

# **IMPACT ON COST & LABORATORY SERVICE FOR ABG ANALYSIS WITH TRAINING RELATED TO ABG COLLECTION & TRANSPORT**

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## Introduction:

- The **usefulness of ABG**
  - Dependent on accuracy of analysis
  - unbroken testing service for continue monitoring of patient.
- **Pre-analytical error** does impact on output of the analysis ,
  - time & site of collection
  - use of right vaccutte with preservatives with concentration
  - method of transportation
  - labeling of collected sample.
- Improper Heparin Conc >>> Clotted sample >>> Instrument breakdown >>> Decrease Clinician Compliance

## Aim

After training to resident doctor about ABG sample collection and transportation,

- To evaluate improvisation of **pre-analytical error in sample collection**.
- To evaluate improvisation on **average cartridge life**.
- To evaluate improvisation on the **cost of arterial blood gas analysis**
- To evaluate improvisation on laboratory service with **sample flow** .

## **Material and method:**

- Retrospective Study (December 2022 to July 2023)
- Data Collected
  - **number of arterial blood gas analysis performed**
  - **number of ABG cartridge utilized**
  - **amount of rupees utilized for purchase of ABG cartridge**
- Training to reduce Pre-Analytic Error was conducted on **24<sup>th</sup> February 2023**

## Component of the Training

- Proportion of whole blood and heparin in container
  - 40 IU heparin per ml of whole blood.
- Sample should be in following proportion
  - **0.05 ml Heparin plus 1.0 ml blood** (approx conc. 50 IU/ml)
  - **0.1 ml Heparin plus 2.0 ml blood** (approx conc. 50 IU/ml)
- Other Requirement
  - **Cold chain**
  - Appropriate **labeling with visibility** of the sample
  - **Tight shield cap** of syringe.
- After 4 month of the training - Data Collected

# Result

**Table-1: Impact of Training on Life of ABG Cartridge and Cost per ABG Test**

	Average ABG Cartridge Life in Days	Average ABG Sample Run in Day	Average Total ABG Sample Estimated From Cartridge	Price of Single Cartridge	Cost per ABG Sample	Impact on Cost of ABG Sample Estimation in Percentage	Average Cartridge life in Percentage
Pre-Training	12.2	17.5	212.33	41437	<b>195.2</b>		
Post - Training	19.8	30.1	596.17	41437	<b>69.5</b>	<b>-64.4</b>	<b>63.01</b>

# Result

- With this **increase sample load**,
  - Decrease cost** per ABG sample analysis
  - Decrease total cost** of cartridge utilization effectively.

**Table-2: Pre vs Post Training Cost on ABG samples**

Training	Month	Total Days	ABG Sample Estimated Per month	Cost per ABG Sample in Rupees	Average Cost of ABG Estimation in the month in Rupees	Impact of Training on Cost of ABG per Month in Rupees	Impact of Training on Cost of ABG per Month in %
Pre-Training	2nd Dec'22 to 22nd Feb'23	73	1274	195.2	102173	-39496	-39
Post-training	3rd Mar'23 to 9th Jul'23	119	3577	69.5	62678		

# Result

**Table 3: Impact of Training On ABG Sample Flow (Quality Indicator of Laboratory Work)**

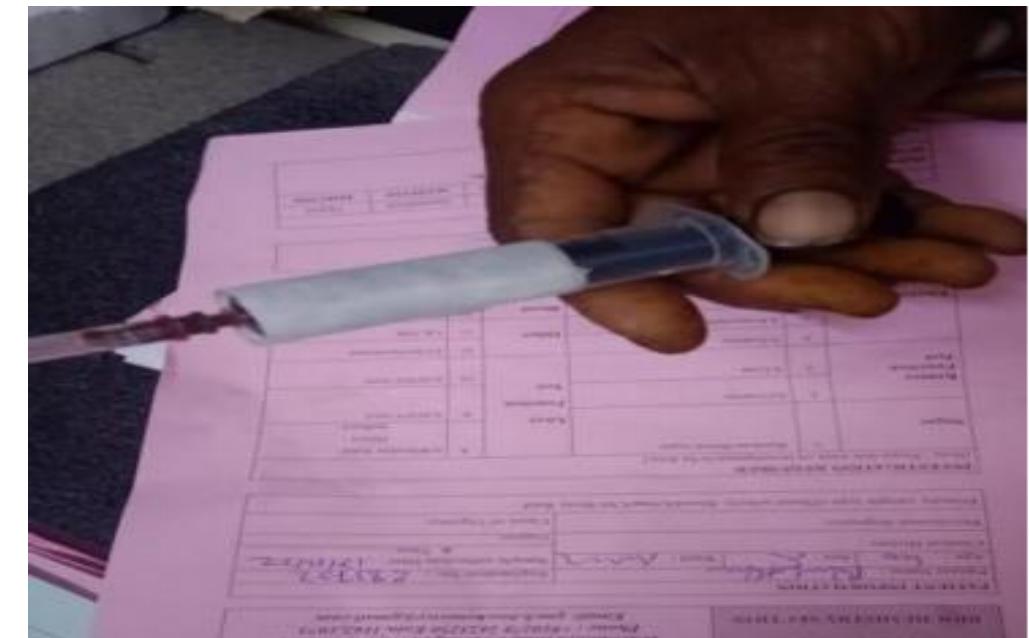
	Period	Total Days of the Periods	Cartridge	No. of sample	Average Sample in a day	Impact of Training On ABG Sample Flow in Percentage
<b>Pre-training</b>	2nd Dec'22 to 22nd Feb'23	73	6	1274	17	72.2
<b>Post-training</b>	3rd Mar'23 to 9th Jul'23	119	6	3577	30	

## Discussion:

- we have noticed some problem frequently.
  - ✓ **Frequent breakdown** of ABG instrument - Siemens Rapid Point 500
  - ✓ **Frequent failure** of ABG cartridge with in very short time of installation.
  - ✓ **Frequent blockage** of ABG analyzer capillary.



**without ice-pack**



**Label covering visibility of Clot**

## Discussion:

### Post-training

- ✓ Correction of Pre-Analytical Error
- ✓ **Significant decrease in clotted sample**
- ✓ **Identifiable clot in sample**
- ✓ **Drastic reduction in analyzer breakdown.**
- ✓ **Decrease Turn around time**
- ✓ **Clinician compliance increase**
- ✓ **Increased sample flow per day**



**Post-training - Appropriate labeling**  
**&**  
**Visibility of Sample With Ice-Pack**

## Conclusion:

- ✓ In laboratory practice , role of **root cause analysis** is **very significant** for perfect implementation of corrective action and to prevent recurrence of the problem.
- ✓ **Pre-analytical training** of appropriate proportion of heparin and whole blood as well as for labeling of sample can reduce significantly
  - Breakdown of ABG instrument
  - Turn around time of ABG analysis
  - Total cost per analysis of ABG
- ✓ And Can **significantly increases**
  - **Sample flow** in laboratory
  - **Profitability** of the laboratory
  - Instrument and Cartridge **life span**
  - Most importantly, **Clinician faith** towards continues service of testing.

# Reference:

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