Define the Problem

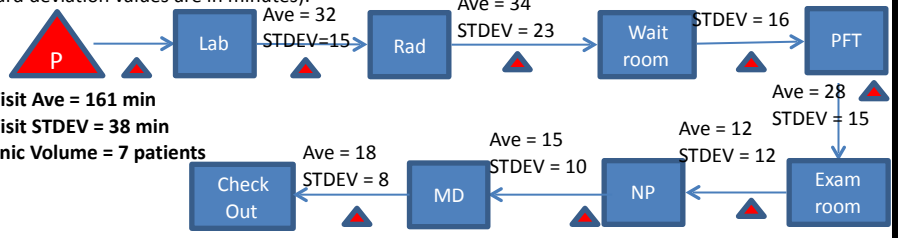
The post-lung transplant outpatient clinic session has an average volume of 7 patients, even though the clinic has the recommended space capacity for up to 27 patients (20 min/patient) per session. This "gap" between the actual and ideal utilization of clinic space (26% of ideal utilization) has resulted in a delay in timely access to care for many lung transplant patients, and a loss of potential revenue/profit for the outpatient clinic and hospital.

Background

The post-lung transplant outpatient clinic serves as the venue for monitoring lung transplant recipients, and managing their lung allograft and non-allograft related complications. The clinic visit includes a comprehensive evaluation that includes laboratory testing, x-rays, pulmonary function testing, a nurse practitioner encounter, and a transplant physician examination. This clinic is a vital component to the successful care of the lung transplant recipients, and is relied upon to generate a significant component of the overall revenue for the lung transplant program.

Current Design

I followed patient flow for 71 patients over 9 clinics sessions and recorded process times (average and standard deviation values are in minutes):



Total Visit Ave = 161 min
Total Visit STDEV = 38 min
Ave Clinic Volume = 7 patients

- Patient arrival times were extremely variable and majority of patients did not arrive to hospital at scheduled time.
- Laboratory wait time was shorter and less variable for the patients arriving earlier in the morning.
- The earlier half of the clinic period runs much more efficiently than the later half.
- There is a significant amount of time variability for the PFT (pulmonary function testing) process.
- There is a significant amount of time variability for the NP (nurse practitioner) and MD (physician) evaluation; the average total time (NP+MD =45 min) exceeds the allotted 20 min exam room time.
- There is a significant amount of variability in the total visit time (+/-38 minutes).

Identify Root Causes

- Variability in patients arriving on-time due to lack of clarity regarding scheduled appointment time and unpredictable traffic patterns.
- Variability in laboratory (and radiology) times due to early versus late morning arrival time for patients to the lab.
- Improved efficiency in the earlier versus later half of the clinic due to patients arriving from lab and radiology on time (related to #2).
- Variability in PFT times and PFT wait room times due to partial versus complete PFT testing (partial PFT = spirometry without lung volume testing, which in most cases is sufficient and takes less than half the time).
- Variability in exam room and NP/MD evaluation times due to lack of a coordinated system of communication between clinic admin, NP, and MD.
- NP time is largely spent on clarification and reconciliation of patient medication list.
- Variability in total visit time due to combination of #1-#6.
- "Gap" between average clinic volume (7 patients) and "ideal" number of potential clinic slots (27) due to #1-#6, but (27) 20min clinic slots may be unrealistic target.

Target Design

- Administrative assistant could call patients 1 week and 1 day before clinic to remind patients of appointment, arrival time to hospital, and variability in traffic.
- Patients could be scheduled in 2 shifts – a larger early shift that will arrive at the lab at 6:30 am, and a smaller, later shift that will arrive at lab at 8am.
- All PFTs could be ordered as spirometry testing alone. If complete PFTs are required, they could be performed at a later time/date **(reduction of 15-20 min/patient)**.
- A time limit for the exam room portion of the visit could be set, less than the current 45 min average, but longer than the current suggested 20min time slot - suggest 30 minutes **(reduction of 15 min/patient)**.
- NP could either directly or indirectly contact patients day before clinic visit to review medication list **(reduction of 5-10 min/patient)**.
- NP could wait until MD in room to ask similar clinical questions to avoid redundancy **(reduction of 5 min/patient).**
- Gradual addition of increased patient volume as changes are implemented, with a goal of adding 2 additional patients/clinic every 2 weeks for an end goal of an average of 18 patients/clinic session.

Guidelines

- Listening to the patients is very important – they are an essential partner in this proposed plan, and their feedback is vital.
- Quality of patient care must not be sacrificed in trying to improve efficiency – continue to ensure that enough time and attention is being devoted to each patient.
- Communication between team members is essential for the clinic to run efficiently.

Execution Plan

Action	Responsibility	Due Date	Target
• Patient phone reminder about appointment	M.H.	9/29/2014	100% patients
• Scheduling patients in 2 timed shifts for lab	M.H./E.R.	10/6/2014	100% patients
• Changing PFT ordering method to spirometry alone	M.H./E.R.	10/13/2014	90% patients
• Imposing time limit of 30 min for exam room	E.R./J.P.	10/6/2014	> 75% patients
• Contact patient prior to visit for medication review	E.R./J.P.	10/6/2014	> 75% patients
• Combined NP/MD clinical questioning	E.R./J.P./T.A./I.N.	9/29/2014	100% patients
• Increasing clinic patient volume by 2 every 2 weeks	M.H.	10/6/2014	12 patients
		10/20/2014	14 patients
		11/3/2014	16 patients
		11/17/2014	18 patients

Validate & Sustain Results

	Due Date	Target	Actual	Reason for gap
• Patient phone reminder	9/29	100%	100%	
• Scheduling patients	10/6	100%	100%	
• Changing PFT to spirometry	10/13	90%	88%	
• Exam room time limit 30 min	10/6	>75%	50%	Several complex patients
• Medication review	10/6	≥75%	100%	
• Combined NP/MD questioning	9/29	100%	100%	
• Increased clinic patient volume	10/6	12	12	1 patient no-show
	10/20	14	13	1 patient no-show
	11/3	16	15	
	11/17	18	17	1 patient no-show

Update of project change goals:

Patient volume increase from 7 to 17 patients (final goal =18 patients)
Ave clinic exam room time decrease from 45 to 34 min (final goal = 30 min)