Cost & Efficiency Project : Optimizing Material Utilization in Mucosal and Trucut Biopsy Procedures

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INTRODUCTION

In a resource-intensive healthcare environment, efficient use of materials is essential to control costs without compromising diagnostic quality. At Shaukat Khanum Memorial Cancer Hospital & Research Centre (SKMCH & RC), mucosal and trucut biopsy procedures contribute significantly to histopathology workload and material consumption such as the practice of preparing four tissue sections (H&E) of small biopsies (mucosal, trucut) across two slides (two sections on each slide). This approach involves using more material and taking extra time for pathologists to review, ultimately leading to higher costs and slower work. Addressing such practices is essential for improving efficiency and sustainability.

METHODS

Data from 1st Jan to 30th June 2024 was collected and analyzed to evaluate the consumption patterns and associated cost of materials used in Mucosal and Trucut Biopsy Procedures at Shaukat Khanum Memorial Cancer Hospital & Research Centre (SKMCH & RC).

During this period:

- Consumed slides (count) extended cost was Rs. 1,797,036
- Consumed coverslips (count) extended cost was Rs. 742,254
- Consumed mounting media (ml) extended cost was Rs. 42,192
- Consumed printing (count) extended cost was Rs. 273,462
- Consumed paraffin (gm) extended cost was Rs. 364,032

Overall expenditure was Rs. 3,218,976.

Modification in Embedding Molds

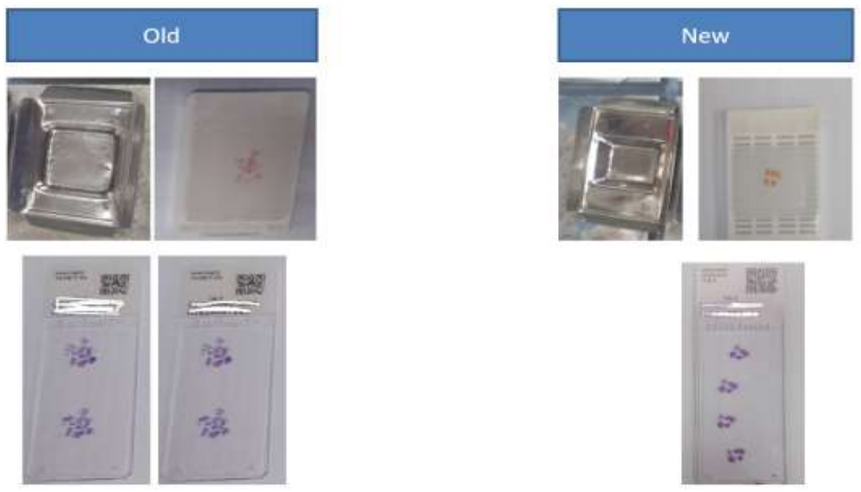

Figure 1 : Highlights the differentiation between old and new practices

Summary

Item	Unit Cost (Rs)	Pre implementation 01-01-2024 to 30-06-2024 Total CPTs: 16407		Post implementation 01-01-2025 to 30-06-2025 Total CPTs: 17794	
		Count	Extended Cost	Count	Extended Cost
Slides (Count)	46	39,066	1,797,036	20,696	952,016
Coverslips (Count)	19	39,066	742,254	20,696	393,224
Mounting Media (mL)	18	2,344	42,192	1,242	22,356
Printing (count)	7	39,066	273,462	20,696	144,872
Paraffin (gm)	3	121,344	364,032	122,106	366,318
		Total	**3,218,976**	**Total**	**1,878,786**

Table 1: A summary table showing all the material used and their relevant costs.

Financial Impact

Summary of Cost saving due to shift in practice	
Total CPTs (over 6 months, Jan-2025 to Jun-2025) where changes are applicable	17,797
Total cost if processed with old practice	3,524,007
Total cost when processed with new practice	1,878,786
Total savings	3,524,007 - 1,878,786 = 1,645,221
Estimated cost saving over one year	Rs. 1,645,221 x 2 = Rs. 3,290,442 per year.

Table 2: Shows the financial impacts of cost saving practice

STRATEGIES

The implementation of specially designed embedding molds will allow four H&E sections to be placed on a single slide instead of two. This approach is expected to significantly reduce material costs, improve operational efficiency, and maintain high-quality diagnostic standards.

- New molds were procured.
- The molds were tested, and feedback was collected from the histopathologist.
- Upon receiving approval, staff were trained on the use of the new molds.
- The molds are now in regular use.

Gantt Chart

Sr#	Activities	Jan 2025	Feb 2025	Mar 2025	Apr r2025	May 2025	June 2025	July 2025	Aug 2025
1	C&E Project Proposal & Approval								
2	Team formation								
3	Define requirements: identify the specifications of small molds								
4	Team meeting: discuss and finalize the decision to use small molds								
5	Search for supplier: identify the supplier								
6	Evaluate options: Compare different molds based on quality, price, and delivery time.								
7	Raise Material Purchase Request								
8	Follow up the MPR								
9	Receive the molds								
10	Evaluation and correction of mold size								
11	Training: Train staff on the new embedding and cutting process using the special-sized molds.								
12	Implement Changes: Start using the new molds.								
13	Take the feedback from pathologist								
14	Monitor Implementation								
15	Closure								

Figure 2: Gantt chart shows the activities trend from Jan 2025 to Dec 2025

RESULTS

During the review period from January to June 2025, Shaukat Khanum Memorial Cancer Hospital and Research Centre (SKMCH&RC) achieved a measurable reduction in material usage for mucosal trucut biopsies. Implementation of the new practice led to a significant cost reduction—from **Rs. 3,524,007** under the previous approach to **Rs. 1,878,786** by June 2025—resulting in an overall **savings of Rs. 3,290,442** . This reflects the successful execution of cost-optimization measures. The improvement reflects the effectiveness of implemented corrective actions and quality enhancement initiatives..

CONCLUSION

Reduced Handling Errors:
Consolidating sections onto fewer slides minimizes manual handling steps, thereby lowering the risk of sample misplacement or accidental swapping.

Seamless Slide Review:
Enabling pathologists to review multiple sections on a single slide streamlines the diagnostic process by eliminating unnecessary slide changes.

Enhanced Visual Comparison:
Displaying all tissue sections side by side on one slide allows for more efficient and accurate comparison of different specimen areas and tissue levels.

Cost-Efficiency:
A cost-efficient target for the materials used in mucosal trucut biopsy was successfully achieved through the implementation of improved practices, resulting in significant cost savings and optimized resource utilization.

In a nutshell, the review period from January to June 2025 demonstrates that Shaukat Khanum Memorial Cancer Hospital and Research Centre (SKMCH&RC) effectively reduced material usage and achieved substantial cost savings in mucosal trucut biopsies. The overall savings of **Rs. 3,290,442 per year** highlight the success of the implemented corrective actions, cost-optimization strategies, and quality enhancement initiatives, reflecting a sustained commitment to operational efficiency and continuous improvement.
These results reflect the success of the adopted strategies in promoting sustainable practices, streamlining laboratory operations, and optimizing resource utilization across all pathology service points