Patient safety and advances of Nursing Techniques

• At LCCH, we strive to provide the best, current, evidence based care for our patients and their families.

• A number of quality improvement initiatives have been introduced into nursing practice in the BMT unit at LCCH over the last 2 years

• These have improved safety for patients and have positively affected clinical outcomes
Quality activities that were undertaken are:

- Development of order sets for ordering bloods from electronic medical records
- Use of vacutainers on CVADs to take bloods
- Use of Posiflush saline flushes
- NG taping with clear Coloplast tape
- Use of Stratamed for GvHD and MARSI
- Use of silicone remove wipes for removing dressings
- Introduction of securement devices for CVADs
Development of order sets for ordering bloods from electronic medical records

• With introduction of ieMR, came electronic ordering of blood tests.

• BMT patients and donors have large number of bloods required

• Difficulties with management of

  • Ordering the right blood test sets for groups of patients (pre/post BMT)
  • Potting minimum collection volumes and netting tests
  • Rotating Drs who are asked to order specific blood sets
Development of order sets for ordering bloods from electronic medical records

• We worked with ieMR team to develop order sets
  • Pre BMT, post BMT, donors, etc
  • Much easier to order as 1 set (screenshot of favourites and order sets)
  • Nurses can send to Drs to co-sign – easy for coordinators
  • Correct bloods get ordered

• Trying to get min volumes onto ieMR

• Difficulties with specialty orders - engraftment tests and NAA testing as they are still required to be on paper forms
  • Adding them to ieMR requests as a one off misc. test – 50% successful!
Spread sheet of all the tests, pathology codes, Specimen types and special handling information prepared – one example below

<table>
<thead>
<tr>
<th>Plan Name</th>
<th>Single Phase / Multi Phase</th>
<th>Plan Type</th>
<th>Display Method</th>
<th>Phase Name</th>
<th>Sub Phase</th>
<th>Clinical Category</th>
<th>Clinical Sub Category</th>
<th>Persistent</th>
<th>Note</th>
<th>OffPut</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBM</td>
<td>Single Phase / Multi Phase</td>
<td>Plan Type</td>
<td>Display Method</td>
<td>Phase Name</td>
<td>Sub Phase</td>
<td>Clinical Category</td>
<td>Clinical Sub Category</td>
<td>Persistent</td>
<td>Note</td>
<td>OffPut</td>
</tr>
<tr>
<td>HEP</td>
<td>Hepatitis B Full Screen</td>
<td>HBM</td>
<td>Specimen Type: &quot;Blood&quot;; Collection Priority: &quot;Urgent&quot;; Collected: &quot;No&quot;; Clinician Collect: &quot;Yes&quot;;</td>
<td>1x2mL EDTA, 1x crossmatch tube 2mL into 6mL tube; 2 x 2mL into 2 x 5mL Yellow top with gel tubes (HCG-extra 2mL into 5mL Yellow top with gel if needed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCV</td>
<td>Hepatitis C Serology</td>
<td>HCV</td>
<td>Specimen Type: &quot;Blood&quot;; Collection Priority: &quot;Urgent&quot;; Collected: &quot;No&quot;; Clinician Collect: &quot;Yes&quot;;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV</td>
<td>HIV Serology Antibody/Antigen</td>
<td>HIV</td>
<td>Specimen Type: &quot;Blood&quot;; Collection Priority: &quot;Urgent&quot;; Collected: &quot;No&quot;; Clinician Collect: &quot;Yes&quot;;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMV</td>
<td>CMV Serology IgG</td>
<td>CMV</td>
<td>Specimen Type: &quot;Blood&quot;; Collection Priority: &quot;Urgent&quot;; Collected: &quot;No&quot;; Clinician Collect: &quot;Yes&quot;;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPSE</td>
<td>Syphilis Serology</td>
<td>TPSE</td>
<td>Specimen Type: &quot;Blood&quot;; Collection Priority: &quot;Urgent&quot;; Collected: &quot;No&quot;; Clinician Collect: &quot;Yes&quot;;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T Doug</td>
<td>Toxoplasma gondii Serology IgG</td>
<td>T Doug</td>
<td>Specimen Type: &quot;Blood&quot;; Collection Priority: &quot;Urgent&quot;; Collected: &quot;No&quot;; Clinician Collect: &quot;Yes&quot;;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPH</td>
<td>Blood group and antibody screen medical/surgical requirements</td>
<td>GPH</td>
<td>Specimen Type: &quot;Blood&quot;; Collection Priority: &quot;Urgent&quot;; Collected: &quot;No&quot;; Clinician Collect: &quot;Yes&quot;;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCG</td>
<td>HCG</td>
<td>HCG</td>
<td>Specimen Type: &quot;Blood&quot;; Collection Priority: &quot;Urgent&quot;; Collected: &quot;No&quot;; Clinician Collect: &quot;Yes&quot;;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Children’s Health Queensland Hospital and Health Service
Posters prepared to aid the collectors on which tubes could be netted to collect and minimum volumes required.
Use of vacutainers on CVADs to take bloods

April 2016, Pathology Reported an increase in Spurious Hb results

• Total number of FBC (April/May):
  o 5C = 1007
  o 11B = 905

• Erroneous FBC only seen in 11B, this trend did not occur with 5C.
  – 25 “erroneous” results from 905 collections 2.8% of all FBC samples processed

  – FBC cost $14.79 x 25 = $369.75 (over 2 months) for one year it would cost around $2220 to have to repeat tests
Identifying Spurious Hb Results

- 7y.o. Female
- Results are reviewed against cumulative data for the patient
- Note: Markedly raised Hb = 148g/L ?Cause
- Review of other results on same collect
Biochemistry results on same collection

<table>
<thead>
<tr>
<th>Sample Appearance</th>
<th>Clear</th>
<th>Clear</th>
<th>Clear</th>
<th>Clear</th>
<th>Clear</th>
<th>Clear</th>
<th>mmol/L (133 - 144)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>134</td>
<td>132</td>
<td>135</td>
<td>137</td>
<td>136</td>
<td>132</td>
<td>(3.6 - 5.3)</td>
</tr>
<tr>
<td>Potassium</td>
<td>4.1</td>
<td>3.8</td>
<td>3.6</td>
<td>4.2</td>
<td>4.2</td>
<td>4.0</td>
<td>(97 - 110)</td>
</tr>
<tr>
<td>Chloride</td>
<td>102</td>
<td>101</td>
<td>104</td>
<td>104</td>
<td>103</td>
<td>101</td>
<td>(17 - 30)</td>
</tr>
<tr>
<td>Bicarbonate</td>
<td>24</td>
<td>25</td>
<td>22</td>
<td>25</td>
<td>24</td>
<td>22</td>
<td>(4 - 13)</td>
</tr>
<tr>
<td>Anion Gap</td>
<td>8</td>
<td>6</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>(3.0 - 7.8)</td>
</tr>
<tr>
<td>Glucose</td>
<td>8.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(3.0 - 6.0)</td>
</tr>
<tr>
<td>Urea</td>
<td>3.3</td>
<td>3.7</td>
<td>4.5</td>
<td>5.3</td>
<td>3.6</td>
<td>4.3</td>
<td>(2.5 - 6.0)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>&lt; 30</td>
<td>&lt; 30</td>
<td>&lt; 30</td>
<td>&lt; 30</td>
<td>&lt; 30</td>
<td>&lt; 30</td>
<td>&lt; 58 (40 - 100)</td>
</tr>
<tr>
<td>Urea/Creat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(40 - 100)</td>
</tr>
<tr>
<td>Urate</td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.11 - 0.33)</td>
</tr>
<tr>
<td>Protein (Total)</td>
<td>58</td>
<td>58</td>
<td>61</td>
<td>62</td>
<td>57</td>
<td></td>
<td>(57 - 80)</td>
</tr>
<tr>
<td>Albumin</td>
<td>35</td>
<td>31</td>
<td>30</td>
<td>29</td>
<td>28</td>
<td></td>
<td>(29 - 42)</td>
</tr>
<tr>
<td>Globulin</td>
<td>23</td>
<td>27</td>
<td>31</td>
<td>33</td>
<td>29</td>
<td></td>
<td>(25 - 45)</td>
</tr>
<tr>
<td>Bilirubin (Total)</td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>&lt; 4</td>
<td></td>
<td>(20)</td>
</tr>
<tr>
<td>Bilirubin (Conj.)</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
<td></td>
<td>(4)</td>
</tr>
<tr>
<td>Alkaline Phosphatase</td>
<td>109</td>
<td>109</td>
<td>104</td>
<td>100</td>
<td>94</td>
<td></td>
<td>(120 - 440)</td>
</tr>
<tr>
<td>Gamma-GT</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>16</td>
<td>17</td>
<td></td>
<td>(&lt; 22)</td>
</tr>
<tr>
<td>Alanine Transaminase</td>
<td>11</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>11</td>
<td></td>
<td>(5 - 25)</td>
</tr>
<tr>
<td>Aspartate Transaminase</td>
<td>13</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td></td>
<td>(&lt; 41)</td>
</tr>
<tr>
<td>Lactate Dehydrogenase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>92</td>
<td>U/L (140 - 280)</td>
</tr>
<tr>
<td>Calcium</td>
<td>2.21</td>
<td>2.16</td>
<td>2.17</td>
<td>2.24</td>
<td>2.09</td>
<td></td>
<td>(2.20 - 2.65)</td>
</tr>
<tr>
<td>Calcium (Alb. Corr.)</td>
<td>2.31</td>
<td>2.34</td>
<td>2.37</td>
<td>2.46</td>
<td>2.33</td>
<td></td>
<td>(2.20 - 2.65)</td>
</tr>
<tr>
<td>Phosphate</td>
<td>0.92</td>
<td>0.79</td>
<td>0.94</td>
<td>0.99</td>
<td>0.96</td>
<td></td>
<td>(0.90 - 2.00)</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0.76</td>
<td>0.80</td>
<td>0.82</td>
<td>0.78</td>
<td>0.74</td>
<td></td>
<td>(0.65 - 1.10)</td>
</tr>
<tr>
<td>Osmolality (Calculated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>286</td>
<td>mmol/L (275 - 295)</td>
</tr>
</tbody>
</table>

- Note: Cumulative results consistent for all analytes
- No indication of dilution with IV fluids
- Results indicate same patient i.e. not wrong blood in tube
Transfusion History

<table>
<thead>
<tr>
<th>Date</th>
<th>User</th>
<th>Lab No</th>
<th>Unit No</th>
<th>Product</th>
<th>Group</th>
<th>Status</th>
<th>Transfused</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:47 05-May-16</td>
<td>ky2</td>
<td>74077-1003</td>
<td>3266477</td>
<td>PLAIR1</td>
<td>A POS</td>
<td>Desp ward 11B-LCCH</td>
<td>10:47 05-May-16</td>
</tr>
<tr>
<td>12:10 29-Apr-16</td>
<td>co3</td>
<td>74560-2811</td>
<td>3261798</td>
<td>RCIR</td>
<td>A POS</td>
<td>Compatible</td>
<td>10:25 28-Apr-16</td>
</tr>
<tr>
<td>13:15 04-Apr-16</td>
<td>an8</td>
<td>74558-3302</td>
<td>2685907</td>
<td>PPLDI</td>
<td>O NEG</td>
<td>Desp ward 11B-LCCH</td>
<td>13:15 04-Apr-16</td>
</tr>
<tr>
<td>14:13 31-Mar-16</td>
<td>tz2</td>
<td>74406-1281</td>
<td>2707507</td>
<td>RCIR</td>
<td>A POS</td>
<td>Compatible</td>
<td>14:32 31-Mar-16</td>
</tr>
<tr>
<td>12:50 31-Mar-16</td>
<td>tz2</td>
<td>74406-1281</td>
<td>2712808</td>
<td>PLAIR1</td>
<td>A POS</td>
<td>Desp ward 11B-LCCH</td>
<td>12:50 31-Mar-16</td>
</tr>
<tr>
<td>08:07 07-Mar-16</td>
<td>tz2</td>
<td>72889-1008</td>
<td>2693644</td>
<td>RCIR</td>
<td>A POS</td>
<td>Compatible</td>
<td>08:06 07-Mar-16</td>
</tr>
<tr>
<td>19:01 22-Feb-16</td>
<td>ab39</td>
<td>74137-5412</td>
<td>2655281</td>
<td>PPLDI</td>
<td>A POS</td>
<td>Desp ward 11B-LCCH</td>
<td>19:00 22-Feb-16</td>
</tr>
<tr>
<td>15:05 22-Feb-16</td>
<td>tz2</td>
<td>74137-5412</td>
<td>2679313</td>
<td>RCIR</td>
<td>A POS</td>
<td>Compatible</td>
<td>15:05 22-Feb-16</td>
</tr>
<tr>
<td>12:18 31-Jan-16</td>
<td>ne4</td>
<td>73834-8737</td>
<td>2658404</td>
<td>PLAIR2</td>
<td>A POS</td>
<td>Desp ward 11B-LCCH</td>
<td>12:15 31-Jan-16</td>
</tr>
<tr>
<td>14:29 13-Jan-16</td>
<td>an8</td>
<td>73830-8268</td>
<td>2634490</td>
<td>RCIR</td>
<td>O POS</td>
<td>Compatible</td>
<td>14:09 13-Jan-16</td>
</tr>
<tr>
<td>14:11 16-Dec-15</td>
<td>co3</td>
<td>72950-6100</td>
<td>2626090</td>
<td>RCIR</td>
<td>A POS</td>
<td>Compatible</td>
<td>14:11 16-Dec-15</td>
</tr>
</tbody>
</table>

- Note: Patient was transfused Red Cells and Platelets day prior
- Rise in Hb from 52g/L to 148g/L not possible from 1 unit
Review the tubes collected visually:

same patient same time of collection, A and B left to settle

**Note:**
- Tube A (Chemistry) shows reduced red cells (low Hb)
- Tube B (FBC) shows increased red cells (High Hb)
- Tube C (FBC) same tube as Tube B represents “normal looking blood” when unspun
Integrity of specimen

To ensure integrity of specimen is maintained

1- Cease any medication/fluid administration occurring via line

2- Discard first 3-5mls

3- Perform collection: Sample needs to be potted as soon as possible following the correct order of draw to maintain integrity of specimen. In the instance where essential patient care is required to be provided immediately following collection, a second staff member should be available to assist with tasks as is appropriate to ensure sample is potted in a timely fashion.

Ensure syringe is inverted/ tilted back and forth following any delay in potting this ensures mixing of the specimen and prevents erroneous FBC results - haemoconcentration.

4- Dispense blood into tubes using correct order of draw inverting each tube once blood dispensed:

**Blood Culture/s**

**Blue Citrate**

**Red SST**

**Pink EDTA**

**Purple EDTA**

5- Invert all tubes once potted, this ensures adequate mixing of blood and tube additives.
BLOOD TUBES

ORDER OF DRAW

1. Blood Culture
   - M/C/S

2. Citrate
   - COAG
   - INR
   - APTT
   - D-Dimer
   - FIX

3. SST
   - CHEM 20
   - CRP
   - Anti-HAV
   - Transferrin
   - HEP B
   - HEP C
   - CMV
   - HIV
   - DPHILIS
   - HDV
   - HBV
   - Malaria
   - CMV
   - Vancomycin
   - Cefepime
   - CRP

4. SST no Gel
   - Copper, Zinc, Selenium

5. Trace
   - Tissue typing
   - Rhesus
   - Malaria

6. Lithium Hep
   - Prothrombin

7. Lithium Hep no Gel
   - FISH Chromosomes (blood)
   - Hemoglobin
   - Cytogenetics
   - Plasma Haemoglobin

8. EDTA
   - PCR
   - ADNOC PCR
   - CMV PCR
   - EBV PCR
   - HCV
   - TB
   - Penicillin
   - CD34 Count
   - Chromatin Studies
   - X MATCH
   - GROUP & HOLD
   - TAOLOG
   - Manganese

9. Fluoride Oxalate
   - Glucose, Lactate

10. ACD
    - Tissue typing
    - Rhesus
    - ABO

Gently invert tubes 8-10 times to ensure adequate mixing. Syringe collections, put a cap and ensure adequately mixed prior to potting.
Summary:

• Cause for spurious Hb due to collection technique – delay in potting bloods into tubes

• Insufficient mixing of syringe prior potting

• Reason for mixing prior to potting is based on “ESR” principal

• ESR = Erythrocyte Sedimentation Rate (red cells falling into “coin stacks”) and separating away from plasma as seen in photo of tubes
Vacutainer method: two to choose from

Method 1 – if not connected

Use aseptic non touch technique to prepare equipment and environment for collection

Collect specimens:
- Clean needleless access device (bung) as per ANTT guidelines
- Using a 10 ml syringe, withdraw discard blood (minimum 5mL) and dispose
- Attach vacutainer sleeve to the needleless access device (bung)
- Attach tubes in potting order to the vacutainer sleeve and collect blood
- Gently invert tubes 8-10 times to ensure adequate mixing
- Discard vacutainer sleeve into sharps container
- Using a pulsatile technique, flush the line with 0.9% Sodium Chloride
- Lock the line under positive pressure using the relevant heparin solution

Method 2 – if connected

Use aseptic non touch technique to prepare equipment and environment for collection

Collect specimens:
- Stop all infusions
- Clean needleless access device (bung) as per ANTT guidelines
- Flush the line with 0.9% Sodium Chloride
- Using the same syringe, withdraw discard blood (minimum 5mL) and dispose
- Attach vacutainer sleeve to the needleless access device (bung)
- Attach tubes in potting order to the vacutainer sleeve and collect blood
- Gently invert tubes 8-10 times to ensure adequate mixing
- Discard vacutainer sleeve into sharps container
- Using a pulsatile technique, flush the line with 0.9% Sodium Chloride
If CVL will not bleed with the Vacutainer system, blood can be collected by syringe method and then potted using a transfer device

- Withdraw blood as previously described using a syringe and ANTT
- Pot immediately, mixing syringe well prior to potting
- Attach vacutainer transfer device to the syringe
- Attach tubes in potting order to the vacutainer transfer device
- Gently invert tubes 8-10 times to ensure adequate mixing
- Discard vacutainer transfer device into sharps container
- Using a pulsatile technique, flush the line with 0.9% Sodium Chloride
Print labels and then collect blood

Attach the label length wise so that the sample can be viewed and barcode can be scanned. Best practice dictates that blood should be collected first and then label applied. Sign and date the tubes.
Paediatric Sampling Considerations

Samples can be netted or grouped to cover a few tests - extra labels should be included in the specimen bag for Pathology use.

Container volumes reflect container size – you must determine the amount of blood to include depending on the size of the patient.

Never attach more than one label to a tube and don’t stick two tubes together with a single label.
Invert the Tube

Invert the Vacutainer tube 5-6 times for adequate mixing of blood and additive from the tube. Do not shake the specimen tube.
Vacutainer survey

Oncology Service, Staff Survey November 2016

Thank you for taking the time to complete this survey by the Oncology Service at the Lady Cilento Children’s Hospital. The information collected from the survey will be used to help us assess any issues with blood collection using vacutainers on Ward 11b. Your feedback is important to us as we strive to improve blood collection.

This Survey should only take about 5 minutes of your time. This is an anonymous survey; however if you could please complete your role designation that would be most helpful. If you have any questions, please contact the Clinical Practice Facilitator or Nurse Educator on x2018 and x1756 respectively.

Designation of person filling out form (please tick as appropriate):
- CN
- RN
- GN
- EN
- CN <1 Yr
- CN >1-2 Yrs
- CN >2 Yrs
- GN <1 Yr
- RN >1-2 Yrs
- RN >2 Yrs

1. Have you used the vacutainer collection device? Yes □ No □

2. Is this the first time you have used the vacutainer system? Yes □ No □

3. Have you used vacutainers at a previous hospital/clinic? Yes □ No □

4. If you used the vacutainer system, please circle the device(s) you have used?
   - Blue BD CVAD
   - Red BD Syringe
   - Green Syringe

5. Did you find them easy to use? Yes □ No □

6. Do you like them? Yes □ No □

7. Did you have any problems using the vacutainer system?

Please return the completed survey to the Clinical Practice Facilitator in-tray in the 11b Hub. The Oncology team thank you for taking the time to answer this survey.
Use of Posiflush saline flushes

- Nursing staff repeatedly report lack of time as rationale for non-compliance with appropriate flushing of peripheral intravenous catheter (PIVC) and central venous catheter devices (CVADs) before, after and in between medication administration.

- Inappropriate flushing can lead to occlusion +/- thrombus formation which can also result in infection.
  - Currently 25% of PIVC and 30% of CVAD fail due to complication; the number of complications actually occurring is much greater than this as some of these complications are able to be treated to enable catheter salvage rather than removal.

- Inappropriate syringe selection can result in catheter fracture due to increase pressure.

- Normal saline bags were being accessed for 30-50ml syringe driver saline infusions TKVO between medications – wasteful, infection risk

- There are a variety of prefilled sodium chloride syringes available that could potentially assist in nursing compliance with proper flushing practices.
  - Not all sizes of these syringes are currently available on the list of approved medicines.
A time in motion study comparing manually prepared sodium chloride flush to use of pre-filled flush

- mean difference of 49 seconds between the two flushing techniques, with prefilled syringes proving to be less labour intensive.
- The average patient receives 15 medication and blood aspirates per day. Assuming this time saving per flush the average nurse could save 30 minutes per day in time.
- Greater savings could be realised in more labour intensive areas such as bone marrow therapy and intensive care units.
2. Analysis of the cost comparative Posiflush® v- manually prepared 0.9% Sodium Chloride (NaCl) flush

<table>
<thead>
<tr>
<th>(Posiflush®)</th>
<th>Cost</th>
<th>Manually prepared flush</th>
<th>Cost</th>
<th>Manually prepared flush with safety needle</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-filled Syringe</td>
<td>$0.37c</td>
<td>10mL Luer Lock Syringe</td>
<td>$0.12c</td>
<td>10mL Syringe with needle</td>
<td>$0.28c</td>
</tr>
<tr>
<td>0.9% NaCl ampoule</td>
<td>$0.19c</td>
<td>0.9% NaCl ampoule</td>
<td>$0.19c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawing up needle</td>
<td>$0.02c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$0.37c</td>
<td><strong>TOTAL</strong></td>
<td>$0.33c</td>
<td><strong>TOTAL</strong></td>
<td>$0.47c</td>
</tr>
</tbody>
</table>

The cost differential is evident in the above table. Dependent upon whether a safety needle or non safety needle is to be used, there is either a reduced cost to using prefilled syringes or an additional cost of $0.04c to utilise the pre-filled syringe – v- the manually prepared flush. The response from QHMAC suggests that labour costs are not accepted as real costs, nor are the costs of labelling syringes as not all syringes are labelled consistently. Such a flippant response to bad practice is quite remiss on behalf of QHMAC which should be seen to support the correct and safe labelling of syringes. The addition of the label alone would retrieve the costs to that of cost neutral, as well as the added positive attribute of ensuring safe delivery of medicines in keeping with National Recommendations for User-Applied Labelling of Injectable Medicines, Fluids and Lines (Australian Commission on Quality and Safety in health Care).

Keogh, Marsh, Higgins et al (2013) prepared a time and motion study of peripheral venous catheter flushing practice using manually prepared and prefilled flush syringes. Their observational study determined a mean difference of 49 seconds between the 2 flushing techniques, with prefilled syringes less labour intensive. Whilst this alone, does not seem great, the average oncology child receives approximately 15 medication and blood aspires per day, assuming correct practice and a flush is administered pre and post medication administration the average oncology nurse would save approximately 30 minutes per day. Greater time savings could be achieved in the more labour intensive Bone Marrow Therapy (BMT) and Critical Care units such as Intensive Care Unit (ICU) and High Dependency Unit (HDU). Not only is this time saved, it would also ensure compliance with flushing before and after medication administration to prevent non-thrombotic occlusion through medication mixing and forming precipitate or thrombotic occlusion if the device has not been sufficiently flushed after blood sampling. The prevention of both thrombotic and non-thrombotic occlusion ensures patency of the device which also results in cost savings when the device does not require replacing. Frequent catheter resites also requires multiple penetrations of the skin barrier, which has implications for patient comfort and staff time.

QHMAC also indicated that the proper use of aseptic non-touch technique would also result in an absence of catheter related bloodstream infection. This could be true in an environment where;

a. A sterile environment is achievable (i.e. complete absence of micro-organisms). This is not achievable in the normal ward environment where micro-organisms are everywhere and ANTT is the next best alternative to reduce the risk of infection.
• All pre-filled syringes have the same barrel diameter of a 10mL syringe which is the appropriate size syringe to use to flush vascular access devices to ensure the minimum pressure applied.

• VAMS CNC sent application to Qld Health Medicines Advisory Committee

• Medication advisory committee approved use of all sizes of Posiflush® Pre-filled sodium chloride syringes for use within CHQ
Clinical Efficiencies and Savings through the Use of Pre-filled Saline Syringes in Hemodialysis

Billie Hilborn RN, CNePh(C), BScN, MHSc, Anita Amos RN, BScN, CNePh(C) and Lynda Galama, RT, BHA, CLL, BD Lean Healthcare Consultant

ABSTRACT

Clinical efficiencies and savings through the use of pre-filled saline syringes in hemodialysis

METHOD AND MATERIAL

DATA WAS COLLECTED UTILIZING:

- Chart reviews
- Pharmacy medication issue reports
- Infection Prevention and Control reports
- Lean Six Sigma principles for assessing clinical processes (See Figure 1)

RATIONAL FOR INTRODUCTION OF BD POSIFLO™ TECHNOLOGY

- Simplicity of use
- Reduced risk of contamination through decreased number of touch points
- Reduced time for clinical processes
- Improved clinician safety

RESULTS - IMPACT OF TECHNOLOGY

<table>
<thead>
<tr>
<th>BEFORE (manual fill)</th>
<th>AFTER (BD Posiflo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to fill syringe</td>
<td>faster</td>
</tr>
<tr>
<td>Reduced risk of contamination</td>
<td>no contamination</td>
</tr>
</tbody>
</table>

SUMMARY

- Reduced time for clinical processes
- Improved clinician safety

CONCLUSIONS

- Simplifying clinical processes
- Reduced risk of contamination

REFERENCES

NG taping with clear Coloplast tape

- Standard - tape NGTs onto cheek with duoderm underneath NGT and fixamull over the top
- Change weekly

- Scenario – BMT patient developed a sore area under NGT which was not entirely visible due to taping
  - became what was thought to be a pressure area.

- This was inspected when tape was removed, found to be a fungal lesion

- Prompted immediate change in practice
NG taping with clear Coloplast tape

- Research into clear dressing types
  - Strong enough to hold tube
  - Transparent
  - Protective
  - Easy to apply and remove
  - Cost

- Clear Coloplast dressing
  - Tested on
    - underneath and over the top of tubes taped to our skin
  - Older patients who could manage their tubes being manipulated

- Success with trial, was ordered through CRS and introduced into oncology population.
  - Patients with allergies and/or skin that nothing will stick to
  - Use alternative dressings and put strict obs in place to monitor for skin issues
Managing medication adhesive related skin injuries (MARSI) due to central venous access device (CVAD) dressings using a silicone gel wound dressing.

- Centre for Disease Control (CDC) guidelines for prevention of intravascular catheter-related infections 2011, recommends central venous access devices (CVAD’s) are
  - covered with sterile, transparent, semi-permeable dressings
  - changed weekly.
- CVAD dressings can be associated with medication adhesive related skin injuries, MARSI, which can occur from incorrect use of
  - skin decontamination products
  - inadequate assessment of skin integrity, or inappropriate removal of dressings.
- The wounds were cleaned with saline and then Stratamed® applied at least daily.
- Once dried, the exit site was covered with either gauze or melolin with tubigrip to hold it in place to protect the exit site.
- If the child was very small and the risk of dislodgement was high, a simple dressing and securement device was used.

- 12 patients were treated using this wound technology.
  - This heterogeneous group of oncology patients aged 14 months to 13 years, were receiving active therapy.
  - 11 patients had tunnelled CVADs and one an implanted port. CVAD dressing change procedures adhered to hospital policy.
Managing medication adhesive related skin injuries (MARSIs) due to central venous access device (CVAD) dressings using a silicone gel wound dressing.

- At Lady Cilento Children’s Hospital we have anecdotal evidence of increased MARSIs associated with dressing technology and use of chlorhexidine as the first line skin decontamination solution.

- Historically our treatment of MARSIs was substitution of dressings and healing time was regularly many weeks.

- Our current method involves the use of Stratamed®, a sterile gel which dries to form an invisible, semi-permeable, protective, waterproof layer.

- This dressing is indicated for compromised skin, and conforms to CDC recommendations.
Managing medication adhesive related skin injuries (MARSI) due to central venous access device (CVAD) dressings using a silicone gel wound dressing.

- Resolution of the skin injuries was observed in all 12 patients in 14 days or less.
- During this time, patient’s skin was patch tested for use of alternate dressing for use once their MARSI resolved.
- Patient’s then resumed dressings as per hospital policy. Patients and carers reported less pruritus and irritation using the gel.

- The fast resolution of these cases is thought to be due to the gel lightly bonding to the contours of the skin providing 24 hour full contact instead of sitting on top.
- Significantly reduces acute inflammatory responses and promotes faster healing.

- The Stratamed® allowed the skin to maintain a moist, semi-permeable environment, consistent with healthy skin, without causing the abrasion/irritation that applying/removing previous/standard dressings would cause.

MARSI in our institution have increased in frequency and can be caused by multiple factors. Whilst the rapid wound healing observed using this advanced film-forming dressing in these cases is encouraging, further research would be beneficial.
Managing medication adhesive related skin injuries (MARSIs) due to central venous access device (CVAD) dressings using a silicone gel wound dressing.
Use of silicone remove wipes for removing dressings

- Frequent dressing changes strips epidermis and causes trauma and pain.
- Oncology patients at high risk of compromised skin
- Previous practice was to use Remove wipes to assist with removal of CVAD dressings.

- These were
  - very ‘sticky’, ‘smelly’, ‘stingy’
  - Were associated with high incidence of skin reactions and tackiness of dressing
  - Left residue that needed to be wiped off prior to re-dressing
    o Chemical reaction with chlorhex - burning

- Prompted research into alternative dressing removal agents.
- With seeing results of skin protective properties of Stratamed, we sought silicone based wipes
Use of silicone remove wipes for removing dressings

- Welland Medical Adhesive Remover Wipes
  - Effectively remove adhesive
  - Less stingy
  - A lot less smelly
  - Don’t appear to affect the integrity of the dressing on removal – less sticky
  - Dressings can be put straight onto area without use of any skin prep – no residue
  - Protective of the skin
Introduction of securement devices for CVADs

- Increased incidence of line breakages in oncology population, mostly younger patients
- Consistently at the top of the hub on the CVLs
  - ? Batch of CVADs
  - ? Inefficient dressing of CVADs
- Position of fractures appeared to be from twisting, therefore weakening of CVAD lines
  - especially with heavy connections and taps with lines attached
- Changed practice to eliminate dressing technique
Prevention of CVC rupture - STAT

Shergold, J., Till, T., Travers, R., Ritchie, J.

The oncology unit at the Royal children’s Hospital (RCH), Brisbane, performs 25-30 ablative Blood and Marrow Transplants (BMT) per year on patients with malignant and non-malignant diseases. Due to the intensity of this treatment modality, a functioning Central Venous Catheter (CVC) is imperative to provide intrinsic supportive therapy. In 2012 it was noted that there was anecdotal increase in the number of CVC fractures. The literature reports an incidence of between 3 and 18% of CVC fractures.

While repairing the CVC after fracture is possible and usually successful, there are undesirable side effects from the repair:
- 2.4 fold increased risk of infection
- potential for unnecessary surgery to replace CVC
- Nursing and Medical time to site PIV
- Trauma to patient from cannulation who require intravenous medication otherwise administered via CVC due to the repair requiring 24 hours due to silicon drying time
- Cost of care increased documented up to $49000

The leading factors adversely influencing structural integrity of the lines that led fractures were:
- Weight of the intravenous line
- Infusing balance of fluid through twisted lines causing ballooning of the CVC

We needed a device that increased security whilst being low invasively and comfortable for the patient. The options for secureless options are limited in Australia and so it was decided to trial the Statlock® Catheter Stabilisation Device.

In the period between January and September 2012, the BMT unit had 4/17 line fractures.

After Statlock® implemented

Between October 2012 and January 2013 the BMT unit had 0/11 CVC fractures.

In conclusion we found that the statlock® catheter securement device, prevented twisting and pulling of the CVC with minimal skin irritation.

From a cost perspective there have been reductions in:
- staff hours
- theatre costs
- reduced time spent untwisting lines, re-taping CVC’s and resetting fluid pumps.

The oncology unit at the RCH has implemented the statlock® catheter securement device across all high risk oncology patients (BMT, babies and toddlers). As other secureless devices become available we will continue to evaluate them.

Introduction of securement devices for CVADs

- Research and benchmarks into other areas
  – Trialled use of Sorbaview dressings

- Problem – allergies to tapes
  – Griplock devices

- Use of Griplock devices to hold hub when Sorbaview cannot be used
  – Dressing over site, Griplock on dressing, keeping entry site clear,

- Decrease in CVL fractures at the tip of the hub
Thank You to:

Jo Ritchie Quality Manager BMT LCCH
Jill Shergold BMT CNC LCCH
Rachel Edwards Oncology Educator LCCH
Elizabeth Warde Stratpharma
Monique Tovo ACI
Richard Makin Quality Manager, Blood and Marrow Transplant Network

Rebecca Beardmore, Clinical Nurse, BMT Service, LCCH
Rebecca.Beardmore@health.qld.gov.au