Computer Error with Lab Ordering at the New York Presbyterian Hospital, Milstein Pavilion

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A. Study Purpose and Rationale

In the effort to modernize the New York Presbyterian Hospital system, the Eclipsys XA Sunrise computer software was introduced to the Milstein Pavilion in December 2004. The advent of this system was directed at eliminating an era of paper documentation and orders in favor of starting a more efficient method that would ease documentation, decrease medical error, and more firmly tie communication between physician, pharmacy, and nursing staff. To date, the entire Milstein Pavilion uses this system for order entry.

Since the implementation of Eclipsys, many expected and unexpected problems have arisen with the integration of such a powerful tool with the existing computer infrastructure of the hospital. One aspect of the new system is computer physician order entry (CPOE). While this has facilitated the entry, acknowledgement, and completion of many orders, great flaws still exist. One perplexing obstacle encountered by physicians who use CPOE, is the failure for blood labs to be drawn on patients despite computerized orders being entered correctly. Many factors are responsible for such a failure including patient refusal to have blood drawn, inability of the phlebotomists to encounter a patient, and unsuccessful attempts by the technician. Moreover, failure of the computer system to correctly log the order for labs has also been a contributing factor.

A low level of computer error is expected with any computer system of such a complex nature, however, it is believed that the level of this reversible error is currently greater at this institution than accepted. To date, the Department of Information Technology has not yet launched studies to formally evaluate this difference. Thus, further study into the true percentage of laboratory orders that are lost due to computer error would be beneficial in evaluating the system so that the technical problem(s) may be remedied. In addition, by surveying all the potential reasons why labs are not being drawn successfully, in addition to computer error, we may be able to identify other contributing reasons for failed blood draws to aid the hospital in creating solutions for these barriers. In sum, identifying and remedying these inefficiencies will lead to overall better patient care and greater efficiency.

B. Study Design and Statistical Analysis

The proposed prospective observational study will survey resident physicians from the Internal Medicine Residency Program who are rotating though a ward service. Residents will be asked to complete an online survey daily for 5 days. On each given day the physician will detail in the survey the following information from the previous day:

1. how many patients had labs ordered
2. how many of the patients did not successfully have labs drawn during the 24 hour period
3. the reason the labs were not successfully drawn

As of today, no data yet exists on the actual percentage of computer error when ordering labs at this institution. Polling of physicians in the hospital reveals an accepted rate of computer error of approximately 3 percent. Based on experience on the ward services, general consensus approximates the actual percentage of error to be greater at approximately 5 percent. Chi square test using $\text{proportion}_1=0.03$ (accepted rate of error) and $\text{proportion}_2=0.05$ (proposed observed rate of computer error) reveals that in order to recognize a true and significant difference with a power of 80% and $p< 0.05$, 802 lab entries must be evaluated for successful or unsuccessful drawing. Five ward services exist

(General Medicine 1, General Medicine 2, Cardiology, Oncology, Infectious Disease) each consisting of 4 resident/intern teams with each team caring for an average of 9 patients daily. Thus, in one day approximately 180 patients on the ward service have labs drawn [(5 ward services) x (4 teams) x (9 patients)]. If data is collected for 5 days, potentially 900 orders [(180 patients) x (5 days)] may be analyzed for successful or unsuccessful lab drawing providing the necessary power for this study.

C. Study Procedure

In addition to collecting data on the number of unsuccessful lab draws that occur due to computer error, the surveys will request that the residents also quantify the number of lab draws that are not completed for other, non-computer related problems. Although no statistical analysis will be performed on this data, proportions will be calculated to help quantify other possible reversible sources leading to incomplete lab draws.

D. Study Drugs

There will be no drugs used in this study.

E. Medical Devices

There is no medical device used in this study.

F. Study Questionnaires

Please see attached.

G. Study Subjects

The study subjects will be the Internal Medicine resident physicians rotating through a ward service at the Milstein Pavilion and thus, are responsible for ordering labs on their patients. These physicians are in the position to most rely on the success of CPOE to have labs drawn. All residents who are rotating through another rotation will be excluded from participating.

Although physicians in the intensive care units (ICUs) also order laboratories using CPOE, completion of these orders are not representative of the majority of the hospital . ICU labs are drawn directly by the nursing and/or physician staff and do not face the same potential barriers to completion that exist throughout the ward services. Thus, orders from the ICU setting will be excluded from this study.

H. Recruitment of Subjects

All Internal Medicine resident physicians rotating through a ward service at the Milstein Pavilion will be asked to participate.

I. Confidentiality of Study Data

The proposed study is an observational study pertaining to the number of ordered morning laboratory studies. In no manner are private data being collected such as patient names and types of studies that would jeopardize HIPAA mandated privacy.

J. Potential Conflict of Interest

There is no identified potential conflict of interest.

K. Location of the Study

The study will take place at the Milstein Pavilion of New York Presbyterian Hospital.

L. Potential Risks

Since this is a prospective observational study requiring completion of a daily online questionnaire by participating physicians, there are no risks to patients.

M. Potential Benefits

There are no potential benefits to patients.

N. Alternative Therapies

Not applicable.

O. Compensation to Subjects

There will be no compensation to the participating subjects.

P. Costs to Subjects

Costs to the participating resident physician will be minimal with the requirement of completing a daily online survey that should take approximately 1-2 minutes to complete.

Q. Minors as Research Subjects

Not applicable.

R. Radiation or Radioactive Substances

Not applicable.

Resident survey pertaining to completion of daily lab draws:

1. Ward Service: ___
2. Resident/intern team: ___
3. Date labs were supposed to be drawn: ____
4. Number of patients for which labs were ordered: ___
5. Number of patients for which labs were not completed: ___
6. For the labs that were not completed (section 5), please detail how many were not done for the following reasons below:

    a. patient refused: ___
    b. patient not available: ___
    c. phlebotomist was unsuccessful: ___
    d. computer error*: ___
    e. other**: ___ (please document reasons)

Note: Sum of a-e should equal number entered in section 3.

* *Computer error* is defined as labs being correctly ordered yet labels for labs failed to print and/or patient was not listed on lab registry to have labs drawn.

** *Other* is defined as any other definable reason labs were not drawn besides those listed in a-d.

If there are questions or problems, please contact Themy Dumlao at tfd2101@columbia.edu or page beeper 3146 (917-899-1643, long range).