Seeking the innovation in Healthcare Supply Chain

What is required to the healthcare in the 21st century

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Chair, GS1 Healthcare Japan
Dean, Graduate School
International University of Health and Welfare
Contents of my talk

- Multiple aspects of healthcare supply chain
- Supply chain reform and present status in Japan
- Barcode utilization in a hospital for patient safety. Three hospitals with advanced systems
- Future problems to be solved
Multiple Aspects of Supply Chain

“Supply Chain” that is a flow from production through consumption consists of four parts

- manufacturer to wholesaler
- wholesaler to purchase dpt. of hospital
- purchase dpt. to pharmacy / supply center
- pharmacy / supply center to patient
Supply chain in hospital
- pharmaceutical products-

Manufacturer → Wholesaler/Distributor → Purchasing Department → Hospital Pharmacy → Ward
Objectives of supply chain reform vary at each part

- Manufacturer: anti-counterfeit, efficient distribution
- Wholesaler (upper): efficient distribution
- Wholesaler (lower): efficient distribution (efficient ordering)
- Hospital:
  - Purchase dpt.: efficient ordering
  - Pharma dpt.: inventory control, better management by controlling products flow
  - Ward: patient safety
Contents of my talk

- Multiple aspects of healthcare supply chain
- Supply chain reform and present status in Japan
- Barcode utilization in a hospital for patient safety and 3 excellent examples
- Problems to be solved
Common Basic Element for attaining Objectives at each segment --- Unique ID

- Unique ID is a common basic element functioning as product identifier at manufacturer, wholesaler and hospital, though it may be used for different objectives at each segment.

- Unique ID like EAN code is widely used in the adjacent industry such as cosmetics, grocery, etc., and has brought great benefit.
History of Barcode Implementation in Japan

<table>
<thead>
<tr>
<th>Medical Devices</th>
<th>Equipments</th>
<th>Prescription Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start using JAN(EAN-13)</td>
<td>Database for All Healthcare Products (MEDIS)</td>
<td>Revised Pharmaceutical Affairs Law delivered</td>
</tr>
<tr>
<td>Barcode Guideline (J FMDA)</td>
<td>Revised Barcode Guideline (J FMDA)</td>
<td>Barcode Guideline (MHLW)</td>
</tr>
<tr>
<td>Followed by Dental Trade Association</td>
<td>Direct Marking Guideline</td>
<td>(Issued in Sept. 2006)</td>
</tr>
<tr>
<td>Barcode Guideline (MHLW)</td>
<td>Time Limit for Implementation</td>
<td>(Sept. 2008)</td>
</tr>
<tr>
<td>(Issued in March 2008)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Limit for Implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(March 2009 / March 2010 / March 2011)</td>
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JFMDA: Japan Federation of Medical Devices Associations
MHLW: Ministry of Health, Labour and Welfare
History of Barcode Implementation in Japan

- **Medical Devices**: Start using JAN(EAN-13) Barcode Guideline (JFMDA)
- **Equipments**: Database for All Healthcare Products (MEDIS)
- **Prescription Drugs**: Revised Pharmaceutical Affairs Law delivered

Timeline:
- **1980s**: Barcode Guideline (J FMDA)
- **1999**
- **2000**
- **2001**
- **2002**
- **2005**
- **2006**
- **2007**
- **2008**
- **2009**
- **2010**

- **2005**: Revised Barcode Guideline (J FMDA)
- **2006**: Followed by Dental Trade Association
- **2007**: Revised Pharmaceutical Affairs Law delivered
- **2008**: Barcode Guideline (MHLW) (Issued in March 2008)
- **2009**: Time Limit for Implementation (March 2009 / March 2010 / March 2011)

JFMDA: Japan Federation of Medical Devices Associations
MHLW: Ministry of Health, Labour and Welfare
Present Status of Japan

- Allocation of Unique ID -- almost done
- Placing Unique ID -- almost done
  - Use of RFID to be tried
- Manufacturer ~ Wholesaler -- improved by using Unique ID
- Wholesaler ~ Hospital -- half improved
- Supply Chain inside Hospital
  - Pharma/Material dpt. -- fairly disseminated
  - Use for patient safety at ward -- very limited
# Rate of Barcoding on Drugs at Sales Unit Level

[Annual Survey by MHLW in Sep. 2009]

<table>
<thead>
<tr>
<th>Specific Biological Product ①</th>
<th>GTIN(JAN)</th>
<th>Registration to MEDIS-DC Database</th>
<th>Product Code</th>
<th>Expiry Date</th>
<th>Lot No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>100%</td>
<td>92.9%</td>
<td>97.1%</td>
<td>97.2%</td>
<td>97.2%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Biological Product (Excluding ①)</th>
<th>GTIN(JAN)</th>
<th>Registration to MEDIS-DC Database</th>
<th>Product Code</th>
<th>Expiry Date</th>
<th>Lot No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>100%</td>
<td>93.9%</td>
<td>99.1%</td>
<td>92.6%</td>
<td>92.6%</td>
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</table>

<table>
<thead>
<tr>
<th>Injection</th>
<th>GTIN(JAN)</th>
<th>Registration to MEDIS-DC Database</th>
<th>Product Code</th>
<th>Expiry Date</th>
<th>Lot No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>89.2%</td>
<td>89.9%</td>
<td>14.1%</td>
<td>14.1%</td>
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</table>

<table>
<thead>
<tr>
<th>Oral Medicine</th>
<th>GTIN(JAN)</th>
<th>Registration to MEDIS-DC Database</th>
<th>Product Code</th>
<th>Expiry Date</th>
<th>Lot No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>99.9%</td>
<td>82.6%</td>
<td>89.6%</td>
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</table>

<table>
<thead>
<tr>
<th>External Medicine</th>
<th>GTIN(JAN)</th>
<th>Registration to MEDIS-DC Database</th>
<th>Product Code</th>
<th>Expiry Date</th>
<th>Lot No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>99.9%</td>
<td>79.8%</td>
<td>89.5%</td>
<td>2.6%</td>
<td>2.6%</td>
<td></td>
</tr>
</tbody>
</table>
## Rate of Barcoding on Medical Devices

[Annual Survey by MHLW in Sep. 2009]

<table>
<thead>
<tr>
<th></th>
<th>GTIN</th>
<th>Registration to MEDIS-DC Database</th>
<th>Barcode Individual Package</th>
<th>Barcode Inner Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Devices</td>
<td>94.1%</td>
<td>57.4%</td>
<td>65.1%</td>
<td>80.8%</td>
</tr>
<tr>
<td>In Vitro Diagnostics</td>
<td>97.8%</td>
<td>58.6%</td>
<td>76.1%</td>
<td>84.6%</td>
</tr>
<tr>
<td>Consumable Supply</td>
<td>88.7%</td>
<td>37.7%</td>
<td>---</td>
<td>59.5%</td>
</tr>
</tbody>
</table>
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- Problems to be solved
Use of barcode in hospitals

- Patient safety is the most important application.
- How does barcode contribute “patient safety”?
Warning system has been introduced for prescription stage, but not introduced for dispensing and administration stage.
Warning system should be introduced at the point of action, pharmacy and ward.
Data entry is required in three points to verify the action

- Barcodes can solve the difficulty of data input
  - Patient: Barcode on the wrist band
  - Pharmacists or Nurses: Barcode on the name tag
  - Drugs & Medical devices: Barcode on the product

- It is demonstrated that the incidences at the stage of practice could be drastically reduced by this method.
Three points verification at point of care

- GS1-128 Barcode
- QR Code
- Label of medication

① Nurse ID
② Wristband
③ Label of medication

- Prevention of misidentification of patient and medication error
  - Scanning 3 barcodes to verify patient ID, nurse ID and the medication at the time of administration

- Automatic recording of medical actions
  - Recording administration data automatically and improving reliability of the patient record
  - Traceability of medication
Number of incident / accident report

Infusion and Injection

medication
Discrete Excellent Examples

- Akita University Hospital
- Kyoto Second Red Cross Hospital
- National Center for Child Health and Development
- NTT Medical Center Tokyo
National Center for Child Health and Development
Bed-side Terminal at National Center for Child Health and Development

- 12-inch Touch Panel Display
- All of 500 Beds are equipped
- Barcode Scanner
- TV remote controller
- Extensibility (4 USB connectors)
National Center for Child Health and Development
Search result

Patient ID: 0960013521
Sex: 男性
Date of birth: 1988/03/01
Age: 14歳 0か月 17日

Order number: 00015606

Date of taking medicine: 2002/03/18 16:01

Start
Confirm
Change speed
Finish
Akita University Hospital
Safety Management System using Patient Wrist Band with RFID at Akita University Hospital

- **RFID**
  - 13.56MHz
  - Passive RFID tag

- **Wrist Band**
  - Patient ID (Text and Barcode) on the surface
  - Water proof coating on the reverse side

- **PDA**
  - Drop impact resistance: 1.0m
  - Alcohol resistant body (Cleaned by rubbing alcohol)
RFID attached on Nurse ID tag, Patient Wrist Band and Infusion Bag

<table>
<thead>
<tr>
<th>Nurse ID Tag</th>
<th>Patient Wrist Band</th>
<th>Infusion Bag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active RFID</td>
<td>Active RFID</td>
<td>Passive RFID</td>
</tr>
</tbody>
</table>
Infusion Pole equipped with RFID Antennas

- Antenna for Infusion Bag Tag
- Battery Unit
- Antenna for Infusion Bag Tag
- RFID on Infusion Bag
- RFID on Infusion Bag is surely read!
- PDA for checking Infusion Bag Tag
- Antenna for Nurse Tag & Patient Tag

Akita University Hospital
NTT Kanto Medical Center, Tokyo
Application of Data Matrix & RFID in the Sterile Supply Dept.

Return → Cleaning → Assembly → Sterilization → Supply · Storage

Application of bar-coding and RFID

Surgical instruments: Data Matrix

Containers: RFID

Data Matrix symbol

Scanner

RFID tag
Reading Data Matrix at the time of assembling instruments
For preventing assembly error

Showing the set to be assembled

<table>
<thead>
<tr>
<th>Set Name</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery Big C</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status</th>
<th>No. of Scanned</th>
<th>No. of Regist.</th>
<th>Composition</th>
<th>Surg. Inst.</th>
<th>Affix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembling</td>
<td>4</td>
<td>115</td>
<td>115</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>

NTT Medical Center Tokyo
In case of discarded or unusable item

<table>
<thead>
<tr>
<th>Set Distribution Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Status</td>
</tr>
<tr>
<td></td>
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NTT Medical Center Tokyo
Assembly information is read from RFID Tag
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Why barcode is not used for patient safety?

- The followings are essential to operate this GS1 system;
  - Recognition of hospital staff that barcode is useful for patient safety
  - Decision on initial investment by top management of hospital
  - Cooperation of nursing department
  - Inclusion of barcode system in a standardized hospital information system
How to solve the problem?

- It is necessary to disseminate the knowledge about using barcode to medical personnel.
- Discussion in the academy and coverage by journalism
- Education of top management of hospitals
- Reflection to the reimbursement of medical fees
- To make “Distribution System” a standard module of hospital information systems
The first general assembly of the GS1 Healthcare Japan took place on May 28, 2009. [http://www.dsri.jp/gshealth/]

Around 100 attendees from MoH, METI, healthcare companies, hospitals, associations and solution providers.

Membership; as of Nov. 1st, 2010

- Regular Member (Healthcare Companies) – 46
- Individual Member (Doctors, Professors, etc.) – 15
- Association Member (Industry Associations) – 16
- Supporting Member (Solution Providers) – 23

Professor Sigekoto Kaihara
Chairperson of GS1 Healthcare Japan
Recent activities of GS1 Healthcare Japan

- Healthcare Survey Mission to Europe and United States
  Aug. 26 ~ Sep. 6, 2009
  Visiting NHS, FDA, 5 hospitals, 1 GPO and GS1US
  15 participants

- Participation in GS1 Healthcare Hong Kong Conference
  Oct. 5 ~ 9, 2009
  6 participants

- Hospital Visit (Kanto Medical Center NTT EC)
  Dec. 4, 2009
  63 participants

- DC Visit (Eisai Distribution Co., Ltd.)
  Jan. 26, 2010
  40 participants

- Healthcare Survey Mission to Korea
  May 17 ~ 20, 2010
  Visiting hospitals, universities, pharmaceutical manufacturer, etc.
  18 participants

- Participation in GS1 Healthcare Geneva Conference
  June 22 ~ 24, 2010
  8 participants

- Healthcare Survey Mission to Europe
  Sep. 1 ~ 12, 2010
  Visiting hospitals, pharmaceutical manufacturers, distributors, etc.
  13 participants
Thank You for Cooperating in the Activities of GS1 Healthcare Japan!

http://www.dsri.jp/gshealth/

GS1Healthcare
Hong Kong Conference
(Oct. 7, 2009)

Briefing Session
(Dec. 1, 2009)

Survey Mission visiting FDA
(Sep. 2, 2009)
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