

Thalassemia Clinic at the McGill University Health Centre¹

Cordelia Gray, Director of Operations for Central Laboratories at the McGill University Health Centre (MUHC, a group of several Montreal hospitals), headed up a quality improvement team that was trying to improve the service delivery for thalassemia transfusion patients. The thalassemia clinic served a high-demand population who had suffered from the genetic blood illness their entire life, and now had to fit frequent blood transfusions into their adult life of jobs and family responsibilities. Patients came to the clinic every three weeks for 2 units and sometimes for 3-4 units of blood, each unit taking approximately 3 hours to administer (a total of 6-12 hours). However, prior to receiving the transfusion, the patient's blood had to be sampled and matched, a process that took several hours.

The quality improvement team had surveyed its customers (a response rate of 57 out of 59). The results pointed to patient dissatisfaction with the speed with which they received their blood for transfusion – wait times were critical. The process involved the following steps:

- The patient books appointments. (The several patients that were treated on a given day were scheduled to arrive in the morning, staggered every 20 minutes starting at 9 AM.)
- The patient comes to clinic and registers.
- The patient sees doctors, thalassemia coordinator and may have other tests.
- A nurse in the clinic collects a sample from the patient.
- The sample is sent by porter to the centralized lab.
- The sample is tested in the lab for antibodies and samples of donated blood are tested to cross-match.
- The compatible blood products are retrieved from storage in the blood bank.
- The blood products are sent by the porter from the blood bank to the clinic.
- Nurses hang the blood and administer it to the patient.

The total process time (prior to the nurse hanging the blood) depended on how quickly the lab was able to cross-match the blood – according to a benchmark with Children's Hospital, the matching process should be done in 2 hours, including travel time. In practice the average time was 2.5 hours with a standard deviation of 2 hours. Those patients whose blood did not test positive for a number of antibodies were served in 2 hours on average, but those patients who did test positive took longer on average 3 hours, as sourcing appropriate blood products was more difficult.² For these patients, the lab would need to test more samples from donated blood to find one with appropriate characteristics that would not conflict with patient's blood. In fact, patients exhibiting a number of antibodies often required "washed blood," that was generally in short

¹ This case was based on "UHN: Lindsay Campbell and Thalassemia Quality" by Joseph D'Cruz © 2003.

² Antibodies affect the typical A, B, O and Rh positive/negative designation. There are a myriad of other antibodies as well. The number of different antibodies a person presents increases as they are exposed through transfusions to more antibodies. Once exposed, the antibodies do not go away.

supply and great efforts were made to source matching blood products so washed blood would not be used and would be available for other patients. In a typical week, 40% of the thalassemia patients required washed-blood. Also, the later in the day a sample was received by the laboratory, the greater the delay in processing it as demands from other clinics and departments grew.

Thalassemia patients were very knowledgeable about their disease and formed a political advocacy group. The clinic served 59 patients, treating 3 to 8 patients a day, 3 days a week (Monday, Wednesday and Friday). When they were unhappy, the group was known to be vocal. Many of the patients had experienced short waits (under 2 hours) for the start of transfusion when served by the Children's Hospital, before graduating into the general population served by MUHC, across the street. At the Children's Hospital, the children's thalassemia clinic, the laboratory and blood bank were located in the same building and parents were able to carry samples to the lab and blood products back to the clinic. The short waits occurred even though the children's thalassemia clinic was only open on Tuesday and Thursday.

The clinic, the lab and the blood bank were each located on different buildings and a dedicated porter constantly transported patient samples to the lab and blood products from the bank to the clinic (a walk of 10 minutes between each). Because of the distance, the porter would often wait to carry several samples at once. Unless there was an emergency, the thalassemia clinic was the porter's highest priority.

Canadian Blood Services (CBS) typically delivered blood to the blood bank by 8 AM and then samples of the blood to the lab for testing. The testing would be done once a patient's blood sample was present and was needed to be cross-matched for antibodies. Approximately once a week the delivery would be delayed until 10 AM. Normally, blood had a 42-hour shelf life after receipt, but washed red cells had a shelf life of only 24 hours. The blood would be used by patients from all clinics and departments across MUHC.

The clinic was served by 3 nurses working 8 hour shifts, two starting work at 8 AM to prepare for the patient's arrivals and the third beginning work at 4 PM to serve clients who had been delayed. This late nurse was also needed in case patients (especially the teenagers) changed their appointments and when patients came in the day before their appointment to get a sample taken early so they would not need to wait the following day. Each nurse was capable of sampling a patient in 10 minutes. Administering each unit of blood, once it arrived, would require 20 minutes of preparation (including paper work). Thus patients were scheduled to arrive every 20 minutes in the morning.

Cordelia Gray recognized that improving the process would require the participation of everyone (doctors, nurses, the lab, patients, CBS)

The patients' political advocacy group is claiming that the clinic is understaffed and should be staffed to meet the maximum number (8) of patients every day. Further, they claim that the CBS is not stocking enough blood to satisfy the needs of all the patients and they need to hold more inventory to address any possible demand that will arise from the clinic.

Questions

(Q1) The whole process before administering blood can be broken down into the following nine activities:

- A. Register
- B. Consult and take tests
- C. Sample blood
- D. Deliver blood sample to lab
- E. Deliver blood to bank (CBS) F. Deliver test blood to lab (CBS) G. Cross-match
- H. Retrieve blood from bank

I. Deliver blood to clinic

(Note: Administering blood is a pure medical activity. This activity will be excluded since your analysis will not help to reduce the activity time which is determined by doctors or nurses.)

Find the precedence relationships among the nine activities and draw a *process flow diagram*. On the diagram, identify a bottleneck, an activity (or a group of activities) for improvement. (Hint: This is an assembly process, not a serial process. Assembly occurs in activity G. Some activity times are not available in this case. To such an activity, you do not have to attach its time.)

(Hint: You can simply type in the process diagram as below.)

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P -- Q -- R -- S
      |
      X -- Y
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(Q2) Consider the following *7 dimensions of service quality* (A. Valerie et al. 1990. *Delivering Quality Service: Balancing Customer Perceptions and Expectations*):

- *Convenience*: Availability and accessibility (e.g., location)
- *Reliability*: Ability to perform a service accurately, dependably and consistently
- *Responsiveness*: Willingness to answer questions and deal with problems (related to robustness)
- *Time*: Speed with which service is delivered
- *Assurance*: Knowledge exhibited by personnel
- *Courtesy*: How customers are treated by employees
- *Tangibles*: Physical appearance of facilities, equipment, personnel and communication materials

Explain why the patients' perception of the service is low compared to their experience at the Children's Hospital. Is waiting time the most important quality dimension for the clinic? Which dimension of quality should be emphasized the most? How could the stress of waiting be reduced by educating patients about the process?

