are not being fully utilized, moments when they could be with a patient and they are not? Of course. Can we do something about it? Of course.

In TOC, the constraint is the leverage point for improving the whole system and achieving the goal. In a medical practice, the constraint is the physician’s time. In order to get the most from the constraint, it is important to protect the physicians from the uncertainty inherent in the system, and this is done with buffers.

The initial buffers used to manage patient flow effectively through the practice are the scheduling buffer, the constraint buffer and the physician interruption buffer. However, the buffers do much more than protect the physicians from the fluctuations in patient availability. The buffers provide the information and focus to improve the practice continuously. Through using this valuable tool, the medical practice in this case increased the number of patients a physician could see in the same time period. These buffers and their use are described in the next sections.

We began the implementation in a family practice clinic with seven partners and 10.5 physicians in a small Southern U.S. town. When we began, there were two obvious main causes for disruptions in the physician-patient flow:

• No patient available at the moment when the physician was ready
• Interruptions requiring the physicians to stop what they were doing and do something else

Let’s take a closer look at these two situations and see how to apply the TOC concept of buffer management to alleviate or eliminate them.

No patient available

We wanted all the physicians to be providing constantly; in other words, seeing patients. We needed to figure out what was causing all the downtime.

The first and most obvious reason was the occasional empty appointment slot. The reason there was no patient scheduled is not as important as having a full appointment schedule. A fully booked schedule became the responsibility of the scheduler. The scheduler’s job is to reduce uncertainty and eliminate interruptions to the flow in advance. Remember, a no-show or a slot with no appointment scheduled generally results in the physician being idle.

To make this job possible, a scheduling buffer, illustrated by Figure 1, was introduced.

The scheduling buffer is used to maintain a consistent (and then increased) flow of patients to each physician. We set the scheduling buffer level at three days, with the first day (today) being the red region, the second day (tomorrow) being the yellow region and the third day (day after tomorrow) being the green region. This is a rolling schedule, so the first day moves forward in time as time passes.

Using this scheduling buffer, the scheduler:

• Always works first to fill any open appointment slots in the red region. These are imminent empty appointment opportunities. This is done by calling patients who have appointments further in the future (call forward of appointments) and with call-ins and walk-ins.
• Next, the scheduler tries to fill the empty slots in the yellow region (tomorrow) and afterward the green region (day after tomorrow). Of course, patients call to cancel appointments, and this requires scheduler action based on which region the cancellation is in; any red region slot gets immediate priority.

By using buffer management in this manner, the practice is able to eliminate the problem of vacant appointment slots.

Our scheduler also holds one or two slots at the end of each physician session to handle acute same-day call- or walk-ins, a choice made by the physicians and management. This enables the practice to provide timely healthcare to its acute patients without jeopardizing the scheduled appointments.

The reserved slots should not be allocated in the normal call-forward of appointments but should be reserved for that day’s emergencies.

Many additional steps can be taken to further improve the flow. For example:

• Educate patients that there is time reserved for sick patients and discourage walk-ins. Having end-of-session acute appointment slots protects the whole session from disruption by a walk-in.
• To improve the flow continually, the scheduler should monitor the backlog of scheduled patients to determine if more of one type of appointment is needed.
• The scheduler should monitor the effects of seasonality to recommend changes to scheduling templates proactively.

![Figure 1](https://via.placeholder.com/150)

**Scheduling buffer**

Proper buffer management can help eliminate the waste of empty appointment slots in a medical practice.

<table>
<thead>
<tr>
<th>Next three days schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>3d 8h</td>
</tr>
<tr>
<td>2d 8h</td>
</tr>
<tr>
<td>1d 8h</td>
</tr>
</tbody>
</table>