Online Supplement to "A Data-Driven Model of an Appointment-Generated Arrival Process at an Outpatient Clinic"

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Abstract

(From the main paper) We develop a high-fidelity simulation model of the patient arrival process to an endocrinology clinic by carefully examining appointment and arrival data from that clinic. The data includes the time that the appointment was originally made as well as the time that the patient actually arrived, or if the patient did not arrive at all, in addition to the scheduled appointment time. We take a data-based approach, specifying the schedule for each day by its value at the end of the previous day. This data-based approach shows that the schedule for a given day evolves randomly over time. Indeed, in addition to three recognized sources of variability, namely, (i) no-shows, (ii) extra unscheduled arrivals and (iii) deviations in the actual arrival times from the scheduled times, we find that the primary source of variability in the arrival process is variability in the daily schedule itself. Even though service systems with arrivals by appointment can differ in many ways, we think that our data-based approach to modeling the clinic arrival process can be a guideline or template for constructing high-fidelity simulation models for other arrival processes generated by appointments.

Keywords: simulation stochastic input modeling, simulating appointment-generated arrival processes, scheduled arrivals in service systems, outpatient clinics, data-driven modeling, stochastic models in healthcare

A Introduction

In this online supplement, we present additional material supplementing the main paper. As explained in the introduction of the main paper, the appointment arrival data are from an endocrinology outpatient clinic of a major teaching hospital in South Korea, collected over a 13-week period from July 2013 to September 2013. Sixteen doctors work in this clinic and patients arrive to the clinic knowing which doctor they will meet; hence, each doctor operates as a single-server system. Each doctor works in a subset of available days and shifts. There are three shifts: morning (am) shifts, roughly from 8:30 am to 12:30 pm, afternoon (pm) shifts, roughly from 12:30 pm to 4:30 pm, and full-day shifts. During the weekdays of the 13-week study period, the 16 doctors worked for a total of 228 am shifts, 220 pm shifts, 25 full-day shifts. The shifts are not evenly distributed among the doctors; the numbers ranged from 11 to 46.

Table 7 provides the distribution of shifts by doctor in the study period. The doctor we focused on to develop our approach is doctor 9 in Table 7, for which the corresponding 22 am shifts are underlined.

Table 7: Shifts by Doctor over 13 Weeks (from July to September 2013)

	Mon			Tues			Wed			Thurs			Fri			All Weekdays		
Doc	AM	PM	Both	AM	PM	Both	AM	PM	Both	AM	PM	Both	AM	PM	Both	AM	PM	Both
1	0	12	0	0	7	4	9	0	1	1	0	0	7	0	0	17	19	5
2	0	12	0	0	6	6	11	0	0	9	0	0	1	0	0	21	18	6
3	0	10	2	11	0	0	0	1	0	1	0	1	0	0	9	12	11	12
4	0	2	0	12	0	0	11	0	0	0	10	0	11	0	0	**34**	12	0
5	12	0	0	0	9	2	0	10	0	10	0	0	1	0	0	23	19	2
6	6	0	0	1	4	0	4	0	0	4	0	0	2	0	0	17	4	0
7	8	0	0	0	0	0	0	1	0	0	7	0	5	0	0	13	8	0
8	1	1	0	0	0	0	0	9	0	9	0	0	0	9	0	10	19	0
9	0	11	0	12	0	0	0	2	0	0	9	0	10	0	0	<u>22</u>	**22**	0
10	1	0	0	0	0	0	1	0	0	0	0	0	0	9	0	2	9	0
11	0	0	0	0	12	0	0	0	0	10	0	0	0	0	0	10	12	0
12	0	0	0	12	0	0	0	10	0	0	0	0	0	0	0	12	10	0
13	0	13	0	0	0	0	11	0	0	0	0	0	1	0	0	12	13	0
14	0	13	0	1	0	0	0	0	0	0	10	0	0	0	0	1	**23**	0
15	0	0	0	0	0	0	0	11	0	0	0	0	10	0	0	10	11	0
16	12	0	0	0	0	0	0	10	0	0	0	0	0	0	0	12	10	0
All	40	74	2	49	38	12	47	54	1	44	36	1	48	18	9	228	220	25

In Section C, we provide three tables, Tables 11 to 13, for the am shift of doctor 9; these are the referenced tables but not included in the main paper because of space constraint. Next, we select three additional doctor shifts and follow the steps of the approach we develop in the main paper to provide an independent confirmation of our approach. We consider the pm shift of the same doctor analyzed in the main paper (doctor 9) to contrast am versus pm shifts. We include one other am shift (of doctor 4) and one other pm shift (of doctor 14), selected because of their relatively high volume of patients. The three additional doctor shifts are

indicated in bold in Table 7. The actual figures and tables for the analysis of the three additional doctor shifts are provided in Sections D to F.

Now we summarize our key observations in Tables 8 to 10. In summary, we find that the approach we develop in the main paper can be easily applied to other doctor shifts. We also find that much is the same for the am and pm shifts and across the three doctor shifts we analyze. One difference we find is that the stochastic order in the lateness behavior (that the lateness consistently decreases over the day in the sense that each successive ecdf is stochastically less than the one before) is more pronounced in the am shifts than the pm shifts. In fact, this observation holds in general across the 16 doctors we have in the data: see Figures 12 in our companion study Kim et al. (2015). The plots for all the individual doctors also appear in Figures 13 to 17 in Kim et al. (2015).

We also found significant differences in the demand outside the main interval, which we discuss next in Section B.

B Elaboration on the Scheduled Appointments Outside the Master Schedule

In §2.3 we have developed a natural way to infer the master schedule directly from the data. The master schedule in Table 1 of the main paper is the middle region of 22 time slots in the interval $[8:50, 12:20]$. However, that table shows that about 10% of the appointments fall outside of the main interval. From a direct analysis of the data, we inferred that these exceptional appointments probably represent responses to excess demand, beyond what would normally be desired. We first confirmed that by observing that there was strong positive correlation between the days with large daily totals and the days with at least 5 scheduled appointments after the main interval. In particular, Table 1 shows that 12 of the 22 days have 5 or more appointments after the main interval, while 12 of the 22 days have at least 67 total appointments, and that 10 of those days appear in both. We also observed a somewhat larger number of appointments in the first interval of the master schedule, also providing supporting evidence.

Those observations led us to consider the classification of service systems into two types: (i) low-demand service systems and (ii) high-demand service systems. We inferred that the doctor we analyzed was operating as a high-demand service system, although only about half the days seemed to be overloaded (which of course depends on the definition). That motivated us to look for further explanation. We found at least a partial explanation when we examined appointments for new and repeat patients. In particular, we found that the repeat patients may be scheduled far ahead of the appointment date, presumably at the end of their previous visit. Indeed, many were scheduled about 3 months before. To better understand repeat appointments, we might need data over a much longer time interval than the 13 weeks we used. In contrast, as shown in Figure

3, new patients mostly scheduled in the two weeks or even only a few days before the appointment date.

We might measure the amount of excess demand by adding the total number of appointments in the slots after the master schedule. Let $\bar{N}_O$ be the average number of appointments scheduled after the main interval (for the given doctor, averaged over the 22 days) and let $\bar{N}_1$ be the average excess (number) of appointments in the first interval above the average inside. Let $\bar{N}_T = \bar{N}_O + \bar{N}_1$. For Dr. 9 am, Table 1 shows that $\bar{N}_O = 5.27$, $\bar{N}_1 = 0.65$ so that $\bar{N}_T = 5.92$. Compared to the average total number of 66.09, we get $5.92/66.09 \approx 9\%$; compared to the average number in the main interval of 60.82, we get $5.92/60.82 \approx 10\%$;

B.1 A Comparison with the Other Doctor Shifts

It is thus interesting to compare these estimates to the other doctor shifts. First, for Dr. 9 pm, Table 14 shows that 5 days have a daily total of at least 65, while 5 of the 22 days have at least 5 after the main interval, with 3 days being in common. Table 14 also shows that $\bar{N}_O = 2.50$, $\bar{N}_1 = 0.54$ so that $\bar{N}_T = 3.04$, which is lower than in the am. Compared to the average total number of 58.02, we get $3.04/58.02 \approx 5.2\%$; compared to the average number in the main interval of 56.32, we get $3.04/56.32 \approx 5.4\%$. This is lower than the am shift, but not radically different.

In contrast, for Dr. 4 am, Table 22 tells a very different story. Table 22 shows that 4 of the 22 days have a daily total of at least 72, while 4 of the 22 days have at least 5 after the main interval, with *no* days in common. Moreover, for Dr. 4 am, Table 22 shows that $\bar{N}_O = 1.09$, $\bar{N}_1 = 0.43$ so that $\bar{N}_T = 1.52$. Overall, there does seem to be a significant difference between Dr. 4 am and Dr. 9 am, with the new Dr. 4 am shift having less exceptional demand. It seems likely that the schedule may being created differently for the two doctors. In any case, we see significantly fewer appointments outside the main time interval.

Finally, we consider Dr. 14 pm. For Dr. 14 pm, the average total number of appointments is about half the values in the previous shift. Thus, we might judge the days after the main interval with a lower threshold; we use 3 instead of 5. Table 30 shows that 8 of the 23 days have total numbers at least 39, while only 2 days have at least 3 appointments after the main interval, but these 2 are contained among the first 8. Moreover, for Dr. 14 pm, Table 30 shows that $\bar{N}_O = 1.00$, $\bar{N}_1 = 0.36$ so that $\bar{N}_T = 1.36$. Compared to the average total number of 65.35, we get $1.52/65.35 \approx 2.3\%$; compared to the average number in the main interval of 64.26, we get $1.52/64.26 \approx 2.4\%$. Again, there does seem to be a significant difference between Dr. 14 pm and both Dr. 9 am and pm, with Dr. 14 having less exceptional demand. Again, it seems likely that the schedule may being created differently for the two doctors. While the master schedules are very similar, the extra demand and its treatment seem quite different.

B.2 Negligible Impact on the Stochastic Arrival Process Model

These results invite further investigation in order to better understand the appointment schedule for the clinic. However, it does not seem that these differences should seriously affect the stochastic arrival process models for the doctors, in order to carry out the studies described in §1.3 of the main paper.

Given that patients make appointments to see designated doctors, and given that deviations from that assignment are indeed rare, it seems natural to regard the different arrival processes for the different doctors as mutually independent stochastic arrival processes in the clinic stochastic queueing network model. However, given the significantly different numbers of appointments for different doctors, it is evident that the doctor arrival processes should not nearly be regarded as i.i.d. It remains to investigate how these different daily totals depend on the doctor and the kinds of patients that doctor treats. If we were to analyze the entire clinic, it would be necessary to carry out the analysis in this paper for each doctor shift, as we have done for the four doctor shifts considered.

Table 8: Summary of Dr 9 pm shift Compared to Dr 9 am shift.

Dr 9 am	Dr 9 pm	Note
Defining and Modeling the Daily Schedule		
Figure 2	Figure 9	Evolution of the schedule. Similar in that the average of the 22 sets of percentage data jumps at regular intervals, especially around 3 months before the appointment date.
Figure 3	Figure 10	Evolution of the schedule by new and repeat patients. Similar in that new patients are likely to schedule their appointments much closer to the appointment date than the repeat patients.
Table 1	Table 14	$B_{s,j}$. Master schedule is similar with $\tau = 10$ min, $\beta = 2.6$ patients, $\nu = 22$ slots and main interval $[12{:}50, 16{:}20]$. The daily totals within the main interval are stable, with mean 56.32 and variance 24.99. The full daily totals for the entire am shifts are more variable, with mean 58.82 and variance 35.87.
Table 2	Table 15	The estimated distributions of B_s and N_o. The estimated distribution of B_s is $P(B_s = k) = 0.06,\ 0.29,\ 0.61, 0.04, 1 \le k \le 4$, so that $E[B_s] = 2.63$, $E[B_s^2] = 7.35$, $Var(B_s) = 0.433$, and $SD(B_s) = 0.658$. The variance is considerably less than the mean, so we can conclude that the distribution of B_s is much less variable than Poisson. The estimated correlation ρ_S in (2.10) is $\frac{24.99-22\times0.433}{22*0.433*21} = 0.077$, which is sufficiently small that we consider the i.i.d. model reasonable.
Adherence to the Schedule: Patient No-Shows and Unscheduled Arrivals		
Table 3	Table 16	$B_{n,j}$. Similar to Dr 9 am shift, the number of no-shows ranges from 2 to 10 per day, with an average of 4.91 per day. The overall proportion of no-shows is $4.91/58.82 = 8.3\%$. The observed sample variance of the average number of no-shows is 3.71, which is slightly smaller than the overall average of 4.91, supporting the model with i.i.d. Bernoulli no-shows.
Table 11	Table 17	$B_{u,j}$. On average, 2.09 unscheduled patients per day.
Table 12	Table 18	$B_{a\|u,j}$. On average 1.82 arrived per day among unscheduled patients. Unlike Dr 9 am shift, the unscheduled arrivals are less likely to be outside the main interval. Combining the summary data from Tables 14, 16 and 18, the means are $E[N_A] = E[N_S] - E[N_N] + E[N_U] = 58.8 - 4.9 + 1.8 = 55.7$. $E[N_A] = 55.7$ is only about 5% less than $E[N_S] = 58.8$. From the perspective of the daily totals, there is strong adherence to the schedule. The sample variances are $Var(N_A) = 49.5$, $Var(N_S) = 35.9$, $Var(N_N) = 3.7$ and $Var(N_U) = 2.8$. Similar to Dr 9 am shift, the variability of N_A is primarily due to the variability of N_S. Unlike Dr 9 am shift, $Var(N_A) > Var(N_S)$ and $Var(N_A)/E[N_A] = 49.5/55.7 = 0.889 > 0.611 = 35.9/58.8 = Var(N_S)/E[N_S]$.
The Arrival Pattern over the Day: Patient Non-Punctuality		
Table 4	Table 19	Details on patient non-punctuality within the main interval. In the main interval, the average no-show rate is 8.5%, the average % late is 10.5%, and the average % late more than 15 minutes is 3.8%. On average, patients arrive 54 minutes before their appointment time. Unlike Dr 9 am shift, the no-show rates change over time, ranging from 6.4% to 13.1%.
Table 5	Table 20	Details on patient non-puncuality by new and repeat patients. Among new patients, the average no-show rate is 7.8%, the average % late is 11.3%, and the average % late more than 15 minutes is 4.6%. Among repeat patients, the average no-show rate is 8.3%, the average % late is 10.7%, and the average % late more than 15 minutes is 3.5%. Similar to Dr 9 am shift, new patients tend to be more late than the repeat patients. In general, patients tend to arrive early rather than late, reflecting strong adherence to the schedule.
Figure 4	Figure 11	The lateness ecdfs in each 30-minute intervals. Different from Dr 9 am shift, the lateness ecdfs do not have a clear stochastic order.
Figure 5	Figure 12	Earliness and lateness histograms and associated exponential fits. Similar to Dr 9 am shift, given the limited data, the exponential fit for X^- might be judged adequate, but we might also want to allow for greater variability in the lateness.
Table 13	Table 21	$B_{s,j} - B_{a,j}$. Similar to Dr 9 am shift, the difference is often large, which we have seen must be primarily due to deviations from the scheduled arrival times, and especially earliness.
Figure 7	Figure 13	Histograms of the counting processes $S(t)$ and $A(t)$. Similar to Dr 9 am shift, the histograms expose systematic effects and show the variability. $S(t)$ is in general smaller than $A(t)$ for 14 pm and 15 pm, but then they are about the same at 16 pm and become smaller at 17 pm, which is caused by the earliness of patient arrivals and patient no-shows.
Figure 8	Figure 14	Plots of the average number of scheduled and actual arrivas in each 10-minute interval. Similar to Dr 9 am shift, the estimated rate function for the schedule within the main interval is constant but the estimated rate function of the actual arrivals is increasing and then decreasing because of the tendency for patients to arrive early.

Table 9: Summary of Dr 4 am shift Compared to Dr 9 am shift.

Dr 9 am	Dr 4 am	Note
Defining and Modeling the Daily Schedule		
Figure 2	Figure 15	Evolution of the schedule. Similar in that the average of the 34 sets of percentage data jumps at regular intervals, especially around 3 months before the appointment date.
Figure 3	Figure 16	Evolution of the schedule by new and repeat patients. Similar in that new patients are likely to schedule their appointments much closer to the appointment date than the repeat patients.
Table 1	Table 22	$B_{s,j}$. Master schedule is similar with $\tau = 10$ min, $\beta = 3.5$ patients, $\nu = 18$ slots and main interval $[9{:}00, 11{:}50]$. The daily totals within the main interval are stable, with mean 64.26 and variance 39.53. The full daily totals for the entire am shifts are more variable, with mean 65.35 and variance 27.87.
Table 2	Table 23	The estimated distributions of B_s and N_o. The estimated distribution of B_s is $P(B_s = k) = 0.01, 0.07, 0.31, 0.50, 0.10, 1 \leq k \leq 5$, so that $E[B_s] = 3.58$, $E[B_s^2] = 13.58$, $Var(B_s) = 0.764$, and $SD(B_s) = 0.874$. The variance is considerably less than the mean, so we can conclude that the distribution of B_s is much less variable than Poisson. The estimated correlation ρ_S in (2.10) is $\frac{39.53-18\times0.764}{18*0.764*17} = 0.110$, which is sufficiently small that we consider the i.i.d. model reasonable.
Adherence to the Schedule: Patient No-Shows and Unscheduled Arrivals		
Table 3	Table 24	$B_{n,j}$. Similar to Dr 9 am shift, the number of no-shows ranges from 1 to 10 per day, with an average of 4.71 per day. The overall proportion of no-shows is $4.91/65.35 = 7.5\%$. The observed sample variance of the average number of no-shows is 4.40, which is slightly smaller than the overall average of 4.71, supporting the model with i.i.d. Bernoulli no-shows.
Table 11	Table 25	$B_{u,j}$. On average, 2.85 unscheduled patients per day.
Table 12	Table 26	$B_{a\|u,j}$. On average 2.79 arrived per day among unscheduled patients. Combining the summary data from Tables 22, 24 and 26, the means are $E[N_A] = E[N_S] - E[N_N] + E[N_U] = 65.4 - 4.7 + 2.9 = 63.6$. $E[N_A] = 63.6$ is only about 3% less than $E[N_S] = 65.4$. From the perspective of the daily totals, there is strong adherence to the schedule. The sample variances are $Var(N_A) = 19.5$, $Var(N_S) = 27.9$, $Var(N_N) = 4.4$ and $Var(N_U) = 5.6$. Similar to Dr 9 am shift, the variability of N_A is primarily due to the variability of N_S. Similar to Dr 9 am shift, $Var(N_A) < Var(N_S)$ and $Var(N_A)/E[N_A] = 19.5/63.6 = 0.307 < 0.427 = 27.9/65.4 = Var(N_S)/E[N_S]$.
The Arrival Pattern over the Day: Patient Non-Punctuality		
Table 4	Table 27	Details on patient non-punctuality within the main interval. In the main interval, the average no-show rate is 7.5%, the average % late is 17.6%, and the average % late more than 15 minutes is 6.0%. On average, patients arrive 25 minutes before their appointment time. Unlike Dr 9 am shift, the no-show rates change over time, ranging from 5.5% to 9.0%.
Table 5	Table 28	Details on patient non-puncuality by new and repeat patients. Among new patients, the average no-show rate is 7.4%, the average % late is 22.6%, and the average % late more than 15 minutes is 7.7%. Among repeat patients, the average no-show rate is 7.2%, the average % late is 16.1%, and the average % late more than 15 minutes is 5.2%. Similar to Dr 9 am shift, new patients tend to be more late than the repeat patients. In general, patients tend to arrive early rather than late, reflecting strong adherence to the schedule.
Figure 4	Figure 17	The lateness ecdfs in each 30-minute intervals. Similar to Dr 9 am shift, the lateness tends to decrease over the day in the sense that each successive ecdf is stochastically less than the one before.
Figure 5	Figure 18	Earliness and lateness histograms and associated exponential fits. Similar to Dr 9 am shift, given the limited data, the exponential fit for X^- might be judged adequate, but we might also want to allow for greater variability in the lateness.
Table 13	Table 29	$B_{s,j} - B_{a,j}$. Similar to Dr 9 am shift, the difference is often large, which we have seen must be primarily due to deviations from the scheduled arrival times, and especially earliness.
Figure 7	Figure 19	Histograms of the counting processes $S(t)$ and $A(t)$. Similar to Dr 9 am shift, the histograms expose systematic effects and show the variability. $S(t)$ is in general smaller than $A(t)$ for 10 am and 11 am, but then they are about the same at 12 pm and become smaller at 13 pm, which is caused by the earliness of patient arrivals and patient no-shows.
Figure 8	Figure 20	Plots of the average number of scheduled and actual arrivas in each 10-minute interval. Similar to Dr 9 am shift, the estimated rate function for the schedule within the main interval is constant but the estimated rate function of the actual arrivals is increasing and then decreasing because of the tendency for patients to arrive early.

Table 10: Summary of Dr 14 pm shift Compared to Dr 9 am shift.

Dr 9 am	Dr 14 pm	Note
Defining and Modeling the Daily Schedule		
Figure 2	Figure 21	Evolution of the schedule. Similar in that the average of the 34 sets of percentage data jumps at regular intervals, especially around 3 months before the appointment date.
Figure 3	Figure 22	Evolution of the schedule by new and repeat patients. Similar in that new patients are likely to schedule their appointments much closer to the appointment date than the repeat patients.
Table 1	Table 30	$B_{s,j}$. Master schedule is similar with $\tau = 10$ min, $\beta = 2$ patients, $\nu = 18$ slots and main interval $[13{:}30, 16{:}20]$. The daily totals within the main interval are stable, with mean 33.39 and variance 28.52. The full daily totals for the entire am shifts are more variable, with mean 34.39 and variance 38.25.
Table 2	Table 31	The estimated distributions of B_s and N_o. The estimated distribution of B_s is $P(B_s = k) = 0.25,\ 0.59,\ 0.17, 1 \le k \le 3$, so that $E[B_s] = 1.94$, $E[B_s^2] = 4.14$, $Var(B_s) = 0.376$, and $SD(B_s) = 0.614$. The variance is considerably less than the mean, so we can conclude that the distribution of B_s is much less variable than Poisson. The estimated correlation ρ_S in (2.10) is $\frac{38.25-18\times0.376}{18*0.376*17} = 0.274$, which is sufficiently small that we consider the i.i.d. model reasonable.
Adherence to the Schedule: Patient No-Shows and Unscheduled Arrivals		
Table 3	Table 32	$B_{n,j}$. Similar to Dr 9 am shift, the number of no-shows ranges from 0 to 8 per day, with an average of 3.35 per day. The overall proportion of no-shows is $3.35/34.39 = 9.7\%$. The observed sample variance of the average number of no-shows is 4.15, which is slightly larger than the overall average of 3.35, supporting the model with i.i.d. Bernoulli no-shows.
Table 11	Table 33	$B_{u,j}$. On average, 3.83 unscheduled patients per day.
Table 12	Table 34	$B_{a\|u,j}$. On average 3.09 arrived per day among unscheduled patients. Combining the summary data from Tables 30, 32 and 34, the means are $E[N_A] = E[N_S] - E[N_N] + E[N_U] = 34.4 - 3.4 + 3.1 = 34.1$. $E[N_A] = 34.1$ is only about 1% less than $E[N_S] = 34.4$. From the perspective of the daily totals, there is strong adherence to the schedule. The sample variances are $Var(N_A) = 22.8$, $Var(N_S) = 38.3$, $Var(N_N) = 4.2$ and $Var(N_U) = 14.7$. Similar to Dr 9 am shift, the variability of N_A is primarily due to the variability of N_S. Similar to Dr 9 am shift, $Var(N_A) < Var(N_S)$ and $Var(N_A)/E[N_A] = 22.8/34.1 = 0.669 < 1.113 = 38.3/34.4 = Var(N_S)/E[N_S]$.
The Arrival Pattern over the Day: Patient Non-Punctuality		
Table 4	Table 35	Details on patient non-punctuality within the main interval. In the main interval, the average no-show rate is 10.4%, the average % late is 10.4%, and the average % late more than 15 minutes is 2.5%. On average, patients arrive 52 minutes before their appointment time. Unlike Dr 9 am shift, the no-show rates change over time, ranging from 5.7% to 13.8%.
Table 5	Table 36	Details on patient non-puncuality by new and repeat patients. Among new patients, the average no-show rate is 12.2%, the average % late is 10.4%, and the average % late more than 15 minutes is 2.6%. Among repeat patients, the average no-show rate is 9.3%, the average % late is 10.3%, and the average % late more than 15 minutes is 2.7%. In general, patients tend to arrive early rather than late, reflecting strong adherence to the schedule.
Figure 4	Figure 23	The lateness ecdfs in each 30-minute intervals. Similar to Dr 9 am shift, the lateness tends to decrease over the day in the sense that each successive ecdf is stochastically less than the one before.
Figure 5	Figure 24	Earliness and lateness histograms and associated exponential fits. Similar to Dr 9 am shift, given the limited data, the exponential fit for X^- might be judged adequate, but we might also want to allow for greater variability in the lateness.
Table 13	Table 37	$B_{s,j} - B_{a,j}$. Similar to Dr 9 am shift, the difference is often large, which we have seen must be primarily due to deviations from the scheduled arrival times, and especially earliness.
Figure 7	Figure 25	Histograms of the counting processes $S(t)$ and $A(t)$ for t. Similar to Dr 9 am shift, the histograms expose systematic effects and show the variability. $S(t)$ is in general smaller than $A(t)$ for 14 pm and 15 pm, but then they are about the same at 16 pm and become larger at 17 pm, which is caused by the earliness of patient arrivals and patient no-shows.
Figure 8	Figure 26	Plots of the average number of scheduled and actual arrivas in each 10-minute interval. Similar to Dr 9 am shift, the estimated rate function for the schedule within the main interval is constant but the estimated rate function of the actual arrivals is increasing and then decreasing because of the tendency for patients to arrive early.

C Doctor 9 AM Shifts: Additional Tables

Table 11: The extra unscheduled arrivals, i.e., the same-day arrivals $B_{u,j}$ scheduled for slot j on each of the 22 days.

time slot	22 days in July-October 2013																					Avg	Var	Var/Avg
7:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.05	0.05	1.00
8:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:50	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0.14	0.12	0.90
9:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.09	0.09	0.95
9:10	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0.14	0.12	0.90
9:20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
9:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
9:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.09	0.09	0.95
9:50	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.09	0.09	0.95
10:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
10:10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
10:20	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0.14	0.12	0.90
10:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0.09	0.09	0.95
10:40	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.14	0.12	0.90
10:50	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09	0.09	0.95
11:00	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.09	0.09	0.95
11:10	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.09	0.09	0.95
11:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.05	0.05	1.00
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
11:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
11:50	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.09	0.09	0.95
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
12:10	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0.14	0.12	0.90
12:20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
12:30	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0.14	0.12	0.90
12:40	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0.14	0.22	1.60
12:50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0.09	0.09	0.95
13:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.09	0.09	0.95
Daily Total	2	3	0	1	1	1	1	3	2	1	3	8	3	2	2	2	3	4	0	2	3	1	2.18	2.82	1.29
[8:50, 12:20] Total	2	3	0	1	1	1	1	1	2	1	2	5	2	1	2	2	3	3	0	1	2	1	1.68	1.27	0.76

Table 12: The unscheduled arrivals that actually arrived ($B_{a|u,j}$) for slot j on each of the 22 days.

Slot	Different Days																					Avg	Var	Var/Avg
7:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
8:50	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0.14	0.12	0.90
9:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.09	0.09	0.95
9:10	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0.14	0.12	0.90
9:20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
9:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
9:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.09	0.09	0.95
9:50	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.09	0.09	0.95
10:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
10:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
10:20	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0.14	0.12	0.90
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.05	0.05	1.00
10:40	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.14	0.12	0.90
10:50	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09	0.09	0.95
11:00	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.09	0.09	0.95
11:10	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
11:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.05	0.05	1.00
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
11:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
11:50	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.09	0.09	0.95
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
12:10	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0.14	0.12	0.90
12:20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
12:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0.09	0.09	0.95
12:40	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0.14	0.22	1.60
12:50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0.09	0.09	0.95
13:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.09	0.09	0.95
Daily Total	2	3	0	1	1	1	1	2	2	0	3	7	3	1	2	2	3	4	0	2	2	1	1.95	2.43	1.24
[8:50, 12:20] Total	2	3	0	1	1	1	1	1	2	0	2	4	2	0	2	2	3	3	0	1	2	1	1.55	1.21	0.78

Table 13: The difference between the number of patients scheduled to arrive for slot j ($B_{s,j}$) and the number of patients who actually arrived for slot j ($B_{a,j}$) on each of the 22 days.

Slot	Different Days																				
7:50	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	0
8:00	0	-2	-3	-1	-7	-2	-2	-4	1	-2	-4	-5	-2	-5	-1	-3	-2	-4	0	-1	-2	-1
8:10	-3	0	0	0	-2	-4	-1	1	-3	0	0	-4	0	0	-2	-3	-2	-1	0	-2	0	0
8:20	-2	-1	-3	-3	-1	-2	-2	-5	-3	-1	-1	0	-3	0	-1	-3	-4	0	-4	0	-2	-2
8:30	-1	-2	-3	-1	-2	-2	-1	-2	-3	0	-3	-2	-2	-2	-3	-3	-3	-2	-1	-4	-5	-7
8:40	-3	-5	-4	-5	-4	-3	-3	-3	-1	-2	0	-3	0	-3	-1	-1	-1	-1	-3	0	-2	-2
8:50	2	2	4	3	3	2	1	3	2	-3	2	1	0	0	0	0	1	-6	3	2	2	1
9:00	-1	-2	1	0	1	-1	-2	-1	-3	-2	2	0	0	-1	-3	0	0	-1	0	0	0	2
9:10	-1	1	1	0	-3	0	1	0	-1	0	-3	1	-2	3	1	-1	-2	1	0	-2	1	-2
9:20	0	-1	-1	-2	-1	-4	-1	-2	-3	-2	-1	1	1	-1	1	1	-2	2	-2	0	1	-2
9:30	-2	-1	0	-1	1	2	1	1	1	-3	-4	0	-1	0	1	-4	0	2	1	1	-2	0
9:40	2	2	-1	0	-2	-3	0	2	0	2	-3	-3	0	1	-1	0	-4	-2	-1	-2	-1	-1
9:50	1	2	-2	2	0	-1	-2	0	-1	1	2	-1	-1	1	2	0	2	1	0	-3	1	3
10:00	-4	0	1	0	-1	3	-4	1	1	2	0	1	-1	-2	0	1	3	1	0	0	2	1
10:10	0	-1	2	3	1	0	1	2	2	-1	1	3	-1	-2	-2	2	0	1	1	0	2	1
10:20	1	1	1	2	0	2	1	1	1	0	-2	3	1	1	2	-2	2	0	0	2	1	0
10:30	0	-3	-3	0	1	1	0	-1	1	0	-1	1	2	-3	0	1	1	-2	1	1	-1	0
10:40	2	0	0	1	2	-2	-1	1	0	0	-1	0	-1	0	0	0	2	-1	-4	0	-1	0
10:50	0	-4	2	2	-2	0	0	-1	1	0	2	1	0	0	2	2	-1	1	1	-1	2	1
11:00	0	1	1	0	-1	-2	3	1	-1	4	3	1	1	2	2	0	2	1	0	3	-2	-1
11:10	-2	0	2	-1	3	2	2	0	1	0	1	0	1	1	-1	2	1	1	1	1	0	3
11:20	1	3	-1	3	3	3	1	2	2	1	0	1	-3	1	-2	2	3	0	2	1	2	1
11:30	0	0	2	1	2	1	1	-1	1	3	0	1	2	2	-2	2	2	-1	1	1	1	1
11:40	3	1	2	2	0	0	2	3	1	0	1	-2	1	-1	2	1	1	0	0	2	0	1
11:50	-1	1	3	2	3	0	0	-2	-1	-1	1	0	1	2	2	-1	2	0	2	2	-1	1
12:00	1	3	1	0	2	3	4	0	0	2	1	2	1	0	-2	3	0	2	1	1	3	1
12:10	3	2	1	-1	2	3	2	2	0	2	2	1	3	1	1	1	-1	2	-1	1	2	0
12:20	2	2	3	2	2	1	3	1	2	2	3	2	3	1	1	2	-1	1	-1	2	1	2
12:30	2	1	0	-1	0	2	3	2	0	2	2	1	2	3	3	1	0	4	3	0	2	2
12:40	0	0	0	0	0	2	2	3	3	0	3	2	1	0	2	3	3	2	3	0	0	2
12:50	0	0	0	0	0	0	0	1	4	0	0	0	0	2	2	0	1	0	4	0	-1	4
13:00	1	0	0	0	1	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0

D Doctor 9 PM Shifts

Figure 9: [Doctor 9 PM Shifts] The evolution of the daily cumulative number of patients scheduled over the previous year for each of the appointment days (left) and the percentage of patients who are scheduled k days in advance for each of the appointment days (right). The thick line indicates the average over the appointment days.

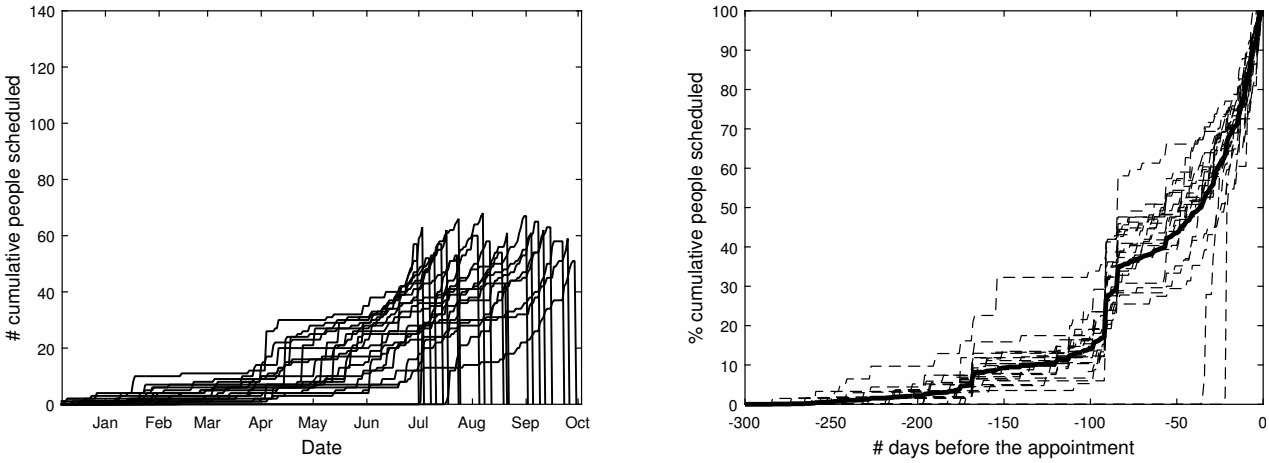


Figure 10: [Doctor 9 PM Shifts] The evolution of the daily cumulative number of patients scheduled and the percentage of patients who are scheduled k days in advance for each of the appointment days for new patients (left two panels) and repeat visits (right two panels). The thick line indicates the average over the appointment days.

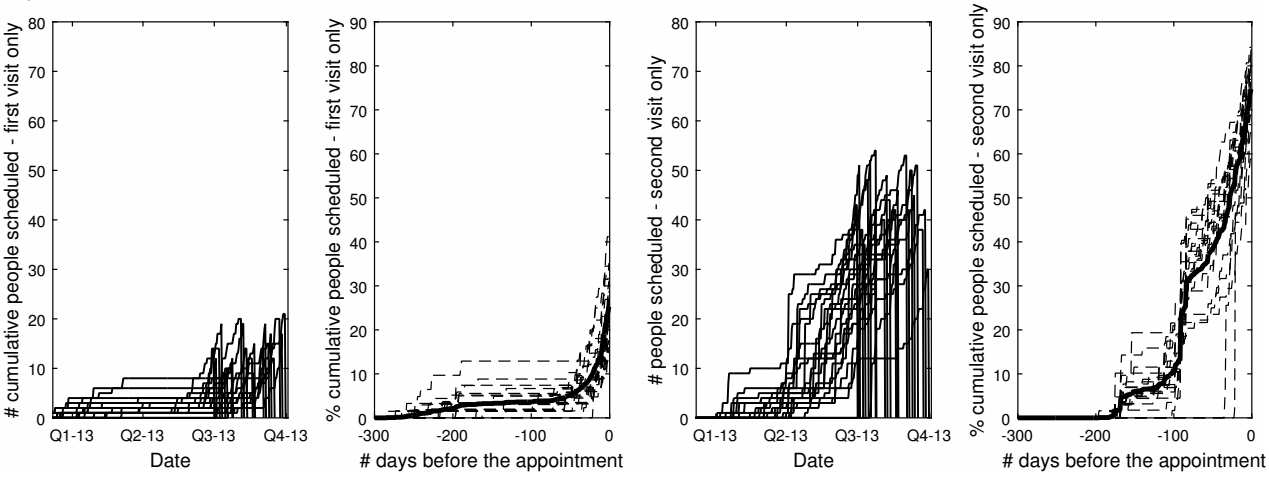


Table 14: [Doctor 9 PM Shifts] The number of patients scheduled in each 10-minute time slot (displayed vertically) on each appointment day (displayed horizontally).

time slot	22 days in July-October 2013																						Avg	Var	Var/Avg
11:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
11:10	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
11:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:50	6	4	3	4	4	4	0	4	3	4	4	4	0	3	4	3	3	4	5	0	2	0	3.09	2.85	0.92
13:00	3	4	2	3	3	1	0	3	3	4	2	2	0	3	3	3	3	3	3	5	3	3	2.68	1.37	0.51
13:10	3	2	3	2	2	3	0	2	3	3	2	2	0	3	3	3	3	3	2	3	3	3	2.41	0.82	0.34
13:20	2	3	3	3	3	3	0	3	2	3	2	2	0	3	3	2	2	2	3	4	2	2	2.36	0.91	0.38
13:30	3	3	4	3	3	3	3	3	2	3	2	2	2	3	3	3	3	2	3	3	3	3	2.82	0.25	0.09
13:40	3	3	2	3	3	2	3	3	2	2	3	3	3	2	3	2	3	2	3	3	3	3	2.68	0.23	0.08
13:50	3	3	3	2	3	1	3	3	3	4	2	2	3	3	3	3	2	0	2	3	3	2	2.55	0.74	0.29
14:00	2	2	2	2	3	2	3	3	3	3	3	3	3	2	3	1	2	2	2	2	3	3	2.45	0.35	0.14
14:10	3	2	2	2	2	3	3	2	3	3	2	4	3	3	2	3	3	3	2	3	3	3	2.68	0.32	0.12
14:20	2	3	3	3	3	3	2	3	3	2	3	3	3	1	2	3	3	1	3	2	3	2	2.55	0.45	0.18
14:30	1	2	2	3	3	3	3	3	3	3	3	2	4	3	3	2	2	1	3	2	3	3	2.59	0.54	0.21
14:40	3	3	2	2	2	3	3	3	3	3	2	2	2	2	3	1	2	3	2	3	3	1	2.41	0.44	0.18
14:50	2	3	3	2	1	3	3	2	2	2	2	2	3	3	3	2	3	3	3	2	3	2	2.45	0.35	0.14
15:00	1	3	2	2	3	3	2	3	3	3	3	3	1	3	2	1	3	3	3	3	2	3	2.50	0.55	0.22
15:10	3	3	0	2	1	2	3	2	1	2	3	3	3	3	4	3	2	3	3	2	2	2	2.36	0.81	0.34
15:20	3	2	3	2	3	3	3	2	3	3	2	1	3	3	3	3	3	2	3	3	3	2	2.64	0.34	0.13
15:30	2	3	3	3	3	3	2	3	3	3	3	1	3	3	3	3	3	3	3	3	3	1	2.73	0.40	0.15
15:40	3	2	3	2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	2	2	3	4	2.77	0.28	0.10
15:50	3	3	3	3	3	3	3	3	3	3	3	2	3	1	3	3	3	3	3	3	2	2	2.77	0.28	0.10
16:00	3	3	2	2	3	3	3	3	2	3	2	3	2	3	2	3	2	3	3	3	1	3	2.59	0.35	0.13
16:10	3	3	2	3	3	1	3	2	3	3	2	1	0	3	2	3	3	1	2	2	3	3	2.32	0.80	0.34
16:20	0	3	0	1	0	2	3	3	3	3	2	2	0	3	2	3	3	1	2	2	3	1	1.91	1.32	0.69
16:30	0	1	0	0	0	3	2	2	1	3	2	3	0	2	2	3	2	3	2	0	0	0	1.41	1.49	1.06
16:40	0	0	0	0	0	0	0	3	0	0	1	0	0	0	3	2	3	2	1	0	0	0	0.68	1.27	1.87
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.09	0.09	0.95
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0.09	0.18	2.00
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0.14	0.41	3.00
Daily Total	57	63	52	54	57	62	53	66	60	68	58	54	43	61	67	61	65	62	63	58	59	51	58.82	35.87	0.61
[12:50, 16:20] Total	57	62	52	54	57	57	51	61	59	65	55	51	43	59	62	56	59	51	60	58	59	51	56.32	24.99	0.44
All slot avg	1.5	1.7	1.4	1.4	1.5	1.6	1.4	1.7	1.6	1.8	1.5	1.4	1.1	1.6	1.8	1.6	1.7	1.6	1.7	1.5	1.6	1.3	1.55	1.96	1.26
All slot var	2.4	2.1	1.9	1.8	2.1	1.9	2.1	2.0	1.9	2.3	1.7	1.8	2.0	2.0	2.1	1.9	1.8	1.8	2.0	2.3	2.0	1.9			
All slot var/avg	1.6	1.3	1.4	1.2	1.4	1.2	1.5	1.1	1.2	1.3	1.1	1.2	1.8	1.2	1.2	1.2	1.0	1.1	1.2	1.5	1.3	1.4			
[12:50, 16:20] avg	2.6	2.8	2.4	2.5	2.6	2.6	2.3	2.8	2.7	3.0	2.5	2.3	2.0	2.7	2.8	2.5	2.7	2.3	2.7	2.6	2.7	2.3	2.56	0.69	0.27
[12:50, 16:20] var	1.3	0.3	0.9	0.5	0.8	0.6	1.4	0.3	0.3	0.3	0.4	0.7	1.9	0.4	0.3	0.5	0.2	1.0	0.5	0.9	0.3	0.9			
[12:50, 16:20] var/avg	0.5	0.1	0.4	0.2	0.3	0.2	0.6	0.1	0.1	0.1	0.1	0.3	0.9	0.2	0.1	0.2	0.1	0.4	0.2	0.3	0.1	0.4			

Table 15: [Doctor 9 PM Shifts] The estimated distribution of the batch sizes (B_s) within the main interval and the estimated distribution of the total number of scheduled arrivals after the main interval (N_o).

	$\hat{P}(B_s = k)$				$\hat{P}(N_o = k)$											
number k	1	2	3	4	0	1	2	3	4	5	6	7	8	9	10	11
Estimated distribution	0.06	0.29	0.61	0.04	0.36	0.09	0.09	0.23	0.00	0.14	0.05	0.00	0.00	0.00	0.00	0.05

Table 16: [Doctor 9 PM Shifts] The number of no-shows ($B_{n,j} \equiv B_{s,j} - B_{a|s,j}$) for each 10-minute time slot j (displayed vertically) on each appointment day (displayed horizontally).

time slot	22 days in July-October 2013																					Avg	Var	Var/Avg
11:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
11:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:50	0	0	0	1	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0.18	0.16	0.86
13:00	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0.27	0.21	0.76
13:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.05	0.05	1.00
13:20	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0.18	0.16	0.86
13:30	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0.18	0.16	0.86
13:40	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0.18	0.25	1.38
13:50	1	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.18	0.25	1.38
14:00	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.18	0.16	0.86
14:10	0	0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0.23	0.18	0.81
14:20	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0.27	0.21	0.76
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0.09	0.09	0.95
14:40	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0.18	0.16	0.86
14:50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0.14	0.12	0.90
15:00	1	0	0	0	1	1	0	2	0	0	0	0	0	1	1	0	0	0	0	1	0	1	0.41	0.35	0.85
15:10	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0.23	0.18	0.81
15:20	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	0.18	0.25	1.38
15:30	1	2	1	0	1	0	1	0	0	0	1	1	0	0	0	2	0	0	0	1	0	1	0.55	0.45	0.83
15:40	0	0	0	0	0	0	0	0	0	1	1	0	0	2	1	0	1	0	0	1	0	0	0.32	0.32	1.01
15:50	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	2	0	0	0	0	0	0.27	0.30	1.11
16:00	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	1	0.27	0.21	0.76
16:10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.09	0.09	0.95
16:20	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0.18	0.16	0.86
16:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
16:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	5	5	5	5	4	3	3	5	3	6	4	6	4	5	6	4	5	0	7	10	7	6	4.91	3.71	0.75
[12:50, 16:20] Total	5	5	5	5	4	2	3	5	3	5	4	6	4	5	6	4	5	0	7	10	7	6	4.82	3.87	0.80
All slot avg	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.0	0.2	0.3	0.2	0.2	0.13	0.13	1.02
All slot var	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.0	0.2	0.3	0.2	0.1	(across all days)		
All slot var/avg	0.9	1.3	1.3	0.9	0.9	0.9	0.9	1.3	0.9	0.9	0.9	0.9	0.9	1.3	0.9	1.4	1.3		0.8	1.0	1.1	0.9			
[12:50, 16:20] avg	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.0	0.3	0.5	0.3	0.3	0.22	0.20	0.93
[12:50, 16:20] var	0.2	0.3	0.3	0.2	0.2	0.1	0.1	0.3	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.0	0.2	0.4	0.3	0.2	(across all days)		
[12:50, 16:20] var/avg	0.8	1.2	1.2	0.8	0.9	1.0	0.9	1.2	0.9	0.8	0.9	0.8	0.9	1.2	0.8	1.4	1.2		0.7	0.8	1.0	0.8			

Figure 11: [Doctor 9 PM Shifts] The lateness ecdfs in each of the 30-minute intervals.

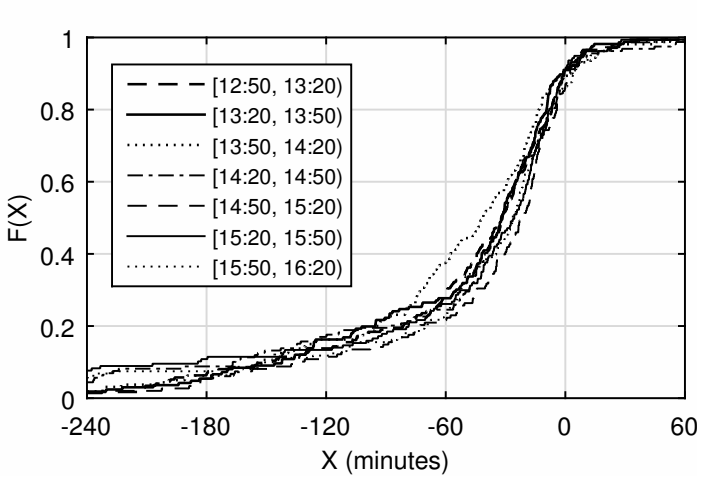


Table 17: [Doctor 9 PM Shifts] The extra unscheduled arrivals, i.e., the same-day arrivals $B_{u,j}$ scheduled for slot j on each appointment day.

time slot	22 days in July-October 2013																					Avg	Var	Var/Avg
11:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
11:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.05	0.05	1.00
12:50	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0.14	0.12	0.90
13:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
13:10	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.09	0.09	0.95
13:20	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:40	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0.18	0.16	0.86
13:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.05	0.05	1.00
14:00	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09	0.09	0.95
14:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.05	0.05	1.00
14:20	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.09	0.09	0.95
14:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.09	0.09	0.95
14:40	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0.09	0.09	0.95
14:50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
15:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0.14	0.22	1.60
15:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
15:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
15:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
15:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.05	0.05	1.00
15:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.05	0.05	1.00
16:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0.14	0.12	0.90
16:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0.14	0.22	1.60
16:20	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.18	0.16	0.86
16:30	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0.23	0.18	0.81
16:40	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	2	3	0	2	1	1	0	3	0	3	3	1	2	3	4	4	1	7	2	2	0	2.09	2.75	1.32
[12:50, 16:20] Total	2	2	0	2	1	1	0	1	0	3	3	0	2	2	4	4	1	6	1	1	2	0	1.73	2.40	1.39

Table 18: [Doctor 9 PM Shifts] The unscheduled arrivals that actually arrived ($B_{a|u,j}$) for slot j on each appointment day.

time slot	22 days in July-October 2013																						Avg	Var	Var/Avg
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
11:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.05	0.05	1.00
12:50	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0		0.14	0.12	0.90
13:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
13:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.05	0.05	1.00
13:20	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:40	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0.18	0.16	0.86
13:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.05	0.05	1.00
14:00	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09	0.09	0.95
14:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.05	0.05	1.00
14:20	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0.09	0.09	0.95
14:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.09	0.09	0.95
14:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.05	0.05	1.00
14:50	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
15:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0.14	0.22	1.60
15:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
15:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
15:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.05	0.05	1.00
15:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.05	0.05	1.00
16:00	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0		0.14	0.12	0.90
16:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0.09	0.09	0.95
16:20	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0.14	0.12	0.90
16:30	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0.23	0.18	0.81
16:40	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.05	0.05	1.00
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	1	3	0	2	0	1	0	1	0	3	2	1	2	3	4	4	1	6	2	2	2	0	1.82	2.44	1.34
[12:50, 16:20] Total	1	2	0	2	0	1	0	0	0	3	2	0	2	2	4	4	1	5	1	1	2	0	1.50	2.17	1.44

Table 19: [Doctor 9 PM Shifts] Average numbers of scheduled arrivals for each 30-minute interval within the main interval as well as the proportions of no-shows and lateness and the average earliness (X^-), lateness (X^+) and overall deviation (X), plus 95% confidence intervals.

Interval	Avg # Scheduled	% No-show	% Late	% (Late>15 min)	Avg(X^+)	Avg(X^-)	Avg(X)
[12:50, 13:20)	8.2 ± 1.3	6.5 ± 3.5	10.5 ± 5.4	3.9 ± 3.9	26.1 ± 33.5	-59.2 ± 10.9	-49.3 ± 7.7
[13:20, 13:50)	7.9 ± 0.6	6.4 ± 3.9	9.6 ± 5.1	1.9 ± 2.1	13.2 ± 6.3	-61.4 ± 10.9	-54.0 ± 10.5
[13:50, 14:20)	7.7 ± 0.6	7.7 ± 4.8	10.7 ± 4.8	5.7 ± 3.8	21.0 ± 10.2	-68.7 ± 16.2	-58.6 ± 13.8
[14:20, 14:50)	7.5 ± 0.5	7.2 ± 4.0	8.3 ± 4.2	3.8 ± 2.9	26.6 ± 15.4	-64.8 ± 13.4	-57.4 ± 13.0
[14:50, 15:20)	7.3 ± 0.6	11.0 ± 5.1	13.0 ± 6.7	2.8 ± 4.1	10.6 ± 8.8	-53.5 ± 14.1	-45.8 ± 14.9
[15:20, 15:50)	8.1 ± 0.5	13.1 ± 4.4	9.2 ± 4.8	4.0 ± 3.7	14.2 ± 8.3	-65.3 ± 13.5	-57.4 ± 12.1
[15:50, 16:20)	7.7 ± 0.5	8.8 ± 4.5	11.8 ± 4.9	3.4 ± 3.1	12.3 ± 6.8	-65.0 ± 14.9	-57.0 ± 15.0
[12:50, 16:20)	54.4 ± 2.0	8.5 ± 1.5	10.8 ± 2.2	3.8 ± 1.2	18.1 ± 4.9	-62.6 ± 5.2	-54.0 ± 5.0

Table 20: [Doctor 9 PM Shifts] Average numbers for new and repeat patients for the main interval and outside of the interval as well as the proportions of no-shows and lateness and the average earliness (X^-), lateness (X^+) and overall deviation (X), plus 95% confidence intervals.

Interval	Avg # Scheduled	% No-show	% Late	% (Late>15 min)	Avg(X^+)	Avg(X^-)	Avg(X)
New	14.8 ± 1.7	7.8 ± 3.6	11.3 ± 3.8	4.6 ± 2.3	18.1 ± 7.1	-54.8 ± 8.0	-46.8 ± 7.8
New - $[12{:}50, 16{:}20)$	14.1 ± 1.7	8.2 ± 3.8	10.3 ± 4.1	4.0 ± 2.4	17.4 ± 7.7	-55.2 ± 8.1	-47.7 ± 7.9
New - outside	0.6 ± 0.4	0.0 ± 0.0	35.0 ± 33.9	20.0 ± 30.2	15.4 ± 12.3	-38.9 ± 27.7	-20.3 ± 26.7
Repeat	43.9 ± 2.9	8.3 ± 1.9	10.7 ± 2.1	3.5 ± 1.3	18.1 ± 6.1	-64.5 ± 5.3	-55.8 ± 5.1
Repeat - $[12{:}50, 16{:}20)$	40.3 ± 2.4	8.3 ± 1.9	10.9 ± 2.1	3.6 ± 1.4	18.3 ± 6.3	-65.3 ± 6.2	-56.5 ± 6.0
Repeat - outside	3.6 ± 1.2	6.3 ± 4.6	10.3 ± 12.1	2.8 ± 4.0	16.5 ± 21.1	-54.4 ± 18.8	-47.3 ± 18.7

Figure 12: [Doctor 9 PM Shifts] Earliness (X^-) and lateness (X^+) histograms and associated exponential fits. Top to bottom: scheduled arrivals in [13,14), [14,15), and [15,16).

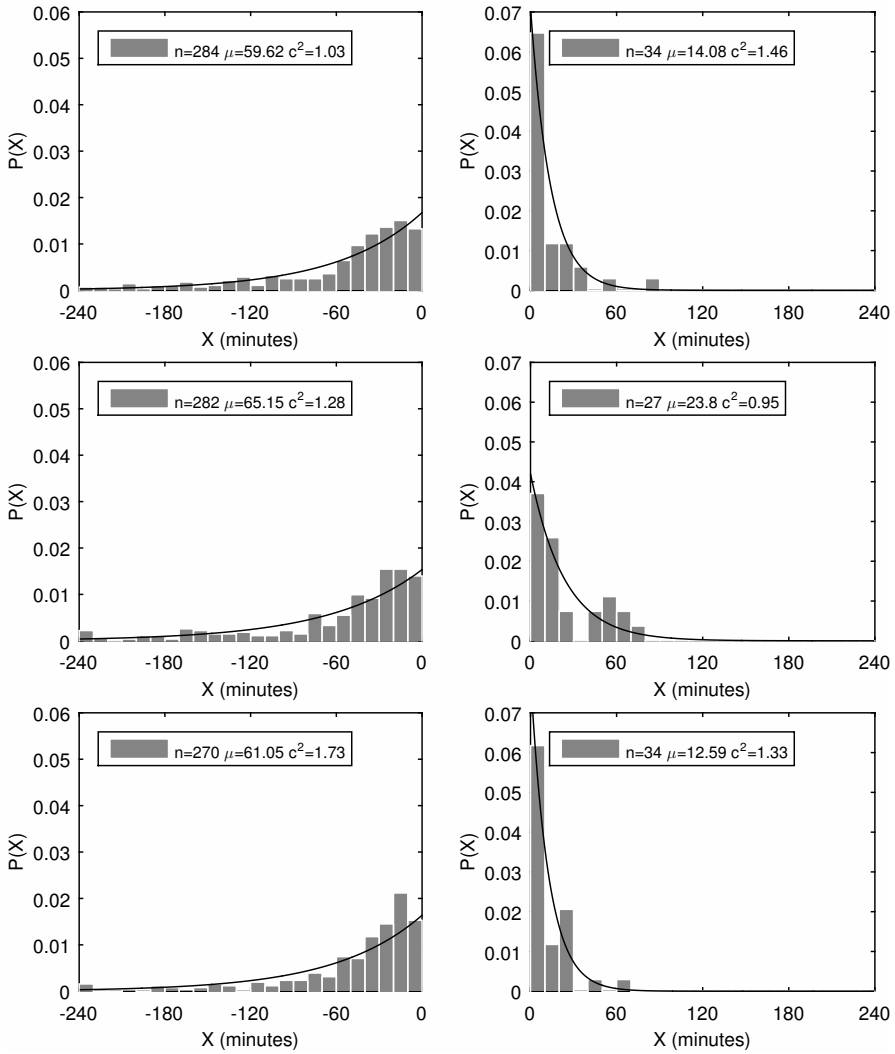


Table 21: [Doctor 9 PM Shifts] The difference between the number of patients scheduled to arrive for slot j ($B_{s,j}$) and the number of patients who actually arrived for slot j ($B_{a,j}$) on each appointment day.

time slot	22 days in July-October 2013																					
11:00	0	0	0	0	0	0	0	-1	0	0	-1	-1	0	0	0	0	-1	0	0	0	0	-2
11:10	-1	0	-1	0	0	0	0	-2	-1	0	0	-1	0	0	0	-1	-1	0	0	-1	-1	-1
11:20	0	0	-2	-1	-1	0	0	-1	0	-1	0	-1	-1	0	0	-1	0	-2	0	0	-2	0
11:30	0	-1	-1	-1	-1	0	-1	0	-1	-1	0	-1	0	0	-1	0	-1	0	-3	0	-2	-2
11:40	0	-2	0	-1	0	0	0	0	0	-1	-1	0	0	-3	-1	-1	-1	0	-1	0	-1	-1
11:50	-4	0	-1	-1	-1	-1	0	0	0	-2	-1	-1	-1	-1	0	-2	0	-1	-2	-2	-1	0
12:00	-1	0	-1	-1	0	-3	-1	-1	-1	0	-3	0	-1	0	0	-1	-1	0	0	-1	-3	-1
12:10	-2	-2	-3	-2	-3	-1	-1	-3	0	-1	-1	-1	-1	0	-2	-1	0	-2	0	0	0	0
12:20	-1	0	0	-1	0	-2	0	-1	-3	-1	-2	0	0	-2	-3	-2	0	-4	-1	-3	-1	-1
12:30	-2	-4	-1	-4	-2	-4	0	-2	-2	-4	-2	0	0	-3	-2	-2	-1	-1	-3	0	0	-1
12:40	-2	-3	-2	0	-3	-3	-2	-2	-2	-4	-3	-2	-1	-1	-1	-2	-5	-4	-2	0	-2	-5
12:50	0	0	1	3	2	1	-1	3	2	0	2	1	0	1	-1	-1	0	0	3	-1	0	-3
13:00	0	2	-1	1	1	-1	0	-1	-1	-1	-1	0	-4	-1	2	2	0	1	1	2	0	2
13:10	2	1	1	0	0	1	-4	-1	-1	2	1	0	0	2	2	1	0	3	1	1	0	1
13:20	-1	2	3	2	0	3	-3	3	1	0	0	1	0	3	2	1	0	1	2	2	2	1
13:30	2	-1	3	-1	1	0	1	-1	2	1	-1	0	-1	-2	1	2	-1	-1	1	-2	0	2
13:40	2	1	-1	1	2	1	3	1	-2	1	2	2	3	-1	1	-3	0	0	3	2	2	1
13:50	0	0	3	-1	2	-2	1	-1	2	0	-2	1	2	1	0	3	2	-3	2	2	1	-1
14:00	2	-2	-1	1	1	2	1	0	0	2	2	0	-1	-1	2	-1	1	-2	0	2	2	2
14:10	3	1	-1	0	2	1	3	0	0	-2	2	0	1	3	0	3	0	2	-1	-1	0	3
14:20	0	-1	2	0	0	0	1	2	1	-1	2	2	1	-2	-1	2	2	1	2	1	0	2
14:30	-1	-2	-1	0	2	2	-1	1	2	1	2	-1	1	0	-2	0	0	-3	1	-2	2	3
14:40	2	2	-1	1	-1	-2	-1	0	0	2	0	1	2	2	0	-1	-1	0	-1	1	3	-2
14:50	1	2	2	1	1	0	1	0	-1	0	2	1	-1	-1	-1	-1	0	1	2	-1	0	0
15:00	-1	0	0	0	0	2	1	3	-1	3	0	1	1	0	1	-1	3	0	-2	3	1	2
15:10	1	-1	-1	2	-2	0	0	2	0	-1	1	0	0	-1	3	0	-1	2	-1	-1	2	0
15:20	0	1	2	-1	1	2	0	0	2	3	2	0	-1	3	2	2	3	-1	2	1	1	0
15:30	2	3	1	1	1	1	-1	3	2	-2	1	-1	0	1	1	2	1	1	1	3	2	-2
15:40	2	2	2	2	1	1	2	1	1	1	0	2	1	1	2	0	2	1	1	-1	1	4
15:50	2	1	1	2	2	2	1	2	0	3	2	2	3	-2	1	-1	1	2	1	1	1	1
16:00	3	1	2	1	2	0	2	2	1	2	0	1	2	1	-1	2	0	0	1	3	-2	2
16:10	3	2	2	2	2	1	3	0	2	2	1	0	0	2	2	1	1	-1	1	1	3	2
16:20	-2	2	0	0	0	2	1	1	3	3	2	2	0	3	1	3	2	-1	2	2	3	0
16:30	0	1	0	0	0	3	2	1	1	3	0	3	0	2	0	2	2	2	2	0	0	0
16:40	0	0	0	0	0	0	0	3	0	0	1	0	0	0	3	1	2	0	0	0	-1	0
16:50	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	-1	0	1	0	0	0	0	0
17:00	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
17:10	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	3	0	0	0	0

Figure 13: [Doctor 9 PM Shifts] Histograms of the counting processes $S(t)$ and $A(t)$ at four different times. From left to right: 14 pm, 15 pm, 16 pm and 17 pm.

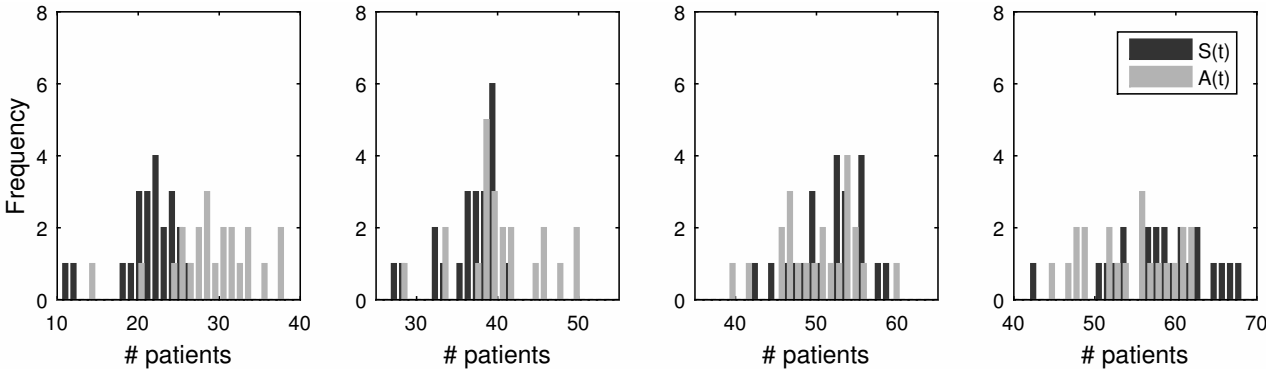
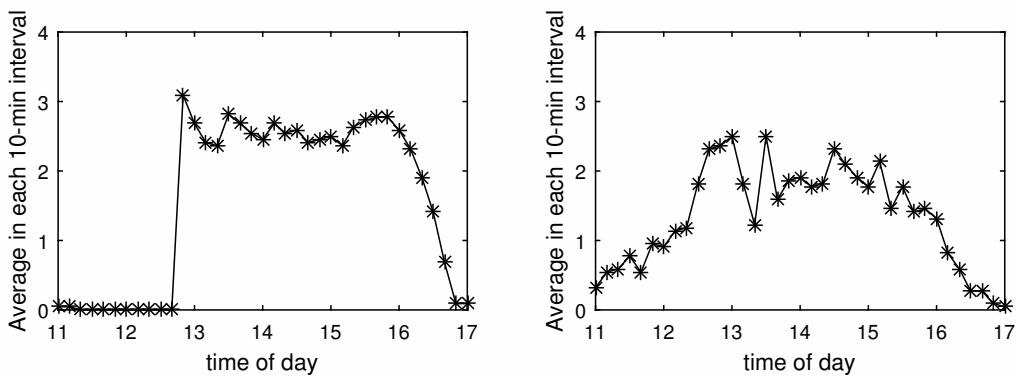


Figure 14: [Doctor 9 PM Shifts] Plots of the average numbers of scheduled (left) and actual (right) arrivals in each of the 10-minute intervals.



E Doctor 4 AM Shifts

Figure 15: [Doctor 4 AM Shifts] The evolution of the daily cumulative number of patients scheduled over the previous year for each of the appointment days (left) and the percentage of patients who are scheduled k days in advance for each of the appointment days (right). The thick line indicates the average over the appointment days.

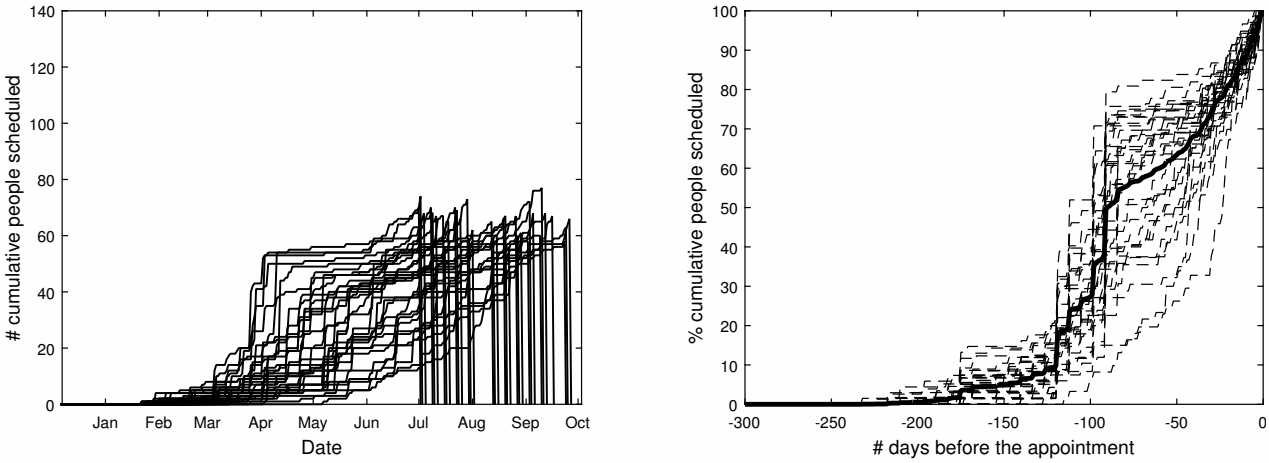


Figure 16: [Doctor 4 AM Shifts] The evolution of the daily cumulative number of patients scheduled and the percentage of patients who are scheduled k days in advance for each of the appointment days for new patients (left two panels) and repeat visits (right two panels). The thick line indicates the average over the appointment days.

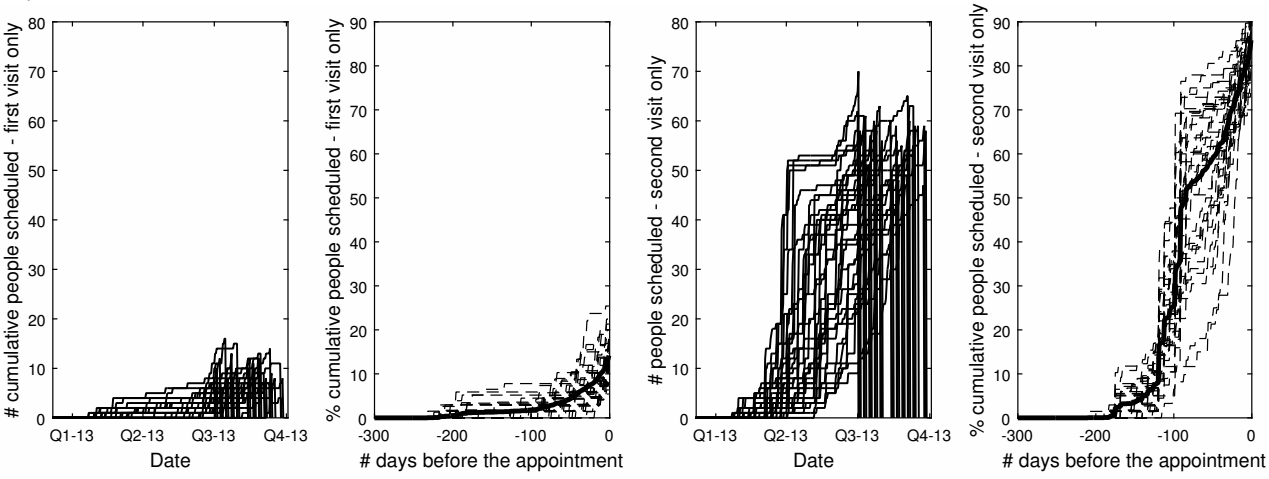


Table 22: [Doctor 4 AM Shifts] The number of patients scheduled in each 10-minute time slot (displayed vertically) on each appointment day (displayed horizontally).

time slot	34 days in July-October 2013																																		Avg	Var	Var/Avg
7:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
9:00	3	5	4	4	3	4	3	4	4	4	4	4	5	3	5	3	3	3	4	2	3	4	4	2	0	5	3	0	5	4	0	0	3	5	3.29	2.15	0.65
9:10	4	4	3	4	4	4	4	3	4	4	4	4	4	3	4	5	4	4	3	4	3	4	3	3	0	4	5	0	4	3	0	0	3	3	3.29	1.79	0.54
9:20	3	5	4	5	4	4	4	4	3	4	4	4	4	4	4	4	2	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	3	3.85	0.31	0.08
9:30	3	3	3	4	3	4	4	2	3	3	3	3	4	3	4	4	3	4	3	4	1	2	3	4	4	4	3	5	4	5	3	3	2	3	3.32	0.71	0.21
9:40	5	4	4	4	4	3	3	4	4	4	4	4	4	3	2	3	4	3	4	4	2	3	3	4	3	4	2	3	4	3	4	3	3	4	3.50	0.50	0.14
9:50	2	4	4	4	4	4	4	4	3	4	3	4	4	4	3	4	3	4	4	3	4	4	4	3	3	3	3	3	3	4	5	3	4	4	3.62	0.36	0.10
10:00	5	3	5	3	4	3	4	1	3	4	5	5	4	3	3	2	3	2	1	4	2	4	3	2	4	4	5	4	4	3	4	3	5	4	3.47	1.23	0.35
10:10	3	4	3	3	4	4	4	3	4	4	4	3	4	3	4	4	3	4	3	3	4	3	2	4	3	3	4	1	4	4	4	3	3	4	3.44	0.50	0.14
10:20	4	3	4	4	2	4	3	4	4	4	3	4	3	4	3	4	3	4	4	4	4	3	4	3	3	4	4	3	4	4	2	4	4	4	3.59	0.37	0.10
10:30	5	3	4	5	3	5	2	2	5	4	4	3	3	4	3	3	3	4	4	4	3	4	3	3	2	4	4	3	5	4	5	4	1	4	3.59	0.98	0.27
10:40	5	3	4	3	5	4	4	4	3	4	4	4	4	3	4	2	3	4	3	3	4	4	4	4	4	3	3	3	4	4	3	3	4	4	3.65	0.42	0.11
10:50	4	4	4	3	3	2	4	3	3	3	4	3	3	4	3	4	4	1	5	4	3	4	3	4	2	5	4	4	5	3	4	4	2	2	3.44	0.86	0.25
11:00	4	5	4	2	4	4	4	2	4	4	4	3	5	3	3	4	3	4	3	4	4	4	2	3	3	4	4	4	4	5	4	3	4	4	3.68	0.59	0.16
11:10	3	4	3	4	4	3	4	3	4	4	4	3	4	3	3	4	4	2	2	4	3	4	4	3	3	4	4	3	5	4	4	3	4	4	3.56	0.44	0.12
11:20	4	4	3	3	4	4	5	3	4	4	4	4	4	2	3	4	3	4	5	5	3	5	4	2	3	5	4	3	5	3	2	3	3	3	3.65	0.78	0.21
11:30	4	4	3	4	4	4	3	4	4	4	4	4	4	4	3	2	4	3	4	3	3	2	3	4	4	4	4	2	4	3	4	3	4	3	3.53	0.44	0.12
11:40	4	5	4	4	4	3	3	4	4	4	4	4	5	4	3	5	2	3	5	4	3	4	2	4	4	3	4	4	4	3	4	4	4	4	3.79	0.53	0.14
11:50	5	5	5	3	5	4	5	2	2	4	3	3	5	2	5	4	5	3	5	4	3	5	5	5	3	5	4	3	5	5	3	2	5	4	4.00	1.21	0.30
12:00	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4	0	0	5	4	2	0	0.71	2.21	3.14
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	5	0	0	3	2	0	0	0.38	1.27	3.33
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	70	74	68	70	68	67	67	56	65	70	69	66	73	59	62	65	59	60	66	67	56	67	60	61	58	72	68	60	77	68	67	58	63	66	65.35	27.87	0.43
[9:00, 11:50] Total	70	72	68	66	68	67	67	56	65	70	69	66	73	59	62	65	59	60	66	67	56	67	60	61	52	72	68	51	77	68	59	52	61	66	64.26	39.53	0.62
All slot avg	2.5	2.6	2.4	2.5	2.4	2.4	2.4	2.0	2.3	2.5	2.5	2.4	2.6	2.1	2.2	2.3	2.1	2.1	2.4	2.4	2.0	2.4	2.1	2.2	2.1	2.6	2.4	2.1	2.8	2.4	2.4	2.1	2.3	2.4	2.33	3.41	1.46
All slot var	4.1	3.9	3.7	3.4	3.7	3.6	3.7	2.9	3.4	3.7	3.7	3.4	4.2	2.8	3.2	3.6	2.9	3.2	3.9	3.6	2.7	3.7	3.1	3.2	2.7	4.1	3.7	3.2	4.6	3.7	3.8	2.7	3.2	3.5	(across all days)		
All slot var/avg	1.6	1.5	1.5	1.4	1.5	1.5	1.5	1.4	1.5	1.5	1.5	1.5	1.6	1.3	1.5	1.6	1.4	1.5	1.7	1.5	1.4	1.6	1.4	1.5	1.3	1.6	1.5	1.5	1.7	1.5	1.6	1.3	1.4	1.5			
[9:00, 11:50] avg	3.9	4.0	3.8	3.7	3.8	3.7	3.7	3.1	3.6	3.9	3.8	3.7	4.1	3.3	3.4	3.6	3.3	3.3	3.7	3.7	3.1	3.7	3.3	3.4	2.9	4.0	3.8	2.8	4.3	3.8	3.3	2.9	3.4	3.7	3.57	0.80	0.22
[9:00, 11:50] var	0.8	0.6	0.4	0.6	0.5	0.4	0.6	0.9	0.5	0.1	0.3	0.4	0.4	0.4	0.6	0.8	0.6	0.8	1.2	0.4	0.7	0.7	0.7	0.7	1.5	0.5	0.5	1.8	0.3	0.5	2.1	1.4	1.1	0.5	(across all days)		
[9:00, 11:50] var/avg	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.3	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.1	0.2	0.2	0.2	0.2	0.5	0.1	0.1	0.6	0.1	0.1	0.6	0.5	0.3	0.1			

Table 23: [Doctor 4 AM Shifts] The estimated distribution of the batch sizes (B_s) within the main interval and the estimated distribution of the total number of scheduled arrivals after the main interval (N_o).

	$\hat{P}(B_s = k)$					$\hat{P}(N_o = k)$									
number k	1	2	3	4	5	0	1	2	3	4	5	6	7	8	9
Estimated distribution	0.01	0.07	0.31	0.50	0.10	0.79	0.00	0.06	0.00	0.03	0.00	0.06	0.00	0.03	0.03

Figure 17: [Doctor 4 AM Shifts] The lateness ecdfs in each of the 30-minute intervals.

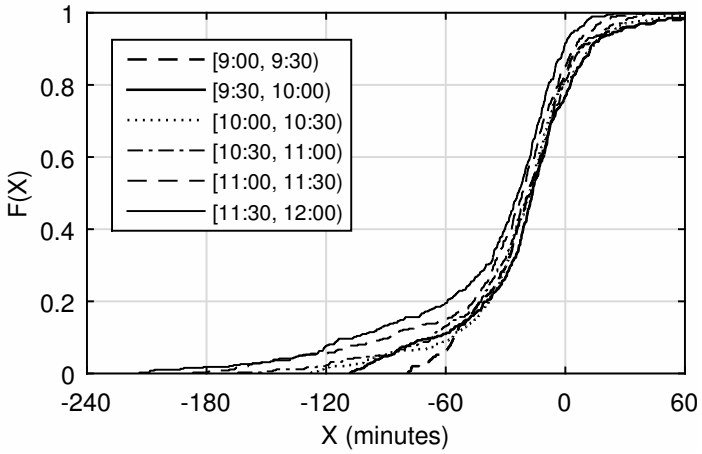


Table 24: [Doctor 4 AM Shifts] The number of no-shows ($B_{n,j} \equiv B_{s,j} - B_{a|s,j}$) for each 10-minute time slot j (displayed vertically) on each appointment day (displayed horizontally).

time slot	34 days in July-October 2013																																Avg	Var	Var/Avg
7:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
9:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0.15	0.13	0.88
9:10	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0.18	0.15	0.85
9:20	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0.18	0.15	0.85
9:30	1	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0.29	0.21	0.73
9:40	0	0	1	1	0	1	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0.35	0.30	0.84
9:50	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0	1	1	0	0	1	0	0	1	0	0	1	0	0	0.29	0.21	0.73
10:00	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0.26	0.20	0.76
10:10	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	0	0	0	0	1	2	0	2	0	1	0	0	0.32	0.35	1.07
10:20	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0	0	0	0	0	0	1	1	2	0	0.32	0.35	1.07
10:30	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	2	1	0	0	1	0	0	0	1	1	0	0	1	1	2	0	1	0.44	0.38	0.85
10:40	0	1	1	0	0	0	1	1	0	1	0	0	1	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0.32	0.23	0.70
10:50	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	1	0	0	0.21	0.17	0.82
11:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0.18	0.15	0.85
11:10	1	1	0	2	0	0	0	0	0	1	0	0	2	1	0	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0.38	0.36	0.95
11:20	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0.21	0.17	0.82
11:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0.21	0.17	0.82
11:40	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0.15	0.13	0.88
11:50	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	2	1	0	0	2	0	0.26	0.32	1.22
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	3	3	4	8	5	2	6	2	2	3	1	7	6	5	4	4	3	8	6	4	5	7	4	4	4	4	8	3	5	5	10	7	6	2	4.71	4.40	0.93
[9:00, 11:50] Total	3	3	4	8	5	2	6	2	2	3	1	7	6	5	4	4	3	8	6	4	5	7	4	4	4	4	8	3	5	5	10	7	6	2	4.71	4.40	0.93
All slot avg	0.1	0.1	0.1	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.3	0.2	0.2	0.1	0.1	0.1	0.3	0.2	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.3	0.1	0.2	0.2	0.4	0.3	0.2	0.1	0.17	0.16	0.97
All slot var	0.1	0.1	0.1	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.2	0.3	0.2	0.1	0.1	0.1	0.3	0.2	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3	0.3	0.1	(across all days)		
All slot var/avg	0.9	0.9	0.9	1.0	0.9	1.0	0.8	1.0	1.0	0.9	1.0	0.8	1.5	0.9	0.9	0.9	0.9	1.0	0.8	0.9	0.9	1.1	0.9	0.9	0.9	0.9	1.0	0.9	1.7	0.9	0.7	1.1	1.5	1.0			
[9:00, 11:50] avg	0.2	0.2	0.2	0.4	0.3	0.1	0.3	0.1	0.1	0.2	0.1	0.4	0.3	0.3	0.2	0.2	0.2	0.4	0.3	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.4	0.2	0.3	0.3	0.6	0.4	0.3	0.1	0.26	0.23	0.88
[9:00, 11:50] var	0.1	0.1	0.2	0.4	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.5	0.2	0.2	0.2	0.1	0.4	0.2	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.4	0.1	0.4	0.2	0.3	0.4	0.5	0.1	(across all days)		
[9:00, 11:50] var/avg	0.9	0.9	0.8	0.9	0.8	0.9	0.7	0.9	0.9	0.9	1.0	0.6	1.4	0.8	0.8	0.8	0.9	0.9	0.7	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.9	1.6	0.8	0.5	0.9	1.4	0.9			

Table 25: [Doctor 4 AM Shifts] The extra unscheduled arrivals, i.e., the same-day arrivals $B_{u,j}$ scheduled for slot j on each appointment day.

time slot	34 days in July-October 2013																																Avg	Var	Var/Avg
7:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.03	1.00
9:10	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.12	0.11	0.91
9:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.09	0.08	0.94
9:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0.12	0.11	0.91
9:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	2	0	0	1	0	1	1	0	0.26	0.26	0.99
9:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.06	0.06	0.97
10:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0.18	0.15	0.85
10:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	2	0	0	0	0	1	0	0	0.21	0.23	1.11
10:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0.09	0.08	0.94
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0.12	0.11	0.91
10:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.15	0.13	0.88
10:50	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0.15	0.13	0.88
11:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0.15	0.13	0.88
11:10	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.18	0.21	1.19
11:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	0.21	0.23	1.11
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	2	1	0	0	0	0	0	0	1	0	0	0	0	0.24	0.25	1.05
11:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0.21	0.17	0.82
11:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0.15	0.13	0.88
12:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.06	0.06	0.97
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0.12	0.23	1.94
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	1	0	0	0	1	0	0	3	0	0	0	1	0	4	4	3	7	3	7	2	5	5	5	4	7	2	4	6	1	5	5	4	5	3	2.85	5.58	1.96
[9:00, 11:50] Total	0	0	0	0	1	0	0	3	0	0	0	1	0	4	4	3	7	3	7	2	5	5	4	4	7	2	4	6	1	5	3	2	5	3	2.68	5.44	2.03

Table 26: [Doctor 4 AM Shifts] The unscheduled arrivals that actually arrived ($B_{a|u,j}$) for slot j on each appointment day.

time slot	34 days in July-October 2013																																					Avg	Var	Var/Avg
7:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
8:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.03	1.00
9:10	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.12	0.11	0.91
9:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.09	0.08	0.94
9:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.12	0.11	0.91
9:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	0	2	0	0	1	0	1	0	0	0	0	0.24	0.25	1.05
9:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.06	0.97
10:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0.18	0.15	0.85
10:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	2	0	0	0	0	1	0	0.21	0.23	1.11
10:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.09	0.08	0.94
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.12	0.11	0.91
10:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0.13	0.88
10:50	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0.15	0.13	0.88
11:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.15	0.13	0.88
11:10	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.18	0.21	1.19
11:20	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	0	0	0.21	0.23	1.11
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.24	0.25	1.05
11:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0.21	0.17	0.82
11:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0.15	0.13	0.88
12:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.06	0.97
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0.09	0.14	1.63
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	1	0	0	0	1	0	0	3	0	0	0	1	0	4	4	3	7	3	7	2	5	5	5	4	7	2	4	6	1	5	5	3	4	3				2.79	5.44	1.95
[9:00, 11:50] Total	0	0	0	0	1	0	0	3	0	0	0	1	0	4	4	3	7	3	7	2	5	5	4	4	7	2	4	6	1	5	3	2	4	3				2.65	5.33	2.01

Table 27: [Doctor 4 AM Shifts] Average numbers of scheduled arrivals for each 30-minute interval within the main interval as well as the proportions of no-shows and lateness and the average earliness (X^-), lateness (X^+) and overall deviation (X), plus 95% confidence intervals.

Interval	Avg # Scheduled	% No-show	% Late	% (Late>15 min)	Avg(X^+)	Avg(X^-)	Avg(X)
[9:00, 9:30)	10.4 ± 1.0	5.7 ± 2.9	18.4 ± 4.4	8.1 ± 4.0	20.5 ± 8.0	-27.7 ± 2.7	-18.9 ± 3.7
[9:30, 10:00)	10.4 ± 0.4	9.0 ± 2.4	23.1 ± 4.1	8.2 ± 2.5	19.5 ± 5.5	-31.1 ± 3.2	-19.5 ± 3.4
[10:00, 10:30)	10.5 ± 0.4	8.6 ± 2.9	18.3 ± 5.9	8.8 ± 3.7	16.8 ± 3.6	-29.9 ± 3.5	-21.4 ± 4.6
[10:30, 11:00)	10.7 ± 0.5	9.0 ± 3.0	18.3 ± 4.5	6.4 ± 3.0	12.3 ± 3.5	-33.1 ± 3.1	-24.8 ± 3.7
[11:00, 11:30)	10.9 ± 0.6	7.0 ± 2.2	15.0 ± 3.8	3.5 ± 2.1	9.7 ± 2.0	-39.9 ± 5.7	-32.2 ± 5.0
[11:30, 12:00)	11.3 ± 0.5	5.5 ± 2.1	8.1 ± 2.8	0.7 ± 0.8	9.0 ± 4.5	-41.8 ± 3.8	-37.3 ± 3.3
[9:00, 12:00)	60.3 ± 2.0	7.5 ± 1.3	17.6 ± 2.0	6.0 ± 1.3	15.8 ± 2.1	-33.7 ± 2.0	-25.1 ± 2.1

Table 28: [Doctor 4 AM Shifts] Average numbers for new and repeat patients for the main interval and outside of the interval as well as the proportions of no-shows and lateness and the average earliness (X^-), lateness (X^+) and overall deviation (X), plus 95% confidence intervals.

Interval	Avg # Scheduled	% No-show	% Late	% (Late>15 min)	Avg(X^+)	Avg(X^-)	Avg(X)
New	9.2 ± 1.1	7.4 ± 2.7	22.6 ± 5.5	7.7 ± 2.9	20.5 ± 9.1	-30.4 ± 5.3	-19.8 ± 4.8
New - [9:00, 12:00)	8.5 ± 1.0	8.2 ± 3.2	22.7 ± 6.1	8.6 ± 3.6	21.1 ± 9.4	-28.3 ± 4.8	-18.4 ± 5.4
New - outside	0.7 ± 0.3	2.6 ± 5.5	15.8 ± 18.1	0.0 ± 0.0	8.4 ± 6.6	-46.8 ± 24.4	-38.0 ± 22.5
Repeat	56.1 ± 2.1	7.2 ± 1.3	16.1 ± 1.9	5.2 ± 1.3	15.1 ± 1.9	-35.1 ± 2.1	-27.0 ± 2.2
Repeat - [9:00, 12:00)	51.8 ± 2.2	7.5 ± 1.5	16.8 ± 2.0	5.5 ± 1.3	15.2 ± 2.0	-34.2 ± 2.3	-26.0 ± 2.4
Repeat - outside	4.4 ± 0.8	5.7 ± 5.1	6.3 ± 4.5	1.1 ± 1.6	20.0 ± 32.7	-42.4 ± 8.4	-38.5 ± 8.0

Figure 18: [Doctor 4 AM Shifts] Earliness (X^-) and lateness (X^+) histograms and associated exponential fits. Top to bottom: scheduled arrivals in [9,10), [10,11), and [11,12).

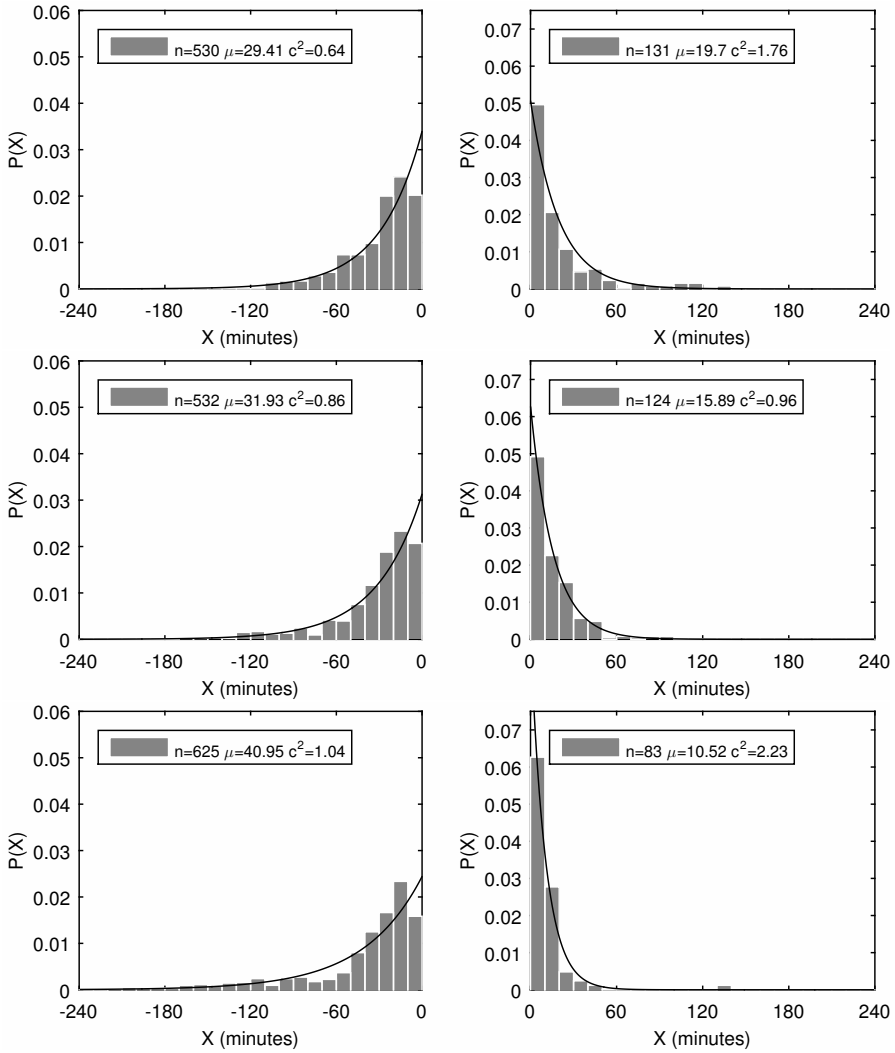


Table 29: [Doctor 4 AM Shifts] The difference between the number of patients scheduled to arrive for slot j ($B_{s,j}$) and the number of patients who actually arrived for slot j ($B_{a,j}$) on each appointment day.

time slot	34 days in July-October 2013																																
7:50	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	
8:00	-4	-1	-1	-3	-4	-1	-1	-3	-3	-1	-2	-2	0	-3	0	-2	-2	-3	-3	-5	-1	-2	0	0	0	-3	-2	0	0	0	-2	-1	-1	-3
8:10	-2	-2	0	-2	-1	-2	0	0	-3	0	0	-1	-1	0	0	-2	-2	0	0	-1	-1	0	-1	0	-1	-4	-2	-1	-1	0	0	0	0	0
8:20	-1	-1	-3	0	-3	-4	-1	-1	-3	-1	-2	-3	-1	-1	-3	-1	0	-2	0	-2	-2	-1	0	-2	-1	-1	0	0	0	-2	0	-2	0	-2
8:30	-1	-4	-4	0	-1	-3	-2	-4	0	-2	-4	-3	0	-2	-3	-2	-1	-1	-1	0	0	-2	-1	-1	-1	-1	-1	-1	-1	-2	-1	0	-3	-2
8:40	-2	-4	-3	-4	-1	-1	-6	-2	-2	-2	-2	-4	-4	-1	-2	-4	-2	-3	-3	-1	-2	-3	-1	-2	0	-4	-2	0	-5	-3	0	-2	-6	-2
8:50	0	-1	-5	-1	-1	-2	-5	-3	-2	-2	-3	-2	-3	-1	-1	-3	-2	0	-3	-4	0	-4	-2	-1	-1	-3	-5	-2	-4	0	-2	-3	-5	-1
9:00	0	-3	1	1	1	0	1	2	1	0	0	-1	-1	0	4	0	2	-1	0	-3	0	2	-3	-1	-3	3	2	-2	4	-1	-1	-2	0	0
9:10	0	0	-1	4	-2	3	1	1	1	-2	-2	2	1	1	-2	0	-3	-1	2	4	-1	2	-1	0	-3	2	2	-3	-1	2	-4	-2	1	-2
9:20	-1	2	3	-1	0	2	2	1	-2	2	2	0	-2	2	1	3	0	1	-1	2	0	2	1	1	0	1	-1	0	3	0	1	2	-1	0
9:30	1	2	-1	0	0	2	-1	0	0	0	-2	1	1	0	0	0	-3	1	-2	0	-1	-1	0	2	-2	3	-1	-1	-1	0	2	2	-2	1
9:40	1	-5	-1	2	0	-3	-4	-1	1	1	4	3	-2	-3	-1	-3	1	-1	2	-1	-2	-1	-1	0	-2	2	-1	0	1	1	2	-1	0	-2
9:50	-2	0	1	-2	0	0	4	1	2	0	1	1	-1	0	-1	2	1	3	-5	-1	0	-1	3	-2	1	-4	-1	-1	-1	2	-3	1	2	1
10:00	-1	1	4	-2	1	-2	1	-2	0	-1	2	2	4	1	1	1	-2	1	-3	0	-2	2	0	-2	1	0	4	-1	2	1	1	0	4	2
10:10	1	1	1	0	1	2	2	-1	-1	-2	1	0	-1	1	1	-1	1	1	1	-1	-2	0	-1	1	0	-3	1	1	-3	4	3	1	1	2
10:20	-2	1	0	1	-1	-3	2	1	1	2	-2	1	0	1	2	3	0	-2	2	2	3	-2	0	-3	1	-1	2	-1	1	-8	-1	2	0	-1
10:30	1	-2	3	2	-3	0	0	-1	0	1	-1	3	1	1	-6	1	1	1	3	2	2	2	1	0	-1	0	2	-3	2	-2	3	-2	-2	-1
10:40	1	1	2	1	2	2	-2	0	0	1	0	-1	0	-1	2	0	-3	2	0	0	-1	0	2	0	1	-2	-2	0	-1	4	-3	-3	0	1
10:50	0	2	1	0	1	0	3	-1	-1	0	0	-1	3	1	-2	2	1	1	0	1	0	2	-5	1	-1	4	-1	2	0	-2	-4	2	0	-2
11:00	3	4	2	1	3	0	0	0	0	-3	0	1	0	0	-2	0	0	2	1	-1	2	1	-2	-1	0	1	1	1	-3	-2	1	2	1	2
11:10	0	1	-1	1	3	2	4	2	2	1	1	1	0	0	2	-1	0	-5	-2	-1	1	-2	3	2	0	0	-2	1	0	3	3	1	2	0
11:20	1	2	-2	2	2	1	-1	1	4	4	2	2	3	-1	-1	1	1	3	3	1	1	1	1	-1	-2	4	0	2	5	2	-1	0	-1	-1
11:30	3	2	2	2	0	3	2	3	1	0	3	1	1	3	3	0	1	3	0	3	2	-1	1	0	2	3	3	-2	0	0	2	0	4	1
11:40	3	2	2	2	2	2	3	4	4	3	2	4	4	1	3	3	2	2	4	4	2	3	1	4	3	1	4	0	2	1	0	3	2	4
11:50	3	3	5	2	5	4	4	2	2	4	3	3	5	2	5	4	5	3	4	4	3	5	5	5	2	4	4	1	5	3	3	2	5	4
12:00	0	2	0	2	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	-1	0	0	0	2	0	0	3	0	0	5	4	1	0
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	0	0	2	0	0	0
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0

Figure 19: [Doctor 4 AM Shifts] Histograms of the counting processes $S(t)$ and $A(t)$ at four different times. From left to right: 10 am, 11 am, 12 pm and 13 pm.

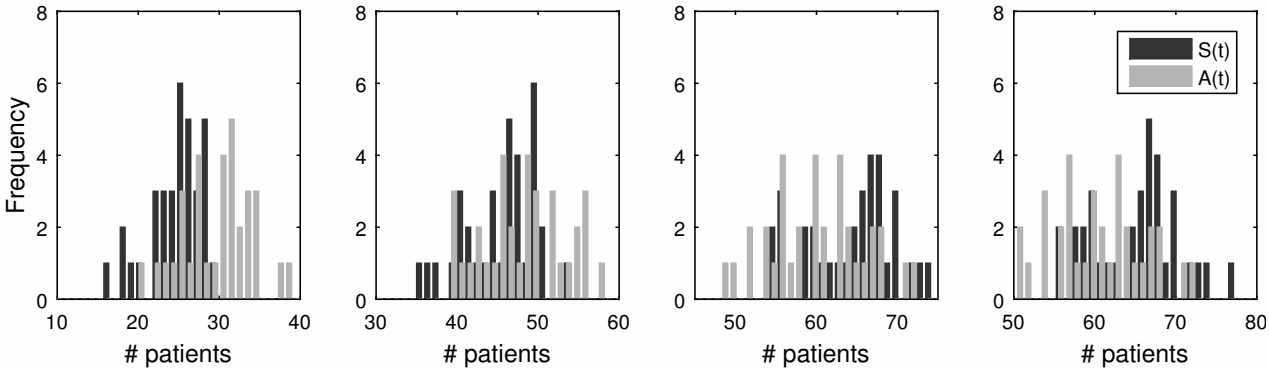
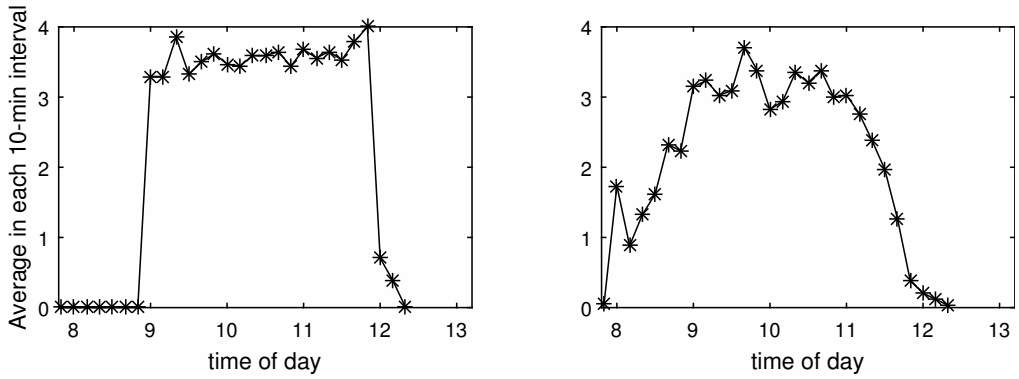


Figure 20: [Doctor 4 AM Shifts] Plots of the average numbers of scheduled (left) and actual (right) arrivals in each of the 10-minute intervals.



F Doctor 14 PM Shifts

Figure 21: [Doctor 14 PM Shifts] The evolution of the daily cumulative number of patients scheduled over the previous year for each of the appointment days (left) and the percentage of patients who are scheduled k days in advance for each of the appointment days (right). The thick line indicates the average over the appointment days.

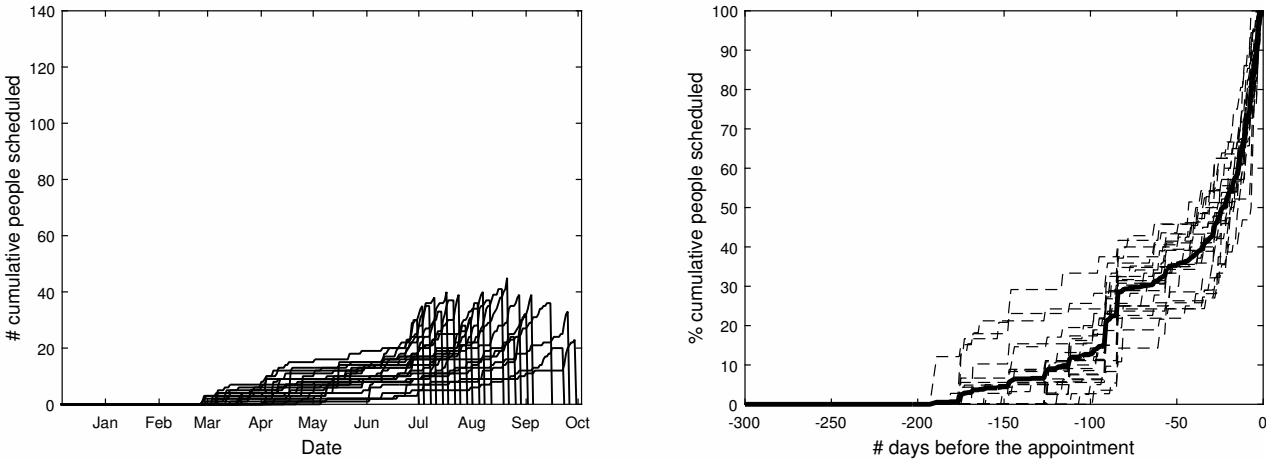


Figure 22: [Doctor 14 PM Shifts] The evolution of the daily cumulative number of patients scheduled and the percentage of patients who are scheduled k days in advance for each of the appointment days for new patients (left two panels) and repeat visits (right two panels). The thick line indicates the average over the appointment days.

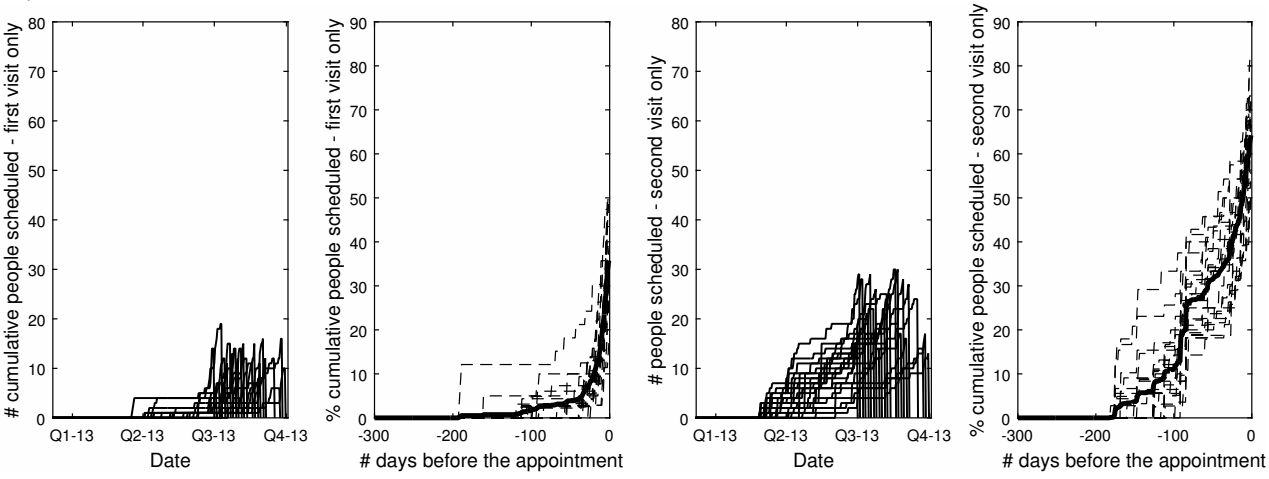


Table 30: [Doctor 14 PM Shifts] The number of patients scheduled in each 10-minute time slot (displayed vertically) on each appointment day (displayed horizontally).

time slot	23 days in July-October 2013																							Avg	Var	Var/Avg
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:30	2	3	3	3	3	3	1	3	1	1	2	3	3	2	3	1	1	2	3	3	1	2	2	2.22	0.72	0.33
13:40	1	2	2	3	3	3	2	3	2	1	2	2	2	2	1	2	2	2	3	2	2	3	0	2.04	0.59	0.29
13:50	2	1	2	3	2	2	2	2	2	3	1	3	2	2	2	3	2	2	2	1	1	2	2	2.00	0.36	0.18
14:00	2	2	2	2	2	3	2	3	2	1	2	2	1	3	3	0	1	2	3	2	0	3	3	2.00	0.82	0.41
14:10	2	1	3	2	2	2	2	2	2	2	2	2	2	2	1	1	2	1	3	3	1	1	1	1.83	0.42	0.23
14:20	2	2	1	2	2	2	2	2	1	2	2	3	3	2	3	1	2	3	2	2	1	2	2	2.00	0.36	0.18
14:30	2	2	1	2	2	3	3	1	2	0	2	2	1	3	3	1	2	2	2	2	2	1	2	1.87	0.57	0.31
14:40	2	2	1	3	1	1	2	2	2	2	1	2	2	2	2	1	2	1	3	2	0	1	1	1.65	0.51	0.31
14:50	1	2	2	2	0	2	2	3	1	2	2	2	1	2	2	2	2	2	2	2	1	2	1	1.74	0.38	0.22
15:00	2	2	3	2	2	3	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	0	1.91	0.36	0.19
15:10	1	3	2	3	2	2	2	2	1	2	2	2	2	1	3	1	3	2	1	2	0	2	0	1.78	0.72	0.41
15:20	1	2	2	2	2	3	2	1	0	1	3	2	3	3	3	1	2	2	1	2	1	2	2	1.87	0.66	0.36
15:30	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2	1	2	1	2	2	1	2	1	1.70	0.22	0.13
15:40	1	2	1	0	1	1	2	2	1	2	3	3	2	2	2	1	0	1	2	1	1	2	1	1.48	0.62	0.42
15:50	2	2	3	2	2	2	3	2	2	2	2	2	1	1	2	2	2	1	2	2	2	0	1	1.83	0.42	0.23
16:00	1	1	2	2	2	2	1	2	2	2	3	2	2	3	3	1	3	2	2	1	2	1	1	1.87	0.48	0.26
16:10	1	2	2	2	2	2	2	1	2	2	2	1	2	2	2	1	3	2	0	2	1	2	2	1.74	0.38	0.22
16:20	3	3	2	1	1	1	2	2	2	3	1	1	2	3	1	2	3	2	2	2	1	2	1	1.87	0.57	0.31
16:30	0	0	0	0	0	1	2	2	0	0	0	2	2	2	2	0	3	0	1	1	0	1	0	0.83	0.97	1.17
16:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0.17	0.42	2.43
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	30	35	35	38	33	40	37	39	28	31	36	40	37	41	45	24	39	32	39	36	20	33	23	34.39	38.25	1.11
[13:30, 16:20] Total	30	35	35	38	33	39	35	37	28	31	36	38	35	39	40	24	36	32	37	35	20	32	23	33.39	28.52	0.85
All slot avg	1.0	1.2	1.2	1.3	1.1	1.3	1.2	1.3	0.9	1.0	1.2	1.3	1.2	1.4	1.5	0.8	1.3	1.1	1.3	1.2	0.7	1.1	0.8	1.15	1.13	0.99
All slot var	0.9	1.2	1.2	1.4	1.1	1.4	1.1	1.3	0.8	1.1	1.2	1.3	1.2	1.3	1.5	0.7	1.4	1.0	1.3	1.1	0.6	1.1	0.8	(across all days)		
All slot var/avg	0.9	1.0	1.1	1.1	1.0	1.1	0.9	1.0	0.9	1.0	1.0	0.9	0.9	1.0	1.0	0.9	1.1	0.9	1.0	0.9	0.9	1.0	1.1			
[13:30, 16:20] avg	1.7	1.9	1.9	2.1	1.8	2.2	1.9	2.1	1.6	1.7	2.0	2.1	1.9	2.2	2.2	1.3	2.0	1.8	2.1	1.9	1.1	1.8	1.3	1.86	0.52	0.28
[13:30, 16:20] var	0.4	0.4	0.5	0.6	0.5	0.5	0.3	0.4	0.4	0.6	0.4	0.3	0.4	0.4	0.5	0.5	0.6	0.3	0.6	0.3	0.5	0.5	0.7	(across all days)		
[13:30, 16:20] var/avg	0.2	0.2	0.3	0.3	0.3	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.2	0.3	0.1	0.4	0.3	0.5			

Table 31: [Doctor 14 PM Shifts] The estimated distribution of the batch sizes (B_s) within the main interval and the estimated distribution of the total number of scheduled arrivals after the main interval (N_o).

	$\hat{P}(B_s = k)$			$\hat{P}(N_o = k)$					
number k	1	2	3	0	1	2	3	4	5
Estimated distribution	0.25	0.59	0.17	0.52	0.13	0.26	0.04	0.00	0.04

Table 32: [Doctor 14 PM Shifts] The number of no-shows ($B_{n,j} \equiv B_{s,j} - B_{a|s,j}$) for each 10-minute time slot j (displayed vertically) on each appointment day (displayed horizontally).

time slot	23 days in July-October 2013																						Avg	Var	Var/Avg
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:30	1	0	0	0	1	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	1	0.30	0.31	1.03
13:40	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0.13	0.12	0.91
13:50	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0.30	0.22	0.73
14:00	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.17	0.15	0.86
14:10	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0.13	0.12	0.91
14:20	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0.17	0.15	0.86
14:30	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0.17	0.24	1.39
14:40	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0.26	0.20	0.77
14:50	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0.22	0.18	0.82
15:00	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.13	0.12	0.91
15:10	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	2	0	1	0	0	2	0	0.35	0.42	1.20
15:20	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0.13	0.12	0.91
15:30	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0.17	0.15	0.86
15:40	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.13	0.12	0.91
15:50	0	0	0	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.22	0.27	1.24
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.04	0.04	1.00
16:10	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	1	0	0	0	0.22	0.18	0.82
16:20	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.09	0.08	0.95
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
16:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Daily Total	3	3	3	6	4	0	2	5	5	2	3	4	5	8	6	0	3	1	0	5	3	3	3.35	4.15	1.24
[13:30, 16:20] Total	3	3	3	6	4	0	2	5	5	2	3	4	5	8	6	0	3	1	0	5	3	3	3.35	4.15	1.24
All slot avg	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.2	0.0	0.1	0.0	0.0	0.2	0.1	0.1	0.11	0.11	1.02
All slot var	0.2	0.1	0.1	0.2	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.0	0.1	0.0	0.0	0.2	0.1	0.1	0.1	(across all days)	
All slot var/avg	1.6	0.9	0.9	0.8	0.9		1.0	1.3	0.9	1.0	0.9	1.4	0.9	0.8	1.2		0.9	1.0		1.3	0.9	0.9	0.9		
[13:30, 16:20] avg	0.2	0.2	0.2	0.3	0.2	0.0	0.1	0.3	0.3	0.1	0.2	0.2	0.3	0.4	0.3	0.0	0.2	0.1	0.0	0.3	0.2	0.2	0.2	0.19	0.18	0.95
[13:30, 16:20] var	0.3	0.1	0.1	0.2	0.2	0.0	0.1	0.3	0.2	0.1	0.1	0.3	0.2	0.3	0.4	0.0	0.1	0.1	0.0	0.3	0.1	0.1	0.1	(across all days)	
[13:30, 16:20] var/avg	1.6	0.9	0.9	0.7	0.8		0.9	1.2	0.8	0.9	0.9	1.4	0.8	0.6	1.1		0.9	1.0		1.2	0.9	0.9	0.9		

Table 33: [Doctor 14 PM Shifts] The extra unscheduled arrivals, i.e., the same-day arrivals $B_{u,j}$ scheduled for slot j on each appointment day.

time slot	23 days in July-October 2013																						Avg	Var	Var/Avg
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0.13	0.12	0.91
13:40	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0.17	0.24	1.39
13:50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0.17	0.15	0.86
14:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	0	0	0.17	0.15	0.86
14:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.13	0.12	0.91
14:20	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.09	0.08	0.95
14:30	0	0	0	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0.22	0.27	1.24
14:40	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	2	1	1	0.35	0.33	0.94
14:50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0.17	0.15	0.86
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.09	0.08	0.95
15:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	2	0.26	0.38	1.47
15:20	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.13	0.12	0.91
15:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	2	0	0	0.22	0.27	1.24
15:40	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.13	0.12	0.91
15:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0.17	0.15	0.86
16:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0.13	0.21	1.61
16:10	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.17	0.15	0.86
16:20	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0.22	0.18	0.82
16:30	1	0	0	0	0	1	0	1	0	1	1	1	0	1	0	2	1	0	0	0	1	1	0.52	0.35	0.67
16:40	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0.09	0.08	0.95
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0.09	0.08	0.95
Daily Total	2	0	1	2	1	2	1	4	3	7	1	3	3	1	2	10	7	2	2	0	13	10	11	3.83	14.70	3.84
[13:30, 16:20] Total	1	0	1	2	1	1	1	3	3	6	0	1	3	0	1	8	6	2	1	0	13	8	10	3.13	13.03	4.16

Table 34: [Doctor 14 PM Shifts] The unscheduled arrivals that actually arrived ($B_{a|u,j}$) for slot j on each appointment day.

time slot	23 days in July-October 2013																							Avg	Var	Var/Avg
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
12:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
13:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0.13	0.12	0.91
13:40	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0.17	0.24	1.39
13:50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0.17	0.15	0.86
14:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0.13	0.12	0.91
14:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.09	0.08	0.95
14:20	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04	0.04	1.00
14:30	0	0	0	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	0	0	0	1	0	0.22	0.27	1.24
14:40	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0.17	0.15	0.86
14:50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	0.17	0.15	0.86
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
15:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	1	0.17	0.24	1.39	
15:20	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09	0.08	0.95
15:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0.17	0.24	1.39
15:40	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.13	0.12	0.91
15:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0.13	0.12	0.91	
16:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0.09	0.08	0.95	
16:10	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.17	0.15	0.86
16:20	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0.17	0.15	0.86
16:30	1	0	0	0	0	1	0	1	0	1	0	1	0	1	0	2	1	0	0	0	0	1	1	0.48	0.35	0.74
16:40	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0.09	0.08	0.95
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0.09	0.08	0.95
Daily Total	2	0	1	1	1	2	1	4	3	7	0	3	3	1	2	8	7	0	1	0	10	6	8	3.09	9.26	3.00
[13:30, 16:20] Total	1	0	1	1	1	1	1	3	3	6	0	1	3	0	1	6	6	0	0	0	10	4	7	2.43	7.80	3.20

Table 35: [Doctor 14 PM Shifts] Average numbers of scheduled arrivals for each 30-minute interval within the main interval as well as the proportions of no-shows and lateness and the average earliness (X^-), lateness (X^+) and overall deviation (X), plus 95% confidence intervals.

Interval	Avg # Scheduled	% No-show	% Late	% (Late>15 min)	Avg(X^+)	Avg(X^-)	Avg(X)
[13:30, 14:00)	6.3 ± 0.6	13.1 ± 6.6	10.1 ± 5.8	3.6 ± 4.3	12.0 ± 6.0	-57.7 ± 11.8	-50.8 ± 11.3
[14:00, 14:30)	5.8 ± 0.6	9.5 ± 5.7	11.0 ± 7.4	0.9 ± 1.8	7.2 ± 3.0	-69.4 ± 16.3	-62.2 ± 16.7
[14:30, 15:00)	5.3 ± 0.6	13.8 ± 6.3	12.1 ± 7.9	3.6 ± 4.2	14.1 ± 12.2	-73.3 ± 18.0	-61.0 ± 16.0
[15:00, 15:30)	5.6 ± 0.7	10.5 ± 6.6	10.4 ± 5.6	3.0 ± 3.5	15.7 ± 10.8	-51.5 ± 11.7	-45.1 ± 12.4
[15:30, 16:00)	5.0 ± 0.5	10.9 ± 7.3	10.2 ± 6.2	2.7 ± 3.1	8.5 ± 6.5	-53.1 ± 15.1	-48.0 ± 15.4
[16:00, 16:30)	5.5 ± 0.6	5.7 ± 4.5	8.3 ± 4.9	0.9 ± 1.8	4.8 ± 4.0	-41.4 ± 7.4	-37.4 ± 6.7
[13:30, 16:30)	31.5 ± 2.3	10.4 ± 2.5	10.4 ± 2.8	2.5 ± 1.3	12.2 ± 4.0	-59.3 ± 5.7	-52.0 ± 5.6

Table 36: [Doctor 14 PM Shifts] Average numbers for new and repeat patients for the main interval and outside of the interval as well as the proportions of no-shows and lateness and the average earliness (X^-), lateness (X^+) and overall deviation (X), plus 95% confidence intervals.

Interval	Avg # Scheduled	% No-show	% Late	% (Late>15 min)	Avg(X^+)	Avg(X^-)	Avg(X)
New	12.2 ± 1.5	12.2 ± 5.6	10.4 ± 3.6	2.6 ± 2.6	7.7 ± 2.7	-51.5 ± 9.9	-45.2 ± 9.0
New - [13:30, 16:30)	11.2 ± 1.4	12.5 ± 5.7	10.4 ± 3.4	2.8 ± 2.7	8.2 ± 3.1	-52.3 ± 10.6	-45.7 ± 9.4
New - outside	1.0 ± 0.4	6.7 ± 14.3	14.3 ± 21.0	0.0 ± 0.0	3.1 ± 33.9	-48.1 ± 28.7	-40.8 ± 26.3
Repeat	22.2 ± 2.5	9.3 ± 3.3	10.3 ± 3.3	2.7 ± 1.3	13.6 ± 4.6	-62.6 ± 6.7	-54.9 ± 7.0
Repeat - [13:30, 16:30)	20.3 ± 2.1	10.0 ± 3.5	10.4 ± 3.2	2.9 ± 1.4	13.8 ± 4.6	-64.3 ± 8.1	-56.6 ± 8.4
Repeat - outside	1.9 ± 0.6	1.3 ± 2.8	11.8 ± 12.9	0.0 ± 0.0	5.1 ± 7.8	-42.6 ± 19.0	-37.1 ± 19.0

Figure 23: [Doctor 14 PM Shifts] The lateness ecdfs in each of the 30-minute intervals.

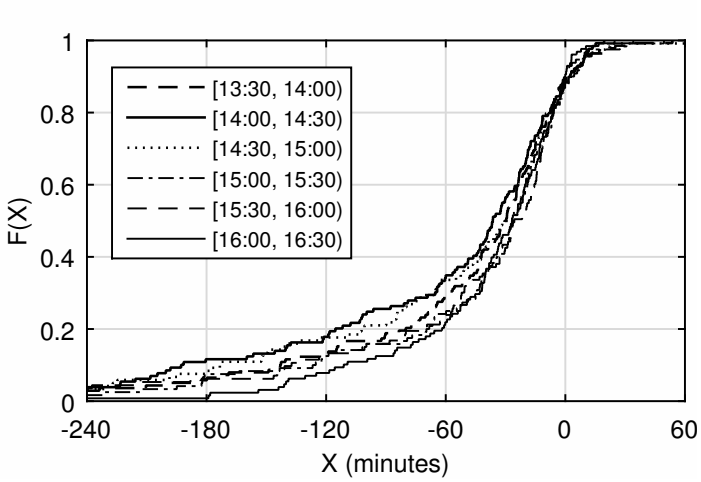


Table 37: [Doctor 14 PM Shifts] The difference between the number of patients scheduled to arrive for slot j ($B_{s,j}$) and the number of patients who actually arrived for slot j ($B_{a,j}$) on each appointment day.

time slot	23 days in July-October 2013																					
12:00	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	-1	0	-1	-3
12:10	0	0	-1	0	0	-1	0	0	-1	-1	-1	-2	-1	0	0	0	0	-1	0	-2	0	0	-2
12:20	0	-1	0	-1	0	0	0	-1	0	0	0	0	0	0	0	-1	-1	-1	0	-1	0	-1	0
12:30	0	0	0	0	0	-1	-1	-2	-1	0	0	0	-1	-1	-2	-2	0	0	0	-1	-1	0	-2
12:40	-1	-1	0	0	0	-1	0	-2	-1	0	0	-1	-1	-1	0	0	-1	-1	-1	-1	0	-1	0
12:50	-2	-1	-4	-1	-1	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0	-3	0
13:00	0	-1	0	-1	-3	-2	-2	0	-1	0	-2	-2	-2	0	0	-1	-1	0	-1	0	0	-2	0
13:10	0	0	0	-2	-3	-1	0	-2	-2	-1	-2	-2	0	-1	-3	-1	-1	-2	-4	-1	-4	-1	-1
13:20	-1	0	0	0	-1	-5	0	-1	-2	0	-2	0	-1	-3	-2	0	-2	-2	-2	-1	-1	-4	-3
13:30	1	1	2	2	2	2	0	1	1	-1	0	0	-1	-1	1	1	-2	-1	-1	1	0	2	0
13:40	-2	2	-1	2	-2	-2	1	1	0	0	-1	0	0	-1	1	1	2	1	-1	0	1	0	0
13:50	2	-1	0	2	2	2	1	0	-2	1	1	3	2	0	1	2	-1	2	2	1	1	0	2
14:00	2	1	2	1	1	0	0	2	2	-1	2	1	-1	3	2	-2	-1	2	3	2	-1	3	1
14:10	-1	1	2	-2	1	2	0	1	0	2	0	-1	2	1	-2	-1	-1	1	-1	3	-1	0	0
14:20	2	2	-1	2	2	0	-1	-1	1	-1	0	1	1	2	1	-1	-3	-1	0	1	1	1	1
14:30	1	1	-1	-2	1	0	1	-2	2	-7	-1	0	0	3	0	1	0	-1	1	0	0	0	2
14:40	1	2	-1	-3	1	-3	0	1	1	1	1	2	-1	1	2	-3	1	0	3	1	-2	-1	1
14:50	0	-1	0	0	-1	1	-1	2	1	1	-1	2	-1	1	0	2	1	0	1	1	-1	1	0
15:00	1	2	1	1	-1	3	0	0	1	0	-1	0	1	0	0	2	-1	2	1	1	2	2	-2
15:10	0	-1	1	2	0	0	0	2	0	2	2	1	1	0	2	-1	2	2	0	1	-4	1	-2
15:20	1	1	1	2	1	1	-1	1	-1	-1	3	-3	1	0	3	0	2	2	-2	1	1	-1	2
15:30	1	-1	-2	1	1	1	1	2	0	0	-2	0	2	2	2	0	1	-2	2	1	0	1	-1
15:40	-3	1	0	0	0	0	2	1	0	-1	1	3	2	0	-3	0	-4	0	2	-1	1	1	-1
15:50	0	2	2	0	2	0	2	-1	2	1	2	0	-2	0	2	1	0	-1	-1	0	0	-2	0
16:00	1	-1	1	2	1	0	0	0	0	2	3	1	0	0	1	0	1	1	2	1	1	-1	1
16:10	0	1	2	2	1	2	0	1	0	2	2	-1	2	0	0	-1	2	2	-1	1	1	2	2
16:20	2	3	1	0	1	1	2	2	2	1	1	1	2	3	-1	1	3	2	1	2	1	2	1
16:30	0	0	0	0	0	1	1	2	0	0	0	2	2	2	2	0	3	0	1	1	0	1	0
16:40	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	3	0	-1	0	1	0	0	0	0
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 24: [Doctor 14 PM Shifts] Earliness (X^-) and lateness (X^+) histograms and associated exponential fits. Top to bottom: scheduled arrivals in [13,14), [14,15), and [15,16).

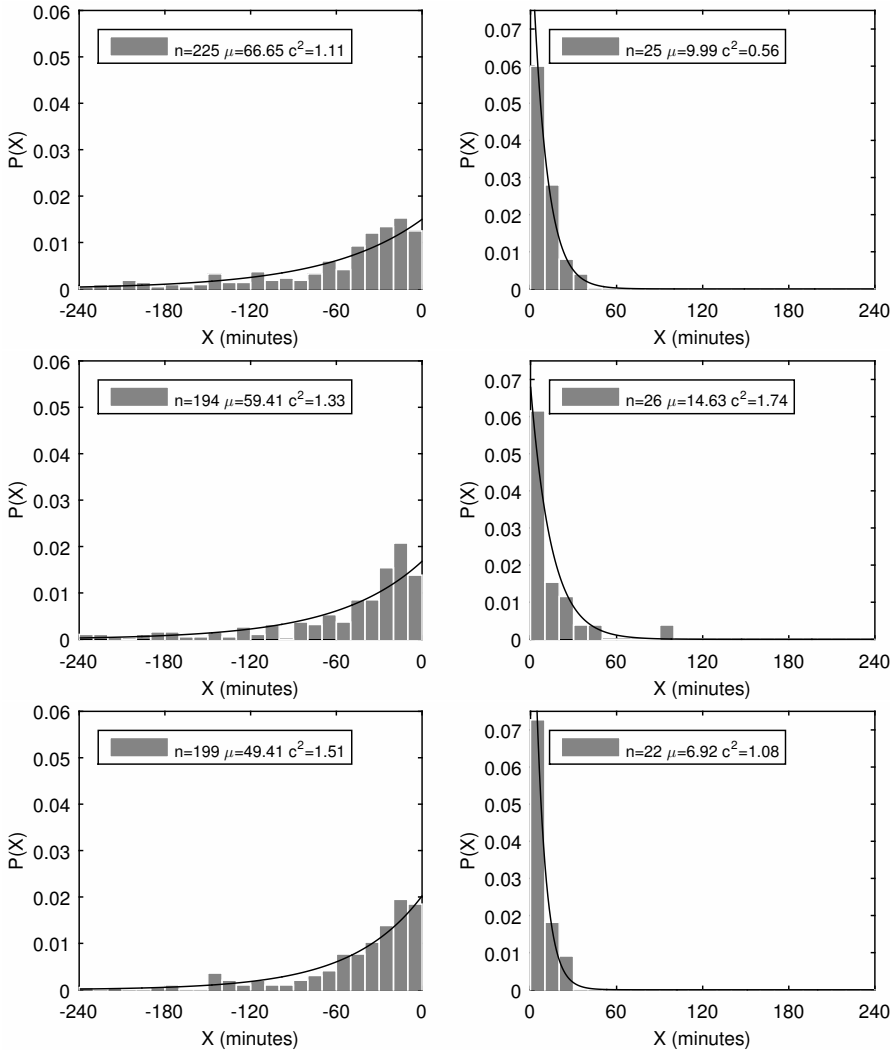


Figure 25: [Doctor 14 PM Shifts] Histograms of the counting processes $S(t)$ and $A(t)$ at four different times. From left to right: 14 pm, 15 pm, 16 pm and 17 pm.

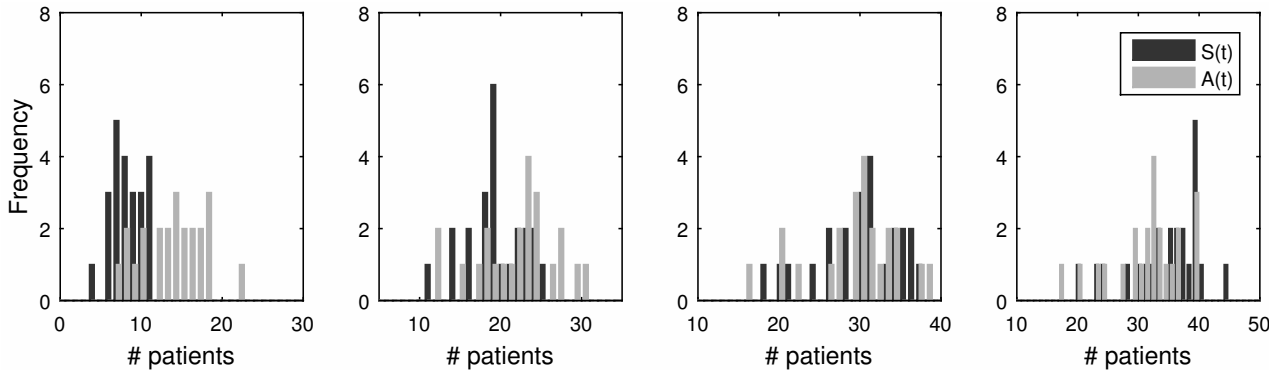
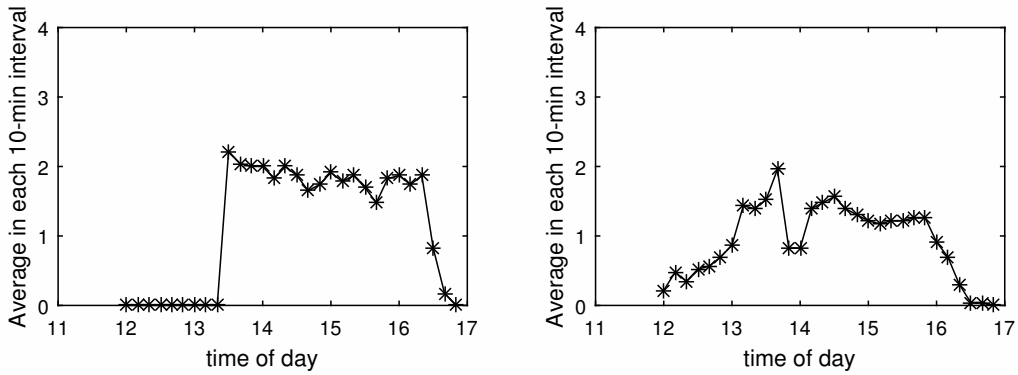


Figure 26: [Doctor 14 PM Shifts] Plots of the average numbers of scheduled (left) and actual (right) arrivals in each of the 10-minute intervals.



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