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Positive Impact of Workflow Enhancements to Incorporate Prospective Whole Slide Imaging of Breast Core Biopsies as Part of Routine Diagnostic Practice

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INTRODUCTION

Digital pathology or whole slide imaging (WSI) involves the digitalisation of an entire glass slide into "virtual slide". While differing opinions exist with regard to value and workflow impact of WSI on a laboratory's workload as part of routine diagnostic practice, it is generally acknowledged that WSI of selected cases can be positively impactful. With current resources, it is quintessential to focus on prospective scanning of high-value and impactful cases. An example is breast core biopsies cases that frequently need to be reviewed and correlated during radiological-pathology rounds and with subsequent specimens derived from definitive surgeries or as the disease advances.

AIMS

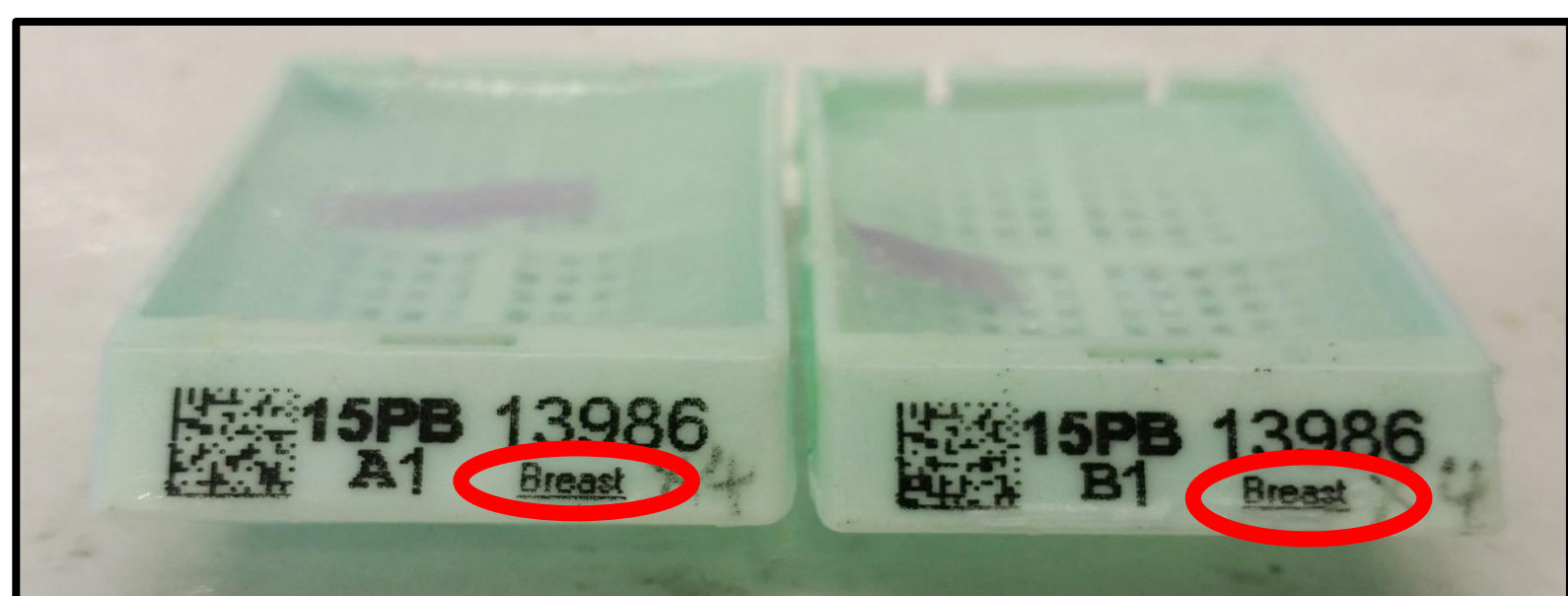
1. To identify the steps taken to maximize the prospective scanning of breast core biopsies in routine processes.
2. To study the impact of these changes on the time taken to despatch the breast core biopsy cases to pathologists.

METHODOLOGY

Initial workflow observations were conducted and the following pre-emptive workflow alterations were introduced.

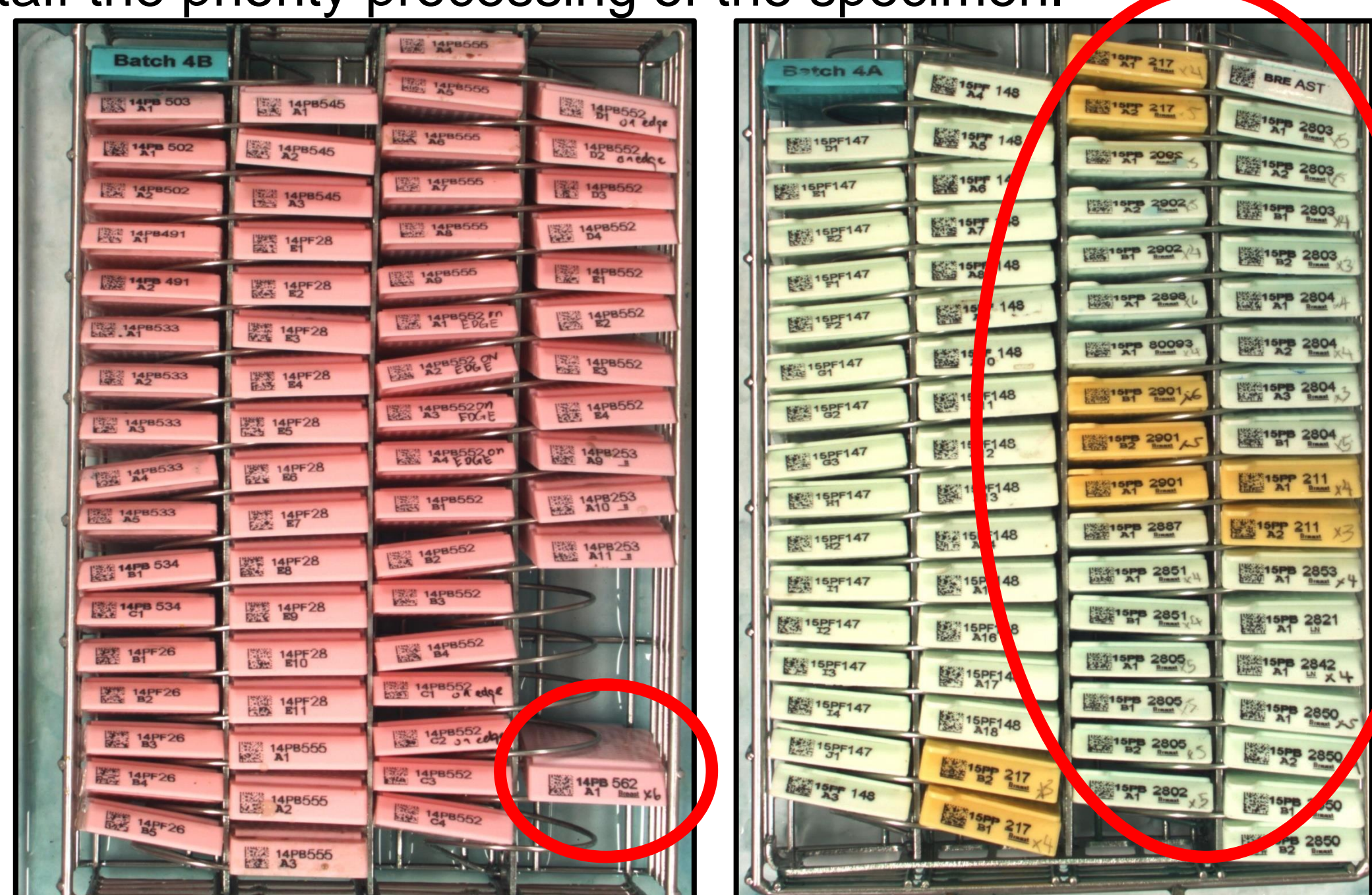
1. Unique Tissue Identification

- Unique "Breast" identifier is printed on cassettes to alert staff.
- "Breast" identifier is limited to only breast core biopsies.



2. Specific batching of specimens for priority processing

- Biopsies are processed in a specific "Breast" batch.
- When tissue is embedded, a purple colour tag is added to highlight to staff the priority processing of the specimen.



3. Standardization of procedures.

- To ensure optimal quality in spatial arrangement in embedding and microtomy, a maximum of 6 core biopsies are processed in each cassettes.

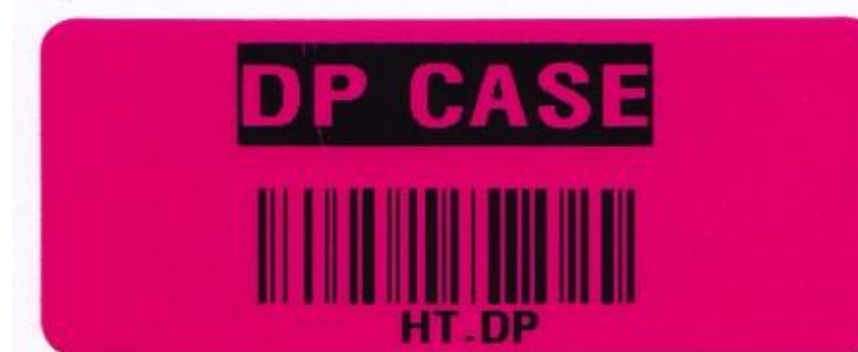
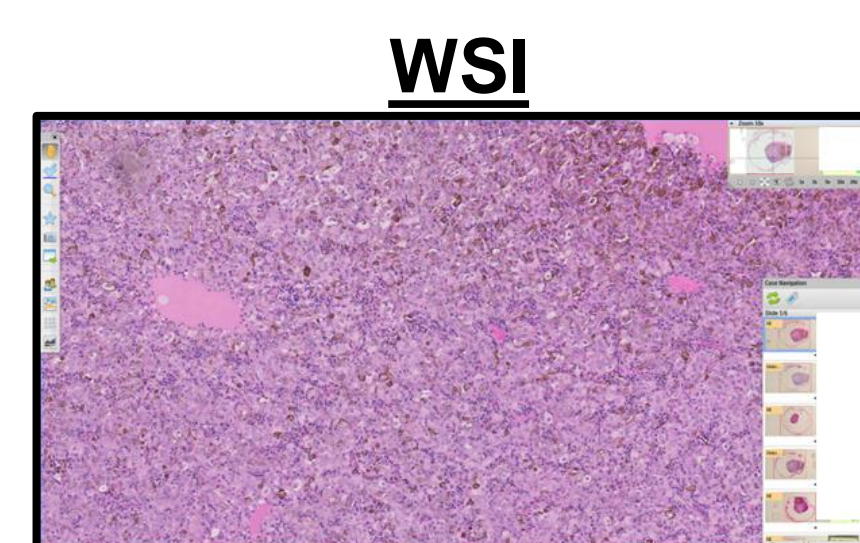
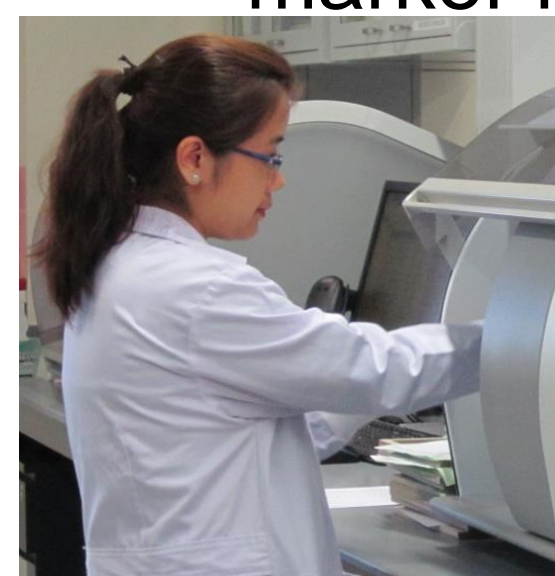


- To reduce the need for repeated recuts, 3 slides of fully exposed sections are submitted to the pathologist for diagnosis.



4. Digitalization of slide prior to despatch.

- Once each case is assembled, it is sent for WSI.
- "DP CASE" label is affixed on the forms and corresponding "HT.DP" marker is tagged to the case in the LIS as part of the WSI process.



5. Ensuring follow-up procedures of the biopsies are promptly digitalized and despatched.

- Follow up procedures, such as immunohistochemical staining, are requested through the Laboratory Information System (LIS).
- A LIS-generated request will be sent and printed in the laboratory.
- LIS-generated request form have a specific data field ("HT.DP" marker) to highlight the need for WSI in the requested follow up procedures.

SGH Immunohistochemistry Request		Date of Test: 03/06/15/1451
Patient's Name		Slide Scan: HT.DP
Biopsy No: 15PB13986	Block No: A1, B1	Type of Request: HEM
Pathologist:		
Remarks:		
Others:		
TEST REQUEST	RR	PR
CHECKS		

Slide Scan: HT.DP

SGH Histology Request		Date/Time: 03/06/15/1451
Patient Name		Slide Scan: HT.DP
Biopsy No: 15PB13986	Block No: A1, B1	Type of Request: HEM
Pathologist:		
(Type of Microtomy)	(No of sections)	(Special Instructions)
	(Wait sections per slide unless otherwise stated)	
1. Recut H&E: Deeper sections (DS)	X 1	
2. Retrieval of Materials:		

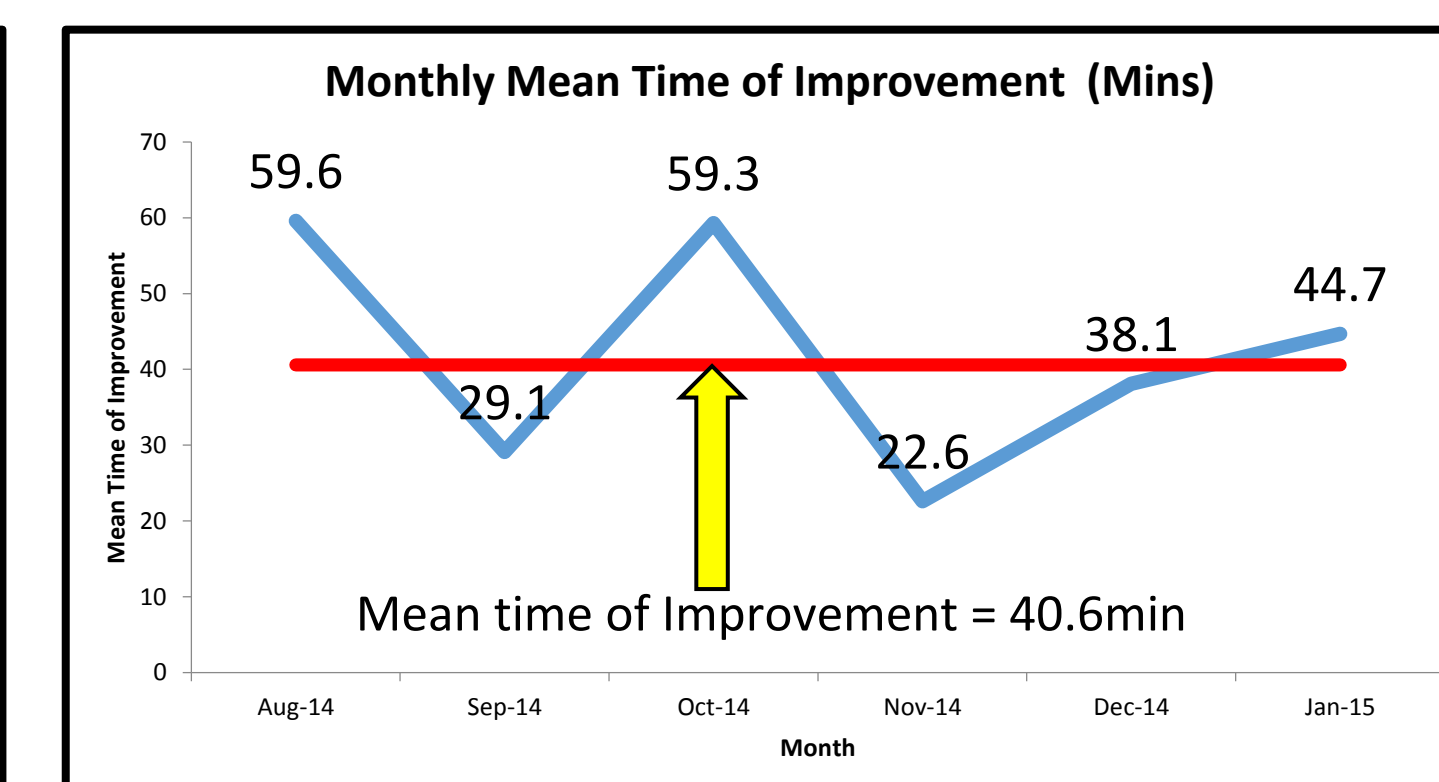
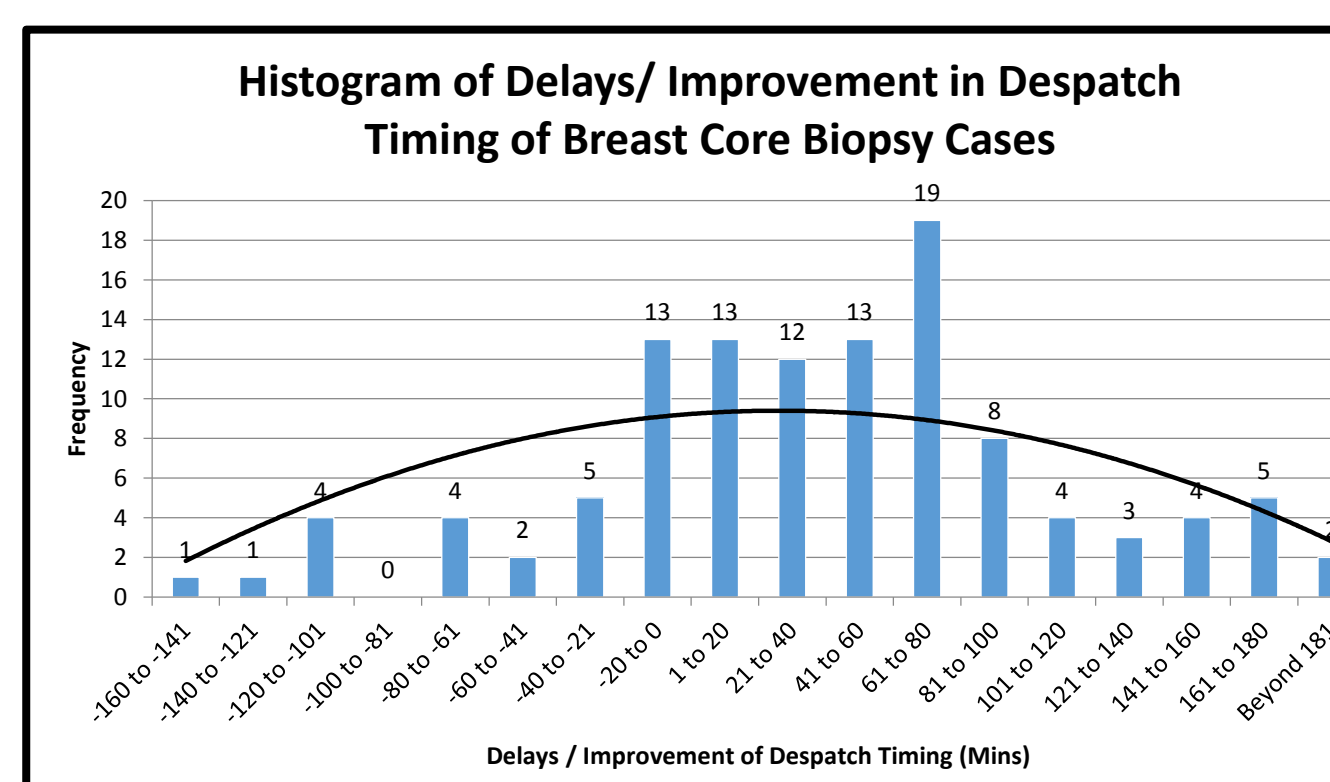
Slide Scan: HT.DP

For impact analysis, median distribution time of breast core biopsy cases was recorded and compared to previous procedure timings. Comparison was done using paired T-test on the data recorded between August 2014 and January 2015. A total of 113 entries was recorded.

RESULTS

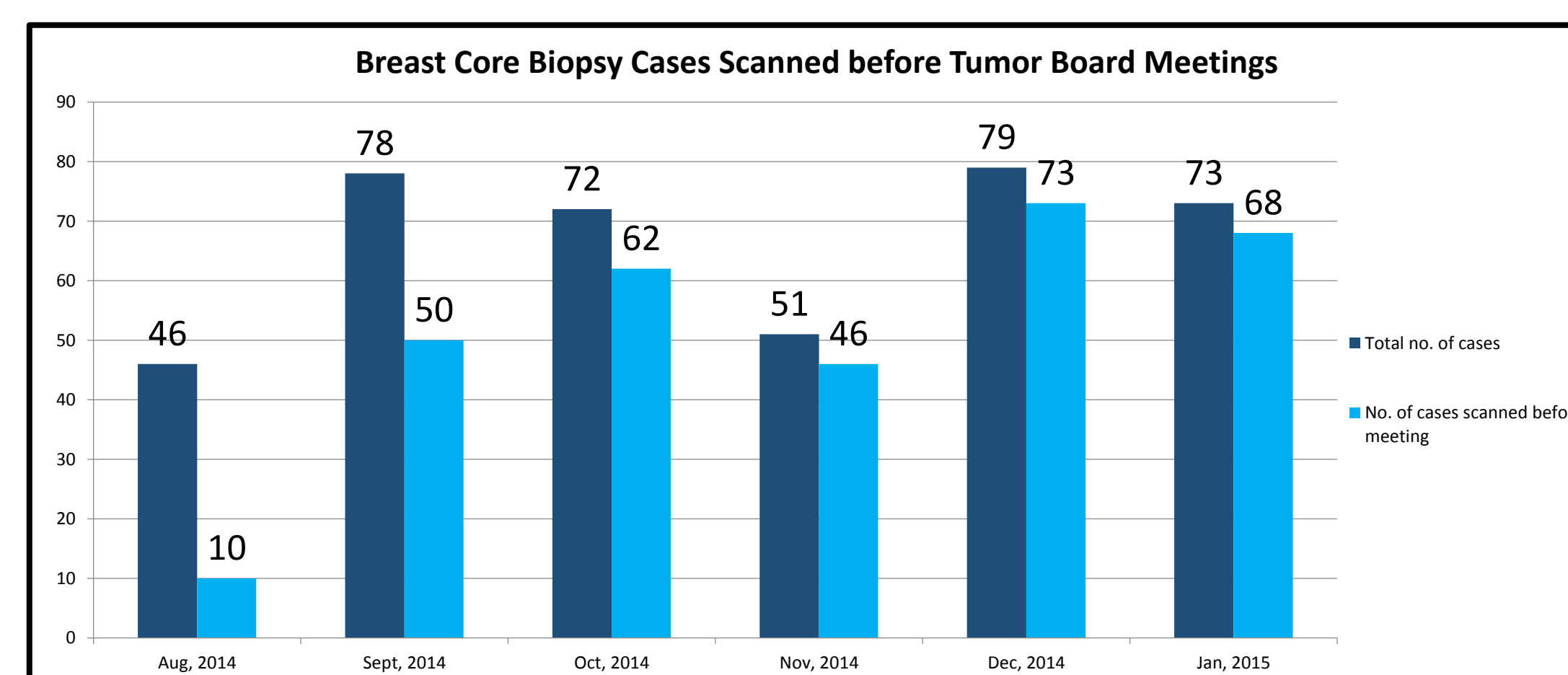
Improvement in time taken to despatch cases to pathologist.

- There was an overall mean improvement of 40.6 minutes after the introduction of the changes. Cases were despatched earlier to pathologist for review.
- This change was statistically significant with a P value of <0.00001.
- The distribution of the improvement is in the graph below



Increased percentage of cases scanned prospectively before tumor board meetings.

- By digitalizing the slides before diagnosis, reduced the need for retrospective retrieval of slides for scanning prior to tumor boards.
- 70% of breast core biopsies were scanned prospectively.
- Reducing the time and effort for retrospective retrieval and free staff to perform other tasks and duties.



CONCLUSION

Prospective WSI of breast core biopsies is readily achievable without negatively impacting timeliness of diagnostic case processing when adopting these workflow changes. Such changes can also be extended and adapted for use on other selected high-value specimens.