AMERICAN UNIVERSITY OF BEIRUT

BLOOD WITHDRAWAL FROM INTRAVENOUS CATHETER BY AUBMC EMERGENCY DEPARTMENT NURSES: COMPARISON OF TWO PRACTICES INITIATIVE

by
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AN ABSTRACT OF THE PROJECT OF

Houry H. Nazaretian for Master of Science in Nursing Administration Track
Major: Nursing

Title: Blood Withdrawal from Intravenous Catheter by Nurses in the Emergency Department: Observation of a clinical trial Comparing and Contrasting Two Practices

Laboratory tests are essential to diagnosis and treatment in the emergency department (ED), but they can result in prolonged waiting times for patients, multiple needle pricks and complaints about pain and discomfort. In many parts of the world as well as the United States, registered nurses are allowed to withdraw blood samples from intravenous catheter sites, thus speeding up the blood sampling process and treatment.

As this is not the case at AUBMC, a feasibility study was conducted to evaluate the change in practice from a cost, time and applicability perspective. Using an observational approach, data were collected about the management of a possible change in practice in the ED at AUBMC. Two proposed changes to practice were trialled and compared with current practice. The change process followed by the change team was documented and recommendations were made about how best to introduce such changes to nursing practice in the ED. At the same time, the study investigated whether allowing registered nurses to collect blood will significantly improve patient experience or satisfaction, length of stay and cost.

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CHAPTER I

INTRODUCTION

The American University of Beirut Medical Center (AUBMC) receives a large number of patients from diverse cultures and socio-economic levels with varying acuities. About 10% of ambulatory care takes place in the Emergency Department (ED). This population of patients has expectations concerning the quality and efficiency of care delivered.

Based on observation and discussion between ED staff, a common complaint voiced by the patients is the amount of time to collect blood samples and the frequency or number of multiple venipunctures made delaying diagnosis.

While venipuncture is a common procedure for reaching the venous bloodstream, it is an invasive procedure needed in diagnosis and parenteral therapy (Fujii, 2013, p. 381).

The blood collection process in the ED at AUBMC starts when the medical team decides on the plan of care: diagnostic tests needed, drugs, intravenous (IV) therapy and so on. Taking a closer look at IV insertion process and the blood collection process, the patient undergoing these processes would be venipucntured once by the registered nurse (RN) during insertion of the IV line and a second time by the phlebotomist in blood collection venipuncture.

The issue of concern is the blood collection process since it is causing a delay to diagnosis. Some of these reasons for the delay are: ED overcrowding, multiple venipuncture, patient acuity, waiting time for phlebotomist to arrive, specimen processing time and staff shortage (refer to Appendix I 7).

Through the utilization of multidisciplinary teams, the ED team has worked to improve this process. They have increased the number of practical nurses (PN) certified to draw blood samples, initiated the use of the pneumatic tube, made agreements with the lab administration to obtain blood results as quickly as possible (45minutes to 1 hour), and hired staff to initiate bedside registration quicker along with pre-printed orders for specific disease pathways like sepsis, acute coronary syndrome, and asthma to make the medical care plan standardized and quick. One issue of concern that remains unaddressed is the delay in the blood collection process and the frequency of multiple venipunctures to obtain samples.

Data was gathered on 128 cases by the evidence-based health care management unit (EHMU) at AUBMC, concerning the process of blood withdrawal, concentrating on how much time it took for lab specimens to reach the laboratory starting from the moment the doctor requests the labs to the time the phlebotomist arrives and withdraws the sample to the time the samples are received and being processed. The data showed that the average time it took the phlebotomist to arrive at the bed side of the patient after being called to collect a blood sample was two minutes and 27 seconds.

Considering that this time is billable and that the average cost per hour in the ED is $9.33, the delay in time to diagnosis is considered an unnecessary cost.

Some causes of frequent venipuncture are drawing a blood sample after a failed attempt, a.k.a. redraw (Latino, 2011, p. 4). Hemolyzed samples also account for a number of redraw events. Hemolysis can be defined as: “The lysis or the breaking open of red blood cell (erythrocyte)” (Biology Online, 2014). The ED at AUBMC had a hemolysis rate of 27.87% in the year 2012, as compared to the rest of units in the hospital.

Considering the practice was the same in 2013 and 2014, we can presume that the hemolysis rate has not changed since.

As the number of redraw samples increase, so do the frequencies of venipunctures, which in turn increase the risk of staff experiencing a needle stick injury. A needle stick injury can be defined as: "an accidental puncture of the skin with an unsterilized instrument (as a syringe)" (Merriam-Webster, 2014). Aside from the unforeseen cost of redraws in current practice, the administration must consider on the financial and psychological cost that takes place when a staff members experiences a needle stick injury.

A needle stick injury will cost the institution around $120(data taken from the laboratory administration), to conduct full serology testing as an indicator for any blood-borne pathogens at AUBMC. Taking into consideration the cost on the institution to give Hepatitis B vaccine and its boosters to all employees before employment, which mount up to around $55(data taken from infirmary department) per staff member, then the cost of blood testing post needle stick injuries can be considered as unnecessary and avoidable cost.

Even though there were only twelve needle stick injuries in the ED at AUBMC in 2013 and few were due to medicut needles, the number is likely to be higher as some incidences go unreported. Such incident causes worry and affects health and wellbeing of the staff member, influencing the quality of care that they deliver at the bedside, ultimately effecting patient comfort and experience.

This process is of interest to the emergency department administration and the hospital administration because it involves all members of the medical staff and has direct influence on patient satisfaction and quality and efficiency of care delivered.

The goal of the project is to assess if the change in blood collection process will lead to any improvement and benefit in care delivered with regards to time, patient comfort, and cost.

The objectives are to: 1) identify whether the proposed change of practice will decrease the duration of blood collection and time to diagnosis measured through observation of the blood collection and IV insertion process' duration; 2) evaluate patient satisfaction in light of discomfort measured through direct patient feedback during trials of the proposed practices and number of venipunctures endured; and 3) assess if the change in practice would be less costly in the proposed practice.

CHAPTER II

LITERATURE REVIEW

A. Time to Diagnosis

Emergency departments worldwide are suffering from the issue of increased length of stay and overcrowding. A lot of research and investigation has been done concerning the increase in ED utilization, leading to the Institution of Medicine (IOM) labelling the situation as the: "National epidemic of overcrowding EDs" (Gardner, Sarkar, Maselli & Gonzales, 2007, p. 649).

Median length of stay is around 130 minutes in some EDs. To reduce this time, ED administrations started using case managers and overcrowding control tactics recommended by literature to solve patient flow. Additionally, it has shown that hospitals should also focus on improving test processing as an effective means to decrease length of stay (Gardner, Sarkar, Maselli & Gonzales, 2007, p.649).

Understanding the link between length of stay and test processing is essential since specimen processing and results directly influence time to diagnose the patients. While new approaches to management of severe sepsis and septic shock appear to be time dependent, studies recommend the administration of antibiotics as soon as possible when reasonable suspicion of sepsis is evident, thus increasing the chances of a favourable outcome (ED-SEPSIS, 2006, p. 38). Therefore, delays in blood collection delays diagnosis, leading to an increase in the length of stay.

B. Patient Discomfort and Experience

Anticoagulation complicates venipuncture and frequent venipuncture can cause nerve damage and neuropathic pain, local and systematic infections, vein damage, hematoma and superficial bleeding (Fujii, 2013, p. 381 & Zengin&Enc, 2007, p.386).

Some pain is inevitable through venipuncture, but pain and discomforts must be minimized as they are major factors leading to patient dissatisfaction. Fundamental nursing care, competence in clinical care, education and communication help in reducing and treating pain and discomfort (McCabe, 2004, p. 47).

Imbedded in the mission, vision and strategic framework of many institutions worldwide is a commitment to quality, efficiency and safety (De-La-Cueva-Ariza et al. 2014, p. 7). Always the goal is to improve client satisfaction and make visits as comfortable as possible (De-La-Cueva-Ariza et al. 2014, p. 7). Satisfaction has become the key factor in health services and is a main indicator of the quality of care offered (De-La-Cueva-Ariza et al. 2014, p. 7).

Though ED patients need more or less urgent attention, resulting in variations to patient flow, patients triaged as non-urgent have shown to make up the majority of patient population presenting to the ED(Muntlin, Gunningberg & Carlsson, 2006, p. 1053). Many studies on the patient experience in the ED concentrate on increasing patient feedback and suggestion, including suggestions such as: “Nurses should learn to make contact with the patient” and “the nurse was good at inserting the intravenous cannula” (Muntlin, Gunningberg& Carlsson, 2006).

C. Procedure Cost

In addition to the pain of frequent venipuncture, the unexpected failure to withdraw the sample by the phlebotomist leads to a commonly overlooked budgetary problem: redraws (Nassir & McLean, 2013).

These unexpected failures in turn add to unexpected cost in short-term financials and they account to added expenses at the point of care (Nassir & McLean, 2013). One ER at a 225-bed hospital showed to have redraw rates of up to 10,013 times a year, at an average cost of about 300$ this adds up to $3 million annually(Nassir & McLean, 2013).

Analytical study of the blood drawing process showed that redraw in the ER would delay the patient 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) (Latino, 2011, p. 5). Considering this time is billable and the average cost per minute in the ER is $3.68, then this additional waiting time is considered a loss (Latino, 2011, p. 5).

D. Nurses Overlooking Phlebotomists

Is it enough to enhance phlebotomists' technique, or should AUBMC follow the suggestion of some studies that have shown blood withdrawal using catheters showed reduced irritation, anxiety, and superficial bleeding risk (Zengin&Enc, 2007, p.390)?

One report describes how some hospitals have tried to improve the quality of care that they provide by combining nursing with phlebotomy (Southwick, 2001). Southwick states that phlebotomy personnel and nurses opposed the idea, but the administrative decision was aimed at having fewer caregivers interact with patients, since patients reported having different people drawing blood, bringing their food, and taking their blood pressure was a major cause of dissatisfaction. The decision to decentralize the task of phlebotomy to nursing, required supervision and follow up to avoid errors, redraws,

hemolysis rates and other issues (Southwick, 2001). Hospitals in the US have been following this practice for more than six years (Southwick, 2001).

In contrast with results found in other studies where they have investigated the efficiency of nurses overseeing phlebotomy in an ED, results showed that during peak hours, contamination was a high risk and concern since a contaminated sample will result in longer length of stay due to need to repeat the blood draw and test process(AHRQ, 2013).

The recommendation in these studies was to have on-call phlebotomy personnel from the lab, with no cost of hiring new personnel and training them, and giving the ED staff the option to contact the on-call during peak hours or when specimen collection begins to pile up (AHRQ, 2013).

1. Practice Guidelines and Recommendations

There is suggestive evidence for and against the practice of blood collection from an intravenous line since it may lead to hemolysis. Literature suggests a list or sequence of steps to follow to allow proper blood collection to avoid hemolysis: such as Chevalier's eight tips to follow that ensure quality blood samples while minimizing incidences of hemolysis and allowing patients to avoid the distress of having another needle stick (Chevalier, 2013). More guidelines are also available in the literature: including the Emergency Nursing Association clinical practice guideline: prevention of blood specimen hemolysis in peripherally-collected venous specimens published in 2012.

Evidence also recommends the use of primary tubes adapted for drawing blood from intravenous lines (see Appendix I 1 and I 2) because the use of syringe to draw blood may have a high risk of needle-stick injury and blood contamination and may also be associated with additional erythrocyte injury and identification errors, as the syringe

cannot be equipped with labels or other patient identifiers (Lippi, Avanzini & Cervellin, 2013, p.563).

Allowing nurses to draw blood will reduce the number of venipunctures when using these primary tubes adaptors (see Appendix I. 3). Evidence suggests that it represents a breakthrough for decreasing the rate of hemolyzed samples and lowering healthcare costs and patient discomfort (Lippi, Avanzini & Cervellin, 2013, p.563).

Aside from the primary tube adaptors, also referred to as vacutainer luer adaptor, other products in the market can be used to combine IV insertion with blood sampling such as the NovaCath catheter created by Tangent Medical Technology, which is a new IV catheter that combines several aspects together. It is formally called NovaCath™ Integrated IV Catheter System, but in the report it will be referred to as Novacath (see Appendix I. 4). As stated on the Tangent medical Technologies website, this IV catheter system uniquely integrates several elements: advanced catheter stabilization, closed system blood control, next-generation tubing, management, and passive safety technology (Tangent Medical, 2013) (see. Appendix I.5).

With all the above into consideration: allowing nurses to collect blood sample from the IV catheter after insertion using a specific device is shown to have a significant positive influence on length of stay, patient discomfort, and procedure cost.

CHAPTER III

METHOD

A. Project Initiation

Well before obtaining the approval of the hospital administration and stakeholder, the idea to change current practice started with the efforts of the ED Magnet taskforce involvement in the yearly Magnet competition titled: “Key Performance Improvement”. During this time the author volunteered to write the initial proposal for the competition with the help of a Magnet taskforce member. The efforts of the taskforce did not continue. At that time the author introduced the idea to the nurse quality manager of ED and continued to work on the proposal, with the collaboration and supervision of ED management.

The series of events that followed started with the establishment of a taskforce composed of the members of the ED quality taskforce supervised by the nurse quality manager; than it was decided to conduct a performance improvement project for the purpose of comparing two practice initiatives with the current practice. The author volunteered to be a part of the taskforce as recorder and auditor of the change process using Kurt Lewin Change Management Model and The Managing Change Check-list (see appendix V). In addition to auditing the change process, the author observed and audited the team roles and team effectiveness using concepts from The Team Handbook (Scholtes, Joiner & Streibel, 2003) and roles in groups (Context Institute, 2014).

B. Design

This project is a comparison of two practice initiatives for performance improvement purposes conducted in the emergency department at AUBMC. The purpose is to observe feasibility of these practices from a time, cost and discomfort

perspective, supervised by the quality department. Permission from the hospital administration and stakeholders was obtained.

The comparison was between three alternatives: 1) the current process, 2) the proposing practice I (PPI), and 3) the proposing practice II (PPII). The three alternatives were analysed and compared according to the cost (equipment cost, time cost, and training cost) as a short term objective. In addition, alternatives were analysed and compared according to patient satisfaction (mainly regarding discomfort level, and patient/nurse interaction time) and time needed to reach diagnosis and ultimate length of stay.

The current practice follows traditional practice of AUBMC where the RN inserts the IV line and then the technicians arrives to withdraw a blood sample and sends it to the laboratory for analysis.

In the first proposed practice I (PPI), the RN used the current catheter for IV insertion, but in addition the RN used the vacutainer leur adaptor and the vacutainer system to withdraw blood (see Appendix I1, I2 and I3).

In the second proposed practice II (PPII), the RN, used the new Novacath catheter to insert an IV and withdraw blood.

C. Sampling

Due to limited available samples of PPI and PPII to trial, a representative sample of five registered nurses of grade nine occupational levels were randomly picked. Grade nine level nurses were picked is because they compose the majority part of the ED staff from occupational level aspect, and they are mostly assigned to the bedside rather than in-charge or triage. The sample of nurses was trained in the proper use of PPI through

picture demonstration (see appendix I. 8 and I. 9) and PPII through video demonstration (Tangent Medical, 2014). The author helped in training the sample of RNs.

D. Data Collection

1. Time Factor

During trials of PPI and PPII, the time needed for the five RNs to use the catheters and draw a blood sample was observed and documented individually. An observer accompanied the RNs during IV insertion, gathering data using the checklist in Appendix VI during the current practice and the trial periods of PPI and PPII. The checklist in appendix VI was a predetermined list of elements that need to be observed during the trials: communication with the patient, equipment used, time of the procedure, patient compliant, and feedback.

2. Discomfort factor

Patient feedback was gathered concerning the new initiatives. All patients were informed that they are undergoing a trial for the purpose of performance improvement.

3. Procedure Cost factor

A chart audit over a seven day period was done to calculate the number of venipunctures and number of patients obtaining two venipunctures to complete the IV

insertion and blood collection process in the current practice (Refer to Appendix I. 6 for detailed project timeline).

Combine equipment cost, service cost, and observed number of patients (per week) who underwent venipuncture following the current practice: total blood withdrawal and IV insertion cost per patient was calculated. The author took part in the collecting and analysing of all cost related data in addition to forecasting the data.

This data was used as the baseline cost data with which the costs of PPI and PPII were compared. It was also used to estimate the annual cost of each initiative added with the annual training cost.

The annual training cost is the cost of training ED RNs to obtain phlebotomy certification. While the cost analysis was underway, the ED administration in collaboration with the laboratory administrative came to the conclusion that to allow nurses to draw blood sample during IV insertion, they need to be certified as phlebotomists. To complete the training, all RNs have to complete 30 successful venipunctures using the vacutainer system under the supervision of staff. The author volunteered to do the training, for the purpose of calculating the total hours needed to complete the training.

This total annual cost of venipuncture per patient combined with the annual training cost was used to project the annual cost in relation to number of venipunctures.

CHAPTER IV

RESULTS

Table1. IV Insertion and Blood Collection Practices: number of venipuncture, staff involved, and duration.

Number of venipunctures	**Current Practice**		**P P I**	**P P II**
	2		1	1
Staff involved	*RN*	*Phlebotomist*	*RN*	*RN*
Service Duration (seconds)	25	15	**46.12**	**119**
	40			

Note: Time shown for phlebotomist refers to blood collection only.

A. Time Factor

During the trial period from January 6, 2014 to January 10, 2014, the observer documented the time the RN needed in the current practice, PPI and PPII procedures respectively, in addition to the time the phlebotomist needed in blood sampling. The data is presented in Table 1.

B. Patient Discomfort and Experience

Results of the chart audit showed that out of total 912 patients presenting to the ED from January 10, 2014 to January 17, 2014, a total of 309 patients were venipunctured twice, once for IV insertion and once for blood sampling. In other words, out of the total number of patients presenting to the ED 33.8% underwent two separate

venipunctures: one for IV insertion and one for blood during the audited week. This number was used to project approximate patient numbers over one year presented in Table 4.

Considering that the proposed practice will be combining nursing IV insertion with phlebotomy blood collection venipunctures, the number of venipunctures the patient has to endure was cut to half in PPI and PPII.

C. Procedure Cost

In order to project the annual cost difference of the different practices, data was gathered about the equipment needed, staff salaries, number of venipuntures done and the time it needed for the venipuncture in current practice, PPI and PPII.

Starting with calculating the service cost using salary and service hours documented, results are presented in Table 2.

Table 2. Salary Costs by Occupational Group, Method and Duration

	Current Practice		**PPI**	**PPII**
	RN	Phlebotomist	RN	RN
Service in Seconds	25	15	46.12	119
Salary hourly cost (3600 sec)	$5.45	$4.79	$5.45	$5.45
Service cost	0.038	0.02	0.07	0.180

*Numbers as brought to estimation of 10

Combining the equipment needed for each practices with service cost, the total blood withdrawal and IV insertion cost per patient was calculated, and is presented in Table 3.

Table 3.Blood Withdrawal Costs by Method (Current practice, PPI, PPII)

Item	Quantity	Current Practice		Proposed Practice I	Proposed Practice II
		RN	Phlebotomy	RN	RN
Medicut Gauge 20	1	0.77		0.77	7
Gauze	1	0.0074	0.0074	0.0074	0.0074
Alcohol Swab	2	0.015	0.015	0.015	0.015
Tourniquet	1	0.4	0.4	0.4	0.4
Gloves	2	0.0648	0.0648	0.0648	0.0648
Tegaderm	1	0.57		0.57	0.57
Vacutainer adaptor	1			0.34	0.34
Vacutainer	1		0.7	0.7	0.7
Vacutainer needle	1		0.0675		
Service hourly cost $		0.038	0.02	0.07	0.18
Total blood withdrawal and IV insertion cost per patient		**1.865**	**1.275**		
		3.140		**2.937**	**9.277**

*Numbers as brought to estimation of 10

Using the total blood withdrawal and IV insertion cost per patient along with the observed number of patients per week, estimated number of patients per year was calculated, and then the estimated blood withdrawal cost per year. The total of PPI and PPII was added with annual training cost to calculate the total annual cost of PPI and PPII. The author volunteered to do the training to calculate the cost of the training. It was observed that eight hours are needed to complete 30 successful venipuntures using the vacutainer system. Using the basic salary of grade nine nurses; the training cost would be

$43.6 per year. Along with the variance of the totals as compared to the total annual of the current practice, Table 4 presents the data.

Table 4. Projected Annual Blood Withdrawal Cost (year 1)

	Current Practice	PPI	PPII
Cost of blood withdrawal per patient	**3.140**	**2.937**	**9.277**
Observed number of patients / week	**309**	**309**	**309**
Estimated number of patients / year	**16068**	**16068**	**16068**
Estimated blood withdrawal cost /year	**$50,453**	**$47,191**	**$149,062**
Annual training cost		**$43.6**	**$43.6**
Total annual	**$50,453**	**$47,234**	**$149,105**
Variance		**$3,218**	**$(98,652)**

*Numbers are brought to estimation of 10

CHAPTER V

ANALYSIS

A. Time Factor

In the current practice, the time needed for the patient to complete IV insertion and blood withdrawal was 40 seconds; combined with the phlebotomy waiting time; total time would be 187 seconds. Considering that in PPI and PPII the IV insertion and blood collection processes are combined, the patient would not have to wait for the phlebotomy to arrive, and the RN would be doing the blood drawing while inserting the IV, the average procedure time can be 46.2 second in PPI and 119 seconds in PPII, improving practice (For detailed process map To-Be refer to Appendix III).

By following PPI or PPII, IV therapy and blood testing are done quicker; thus time to diagnosis would be shorter. This in turn would influence patient turnover rates and flow ultimately improving patient length of stay.

B. Patient Discomfort and Experience

While this time period or length of stay, would seem a minor delay in the treatment process from the medical staff and administration point of view, from the patient's and patient's expectation of receiving efficient care at the ED, it isn't and it will influence their satisfaction and experience.

As displayed in the result of Table 1, following the new practice, the venipuncture numbers are decreased to half; meaning the patient would only have to endure one venipuncture during their stay thus reflecting positively on patient's pain and discomfort.

Additionally the decrease in frequency of venipuncture will also help in decreasing risk of infection and improving patient safety.

From the nursing care delivery perspective, we can say that assigning the responsibility of blood withdrawal to RNs will help in making the care less fragmented and making nurses more involved and in control of the care for their patients. This will significantly influence the nurse-patient relationship and quality of care provided by the nurses in the ED.

C. Procedure Cost

Comparing the two practices from a cost perspective, we can see that PPI is a quicker and less costly process whereas PPII is slightly slower and more costly process to adopt. However the decision for practice change should not be based solely on economics. The special aspects or features of passive safety technology in PPII are important as well. These features allows the needle of the catheter to retract back into the plastic tube after use, which will lead to fewer incidences of needle stick injuries and reduction in costs associated with needle stick injury treatment

Even though the starting price of PPII catheter is very high, the probability that the price will be adjusted if the catheter was adopted in AUBMC is high, since the unit volume will increase resulting in decrease in cost of the quantity ordered.

D. Decision Matrix

For further elaboration and help in decision making, a decision matrix was recommended to weigh and compare results.

In Table 10, the first column is the list of the practice methods. In the first row are the criteria against which the practices will be weighed. The scale type is a semantic scale as words are used rather than numbers to help respondents describe their feelings about the product or the brand (Corporate Document Respiratory, 1997). In an effort to provide weight to the feelings and labels of the semantic scale, each label is given a score: elements with desired outcome are displayed as positive numbers, and elements which are not desired are displayed in negative numbers.

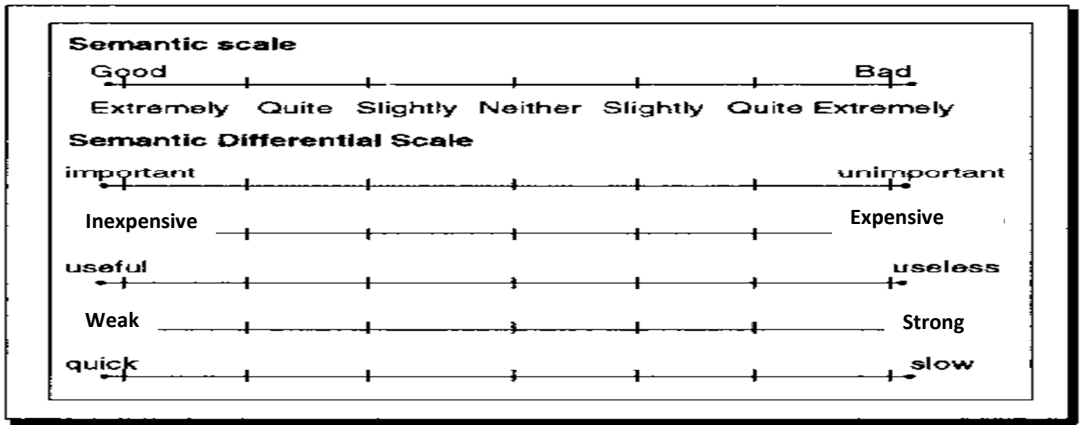


Figure 1. Semantic Scale (Corporate Document Respiratory, 1997)

Some of the scores are directly related to the feelings and labels, meaning a positing feeling or a desirable label has a positive score. For example: “quite useful” has a score of two whereas “neither useful” has a score of zero. In contrast, some scores with are inversely related to the feelings and labels, meaning a positing feeling or label has a negative score. For example: a discomfort feeling of “quite strong” receives a score of minus two since it is undesirable, or a material cost label of “slightly inexpensive” receives a score of one because it is desirable.

Table 5. Decision matrix.

Criteria / Methods	Time factor		Patient Satisfaction		Cost		Total
	Waiting time	Procedure Time	Discomfort level	Experience	Procedure	Safety	
Current	-2	1	-2	0	-1	-2	-7
PPI	2	2	-1	3	1	-1	6
PPII	2	-1	-1	2	-3	1	0

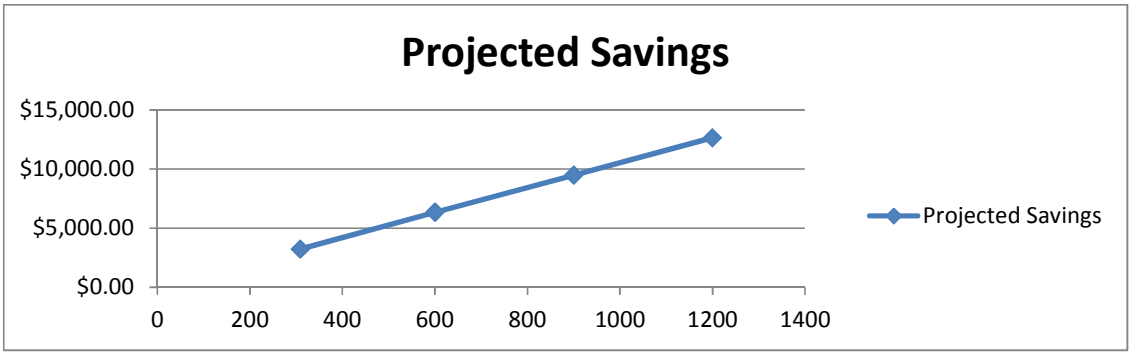
*Desirable scores are shaded in light colours and undesirable are shaded in darker colours.

Results showed that PPI receives the highest scores compared to the other practices. As a further projection of the savings the institution would make if PPI was adopted, Table 6 presents the relationship between number of venipunctures and annual savings (see Figure 2 a line graph of the projection).

Table 6 . Relationship between number of venipuncture and projected savings.

Number of Venipunctures	Projected Savings
309	**$3218**
600	**$6,290**
900	**$9,457**
1200	**$12,624**

Figure 2. Line graph of the projected savings



CHAPTER VI

DISCUSSION

A. Processes Evaluation

1. Change Process

The change process was evaluated following the concepts of the Kurt Lewin Change Management Model that was developed in the 1950s, which is composed of three stages: unfreeze, change and refreeze (Mind Tools, 2014). The unfreeze stage, involves acceptance of change and breakdown of the status quo before a new way of operating can start to be built (Mind Tools, 2014). During the change stage, people begin to resolve their uncertainty and look for new ways to do things; they start to believe and act in ways that support the new direction (Mind Tools, 2014). In the refreeze stage, the changes made are taking shape, and people have embraced the new ways of working, ultimately leading to the organization being ready to refreeze (Mind Tools, 2014).

The performance improvement project evaluations concern the actual events that took place during each stage. During the unfreeze stage cost analysis was done and the idea of change in practice was imposed on staff. Then during the change stage, training of RNs and implementation of practice change started. But the refreeze stage is still not reached yet; partial process evaluation is being conducted.

A second tool was used to evaluate the change process: "The Managing Change Checklist"; is a tool that provides a quick checklist of the ingredients necessary to ensure successful changes. It helps to monitor several aspect of a change such as; communication process, communication content, involvement of affected people and leadership style. (Collegiate Project Services, 2010).

Some of the positive aspects that were observed during the evaluation included the quick approval and response from the hospital administration which reflects positively on AUBMC's efforts on empowerment and continual improvement in patient care delivery, as well as the agreement between the ED administration and the Laboratory administration which reflects the multi-disciplinary effort to improve practice and care. Some of the negative aspects included the improper start of unfreeze and change stages: the idea was not shared with staff, the change initiatives were imposed on the staff, no evaluation or auditing was planned beforehand, and no formal training of the practice was planned. In addition, high levels of resistance were observed, with no planned way of dealing with them.

2. Team Process

Team effectiveness was evaluated and audited using concepts from the Team Handbook, which contains explanation and description of many concepts like team roles, tools for planning, data gathering and analyzing, and decision making (Scholtes, Joiner & Streibel, 2003). In addition to the team handbook, concepts of group task roles was also followed because it shows and helps to distinguish between leadership roles that help the group accomplish its task and reach full human potential in teams. It is also important to realize the "leadership" is not designated to one person. Group task roles are many: initiator, information seeker, opinion seeker, elaborator etc. Maintenance roles include: encourager, harmonizer, compromiser, process observer, and gate-keeper, while blocking role include: aggressor, recognition seeker, self-confessor, and dominator (Context Institute, 2014).

CHAPTER VII

RECOMMENDATIONS

For future change in performance or practice initiatives in the ED, it is recommended that the taskforce or team follow a clear charter for change, designate clear team roles, and follow an assigned project timeline or group task concepts.

As for processes, an evaluation process or plan can be incorporated and become an integral part of the process. During the change process, models and checklists can be used and followed as well as change agents, video or picture presentations in trainings.

CHAPTER VIII

LIMITATIONS

Since only five samples of Novacath catheter were provided for trial, only five RNs were picked to conduct the trial. Even though the sample was a representative sample, a larger and more diverse sampling is needed to evaluate if the data collected on time and cost are accurate.

The risks associated with using the Novacath are greater than the vacutainer system in proposed practice I because the vacutainer system is already followed in the hospital and feedback has been positive. More study and research needs to be conducted concerning the use of both products in the light of hemolysis, infection, and cost.

CONCLUSION

Allowing RNs to withdraw blood while starting a peripheral IV line will significantly improve quality of the care delivered in the ED, reduce procedure costs, and enhance patient experience.

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APPENDIX I

FIGURES

Appendix I. 1. BD Vacutainer luer adaptor

(Becton Dickinson and Company B., 2013).

Appendix I. 2. Luer adapter blood transfer device white with pre-attached holders & female luer adapter

(FISHER SCIENTIFIC, 2013)

Appendix I. 3.BD Vacutainer Blood Transfer Device With Luer Adapter

(Colonial Medical Supplies ,2014)

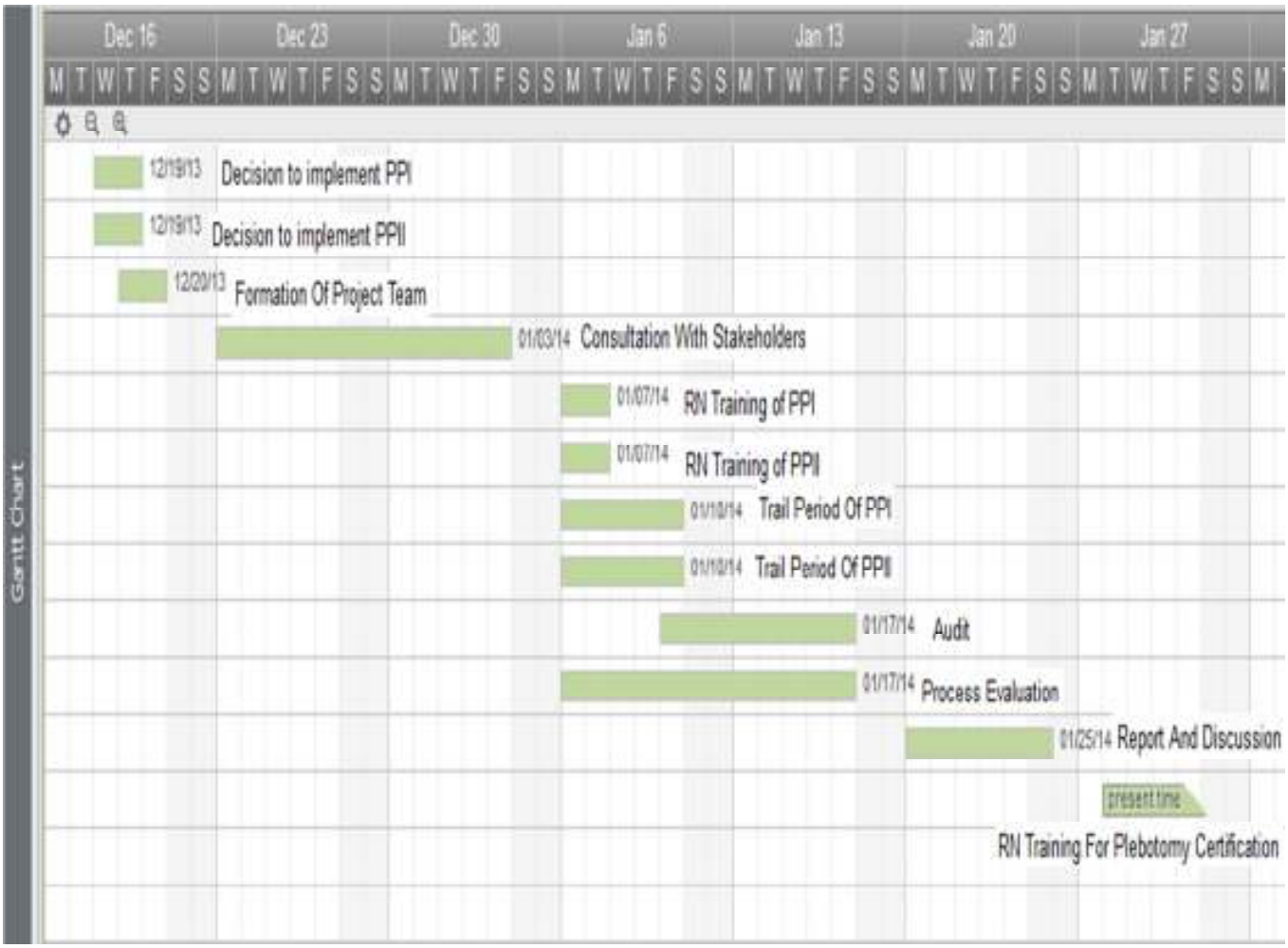
Appendix I 4. NovaCath™ Integrated IV Catheter System

(Tangent Medical, 2013)

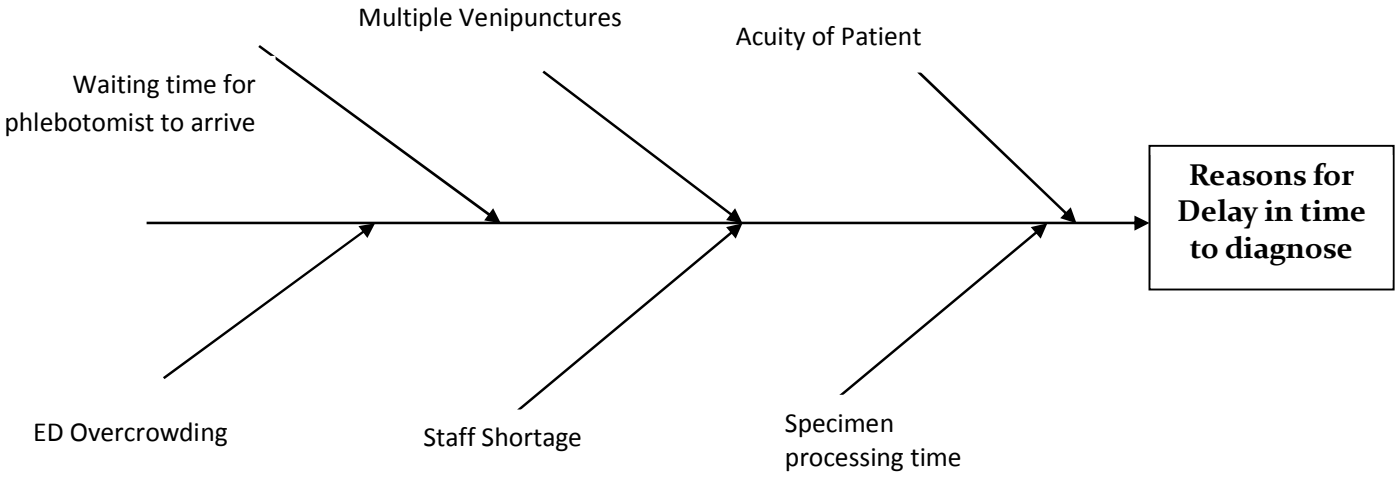
Appendix I 5: Next-Generation Tubing Management

(Tangent Medical, 2013)

Appendix I. 6: Gantt Chart of project Timeline



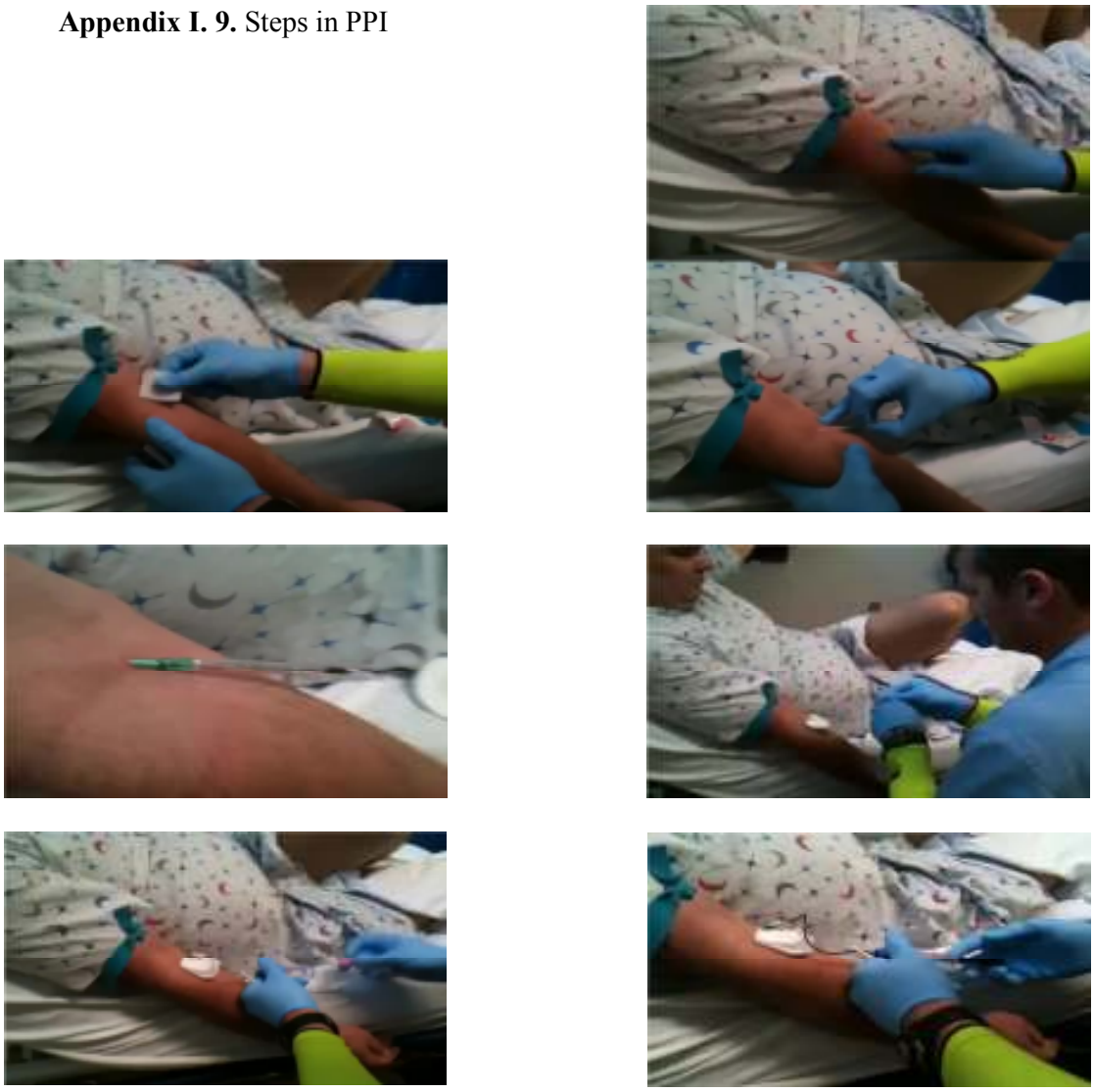
Appendix I. 7. Root cause-analysis using fishbone diagram:



Appendix I. 8. Equipment needed in PPI

(Progressive verb tense worksheets, blood tubes color chart test) , (Cirurgicaestilo, Catéter Intravenoso (Terapia Intravenosa Periférica) Angiocath – BD), (TRIDENT PHARM PTE LTD, Other Disposables) , (Study Droid, Steril Tech Instrument ID)

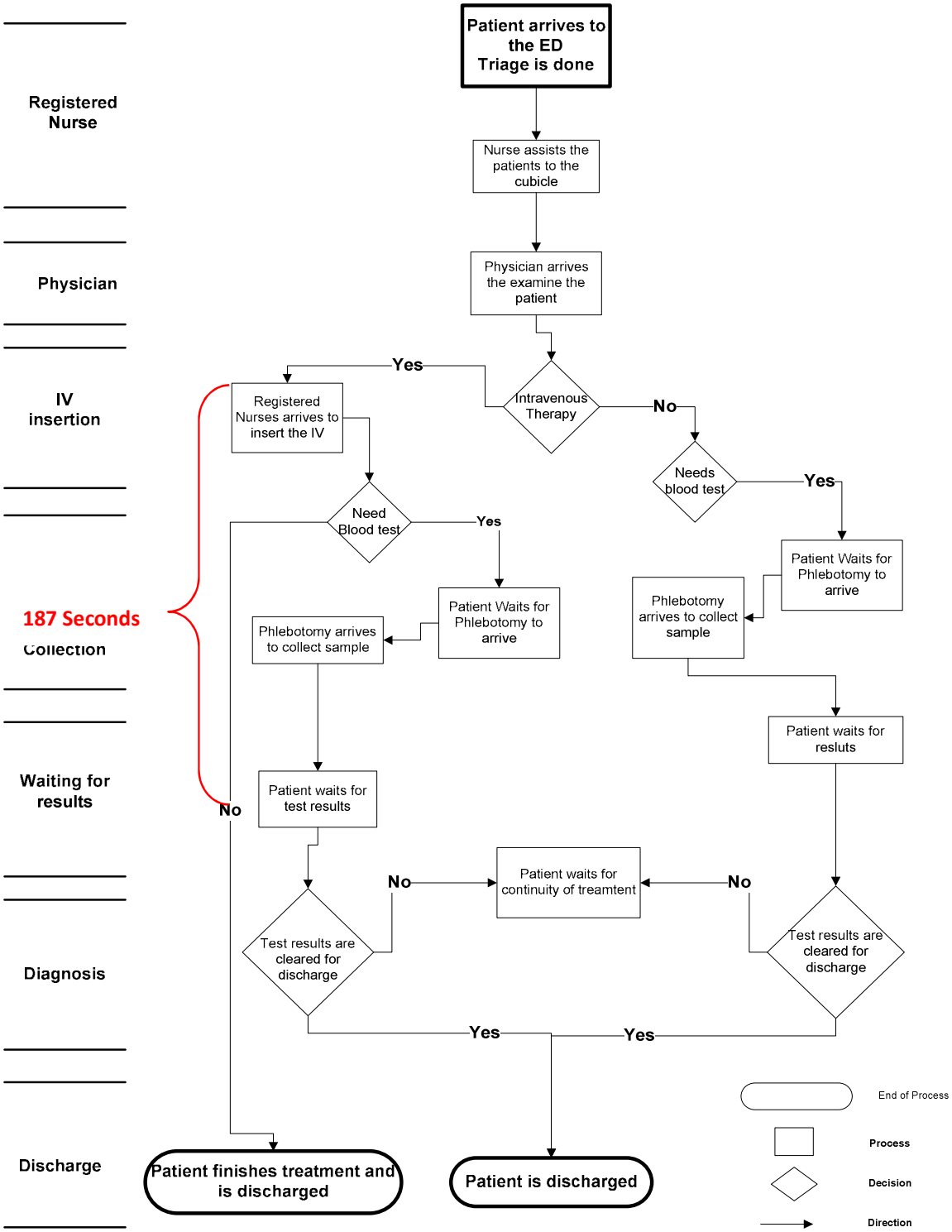
Appendix I. 9. Steps in PPI



(YouTube, Inserting an IV and withdrawing blood)

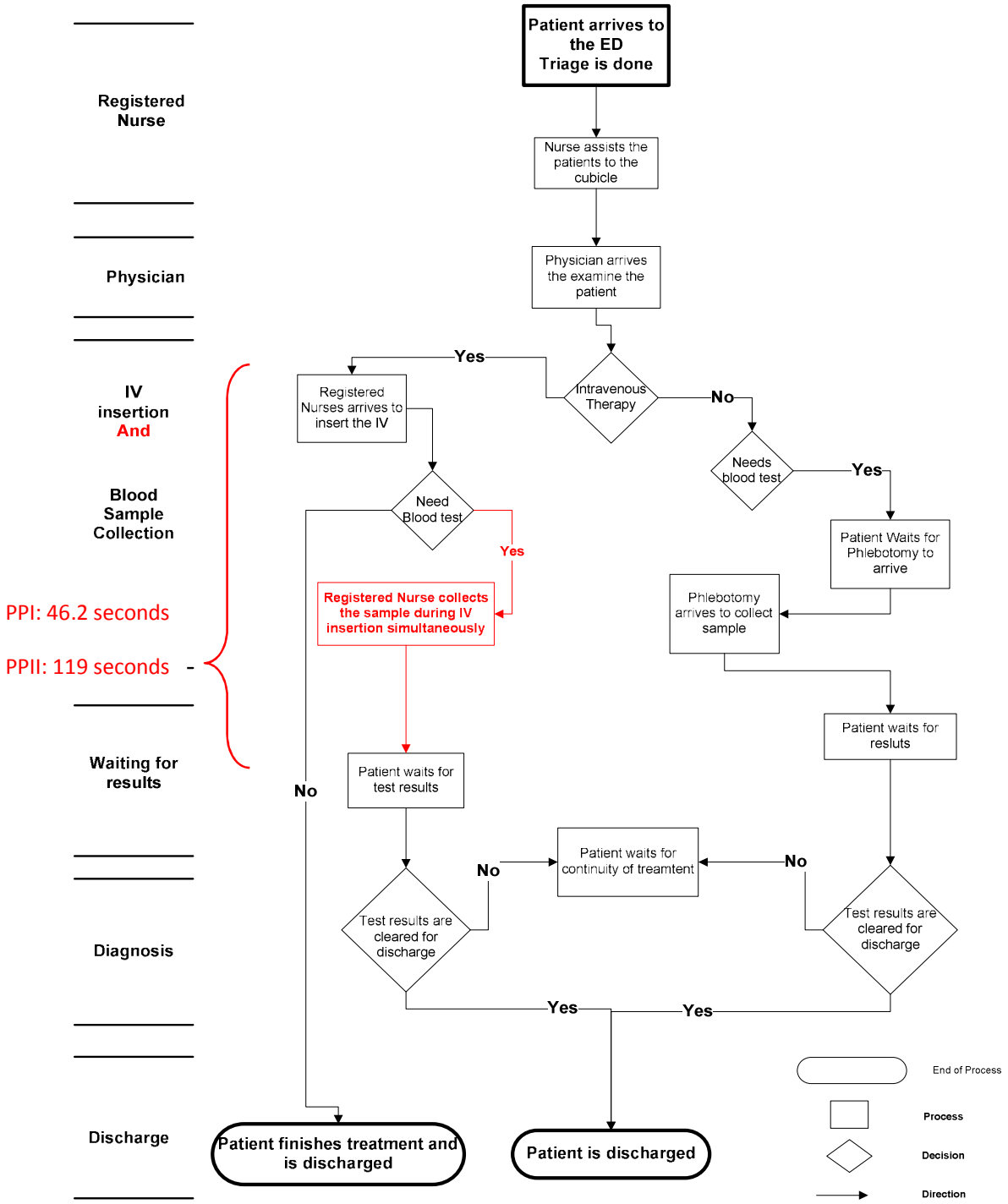
APPENDIX II

PROCESS MAP AS-IS



APPENDIX III

PROCESS MAP TO-BE



APPENDIX V

OBSERVATION CHECKLIST

	YES	NO	COMMENTS
Did the nurse explain the new procedure of IV insertion?	Yes		
How many alcohol swabs did the nurse use?			2 swabs
Did the nurse wear gloves? If yes, how many?			1 pair
How much time did the insertion take?			57 seconds
Did the patient complaint?	Yes		Patient thought this is was his last venipuncture
If yes, was the team informed about it?			The nurse and the doctor tried to make him understand
How did the patient respond?			Patient nodded
Did the nurse show competence during insertion?	Yes		
How was the training done?			Through video demonstration

Additional Comments:

APPENDIX VI

THE MANAGING CHANGE CHECKLIST

The Managing Change Checklist

This tool provides institutions with a quick checklist of the ingredients necessary to ensure a successful changeimplementation.

1. Communication Process

No.	Item	Yes	No	Comments
1	Have we let people know about the change far inadvance?	Yes		
2	Have we communicated frequently about thechange (before, during, and after)?	Yes		
3	Are we using multiple communication methods?	Yes		Face-face. email
4	Are we employing multiple communicatorsources?		no	
5	Are we communicating empathy for the change?	Yes		
6	Have we devised innovative forms ofcommunication (e.g., slogans, ceremonies)?		no	
7	Have we developed and executed a systematiccommunication plan?		no	

2. Communication Content

No.	Item	Yes	No	Comments
1	Are we outlining the reasons for the change (true rationale)?	Yes		
2	Are we explaining the benefits of the change?	Yes		

3	Are we explaining the roles that people were going to have during the change?	Yes		RN not too happy about added responsibility
4	Are we explaining the plan for carrying out the change?		no	
5	Are we communicating our expectations?	Yes		
6	Have we brainstormed likely questions andconcerns employees might have?	Yes		
7	Have we developed straightforward responses tothe concerns and questions?		no	
8	Have we communicated what stays, what is leftbehind, and what is gained?	Yes		

1. Involvement

No.	Item	Yes	No	Comments
1	Are we empowering the affected people to make decision?	Yes		
2	If not, are we getting input from people before the decision was made?			
3	Are we empowering affected people to help design the change?	Yes		
4	If not, are we getting input from people about how to implement?	Yes		
5	Are we involving people at the lowest levels possible?	Yes		
6	Are we communicating this involvement to others?		no	

1. Leadership

No.	Item	Yes	No	Comments

1	Are managers providing the resources employees needed to make the change?	Yes		
2	Are managers providing for training in the new skills needed to make the change?	Yes		
3	Are managers providing the information that employees needed to make the change?	Yes		
4	Are managers providing psychological support and encouragement during the change?	Yes		
5	Are managers identifying and removing barriers to implementing the change?	Yes		
6	Are managers identifying and training change agents and/or facilitators?	Yes		
7	Are managers installing feedback systems for motivational purposes?	Yes		
8	Are managers displaying a positive attitude about the change? (i.e., no "scapegoats")	Yes		
9	Are managers living by their commitments during the change?	Yes		
10	Are managers modeling the change for others?	Yes		
11	Are managers providing recognition for accomplishing the change?	Yes		
12	Are managers providing rewards (if appropriate) for accomplishing the change?		no	
13	Are managers including successful change as part of the performance appraisal process?	Yes		

(Collegiate Project Services, 2010)