

## **Healthcare Clinic System Industrial Information Systems Group Project**

### **Background**

The medical industry has undergone many changes in recent history. The changes include: (1) health maintenance organizations (HMO) instead of traditional insurance plans; (2) escalating cost of drugs; (3) growth in the elderly population; (4) pressure to adopt electronic health records; and (5) increased utilization of systems engineering methods to improve productivity and reduce costs.

An example of a clinic that is applying systems engineering methods is the CareSuperior Health Care (CHC) Clinic in Miami-Dade (not their real name). The CHC serves patients who are on Medicare/Medicaid in Miami-Dade. 95% of their patients are Hispanic, many only speak Spanish. Since they are recipients of Medicare/Medicaid the patients are mostly over 62 years of age. Medicare/Medicaid is paid for by the U.S. Federal Government. Medicare (and Medicaid hereafter) follows a schedule of payments for services. Traditionally, Medicare did not pay for drugs, but in 2004 the U.S. Government added a drug plan. The way a payment schedule works is that a physical check-up by the primary care physician is paid at \$60 per visit twice per year. These rates are rather low, and it is very difficult for doctors or clinics to make a profit. In fact, CHC has been losing money for the past few years.

An acquisition group reviewed CHC's financial records and thought that with improved management and more efficient processes they could make a profit. So CHC was bought out for a rather low market value (since they were losing money). The new management has instituted various policies and projects to turn-around the clinic. Part of the new management is the establishment of a Management Engineering Department within the organization. The new department has two employees, whose job it is to conduct projects to improve the profitability of CHC.

### **Company Information**

CHC operates 8 clinics in Miami-Dade. Their headquarters are in downtown Coral Gables where all the administration and professional staff work. The clinics are found in areas where most of their patients live (Little Havana (2), Sweetwater, West Kendall, Hialeah, South Miami, Downtown Miami, and Miami Beach). Many of their patients lack transportation or have special requirements, so CHC also operates 10 specially equipped vans to pickup and drop-off patients.

CHC employs a regular staff of doctors, medical assistants, and nurses. The medical doctors they directly employ can only handle about 40% of all the patients' visits and medical needs. To cover the other 60%, they subcontract out with local doctors. For example, a gynaecologist would be subcontracted out to work one day per month at a certain clinic. On that day, CHC would schedule all the women who need exams to see the gynaecologist. The contract usually stipulates a fixed amount (\$600/day) for the doctor to see an established number of patients (20/day). By contract, the doctor is not required to see more than 20 patients.

Like many clinics, CHC has a mostly paper-based system. The patient medical records are paper charts kept in the "home" clinic of the patient. The home clinic is the primary clinic the patient is assigned to. CHC serves about 35,000 patients. Additionally, if a patient has no activity after 3 years, then CHC has a policy to move their charts to a separate storage facility. In this facility, it is estimated they currently have about 7,000 patient records. A study was commissioned to determine the extent of the paper-based system. At each clinic, 20 patient records were randomly selected and examined. The results

To better understand the project goals, the systems analyst conduct an interview with the new company president.

## **Interview**

Daphne Bernatolli (for short DB) is the Project Manager. She interviews the company president in order to determine the project goals and objectives that she should address in her project.

DB: Hello, I'm glad you're taking the time to meet with us so that we can get an overall vision for the project and start out on the right foot. Maybe we can start by you describing to us what your overall goals are for CHC and how this project is intended to help.

Pres: You could say that except for some isolated spreadsheets and the billing system, CHC is almost entirely a paper-based organization. I think that with redesigned processes supported by IT that we can greatly improve the efficiency of our work, provide better quality services to our patients, and reduce our operational costs. Our strategy is to redesign our processes in phases; our first project is to adopt an electronic medical record (EMR) system. The EMR should do more than just convert the paper charts to electronic charts; it should also make our workflow more efficient. Specifically, I expect an EMR system to include patient billing for all services and help us integrate our patient services with the laboratory. It should cover the entire process of serving a patient.

DB: Should we include patient appointment scheduling in our analysis?

Pres: Yes, patient appointment scheduling is important. We are probably losing a lot of money because of poor scheduling. Currently, it is done manually by our coordinators in each clinic. There is no centralization.

DB: So there is no system in place for scheduling?

Pres: Well no, there is a system, but not a very good one. When CHC was first formed there were only the two clinics in Little Havana. A simple scheduling system was purchased for those clinics. The system would schedule patients for either of the two clinics. It worked fine for the two clinics. But the problem is that when we acquired some of the other clinics they already had different scheduling systems that they were using. So now we have three different scheduling systems in use. This causes a problem because we want the ability to schedule patients to go to any of the clinics. I really think we need a single scheduling system to use across all the clinics.

DB: Can you explain how this works?

Pres: We usually have a specialist on contract for a few days per month. For example, our Urologist is on contract for two days per month, and we rotate him between all of the clinics. So, if a patient needs to see a Urologist that month, then the patient has to go to the clinic where the Urologist is scheduled.

DB: How do the patients get to the clinic if it is far away?

Pres: Well, we have the vans go and pick them up. But, this is yet another problem. Our vans are scheduled by Hector Hernandez (HH), who is the manager of the transportation department. Coordinating the scheduling of the vans with the scheduling of patients is very difficult. None of the three patient scheduling systems were designed for including transportation. So, it is up to the secretary taking the appointment to ask the patient if they need transportation. Sometimes, the secretary forgets, which causes either the patient to miss the appointment or to be late for the appointment.

DB: How does the process of scheduling the vans work?

Pres: The coordinators are supposed to send an email with an Excel spreadsheet attached to it to HH every evening. HH receives all of the spreadsheets from the 8 clinics and makes a schedule for the vans. He usually doesn't get the spreadsheets until around 5:00 PM and it takes him about 1-2 hours to make up the schedule. Lately, he's been demanding overtime or he'll quit.

DB: Does he use any system to schedule the vans?

Pres: No, really it is based on his experience. I suspect we could do a much better job. In the past whenever we had problems getting patients to the clinics the solution was to buy another van. However, we believe that more efficient scheduling could help. Sometimes the van is driving long distances without any patients in it. We benchmarked other clinics and we believe we should only need 8 vans instead of the 10 we now have. Each van costs \$40,000 to purchase and it is depreciated over 7 years. The yearly operating costs for the driver, gas, and maintenance are another \$40,000. So, we think we could save a significant amount of money if we could do a better job of managing transportation.

DB: Tell me more about the scheduling requirements and any special issues.

Pres: One issue I failed to mention is that we have a very high rate of no-shows and last-minute cancellations. A lot of our patients just simply forget. I have the secretaries call all the patients the day before their appointment as a reminder. It takes them about 1-2 hours each morning, but it seems necessary. Although, even with the reminder calls we still experience no-shows. Some of our patients are ornery and have preferences for or against some doctors. A related problem is walk-ins. Walk-ins are patients who just show up without an appointment. For example, there is one doctor, a Dr. Isabel Ines, that is from Cuba and many of our Cuban patients prefer going to her than to some of the other doctors. So, patients 'forget' about their appointment if it is with another doctor and walk-in when she is here.

DB: In the airline industry they forecast the no-shows for each flight and overbook the flight. For example, if an airplane holds 200 passengers they might sell 225 tickets with the expectation that some of the passengers will not show up. Have you thought about over-booking the doctors?

Pres: That's a great idea. Because we pay the doctors a fixed rate per day. Usually they are obligated to see 20 patients per day, but oftentimes, they see less. My accountant was reviewing the records and told me that our doctors see on average 18 patients a day. From my perspective the difference between the 20 we are paying for and the 18 the doctor actually sees is lost money. If we pay the doctor on average \$600/day then you can do the math, we lose a lot of money.

DB: Well, how many doctors do you have working on any one day?

Pres: On a typical day we have about 16 doctors in total, or 2 doctors in each of the eight clinics.

DB: In order to forecast no-shows we need historic data. Is any data available?

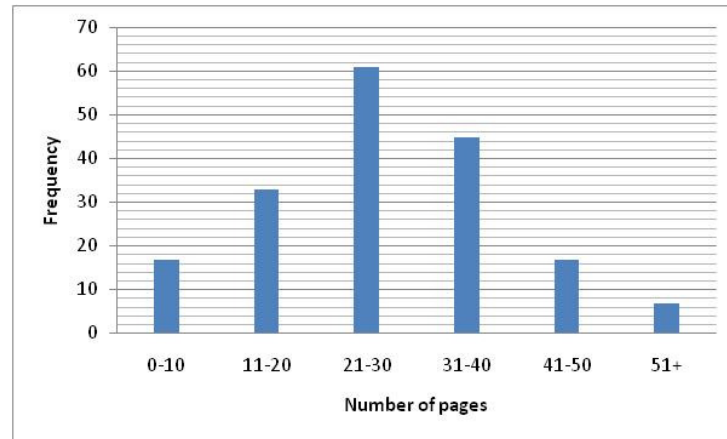
Pres: Yes, since we took over CHC we have been collecting data. We have data for each clinic from the last six months.

DB: Are there any other issues or requirements the scheduling system should have?

Pres: Well, the scheduling system should be able to generate various reports on the number of patients seen by each doctor, who uses transportation, etc. We need these reports for continuous improvement of the systems.

DB: OK, back to the EMR system, do you have a sense of how many patient records you currently have? Also, could I review some of the patient records to understand what they contain.

Pres: We store the paper medical charts in the “home” clinic of the patient. Each clinic has a storage area next to the coordinator’s work area. We did a study last year and estimated that we have approximately 36,000 patient charts. At each clinic, we sampled 20 charts to determine the number of pages per chart. The data is here.



Each medical record consists of the doctor’s notes, meds that were ordered, lab reports, x-rays, other images, and so forth. I think an EMR system needs to include all these information sources as well. Oh, the records also include patient personal information such as address etc.

DB: How do you see the EMR helping to improve efficiency?

Pres: One area EMR should help is in exchanging information between our clinics, with the laboratory, and with external partners. Currently, we often fax patient records between clinics and to external partners such as laboratories only to result in busy signals or “fax failed” messages. Once the referral information reaches the other facility, the coordinators frequently need additional patient information to make a schedule or treatment decision. We call these callbacks. On average, CHC experiences callbacks for missing information on 20% of our interaction with laboratories, and outside providers. This information request and response, handled through telephone and fax, is slow and involves many touchpoints. To give you an example, at the Kendall clinic a patient complained about the long time to get a referral approved. In this incident, the patient was complaining of pain in their lower-left abdomen, and the physician diagnosed the patient with diverticulitis. To confirm the diagnoses, the physician referred the patient for a CRT scan. To get approval from the insurance company for the referral, the coordinator needs to send the patient information and then get the approval. Only at that time can the coordinator schedule the CRT scan. Well, in this case it took 7 days to get the approval and the patient no longer had the complaint. So the patient didn’t get the CRT scan, and we do not know if the patient was suffering from diverticulitis or some other condition. This happens all the time, and our hope is that EMR and associated system improvements can reduce the time for referrals to 24 hours in the majority of situations.

The system should also help reduce our charting errors. We did an audit two years back, and we found that 5% of the charts had errors in the medical information contained in them. Some of these errors are introduced during transcription, some due to poor hand-writing, and inefficient exchange of data. A centralized EMR should help eliminate many of these errors.

DB: What other potential savings do you foresee?

Pres: Two potential savings are reduction in chart pulls and expenses related with transcription. The average cost of a chart pull at CHC is approximately \$4, accounting for the time and cost of medical records personnel to retrieve and then re-file a paper chart. We hope to reduce transcription costs by 25% – 50%. We spent \$96,000 on transcription costs last year. We also expect benefits by avoiding costs by reducing adverse drug events, offering alternatives to expensive medications, and reducing the use of laboratory and radiology tests. This is possible because we see that most EMR systems provide alerts and other decision support.

Pres: I also believe besides savings there are opportunities. EMR should promote greater standardization in the work place, which should improve efficiency and quality of service.

DB: Are there any constraints that you know of on the EMR system?

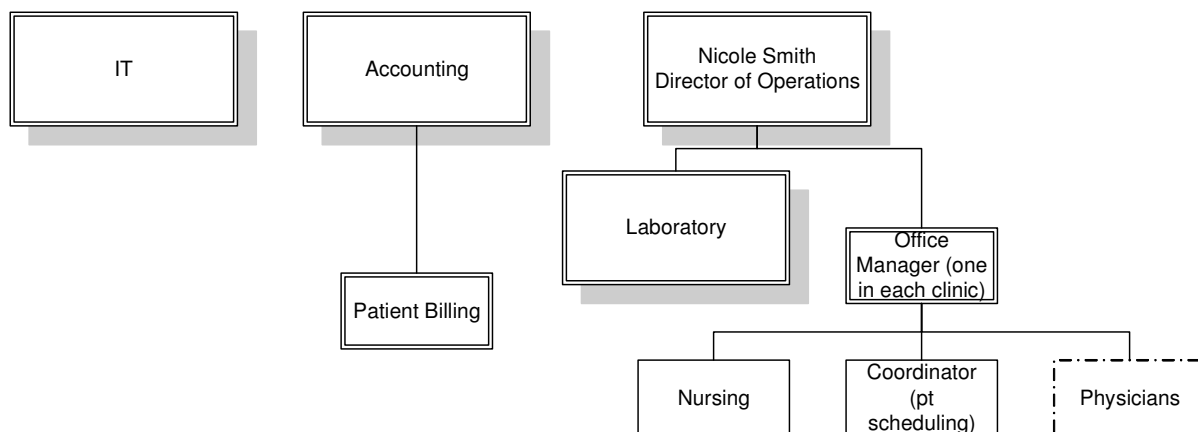
Pres: The EMR must be compliant with HIPAA, which I imagine most systems are, but you need to make sure. Especially, if you recommend a system not specifically designed for healthcare. Additionally, by law we must maintain medical records for 7 years after last servicing a patient. So any system must be compliant with this regulation too.

DB: How about on the technology side, are there any constraints?

Pres: You need to talk to the IT Manager because he recently developed an IT strategic plan or architecture and I believe he wants to stay on a Microsoft platform using PCs. Most staff and doctors are familiar with the Windows operating system, so that approach seems appropriate.

DB: Do you have an organizational chart so that I can understand what is in scope for the project?

Pres: Yes, here is an organizational chart. Nicole Smith is our director of operations. She oversees all the clinics, each of which has an office manager. The coordinators are in each clinic and they do the patient appointment scheduling, coordinate care with other clinics, labs, etc. Billing is centralized under Accounting. The laboratory is also under Nicole. It is centralized in our Kendall office. The IT organization has about 5 employees and is a separate unit. These are all the organizational units that would be affected by the project. The office managers should benefit from better reporting to help them manage the clinics. There may be unknown benefits in that area.



DB: You say patient billing is included, but I thought CHC had a practice management system that did billing?

Pres: You are correct, we have a practice management system that does billing. Let me rephrase what I mean. The EMR needs to interface with the practice management system. It needs to let the practice management system know what was done to the patient so that the patient can be billed. Also, it should support information requests by the government for what procedures and treatments were ordered.

DB: OK, so the EMR doesn't need to actually do the billing, it needs to send the treatment codes to the practice management system for billing. What other interfaces will be needed?

Pres: Off the top of my head I cannot think of any. The lab has a desktop system to keep track of the labs, I'm not sure if the EMR should replace that system or interface to it. Reengineering of the laboratory operations is in scope for this project. We need to streamline the interaction between the patient services and the laboratory. Many of the doctors will continue to talk into their recorders, so the EMR should interface with some transcription service or system so that the voice data can be transcribed and stored by the EMR.

DB: One very last thing, but how much budget are you willing to allocate for this project?

Pres: Based on what I think we can save I'm willing to allocate up to \$250,000. We already have computers in the clinics so I don't want to spend a lot of money on new hardware. The exception might be a server in the Coral Gables office. I want the project to be done in the next three months too ☺