The Effect of Reliable On-Time Reporting of
Routine Morning Laboratories on Inpatient Length of Stay

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A. Study Purpose and Rationale

Inpatient medicine is increasingly subject to quantitative quality measures and efforts to lower costs, including efforts both by hospitals and insurance providers to shorten length of stay. Longer lengths of stay are associated with higher costs and expose patients to opportunities for iatrogenic complications such as hospital-acquired infections. In addition, with house staff restricted by increasingly limited work hours, in order to care for the same number of patients they must do so in a more efficient manner. Toward both these ends, process improvements are often suggested.

At CUMC, routine morning laboratories (ordered as 5 am collections) are typically resulted to medicine teams after 11 am, when morning attending rounds are nearing completion. According to a 1996 survey of 653 hospitals, this puts our institution at about the 10th percentile (lower percentiles representing later times) for reporting times in 1996 terms, likely representing a worse showing in 2011 terms.[1] Although laboratory result availability is an accepted clinical laboratory quality measure[2], very little data exists that examines the relationship between reliability or timeliness of morning laboratory results, and the data that is available never approaches this question directly, instead relying on measures like surveys[1, 3] It seems plausible that reliable reporting of morning labs before morning rounds would expedite that day's discharges and well as facilitate speedier diagnosis, or perhaps more importantly, the treatment of medical inpatients. This hypothesis has been borne out some studies examining the effect of laboratory turnaround time in the emergency department on ED LOS, but no such studies have been executed for routine tests for inpatients,[1] and the relative slowness with which labs are currently reported at this institution offers an opportunity to examine this question and to help determine whether improving this process is worth the investment of hospital dollars.

B. Study Design and Statistical Analysis

Patient Selection – All patients admitted to 6GS and 6GN during the time periods described below will be automatically included in the study, with the following exclusions:

1. Patients who at any point during their admission were located in the cluster room (a 4-bed room on 6GN typically used for demented or delirious patients who require additional supervision)
2. Patients who at any time during their admission were located in the Step-Down Unit
3. Patients who at any time during their admission were located on a different ward

Intervention – A process improvement project will be undertaken to improve the time that routine morning lab results (defined to include CBC, BMP, Mag, Phos, LFTs, PT/INR, or PTT ordered for "AM phlebotomy") are reported for patients admitted to 6GS. Patients admitted to 6GN will serve as controls with no intervention to improve their morning lab reporting times. The process improvements for 6GS will be guided by a study team that will identify bottlenecks to earlier reporting of lab results. The team will decide what interventions to execute, taking care to only choose interventions that are unlikely to affect the reporting of labs for 6GN (for example, no changes could be made to laboratory-side processes because these would affect both wards). Possible interventions include the hiring of additional phlebotomists, monitoring of phlebotomist performance with regular reviews, or utilizing runners to bring samples the laboratory in a more timely manner. So as to not further disturb patients' sleep the morning phlebotomy start time of 5 am will not change. As the interventions are introduced, the average time of morning lab reporting will be monitored for achieving a goal of reporting 90% of those labs by 8 am, allowing 2 hours before the hospital's discharge time. (This 2-hour measure was found to be the median in a study of morning labs availability at 367 institutions, which also found that about 90% of labs were

reported by those institutions' self-defined reporting deadlines.[4]) After this goal is achieved for a period of one month, ALOS will be measured for each patient admitted to both 6GN and 6GS (with the above exclusion) and discharge diagnosis recorded for a period of three months. This will be compared retrospectively to data from the same three months in the previous year (to control for seasonal variation in case mix).

Outcome Measures – The primary outcome measure is the change in average length of stay for the intervention group. The 10 most frequent discharge diagnoses will make up subgroups that will be analyzed for differential effects by diagnosis.

Statistical Analysis – One of NYP administration's "key targets" for 2011 is reducing ALOS by 0.3 days from the current mean of 6.58 days (variance 0.6, SD 0.77)[5]. Using an unpaired t-test, 80% power for detecting a change in ALOS of 0.3 days can be achieved with 106 patients in each group.

n = 1 + 16(SD/effect)^2 = 1 + 16(0.77/0.3)^2 = 106

ALOS's will be compared using unpaired t-tests if their distribution approximates normal. However, it is likely the distribution of data will not be normal. In that case, transformations will be attempted, and if unsuccessful, data will be compared using a Wilcoxon rank sum test.

C. Study Procedures – None except as described above

D. Study Drugs -- None

E. Medical Devices -- None

F. Study Questionnaires -- None

G. Study Subjects – As described under "Patient Selection" above

H. Recruitment of Subjects – No active recruitment will be performed. Patients will be automatically enrolled as described above.

I. Confidentiality of Study Data – All study data will be de-identified and stored securely.

J. Potential Conflict of Interest -- None

K. Location of the Study – Milstein 6GN, 6GS

L. Potential Risks – Being awoken earlier on average for phlebotomy, but not before 5am as is current practice.

M. Potential Benefits – Shortened LOS, reduced morbidity/mortality, timelier diagnosis or treatment

N. Alternative Therapies – Routine care

0. Compensation to Subjects -- None

P. Costs to Subjects -- None

Q. Minors as Research Subjects -- None

R. Radiation or Radioactive Substances -- None

References

1. Hawkins RC. Laboratory turnaround time. *Clin Biochem Rev.* Nov 2007;28(4):179-194.
2. Shahangian S, Snyder SR. Laboratory medicine quality indicators: a review of the literature. *Am J Clin Pathol.* Mar 2009;131(3):418-431.
3. Steindel SJ. Timeliness of clinical laboratory tests. A discussion based on five College of American Pathologists Q-Probe studies. *Arch Pathol Lab Med.* Oct 1995;119(10):918-923.
4. Novis DA, Dale JC. Morning rounds inpatient test availability: a College of American Pathologist Q-Probes study of 79860 morning complete blood cell count and electrolyte test results in 367 institutions. *Arch Pathol Lab Med.* Apr 2000;124(4):499-503.
5. NYP Strategic Initiative Report Card - 1st Quarter 2011. *http://infonet.nyp.org/initiative/1Q2011SIReportCard.ppt* Accessed August 1, 2011.