Managing the Outpatient Department Waiting Time at Rajas Eye Hospital[1]

Harshal Lowalekar and N. Ravichandran

It was half past noon on July 29. Dr. Rajiv Chaudhary, the director of Rajas Eye Hospital and Retina Research Centre, had just returned to his chamber located in the first floor of the hospital. He had been in the operating theatre since morning and it was time to take a short break before he could start examining patients in the outpatient department (OPD). He looked at the monitor in his chamber and saw a huge crowd in the outpatient department (OPD) located in the ground floor. The overcrowding had become a routine problem in the OPD of late. He called the supervisor, Mr. Baghela, to his chamber.

> "Baghelaji, the waiting problem in the outpatient department (OPD) seems to be getting worse with every passing day. Right now there must be more than 100 people waiting in the OPD. It will get even worse in an hour from now. A close friend of mine called me last night and complained that he had to wait for more than three hours for a consultation. I don't understand why it is taking so much time to see our patients. We cannot afford to make patients wait for several hours in the OPD. I want you to examine as to what is causing so much delay. If need be, we can allocate one more supervisor to help you. We have absolutely no problem in increasing the number of receptionists, nurses, optometrists or even ophthalmologists if there is a need to augment our capacity. Since we have some unutilized space on the first floor, I am planning to move some OPD operations from the ground floor to the first floor. This may reduce the over-crowding at the ground floor."

Rajas Eye Hospital and Retina Research Centre

Rajas Eye Hospital and Retina Research Centre was established under the patronage of Choudhary Eye and Retina Centre in the city of Indore, Madhya Pradesh. The hospital, equipped with the state-of-the-art equipment, provides quality eye care to the patients of Indore city and nearby villages. The hospital provides a range of specialty services like phacoemulsification, intraocular lens transplantation, contact lens prescription, glaucoma surgery, retinovitreal surgery, squint surgery and oculoplastic surgery [2,3] . The hospital also organizes camps in slum areas of the city and nearby villages to identify patients and performs cataract surgeries for underprivileged patients free of cost.

Team at Rajas Eye Hospital

The professional team at Rajas Eye Hospital is led by Dr. Chaudhary, who is also the director and the founder of the hospital. He is the president of the Indore Divisional Ophthalmologic Society[4]. He received his M.B.B.S in 1979 and M.S. (Ophthalmology) in 1983 from Mahatma Gandhi Memorial Medical College, Indore[4]. He has performed more than 15,000 cataract surgeries and 1000 retinovitreal surgeries[4]. He is a renowned

1 This case was prepared by Harshal Lowalekar and N. Ravichandran of Indian Institute of Management Indore as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The authors would like to thank Ms. Vandana Tamrakar for her assistance in the preparation of this case.

2 Refer to appendix for the brief description of some key terms related to ophthalmology.

3 Source: http://www.rajaseyehospital.com/facilities.html, retrieved on 9 April 2013.

4 Source: http://rajaseyehospital.in/drProfile.html, retrieved on 9 April 2013.

professional in the field of ophthalmology. Dr. Chaudhary is actively involved in several training programs for junior ophthalmologic surgeons on intraocular lens (IOL) and phacoemulsification surgeries throughout the country[4]. It is mainly due to him that patients from various parts of Indore and neighboring towns visit Rajas eye hospital.

There are three well qualified consultant ophthalmologists at the hospital. They perform surgeries alongside the director. But it is mainly due to the experience and reputation of Dr. Chaudhary that the hospital draws its name and fame. The patients coming to hospital, invariably, come with an expectation to see the director. Dr. Chaudhary makes it a point to see every patient for the final consultation. However, the actual time spent by Dr. Chaudhary on any patient rarely exceeds three minutes. He acts more as a specialist, who confirms the diagnosis made by the consultant ophthalmologists at the hospital. Table 1 shows the team at Rajas Hospital.

Floor Plan and OPD Timings

The activities of the outpatient department (OPD) are conducted on the ground floor of the hospital. The ground floor has separate cabins for the director, the ophthalmologists and the optometrists where they see their OPD patients. The OPD waiting area, in the middle of the floor, has a seating capacity of 80. The floor plan of OPD is shown in Fig 1. A separate chamber cum consulting room for the director is located on the first floor. The patient wards and the operation theatres (OTs) are located on the second and third floors of the hospital respectively. The vehicle parking facility and the dispensary are in the underground floor of the building. The CCTV cameras installed in various parts of the hospital enable the director to monitor various activities from his chamber.

The hospital is operational for five days in a week. The OPD, however, is functional between 10:00 hrs. to 17:00 hrs. for four days: Monday, Tuesday, Wednesday and Friday. The director and the consultant ophthalmologists perform surgeries in the morning and see the patients in OPD after surgeries. Thursdays are reserved only for surgeries.

Patient Flow

New Patients: Approximately 80 new patients visit the OPD on any working day. About 70 percent of these patients visit the clinic after taking an appointment while the rest are walk-in patients (who come without an appointment) due to variety of reasons. The hospital encourages patients to take an appointment before coming to the hospital but has a policy to accommodate the unscheduled ones, as far as possible, during the day. The consultation charge for new patients is Rs. 300. Figures 2 and 3 capture the arrival pattern for new patients with and without appointment respectively. Bulk of the new patients, typically, arrives between 11:00 hrs. to 16:00 hrs. The patients who do not have appointments usually arrive between 9:00 hrs. to 15:00 hrs.

Follow-up Patients: About 20 patients (visiting the OPD) belong to the category of follow-up patients. These patients usually visit the hospital for the follow up on the treatment or the surgery performed during their previous visit(s) to the hospital. There is no formal appointment system for the follow up patients at the hospital. The hospital usually does not charge them. Figure 4 captures the arrival pattern for follow-up patients.

Appointments

The patient appointment is managed and coordinated by the receptionist. A patient can take appointment by phone or by physically visiting the clinic. The hospital also provides the option of taking online appointments through its website. But this mode (website) is not popular. The appointment system at the hospital is completely manual. Depending upon the severity of the health problem and the availability of the slots a patient is provided an appointment. Typically 5 patients are accommodated in a 15 minutes slot. There is no provision for a vacant slot for the walk-in patients who do not have an appointment for the day. The follow-up patients do not require formal appointment under the current system. The patients are expected to arrive at the scheduled time. The patients with appointment are given priority over the walk-ins; however, the hospital tries to accommodate as many walk-ins as possible during the day.

OPD Patient Flow

Fig 5 captures the patient flow for a new patient in the OPD at the hospital. A detailed description is attempted below:

1. Registration: On arrival, the new patient (along with an attendant) registers at the reception counter. The receptionist confirms the appointment and provides a registration form to collect relevant patient information. The receptionist enters the time of arrival and a serial number on the patient form. A consultation fee of Rs.300 is collected at the reception counter. Patient forms are sent to the optometrist(s) and the patients are usually called according to the assigned serial numbers at every stage. The patient waits in the OPD waiting area until called for examination by the optometrist.

2. Optometrist: An attendant calls out the name of the patient to the optometrist room for a preliminary eye examination. An optometrist performs a preliminary eye-sight testing. Once the basic check is carried out, the patient returns to the OPD waiting area for dilation. The optometrist records the results of the eye examination on the patient form. The forms are then sent to the ophthalmologists.

3. Dilation: Dilation is performed by a nurse or an attendant, in the OPD waiting area, for every new patient, before the patient is sent to the ophthalmologist for consultation. Depending upon the patient condition, the dilation takes approximately 30 minutes. Once the dilation is complete (as confirmed by a nurse or attendant) the patient waits for his/her turn (in the OPD waiting area) to meet the ophthalmologist.

4. Ophthalmologist Consultation: The ophthalmologist reads the patient form, performs a thorough examination of the patient and makes a diagnosis. This engagement is for about 15 minutes. Depending upon the severity (of the eye problem) the patient is either recommended a medication or a surgery. The ophthalmologist writes the diagnosis on the patient form which is then forwarded to the director. The patient waits to meet the director for a brief examination and confirmation of the diagnosis.

5. Consultation with Dr. Chaudhary: Being a renowned ophthalmologist, the patients usually wish to meet Dr. Chaudhary at least once during their visit to the clinic. Dr. Chaudhary spends about 3 minutes with every patient and confirms the diagnosis by the consultant ophthalmologist. The patient then meets the counselor who explains arrangements for the procedures (if any) to be performed based on the diagnosis. The counselor gives the patient his/her medical form. The patient is advised to bring the form along with him/her during every visit. The patient is advised a repeat visit after a week for follow-up.

The follow-up patients do not have to go through all the stages described above. Some follow-up patients just meet the ophthalmologist and Dr. Chaudhary to discuss the progress of their eye condition. In rare cases they are charged a professional/consultation fee.

Patient Waiting Time Study

Mr. Baghela, after returning from the director's chamber, went straight to the senior optometrist, Mr. Jain, and shared with him his conversation with the director. After discussion for about an hour, they could not identify the root cause of the long patient waiting line. Mr. Baghela decided that he would conduct an in-depth data based study in the OPD to identify the real cause(s) for the long waiting time.

The patient waiting time study was carried out with the help of three attendants in the OPD between August 1 to August 24. The data regarding the arrival patterns of the patients and the processing times at various stages was collected over a period of two weeks. Table 2 is the data regarding the total time spent by the new patients in the system from the time of registration until the consultation by the director (called as turn-around time or TAT) on August 2. Table 3 is the TAT for the follow-up patients on August 2.

Table 4 is the data regarding the total number of patients who arrived into the system along with the total number

of patients who moved out of the system on completion of service during various time intervals on August 2. Table 5 captures the performance statistics of the OPD as compiled by Mr. Baghela, based on the two week data.

Table 6 summarizes the processing times for various stages and the duration in a day they are operational. It was particularly perplexing for Mr. Baghela to note that the even though average processing times added up to less than an hour, the patients were waiting for more than two hours in the system.

Possible Solutions to the Waiting Time Problem

Mr. Baghela shared the details of his study with Dr. Chaudhary. The findings, unfortunately, did not provide any (new) additional insights. The crowding problem at the OPD has become very pronounced in the recent times and needed immediate attention. Dr. Chaudhary was considering various options to reduce waiting time at the OPD:

1. Since all the activities of OPD were currently performed on the ground floor, shifting some activities to the first floor may reduce the OPD crowding to some extent.
2. The waiting area of the OPD could be extended by using the space currently being used for vehicle parking. This would, however, require considerable investment.
3. The number of receptionists, optometrist, nurses and ophthalmologists could be doubled to reduce the total processing times at respective stages. The reduction in the average service times at each of the stages may reduce the overall waiting time for the patients in the system.
4. The efficiency of the current operations at the hospital could be improved by implementing an ERP system that will help in automating various processes like patient scheduling, documentation, etc. (which are done manually under the current system) at the hospital.
5. Since the system capacity seems to be a constraint, the OPD could start[5] one hour earlier in order to increase the number of patients the system can serve in a day.

Table 1: Team at Rajas Eye Hospital

S. No.	Designation	Number
1	Director	1
2	Consultant Ophthalmologist	3
3	Optometrist	3
4	Counselor	1
5	Supervisor	1
6	O.T In charge/Technicians	5
7	Nurse	2
8	Receptionist	3

Source: Rajas Eye Hospital Documents

Table 2: Patient Turnaround Time: New Patients (Sample*)

Patient No.	Appointment Time	Reporting Time	Exit Time	TAT (Hours: Mins)
1	WA**	09:30	12:55	3:25
2	WA	09:30	12:55	3:25
3	WA	09:45	13:40	3:55
4	WA	09:45	13:00	3:15
5	WA	10:10	13:00	2:50
6	WA	10:30	13:30	3:00
7	10:30	10:40	13:05	2:25
8	WA	10:40	13:05	2:25
9	WA	10:45	13:15	2:30
10	11:00	11:00	13:15	2:15
11	WA	11:00	13:35	2:35
12	11:00	11:00	13:25	2:25
13	WA	11:00	13:25	2:25
14	11:00	11:15	13:30	2:15
15	11:30	11:15	13:40	2:25
16	WA	11:15	13:20	2:05

5 The appointments in the OPD can be given 9 AM onwards instead of 10 AM.

Table 2 Continued...

Patient No.	Appointment Time	Reporting Time	Exit Time	TAT (Hours: Mins)
17	11:15	11:15	13:45	2:30
18	11:15	11:15	13:45	2:30
19	WA	11:15	13:50	2:35
20	11:00	11:30	13:50	2:20
21	11:00	11:30	13:55	2:25
22	11:00	11:30	13:55	2:25
23	11:30	11:30	14:05	2:35
24	11:30	11:30	14:10	2:40
25	11:30	11:45	14:20	2:35
26	13:30	11:45	14:20	2:35
27	13:30	11:45	14:25	2:40
28	11:30	11:45	14:10	2:25
29	WA	11:45	14:15	2:30
30	12:45	11:45	13:10	1:25
31	12:00	11:45	14:15	2:30
32	11:30	12:00	14:25	2:25
33	12:00	12:00	13:35	1:35
34	11:45	12:00	14:30	2:30
35	12:30	12:15	14:40	2:25
36	WA	12:15	13:20	1:05
37	12:10	12:15	14:00	1:45
38	12:15	12:15	14:40	2:25
39	12:15	12:25	NA***	NA
40	12:30	12:30	14:45	2:15
41	12:00	12:30	14:30	2:00
42	12:00	12:30	14:35	2:05
43	11:00	12:30	14:00	1:30
44	WA	12:30	NA	NA
45	12:00	12:45	14:05	1:20
46	WA	12:45	NA	NA
47	12:00	13:00	14:50	1:50
48	12:00	13:00	14:50	1:50
49	13:00	13:00	14:45	1:45
50	13:00	13:00	14:55	1:55
51	13:15	13:00	14:55	1:55
52	13:00	13:00	15:00	2:00
53	WA	13:15	15:10	1:55
54	13:15	13:15	15:10	1:55
55	WA	13:15	15:15	2:00
56	14:00	13:15	15:15	2:00
57	13:30	13:15	15:20	2:05
58	13:30	13:15	15:20	2:05
59	WA	13:30	16:00	2:30
60	13:30	13:30	16:05	2:35
61	13:30	13:30	16:05	2:35
62	13:30	13:30	16:15	2:45
63	13:15	13:30	16:10	2:40
64	13:30	13:30	15:05	1:35
65	13:00	13:30	14:35	1:05
66	14:00	13:40	16:15	2:35
67	13:15	13:45	16:20	2:35
68	WA	13:45	16:20	2:35
69	13:30	13:45	16:25	2:40
70	13:00	13:45	15:05	1:20
71	WA	13:45	16:10	2:25
72	13:00	13:45	16:30	2:45
73	13:00	13:45	16:30	2:45
74	WA	14:00	16:40	2:40
75	14:00	14:00	16:45	2:45
76	14:00	14:00	NA	NA
77	14:30	14:15	15:25	1:10
78	14:00	14:30	16:45	2:15
79	WA	14:30	15:25	0:55
80	WA	14:30	16:50	2:20
81	WA	14:30	16:50	2:20
82	WA	14:30	16:55	2:25
83	WA	14:45	16:55	2:10
84	15:00	15:00	16:35	1:35
85	15:00	15:00	16:35	1:35
86	15:15	15:15	16:25	1:10
87	15:15	15:15	NA	NA
88	15:15	15:15	NA	NA

*Representative data

** Without appointment

***Not Available

Source: Rajas Eye Hospital Documents

Table 3: Patient Turnaround Time: Follow up Patients (Sample*)

Patient No.	Reporting Time	Exit Time	TAT (Hours: Mins)	Patient No.	Reporting Time	Exit Time	TAT (Hours: Mins)
1	10:10	13:05	2:55	13	13:40	14:50	1:10
2	10:15	13:05	2:50	14	14:00	16:20	2:20
3	10:45	13:25	2:40	15	14:00	14:50	0:50
4	11:35	14:10	2:35	16	14:00	16:15	2:15
5	12:00	13:25	1:25	17	14:15	15:30	1:15
6	12:30	14:00	1:30	18	14:30	16:25	1:55
7	12:30	14:05	1:35	19	15:00	15:30	0:30
8	12:45	13:55	1:10	20	15:00	16:45	1:45
9	13:00	14:00	1:00	21	15:10	16:45	1:35
10	13:10	14:25	1:15	22	15:15	16:30	1:15
11	13:15	16:20	3:05	23	15:15	16:30	1:15
12	13:40	16:10	2:30				

* Representative data

** Follow-up patients do not take appointments in the current system

Source: Rajas Eye Hospital Documents

Table 4: Arrival and Departure of Patients at OPD (Date August 2)

Time	Number of Patients Arrived	Number of Patients Served
09:00 -09:30	2	0
09:30 -10:00	2	0
10:00- 10:30	4	0
10:30-11:00	4	0
11:00-11:30	15	0
11:30-12:00	12	0
12:00-12:30	5	0
12:30-13:00	17	4
13:00-13:30	15	15
13:30-14:00	10	11
14:00-14:30	14	19
14:30-15:00	5	13
15:00-15:30	6	10
15:30-16:00	0	3
16:00-16:30	0	19
16:30-17:00	0	11

Source: Rajas Eye Hospital Documents

Table 5: OPD Volume and Performance

Date	Day	(A)	(B)	(C=A+B)	(D)	(E=C+D)	Average Deviation from the Appointment Time (In Mins)	TAT[6] in Hours and Minutes		
								Max	Min	Average
1-Aug	Mon	61	10	71	39	110	36.72	2:50	0:45	1:51
2-Aug	Tue	61	27	88	23	111	19.92	3:55	0:55	2:15
3-Aug	Wed	64	27	91	19	110	23.75	3:40	0:25	1:55
5-Aug	Fri	70	21	91	23	114	30.57	2:55	0:45	1:48
8-Aug	Mon	56	16	72	20	92	20.73	2:20	0:45	1:47
9-Aug	Tue	36	18	54	16	70	30.42	2:30	0:25	1:10
10-Aug	Wed	31	25	56	23	79	28.23	2:30	0:40	1:24
12-Aug	Fri	43	11	54	11	65	38.49	2:35	0:20	1:24
16-Aug	Tue	53	41	94	21	115	26.04	3:35	1:10	2:14
17-Aug	Wed	48	24	72	26	98	36.88	3:45	0:45	2:43
19-Aug	Fri	51	39	90	29	119	34.41	3:55	1:00	2:39
23-Aug	Tue	50	28	78	19	97	27.00	3:00	0:40	2:06
24-Aug	Wed	71	16	87	35	122	53.37	4:20	0:45	2:26
Average		53.46	23.30	76.77	23.38	100.15	31.27			1:59

A- New patients with appointments, **B-** New patients without appointments, **C-** New patients (Total), **D-**Follow up patients, **E-** Total patients

Source: Rajas Eye Hospital Documents

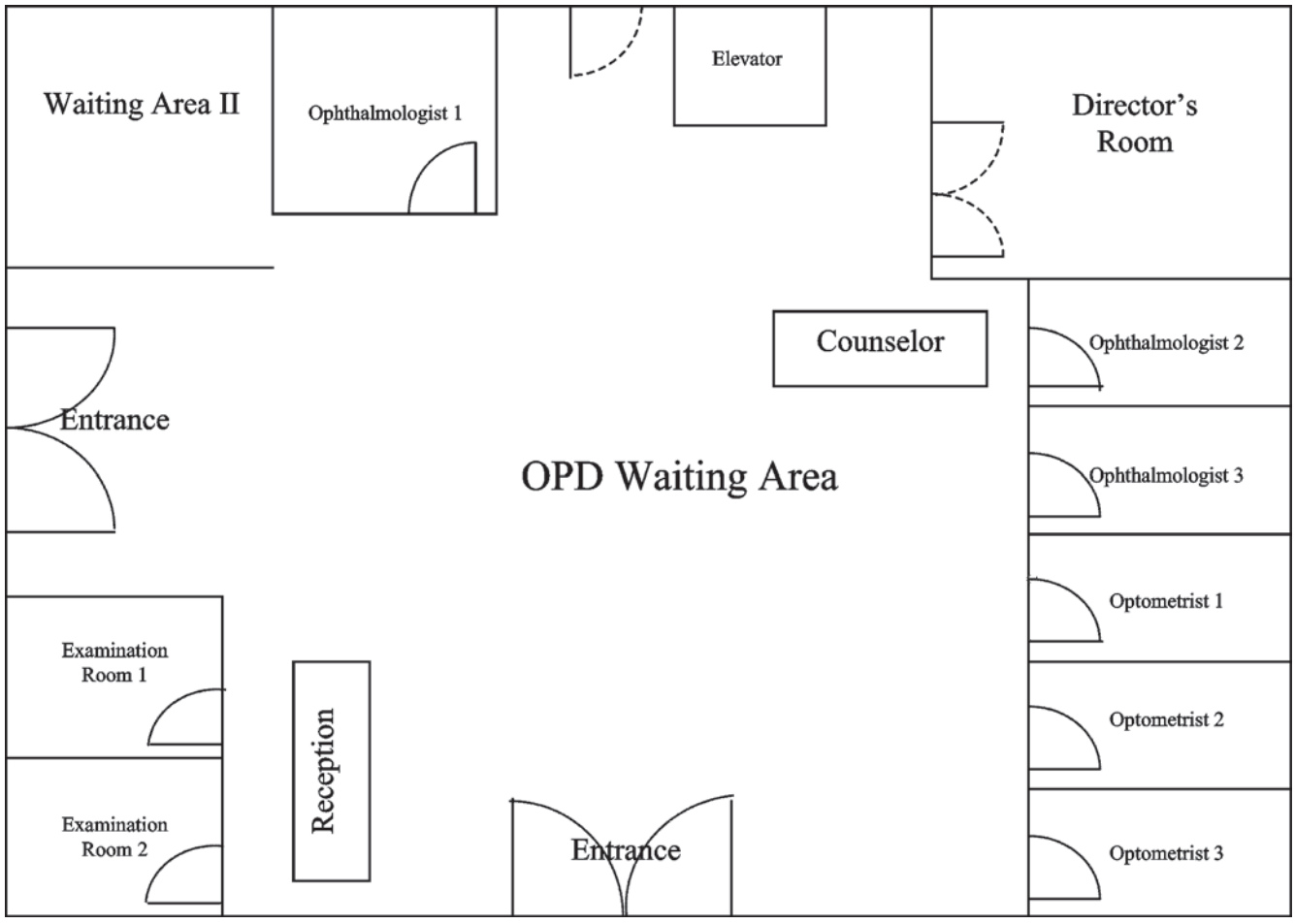
Table 6: Processing Times at various stages

S. No.	Designation	Number	Processing Time /Patient (Mins)	Timings (Hrs.)
1	Director	1	2.22	13:00-17:00
2	Consultant Ophthalmologist	3	6.3	12:00-17:00
3	Optometrist	3	8.6	11:00-17:00
4	Nurse (Dilation)	2	40	10:00-17:00

Source: Rajas Eye Hospital Documents

6. TAT (Turn Around Time): The total time spent by a patient in the system.

Figure 1: Ground Floor Plan (OPD)



Source: Prepared by the case writers

Figure 2: Arrival Pattern (New Patients with appointment)*

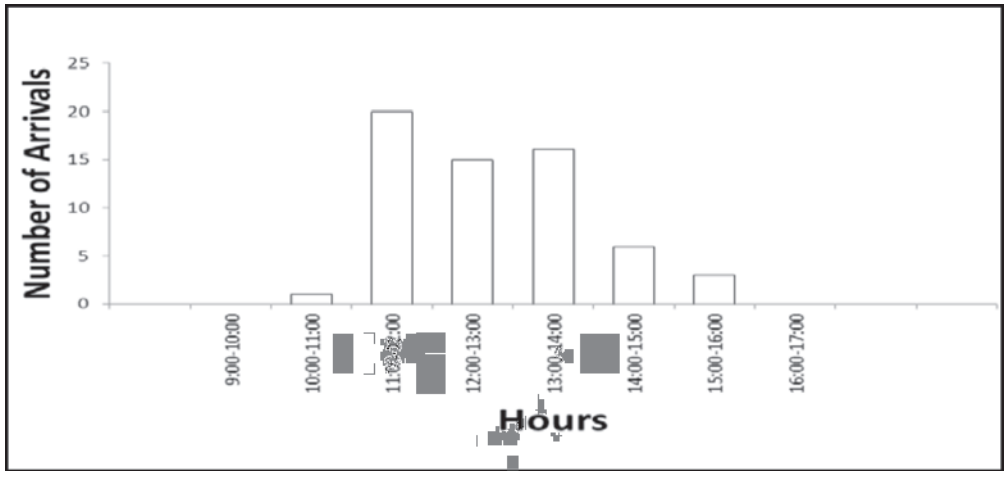


Figure 3: Arrival Pattern (New Patients without appointment)*

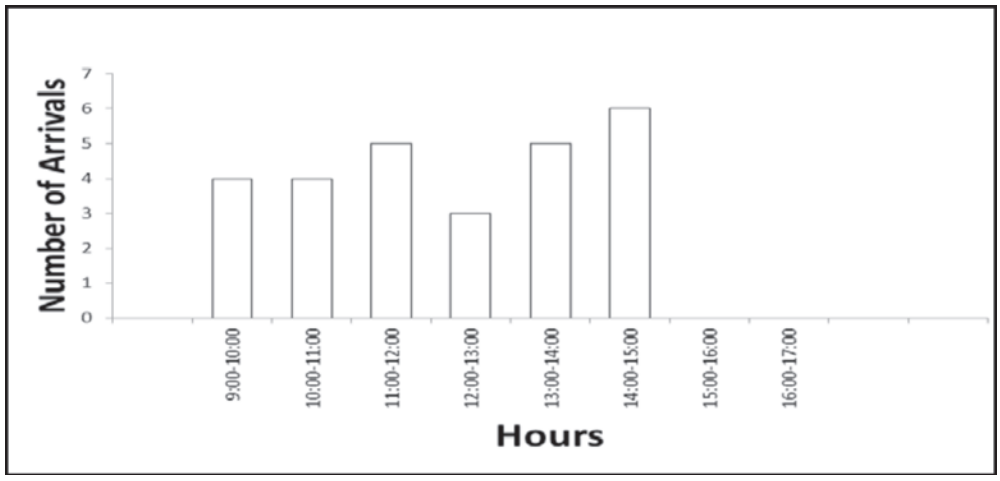
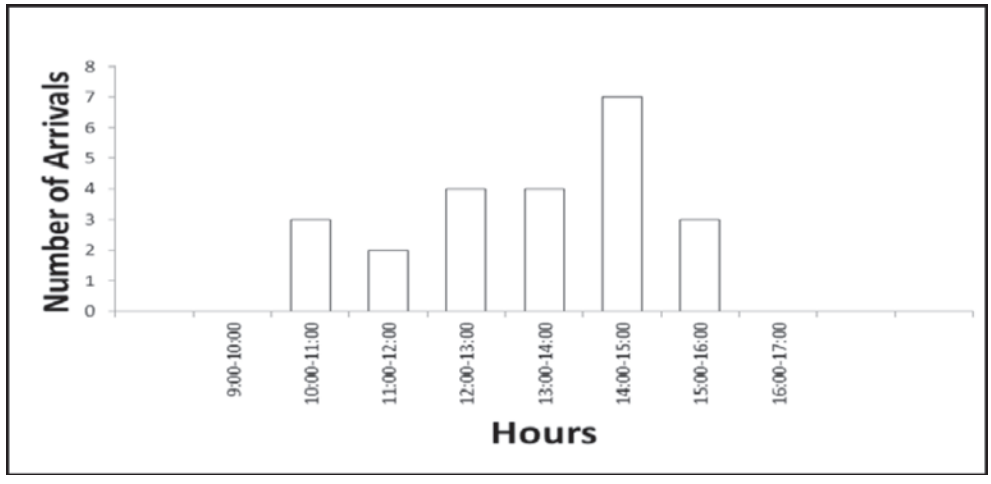
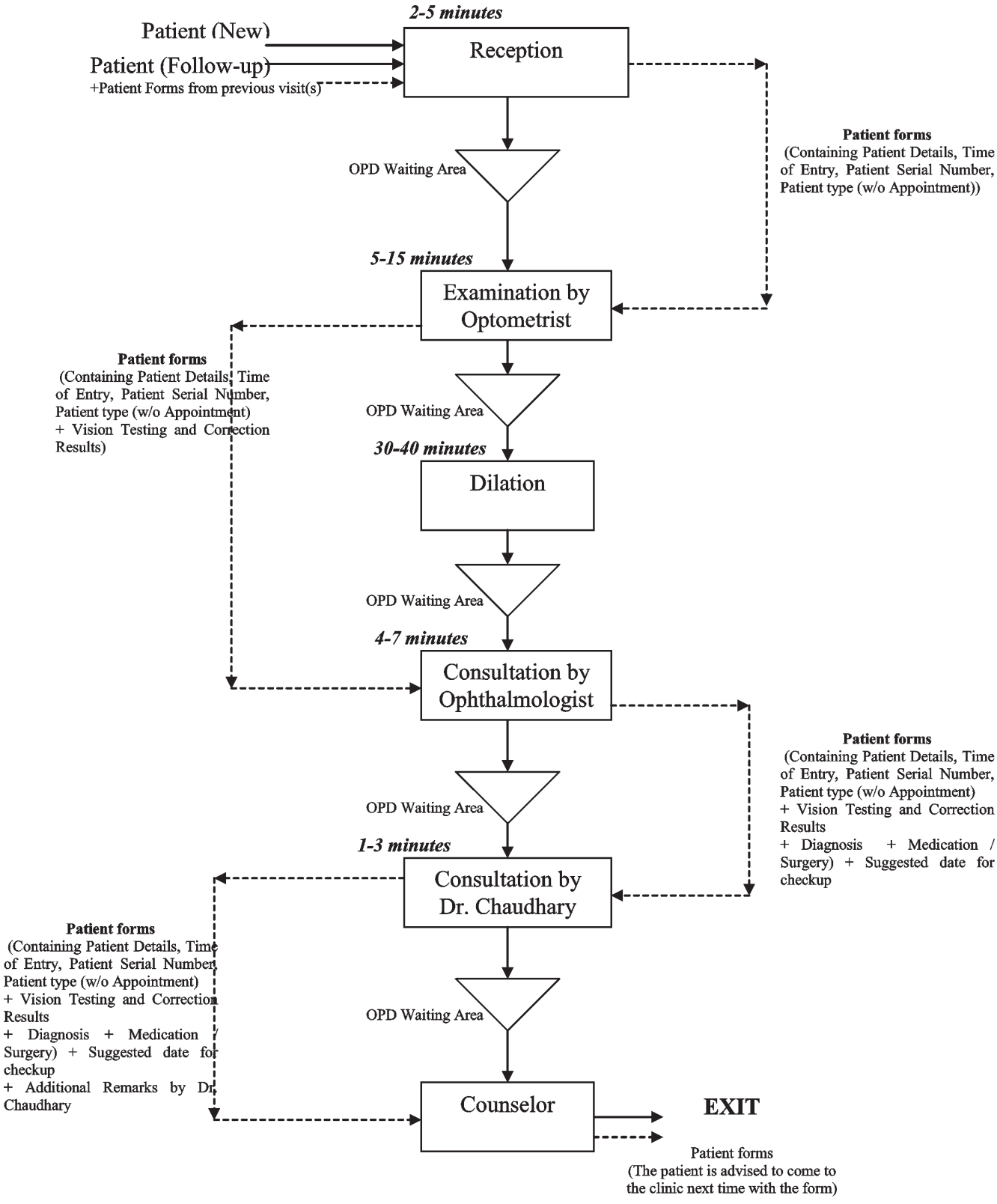


Figure 4: Arrival Pattern (Follow-up Patients) *



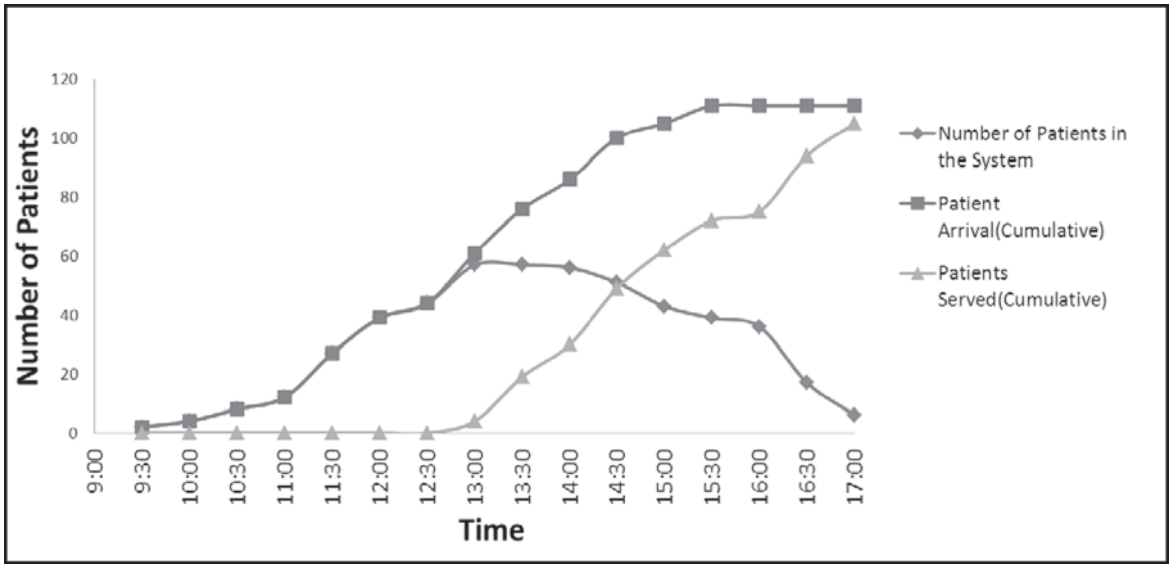
*Source: Prepared by the case writers

Figure 5: Patient Flow in OPD



Source: Prepared by the case writers

Fig 6: Arrival and Departure of Patients at OPD (Date 2 Aug)



Source: Prepared by the case writers.

Appendix: Brief Description of Key Terms

Term	Description
Phacoemulsification	An advanced technique to perform cataract surgery where the eye lens is emulsified using a probe which works on the principle of ultrasonic vibration[7,8].
Glaucoma	The condition in which the pressure in the eye increases and could lead to damage of the optic nerve if not treated properly[7,9].
Fundus Photography	An advanced technology involving a microscope and a camera to capture the photographs of the inner eye suface[7,10].
Retinovitreal Surgery	A mode of surgery using fundus photography for treating retinal diseases[7].
Fundus Fluorescein Angiography	In order to detect the leakage in eye vessels (due to certain eye conditions) the patient is injected with a flurocein dye in the blood vessel of the patient's arm. Fundus photography is then used to detect the possible leakage[7].
YAG Laser	Yttrium Aluminium Garnet Laser. One of the most commonly used lasers in eye surgeries[7,11].

7 Source: http://www.rajaseyehospital.com/facilities.html, retrieved on 9 April 2013
8 Source: http://en.wikipedia.org/wiki/Phacoemulsification, retrieved on 9 April 2013
9 Source: http://en.wikipedia.org/wiki/Glaucoma, retrieved on 9 April 2013
10 Source: http://en.wikipedia.org/wiki/Fundus_photography, retrieved on 9 April 2013
11 Source: http://en.wikipedia.org/wiki/Nd:YAG_laser, retrieved on 9 April 2013

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