reduction target. The residual mean cancellation rate of 31.5% is still undesirably large and was above the upper range of reported no-show rates at (non-pain) primary and subspecialty clinics (15 to 30%) [35–37]. Access to care for new patients increased for both new and established patients, each by approximately 3 patients per day, even though modified open-access scheduling was only implemented for new patients. This reflects, in part, the increase in the total number of established patients in the clinic population. However, other societal factors, such as those related to the management of patients taking controlled substances, might also be responsible. With open access, a much higher percentage of patients (50.1%) were evaluated within 1 week of their request for a visit than previously (19.1%).

Our cancellation rate is lower than the 47.9% cancellation rate among charity and reduced fee patients at an inner-city chronic pain clinic [38]. However, that study overstated the overall clinic cancellation rate because insured and self-pay patients were excluded from the analysis, and those patients were noted to have a low cancellation rate [38]. The new modified open access scheduling policy we implemented was effective in reducing the appointment lag time and increasing patient access to care by a pain specialist. The data indicate that if a goal for a chronic pain clinic is to reduce cancellations, implementing open-access scheduling is not the answer. Rather, assessing other potential etiologies of patient cancellations and trying to mitigate them will be needed. However, if the overarching goal is to improve new patient access, implementing modified open-access might be a viable approach, providing one can anticipate the number of such patients that will cancel at the last minute or fail to show up.

As part of this pilot project, we deliberately did not seek to determine the causes of patient cancellations. We avoided this primarily because we wanted to evaluate the effect of the single, simple intervention of changing the scheduling policy. Calling patients to ask them why they cancelled was not a routine practice for the clinic and was not implemented as part of the change in the scheduling policy. Adding this process might have caused some patients to rebook their appointments and altered the likelihood that they would cancel a second time. This would have confounded the analysis of the effectiveness of open-access scheduling. A current interest of our clinic is to understand the reasons why patients cancel their appointments at the last minute or fail to show. This, hopefully, would allow the implementation of strategies to mitigate these factors, such as identifying individuals who might benefit from a more personalized reminder process [39,40].A group of our colleagues at the University of Miami business school is exploring models for predicting the probability of patient cancellation [41] within our outpatient clinic population, but excluding the chronic pain clinic. Their model is based on factors such as day of the week, provider type, appointment confirmation, ethnicity, marital status, age, season, insurance carrier, appointment lag time, and history of clinic cancellations within the University of Miami Health System. If the probability that an individual patient will cancel at the last minute or fail to show up is confirmed for the chronic pain clinic population, strategies of double booking pairs of patients based on the probability that they will show up for their appointment will be explored.

A possible unintended consequence of our scheduling process change was the occurrence of a few complaints by chronic pain clinic patients related to delays from the scheduled appointment time to the time when the visit began (i.e., tardiness [42]), as reported in the hospital's Press Ganey© surveys (Press Ganey Associates, South Bend, IN). Based on a simulation study, it would be expected that double booking would increase tardiness, but we could not study this because the dataset did not include the initial time of contact with an anesthesia provider in the clinic [43]. Because there is no linking information in these anonymous surveys, we were unable to analyze if these complaints were associated with days that were heavily overbooked, or perhaps, alternatively, with the scheduling of preceding patients that were extremely complex and required extra time. Additional staffing was not flexibly increased to match the scheduled workload on unusually busy days, which likely contributed to increased tardiness on those days as well as stress among the providers. This is an area that a chronic pain clinic needs to manage if overbooking appointment slots in anticipation of cancellations.

4.1. Limitations

This study utilized a retrospective analysis that has several limitations. First, the study was conducted at a single, academic chronic pain clinic. Thus, the results may not be generalizable to other settings, such as community hospital-based or private practice pain clinics. Second, our baseline appointment lag time was relatively short (14.1 days). It may be that greater improvements would be seen in clinics with higher initial lag times, as has been the case in open-access primary care settings [44,45]. Our implementation of a modified open-access model had some restrictions (e.g., a minimum 1 business day lag time). Thus, it is possible that enacting same day open-access policies and unrestricted

scheduling would yield different results. However, such a strategy would require considerable streamlining of the process of obtaining insurance authorization and medical records, especially when those are not immediately available within the organization. Finally, we do not have information on patients who called, but did not schedule an appointment because the times offered did not meet their needs. Although this would have been more likely to have occurred during the baseline period, this is an access consideration, not a cancellation issue.

5. Conclusions

Implementation of a modified open-access scheduling model for new patients seeking treatment at an academic pain center was not an effective strategy to materially reduce their mean cancellation rate, which remained high at 31.5%. Nonetheless, the change in the scheduling policy resulted in increased access for new patients to care by a pain specialist.

Acknowledgments

We would like to thank Anantha Gangadhara, MS, Gardy Excellent, MBA, Steve Williams, MBA, and Laura Pineiro for their support during the conduct of this study.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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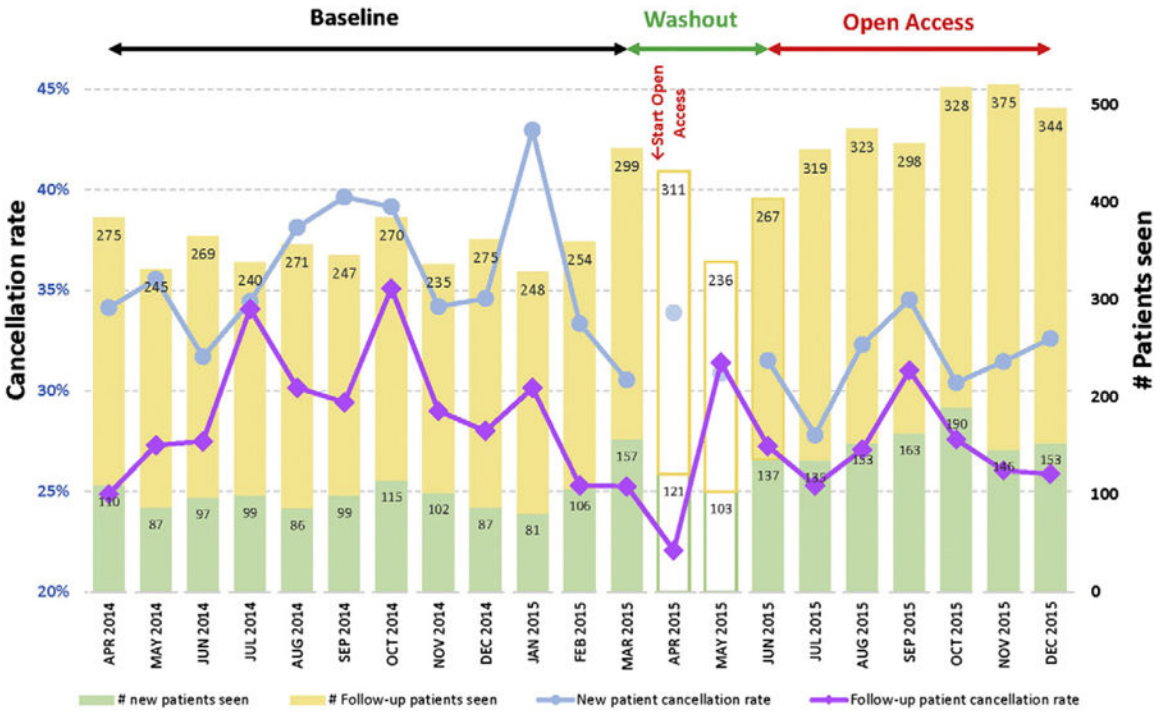

Fig. 1.

Cancellation rates among new patients and clinic volume before implementation (Baseline) and after implementation (Open Access) of a modified open-access appointment process on April 1, 2015. During the Baseline period, a fixed number of available appointment slots were available, daily. During the Open Access period, new patients were given an appointment on a date of their choosing, irrespective of the number of new patients already scheduled. During the first 2 months after the scheduling policy change (Washout), there was a mix of new patients seen who had been scheduled under the original and the open-access policies; this interval was excluded from analysis. The mean cancellation rates by month for new patients (blue circles) and follow-up patients (purple diamonds) are plotted using the left y-axis, and includes no-shows and patients who cancelled within 2 business days of their appointment. Mean volumes per month of new patients (green bars) and follow-up patients (yellow bars) are plotted using the right y-axis. The mean cancellation rate for new patients decreased during Open Access by 4.2% ($P = 0.005$), compared to Baseline, but the follow-up patient cancellation rate was unchanged ($P = 0.16$). The mean number of both new and established patients seen per month increased during the open access period, compared to baseline, by 66.5 ($P = 0.0004$) and 75.2 ($P = 0.002$), respectively.

Table 1

Mean cancellation rates, lag times, and clinic volume before and after implementation of a modified open access scheduling process.

Variable	Patient type	Phase	# Months	Mean ± SD	Open access–baseline	95% CI	*P*-value
% Cancellations[a]	New	Baseline[c]	12	35.7 ± 3.6	−4.2	−6.9 to −1.4	0.005
		Open access[d]	7	31.5 ± 2.1			
	Follow-up	Baseline	12	28.8 ± 3.3	−1.6	−4.2 to 0.8	0.17
		Open access	7	27.2 ± 1.9			
Lag days[b]	New	Baseline	12	14.1 ± 2.6	−4.7	−7.0 to −2.3	0.0006
		Open access	7	9.4 ± 1.8			
	Follow-up	Baseline	12	22.1 ± 1.99	0.6	−1.1 to 2.3	0.47
		Open access	7	22.7 ± 1.1			
Monthly volume	New	Baseline	12	102.2 ± 20.1	51.7	32.0 to 71.4	$<10^{-4}$
		Open access	7	153.9 ± 18.7			
	Follow-up	Baseline	12	260.7 ± 18.8	61.3	29.3 to 93.4	$<10^{-4}$
		Open access	7	322.0 ± 34.0			

SD = standard deviation; CI = confidence interval.

[a] A cancellation was defined as a patient calling to cancel an appointment within 1 business day of the appointment or if the patient failed to show up on the appointment date.

[b] Lag days represent the interval from when the patient called to schedule the appointment to the appointment date.

[c] Baseline was the 12-month interval prior to implementation of modified open-access scheduling.

[d] Open-access was months 3–9 following implementation. The 2-month interval after the start of modified open-access was excluded from analysis because patients seen during this interval were scheduled under both policies.