



BreastScreen
Victoria

Caring about Women

IMAGE QUALITY REVIEW

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Mammographer at St Vincent's Breast Screen



**ST VINCENT'S
HOSPITAL**
MELBOURNE



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BACKGROUND

- St Vincent's BreastScreen :
 - 1x reading and assessment service
 - 8x screening sites
 - Screens over 56,000 women annually
 - Currently the largest screening service in Victoria





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OBJECTIVE

- To review the average quality of images at the eight services within the St Vincent's BreastScreen cluster
- To assess aspects of the images that could be improved
- To identify the positive aspects of image quality and reinforce what we are doing well





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METHOD

- Review 25 clients per mammographer from the eight sites within the St Vincent's catchment.
- Twelve aspects of images were reviewed based on feedback from our doctors and parts of the Perfect, Good, Moderate, Inadequate (PGMI) system.
- The Crainocaudal (CC) image quality was emphasised.





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REVIEW OF IMAGE QUALITY

Some of the areas that were reviewed included:

- Pectoral-Nipple line (PNL) distance
- Any difference between left and right compression
- Was there a bias to the images
- Was nipple in profile
- Was there an air gap seen
- Was all the breast tissue seen
- Was the contralateral side seen.





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COMPLETION OF THE DATA COLLECTION

- 25 clients per mammographer were reviewed at all sites within the St Vincent's cluster.
- Reviewed only mammographers that screened regularly over the 12 months* the review took place
- Looking for common positives of positioning
- Also looking for common areas of improvement that we can target.





PUTTING IT ALL TOGETHER

- Over 6900 images were reviewed from the 8 different St Vincent's services

Table 1. Images reviewed by service

	Service A	Service B	Service C	Service D	Service E	Service F	Service G	Service H
Machine	Siemens Mammomat Inspiration (DR)	Siemens Mammomat (CR)	Philips (formerly Sectra) MicroDose (DR)	Siemens Mammomat (CR)	Hologic Selenia Dimensions (DR)	Siemens Mammomat Inspiration (DR)	Philips (formerly Sectra) MicroDose (DR)	Hologic Selenia Dimensions (DR)
Mammographers (that could be reviewed)	11	6	3	14	7	12	10	6
Clients per mammographer (where possible)	25	25	25	25	25	25	25	25
Images per client (on average)	4	4	4	4	4	4	4	4
Total images reviewed *	1100	600	300	1400	700	1200	1000	600

Chart 1. Compression force and proportion of 'Good' or 'Perfect' images



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Table 2. Results for image quality criteria by service

	A	B	C	D	E	F	G	H
1. All breast tissue imaged (covering from medial to lateral borders of breast tissue)	86%	91%	95%	97%	93%	91%	94%	97%
1a. Poster nipple line (PNL) or if the depth of tissue is with 10mm of pectoral muscle	62%	63%	68%	74%	69%	69%	70%	73%
1b Nipple in profile	74%	81%	67%	73%	64%	74%	73%	70%
2. Compression								
2a. Average compression force used (N)								
CC average compression force	64.94	77.89	91.92	54.36	69.88	62.79	76.53	71.89
Right	65.23	79.07	90.48	53.95	69.4	63.53	77.45	71.18
Left	64.66	76.72	93.36	54.77	70.37	62.06	75.61	72.6
MLO average compression force	69.72	84.03	100.63	56.14	86.46	66.93	82.04	83.17
Right	70.09	85.14	99.49	54.93	85.58	68.19	81.53	82.15
Left	69.36	82.93	101.77	57.35	87.34	65.68	82.56	84.2
2b. Tissue compression thickness								
CC average	54.49	51.07	60.59	57.36	63.94	56.65	56.85	58.59
Right	54.17	51.06	60.24	56.98	64.03	56.64	57.08	58.18
Left	54.81	51.08	60.95	57.75	63.85	56.67	56.62	59
MLO average	55.55	55.01	64.66	57.83	68.24	60.07	56.44	55.71
Right	55.19	54.16	64.33	57.89	67.41	60.09	56.25	59.19
Left	55.92	55.86	65	57.77	69.07	60.05	56.64	52.23
Proportion of "Good" or "Perfect" Images	51%	56%	60%	46%	50%	49%	63%	56%
2d. Percentage of "Good" images that did not meet the "Good" PNL depth criteria	8%	8%	7%	4%	7%	6%	8%	6%
3. Is there a bias to the image	20%	13%	5%	3%	9%	6%	15%	7%
3a. Which side								
Medial	8%	4%	0%	2%	6%	1%	8%	3%
Lateral	12%	9%	5%	1%	3%	5%	7%	4%
4. Is pectoral muscle seen on the image	27%	16%	17%	27%	24%	25%	25%	24%
5. Any skin folds that would down grade the image	7%	16%	10%	11%	9%	10%	7%	6%
6. Any air gaps seen	16%	22%	7%	25%	7%	8%	6%	13%



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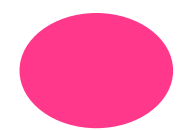
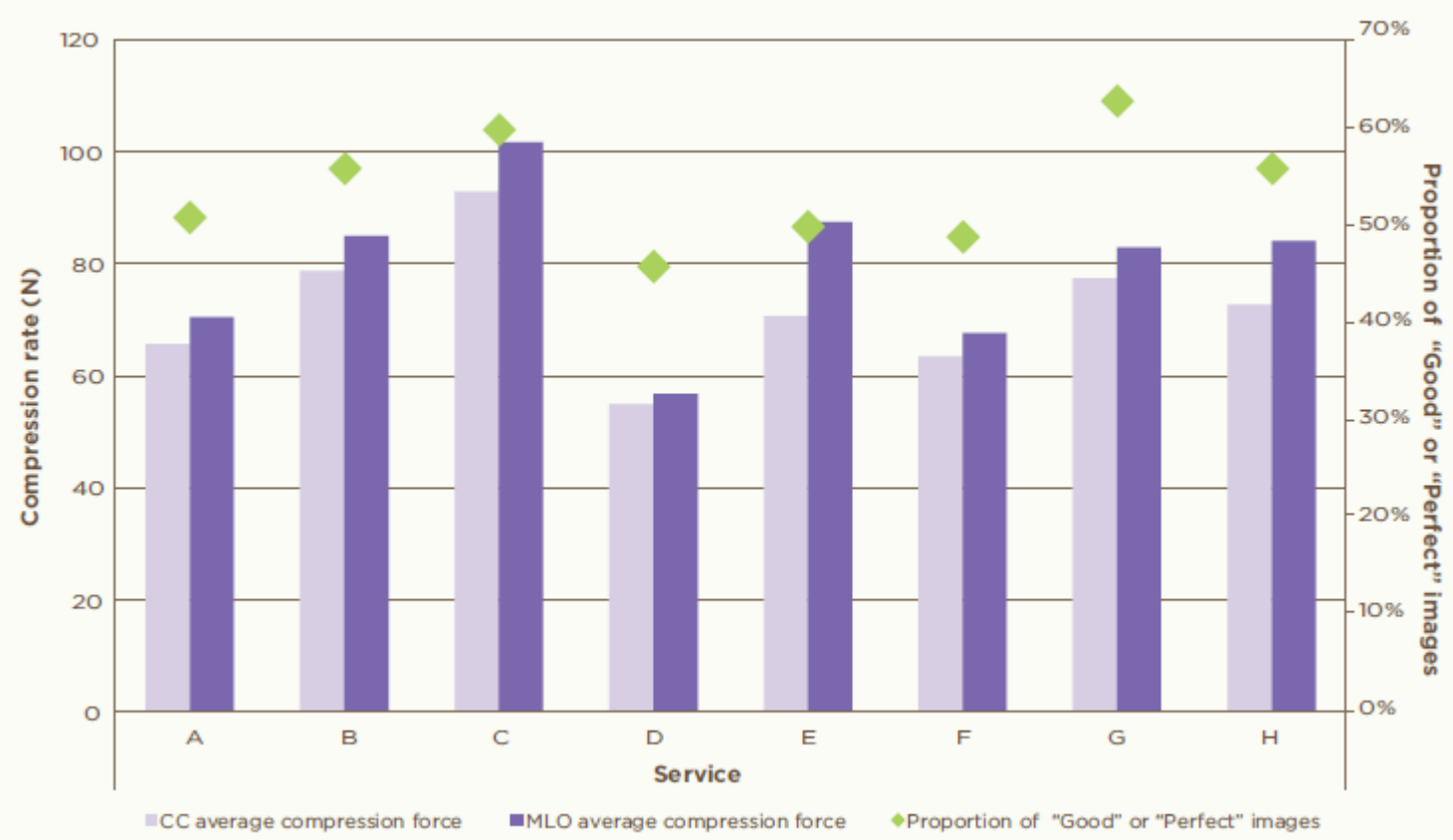
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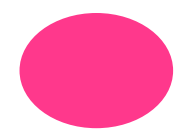
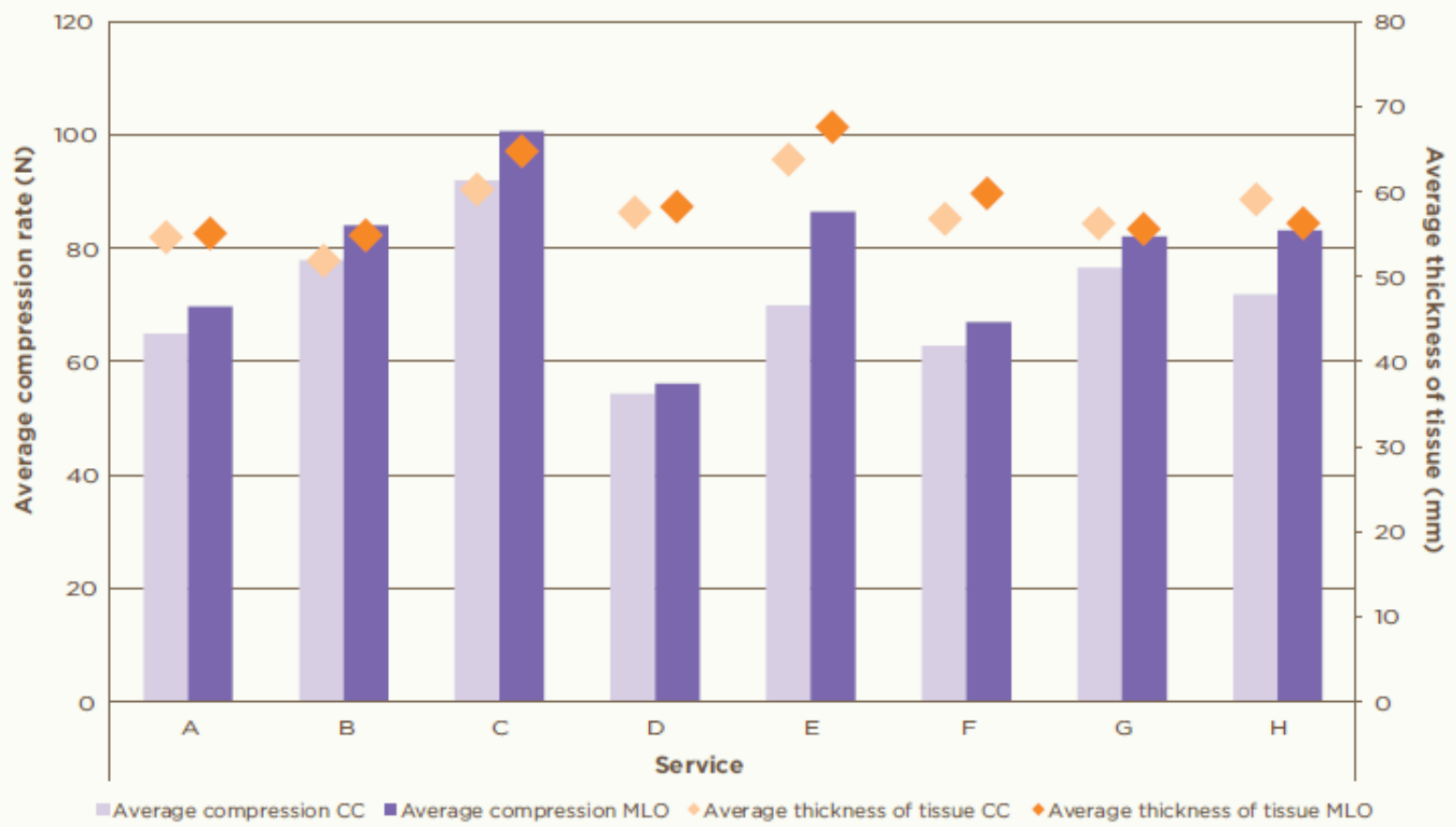
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Chart 2. Compression and thickness of breast tissue





IN SUMMARY

- This review found 53.87% of images were rated ‘Good’ or ‘Perfect quality.’
- Nipple in profile and posterior nipple line met the criteria in over 60% of cases
- All breast tissue covered in over 85% of cases
- Less than 5% of cases had significant bias.





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IN SUMMARY

- 6.75% of images were rated as good when they did not meet the PNL depth criteria
- 9.5% of images that had skin folds that would have down graded the PGMI rating.





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INCIDENTAL FINDINGS

- It was found that some images were not being labelled correctly
- We were able to feed back this information to the relevant sites to rectify this situation.





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CONCLUSION

- There is a minimum compression rate needed to achieve the required quality of image.
- The highest compression rate did not give the highest average quality of image
- The quality of image was not directly related to the thickness of the breast tissue





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OUTCOMES

- Feedback was given to the sites with the lowest compression rate
- A practical workshop was presented to focus on ways to improve our image quality





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WHERE TOO FROM HERE?

- Follow up review
 - See if the work shop has improved our quality
- Survey the mammographers in our catchment:
 - To see how long they have screened for
 - To see what order they take their images
 - Ask what factors effect how much compression they use
 - Ask what they feel effects the quality of their work





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Acknowledgments

- I would like to thank St Vincent's BreastScreen and BreastScreen Unit Victoria for their



References

- Breast Screen Australia National Accreditation Standards, 2015 October, Appendix G, pages, 196-198 {cited 2017 August 17th}. Available from: [http://cancerscreening.gov.au/internet/screening/publishing.nsf/Content/CA8C934AA0B7BA64CA257EFA001C67D7/\\$File/BSA%20NAS%20com_endorsed%20by%20SCO%20Oct%20web%20accessible_updated%205%20May%202016.docx](http://cancerscreening.gov.au/internet/screening/publishing.nsf/Content/CA8C934AA0B7BA64CA257EFA001C67D7/$File/BSA%20NAS%20com_endorsed%20by%20SCO%20Oct%20web%20accessible_updated%205%20May%202016.docx)

