## **MEDICAL CARE OF DAYTON, INC. [MED-CARE]**

**“Affordable high quality health care for the Dayton community”**

## **Patient Appointment System**

ANALYSIS AUTHORIZATION 20XX-12

**Introduction.** Medical Care of Dayton, Inc. (MED-CARE) is a major health organization in the Dayton, Ohio, Metropolitan Statistical Area (MSA) providing a wide range of health care services. We contract with employers for group medical insurance, and we support most health care services at several clinics throughout the area. Thus we simultaneously function as an insurer and a health care provider.

As you know, your small group was established several years ago to support the management team of MED-CARE. The group has been used for numerous special projects and ad hoc problem-solving and data-gathering efforts. It is an honor for young “up and coming” professionals to be assigned to this group; the experience gives them broad exposure to MED-CARE management issues. MED-CARE executives sometimes refer to you as their issue analysis team. However, the official name of your organization is the AIG Team (your motto is Analysis leads to Insights leads to Good decisions).

**This Initiative**. As one element in a broad initiative to become more efficient and improve service to customers, we at MED-CARE want to examine our most widely used appointment-scheduling system. Although the system has been used for some number of years, MED-CARE has become aware that this important system should be studied. Our director of operations (the undersigned) has received a number of comments and complaints from patients, doctors, and administrative staff. It is requested that your AIG team conduct an analysis of this appointment system.

**Current Appointment-Scheduling System.** This particular appointment system is designed to serve many of our offices or clinics based upon similar appointment durations, similar variations in actual visit durations, and similar general assumptions about patients arriving for appointments. There are approximately 25 doctors whom MED-CARE supports that now use this appointment system. The system (for any one doctor) has these characteristics:

1. During the total appointment period on any given day, there are 16 appointments, each scheduled for 15 or 20 minutes in length (includes all doctor pre- and post-appointment tasks). The sequence of the schedule is eight 20-minute appointments followed by eight 15-minute appointments. Thus the total planned appointment period spans four hours and 40 minutes. Typically, an appointment period begins at 7:30 AM and ends after the 16th appointment (scheduled to end at 12:10 PM).
2. We place a reminder phone call to each patient one to two days prior to the scheduled appointment.
3. We see patients only in the order scheduled, that is, if any come very early, they do not get seen earlier than any other patient scheduled before them.
4. We allow a 15-minute “grace” period. If a patient arrives more than 15 minutes late, then this patient must reschedule for another day.
5. Although the first appointment never begins before 7:30 AM, for all other appointments we begin as soon as both the doctor and patient are available.
6. Doctors schedule their other duties after 12:10 PM (the scheduled end of last appointment). Other activities include surgery or other operations, rounds with hospital patients, business meetings, lunch, and, yes, occasionally golf. Thus, delays in completing the appointment period on time can have undesirable consequences for doctors and staff as well as for patients.

**Appointment System Data.** For this study, a large data-gathering exercise was undertaken, and the results are available in an Excel file. We believe that these data are representative of patient behavior and doctor performance in our current appointment system. Note that in this data gathering, we observed only one patient arrival slightly later than 15 minutes after the appointment scheduled start. Thus, for your analysis, we are willing to assume 0 percent later than 15 minutes.

**A Possible Improvement.** MED-CARE’s operations manager, in conjunction with staff and representatives of the doctors we support, have agreed upon the following as a potential improvement to the appointment system, if it can be shown to have significant performance enhancement. This improvement has three elements:

1. Insert buffer times. Some of the loudest complaints about the current system come from doctors and staff indicating they are “not able to predict the completion time of the appointment period.” As one person said, “There is too much variability in end time! I can’t plan anything after work because sometimes we’re as much as 45 minutes after the scheduled end time.” One concept to reduce variability is buffers. We believe that it would be possible to add one or more buffers or “catch-up” periods to the appointment schedule. Although this would mean extending the schedule somewhat past the current 12:10 PM scheduled end time, we believe that our doctors and staff would agree to it if this change results in a more consistent actual ending time (we’ve asked a number of them). Adding up to 15 minutes to the schedule might be considered (in “chunks” no smaller than five minutes). We’re uncertain exactly where in the total appointment period the buffers would work the very best, but we suggest as a first try to put the three five-minute buffers before the 11th, 13th and 15th appointments. Note that the new scheduled completion time will be 15 minutes past 12:10 PM or 12:25 PM.
2. Change the “grace” period. Since we now have patients arriving as much as 15 minutes past the scheduled appointment start time, we believe we could change this to a 10-minute “grace” period. If this change is made, we think that all patients will become more sensitive to their arrival times. We believe that the change to arrival times (from that shown in the data) would stabilize to the following: the approximate 25 percent now arriving after 10 minutes late will become distributed evenly to the 25 previous arrival minutes (i.e., add 1 percent to each).
3. Tighten up the appointment durations. In discussing appointment length with a number of doctors, most believe that (if given signals to help keep them on time) they could ensure that most all appointment durations are not more than three minutes over the scheduled length. Thus, we could implement a system of signals such that the appointment durations would change to the following. For 15-minute appointments, the percentages now over 18 minutes would be equally divided over the 12- to 18-minute durations. For 20-minute appointments, the percentages now over 23 minutes would be equally divided over the 17- to 23-minute durations.

**Charge to the Analysis Team.**

In summary, make sure your study answers these business questions:

1. **Do the new arrival and appointment duration data give insights about causes of poor appointment system performance?**
   1. Are there any conclusions about system performance to be drawn from a careful examination of the newly acquired arrival and appointment duration data? Use tables and/or graphs.
   2. Are there any other insights you would offer?
2. **What is the performance of the current appointment system?**
   1. Use the measures identified in the attached table (1) COMPLETE: the time of completion measured in minutes before or after the scheduled appointment period end time, now 12:10 PM, (2) WAIT: average patient waiting time (after scheduled appointment start) for the full 16-appointment period, and (3) IDLE: total idle time of doctors during the full 16-appointment period. If you propose any other performance measures, consult with your point of contact. This is the most important need from your study—for you to help us develop a good understanding of the overall characteristics of the current system.
   2. Note that we want to understand our system performance “on average” but also how these key properties vary, for example, how often the appointment system has a very low WAIT, low IDLE, very low COMPLETE, or very high values of these three measures. We also want to know how often the appointments end “on time.”
   3. Produce a table of results that describes the current system versus the target values we set (see attached table) and perhaps figures.
3. **Can the possible improvement to the system identified earlier provide significant enhancement to performance**?
   1. Examine the possible improvement to this system identified earlier. Evaluate it (with the model you develop to answer (2) above) using the same three performance measures.
   2. Also, help identify any other nonquantifiable pros and cons of the existing system versus this improvement to the system.
   3. Provide one or more comparison tables.

Based on your analysis, MED-CARE may be willing to examine in detail (perhaps with pilot projects) this possible improvement if your work indicates it may have significant payoff.

1. **Are there any additional insights or recommendations from your analysis**?

Develop a business memo of your study to present to the director of operations (signature below) and to the liaison with all the MED-CARE doctors (your point of contact). Use the requested format for business memos—this is the format that MED-CARE uses for analysis projects. Deliver your memo with analysis backup not later than … (date and time of the week 5 live session).

**Point of Contact.** Kendra Taylor, the liaison with our doctors and the special advisor to MED-CARE’s operations manager, has been involved with this appointment system issue and can answer any questions you may have about our current scheduling system, additional data you may need, and our desires for an improved system. He can give you the perspective of the company and also the perspective of the MED-CARE doctors. Please consult with him to make sure you understand our current system and our needs. Please include him as an addressee on your memo.

**Bottom Line.** MED-CARE is depending upon you to help us to first understand (and second, perhaps improve) this important customer support system.

**JOAN SMITH, RN, MBA**

**DIRECTOR OF OPERATIONS, MED-CARE, INC**

**TABLE OF MED-CARE APPOINTMENT SYSTEM PERFORMANCE MEASURES**

**(Use these measures in your study.)**

|  |  |  |
| --- | --- | --- |
| **NAME\*** | **DEFINITION** | **TARGET VALUES** |
| **COMPLETE** | **Time of completion of a 16-appointment period measured in minutes either before (–) or after (+) the scheduled end time** | **Average <= 8 minutes**  **St Dev <= 5 minutes**  **90%tile <= 15 minutes** |
| **WAIT** | **Average waiting time\*\* (minutes) for the 16 patients of a full appointment period** | **Good:**  **Average <= 8 minutes**  **90%tile <= 12 minutes**  **Excellent:**  **Average <= 5 minutes**  **90%tile <= 8 minutes** |
| **IDLE** | **Total idle time (minutes) of a doctor for the full 16-appointment period** | **Average <= 10 minutes**  **90%tile <= 16 minutes** |

**\*Listed in Priority Order**

# \*\* If a patient arrives early and the appointment begins at or before the scheduled start time, the value of waiting time is zero. If a patient arrives after the scheduled start time but must wait, the value of waiting time is (actual start time – actual arrival time). Thus, we don’t consider as “wait” any time before the scheduled start time. Such time is due to patients arriving early for their appointment.