Electronic Perioperative Documentation in OT

Lee Sow Fong
Senior Manager
Tan Tock Seng Hospital
Over the past 20 years, the computer has had a major impact on hospital information resources management. A historic perspective makes evident two areas where computerization has made its earliest and greatest contribution. The first area includes activities that require a high volume of repetitive data processing. The other area encompasses the services in the health care environment that generate high levels of revenue.

Thus, the computer..... moved to the clinical laboratory, then to the pharmacy and radiology departments....... Remarkably, however, one of the areas that fits both criteria for early introduction of computerization has only in the past few years emerged as a major locus for computer use. This is the hospital surgical suite

Paul J. St. Jacques, M.D., Michael N. Minear…. in their paper “Improving perioperative patient safety through the use of Information Technology”

“…..IT adoption has been low, with only approximately 6% of hospitals nationwide utilizing a comprehensive perioperative information management system”

Whitepaper published by the Telemedicine and Advanced Technology Research Center, USA MRMC in 2006
# Adoption of eDocumention in TTSH OT

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>ePACE (Elective Surgery)</td>
</tr>
<tr>
<td>2006</td>
<td>Enhancement of OT Reservations System to include waiting time for elective surgery</td>
</tr>
</tbody>
</table>
| May 2008 | **OT Reporting System** (OTRS)  
Clinician form: Speciality template  
(Endo procedures, Eye, Ortho, Breast, Uro, Colo-rectal)  
Nurse form: OT & Endoscope |
| Mar 2010 | Enhancement of OTRS  
No Show / Surgery postponement / Cancellation                                                                                         |
| Nov 2010 | Anaesthesia Information System                                                                                                          |
| Dec 2011 | Enhancement of OTRS  
Pre-operative Assessment, “Time Out” and post operative sign out  
Pre-procedure Assessment by Medical Team  
(*WHO Surgical Safety checklist & Hi5 component*) |
| Mar 2012 | New ePACE                                                                                                                                   |
OT Systems Users

In TTSH estimated about 2500 Users

- Clinicians
- Nurses & admin staff in procedural areas
- Outpatient staff - SOC, PACE
- Inpatient staff - Nursing incharge
- Histopathologists
- Blood bank staff
- Radiographers
- MRO staff
- Staff from Office of Clinical Governance
- Higher Management

Responsibility
&
Accountability
OT Surgical Safety Projects

Surgical Safety Project (Aug 09 – Aug 11)
Implementation of WHO Surgical Safety Checklist

Urology “CPIP” Project (Jan – Jul 2010)
Use of “Time Out” Script to aid in pre-op check for elective Urology cases. (Targeted at 100% compliance by surgical team to acknowledge the “Time Out” process)

WHO High 5s Project (5 years project, from Jan 2011)
“Correct Procedure at Correct Body Site”
Issues with paper documentation

- Resistance to changes
- OT nurses lack of confidence in implementing changes
eDocumentation Project

Aim:

To ensure 100% compliance in peri-operative documentation of surgical safety components by using electronic system in OT
"WHO Surgical Safety Checklist has been ... associated with ... improvements in compliance to basic standards of care." – Extracted from “Implementation Manual WHO Surgical Safety Checklist 2009”

TTSH OT
Surgical Safety work processes & pre-op checks are well established. However, the paper documentation compliance was often an issue

Electronic Documentation implemented in Dec 2011
Surgical Safety Checklist

**Sign In**
Before induction of anaesthesia (with at least nurse and anaesthetist)

- Has the patient confirmed his/her identity, site, procedure, and consent?  
  - Yes
- Is the site marked?  
  - Yes
  - Not applicable
- Is the anaesthesia machine and medication check complete?  
  - Yes
- Is the pulse oximeter on the patient and functioning?  
  - Yes
- Does the patient have a:
  - Known allergy?  
    - No
    - Yes
  - Difficult airway or aspiration risk?  
    - No
    - Yes, and equipment/assistance available
  - Risk of >500ml blood loss (7ml/kg in children)?  
    - No
    - Yes, and two IVs/central access and fluids planned

**Time Out**
Before skin incision (with nurse, anaesthetist and surgeon)

- Confirm all team members have introduced themselves by name and role.
- Confirm the patient’s name, procedure, and where the incision will be made.
- Has antibiotic prophylaxis been given within the last 60 minutes?  
  - Yes
  - Not applicable
- Anticipated Critical Events
  - To surgeon:
    - What are the critical or non-routine steps?
    - How long will the case take?
    - What is the anticipated blood loss?
  - To anaesthetist:
    - Are there any patient-specific concerns?
  - To nursing team:
    - Has sterility (including indicator results) been confirmed?
    - Are there equipment issues or any concerns?
- Is essential imaging displayed?  
  - Yes
  - Not Applicable

**Sign Out**
Before patient leaves operating room (with nurse, anaesthetist and surgeon)

- Nurse verbally confirms:
  - The name of the procedure
  - Completion of instrument, sponge and needle counts
  - Specimen labelling (read specimen labels aloud, including patient name)
  - Whether there are any equipment problems to be addressed
- To Surgeon, Anaesthetist and Nurse:
  - What are the key concerns for recovery and management of this patient?

Implemented in Dec 2010
Perioperative Process

Perioperative Work Process

**Reception** (Reception Nurse)
- Receive notification from doctors of case for surgery
- Patient comes to OT from different areas: IP Ward, ED, DSW, SOC
- Patient reaches OT Reception
- Emergency
- Elective
- Life - threatening emergency?
  - YES
  - NO

**Induction Room** (Medical Team & OT Nurse)
- Surgeon / Team Proxy / Procedurist conducts medical assessment by using Pre-procedure / Pre-sedation Assessment Checklist
- OT Nurse checks patient by using Pre-operative nursing Checklist (OT column)
- Anaesthetist assessment
  - Surgical Safety Project: Sign In

**Operating Room** (OT Nurse)
- Move patient to operating room
  - Proceed with induction of anaesthesia
- Position patient for procedure
- All surgical team members present?
  - YES
  - NO
- Notify missing team members that case is ready to start
- Surgical Safety Project: Time Out
- Proceed with surgery
- Procedure complete and wound closure
- Another procedure for the patient?
  - YES
  - NO
- Surgical Safety Project: Sign Out
- Surgery over and patient is sent to PACU / DSW
**E-Perioperative Verification Process**

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### Perioperative Work Process

#### Reception

(Reception Nurse)
- Receive notification from doctors of case for surgery
- Patient comes to OT from different areas
  - IP Ward
  - ED
  - DSW
  - SOC
- Patient reaches OT Reception
- Emergency
- Elective

#### Induction Room

(Medical Team & OT Nurse)
- Surgeon / Team Proxy / Procedurist conducts medical assessment
- Preprocedure / Pre-sedation Assessment Checklist
- OT Nurse checks patient by using Pre-operative nursing Checklist (OT column)
- Anaesthetist assessment
- Surgical Safety Project: Sign In

#### Operating Room

(OT Nurse)
- Patient in OT time
  - Position patient for procedure
  - All surgical team members present?
  - Notify missing team members that case is ready to start
- Time Out
- Surgery start time
- Procedure complete and wound closure
- Another procedure for the patient?
- Surgical Safety Project: Sign Out
- Surgery over and patient is sent to PACU / DSW

---

**Surgical Safety Project:**

- Sign In
- Time Out
- Sign Out

---

**Life-threatening emergency?**

- Reception Nurse checks for correct patient
- Surgical Safety Project: Sign In

---

**Patient moves to different areas**

- IP Ward
- ED
- DSW
- SOC

---

**Patient reaches OT Reception**

- Reception Nurse
- Reception Nurse checks for correct patient
- Surgical Safety Project: Sign In

---

**Emergency**

- Emergency
- Elective

---

**Surgery starts**

- Procedure complete and wound closure
- Another procedure for the patient?
- Surgical Safety Project: Sign Out
- Surgery over and patient is sent to PACU / DSW
### PERIOPERATIVE RECORD

<table>
<thead>
<tr>
<th>Date</th>
<th>OT No.</th>
<th>Discipline</th>
<th>Ward/Bed</th>
<th>Class</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**Nature of Operation:**
- Scheduled > 48hrs before
- Late add-on (<48hrs before)
- Emergency case
- Life threatening emergency

**Operation Scheduling Type:**
- Name:
- ID No:
- Case No:
- DOB:

---

### PRE-OPERATIVE NURSING CHECKLIST (SIGN IN)

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<thead>
<tr>
<th>No.</th>
<th>Ward</th>
<th>OT Receipt</th>
<th>OT</th>
<th>*Reconciled</th>
<th>REMOVED WHERE APPLICABLE</th>
<th>Ward</th>
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<td>1</td>
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<td>a. RFID Tag</td>
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<td>2</td>
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<td>b. Denture(s)</td>
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<td>3</td>
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<td>c. Hairclip(s)</td>
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<td>4</td>
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<td>d. Contact Lens</td>
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<td>5</td>
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<td>e. Spectacles</td>
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<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>f. Jewellery</td>
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<td>7</td>
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<td>g. Hearing Aids</td>
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</tr>
</tbody>
</table>

**Surgical site marked?**
- Special equipment(s) / instrument(s) available?
- Implant for surgery (if applicable) available?

**Remarks:**

**Legend:**
- ✓ - Yes,  X - No, NK - Nil Known, NA - Not Applicable

**Reconciled** (Reconciliation of information):
- Indicate "x - No" for inaccurate information, state details in "Additional information";
- When information (x - No) is rectified, to "✓" Reconciled & update details at "Additional information" section.

**Additional information:**
- Checked by: 
- Time: 

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*Please note: The highlighted areas indicate specific points of interest or potential issues that need to be addressed during the pre-operative nursing checklist.*
# eDocumentation: Reception Nurse “Sign In”

## Reception Nurse: Pre-Operative Nursing "SIGN IN"

### Patient Details
- **Gender:** F
- **DOB:** 01/01/1932
- **Race:** C
- **Case No.:** 1212202682D
- **Discipline:** OPHTHALMO
- **Operation Date:** 23/03/2012

### Nature of Operation
- **Diagnosis:** Right cataract extraction and intraocular lens implantation

### Scheduling Type
- **Scheduling Type:**
  - Scheduled > 48hrs before
  - Late add-on (<48hrs before)
  - Emergency case

### Pre-Operative Checks
1. Patient’s medical records verified and available? [YES] [NO]
2. Patient’s identity & ID tag checked using 2 identifiers? [YES] [NO]
3. Consent has been verified and valid? [YES] [NO]
4. Any implant / pacemaker in patient? [YES] [NO]
5. Is blood available? [YES] [NO] [NA]
6. LA case? For anaesthesia case [YES] [NO]
7. Bowel preparation done (colorectal procedure / pelvic surgery)? [YES] [NO] [NA]
8. Any new allergy not stated in CMIS? [YES] [NKA]
9. Female patient at child bearing age? State LMP: [YES] [NA]
10. AV Fistula / Graft? [YES] [NO]
11. Patient RFID tag removed? [YES] [NO] [NA]
12. Denture(s) removed? [YES] [NO] [NA]
13. Hairclip(s) removed? [YES] [NA]
14. Contact lens removed? [YES] [NA]
15. Spectacles removed? [YES] [NO] [NA]
16. Jewellery removed? [YES] [NO] [NA]
17. Hearing aids removed? [YES] [NO] [NA]
18. Additional information: Pt took meds with sips of water at 0530hrs

### Date and Time
- **Date:** 23/03/2012
- **Time:** 12:47 PM
- **UserName:** KEISHANTHI DJO ORAPERUMAN
- **Status:** Signed

### Medical Alert
- **Drug Allergy:** NIL
- **NIL**
- **Nifedipine (NIFEDIPINE LA - EUDERMA)**

### Remarks
- Tied to clothing
- Jade bangle wrapped with gauze on the left wrist
- Pt took meds with sips of water at 0530hrs

### Additional Information
- Signed
eDocumentation: OT Nurse “Sign In”

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<th>Scheduling Type:</th>
<th>Scheduled &gt; 48hrs before</th>
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<tbody>
<tr>
<td>Nature of Operation:</td>
<td>Right cataract extraction and intraocular lens implantation</td>
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</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Patient’s medical records verified and available?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>2. Patient’s identity &amp; ID tag checked using 2 identifiers?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>3. Consent has been verified and valid?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>4. Implant / any pace maker in patient?</td>
<td>LEFT IOL, STENT</td>
<td>NO</td>
<td>NK</td>
</tr>
<tr>
<td>5. Is blood available?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
</tr>
<tr>
<td>6. LA case? For anaesthetist case</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>7. Bowel preparation done (colorectal procedure / pelvic surgery)?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
</tr>
<tr>
<td>8. Any new allergies not stated in CMIS?</td>
<td>YES</td>
<td>NKA</td>
<td></td>
</tr>
<tr>
<td>9. Female patient at child bearing age? State LMP.</td>
<td>YES</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>10. AV Fistula / Graft?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>11. Patient RFID tag removed?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
</tr>
<tr>
<td>12. Denture(s) removed?</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>13. Hairclip(s) removed?</td>
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<td></td>
</tr>
<tr>
<td>14. Contact lens removed?</td>
<td>YES</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>15. Spectacles removed?</td>
<td>YES</td>
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<td>NA</td>
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<tr>
<td>16. Jewellery removed?</td>
<td>YES</td>
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<td>NA</td>
</tr>
<tr>
<td>17. Hearing aids removed?</td>
<td>YES</td>
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<td>NA</td>
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<tr>
<td>18. Surgical site marked?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
</tr>
<tr>
<td>19. Special equipment(s) / instrument(s) available?</td>
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<td>NO</td>
<td>NA</td>
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<tr>
<td>20. Implant for surgery (if applicable) available?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
</tr>
<tr>
<td>21. Additional information:</td>
<td>TAPE MADE WITH RING OF COTTON STICKS</td>
<td></td>
<td></td>
</tr>
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Date: 23/03/2012 1:02 PM
User Name: GAN YIN TING
Status: Signed
Unlock Reason: 

Sign | Unlock | Save As Draft | Close
**Paper documentation**

![Image of the PRE-PROCEDURE / PRE-SEDATION ASSESSMENT form]

- **Check ALL boxes to proceed:**
  - Valid Diagnosis, Indication, Procedure, Site & Consent.
  - Clinical status unchanged / stable since previous assessment.
  - Any additional risks since last assessment? (If YES, please document in case notes.)
  - Checked lab results & imaging(s)? (if applicable)
  - Prophylactic antibiotics required?
  - Specify: [ ] (communicate with anaesthetist)
  - For anaesthesia, monitored anaesthesia care or deep sedation (refer to anaesthesiology document)

- **SITE MARKING:**
  - A [ ] No site marking for life threatening emergency case / surgery on teeth or mucosal surfaces
  - B [ ] Patient refuses site marking
  - C [ ] No site marking required, as case does not involve any criteria (1 to 4)
  - D [ ] Yes, site marking is done & involves one or more of criteria (1 to 4) (Please check appropriately)

- **For Moderate Sedation**
  - No [ ] Yes [ ] If Yes, appropriately [ ] to proceed
  - No airway or anatomical abnormalities to suspect potential for respiratory compromise during sedation
  - No contraindication from major organ system
  - No known previous adverse response to sedation
  - Vital signs evaluated
  - Patient is fasted
  - Patient consents to undergoing procedure with sedation
  - Patient is incapable of giving consent

**Assessed by:**
Name: ____________________________
MCR: ____________________________
Signature: ________________________
Time: ____________________________
### Proceduralist: Pre-Procedure / Pre-Sedation Assessment "SIGN IN"

<table>
<thead>
<tr>
<th>Gender</th>
<th>DOB</th>
<th>Race</th>
<th>Case No.</th>
<th>Discipline</th>
<th>Operation Date</th>
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<tbody>
<tr>
<td>F</td>
<td>01/01/1932</td>
<td>C</td>
<td>1212202887D</td>
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<table>
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<th>Admit Type</th>
<th>Ward / Bed</th>
<th>Class</th>
<th>OT No.</th>
<th>Medical Alert</th>
<th>Drug Allergy</th>
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<tbody>
<tr>
<td>DS</td>
<td>TWDSTWDS</td>
<td>sub</td>
<td>DSOT - OT22</td>
<td>NIL</td>
<td>Nifedipine (NIFEDIPINE)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scheduling Type</th>
<th>Nature of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right cataract extraction and intracocular lens implantation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
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</thead>
<tbody>
<tr>
<td>1  Valid Diagnosis, Indication, Procedure, Site &amp; Consent?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  Clinical status unchanged / stable since previous assessment?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  Any additional risks since last assessment?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4  Checked lab results &amp; Imaging(s)? (if applicable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5  Prophylactic antibiotics required?</td>
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</tr>
<tr>
<td>Specify: Chloramphenicol (communicate with anaesthetist)</td>
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<tr>
<td>6  For anaesthesia, monitored anaesthesia care or deep sedation?</td>
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<table>
<thead>
<tr>
<th>Site Marking Done?</th>
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<tbody>
<tr>
<td>YES</td>
</tr>
<tr>
<td>☑</td>
</tr>
<tr>
<td>i. Laterality</td>
</tr>
<tr>
<td>ii. specific surface</td>
</tr>
<tr>
<td>iii. specific level</td>
</tr>
<tr>
<td>iv. specific digit or lesion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>User Name</th>
<th>Status</th>
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<th>Unlock Reason</th>
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<tr>
<td>23/03/2012</td>
<td>12:59 PM</td>
<td>GAN YIAN NICOLA</td>
<td>Signed</td>
<td>13882G</td>
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Preoperative “Sign In” Verification

H5sCS-1 - Completed Preoperative Verification Check List

% Compliance

91.5% 92.7% 95.5% 98.4% 98.1% 97.8% 97.6% 98.5% 98.1% 97.5% 97.0% 97.3% 99.8% 100.0%

Source: Data collection from documentation audit of periop record & e-record
# Pre-procedure Site Marking

## Anaesthesia

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</tr>
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<td>End Date</td>
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<tr>
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**Preparation**

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<tr>
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Remarks: PLEX1 PULSE APPLIED TO BOTH CALF.

## Patient Ready For Surgery

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<tr>
<td>Start Time</td>
<td>08:25 AM</td>
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</table>

Remarks:  

## Indicate the op related to Surgical Time 1:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Date</td>
<td>22/11/2003</td>
</tr>
<tr>
<td>Start Time</td>
<td>09:50 AM</td>
</tr>
<tr>
<td>End Date</td>
<td>22/11/2003</td>
</tr>
<tr>
<td>End Time</td>
<td>06:10 PM</td>
</tr>
</tbody>
</table>

Remarks: SITE OF SURGERY CONFIRMED WITH SURGEON.

## Reversal

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Date</td>
<td>22/11/2003</td>
</tr>
<tr>
<td>Start Time</td>
<td>06:10 PM</td>
</tr>
<tr>
<td>End Date</td>
<td>22/11/2003</td>
</tr>
<tr>
<td>End Time</td>
<td>06:20 PM</td>
</tr>
</tbody>
</table>

Remarks:  

---

*Image of a hospital form with details filled in.*
"Sign In" Stop Point Signage

Induction Room
Patient is checked before induction of anaesthesia. Assessment documented in Perioperative Record

- OT Nurse
  - Pre-operative Nursing Checklist “Sign In”

- Proceduralist
  - Pre-procedure / Pre-sedation Assessment by Medical team “Sign In”

Surgical Safety Stop Check!

1. Patient Correct?
2. Consent Valid?
3. Site Marking Done?

Proceed to OT when checks 1, 2, 3 are completed & documented
## Paper Documentation: Time Out Script
(Implemented in Nov10)

**TIME OUT** *(Before skin cleansing)*

Performed & documented by OT Nurse *(Name & Signature)*

<table>
<thead>
<tr>
<th>No.</th>
<th>In the presence of:</th>
<th></th>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Reconciled</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Surgeon:<em><strong><strong><strong><strong><strong><strong>, Anaesthetist:______________, Scrub Nurse:</strong></strong></strong></strong></strong></strong></em></td>
<td></td>
<td></td>
<td>-----</td>
<td>----</td>
<td>------------</td>
<td>----</td>
</tr>
<tr>
<td>1</td>
<td>Has (Name &amp; IC of patient) consented for surgery (nature of surgery)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has patient been positioned correctly for surgery?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is the site marking (site / side) visible?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are the relevant preoperative imaging(s) on display?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are the required implant(s) available? Specify:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are the required special equipment available? Specify:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does this patient have any allergy? Specify:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

Surgeon, Anaesthetist & Nurse to acknowledge

Is prophylactic antibiotic required and has it been administered?

Do you anticipate significant blood loss & use of blood products?

Are there any surgical or anaesthetic concerns to highlight to the team?

Scrub nurse to acknowledge

Have the sterility of sterile items been confirmed?

Are there equipment issue(s) or any concern(s)?

ONLY PROCEED AFTER ALL SURGICAL TEAM MEMBERS ANSWERED / ACKNOWLEDGED TO THE "TIME OUT" PROCESS

Performed & documented by OT Nurse *(Name & Signature)*

Time
eDocumentation: “Time Out” Section
Pre & Post-intervention comparison
-Revised periop record to include site marking check by nurse
*putting marker in induction room

Surgical team members' compliance on surgical site marking

<table>
<thead>
<tr>
<th>Activity</th>
<th>Baseline (Sep 09-Apr 10)</th>
<th>Post-intervention (Jan-Jun 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon verified &amp; marked surgical site in induction room</td>
<td>80% (Baseline)</td>
<td>98% (Post-intervention)</td>
</tr>
<tr>
<td>Anaesthetist checked site marking before induction of anaesthesia</td>
<td>74% (Baseline)</td>
<td>99% (Post-intervention)</td>
</tr>
<tr>
<td>OT nurse checked site marking before transferring patient to OR</td>
<td>59% (Baseline)</td>
<td>98% (Post-intervention)</td>
</tr>
</tbody>
</table>

Baseline survey result: Sep 09-Apr 10 (Total: 127)  
Post-intervention survey result: Jan-Jun 11 (Total: 107)

* Concurrent Hi5s project interventions.
Improvement of Nurses’ Confidence Level

OT nurse confidence level in conducting Time Out using script

- Patient’s identity confirmed
- Procedure confirmed
- Operation side/site confirmed
- Special equipment/instrument confirmed
- Implant availability confirmed
- Prophylactic antibiotics administration confirmed
- Acknowledgement of team members

Before “Time Out script” implementation: Sep 09 - Apr 10 (Total: 158)
After “Time Out script” implementation: Jan - Jun 11 (Total: 135)
Pre & Post Survey: Implementation of eDocumentation

Surgical team members' compliance on surgical site marking
(Year 09 - 12)

- Before Surgical Safety Project: Sep09-Apr10 (No.=127)
  - Surgeon verified & marked surgical site in induction room: 80%
  - Anaesthetist checked site marking before induction of anaesthesia: 74%
  - OT nurse checked site marking before transferring patient to operating room: 59%

- Paper Perioperative Checklist: Jan-Jun11 (No.=107)
  - Surgeon verified & marked surgical site in induction room: 98%
  - Anaesthetist checked site marking before induction of anaesthesia: 99%
  - OT nurse checked site marking before transferring patient to operating room: 98%

- E-Perioperative Checklist: Jan-Apr 12 (No.=50)
  - Surgeon verified & marked surgical site in induction room: 100%
  - Anaesthetist checked site marking before induction of anaesthesia: 100%
  - OT nurse checked site marking before transferring patient to operating room: 94%

6% (3/50) cases:
OT Nurse signed E-form without verifying site mark.
Noted site marking was not done by surgeon yet. Subsequently surgeon did the site marking before the patient is transferred to OT.
Pre & Post Survey: Implementation of eDocumentation

Surgical team members' acknowledgement to Time Out

<table>
<thead>
<tr>
<th>% of compliance</th>
<th>Before Surgical Safety Project: Sep09-Apr10 (No.=158)</th>
<th>Paper Perioperative Checklist: Jan-Jun11 (No.=135)</th>
<th>E-Perioperative Checklist: Jan-Apr 12 (No.=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon</td>
<td>82%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Anaesthetist</td>
<td>74%</td>
<td>96%</td>
<td>97%</td>
</tr>
<tr>
<td>Scrub Nurse</td>
<td>41%</td>
<td>99%</td>
<td>100%</td>
</tr>
</tbody>
</table>

3% (2/60) cases:
1) 1 plastic surgery - Anaesthetist busy with patient head positioning
2) 1 cataract surgery - Anaesthetic MO did not pay attention

Pre & Post Survey: Implementation of eDocumentation
Site Mark Verification Documentation by Surgeon

H5sCS-2 - Properly Marked Surgical Site

% Compliance

80.0% 88.8% 90.0% 93.0% 93.7% 94.5% 96.1% 93.0% 95.2% 96.5% 95.7% 95.6% 94.0% 94.7% 99.9% 100.0%


Implementation of eDocumentation

Source: Data collection from documentation audit of periop record & e-record
OT Nurse “Sign Out”

SIGN OUT (Before patient leaves operating room)

In the presence of:

1. Has the procedure changed or expanded during the operation?
   - Yes
   - No

2. Swab, sharp & instrument have been counted and correct.
   - Yes
   - No

3. Labelling of specimen(s) confirmed by reading out the specimen(s) label(s) to surgeon.
   - Yes
   - NA

4. Any intraoperative events that may affect recovery to highlight to team?
   - Yes
   - No

5. Blood loss < 50ml?
   - Yes
   - No

6. Any equipment/instrument issue(s) to be addressed?
   - Yes
   - No

Surgeon: WONG MARCUS

Anaesthetist: NA

Scrub Nurse: GOH BEE HWA
Recent Survey on Improvement using eDocumentation

Improvement of E-Perioperative Record Compare to Paper Documentation

<table>
<thead>
<tr>
<th>% for each indicator</th>
<th>Information flow from one team to another</th>
<th>Ease to accurately document on-site nursing / clinical</th>
<th>Documentation completeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Users participated in the survey = 112</td>
<td>99.1%</td>
<td>98.2%</td>
<td>94.6%</td>
</tr>
<tr>
<td>Improvement (7.9)</td>
<td>0.0%</td>
<td>0.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>No improvement (3.3)</td>
<td>0.9%</td>
<td>0.9%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Not answered (5.4)</td>
<td>0.9%</td>
<td>0.9%</td>
<td>5.4%</td>
</tr>
</tbody>
</table>

Average understanding level of Surgical Safety Requirements: 0 - Do Not Understand; 10 - Fully Understand
Lessons Learnt

- Understanding of surgical safety factors & system requirements

- Communications of the safety factors, changes, implementation measures, sustaining the changes with the co-operation of the entire surgical team are key success factors.

- Comprehensive and precise checks are critical for compliance to standard care of patient.

- Management support, continuous motivation and education of surgical team members are crucial.

- Continuous monitoring and evaluation of compliance is important for ongoing improvement.
Lesson Learnt: IT System Features

**Applicability**: Off the shelf commercial system or Built

**Interfaces & integration**: value add with connectivity to other clinical systems

**Assessibility**: Web-based application

**Security**: Confidentiality & secure role authorisation

**User Friendly**: Intuitive and simple to use

**Information visualization**: Information automation, push and pull flow

**Capabilities** to support standardization & non-standardized process
What’s Next?

Replacement of OT Scheduling System with OT Management System

- Streamline perioperative workflow to improve patient/NOK experience
- Improve staff communication on perioperative patients’ process flow
- Improve visibility and utilisation of procedure room resources
- Includes Predictability of:
  > OT resources allocation & usage
    (e.g overloading & underuse of resources)
  > Effects of workload variability
  > Future resource requirement
Unlike any other healthcare software vendor, McKesson provides you with a complete care continuum solution that helps you positively impact patient safety in the operating room. From access management and scheduling, supply management and case costing, perioperative and anesthesia management clinical integration, McKesson’s Horizon Surgical Manager™ surgical information system solution can help you build a strong, efficient foundation to enhance your patient and financial outcomes.

Connecting through technology and automation, McKesson’s integrated surgery information system solution gives you the ability to bridge your operating room to your enterprise scheduling, surgical services, supply chain, ERP/back-office and performance management systems. Additionally, we provide implementation and training, system optimization and health care consulting services to ensure optimal ROI from your investment in McKesson. Our surgical solutions empower you to effectively manage your operating room (OR) business and increase your patient safety and financial outcomes.

Horizon Surgical Manager™ provides you with the essential tools and technology to enable better and more efficient care, helping you to:

- Improve operating room capacity and throughput
- Automate clinical documentation and workflow
- Decrease supply and medication spend
- Standardize equipment utilization
- Monitor, analyze and measure operating room performance

Horizon Surgical Manager add-on product modules:

- Perioperative Charting
- Anesthesia Documentation
- Patient Tracking
- Physiological Recording
- Inventory Control
MEDITECH’s Operating Room Management solution provides clinicians with the tools they need to streamline the entire perioperative process, from the preoperative through postoperative stages. Scheduling, materials management, clinical documentation, and robust reporting capabilities enable you to manage your hospital operating rooms with maximum efficiency.

**Highlights:**

- Schedule surgical cases and identify scheduling and resource conflicts
- Foster communication and manage caseloads via the Big Board
- Create preference cards to meet surgical needs, streamline billing, and manage inventories
- Enter perioperative documentation at the point of care and generate documentation-driven charges in real time
- Generate comprehensive reports, such as operating lists, daily logs, and procedure counts

The Operating Room Management Solution Enables Staff to:

**Schedule Surgical Cases and Prevent Conflicts**

Staff can use the integrated Scheduler's Desktop to manage all aspects of operating room scheduling. Complete integration with MEDITECH's Community-wide Scheduling provides full conflict checking. For example, schedulers can simultaneously book preoperative appointments and surgical cases. Drag-and-drop functionality makes it easy to move cases from one time slot to another.

From a single entry point, staff can:
Emergency Department
ASA Emergency Department Information System streamlines workflows and helps improve care delivery in busy emergency departments. Because it's integrated with Epic's other clinical applications, it combines instant access to comprehensive patient information with active decision-support functionality. ASA clients dramatically reduce their wait times and transcription costs while providing faster, better care.

Inpatient Pharmacy
Willow Inpatient Pharmacy System is a key component of Epic's "closed-loop" medication ordering and administration process, linking pharmacists, ordering physicians and nurses to a single order record. With Willow, pharmacists can monitor medication treatment and improve medical outcomes, improving patient safety, minimizing adverse effects and helping control costs. Orders from EpicCare flow directly to Willow for verification and dispensing and also appear automatically on the MAR. Pharmacy staff have direct access to the chart during verification, empowering them to play a more active role in patient care, and verified orders can be routed to the appropriate dispensing device or to pharmacies outside the system. Changes made by a pharmacist are also automatically updated and available for other users. (Note: Willow was formerly known as "EpicRx")

Radiology
Radiant Radiology Information System combines tools for rules-based scheduling, documentation, results communication, chart/film tracking and detailed statistical reporting in a unified system that is fully integrated with our clinical systems. Radiant allows clients to link images and reports with a single system that can be accessed simultaneously by multiple users in multiple departments.

Operating Room
OpTime Operating Room Management System helps improve surgeon productivity, schedule utilization and perioperative documentation in both inpatient hospitals and ambulatory surgical centers. OpTime includes tools for all key perioperative processes including scheduling, preference card management, anesthesia record keeping, pre-op assessments, procedure record and PACU documentation.

Anesthesia
Epic Anesthesia Information Management System is designed to provide full ordering and clinical documentation tools wherever anesthesia services are needed in your organization. It is integrated with OpTime Operating Room Management and EpicCare EMR to streamline workflows across roles. Epic Anesthesia provides dedicated support for pre-op evaluations, pre-admission testing, intra-op record keeping, recovery care and post-procedure care, including inpatient follow-ups and post-op phone calls.
Further Understanding of Fundaments of IT

• System (Vendor) relationship & flexibility
• Backend functionality of the system
• Data extraction into data warehouse
• Alerts for inconsistent data
• Access to raw data; data validation allows for improved data capture at point of care.
• Systemic reporting capabilities: reports standardisation & query search for ad-hoc reports
• Overall system architecture and connectivity
Supporting On-going Changes

- Perioperative Documentation in EHR / EMR
- Software technological needs & upgrades
- Hardware replacement & upgrades
- Bugs fixing
- Desktop > laptops > tablets > Smart phone / device
Supporting On-going Changes

What do you want the IT system to do for the patient, your dept, the hospital and for YOU?

What is **THE WISHLIST**?

How will you incorporate your wishes into the IT system to make your hospital a great place to work?
Supporting On-going Changes

Continuous improvement of perioperative safety for patient

Staff Satisfaction

Vision & Making it Work!!

Appointment Scheduling Software helps you organize your schedule
Thank You