Bar coding in the Blood Bank for Ease, Speed + Accuracy

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Bar coding in the blood bank

Significant difference in:

- **Efficiency**
  - Time to enter & verify entry

- **Risk of error**
  - Reading, interpreting, data entry, data verification

- **Costs associated**
  - Low efficiency, error management & correction

- **Patient safety**
  - Aspect of data accuracy & traceability
McGill University Health Centre

Specialties include:

- Auto/Allo Bone marrow/stem cell transplant
- **Solid organ transplant** → IgHepB
- Hematology/oncology
- Cardiovascular surgery
- Obstetrics → RhIG
- Neurology / Neurosurgery → IVIg, Tisseel
- Apheresis → Albumin
- Specialized Pediatrics / Neonatology → Albumin
- Neonatal/pediatric cardiac surgery & ECMO
- Thalassemia & Sickle Cell Centre
- Hemophilia centre → Factors
## Stable (Fractionated) Products

**Entry activity per year**

<table>
<thead>
<tr>
<th>Activity</th>
<th># entries</th>
<th># vials</th>
<th># vials/entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received</td>
<td>2417</td>
<td>48,637</td>
<td>20</td>
</tr>
<tr>
<td>Issued</td>
<td>17,154</td>
<td>50,698</td>
<td>3</td>
</tr>
<tr>
<td>Returns</td>
<td>2,847</td>
<td>5,830</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total activity</strong></td>
<td><strong>22,500</strong></td>
<td><strong>105,200</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>
Product information entered:

- **Blood components**
  - Order #
  - Invoice #
  - Date of receipt
  - Supplier
  - Product code & name
  - Manufacturer
  - Donor #
  - Expiry date
  - Collection date
  - Blood group
  - Phenotype
  - Attributes (details)
  - Allogenic / Autologous / Directed
  - Volume

- **Plasma derivatives**
  - Order #
  - Invoice #
  - Date of receipt
  - Supplier
  - Product code & name
  - Manufacturer
  - Lot #
  - Expiry date
  - IU / vial (coagulation factors)
  - Sub-vial lot #s (Tisseel)

- **8 Fields: 2 – 4 sources**
  - Invoice → Product code
  - Actual product
  - Manufacturers date sheet
  - Tisseel subvial lot # sheet

- **13 Fields: 2 sources of info**
  - Invoice
  - Actual product (bar codes)
Bar codes → confirmation of administration from paper document – not the product itself

UNKNOWN PATIENT (M)

ABpos

Né(e) : 1995-05-05

Médecin :

Prescripteur : INCONNU

Destination : OR

Mère :

Commentaire(s) :

Directives : PRODUITS CM/ NÉG ET IRRADIÉS

<table>
<thead>
<tr>
<th>Produit</th>
<th>Code fabricant:</th>
<th>N° de lot</th>
<th>Qté: 1</th>
<th>Séquence(s) : 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLASBUMIN 25% 100 ml</td>
<td>0845</td>
<td>26N96L1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALBUMINE 25%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Aspect du produit : ASPECT NORMAL

N° autorisation :  

Commentaire:  

Date et heure de péremption: 2010-09-08

Unité : 100 ml
<table>
<thead>
<tr>
<th>Type de réception</th>
<th>Livraison</th>
<th>Expédition</th>
<th>Autres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code du produit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N° de lot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabricant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fournisseur</td>
<td>0799: HQ-MTL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mis en inventaire le</td>
<td>2008-05-29 à 15:45</td>
<td></td>
<td>Péremption le</td>
</tr>
<tr>
<td>Qté</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nombre d'unités</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>1 BLOOD BANK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Réservation</td>
<td>Oui</td>
<td>Non</td>
<td></td>
</tr>
<tr>
<td>Lieu d'inventaire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No BL.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N° de BC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date de la commande</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N° boîte</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No d'expédition</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
No bar codes → ↑↑ TIME

<table>
<thead>
<tr>
<th></th>
<th>Blood components</th>
<th>Plasma derivatives</th>
<th>Cost (22,500 vials/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry time</td>
<td>13 sec / unit</td>
<td>60 sec / lot #</td>
<td>290 hrs / yr</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1 – 120 vials)</td>
<td>= $7250 / yr</td>
</tr>
</tbody>
</table>
No bar codes → Errors

<table>
<thead>
<tr>
<th>Year</th>
<th>Blood components</th>
<th>Plasma derivatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>2006</td>
<td>14</td>
<td>29</td>
</tr>
<tr>
<td>2007</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td><strong>36</strong></td>
<td><strong>84</strong></td>
</tr>
</tbody>
</table>

- April 2008 : TraceLine v9.4 (ISBT 128 compatible)
  - Bar codes for attributes : CMV-, Irradiated, Directed
    - Need to set defaults for product codes/attributes eliminated
  - Bar codes Héma-Québec phenotype (needs verification)
Errors at the Blood Centre (HQ)

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008 Jan-June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Errors</td>
<td>13</td>
<td>11</td>
<td>4</td>
</tr>
</tbody>
</table>

- Similar lot # → Wrong product delivered:
  - IVIg 10g lot# 26N5K\(^V1\) et IVIg 5g lot# 26N5K\(^W1\)
  - BayGam 2mL # 26N3W\(^T1\) et BayHepB 5mL # 26N53W1
  - Gammagard # VNE1A004 et Iveegam # VNE1A004A
Errors at the MUHC

- **2007 = 21 reported errors** (18 of 21 → database correction)
  - 11 wrong lot numbers
  - 5 wrong expiry dates
  - 2 wrong product codes
  - 1 wrong UI value for coagulation factor

- **Jan-May 2008 = 7 errors**
  - 4 wrong lot numbers
  - 3 wrong expiry dates

**Includes “reported events” only. Errors corrected immediately are not be reported.**
Database corrections

- Once “moved”, lab cannot modify data
  - Database correction by supplier
    - Cost: minimum $260 ($130 / hr x 2 hr (min))
    - Risk of error during correction
      - many vials affected at each status once moved
    - Time to verify following correction.

- Temporary measures
  - Quarantine until corrected
  - Correct each issue voucher by hand to match vial → (?)'s
Database corrections

- 18 errors required database correction.
  - Potential: 18 x $260 = $4680 per year
  - Actual: 6 x $260 = $1560 per year

- Estimate ~36-40 errors requiring 15min to several hours to investigate and make appropriate correction.
  - Estimate cost at $25/hour > $1000 per year

- Cost of frustration = ???
Total cost

- $\Delta$ Increased entry time = $7250
- Supplier correction cost = $1560
- Investigation & followup = $1000

- Estimated cost ~ $10,000 / year
Errors – impact on patient safety

- **Expiry date** 3-12-2007 (entered Dec 3)
  - Nov 07: patient received expired Varizig exp, Mar 12

- **Traceability:**
  - Gammagard LE08G038AB vs LE08G038AD
  - distributed 2 x *AB* instead of 1 x *AB + 1 x *AD
  - Detected by discrepancy in inventory following week
  - Split the vials in system & entered portions into each potential recipient’s file as possibly transfused in case of recall.

- **Dose:**
  - IVIg 10g lot# 26N5KV1 et IVIg 5g lot# 26N5KW1
<table>
<thead>
<tr>
<th>Fabricants</th>
<th>Produits</th>
<th>Formats des dates de péremption</th>
<th>Formats des numéros de lots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baxter</td>
<td>Antithrombine III Baxter 1000 UI</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Colle de fibrine (H) TISSEEL® KIT VH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compl. Coag. Anti-inhibiteur 1000 UI Feiba® MH VH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compl. Prot. par. 600 UI Bebulin® VH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facteur IX conc. 600 UI Immune® VH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Immunoglobulines IV 5 g Ivecam Immuno®</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facteur VIII Rec. Recombine® MC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facteur VIII Rec. ADVATE®</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Immunoglobulines IV Gammagard® S/D</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compl. Prot. par 600 UI Prothromplex® MC TIM4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facteur VII concentré Baxter 600 UI</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protéine C concentré Baxter 500 UI Ceprotin®</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bayer</td>
<td>Facteur VIII rec. Kogenate® FS BIO-SET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BPL</td>
<td>Facteur XI concentré BPL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Immunoglobulines Anti-VZ 125 UI VariZIG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Date formats:**
- mmm dd yyyy
- mmm-dd-yy
- mm yyyy
- yyyy mm dd
- m-d-yyyy
- d mm aa
- mm/dd/yy
- dd mmm yyyy
Avoid long names

Create product codes & names to fit most blood bank computer system windows.
Longer ISBT codes

Shorten names to ensure pertinent info is legible in computer system windows.
Plasma derivatives – to bar code:

- **Product code & name** → limit length
- **Manufacturer**
- **Lot numbers**
  - avoid O’s & I’s, & being too similar
  - Tisseel sub-vial lot # on exterior packaging
- **Expiry date** → standardize format
- **IU per vial**
- **Get ready to enable bedside scanning**
  - To scan the actual product instead of voucher
Everyone makes mistakes.
Quality Assurance is about making it **difficult** to do it **wrong** and **easy** to do it **right**.

Let’s make it **easy** to do it **right** by bar coding all products.