

## Community Clinic

The Community Clinic<sup>1</sup> offers basic medical services to the local community on a walk-in basis. The Clinic is located next door to the local County Hospital, which is a Level II trauma center, and thus, the Clinic does not provide emergency services. The Clinic is open Monday through Friday, from 8:00 am to 6:00 pm. All patients are seen on a non-appointment, walk-in basis.

The staff of the Clinic consists of: 3 physicians (MD), 4.5<sup>2</sup> physician assistants (PA), 4 registered nurses (RN), and 2 medical assistants (MA). There are also 3 receptionists who are responsible for patient check-in and check-out. All full-time members of the staff contribute 40 hours per week toward the Clinic's operations. The Clinic also employs other staff members such as, for example, those with back-office responsibilities (billing, accounting, and so forth).<sup>3</sup>

### Process Flow

Patients arrive at the Clinic, where they wait for a receptionist to become available to check them in. Check-in requires that the receptionist confirm the patient's identity, obtain the patient's insurance information, and either update the patient's existing on-line record or create a new one. The patient is then given several forms to complete and is instructed to fill out the form in the waiting room, return them to the reception desk when they are finished, and then wait in the waiting room until his/her name is called. While the patient is waiting, the patient registration is completed by one of the receptionists using the information obtained from the forms.

When s/he becomes available, a triage nurse (who is an RN) will call the patient's name at the doorway leading from the waiting room to the treatment rooms and then escort the patient to one of the triage examination rooms. The triage nurse then interviews the patient to understand the reason for the patient's visit, obtains and records the patient's vital signs, and performs a preliminary examination of the patient, as necessary. The primary role of the triage nurse is to assess the level of urgency of the patient's condition and also to make an initial determination as to whom the patient should be triaged. In some cases, the triage nurse is able to attend entirely to the patient's medical needs. In most instances, however, the triage nurse must decide whether to direct ("triage") the patient to a PA or to an MD. This decision is made by the triage nurse on the basis of the type and severity of the symptoms presented by the patient.

While broad, the range of medical conditions that can be treated by a PA is not as great as that of an MD. Depending on the patient's condition, there can be uncertainty associated with the PA-MD triage decision, and it is up to the triage nurse to make a decision and direct the patient to either a PA or an MD. On the average, patients wait longer to see an MD than they do to see a PA. Also, the MDs constitute a more expensive resource within the Clinic.<sup>4</sup> Consequently, the triage nurses are encouraged to direct patients to a PA if there is a reasonable likelihood that the patient would not need to see an MD. On the average, about 3% of the patients who are initially triaged to a PA subsequently need also to be seen by an MD. When this happens, the

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<sup>1</sup> This case example presents a hypothetical medical clinic modeled, in part, after the clinic discussed in "University Health Services: Walk-in Clinic," David Maister, 9-681-061, Revised 2006. This case example has been developed exclusively for classroom discussion purposes.

<sup>2</sup> One of the Physician Assistants works part time, providing 20 hours per week to the Clinic.

<sup>3</sup> To focus discussion on the main concepts to be developed in the case analysis, the process description and accompanying data are limited to a simplified version of the Clinic's process for treating patients.

<sup>4</sup> The average annual salaries at the Clinic for MDs, PAs, and RNs are \$170,000, \$85,000, and \$75,000, respectively.

patient is typically instructed to return to the waiting room and wait for an MD to be available. On the basis of a recent study, on the average, 15% of the patients are treated directly by the triage nurse, 40% of patients are initially triaged to a PA, and the remaining 45% are triaged initially to an MD.

When ready to be seen by a PA or an MD, the patient is escorted to one of the treatment rooms by a medical assistant and instructed to wait for the provider. The patient is then examined and treated. Once the visit has been completed, the patient is directed to the check-out reception desk, where payment for the visit is made, detailed information on post-treatment care is provided to the patient, and if applicable, either a written prescription is provided to the patient or is transmitted directly to the patient's pharmacy.

In addition to escorting patients to the treatment rooms, the medical assistants are responsible for cleaning and sanitizing the treatment rooms before each patient's visit. Each MA is responsible for completing a number of other tasks over the course of a day; these daily tasks require on the average 1.5 hours to complete and reduce each MA's effective available capacity for meeting patient demand.

### **The Community Clinic**

Kayla Banks, the Clinic's Operations Manager, has been aware that patient demand at the Clinic has been steadily increasing over the past few years. She is concerned about the Clinic's capacity to accommodate its current patient load. She understands that patient demand varies by the day of the week, as well as by the hour of the day. For example, Monday mornings, as the Clinic is opening up for the week, tend to be a period of high patient demand. One of her weekly challenges is to establish the work schedule for the staff so as to meet the peaks and troughs as much as possible, while also satisfying a number of requirements (or constraints).

The facility itself is relatively new (less than 5 years old) and was designed and built to accommodate a patient load that is significantly higher than the current load. As a result there are a large number of examination and treatment rooms, many of which have remained unused (although they are inspected daily in case they were to be needed). The waiting area is large; even after having to remove a number of seats because of the on-going pandemic, it has more than ample capacity to handle the patient load during peak demand. There are numerous workstations and small offices available for providers to perform the sundry (information- and communications-related) tasks associated with their roles (such as, for example, entering data on patient visits).

The Clinic continually obtains feedback from patients on their assessment of the quality of the service. There have always been some complaints by patients about having to wait too long to see a provider; however, over time, the frequency of complaints and the expressed level of dissatisfaction has increased significantly, especially in regard to the number of complaints about having to wait too long to see an MD. Banks is also hearing a number of complaints from within the Clinic. The MDs are complaining that their patient load is too high, and they are concerned about having to "rush" through patient visits. She is also hearing that the triage nurses have been complaining about criticism directed at them by the MDs because "too many patients are being directed to them when they could easily have been seen by a PA."

Kayla hired a firm to perform a study to gather data on patient demand and process capacity. This study, which was performed over the course of several weeks, provided, for example, the information noted earlier on the percentages of patients triaged to the PAs and to the MDs.

According to the study, the average daily demand at the clinic is 189 patients per day. The results of the study also confirmed Kayla's understanding of the daily and weekly seasonality associated with patient demand over the course of a week. These results now provide her with the data to analyze their effect on the Clinic's operating capacity. The data are summarized in Exhibits 1 – 4.

The next step is for Kayla to use these data to analyze the Clinic's capacity. She has developed a host of questions that need to be addressed. Among the pertinent questions are the following. Does the Clinic have sufficient capacity to handle the current patient workload? What is (are) the process bottleneck(s)? Does she need to increase the capacity of the Clinic by hiring new people or can she alleviate patient complaints about waiting times by marshalling existing resources better? This latter point is extremely important, since the Clinic's budget is extremely limited, and the Clinic's Board of Directors has even been contemplating budget reductions. She would need to present a strong case for acquiring additional resources. If she were to be able to make such a case, which resource(s) should be increased and by how much would they need to be increased?

**Exhibit 1: Data on Resource Availability and Processing Capacity**

Personnel <sup>1</sup>	Number	Patient Treatment Time (minutes/patient/person) <sup>2</sup>	Capacity (patients/hour/person) <sup>2</sup>
MD	3	18.20	3.30
PA	4.5	21.40	2.80
Triage RN	4	6.52	9.20
Medical Assistant <sup>3</sup>	2	3.20	18.75
Reception	3	4.00 <sup>4</sup>	15.00

Notes:

<sup>1</sup> All full-time staff personnel contribute 40 hours per week to Clinic operations. One PA works half-time.

<sup>2</sup> Values reported are averages. Data compiled over a 2-month period.

<sup>3</sup> Patient treatment time includes the time needed to prepare and sanitize treatment room for each patient. Each MA is also responsible for completing 1.5 hours of work each day, which reduces the effective capacity available for meeting patient demand.

<sup>4</sup> Includes patient check-in and check-out.

Rooms <sup>1</sup>	Number	Time Room is Occupied (minutes/patient/room) <sup>2</sup>	Capacity (patients/hour/room) <sup>2</sup>
Examination Room (Triage RN)	4	6.52 <sup>3</sup>	9.20
Treatment Room (MD or PA)	14	20.40 or 23.60 <sup>4,6</sup>	2.94 or 2.54
Waiting Room (seats)	30 <sup>5,6</sup>	15.00 <sup>7</sup>	- <sup>7</sup>

Notes:

<sup>1</sup> All rooms are available 50 hours per week (i.e., when the Clinic is open).

<sup>2</sup> Values reported are averages.

<sup>3</sup> Triage nurses clean and prepare the examination room after each patient (cleaning/preparation time required is included in patient treatment time).

<sup>4</sup> The time that a treatment room is occupied depends on whether it is being used by an MD or a PA. The times reported also include the (average) 2.2 minutes for the Medical Assistant to clean and prepare the room after each patient.

<sup>5</sup> There is one waiting room with 50 seats; the seating capacity has been reduced by 40% as a result of an on-going pandemic.

<sup>6</sup> During the time of the capacity/demand study, 2 of the treatment rooms were never used, and the waiting room was never more than 80% occupied (even when the reduced seating capacity was implemented).

<sup>7</sup> Patients wait on the average a total of 20.0 minutes in the waiting room per visit. This time comprises the time required to complete the registration forms, the time waiting for triage, and the time waiting for either a PA or an MD. Also, because patients sometime brings someone to the Clinic to accompany them, on the average an additional 0.25 person occupies the waiting room per patient.

**Exhibit 2: Patient Demand Data – Daily <sup>1</sup>**

Day	Patients per Day (average) <sup>2</sup>
Monday	212.1
Tuesday	184.8
Wednesday	168.5
Thursday	172.4
Friday	207.2

Notes:

<sup>1</sup> Demand data were compiled over a 2-month period.

<sup>2</sup> The average number of patients per day is 189.0.

**Exhibit 3: Patient Demand Data – Hourly <sup>1</sup>**

Hour	Patients per Hour (average) <sup>2</sup>
8:00 – 9:00 am	23.1
9:00 – 10:00	21.8
10:00 – 11:00	17.2
11:00 – 12:00 pm	15.9
12:00 – 1:00	20.4
1:00 – 2:00	17.5
2:00 – 3:00	16.3
3:00 – 4:00	17.1
4:00 – 5:00	18.9
5:00 – 6:00 pm	20.8

Notes:

<sup>1</sup> Demand data were compiled over a 2-month period.

<sup>2</sup> The average number of patients per hour is 18.9.

### Exhibit 4: Staff Schedule

Day  Hour	Monday					Tuesday					Wednesday					Thursday					Friday				
	MD	PA	Triage (RN)	MA	Receptionist	MD	PA	Triage (RN)	MA	Receptionist	MD	PA	Triage (RN)	MA	Receptionist	MD	PA	Triage (RN)	MA	Receptionist	MD	PA	Triage (RN)	MA	Reception
8:00 – 9:00 am	2	3	2.5	1	1.5	1.5	3	2.5	1	1.5	1.5	2	2.5	1	1.5	1.5	2	2.5	1	1.5	1.5	3	2.5	1	1.5
9:00 – 10:00	3	5	4	2	3	3	5	4	2	3	3	4	4	2	3	3	4	4	2	3	3	5	4	2	3
10:00 – 11:00	3	5	4	2	3	3	5	4	2	3	3	4	4	2	3	3	4	4	2	3	3	5	4	2	3
11:00 – 12:00 pm	3	5	4	2	3	3	5	4	2	3	3	4	4	2	3	3	4	4	2	3	3	3	4	2	3
12:00 – 1:00	1.5	3	2	1	1.5	1.5	3	2	1	1.5	1.5	2	2	1	1.5	1.5	2	2	1	1.5	1.5	2	2	1	1.5
1:00 – 2:00	1.5	2	2	1	1.5	1.5	3	2	1	1.5	1.5	2	2	1	1.5	1.5	2	2	1	1.5	1.5	5	2	1	1.5
2:00 – 3:00	3	4	4	2	3	3	4	4	2	3	3	4	4	2	3	3	4	4	2	3	3	5	4	2	3
3:00 – 4:00	3	4	4	2	3	3	4	4	2	3	3	4	4	2	3	3	4	4	2	3	3	4	4	2	3
4:00 – 5:00	3	5	4	2	3	3	4	4	2	3	3	4	4	2	3	3	4	4	2	3	3	4	4	2	3
5:00 – 6:00 pm	1	3	1.5	1	1.5	1.5	2	1.5	1	1.5	1.5	2	1.5	1	1.5	1.5	2	1.5	1	1.5	1.5	2	1.5	1	1.5