LEAP™ Analysis
SYSTEM ANALYZED: Blood Drawing Process
Opportunity Analysis

March 10, 2005

Specimen Integrity OA

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Opportunity Analysis (OA)
Explanation

The following Opportunity Analysis (OA) was conducted to help us determine the most significant events in our facility that would require a thorough and credible Root Cause Analysis (RCA). This technique was modified from its traditional format to accommodate other processes and systems. The analysis was intended to look at either probabilistic and/or historical events. The analysis delineated which events were most critical to the system, or the most costly, in an effort to justify a detailed RCA.

Below is a quick overview of the OA process used to determine our facility's Significant Few events:

#	Steps	Description
1.	Define the System to Analyze	Define the scope of the analysis by describing where the process begins and ends.
2.	Define the Team Charter (Terminal Objective)	Define why this team was put together and when will they know they have been successful.
3.	Define Loss	Define what is a loss in the current business environment, for the system chosen to be analyzed.
4.	Draw a Process Flow Diagram	Describe the system chosen to analyze in the form of a block diagram showing the process sub-systems.
5.	Fill Out the Opportunity Analysis Worksheet	Obtain the necessary event data to populate the OA worksheet.
6.	Identify the Significant Few	Identify the events that represent the 80% of the losses.
7.	Issue a report	Communicate results.
8.	Conclusion Summary	Summarize conclusions drawn from the analysis.
9.	Recommendations	Delineate the preferred path forward.

Step 1 - Define the System to Analyze

Before beginning the analysis, we defined which system we wished to analyze. This was, in essence, an effort to determine the scope of the analysis; where it began and where it ended.

In this analysis our System to Analyze was identified as:

Blood Drawing Process

Step 2 - Define Team Charter (Terminal Objective)

We had to state the reason that the team was formed in a one or two paragraph statement. This served as the focal point for the team to clearly state it's purpose and objective.

This team is chartered to conduct an unbiased analysis of the Blood Drawing Process. The "Significant Few " events will be identified and recommended to management for further Root Cause Analysis (RCA). All findings and recommendations will be submitted to management for review and approval.

ASSUMPTIONS USED:

The impacts used in this analysis are meant to include the following direct and indirect costs associated with a need to redraw blood due to an error on the first attempt:

1. Additional Labor Costs: Average costs per redraw for:
A. RN = $2.62 (7 minutes @ $22.50 per hour),
B. Unit Secretary = $0.67 (5 minutes @ $8.00 per hour),
C. Lab Tech = $1.11 (5 minutes @ $13.30 per hour),
D. Med Tech = $2.31 (7 minutes @ $19.84 per hour) and
E. QA = $1.40 (3 minutes @ $28.00 per hour)

2. Additional Material Costs: Average costs for supplies associated with redraw:
Venipuncture Supplies
A. Tubes x3 per SST, Lavender, Citrate = $0.28 each
B. Tourniquet = $0.11 each
C. Butterfly = $0.75 each
D. Luer Adapters = $0.15 each
E. Gauze, Alcohol and Band Aid = $0.10 each

Lab Testing Supplies
A. Reagents.= $1.00 per test ran. 33% ran

3. Lost Profit Opportunities Costs associated with using valuable ER time and space to redraw a blood sample after a failed attempt.

It was estimated that the average redraw in the ER would cause the patient to remain in the ER an additional 30 minutes (7 minutes for the redraw, 20 minutes to test the sample and 3 minutes for routing the sample to and from the lab). Had this redraw not occurred, the space in the ER could have been used for waiting patients where the time is billable.

The ER accrues by points. The average revenue per unit in the ER is $828. The average length of stay (L.O.S.) in the ER is 3 hours and 45 minutes or 225 minutes. Therefore, the average cost per minute in the ER is $3.68.

A literature search reveals on the conservative side that the average impact of all costs (direct and indirect) assoicated with a blood culture contamination is $5000.

The team acknowledges that these reflect the physical costs associated with such events and DO NOT reflect the impacts associated with additional risk or customer dissatisfaction. It is acknowledged that such esoteric parameters are difficult to measure in dollars but could easily outweigh the dollar values expressed.

Step 3 - Define Loss

What is the definition of loss in the system we have chosen to analyze? This will often vary from business to business, department to department and economic environment to economic environment. This was a necessary step to focus our efforts and develop a common understanding of what is a loss to us in this system, today.

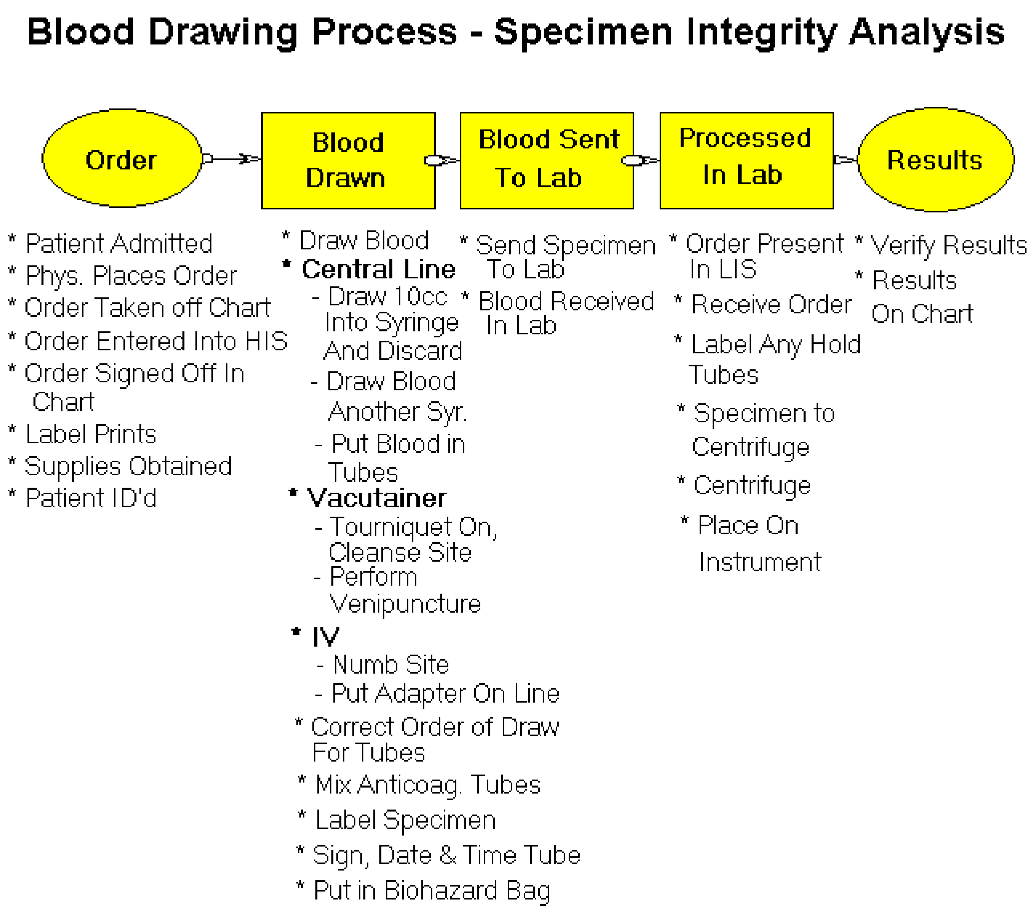
In this analysis, our Loss was defined as:

Any Event or Condition Resulting in a ReDraw

Step 4 – Draw a Process Flow Diagram

At this point we needed to map out the sub-systems of the process we chose to analyze. We used the typical flow charting symbols to develop a simple block diagram to depict the process flow.

In this analysis, our Process Flow Diagram was represented as:



Step 5 – Fill Out the Opportunity Analysis Worksheet

We now determined where the data would come from to fill out our OA worksheet. Several sources were available such as interviews, existing databases, logs, etc. We used the most reliable data source at our disposal.

Once the data was collected and formatted into our worksheet, we did a simple calculation to generate our total loss, for each event in the analysis. The calculation was done automatically in the LEAP™ software as follows:

Frequency x Loss Per Occurrence (Impact) = Total Loss Per Year

In this analysis, our Opportunity Analysis Spreadsheet resulted in the following:

Sub System	Event	Mode	Frequency/ yr	Labor	Lost Profit Opportunities	Materials	Total Annual Loss
Blood Draw	Redraw	Blood Culture Cont.	480	0	5000	0	2400000
Blood Draw	Redraw	Hemolyzed ER	2597	8	110.4	1.39	311094.63
Blood Draw	Redraw	Clotted-ER	409	8	110.4	1.39	48994.11
Blood Draw	Redraw	QNS-ER	403	8	110.4	1.39	48275.37
Blood Draw	Redraw	SUA-ER	211	8	110.4	1.39	25275.69
Blood Draw	Redraw	QNS-Unit	1676	8	0	1.39	15737.64
Blood Draw	Redraw	Hemolyzed Unit	1557	8	0	1.39	14620.23
Blood Draw	Redraw	Clotted Unit	1540	8	0	1.39	14460.6
Blood Draw	Redraw	Mislabeled -ER	67	8	110.4	1.39	8025.93
Blood Draw	Redraw	SUA-Unit	834	8	0	1.39	7831.26
Blood Draw	Redraw	Mislabeled -Unit	239	8	0	1.39	2244.21

Step 6 - Identify the Significant Few

The concept of the Significant Few was derived from a famous Italian Economist named Vilfredo Pareto. Pareto stated that 'In any set or collection of objects, ideas, people and events, a FEW within the sets or collections are MORE SIGNIFICANT than the remaining majority'. Consider these examples:

- 80% of a banks assets are representative of 20% or less of its customers

- 80% of the care given in a hospital is received by 20% or less of its patients

- 80% of the losses in a manufacturing plant are caused by 20% or less of the events

This means that we only have to perform RCA on 20% or less of our events to reduce or eliminate 80% of our facilities losses.

In order to determine the 'Significant Few', we performed a few simple steps (with the help of the LEAP™ software):

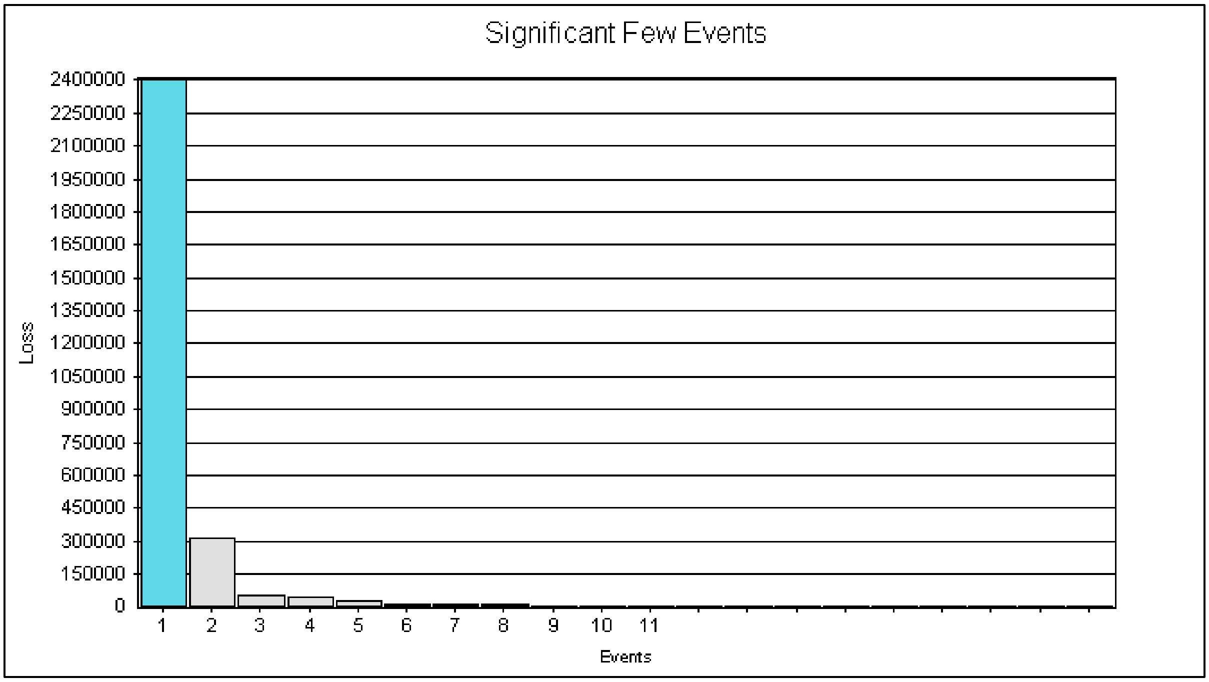
- Totaled all of the events in the analysis to create a global total loss.

- Sorted the total loss column in descending order (i.e. highest to lowest)

- Multiplied the global total loss column by 80% or .80. This gave us the 'Significant Few' loss figure that we will need to determine what the 'Significant Few' events are in our facility.

- We went to the top of the total loss column and begin adding the top events from top to bottom. When the sum of these losses is equal to or greater than the 'Significant Few' loss figure then those events are your 'Significant Few' events.

In this analysis, our Significant Few events were identified as:



ID	Event	Mode	Frequency	Total Annual Loss
1	Redraw	Blood Culture Cont.	480	2400000

Step 7 – Issue a Report

As with any analysis, it was important to communicate our findings to all interested parties. Our report includes the following items:

- An explanation of the analysis technique.

- The event definition that was utilized.

- The process flow diagram that was utilized.

- The results displayed graphically as well as the supporting spreadsheet lists.

- Recommendations of which events are candidates for Root Cause Analysis.

In summary, OA is a fantastic tool for limiting our analysis work to only those things that are of significant importance to the facility. We cannot perform Root Cause Analysis on everything. However, we can use this tool to help narrow our focus to what is 'most' important.

Step 8 – Conclusion Summary

This analysis demonstrates that 4.8% of the occurrences (480/10013) are causing 82% of the annual dollar losses ($2,400,000/$2,896,560). Currently there are approximately 10,013 redraws per year (extrapolated for the period from 9/03 to 9/04) resulting in a consumption of manhour, material and lost profit opportunities costing $2,896,560.

Step 9 – Recommendations

A literature search reveals (See Attached) that the use of a well-trained phlebotomist staff will result in 98% successful draws on the first attempt. Given that statistic, this would indicate that a savings of $2,838, 629 ($2,896,560 x .98) would be realized under the current conditions. The cost of a phlebotomist staff of 25 (full-time equivalents) is estimated at $697,400 per year.

The cost/benefit then becomes:

Total Potential Returns	$2,838,629 per year
Total Initial Investment	$ 697,400 per year
Potential Return on Investment (ROI)	407%
Payback Period	~ 3 months

Based on this empirical data, it is recommended that BAC Hospital set up a phlebotomy team in-house to bring consistency to the task of drawing blood, reduce the risk of exposure due to errors currently being caused in the blood drawing process and increase overall patient safety.

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