QI PROJECT

To Reduce the Waiting Time at Ultrasound Suite, Department of Diagnostic Radiology (DDR)
AIM AND OBJECTIVES

Aim

a) To find solutions to overcome the long waiting time

Objectives

a) To reduce the time patients had to wait before they were called into the procedure rooms

b) To improve existing workflow

c) To deliver quality care to our patients
Result of written survey identified “I like to be called in on time” as the most important criterion to the patients when they visited the ultrasound suite.
Definition of waiting time:

The time the patient is called into the procedure room minus the given appointment time

The average waiting time was found to be 51.6 minutes
Ten patients were picked at random and asked what they considered to be the most acceptable waiting time. All responded **30 minutes** as the most acceptable waiting time.
MISSION STATEMENT

All outpatients for ultrasound scan at the Department of Diagnostic Radiology should not wait more than 30 minutes from their time of appointment within the next nine months.
PROJECT METHODOLOGY & ANALYSIS
QI TOOLS

- Flow Chart
- Fishbone Diagram
- Multivoting
- Pareto Chart
- Prioritization Matrix
- Run Chart
- PDCA Cycle
Flow Chart - Showed a break down of the workflow processes

External Task (Reception)

- Patient arrived at DDR US reception
- Patient placed request form on tray
- HCA confirmed patient’s appointment time
- HCA passed request form to PSC for registration
- PSC called patient, checked patient’s preparation
- PSC registered patient and issued Q number
- HCA instructed patient to change, and waited to be called into the procedure room
- HCA brought request form into the US work area

Internal Task (Ultrasound procedure & reporting)

- Sonographer cleaned room and machine
- Sonographer placed comment sheet in the reporting room
- Sonographer wrote down observations on comment sheet
- Sonographer sent the patient off
- Sonographer discussed findings with radiologists
- Radiologist scanned patient
- Radiologist reviewed history and images
- Sonographer performed and completed scan
- Sonographer confirmed patient identity, assisted patient on exam couch
- Sonographer pressed Q number, and called patient into procedure room
- Sonographer picked up request form, read history from IMS

PSC: Patient Service Clerk, HCA: Health Care Assistant
**Fishbone Diagram** – There were 44 root causes (the smallest bones) for long waiting time

### External Staff
- PSC does not call patients according to appointment time for registration
- HCA is assisting in ultrasound procedure room
- HCA must issue cheque manually
- HCA is not at registration counter because they have to attend to other tasks

### Internal Staff
- Patients wait a long time inside the procedure room to be checked by the radiologists
- Radiologists are not sure on number/type of examination to charge patient
- Radiologists are not present at their reporting station
- Radiologists are too late to check/ rescan findings of some sonographers

### Machines
- Machines are not optimally utilised
- Machine hangs
- Scan is interrupted as sonographer has to contact vendor/reboot machine

### Patients
- Patients request to be called earlier than their appointment time
- Patients are not punctual
- Patients are technically challenging and clinically difficult

### Internal Workflow
- Patients wait >30 minutes from their appointment time
Multivoting - Reduced the 44 root causes to 10
Grade 3 sonographers must be verified.

No machine allocated for training.

Sonographers had many pre and post procedure tasks.

PSC was slow.

Radiologists were not at their reporting station.

Procedure room must be emptied for VVIP.

No slots reserved for patients who walked in for US examinations without prior appointment.

Examination lists were not reduced for training.

Complex cases performed by grade 1 & 2 required verification.

Clinicians were not familiar of exam type.

Root Causes

Pareto Chart – Four vital root causes were identified for solving
Sonographers – level of competency

**Grade 1** - Worked independently
Able to decide if sonographic findings required verification by the radiologists
Trained radiographers and medical officers in ultrasound

**Grade 2** - Sonographic findings were verified at the discretion of the radiologists

**Grade 3** - All sonographic findings were verified by the radiologists
Why must vital root cause 1 be solved?

Root cause 1
Grade 3 sonographers (findings) must be verified

Why must root cause 1 be solved
• Radiologists were busy with other tasks and could not verify findings immediately
• Radiologists had to read patients’ clinical history and radiological images and rescanned the patients, which resulted in duplication of tasks

Solution
Upgrade grade 3 sonographers to grade 1
Why must vital root cause 2 be solved?

Root cause 2
There was no machine allocated for training

Why must root cause 2 be tackled
• Trainees took longer to complete a scan
• Cases were held up
• Trainees’ progress was hampered

Solution
Allocate a room and machine for training
Why must vital root cause 3 be solved?

Root cause 3
Sonographers had many pre and post procedure tasks

Why must root cause 3 be solved
• Procedure room time was not optimised (room was left empty)

Solution
Introduced 1.5 sonographer manpower
## Prioritization Matrix – Identified the most practical solution(s) to be implemented for each vital root cause

<table>
<thead>
<tr>
<th>Problem</th>
<th>Root causes</th>
<th>Proposed solutions</th>
<th>Criteria to consider before implementing solution</th>
<th>Was solution practical?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective</td>
<td>Save time</td>
</tr>
<tr>
<td>Patients waited &gt;30 minutes from their appointment time</td>
<td>1. Grade 3 sonographers (findings) must be verified</td>
<td>To upgrade grade 3 to grade 1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Senior sonographers to assist in verifying findings of grade 3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Do not roster &gt;2 grade 3 per day</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2. No machine allocated for training</td>
<td>To provide a room and machine for training</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To conduct training after work using phantom/volunteers</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3. Sonographers had many pre and post procedure tasks</td>
<td>To send trainees to other learning centers</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To recruit experienced sonographers</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To introduce 1.5 sonographer manpower</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4. PSC was slow</td>
<td>To add another HCA to assist in the external workflow</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To improve training methods</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Run Chart – To monitor the progress of the solutions that were implemented

69.1% patients were already called within 30 minutes of their appointment time before the solutions were implemented.

There were 15 useful observations and 6 data run:
- No special cause variations
- Must implement solution.
PDCA Cycle 1 – (6th July - 6th September 2009)
Upgraded grade 3 sonographers to grade 1

Why PDCA 1 failed?
- The newly appointed grade 1 sonographers needed time to improve scanning speed and clinical reasoning
- It was a transition period - grade 1 sonographers must establish work relationship with the radiologists
PDCA Cycle 2 – (7th September - 6th December 2009)  
Allocated a room and machine for training

Why PDCA 2 failed?

- The trainers were training and clearing clinical cases at the same time
- Hence, there were effectively <5 sonographers clearing cases
- Grade 1 (PDCA1) sonographers still needed time to improve scanning skill and clinical reasoning
PDCA Cycle 2 – (7th December 2009 - 7th March 2010)
Introduced 1.5 sonographers manpower

Why PDCA 3 was a success?

- Grade 1 (PDCA 1) had attained the requisite scanning speed and clinical skill
- The trainer was more focused on training
- There was better team work
- The patients were called in and scanned immediately
- Senior sonographers (grade 1) verified the sonographic findings of grade 3 sonographers

% of patients called 30 mins or less into procedure room

PDCA 1
Upgraded Grade 3 to Grade 1

PDCA 2
Allocated a room and machine for training

PDCA 3
Introduced 1.5 sonographer manpower

No of weeks
Patients’ waiting time was followed up from the end of PDCA 3 until August 2011.

PDCA 1: Upgraded Grade 3 to Grade 1
PDCA 2: Allocated a room and machine for training
PDCA 3: Introduced 1.5 sonographers manpower
PROJECT ACHIEVEMENTS

To the patients

✔ All patients were called within 30 minutes of their appointment times

✔ The waiting area was less crowded, thus alleviating stress level
To the workflow

- Sonographers’ pre and post tasks were performed outside the designated exam slots. This maximised the patients’ turnover per room

- The trainers were more focused on training resulting in less disruption to training

- Senior sonographers assisted the radiologists in verifying the sonographic findings of grade 3. Less disruption to completion of reports
## To the staff

- Able to complete work on time
- All were less stressed
- Trainees were better able to achieve outcome upon completion of training
- Role extension for senior sonographers resulted in personal and professional satisfaction
- Less work related musculoskeletal strains
To the department and organisation

- Less turn-over rate among sonographers
- Able to accept more walk-in cases
- More efficient clinical management of patients
Thank you

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