

Implementation of the ACR DMQC Manual in a Large-Scale Enterprise

July 14, 2020

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Disclosures

- Member of the ACR Subcommittee on Breast X-ray Imaging Physics
- ACR Mammography Phantom Reviewer



Aims

- Share our experience
 - Our motivation for transitioning to the ACR Digital Mammography QC (DMQC) Manual
 - The steps that were involved in implementing a new QC program for a large and interconnected enterprise
 - “Lessons learned”



Resources

<https://www.acraccreditation.org/resources/digital-mammography-qc-manual-resources>

QUALITY CONTROL MANUAL

Revised 2nd Edition — May 2020

- QC Manual – UPDATED MAY 2020!!
- FAQ
- Physicist and Technologist Webinars



A multi-geographic enterprise

- 41 sites offering mammography services
 - 2 states (OH, FL)

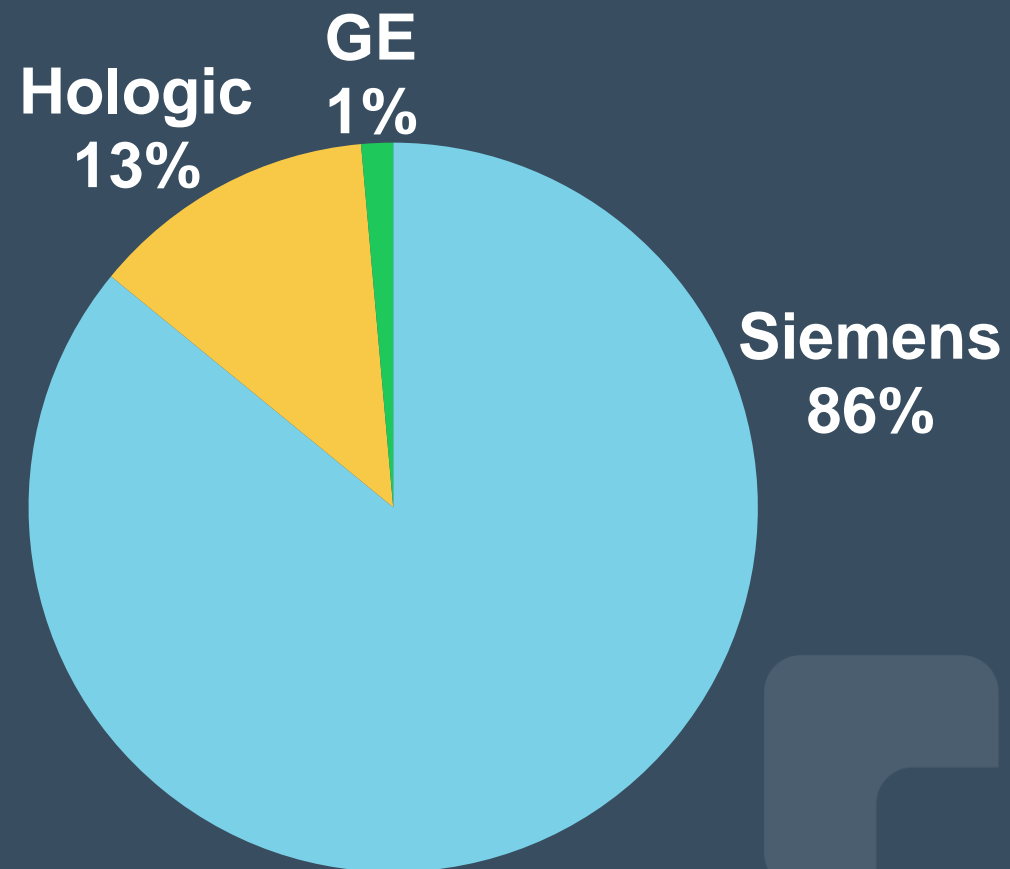
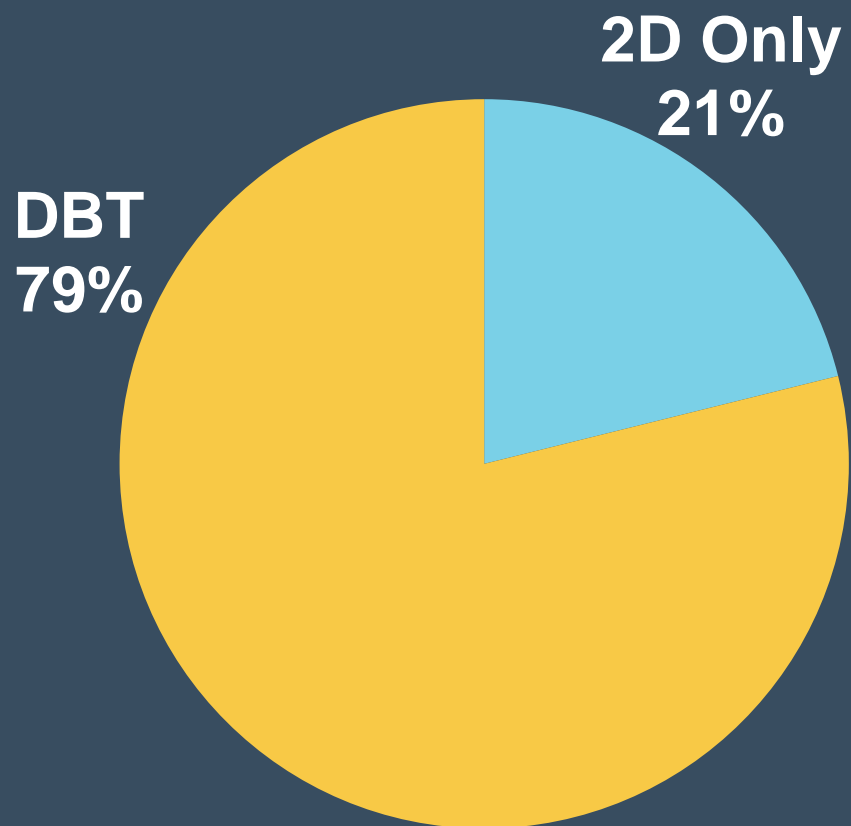


A multi-geographic enterprise

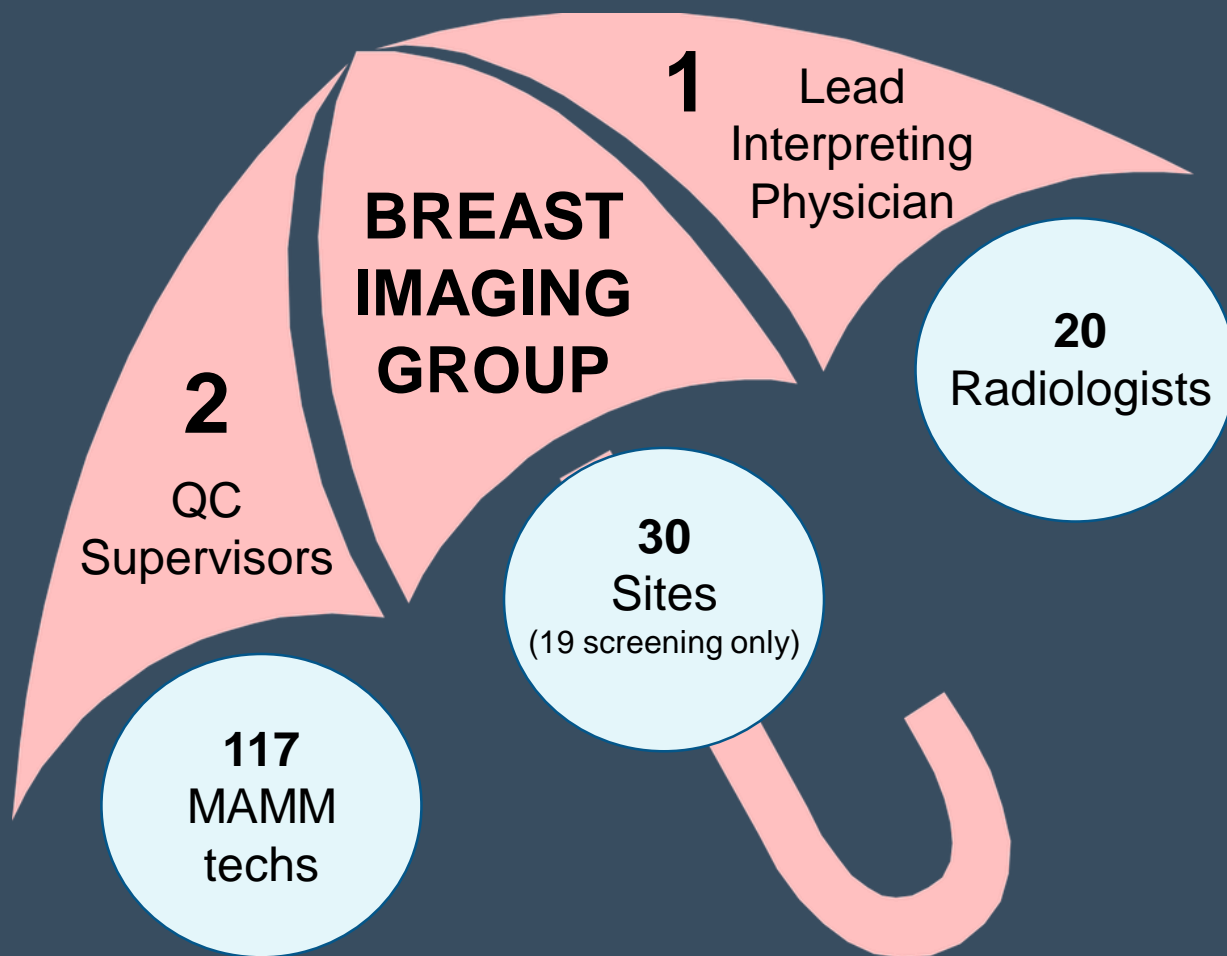
- 41 sites
 - 23 Screening-only
 - 18 Scr+Diagnostic
- 42 Radiologist Workstations
 - Located at DIAGNOSTIC sites



71 FFDM Units



Management Trends

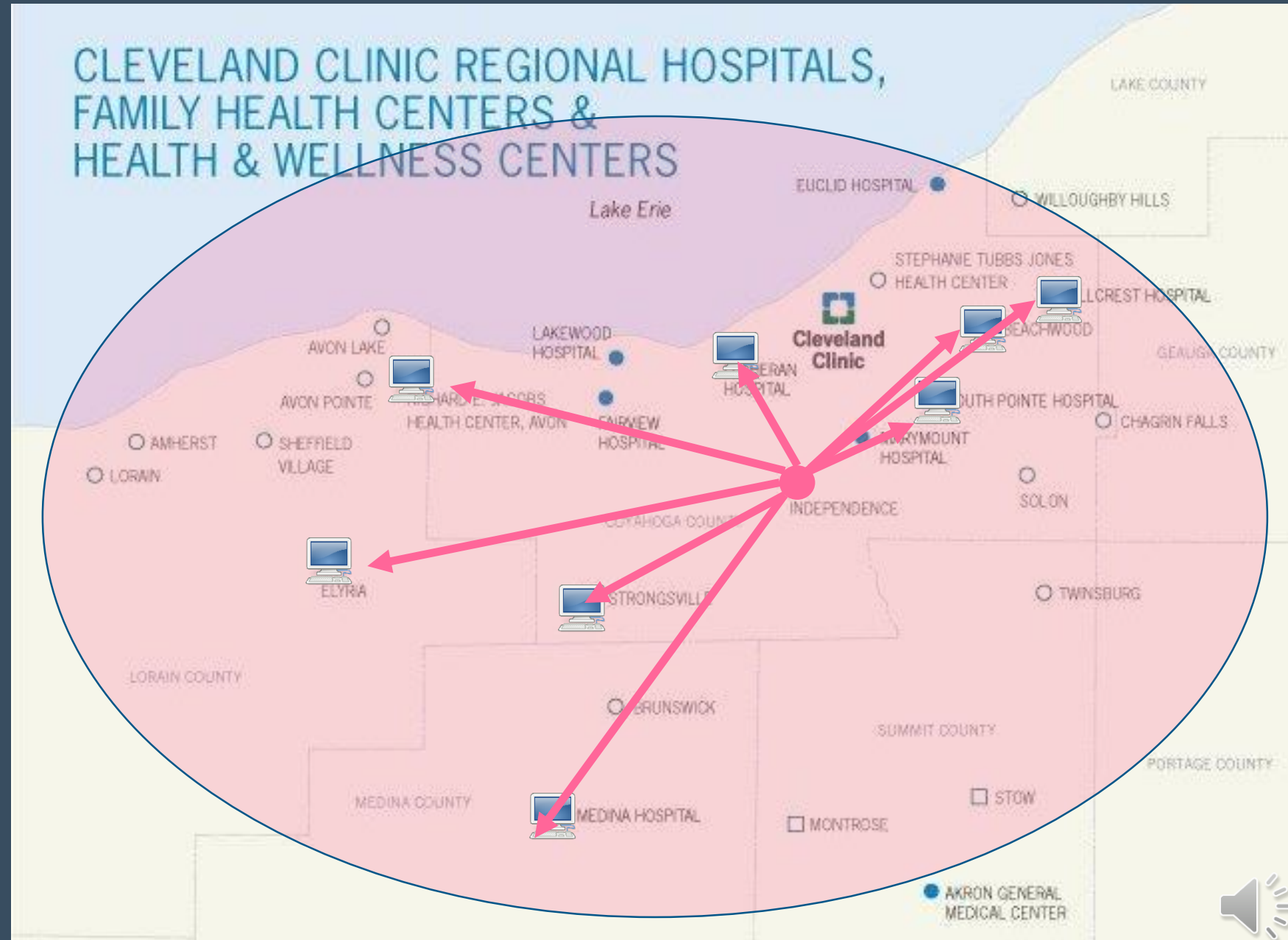


Subset of sites
(~73%) fall under
centralized
management

~14k exams / month
(screening + diagnostic)



- Breast Imaging Radiologists rotate between diagnostic sites
- Screening exam acquired at a Breast Imaging facility can be read from ANY diagnostic site



Management Trends

- Single LIP is responsible for the programs at a large number of sites
 - 2 QC Supervisors responsible for preparing for and attending all MQSA inspections
 - Conduct quarterly QC reviews on behalf of LIP
- Some technologists travel between sites, must be familiar with the equipment and QC programs at each of those sites



Management Trends

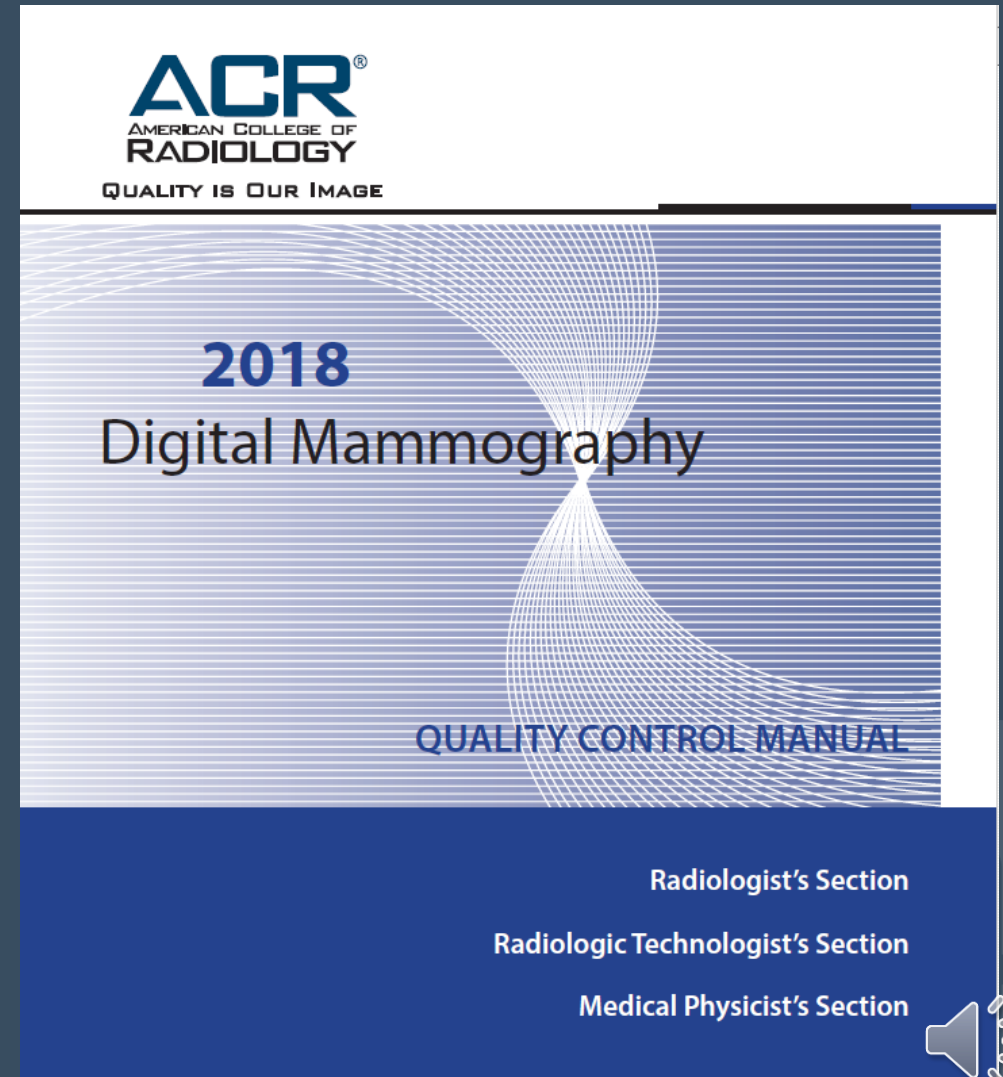
- Highly integrated system
- QC program managed by a small group of people
- Need tools that:
 - Facilitate remote oversight
 - Automate standardized workflows
 - Streamline routine clerical activities



One QC manual to unite them all...

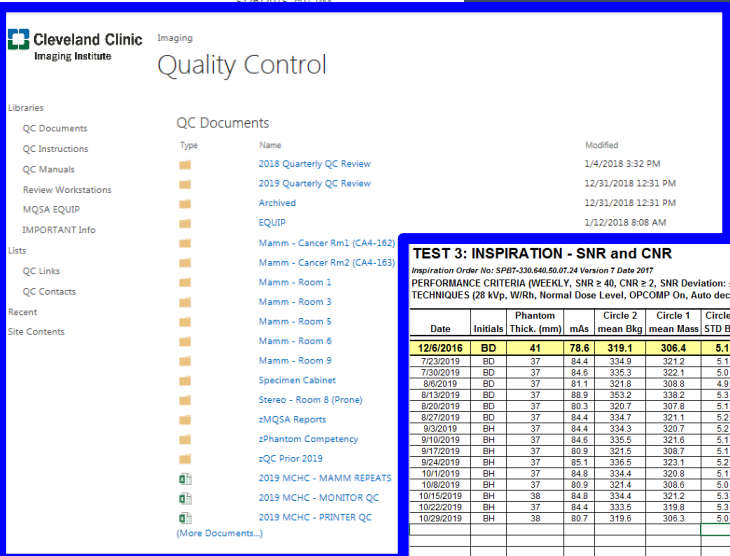
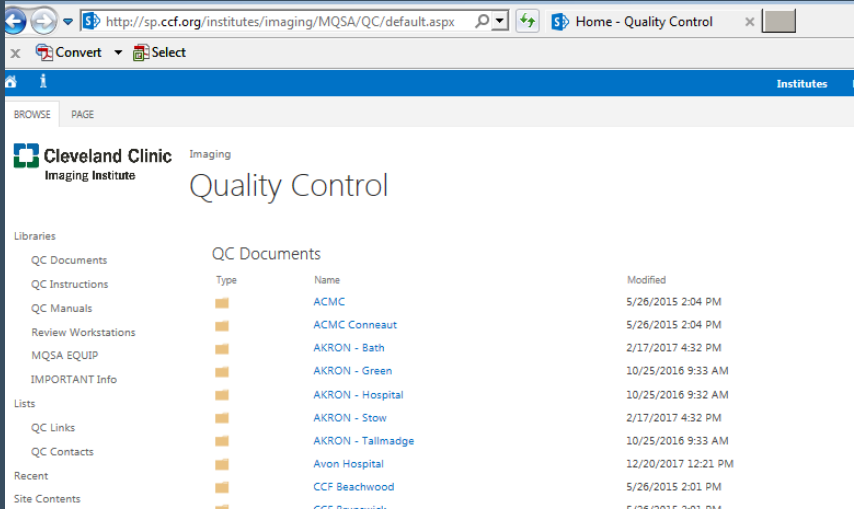
Standardization of
mammography QC across all
vendors and models

- ACR manuals are updated infrequently (unlike vendor QC manuals)

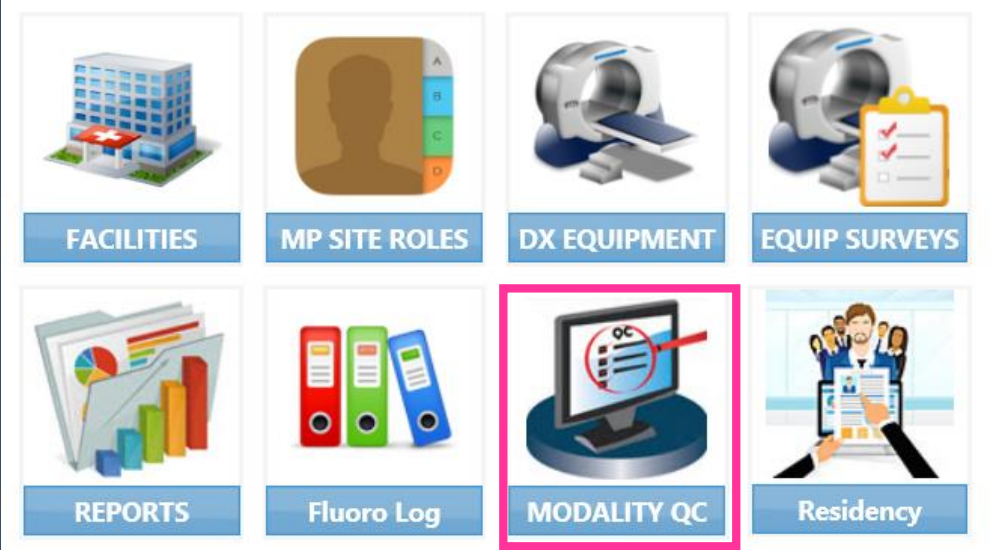


SharePoint+Excel

ModalityQC v.3



TEST 3: INSPIRATION - SNR and CNR													
Inspiration Order No: SP87-330.640.50.07.24 Version 1 Date 2017													
PERFORMANCE CRITERIA (WEEKLY, SNR ≥ 40, CNR ≥ 2, SNR Deviation: ± 15%, CNR Deviation: ± 15%)													
TECHNIQUES (28 kVp, W/Rh, Normal Dose Level, OPCOMP On, Auto decompression Off, AEC Segmentation Off)													
Date	Initials	Phantom Thick. (mm)	mAs	Circle 2 mean Bkg	Circle 1 mean Mass	Circle 2 STD Bkg	SNR	CNR	SNR (%)	CNR (%)	Deviation	Thick.	PASS/FAIL
12/6/2016	BD	41	78.6	319.1	306.4	5.1	53.0	2.50			Baseline		
7/23/2019	BD	37	84.4	334.9	321.2	5.1	55.9	2.69	5.5%	7.6%	-4		PASS
7/30/2019	BD	37	84.9	335.3	322.1	5.0	57.1	2.64	7.7%	5.9%	-4		PASS
8/6/2019	BD	37	81.1	321.8	308.8	4.9	55.5	2.65	4.7%	6.3%	-4		PASS
8/13/2019	BD	37	88.9	353.2	338.2	5.3	57.2	2.83	8.0%	13.4%	-4		PASS
8/20/2019	BD	37	80.3	320.7	307.8	5.1	53.1	2.53	0.2%	1.3%	-4		PASS
8/27/2019	BD	37	84.4	334.7	321.1	5.2	54.8	2.52	3.4%	4.8%	-4		PASS
9/3/2019	BH	37	84.4	334.3	320.7	5.2	54.7	2.62	3.2%	4.8%	-4		PASS
8/10/2019	BH	37	84.6	335.5	321.6	5.1	56.0	2.73	5.7%	9.2%	-4		PASS
8/17/2019	BH	37	80.9	321.5	308.7	5.1	53.2	2.51	0.5%	0.6%	-4		PASS
8/24/2019	BH	37	85.1	336.5	323.1	5.2	55.1	2.58	4.0%	3.2%	-4		PASS
10/1/2019	BH	37	84.8	334.4	320.8	5.1	55.8	2.67	5.3%	0.8%	-4		PASS
10/8/2019	BH	37	80.9	321.4	308.6	5.0	54.3	2.58	2.5%	2.9%	-4		PASS
10/15/2019	BH	38	84.8	334.4	321.2	5.3	53.7	2.49	1.3%	-0.2%	-3		PASS
10/22/2019	BH	37	84.4	333.5	319.8	5.3	53.5	2.58	1.0%	3.6%	-4		PASS
10/29/2019	BH	38	80.7	319.6	306.3	5.0	53.9	2.66	1.8%	6.6%	-3		PASS



Modality-QC > MAMM > Main - Clinic

Mammography (2D+DBT)

Mammography Primary Display

CC-RD1

Siemens Mammomat Inspiration Prime (2D+DBT) CA4-162

✓✓✓✓✓✓✓✓✓✓

CC-RD2

Siemens Mammomat Inspiration Prime (2D+DBT) CA4-163

✓✓✓✓✓✓✓✓✓✗✗✗✗✗



Cleveland Clinic | Radiation Safety Program

Katie Hulme [Logout]

HomeEnterpriseRad SafetyDx ImagingCompliance

siteFeedback

> INVENTORY > Equipment

Modality: MAMM




Img Class: - any -

Show InActive

LOAD ALL MODALITIES

Showing 11 to 20 of 20 entries (filtered from 171 total entries)

Search: MCHC

ID	Image	Type	Unit	Facility	Bldg Code	ModelID	InstallDate
395		Mammography (2D+DBT) @ Main - Clinic > Facility Siemens Mammomat Inspiration (2D+DBT) MCMCWMG02 [3306]	RD3	MCHC	A1-408	104996	400-375409
396		Mammography (2D+DBT) @ Main - Clinic > Facility Siemens Mammomat Inspiration (2D+DBT) MCMCWMG04 [6825]	RD5	MCHC	A1-402	142094	400-518944
397		Mammography (2D+DBT) @ Main - Clinic > Facility Siemens Mammomat Inspiration (2D+DBT) MCMCWMG07 [6804]	RD9	MCHC	A1-420	76009	




FACILITIES



MP SITE ROLES



DX EQUIPMENT




EQUIP SURVEYS




REPORTS



Fluoro Log



MODALITY QC



Residency

[MCHC] Main - Clinic > Facility

[ID#: 395] Siemens Mammomat Inspiration (2D+DBT)

OverviewDetailsSurveys

Survey Type: All

Has Failures: No Filter

Done By: Any

Survey Status: Any

Pending CA: No Filter

Reviewer: Any

Review: Any

Year: All

Month: - no filter -

Add Survey

12 Records Found

Survey Date	Due Date	Survey Type	Done By	Survey Status	Result	Fail #	Pend.CA	Reviewer	Report	Pend.SO	File
2020-10-28	2020-11-28	Annual	Hulme, Katie	Projected		0	0	Hulme, Katie		0	
2019-11-19	2019-11-19	Post-Repair	Wunderle, Kevin	Completed	P	0	0	Hulme, Katie	Closed	0	
2019-10-28	2019-12-08	Annual	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	
2018-12-04	2018-12-04	Post-Repair (Approval Only)	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	
2018-10-08	2018-10-31	Annual	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	
2018-09-05	2018-09-05	Post-Repair (Approval Only)	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	
2018-01-24	2018-01-24	Post-Repair (Approval Only)	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	
2017-10-02	2017-10-02	Post-Repair	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	
2017-09-22	2017-09-22	Post-Repair (Approval Only)	Fisher, Ryan	Completed	P	0	0	Fisher, Ryan	Closed	0	
2017-09-13	2017-09-13	Post-Repair	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	
2017-08-31	2017-11-14	Annual	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	
2016-09-14	2016-09-14	Annual	Hulme, Katie	Completed	P	0	0	Hulme, Katie	Closed	0	

Our Motivation

- QC logs can be transitioned off of SharePoint and into ModalityQC (electronic QC software)
 - Real-time notification of failures
 - Tracking of service tickets
 - Automatic report generation for:
 - ACR
 - MQSA Inspections
 - Quarterly QC reviews for MQSA EQUIP (eventually...)



All-or-nothing

- Highly integrated system
 - Breast Imaging sites
 - Transitioning a single mammography unit necessitated transitioning all workstations
 - Benefit achieved by transitioning ALL sites
 - Large scope, high cost
 - Transition needed to be carefully considered and planned out

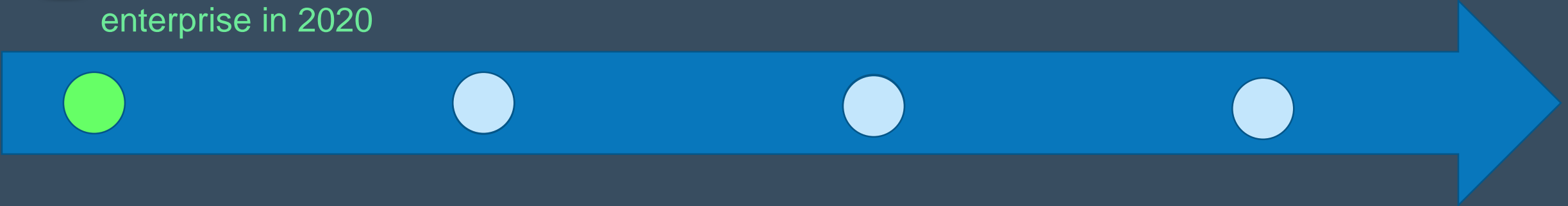




Transition Timeline

2019 Q2

- ✓ Cost-benefit analysis presented to administration
- ✓ Obtained approval to transition enterprise in 2020



Costs and Considerations

- Transitioning does not necessarily make sense for everyone
- Costs need to be detailed to administration:
 - Phantoms
 - Technologist Training
 - Software and/or Development (tools, templates, etc.)



Costs and Considerations

- Vendor will not necessarily provide QC training specific to the ACR QC Manual for new sites or installs
 - Who will conduct this training?



Costs and Considerations



First unit transitioned starts the ticking clock for all peripheral equipment:

- All workstations that read for than unit must be transitioned before the next regularly scheduled annual survey for that mammography unit



Gains/Impact

- Time Savings
 - Technologist
 - Streamlined routine QC
 - Dashboards and failure tracking
 - Lead Interpreting Physician
 - Electronic sign-off for quarterly reviews
 - Physicist
 - Minimal template management



Not about doing “less” ... About making it easier to do the right thing better



Tips

- Include your LIP and Mammography supervisors/administrators in conducting the cost-benefit analysis
 - Ensure you don't miss anything
 - Knowing what the effort will involve (especially TIME) helps set expectations

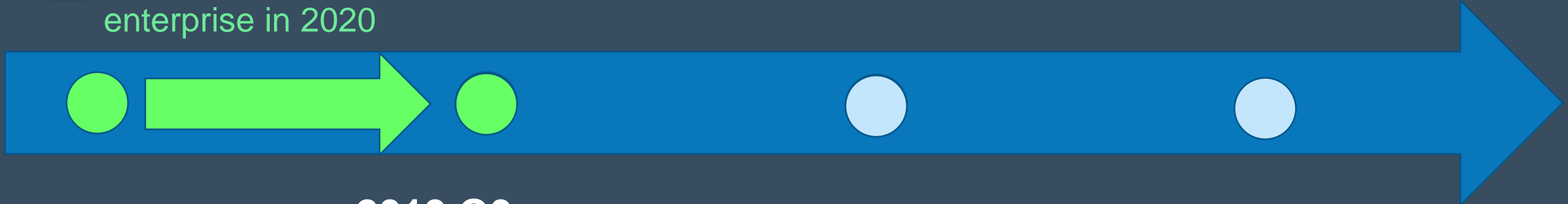




Transition Timeline

2019 Q2

- ✓ Cost-benefit analysis presented to administration
- ✓ Obtained approval to transition enterprise in 2020



2019 Q3

- ✓ Develop beta version of ModalityQC v.3:
 - ✓ Online QC logs
 - ✓ Automatic reports
- ✓ Physics testing template



Meeting with QC Supervisors

- Sat down with QC Supervisors before building out Modality QC v.3
 - Ultimately, this tool was for them and their techs
 - Opportunity for them to outline:
 - Wish-List
 - Biggest pain points
 - Keeping track of service tickets
 - Monitor QC



Objectives

- Ensure forms can be updated quickly, as necessary
- Make electronic QC logs simple to use and hard to screw up
- Make it easier to manage remote sites and know what's going on:
 - How many units down?
 - How many service calls open?



QC Log Design

- Dynamic smart-form designer
 - Can be used to build and design forms for any modality

Mammo Monthly Visual Checklist

1 Room Cleanliness (3 Questions)

+ question ▼ rename

Order	Question <small>show/hide inactive</small>	Type	Answer Options	Detection	Shwn	
▲ 1 ▼ [19]	Mag stands and paddles free from dust	PassFail		WARNING[Fail]	Y	Edit Clone
▲ 2 ▼ [20]	Room and coutnertops free from dust	PassFail		WARNING[Fail]	Y	Edit Clone
▲ 3 ▼ [21]	Cleaning soluation available*	PassFail		FAIL[Fail]	Y	Edit Clone

2 X-Ray Unit (8 Questions)

+ question ▲ ▼ rename



Option to deactivate form or fields that are not applicable

Customization at the item-level:

- Presets
- Tolerance criteria
- Headers/footers

Mammo Weekly Phantom Image Quality (2D)

☐ Not Applicable To This Unit (Exclude)

[305] ACCO-RD1 @

Siemens Mammomat Inspiration (2D+DBT) CE# 155881

Item-Specific Tolerances	Load Form Config	{ Min-Max }	Baseline \pm Change				
Question	Active?	Preset Value	Min	Max	Baseline (center)	Max Change (delta)	Update Baseline on PASS
Technique (2D)							
Target Filter	<input checked="" type="checkbox"/>	1 Preset: W/Rh <input type="text"/>					
kVp	<input checked="" type="checkbox"/>	<input type="text" value="28"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
mAs	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Phantom Score (2D)							
Artifacts	<input checked="" type="checkbox"/>	Pass/Fail - no pre-set					
Fiber Score	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text" value="2"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Speck Group Score	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text" value="3"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Mass Score	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text" value="2"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Form Header Note

Procedure = MAM SCREENING W TOMO
 (Perform exam in COMBO mode, score 2D image and

Form Footer Note

⚠ Days To Complete QC Before Late Alert

7

✕ Cancel

✓ Save

Mammo Weekly Phantom Image Quality (2D)

☐ Not Applicable To This Unit (Exclude)

[305] ACCO-RD1 @

Siemens Mammomat Inspiration (2D+DBT) CE# 155881

Item-Specific Tolerances


Load Form Config

{ Min-Max }

| Baseline ± Change |

Question	Active?	Preset Value	Min	Max	Baseline (center)	Max Change (delta)	Update Baseline on PASS
Technique (2D)							
Target Filter	<input checked="" type="checkbox"/>	1 Preset: W/Rh					
kVp	<input checked="" type="checkbox"/>	28					
mAs	<input checked="" type="checkbox"/>						
Phantom Score (2D)							
Artifacts	<input checked="" type="checkbox"/>	Pass/Fail - no pre-s					
Fiber Score	<input checked="" type="checkbox"/>			2			
Speck Group Score	<input checked="" type="checkbox"/>			3			
Mass Score	<input checked="" type="checkbox"/>			2			
Form Header Note							
Procedure = MAM SCREENING W TOMO (Perform exam in COMBO mode, score 2D image and							
Form Footer N							
Days To Complete QC Before Late Alert 7							

[2070] CC-RD1 - Siemens Mammomat Inspiration Prime (2D+DBT)



Physics ID#: 2070

Site: Main - Clinic

Equipment Type: Mammography (2D+DBT)

Manufacturer: Siemens

Model: Mammomat Inspiration Prime (2D+DBT)

Unit ID: CC-RD1

Bldg Code: CA4-162

SN: 10078

CE #: 142142

Siemens: 400-533422

Mammo Weekly Phantom Image Quality (2D)

Note: Procedure = MAM SCREENING W TOMO
(Perform exam in COMBO mode, score 2D image and tomo slices in their respective logs)
View = RCC
Technique = OPDOSE (Prime ON for 2D, AEC Segmentation ON)
Paddle = 24x30 low-edge
Compression Force = 50 N

Log Date 6/8/2020

☐ Unit Down

☐ Site Closed

Consolidated instructions for the technologist



Mammo Weekly Phantom Image Quality (2D)

☐ Not Applicable To This Unit (Exclude)

[305] ACCO-RD1 @
Siemens Mammomat Inspiration (2D+DBT) CE# 155881

Item-Specific Tolerances
Load Form Config
{ Min-Max }
| Baseline ± Change |

Question	Active?	Preset Value	Min	Max	Baseline (center)	Max Change (delta)	Update Baseline on PASS
Technique (2D)							
Target Filter	<input checked="" type="checkbox"/>	1 Preset: W/Rh					
kVp	<input checked="" type="checkbox"/>	28					
mAs	<input checked="" type="checkbox"/>						
Phantom Score (2D)							
Artifacts	<input checked="" type="checkbox"/>	Pass/Fail - no pre-s					
Fiber Score	<input checked="" type="checkbox"/>			2			
Speck Group Score	<input checked="" type="checkbox"/>			3			
Mass Score	<input checked="" type="checkbox"/>			2			

Form Header Note

Procedure = MAM SCREENING W TOMO

(Perform exam in COMBO mode, score 2D image and

Form Footer N

Days To Complete QC Before Late Alert
7

[2070] CC-RD1 - Siemens Mammomat Inspira



Physics ID#:	2070
Site:	Main Clinic
Equipment Type:	Mammography
Manufacturer:	Siemens
Model:	Mammomat Inspira

Mammo

Log Date 6/8/2020

Note: Procedure = MAM SCREENING W TOMO
(Perform exam in COMBO mode, score 2D image)
View = RCC
Technique = OPDOSE (Prime ON for 2D, AEC S
Paddle = 24x30 low-edge
Compression Force = 50 N

ACR Technique and Procedure Summaries

Image Mode (2D, 2D w/Add-on DBT, DBT)

Facility

Room ID

MAP ID-Unit# (00000-00)

Unit Mfr & Model

ACR DM Phantom Image Quality

Procedure:

Use the technique typically used for a 4.2 cm thick compressed breast of 50% glandular and 50% adipose tissue. Obtain exposure mode, phantom setup, and operating levels from medical physicist. Use largest image receptor size available and matching clinically used paddle. Use 5 daN or 12 lbs compression force. Score and analyze on acquisition workstation (radiologist workstation for DBT). For DBT, record the slice or slab where the test objects are best visualized. Adjust W/L to optimize test objects and record; do not subtract for artifacts. Zoom and pan across entire image to evaluate for artifacts.

Phantom Setup	Date				
	AEC mode				
	Paddle size (IR size)				
	Paddle type (reg or flex)				
	View or selected image				
	Slice or slab # (DBT only)				
	Compression force				
	AEC cell position (if avail)				
	Target/filter (if app)				
	kVp (if app)				
	Density setting (if app)				
	Window width & window level (approx)				
	Image name (if app)				
Image ID (if app)					

Contains the information of the “ACR Technique and Procedures Summary”



Technique (2D)

Target Filter

W/Rh ▼

kVp

28

mAs

Phantom Score (2D)

Artifacts

Pass

Fail

Fiber Score

- select - ▼

min passing: 2

Speck Group Score

- select - ▼

min passing: 3

Mass Score

- select - ▼

min passing: 2

Scoring Diagram

Scoring	Full Point		Half Point	
	Fibers	≥ 8 mm long	Specks	≥ 5 and < 8 mm long
	Specks	4 - 6 specks	Masses	2 - 3 specks
	Masses	≥ ¼ border		≥ ½ & < ¾ border

Failures in phantom image quality **MUST** be corrected **BEFORE** clinical use.



Artifacts

Pass Fail

Fiber Score

0.5

min passing: 2

Speck Group Score

3.0

min passing: 3

Mass Score

1.0

min passing: 2

Scoring Diagram

Scoring	Full Point		Half Point
	Fibers	≥ 8 mm long	≥ 5 and < 8 mm long
Specks		4 - 6 specks	2 - 3 specks
Masses		≥ ¾ border	≥ ½ & < ¾ border

Alert

FAILURE DETECTED!
Please select **Action Taken** (or correct data entry)

OK

Summary of Failed Checks

⊗ [Artifacts @ Fail]=[Fail]

⊗ [Fiber Score @ 0.5] under {2}

⊗ [Mass Score @ 1.0] under {2}

Action Taken Regarding Failed Checks

- select -

Alert

Comments are required when Quality Control checks fail or are outside the acceptable limits.

OK

Will Repeat QC Test

Medical Physicist Consulted AND Service Ordered

Medical Physicist Consulted

Service Ordered

Other (specified in comments)

- select -



Tracking Service

Log Date	Unit Status	QC Result	Logged By	Logged Date	Comments	Fail Action	Site Review	MP Review
2020-04-15	Active	Fail (Critical Item)	Hulme, Katie	2020-04-15 09:42	I called them>>[Artifacts @ Fail]=[Fail]; >>[Fiber Score @ 1.0] under {2};	Service Ordered 		

Service Ordered ×

Service Work Order#:

✕ Cancel ✓ Track Service



Tracking Service

[Home](#) [Enterprise](#) [Rad Safety](#) [Dx Imaging](#) [Compliance](#)

Modality-QC > **MAMM** > CCAC

[2144] **KTEST - Siemens Mammomat Inspiration (2D+DBT) @ AC2-1-145D**

Weekly

Monthly

Quarterly

Semi-Annual

QC Status	QC Check	Last QC	Last QC Result	Last Site Review	Last MP Review
	Mammo Weekly Phantom Image Quality (2D)	2020/04/15	Fail (Critical Item)	2020/03/10 Review	[never]
	Mammo Weekly Phantom Image Quality (DBT)	2020/02/10	Pass	2020/03/10 Review	[never]

Actions

QC Team

Export QC Data

ACR Checklist

Service Ordered

NEW QC TEST



Tracking Service

Modality-QC > **MAMM** > Lorain FHSC

Actions ▾

[2595] **RD1 - Siemens Mammomat Inspiration Prime (2D+DBT) @ LR2-141**

Survey and Service Log

Weekly

Monthly

Quarterly

Semi-Annual



Survey Type:

All



Has Failures:

No Filter



Done By:

Any



Survey Status:

Any



Pending CA:

No Filter



Reviewer:

Any



Review:

Any



Year:

All



Month:

- no filter -



7 Records Found

Survey Date	Due Date	Survey Type	Done By	Survey Status	Result	Fail #	Pend.CA	Reviewer	Report	Pend.SO	File
2021-01-24	2021-02-24	➔ Annual		Projected		0	0	Hulme, Katie		0	
2020-04-29	2020-05-30	➔ Service		Completed	F-P3	1	0	Non-CCF/Service Engineer,	Closed	0	
2020-04-09	2020-05-22	➔ Service		Completed	F-P3	1	0	Non-CCF/Service Engineer,	Closed	0	
2020-01-24	2020-03-10	➔ Annual		Completed	P	0	0	Hulme, Katie	Closed	0	
2019-01-22	2019-01-22	➔ Post-Repair (Approval Only)		Completed	P	0	0	Hulme, Katie	Closed	0	
2019-01-10	2019-11-27	➔ Annual + Post-Repair		Completed	P	0	0	Hulme, Katie	Closed	0	
2018-09-27	2018-09-28	➔ Acceptance		Completed	P	0	0	Hulme, Katie	Closed	0	





Site:	Lorain Family Health and Surgery Center	Bldg Code:	LR2-141
Equipment Type:	Mammography (2D+DBT)	SN:	11011
Manufacturer:	Siemens	CE #:	226705
Model:	Mammomat Inspiration Prime (2D+DBT)	Siemens:	400-606449

Survey Info

Updated: 4/30/2020 10:36:16 AM by WEBERR1

Survey Date:	04/29/2020	Due Date:	05/30/2020
Status:	Completed	Review Status:	Closed
Type:	Service	Performed By:	Non-CCF/Service Engineer, - 04/29/2020
Repair Type:	Other	Reviewer:	Non-CCF/Service Engineer, - 04/29/2020
Additional Staff:	-none-		

Survey Report and Failures

Survey Result:	Fail - P3 (Non Urgent Scheduled Service)	Survey Report:	View Report	
				Review started: 4/29/2020

Comments: Power Outage Unit will not come back up Service Ordered >> WO#[3608415]

	Failure Type	WO #	CA Documentation	Updated	Updated By	CA Done?	
	Equipment Issue Power Outage Unit will not come back up Service Ordered >> WO# [3608415]	3608415	Service Approval	4/30/2020 10:36:03 AM	WEBERR1		



Dashboards

Modality-QC > **MAMM** > Dashboard

Facility: Lutheran ▼

0 Failures

0 Past Failures Pending Service Closure

0 QC Checks Due

QC Completion Map

[illegible]

Dashboards

Modality-QC > MAMM > Dashboard

Facility:

0 Failures

0 Past Failures Pending Service Closure

0 QC Checks Due

QC Completion Map

Item	QC Map
Lutheran LUHO-DS002 [352]	Monthly Review Workstation Monitor QC (Dual Display)
Lutheran LUHO-RD1 [408]	Mammo Weekly Phantom Image Quality (2D)
	Mammo Weekly Phantom Image Quality (DBT)
	Mammo Monthly Visual Checklist
	Compression Thickness Indicator
	Acquisition Workstation Monitor QC (Single Display)
	(Siemens) Detector Flat-Field Calibration (Contact)
	(Siemens) Detector Flat-Field Calibration (Mag)
	(Siemens) Detector Flat-Field Calibration (Tomo)
	Compression Force

Modality-QC > MAMM > Dashboard

Facility:

1 failures

Facility	Bldg	Item Name	Log Date	Unit Status	QC Result	Comments	Fail Action	Service/WO
CCAC	AC2-1-145D	KTEST	2019-10-15	Active	Fail (Critical Item)	speck like artifact by mass>>[Artifacts @ Fail]=[Fail];	Service Ordered	123445

2 Past Failures Pending Service Closure

Facility	Bldg	Item Name	Failed QC	Service/WO
CCAC	AC2-1-145D	KTEST	Acquisition Workstation Monitor QC	112233
CCAC	AC2-1-145D	KTEST	Mammo Weekly Phantom Image Quality (2D)	123123

6 QC Checks Due

Facility	Bldg/Room	Item Name	QC Check	Last QCDate	Due Date
CCAC	AC2-1-145D	KTEST	Mammo Weekly Phantom Image Quality (2D)	10/15/2019	10/22/2019
CCAC	AC2-1-145D	KTEST	Mammo Weekly Phantom Image Quality (DBT)	09/28/2019	10/05/2019

Physics Template

- Changes made to ACR template to adapt it for internal use:
 - Imported inventory from SQL database to auto-populate “Facility, Unit and Test Equipment” page
 - Created look-up tables with the settings to use for each test based on Make/Model



Items of Clarification

- AEC settings for Phantom Image Quality (AEC Segmentation ON or OFF)?

Q. When performing the Phantom Image Quality test, what settings should be used to acquire the phantom image?

A. Some manufacturers have historically included in their QC manual phantom image quality test procedure a step to fix the AEC “sensor” position, or to fix automatic segmentation features, or fix kVp settings, in order to ensure the phantom image quality acquisitions are consistently performed. With ACR’s QC manual and the new, larger phantom, this accommodation is unnecessary. For facilities using the ACR manual, the phantom image quality test must be performed using the same image acquisition settings that are used in routine patient screening mammography exams.

The American College of Radiology Digital Mammography QC Manual: Frequently Asked Questions (revised 10/03/2019), p8-9. <https://www.acraccreditation.org/-/media/ACRAccreditation/Documents/Resources/DMQC/DMQCFAQs.pdf?la=en>





Transition Timeline

2019 Q2

- ✓ Cost-benefit analysis presented to administration
- ✓ Obtained approval to transition enterprise in 2020

2019 Q4

- ✓ Beta test ModalityQC v.3 at MC
- ✓ Beta test Medical Physics annual testing on select units
- ✓ Annual Mammography QC Meeting

2019 Q3

- ✓ Develop beta version of ModalityQC v.3:
 - ✓ Online QC logs
 - ✓ Automatic reports
- ✓ Physics testing template



Modality QC - Beta Testing

- 2 units + 2 workstation + 2 techs
 - Trained technologists on ACR QC and electronic QC logs
 - Conducted ACR QC in conjunction with manufacturer QC for 1 month
 - Purpose
 - Identify bugs in the software
 - Opportunity to develop training materials early and obtain technologist feedback



Annual Mammography QC Meeting

- Early December
- Attendees:
 - Lead QC techs and administrators from all CCF facilities
 - Physicists that perform mammography surveys



Annual Mammography QC Meeting

- Objectives:
 - Review programmatic changes for the new year, including:
 - ACR QC Manual Transition
 - Motivations
 - Roll-out schedule
 - Where and when to order the phantom



Annual Mammography QC Meeting

- Conducted hands-on ACR QC Training session for Phase 1 sites immediately following annual meeting
 - Dropped this for Phase 2 sites, on-site training the day of was found to be sufficient





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2020 Q1

- ✓ Phase1 of roll-out begins



Current Status

- As of this presentation, have transitioned:
 - 15/41 sites
 - 24/71 units



~35%



Transitioning a Site

- Sites cannot transition to the ACR QC Manual until the physicist has conducted an annual survey of the digital mammography unit using the ACR DM QC manual and phantom (transition survey)



Single-Unit Sites

- Physics Testing - AM
- Technologist QC Training (1 hour) - PM
 - Conducted on-site immediately following physics testing
 - Perform and log all weekly, monthly, semi-annual QC
 - Siemens: only tests NOT performed were the quarterly detector calibrations, date of last calibration was logged and recorded



Hands-On Training

- Q1 - All hands-on QC training conducted on-site by Medical Physics
- Q2 - QC Supervisors trained and hands-on QC training split between Medical Physics and QC Supervisors



Lessons Learned:

- Execution stage easier than the planning stage 😊
- None of the sites that have transitioned have had an MQSA inspection yet...
 - Physicist will attend the first few inspections as there will surely be some bumps!



Lessons Learned:

- Anticipate possible issues with ROI measurements for DBT and have a plan in place
 - Export your DICOM images or have the facility burn you a CD
 - Possible DICOM readers w/ ROI statistics:
 - Osirix
 - K-PACS



Lessons Learned

- Remind them to buy their phantom!
 - Divided sites up by quarter, sent reminder email the 2nd month of the preceding quarter
- Emphasize the purpose behind what is happening
 - If it is not in their best interest, you shouldn't be doing it!
- Your confidence helps their confidence



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- Vadim Kartuzov (our computer whiz)
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Every life deserves world class care.