HOW TO MAINTAIN A MAMMOGRAPHY SUITE

Basma Alsaadoun
Mammography is an effective imaging method used for the detection of breast cancer. It has been proven to detect breast cancer at an early stage and, when followed up with appropriate diagnosis and treatment, to reduce mortality from breast cancer.
There are two types of mammography

- Screening
- Diagnostic

We can run both types at the same time or include it under the same roof but we have to consider that we can’t deal with both types exactly the same way.
Screening Mammogram

- A screening mammogram is performed on women without symptoms as a “checkup” once per year beginning at age 40.

- Screening Mammography plays a central part in early detection of breast cancers because it can show changes in the breast up to two years before a patient or physician can feel them.

Fight like a Girl
Mammograms are called diagnostic when they are being done for one of the following reasons:

1. A new breast lump,
2. pain,
3. or nipple discharge was noticed
4. recent screening mammogram showed something that requires more X-ray pictures and possibly a sonogram.
5. last mammogram or sonogram showed something that is being closely followed.
## Screening VS Diagnostic

<table>
<thead>
<tr>
<th>Screening mammography</th>
<th>Diagnostic mammography</th>
</tr>
</thead>
<tbody>
<tr>
<td>For asymptomatic ‘well’ women to detect unsuspected lesions</td>
<td>Scope: For diagnosing breast changes or abnormalities that may have been detected through breast self exam (BSE) and/or clinical examination</td>
</tr>
<tr>
<td>Emphasis is on mass population screening to reduce overall mortality and morbidity</td>
<td>Emphasis: Emphasis is on individual benefit</td>
</tr>
<tr>
<td>According to guideline followed</td>
<td>Target: For women or men of any age who have symptoms or signs</td>
</tr>
<tr>
<td>Free service mostly as part of Govt. funded screening programme</td>
<td>Cost: Medicare rebate may be available but out-of-pocket costs may be incurred</td>
</tr>
<tr>
<td>No referral required. Recommendations from health professionals are strongly encouraged</td>
<td>Referral: Referral required from medical practitioner</td>
</tr>
<tr>
<td>Staff specialise in screening for and assessing impalpable lesions. Mammograms are read independently by two specially trained radiologists</td>
<td>Staff: Staff experienced in a range of diagnostic procedures. Experience in breast cancer mainly with women presenting with palpable lesions/changes</td>
</tr>
<tr>
<td>Results letter notifying the woman screened and her primary health care provider</td>
<td>Notification: Full report is sent to general practitioner or surgeon usually within a few days</td>
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</table>
HOW TO RUN A SUITE

- MOGRAPHY CLINICS
- ULTRASOUND
- BIOPSIES
- PACS AND RIS
- Examination rooms
- Waiting area
- Reception
TYPES OF MAMMOGRAPHY SUITES

- Usually it offers both diagnostic and screening mammography including outpatients and inpatients.
- Such suites including ultrasound and biopsies under the same roof.
Types of mammography suites

Mammography van

Specializes mammography suite including multi clinics and main center
FOLLOWING THE RAPID CHANGES

- No medical science has met the challenge as radiology to move forward in an era of rapid change in medical technology.

- With rapid change in inventing technology, there is a continuous changing demand in the field of radio imaging service.

- Resulting in an advanced, and detailed systematic planning and organizing.

- Having a foresight into future developments and requirements.
mammography suites should use the very best digital mammography equipment and peripherals available in the market today as Tomosynthesis. Which manufactured by the global leader in women's health technology and has an exceptional and consistent record of performance and clarity with a contract of maintenance and training application days before start using it at the suite.
## Key Buying Criteria

<table>
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<tr>
<th>Parameter</th>
<th>Details</th>
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<tbody>
<tr>
<td>Quality</td>
<td>The quality of mammography equipment should be high to ensure accurate results.</td>
</tr>
<tr>
<td>Affordability</td>
<td>Mammography equipment should be available at a reasonable price.</td>
</tr>
<tr>
<td>Brand Image</td>
<td>The reputation of the vendor is essential for capturing a sizeable market share.</td>
</tr>
<tr>
<td>Availability</td>
<td>A sufficient amount of mammography equipment should be available in the market to meet demand.</td>
</tr>
</tbody>
</table>
Breast cancer awareness
Call Center

- Pre-screening to see if women are qualified under guidelines of the program. (age, period time, last mammogram... et c.)

- The woman has a choice of the time, date and location according to the scheduling available.
CALL CENTER

- The women given all the pre-screening preparations as

✓ Not to apply deodorant, cream, powder or perfumes on breasts or underarm

✓ Wearing suitable clothes that easy to change

✓ We can advice the woman to consider an over-the-counter pain medication if she finds that having a mammogram is uncomfortable.

These instructions suppose to be printed or informed by the receptionist who set the appointment.

Also it could be mentioned on site in case of online scheduling.
With proper training, any scheduling personnel can learn how to take a call to set an appointment or giving instructions of the rescanning preparations and logistics of referring patients with symptoms to the specialist technologist to set the priority of the appointment according to the symptoms.
SCHEDULING

• The patient should know that this is a free program for the screening mammogram and any necessary follow up care.

• If she need to pay for the biopsy or ultrasound, the patient should know about the cost before she came.

• Its recommended to tell the patient if she has previous images done at other hospitals to bring all the results and images with her on the day of the current appointed mammogram.
<table>
<thead>
<tr>
<th>Signs &amp; Symptoms</th>
<th>PARAMETERS</th>
<th>ORDER/PERFORM</th>
<th>Suggested Text for Requisition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic Annual Screenings</td>
<td>One baseline exam between 35 and 40. Annual after age 40 (12 months since last screening exam; Medicare 11 months since last screening.)</td>
<td>SCREENING</td>
<td>Screening (baseline, previous done)</td>
</tr>
<tr>
<td>Implant</td>
<td><em>Same as above (If patient has symptoms, see below)</em></td>
<td>Diagnostic</td>
<td>Screening - Implants (When scheduling, identify that patient has implants and is asymptomatic but needs extra time for exam)</td>
</tr>
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<tr>
<td>Mastectomy &lt;5 Years Since Surgery</td>
<td>Diagnostic</td>
<td>Diagnostic: Personal History of Breast Cancer- Mastectomy.</td>
<td></td>
</tr>
<tr>
<td>Mastectomy &gt;5 Years Since Surgery</td>
<td>Screening</td>
<td>Personal History of Breast Cancer</td>
<td></td>
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</tr>
<tr>
<td>Clinical Findings (Symptoms)</td>
<td>Mass</td>
<td>Diagnostic</td>
<td>Diagnostic Mammogram with Ultra-sound, if needed (identify area of mass.)</td>
</tr>
<tr>
<td></td>
<td>Discharge</td>
<td>Diagnostic</td>
<td>Diagnostic Mammogram with Ultrasound- Discharge (Identify breast.)</td>
</tr>
<tr>
<td></td>
<td>Pain- Localized (non Medicare patient)</td>
<td>Diagnostic</td>
<td>Diagnostic Mammogram, Ultrasound as needed- Pain (identify area of pain.)</td>
</tr>
<tr>
<td></td>
<td>Pain- Localized (Medicare patient)</td>
<td>Screening</td>
<td>(Not recognized by Medicare as diagnostic reason for mammogram.)</td>
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</tr>
<tr>
<td>Short Term Follow-Up Exam</td>
<td>Recommendation of previous exam (6 month follow-up)</td>
<td>Diagnostic</td>
<td>Diagnostic Mammogram, Ultrasound as needed-P post Biopsy Exam.</td>
</tr>
<tr>
<td>Post Benign Biopsy Exam</td>
<td>Diagnostic</td>
<td>6 month follow-up.</td>
<td></td>
</tr>
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</tr>
<tr>
<td>Under 30 Years of Age- Order Ultrasound</td>
<td>Symptomatic Breast ONLY (Pain, Mass, Discharge)</td>
<td>Diagnostic</td>
<td>Diagnostic Breast Ultrasound with Mammogram, if needed.</td>
</tr>
<tr>
<td>Recommendation of Additional Imaging (Callback or Recall Exam)</td>
<td>Mammography (Additional Exam)</td>
<td>AAD will contact patient to schedule this exam. Patient will need a diagnostic referral.</td>
<td></td>
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Reception and waiting area... PRIVACY AND COMFORT

- A mammography suite should offer:
  - Comfort.
  - Modesty.
  - Work with one patient at a time.
  - No sitting in a crowded waiting room while partially disrobed or the need to even walk in common/public areas.
  - Changing rooms are spacious, clean, and just steps away from the examinations rooms.
Reception Desk And Waiting Area

- Greeting patients
- Obtain all patient’s information as name, BOD, ID number ... etc.
- The receptionist should not obtain medical history of the patient or giving any medical information about the examination
MAMMOGRAPHY FORM (QUESTIONAIR)

**Life Style**
1. Do you eat fat rich meals daily? Yes
2. Do you eat vegetables/fruits daily? Yes
3. Do you do any exercise? No
4. Do you smoke? No
5. Do you drink alcohol? No

**Surgical History**
1. Have you had any breast surgery or biopsy? No
2. History of high dose radiation therapy to the chest: No
3. History of ovarian removal: No
4. History of hysterectomy: No

**Current History**

**Current complaints/symptoms**
- Lump (palpable)
- Nipple discharge
- Pain
- Skin changes
- Additional comments

**Drawing Indicators**
- Right breast: Moles, lump, dimpling, discharge, pain
- Left breast: Scar, tattoo, piercing
QUALITY ASSURING PROGRAM

- A Quality Assurance program shall include all practices established by the owner to ensure that.

- the mammographic X-ray examination is performed with the lowest possible radiation dose to the patients consistent with clinical diagnostic requirements;

- the mammograms produced provide for accurate clinical assessment.

- all steps leading to accurate diagnosis are taken and the information is made available in a timely fashion to the patient's physicians.
QUALITY ASSURING PROGRAM

• Quality Assurance in mammography is defined as the planned and organized actions necessary to provide confidence that mammographic X-ray equipment and related components operated in a facility will reliably produce quality mammograms with minimum dose to patients and staff.

• This means that the radiologist and other health care professionals will be provided with images of diagnostic quality with the least amount of radiation for the examination.

• A Quality Assurance program for mammography includes Quality Control procedures for the monitoring and testing of mammographic X-ray equipment and related components, and administrative methodology to ensure that monitoring, evaluation and corrective actions are properly performed.
Quality Control Technologist

- There must be a staff member who is responsible for the optimization of image quality. This person must have received adequate training in mammography Quality Control and in the operation of Quality Control test equipment. Depending on the size of the facility these duties can be performed by a staff X-ray technologist on either a part-time or full-time basis. The Quality Control Technologist should have responsibility for:

- ensuring that the optimal level of diagnostic image quality is maintained.
QUALITY CONTROL TECHNOLOGIST

- Performing daily and routine quality control tests of mammographic x-ray equipment, image processor, and ancillary equipment and keeping record of these tests.

- Communicating with staff any changes in image quality.

- Participating fully in the quality assurance program.

- Understanding the contents of this safety code.
Facility Design The Team

- Radiologist
- Technologist
- PACS administrators
- Department administrators
- QC PHYSICIST
- RECEPTIONIST
- VENDOR REPRESENTATIVE/SERVICE ENGINEERS
Interpreting Radiologists Responsibilities

All interpreting radiologists must participate fully in the quality assurance program by:

- Communicating with staff any changes in image quality whether they are due to improper positioning, mammographic technique or image processing.
- Participating in the collection and maintenance of records concerning data for correlation of positive mammograms to biopsies done and the number of cancers detected.
- Understanding the requirements and recommendations of the safety code.
TECHNOLOGIST; Essential Functions:

- Identify anatomical orientation on all required images and assures proper file identification on all images.

- Demonstrate competency performing all mammographic procedures and the operation of all related equipment. Greet patients, obtain history, and enters information in computer system or the questionnaire form.

- Obtain mammographic images according to guidelines.

- Maintain logs; process paperwork for biopsies and statistics.

- Utilize sterile techniques preventing contamination.
All mammographic X-ray technologists must be certified according to a recognized standard, regulations or statutes.

They must have received adequate training.

They must receive continuing education in mammography techniques and procedures.

If the technologists are performing special techniques such as mammography of patients with breast implants, they must also receive adequate training in these techniques.
Technologist

- Provide instruction/mentoring to new hires.
- Provide a positive patient experience; share information with patients, providing knowledge about the procedure; ensuring they are aware of follow-up steps and requirements.
- Maintain communication with radiologists and other physicians, patients and their families, and other persons.
TECHNOLOGIST

- Responsible for all clinical aspects of mammography suite
- Maintains cleanliness of examination rooms.
- Stock necessary medical and radiologic supplies.
- Assists in the completion of the accreditation process
- Observe patient during examination
- Provide coverage as needed (i.e. In the event of call outs or extended patient schedules).
- Participate in emergency evacuation
TECHNOLOGIST

• Review each examination for technical accuracy, presents completed examinations to radiologist, and communicates pertinent data to persons responsible for the care of patients following the procedure

• Demonstrate teamwork; interacts in a positive manner with employees and contributes to a collaborative work environment

• Meet or exceed deadlines, follows through, demonstrating accountability, flexibility and adaptability

• Enhance professional growth and maintain certifications, registration through education programs, conferences, and workshops.
TECHNOLOGIST

- Performs quality assurance on images and equipment
- Demonstrates competency in utilizing systems
- Perform daily QA evaluations, i.e. Processor QC and phantom QC
- Responsible for monthly, quarterly, and yearly QC testing documentation
- Perform all mammographic images daily in guidelines to accreditation
The technologists must:

- understand the contents of the radiation protection and safety.
- be aware of the radiation hazards associated with their work and their duty to protect themselves, their patients, and others.
- All radiology technologists on staff have advanced certification in breast mammography and have undergone rigorous training in breast anatomy and physiology, positioning and compression, as well as imaging of patients with breast implants.
Experienced breast imaging technologists who are registered, certified, and advance their continuous medical education.

Knowledgeable, gentle, efficient, and guide every patient through the entire exam.

The patient should take advantage of the time with technologist - ask her anything about the mammogram procedure or express to her any concerns or questions.
CONTINUITY OF CARE

• Follow-up work is required as a result of a screening mammogram approved

• Monitor progress through whatever additional steps in care are required.
In general, there is no reason to remove pregnant technologists from their duties of operating mammographic X-ray equipment. However, it is advised that an X-ray technologist should immediately notify the coordinator if she suspects that she is pregnant, in order that appropriate steps may be taken to ensure that her work duties during the remainder of the pregnancy are compatible with the recommended dose limits.
• Technologists obtain two-view mammograms for each breasts. Each exam takes about 20 minutes, requiring very little time from a woman’s busy schedule. Results are reported to the patient and her physician within seven to 10 days.

• So we can manage time according to that and appointed schedule according to the number of the patients and working hours.
TECHNOLOGIST

- Be aware of the consequences of improperly performed mammographic procedures on image quality and patient doses
- Have a thorough understanding of their profession and of safe working methods
- Participate fully in the quality assurance program.
The radiation dose from a properly carried out mammographic examination is very low and is essentially only delivered to the breast tissue. Due to the very low x-ray energies used in mammography, there is very little dose to other tissues. However, any procedure involving exposures to ionizing radiation must be carefully managed as it is presumed that even small doses of radiation may produce some deleterious health effects.
Certain basic principles must be observed when determining the shielding requirements for a room used routinely for diagnostic radiology. These are as follows:

- The radiation levels in controlled areas that are occupied routinely by radiation workers must be such that no radiation worker is occupationally exposed to more than 20 mSv per year.

- The radiation levels in uncontrolled areas must be such that no person can receive more than 1 mSv per year.
In general, radiation levels directly beside the image receptor of mammographic X-ray equipment are such that the above limits could be exceeded. However, because mammographic X-ray equipment uses low X-ray tube voltage, reduction in radiation intensity can be easily accomplished with the presence of a suitable shielding barrier between the patient and the technologist, a suitable combination of distance from the sources of radiation and shielding barriers, and restriction of persons from all areas in which the respective recommended dose limit could be exceeded.
Only individuals required for the exam shall be in the mammography suite during an exposure.

If a patient must be held during an exposure, ask a family member to assist before asking another technologist.

Holders shall be provided with appropriate protective lead aprons and shall be positioned such that exposure is minimized and no unprotected body parts are exposed.
Operating & Safety Procedures for Mammography

• Mammography technologist will wear film badges outside of their lead aprons.

• No pregnant women or persons under 18 years of age will be permitted to hold patients.

• Holders will be rotated such that no one person holds patient regularly.
Operating & Safety Procedures for Mammography

• All lead aprons shall be inspected annually for defects.

• A technique chart shall be used and posted near the console.

• The chart should show exposure factors appropriate for the size and density of the breast, implant, or tissue specimens.

• Neither the tube housing nor the collimator shall be held during an exposure.
• Mammography equipment shall be operated by a technologist specifically trained in mammography.

• “Caution Radiation Area” signs shall be posted on all doors leading into mammography room.

• Doors shall be closed during exposures.

• Operators shall stand behind a protective barrier during exposures.
GENERAL RECOMMENDATIONS

- Shielding the floor, walls, ceiling and doors on the basis of distance, maximum expected X-ray tube voltage, and workload. The occupancy factors for the adjacent areas must be considered when calculations are made. Shielding must be constructed to form an unbroken barrier and shielding materials must be adequately supported;

- Positioning the control booth or mammographic X-ray equipment so that, during an exposure, no one can enter the room without the knowledge of the technologist;

- Using appropriate warning signs, which must be posted on the outside of all doors leading to each mammographic room.

- The warning signs must incorporate the X-radiation warning symbol and should incorporate the words "Unauthorized Entry Prohibited";
• operating mammographic X-ray equipment in a dedicated room designed for the purpose of mammography. The doors leading to the mammographic room from public areas should be equipped with self-closing devices.

• ensuring that mammographic rooms are designed to provide adequate working space to allow for ease of patient movement, and ensuring that there is always an adequate shield between the patient and the technologist. If the radiation shield is not part of the mammographic X-ray equipment, an appropriate barrier allowing visibility of the patient must be provided;
Public Comments Written Comments And Suggestions

May Be Submitted At Any Time
A REGULAR WORKING DAY

- Switch machines on and RIS and all monitors that we need and be sure it’s working properly.

- Be sure that all examinations rooms, waiting area, reception and corridors are clean and neat.

- Make sure that all machines are clean.

- Check all the tools needed are available and clean in the examination room (wipes, protections, paddles... etc.)

- Check the changing rooms (gowns, closets, keys, hangers... etc.)
A REGULAR WORKING DAY

- Check today’s schedule.

- Starting with the weekly QC and make sure all the reading recorded properly. (make sure to do it at least one hour earlier than 1st appointment)

- Review the images for the pt. who are scheduled for additional views and review there basic views plus previous images.
A REGULAR WORKING DAY

- Check that all approved cases have been informed about their results.
- Make sure that the approved cases have been informed with their results.
- Make sure that you have enough requirements of the department (wipes, tissues, gowns, etc.) you need for at least one month in advance and prepare the list of needed tools.
Lessons Learned

- Don’t assume anything
- Don’t get caught up in the emotions
- Process map every step and variable
- Over communicate
- Pick team members who’ll communicate
- Don’t skip steps
- Observe, observe, observe

- Don’t blind side anyone
- Clean data is the key to success
- Control charts are effective communication tools for staff and monitoring the process
- Spaghetti maps have a huge visual impact
- Stay the course during the change process
- Understand the 4 elements that employees go through with change
Breast Cancer

Dedicated to all those who’ve lost the fight to those who won’t quit the fight.

THANK YOU

BASMA ALSAADOUN