

# Holistic Support Model: A case-study of BreastScreen Queensland

## a 34 year journey...

Michael Bleazard

Consultant Medical Physicist

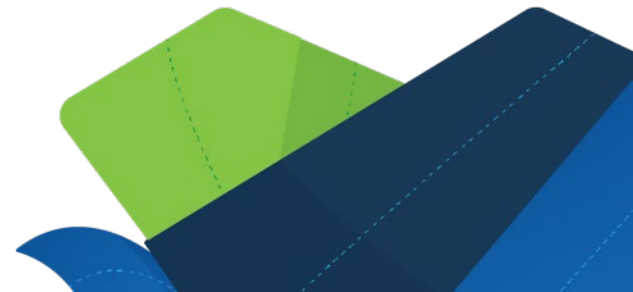
Biomedical Technology Services, Queensland Health



**Queensland**  
Government

# Biomedical Technology Services (BTS)

- A business unit of Queensland Public Health and Scientific Services (QPHaSS) within the Queensland Health
  - Cancer Screening Unit is also part of QPHaSS
- Provides comprehensive health technology management services to the Queensland public health sector and other healthcare industry customers.



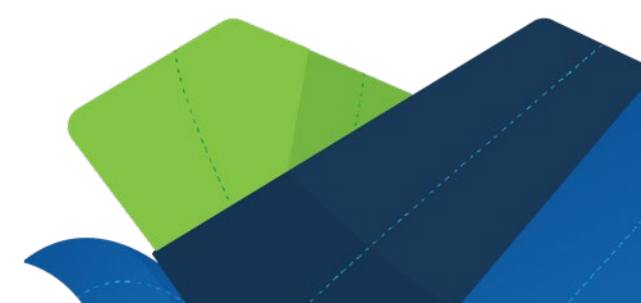
# What BTS Does

## **Health technology management, and consultancy**

- Development and maintenance of a medical equipment management programs
- Equipment procurement support and pre-purchase evaluation.
- Asset management and replacement planning information, analysis and advice.
- Biomedical vendor coordination, performance monitoring and service contract support.
- Hospital and health service development and redevelopment project support

## **Health technology technical support services**

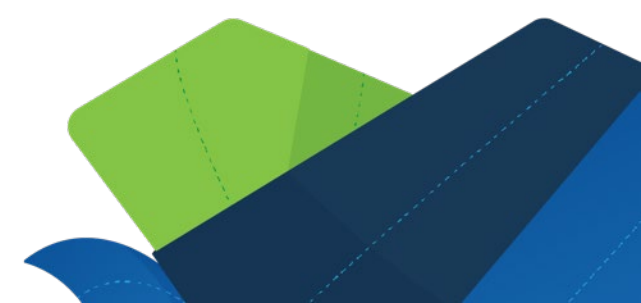
- Acceptance testing, installation, commissioning and pre-use safety assessment.
- Maintenance, including; repair, inspection, performance verification and preventive maintenance.
- Condemnation and disposal coordination



# What BTS Does

## Health technology safety and quality services

- Diagnostic imaging medical physics and radiation safety services, including compliance testing.
- Medical device recall and hazard alert response and coordination.
- Equipment-related incident investigation.
- Participation in, reporting and support for hospital and health service accreditation programs.
- Biomedical information and communications technology (ICT) risk assessment and mitigation



# 1989 – 2005: The Wonder Years

## Medical Physics

- Develop and manage ongoing Quality Control program
  - film-screen
  - NAS testing
- Ongoing image quality and radiation dose optimisation
  - Diagnostic reference levels published
- Strong collaborative support to clinical services
  - Radiologists
  - Medical Officers
  - Radiographers
- Contribute to education and training

## Repair and Maintenance

- Comprehensive in-house repair and maintenance program
- Collaborative partnerships with vendors



# History of the World Part II (2006 – 2012)

## The BSQ Digital Project

- BTS was part of the formation of the BSQ digital project, with other key stakeholders:
  - The BSQ Program
  - eHealth Qld (formerly HSIA)
  - Vendors
  - And many others internal and external to QH
- A significant change initiative:
  - Some of the drivers for change
    - Workforce
    - Technology
    - Population
    - Alignment to organisation goals
  - How to implement with minimal disruption
    - The 'big-bang'?
    - Or Staged?



# Business as Usual (2012 and beyond)

**A multi-disciplinary & multi-skilled team of health professionals:**

**Clinical Applications and PACS admin:**

- 2.6 FTE Digital Applications Radiographers

**Medical Imaging IT:**

- 4 FTE Biomedical Engineers and Medical Imaging IT specialists

**Medical Physicists:**

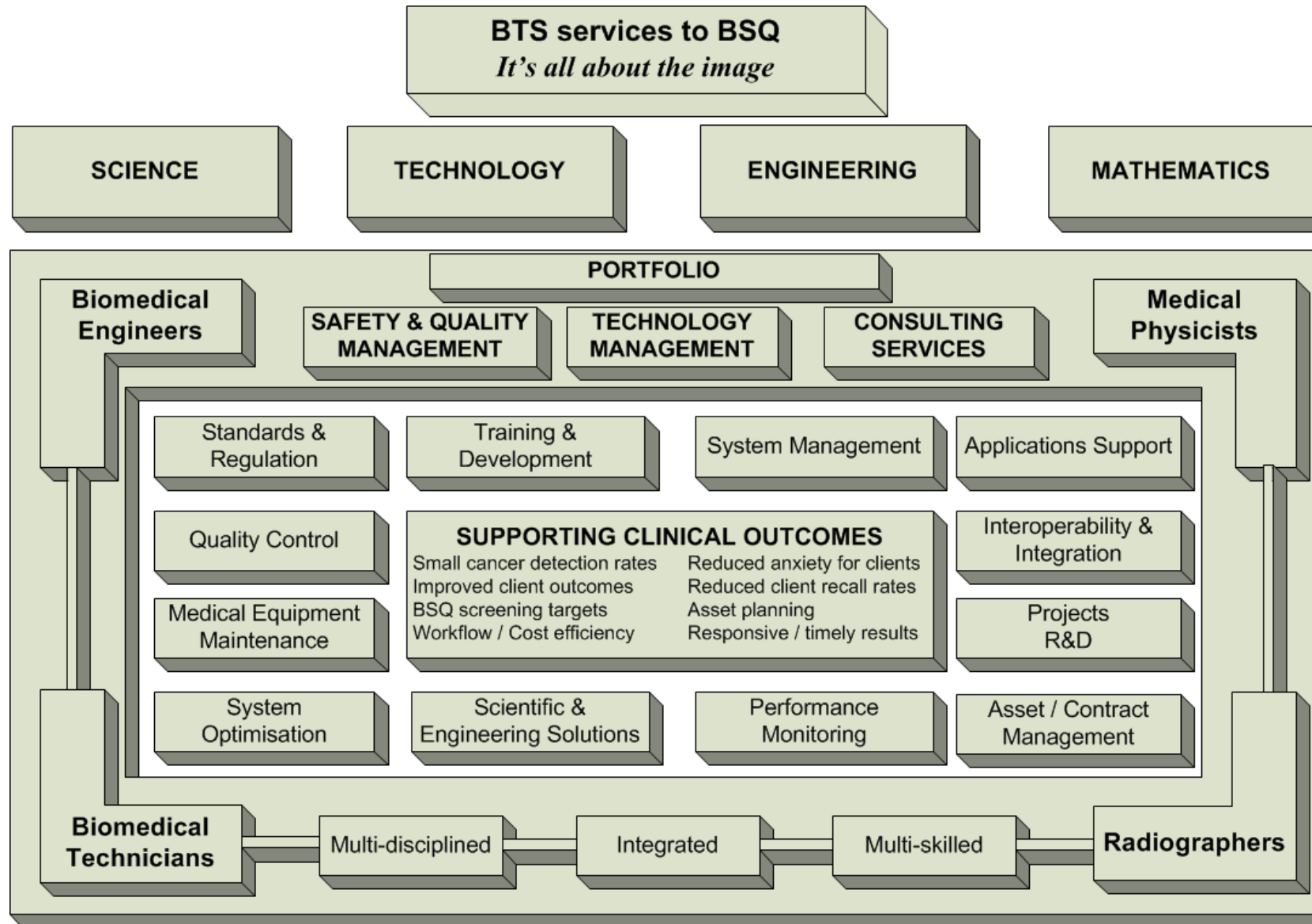
- 4 FTE Medical Physicists

**Technical Repair and Maintenance:**

- ~3.5 FTE Biomedical Technicians



# The Vision: A Holistic Support Model





# There has never been a more exciting time

## Innovation: Evaluation and Implementation:

- Online Quality Control System
  - BSQ Online QC Tool
- Ultrasound Telehealth Initiative
  - Initiated by the BSQ Townsville Service
  - Collaborative effort
- Digital Breast Tomosynthesis
- Volpara (PGMI/Quality scores)
- Ongoing procurement support and advice
- Image sharing portals
- Future directions in imaging technology
- Data analytics
  - MIDAS
- Artificial Intelligence
- Data integration



# Online QC

Medical Imaging Quality Control  
 delivered to you by Biomedical Technology Services, QH

Quality Control Profile Management CC Controller Settings

QHBSQ > BSQ SUNSHINE COAST > BSQ MYRTLE > MYRTLE > 12380745

Hello Heather

Search using Asset Number

### Location

Select which building you are at today

- BSQ CABOOLTURE ☆  
1 items have test due
- BSQ CALOUNDRA ☆  
1 items have test due
- BSQ DJ ROSE ☆  
0 items have test due
- BSQ GYMPIE ☆  
1 items have test due
- BSQ MAROOCHYDORE ☆  
2 items have test due
- BSQ MYRTLE ☆**  
1 items have test due
- BSQ NAMBOUR ☆  
5 items have test due
- BSQ NOOSAVILLE ☆  
1 items have test due
- BTS CENTRAL ☆  
0 items have test due

### Room

In which room is the equipment being tested?

**MYRTLE ☆**  
1 items have test due

### Equipment

Select a device to review it's QC requirements

**Asset Number: 12380745** 3 tests due

SIEMENS HEALTHCARE  
MAMMOMAT REVELATION  
DR Mammography System

Baseline	Test Tasks	Previously	New Value	Notes
	kVp	28	<input type="text"/>	<span>ⓘ</span> <span>📄</span>
<b>65.00</b>	<b>mAs</b>	<b>67</b>	<input type="text"/>	<span>ⓘ</span> <span>📄</span> <span>🔄</span>
	Target/Filter	W/Rh(3)	<input type="text"/>	<span>ⓘ</span> <span>📄</span>
	Compression Force (N)	54	<input type="text"/>	<span>ⓘ</span> <span>📄</span>
	Thickness (mm)	43	<input type="text"/>	<span>ⓘ</span> <span>📄</span>
	OPDOSE or AOP STD or Hologic Auto Filter?	Yes	<input type="checkbox"/>	<span>ⓘ</span> <span>📄</span>
	AEC Segmentation OFF?	Yes(0)	<input type="text"/>	<span>ⓘ</span> <span>📄</span> <span>🔄</span>
309.00	Mean Pixel Value	311.6	<input type="text"/>	<span>ⓘ</span> <span>📄</span> <span>🔄</span>
	Free of Significant Artefacts?	Yes	<input type="checkbox"/>	<span>ⓘ</span> <span>📄</span>

### mAs

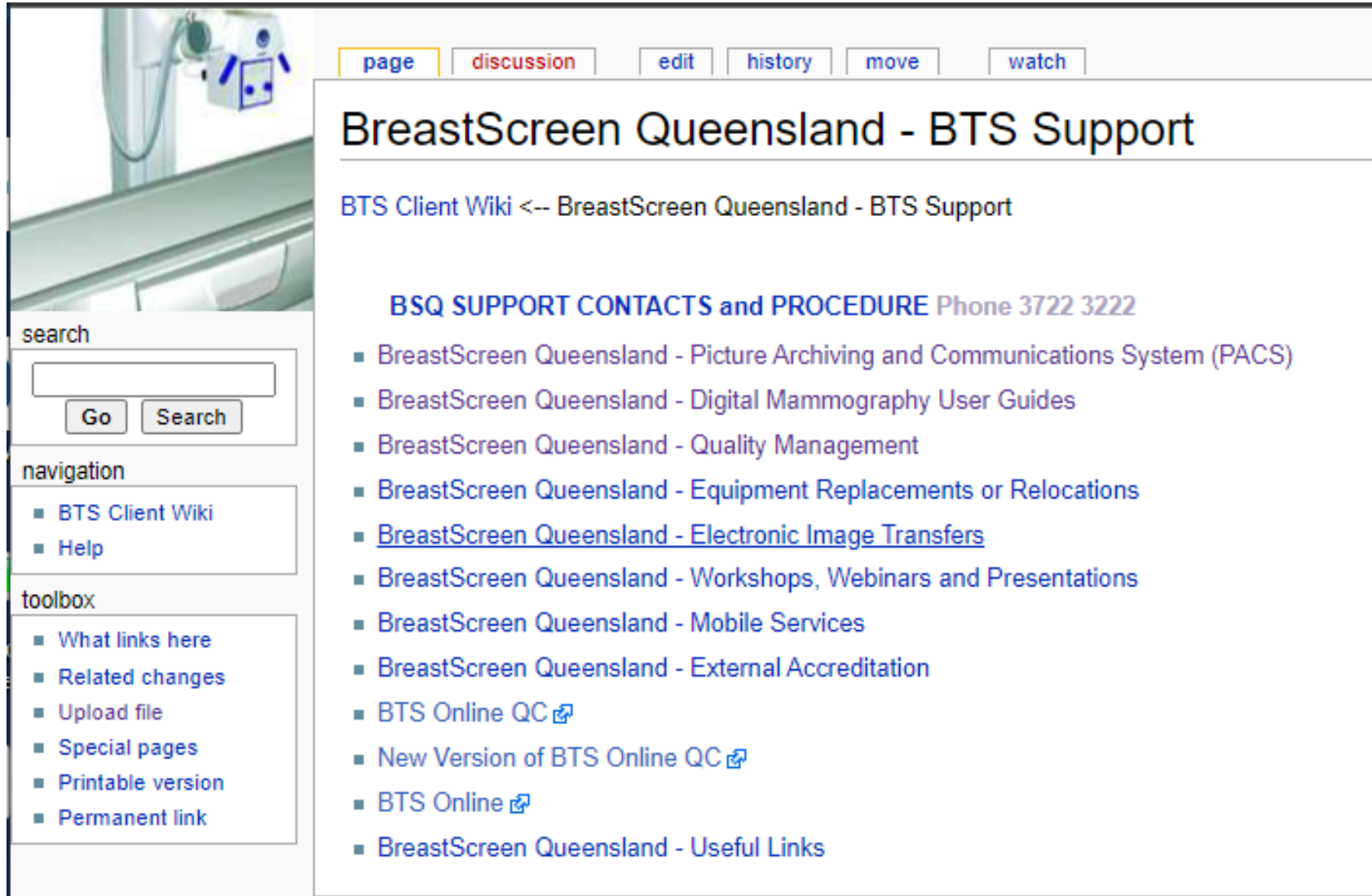
From: 22/06/20... To: 22/11/2022 Apply

# BSQReaderApp

- Microsoft .Net form that integrates between PACS and BSQR
- Used by Readers to input results

The screenshot displays the BSQ Reader application interface. At the top, it shows the 'Location Selection' with 'Organisation Reference: CENTRAL READING HUB'. Below this, 'Batch details' is set to 'Digital Reads for TEST RADIOLOGIST' and 'Staff Code' is '2546'. The 'Case' section includes 'Client's Details' with fields for BSQR Id, Client (label10), DOB (label11), Service (label12), Episode (label13), Site (label16), and Event Start Date (label17). The 'Assessment' section includes '1. No Of Films Technically Unsatisfactory' (0), '2. Mammography Outcome' (No specific finding, Benign finding, Probably benign finding, Probably malignant finding, Highly suggestive of malignancy), and '3. Reason Why Client Referred To Assessment' (2 Allowed) with 'Reason 1' and 'Reason 2' options. The 'Side of Lesion' is set to 'Right Breast'. A legend at the bottom indicates status: No Outcome, Third Read, Has Outcome (option 1-2), Has Outcome (option 3-5), and Saved.

# Client Wiki



The screenshot shows a Wiki page titled "BreastScreen Queensland - BTS Support". At the top, there are navigation tabs for "page", "discussion", "edit", "history", "move", and "watch". Below the title, there is a breadcrumb trail: "BTS Client Wiki <-- BreastScreen Queensland - BTS Support". The main content area features a section titled "BSQ SUPPORT CONTACTS and PROCEDURE Phone 3722 3222" followed by a list of 14 items, each starting with a square bullet point. On the left side of the page, there is a sidebar with three sections: "search" (with a search box and "Go" and "Search" buttons), "navigation" (with links for "BTS Client Wiki" and "Help"), and "toolbox" (with links for "What links here", "Related changes", "Upload file", "Special pages", "Printable version", and "Permanent link").

[page](#) [discussion](#) [edit](#) [history](#) [move](#) [watch](#)

## BreastScreen Queensland - BTS Support

[BTS Client Wiki](#) <-- [BreastScreen Queensland - BTS Support](#)

**BSQ SUPPORT CONTACTS and PROCEDURE Phone 3722 3222**

- [BreastScreen Queensland - Picture Archiving and Communications System \(PACS\)](#)
- [BreastScreen Queensland - Digital Mammography User Guides](#)
- [BreastScreen Queensland - Quality Management](#)
- [BreastScreen Queensland - Equipment Replacements or Relocations](#)
- [BreastScreen Queensland - Electronic Image Transfers](#)
- [BreastScreen Queensland - Workshops, Webinars and Presentations](#)
- [BreastScreen Queensland - Mobile Services](#)
- [BreastScreen Queensland - External Accreditation](#)
- [BTS Online QC](#)
- [New Version of BTS Online QC](#)
- [BTS Online](#)
- [BreastScreen Queensland - Useful Links](#)

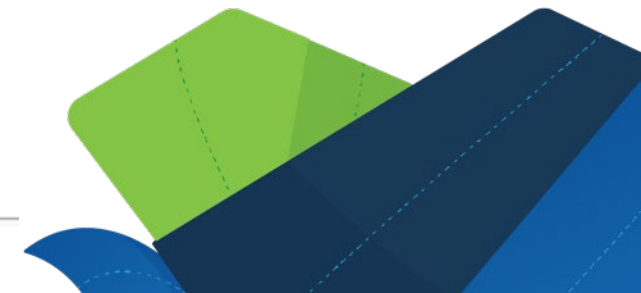
**search**

**navigation**

- [BTS Client Wiki](#)
- [Help](#)

**toolbox**

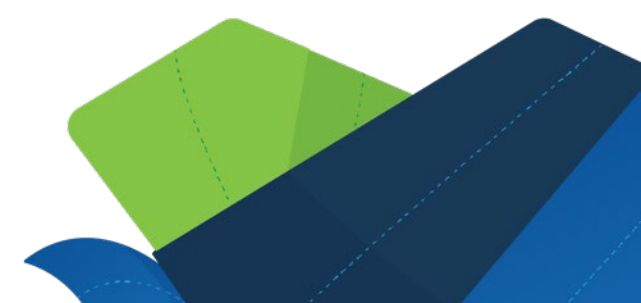
- [What links here](#)
- [Related changes](#)
- [Upload file](#)
- [Special pages](#)
- [Printable version](#)
- [Permanent link](#)



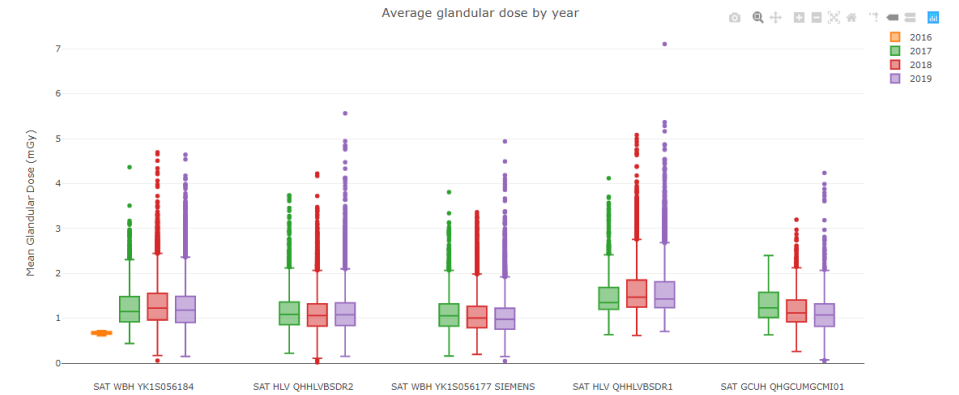
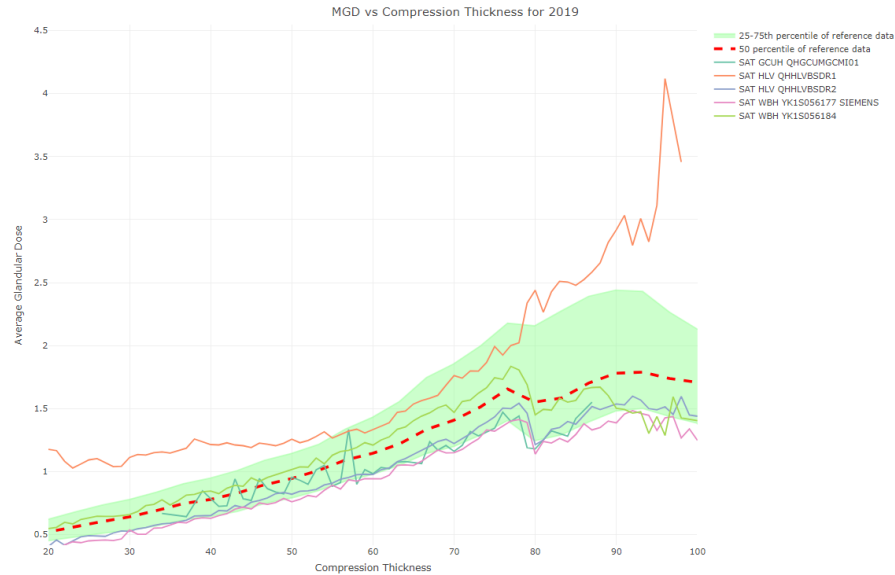
# Data Analytics

## Medical Imaging Data Analytics Solution (MIDAS):

- A works in progress
- Ability to create a data repository
  - Interrogate DICOM nodes
  - Interrogate many DICOM modalities
  - Integrate novel forms of data
- Analysis that will improve efficiency
  - Automate annual reporting
  - Automate standard data collection and analysis
  - Automate routine tasks (e.g. shielding calculations)
  - Provide data to make routine tasks more efficient (e.g. optimisation)



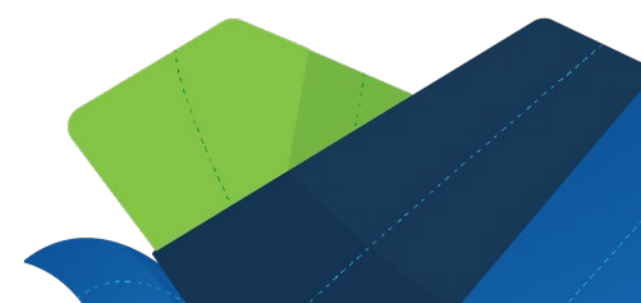
# Annual performance summary data



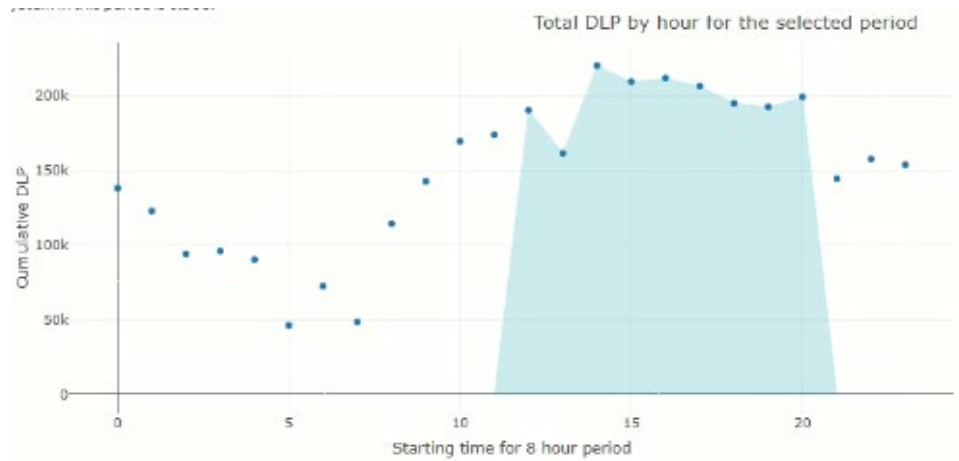
System details:

Display Name	Manufacturer	Manufacturer Model Name	Room Id	Station Name	Number Of Studies
SAT GCUH QHGCUMGCM101	SIEMENS	Mammomat Inspiration	NA	QHGCUMGCM101	893
SAT HLV QHHLVBSDR1	GE MEDICAL SYSTEMS	Senographe Essential VERSION ADS_55.30	GE Rm 1 Helensvale	QHHLVBSDR1	9932
SAT HLV QHHLVBSDR2	SIEMENS	Mammomat Inspiration	Siemens Rm 2 Helensvale	QHHLVBSDR2	20212
SAT WBH YK1S056177 SIEMENS	SIEMENS	Mammomat Inspiration	NA	YK1S056177	17219
SAT WBH YK1S056184	SIEMENS	Mammomat Inspiration	Siemens Rm 2 Treetops	YK1S056184	15113

- Annual reports
- Radiation safety presentations
- Quality audits



# Radiation workload data

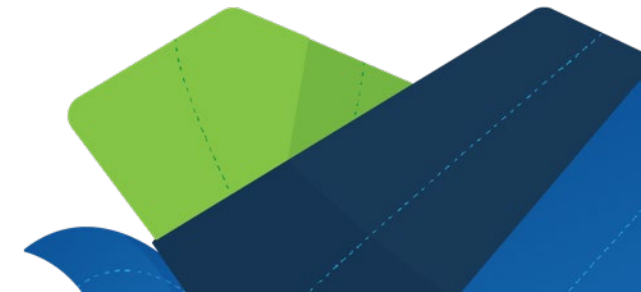


kvp	Median weekly mAs	75th percentile weekly mAs	Max weekly mAs
25.00	192500.00	266050.00	6.00
26.00	261150.00	421475.00	18.00
27.00	404800.00	517000.40	17.00
28.00	2576700.60	3008099.20	59.00
29.00	2594200.70	3727977.28	56.00
30.00	11122201.40	12289132.15	146.00
31.00	8400001.40	12786500.75	110.00
32.00	10915403.50	12883851.85	123.00
33.00	2156700.60	2581849.00	28.00
34.00	1167898.70	1539501.00	17.00
35.00	444149.90	874650.05	10.00
36.00	154900.20	446699.05	5.00
37.00	253150.15	374425.40	4.00
38.00	74399.40	95224.80	1.00
39.00	414799.20	414799.20	1.00
40.00	64700.30	67250.30	1.00
42.00	62800.00	62800.00	1.00

## Weekly workload statistics:

Median N exposures	75th percentile N exposures	Max N exposures
248	341.50	549.00

- Shielding calculations
- Staff dose investigations
- Workload planning and procurement activities

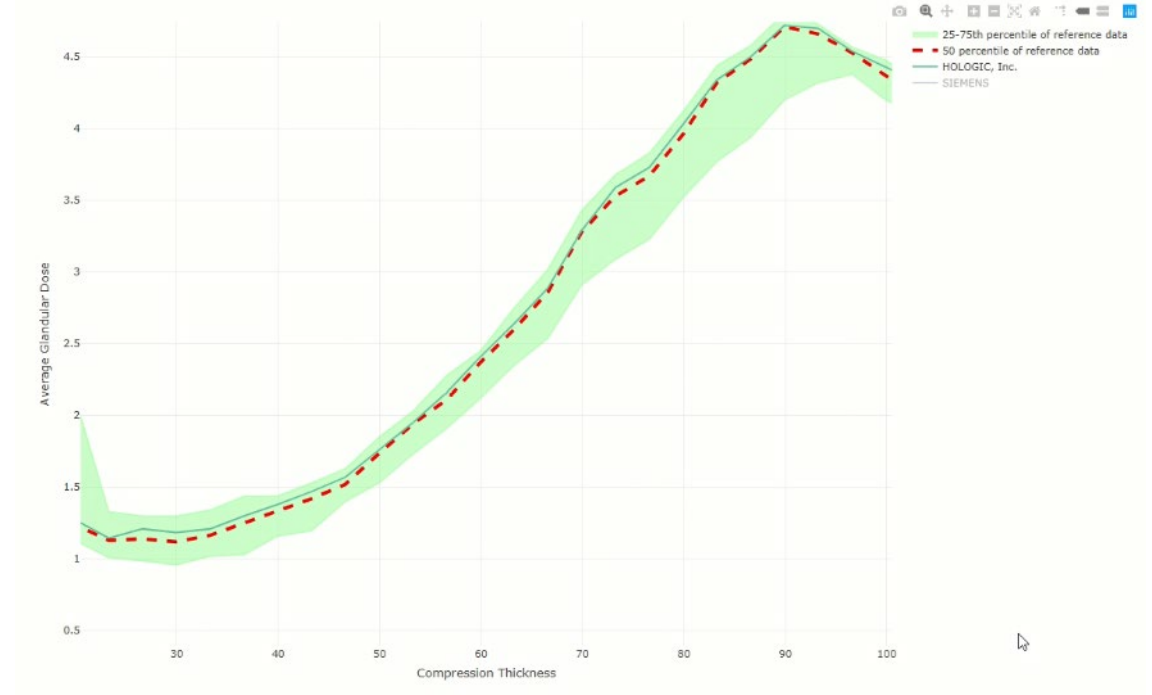


# Comparative data

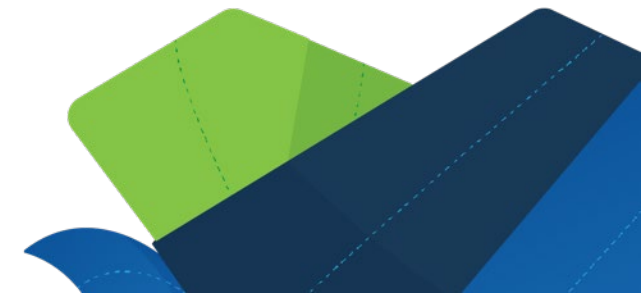


## Screening doses

- Radiation safety presentations
- Patient information leaflets
- Patient dose calculations
- Procurement decisions
- Assess effectiveness of optimisation process



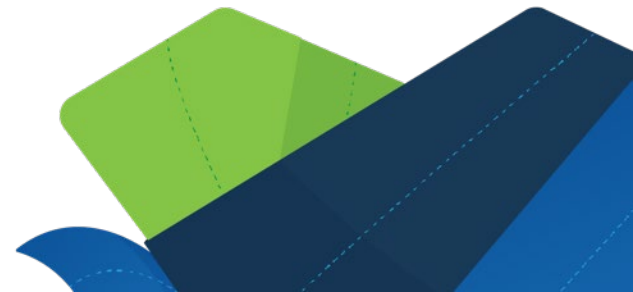
## Tomosynthesis doses





# Other initiatives:

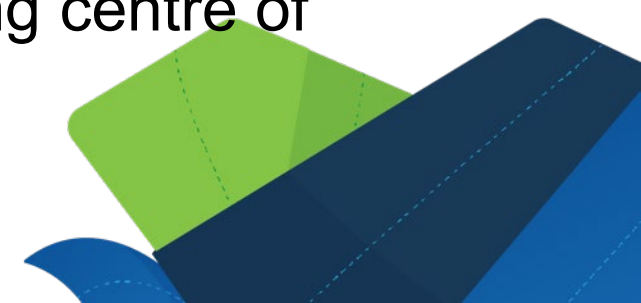
- Barriers to the Introduction of AI into the breast screening program
  - MSc student project
  - Expected completion Jun 2024
- Thought bubbles:
  - National audit of NAS equipment testing results??
  - Inclusion of a Medical Physicist in the BSQ NAS Audit Program??



# What are others doing

## The NHS NCCPM: National Co-ordinating Centre for the Physics of Mammography

- The centre has a broad remit to provide scientific and technical advice to the NHSBSP. This involves the setup and management of information systems that enable NCCPM to monitor the performance of the breast imaging equipment used in the NHSBSP.
- Advice and planning guidance is provided to NHS England & Improvement and throughout the NHSBSP by active participation in formal national committees and meetings, as well as direct communications with leading radiologists, radiographers and physicists working for the NHSBSP.
- NCCPM initiates programmes of research leading to improvements in how breast screening is provided by the NHS and is a leading centre of expertise in this field.





**Thanks, and any questions...**