Experience of clinical UDI applications with smart medical management system relying on GS1 standards

GS1 Healthcare Webinar

Dr. Shih-Chung Huang, Attending Physician of Cardiology; Director of Medical Education and Research Centre, Kaohsiung Armed Forces General Hospital (KAFGH), Chinese Taipei

May 22, 2019
Welcome and thank you for attending!

• Welcome to our May 2019 webinar.
  Thank you to our guest speaker Dr. Shih-Chung Huang, Cardiologist and Director of Medical Education and Research Centre, Kaohsiung Armed Forces General Hospital, Chinese Taipei

• Some housekeeping for today:
  - All attendees will be in listening-only mode
  - If you have questions during the presentation, please type them into the questions area and these will be monitored then answered at the end of the call

• After the webinar:
  - Within a week, the recording will be posted to: http://www.gs1.org/healthcare/hpac_webinars
  - All previous webinars are also posted to this location, so please feel free to use this resource and share the link
GS1 Healthcare Webinars

Forum for thought leaders and adopters of GS1 Healthcare Standards from the global clinical provider environment. The final goal is to improve patient safety, cost efficiency and staff productivity through implementation of GS1 standards.

- The practical realities of implementation of GS1 Standards in the care giving environment in regards to the impact on clinical care and patient interaction
- Supporting the adoption of GS1 Standards in healthcare providers and retail pharmacies
- For publication, presentation and sharing
- To those involved in GS1 standards development, the wider Healthcare stakeholder community and senior executives/decision-makers to gain their buy-in and support for implementation of GS1 Standards
Specific GS1 Healthcare Activities

**Webinars**

- Monthly webinars open to all stakeholders interested in learning about GS1 standards implementation in the care giving environment.
- [http://www.gs1.org/healthcare/hpac_webinars](http://www.gs1.org/healthcare/hpac_webinars)

**Awards**

- Twice per year
- Provider Implementation Best Case Study Award
- Provider Recognition Award
- The prize: travel & accommodation to attend the next GS1 Healthcare conference
- [http://www.gs1.org/healthcare/hpac](http://www.gs1.org/healthcare/hpac)

GS1 Healthcare also holds two global conferences per year. The next conference will be in Delhi, India from November 5 - 7, 2019. We expect significant Healthcare Provider participation on the agenda.
Hospital Introduction
Autobiography

Dr. Shih-Chung Huang

- Attending Physician of Cardiology, Division of Cardiology, Department of Medicine, Kaohsiung Armed Forces General Hospital (KAFGH), Chinese Taipei
- Director of Medical Education and Research Center, Kaohsiung Armed Forces General Hospital (KAFGH), Chinese Taipei.
- Email: sghung@gmail.com
Kaohsiung Armed Forces General Hospital (KAFGH)

<table>
<thead>
<tr>
<th>Organization was established</th>
<th>1945</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of locations</td>
<td>1 general hospital and 4 branches</td>
</tr>
<tr>
<td></td>
<td>• General Hospital in Kaohsiung city</td>
</tr>
<tr>
<td></td>
<td>• Pingtung Branch</td>
</tr>
<tr>
<td></td>
<td>• Zuoying Branch</td>
</tr>
<tr>
<td></td>
<td>• Gang shan Branch</td>
</tr>
<tr>
<td></td>
<td>• Kaohsiung Outpatient Center</td>
</tr>
<tr>
<td>No. of Beds</td>
<td>740</td>
</tr>
<tr>
<td>No. of Staff</td>
<td>1206</td>
</tr>
<tr>
<td>Number of outpatients</td>
<td>43,428 person/month</td>
</tr>
</tbody>
</table>
UDI Application Experience Sharing
UDI System Evolution in KAFGH

UDI System 1.0 in 2016

1. UDI code → an in-hospital code
2. Build an never-ending and huge database
3. Need a lot of manpower to build and maintain
4. The human brain is used as a computer

UDI System 2.0 in 2018

1. Use special algorithm to decode UDI barcode
2. Manual → E-work
3. Get material information rapidly and exactly
4. Manpower ↓
5. Brain exhausting ↓

Build database

AI processing

The Global Language of Business

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Implementation Results in KAFGH

Automatization of UDI application by A.I. based software:

- Clinical medical records (surgical operation information, patient medical information, nursing care information)
- Administration records (inventory, billing, supply chain management)
UDI System Architecture

- **Cloud streaming**
  - Pre-string purchase
  - Post-string declaration

- **Block chain**
  - Sharing information
  - Co-management is more labor-saving

- **Big data**
  - AI management
  - A good decision maker

Vendor Client

Hospital Side

- Medical Material Management System
- UDI Computing System
- Client
- Operation Record System
- Hospital Information Management System
## Applications in Operation Room

### Medical record

- **Record accurately and rapidly key clinical staff information**

### Use date, usage amount, charge code, item name, expiry date, specification, serial or lot number

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>UseBy/Lot/ SN</th>
<th>Quantity</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10mL IV Bag</td>
<td>221205 Lot:112239 SN: 磷酸鹽</td>
<td>1</td>
<td>增 / 刪</td>
</tr>
<tr>
<td>2</td>
<td>10mL IV Bag</td>
<td>230824 Lot:720U2 VSN: 磷酸鹽</td>
<td>1</td>
<td>增 / 刪</td>
</tr>
<tr>
<td>3</td>
<td>10mL IV Bag</td>
<td>230430 Lot:2RT705 VSN: 磷酸鹽</td>
<td>1</td>
<td>增 / 刪</td>
</tr>
</tbody>
</table>

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Applications in Warehouse Management

Before (manual)

After (E work)

Barcode number trace and track
Applications in Accounting

Difficult to identify

If altered, is its usage amount right ???

Accurate, clear, and automatically billing

Before (manual)

After (E form)

Charge code

Usage amount
Applications in Suppliers

Suppliers can obtain real-time stock of hospital medical materials through the cloud, can take the initiative to replenish the goods according to the experience of past use, and reduce wasted inventory time.
## Successful UDI Recognition Rate

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (should be identified)</td>
<td>140</td>
<td>192</td>
<td>285</td>
<td>437</td>
<td>369</td>
<td>518</td>
<td>456</td>
<td>462</td>
<td>377</td>
<td>398</td>
</tr>
<tr>
<td>Class 1 medical device</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>12</td>
<td>10</td>
<td>4</td>
<td>12</td>
<td>12</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Donated human organs</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drug</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>No UDI label (suppliers don’t supply)</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>12</td>
<td>10</td>
<td>30</td>
<td>21</td>
<td>14</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>UDI System error</td>
<td>9</td>
<td>4</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Number (successfully identified)</td>
<td>127</td>
<td>175</td>
<td>264</td>
<td>399</td>
<td>340</td>
<td>480</td>
<td>422</td>
<td>431</td>
<td>352</td>
<td>367</td>
</tr>
<tr>
<td>Success rate for UDI recognition(%)</td>
<td>90.70</td>
<td>91.15</td>
<td>92.63</td>
<td>91.30</td>
<td>92.14</td>
<td>91.89</td>
<td>92.54</td>
<td>93.29</td>
<td>93.37</td>
<td>92.21</td>
</tr>
</tbody>
</table>
Successful UDI Recognition Rate
3

UDI Application
Benefits
Benefit 1

1. Shorten Recording Time

- 90.1% decrease on manual working time (including administration management and medical recording)
Benefit 2

2. Energy Saving and Carbon Reduction

• Save 13,440 A4 paper and reduce carbon emissions

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3. Near-Miss Cases Decrease 0.9%

- 0.9% decreasing on the error rate of medical material record, and improving patient safety (from 5/367 = 1.36% to 2/437 = 0.46%)

REF: https://www.shutterstock.com/
Challenges & Conclusions
Some suppliers are not willing to label UDI on their products due to the concern of cost increase and no urgent enforcement of legislative regulation.

(Ex: class 1 medical device and drug, etc.)
No result by Scan, Use REF to find
The DI code was originally thought to remain **unchanged** for years. However, it will **change** with the types of the packaging level and the place of origin.
# Challenge 2

<table>
<thead>
<tr>
<th>package type</th>
<th>Package Level</th>
<th>DI code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single package</td>
<td>0</td>
<td>04711234560012</td>
</tr>
<tr>
<td>2 in package</td>
<td>0</td>
<td>04711234560029</td>
</tr>
<tr>
<td>10 in package</td>
<td>0</td>
<td>04711234560036</td>
</tr>
<tr>
<td>A box of 48 groups of 2 into</td>
<td>1</td>
<td>14711234560026</td>
</tr>
<tr>
<td>the packaging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A box of 48 groups of 10 into</td>
<td>1</td>
<td>14711234560033</td>
</tr>
<tr>
<td>the packaging</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Challenge 2

Manufacturing origin conversion, UDI code might change.

Made in Ireland

Change of country origin

Made in USA
How to overcome them ?!

We have overcome obstacles by using deep-learning UDI system (patented)

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Take Home Message

- The implantation of GS1 UDI works sufficiently relying on the communication and coordination among clinicians, nurses, administrators, suppliers.
- The smart software system enables our barcode readers and data collectors with the capability to decode correctly. This allows information to be accurately fed into the hospital databases and relevant information systems.
- Most importantly, the full support of higher level management in the hospital is crucial. Additionally, maintaining faculty consensus and collaboration is necessary for long-term and successful patient safety that is achieved through UDI application.
In Our Hospital
Safe and Efficient
Healthcare
Just Need
a Simple Scan!
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Thank you for listening
welcome to our hospital!
GS1 Healthcare webinar: Questions and contact details

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