3D Ultrasound: Utilizing a New Technology in a Diagnostic Breast Imaging Centre to Reduce Wait Times

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Disclosure Statement

Dr. Iles does not have any affiliations with any persons or entities that could be perceived as having a bearing on her presentation.
Capital District Health Authority

• QEII Health Sciences Centre: Location of largest diagnostic breast imaging centre in Nova Scotia

• In 2010, handled 35% (1427/4040) of all abnormal referrals from the Nova Scotia Breast Screening Program

• In 2010, handled 42% (6388/15238) of all diagnostic mammography requests in Nova Scotia
Wait Times

• Between October 2010 and March 2011:
  – Wait time for urgent and semi-urgent diagnostic mammography increased from 22 to 85 days (90th percentile target: ≤ 14 days)

  – Wait time for work-up mammography for abnormal screening mammograms took an unexpected rise from 22 to 34 days (90th percentile target: ≤ 35 days)
Urgent/ Semi-Urgent Diagnostic Mammography Wait Time (QEII)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Median</th>
<th>p90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q3 2009</td>
<td>55</td>
<td>38</td>
</tr>
<tr>
<td>Q4 2009</td>
<td>61</td>
<td>18</td>
</tr>
<tr>
<td>Q1 2010</td>
<td>35</td>
<td>12</td>
</tr>
<tr>
<td>Q2 2010</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>Q3 2010</td>
<td>65</td>
<td>27</td>
</tr>
<tr>
<td>Q4 2010</td>
<td>66</td>
<td>25</td>
</tr>
<tr>
<td>Q1 2011</td>
<td>85</td>
<td>49</td>
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Anecdotal evidence suggested that an increase in diagnostic requests for women <40 years old was burdening the system.
Objectives

• Determine impact of diagnostic requests for women <40 on QEII Diagnostic Breast Imaging

• Propose solutions to the wait time issue

• Follow-up implemented solution(s) to determine efficacy
Methods

• Analyze 12 years of data on the following indicators:
  – Number of patients under 30
  – Number of patients under 40
  – Percent of patients under 30
  – Percent of patients under 40
  – Cancer Detection rate: Under 40 vs. 40 & Over

• Review appointment no-show data

• Review clinical practice guidelines

*All data stored in NSBSP Information System. System captures all breast imaging data (screening and diagnostic) along clinical pathway up to surgical treatment & pathology
• Volume of women <40 presenting at the QEII more than doubled between 1999 and 2010
ProporAon of paAents <40 increased from 4.1% in 1999 to a high of 10.9% of all diagnosAc paAents in 2009

• Proportion of patients <40 increased from 4.1% in 1999 to a high of 10.9% of all diagnostic patients in 2009
While the cancer detection rate dropped for both groups, women aged 40 and over requiring a diagnostic mammogram were over 5 times more likely to have cancer.
Cancer Detection Rate in Diagnostic Patients

Data: 1999-2010, QEII Health Sciences Centre

<table>
<thead>
<tr>
<th>Age Group</th>
<th># Women</th>
<th># Cancers</th>
<th>% Cancer</th>
<th>Cancers per 1000 women</th>
</tr>
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<tbody>
<tr>
<td>&lt;30</td>
<td>2222</td>
<td>25</td>
<td>1.1%</td>
<td>11</td>
</tr>
<tr>
<td>&lt;40</td>
<td>7530</td>
<td>204</td>
<td>2.71%</td>
<td>27.1</td>
</tr>
<tr>
<td>40+</td>
<td>32900</td>
<td>3236</td>
<td>9.836%</td>
<td>98.36</td>
</tr>
</tbody>
</table>

- Cancer detection rate in diagnostic patients is high; even the <30 patients have a cancer detection rate higher than a screening population
- A comprehensive approach is needed to make sure no cancers are missed
Wasted Appointments

• Diagnostic Patients <40 are scheduled for:
  – A Diagnostic Mammogram
  – A Diagnostic Ultrasound

• In 2010:
  – 1 in 3 patients <40 did not require an ultrasound
  – 1 in 6 patients <40 did not show for appointment
Standard Clinical Practice Guideline for Symptomatic Patients

**Background**

**Objectives**

**Methods**

**Findings**

**Recommendations**

**Results**

**Discussion**

[Diagram showing the guideline flow for patients with focal lump or pain or tissue thickening, including decision points for palpable abnormality, diagnostic imaging, and core biopsy with follow-up actions based on BIRADS categories.]
Proposed Solution

• Implement the use of an Automated Breast Volume Scanner (3DUS) for younger diagnostic patients

• Workflow:
  – Patients <35
  – 4 appointments/day: Mammography technologist trained in U/S assigned to 3DUS
  – Patients over age 20 also had 2 view diagnostic mammogram; initially full breast 3DUS later targeted over area of interest
  – If there was a palpable found by the technologist it was worked up with a marker on the skin
  – Read by radiologist later that day or the next morning
Automated Breast Volume Scanner (3DUS)
Advantages/Disadvantages of 3DUS

• Advantages:
  – Standardizes assessment of symptomatic patients
  – Technologist performs without radiologist supervision as in a “screening” mode
  – Allows diagnostic radiologist to concentrate on population with higher likelihood of disease therefore maximizing use of limited resources

• Disadvantages:
  – Incidental findings may trigger workups and follow up examinations that will feed back into the system
  – Requires development of clinical guidelines for interpretation and recommendations
### Synoptic Reporting of 3DUS

**Radiology Reporting**

**Client:** DOE, JANE  
**HCN:** 000001-001-001 (NS)

**Order/Accession #:** 167758 / NSO  
**Procedure:** 3D Breast Ultrasound  
**Prep Date:** 06.08.2011  
**Condition:**

**Technologist:** JUDY CAINES

**Observation #1:** Palpable lump  
**Observation #2:** Single large nodule  
**Observation #3:** Areolar abscess  
**Film observation:** Mass/Nodule, Impression: No Change

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**Ultrasound**

**Radiologist:** JUDY CAINES 1

**Images were compared to:**  
- August 26, 2011: 3D Breast Ultrasound  
- June 27, 2011: Work-up Breast  
- June 24, 2011: Diagnostic Breast  
- May 31, 2011: 3D Breast Ultrasound

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**MANAGEMENT OPTIONS (Age: 27)**

- No further investigation
- Deferral of Report
- Screening Mammography
- Diagnostic Mammography

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**MODALITY / INTERVAL**

**Was a mammographic lesion seen?:**  Yes  
**Was it seen on 3D U/S?:**  Yes  
**Is there a palpable lesion clinically?:**  Yes

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**Risk:** BI-RADS 2: Benign findings

**Note #1:** See Mammogram Report Done Same Day
**Note #2:** None Selected
**Note #3:** None Selected

**Custom note (up to 500 chars):** Current character count: 0

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**All mammography reported directly into database;**  
**Written report also issued by the Diagnostic Reporting System**
Results

- Diagnostic wait time increased to 122 by Q4 2011
- Modified guideline implemented September 2011
- By Q2 2012 wait time had dropped to 16 days
Results

• Work-up wait times have decreased since Q1 2011
Results

• 762 patients <35 as of August 15 2012:
  – 3 Cancers and 1 malignant phyllodes tumour diagnosed
  – PPV of core recommendation: 12.5%

• All cancers and malignant phyllodes were clinically detected and had both 3DUS and mammographic findings

• All biopsies recommended for incidental findings were benign

• One false negative mammogram and 3DUS
  – low grade phyllodes tumour
  – In retrospect nonspecific asymmetry could be seen on mammography
Discussion

• Changes in clinical protocol for patients <35 led to separating other patient groups from the main diagnostic queue to further improve wait times

• A separate queue has since been implemented for breast cancer survivors, patients with implants, and ineligible screens
  – These examinations are performed in “screening mode” for asymptomatic women and do not need an onsite radiologist during imaging

• This additional “screen through diagnostic” queue at a separate screening centre in CDHA has contributed to the improved wait time
Thank you for your consideration.

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