GS1 Healthcare Provider Advisory Council (HPAC) Webinar
Hong Kong Hospital Authority: Transforming the Healthcare Supply Chain

GS1 Global Office
13 November 2014
HPAC Case Study Webinars

- **This is the NINETH Webinar:**
  Hong Kong Hospital Authority:
  “Transforming the Healthcare Supply Chain ”
- **It will be recorded!**
- **Webinars will take place monthly**
<table>
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<tr>
<th>YEAR</th>
<th>DATE</th>
<th>SPEAKER</th>
<th>ORGANISATION</th>
<th>Country</th>
<th>WEBINAR TITLE</th>
</tr>
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<tbody>
<tr>
<td>2015</td>
<td>12th February</td>
<td>Valentino Bulaon</td>
<td>HealthShare NSW</td>
<td>Australia</td>
<td></td>
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<td></td>
<td>12th March</td>
<td>Justin Bitter</td>
<td>Bernhoven Hospital</td>
<td>Netherlands</td>
<td>Medical Device Traceability in OR</td>
</tr>
<tr>
<td></td>
<td>9th April</td>
<td>Doris Nessim</td>
<td>GS1 Canada</td>
<td>Canada</td>
<td>Introducing GS1 Canada's Pharmaceutical Preparation and Administration Implementation Guideline</td>
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Transforming the Healthcare Supply Chain process on pharmaceutical products in public hospitals in Hong Kong

Ms S C Chiang,
BPharm, MRPS, MHA, FACHSM, FHKCHSE, FCPP
Senior Pharmacist
Chief Pharmacist’s Office
Hospital Authority, Hong Kong
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Provide answers to some questions on the SCM project

• Why do we need to transform the Healthcare Supply Chain process on pharmaceutical products?
• What were the problems in the process?
• How did we go about making the transformation?
• What challenges did we encounter?
• What was the outcome?
Dual-track Healthcare System

- Public sector - the cornerstone of the healthcare system
- Private sector – Personalised services for those willing and may afford higher fees
Hospital Authority – Provider of Secondary and Tertiary Medical Services

Public and Private Shares of Hospital Bed-days

Sources: Hospital Authority Statistical Reports and private hospital statistics from Department of Health
Hospital Authority
Hong Kong (HAHK)

• A statutory body established on 1 December 1990
• Manages all public hospitals spread over 7 clusters in HK
  = 41 public hospitals (total 27,900 hospital beds)
  with 47 specialist & 74 general clinics
• Total 63,000 staff
  with 5,475 Doctors & 20,522 Nurses & 5,834 Allied Health
• 2013/14 Government Funding: ~ USD 5.69B (HKD44.4B)
Two Levels of Operational Control for Pharmaceutical Services

• **At Head Office level**:  
  – Chief Pharmacist’s Office  
  – Central steering functions  
    • set policy & directions  
    • establish professional standards  
    • develop and implement & support systems  
    • monitor progress on all pharmaceutical issues

• **At Hospital Cluster level**:  
  – Hospital Pharmacies Cluster Chiefs  
    • Control & perform decentralised operations at local pharmacies including purchasing, clinical activities
Magnitude of our **daily** business transactions in all HA pharmacies in 2013

<table>
<thead>
<tr>
<th>Transaction types</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Dispensed <strong>Items</strong></td>
<td>215,000</td>
</tr>
<tr>
<td>No. of Dispensed <strong>Prescriptions</strong></td>
<td>66,000</td>
</tr>
<tr>
<td>No. of <strong>Patients</strong> Served</td>
<td>58,000</td>
</tr>
<tr>
<td>No. of <strong>Suppliers</strong> dealt with</td>
<td>60</td>
</tr>
<tr>
<td>No. of <strong>Purchase Orders</strong> made</td>
<td>845</td>
</tr>
<tr>
<td><strong>Dollar value of Stock items</strong> received in HK$</td>
<td>36M</td>
</tr>
<tr>
<td>No. of <strong>stock items</strong> involved in stock receipts</td>
<td>1,600</td>
</tr>
<tr>
<td>No. of <strong>Pharmacy Stores</strong> for Stock Receipt/ issue</td>
<td>80</td>
</tr>
<tr>
<td>No. of <strong>Stock Movements</strong> in these stores</td>
<td>2,400</td>
</tr>
</tbody>
</table>
Ever wonder what is the backend of in our pharmacy stores serving the hospitals, Specialist and General out-patients clinics?

- Where do our drugs come from?
- How to control and monitor the movement of drugs?
- What are the logistics in stock receipts?
- What are involved in the processes?
- How to track and trace the Supply Chain?
The ordering and delivery processes in our HA pharmacies

External: From Suppliers (>200)

Internal: At Pharmacy stores (>100) in 7 clusters
The importance and significance of Quality, Safety and Efficiency in drug distribution/medication use

From manufacturers / distributors

Into pharmacy stores

Out from pharmacy stores

Into dispensing areas

To point of care / patient areas

150 suppliers

42 hospitals

100 pharmacies

80 Stores

500 wards

Description of the Major Supply Chain Processes

Industry ->

Logistics provider ->

Healthcare facility ->

Production:
- Receiving of pharma products
- Storage of medicines
- Inventory control
- Quality control
- Compliance with regulations
- Product handling and movement

Manufacturing:
- Quality control of raw materials
- Production of medictions
- Packaging and labeling
- Storage of finished products

Shipping:
- Transportation of medictions
- Distribution to pharmacies
- Handling at point of care

Receiving:
- Receiving of medictions at the pharmacy
- Inventory control
- Quality control

Healthcare Delivery:
- Dispensing of medictions
- Administration to the patient
- Patient safety and satisfaction
- Monitoring of medication use

Key Points:
- Supply chain management
- Quality control
- Safety protocols
- Efficiency improvements
- Patient care optimization
The Journey on Supply Chain Modernisation Project began when HA announced in March 2009 – The Key Initiatives in HA for pharmacy

6. Enhance the HA’s Pharmaceutical IT systems to improve controls by moving progressively towards:
   - introducing bar coding
   - automatically check what is received against what was ordered
   - automatically track and trace drugs to the point of issue and
   - prevent dispensing of expired items
Turning threats into opportunity
How did we do this?
What are the Challenges in SCM Project: overcoming the unknowns!

- System & Processes
- Standards
- Hardware & scanners
- Physical space
- Scope of project
- Our gaps
- People - pharmacy users, vendors, IT, managers, administrators
- Our support
- Time
- Effectiveness

Supply Chain Modernisation Project
Leadership & Project Governance

• Central level
  - User Resource Group (URG)
    - Chaired by Cluster Service Director at Headoffice level
    - members from project team & clusters representatives
    - define project plan & monitor progress
    - allocate resources, prioritise issues & make decision on direction
    - deal with concerns from system vendor and users

• Cluster level
  - 7 Cluster Implementation Project Resource Groups (CIPRG)
  - each Chaired by Cluster Chief Executives
  - members from hospital administrators, finance and pharmacy
  - meet quarterly to report & monitor progress of implementation
Understand the need to transform/modernise the Supply Chain process on Pharmaceutical Products

From manufacturers ➔ into pharmacy stores ➔ into Dispensing area ➔ to point of care (patients)
Identify the scope to be covered in the Supply Chain Modernisation project on Pharmaceutical Products

*IPMOE = In-patient Medication Order Entry
**DDAS= Drug Distribution and Administration System
Defining what we want to do in SCM?

Enable track and trace of product movement from suppliers to pharmacy stores through MSCA with provision of:

- Advance Shipping Notice (ASN) from suppliers to pharmacy ERP to verify PO
- Bar coded information on individual product and outer delivery pack from suppliers to verify required information, manufacturer, lot no., expiry dates etc.
Finding out the means and how’s to do the project

- Applying the funding from the Government
  - approval obtained from HK Government
  - looking around for suitable solution provider
  - chosen Mobile Supply Chain Application from Oracle
  - Learnt about the subject
  - Visited distributors in Hong Kong, China & Japan
  - Surveyed on vendor readiness & bar code status
  - Engaged a Consultant to review the overall situation and made recommendation on Road Map on SCM for HA – short, medium and long term measures
Supply Chain Modernisation on pharmaceutical products – areas of concerns

System
- Scope
- Methodology
- Funding

Process
- Workflow
- inbound
- outbound

People
- Internal
- management
- Support services
- Pharmacy staff
- External
- vendors
- HKGS1

Place
- Which clusters
- Which pharmacies
- Which vendors

Time
- Pilots
- Live run
- Roll out
The IT system: Using MSCA in ERP (Oracle) (Mobile Supply Chain Application)

- Making use of mobile devices to support the Supply Chain Process from Goods receipt to Goods issue as much as possible
- Use wireless connection, scanners, bar codes, data transmission
- Minimize manual data entry
- Improve accuracy & efficiency of data capture
- Not RFID but bar codes
Understand the Industry Standards provided by GS1

**GS1 Identifiers in Healthcare**

<table>
<thead>
<tr>
<th>GS1 Key</th>
<th>Represented Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTIN (Global Trade Item Number)</td>
<td>Identification of Healthcare Product</td>
</tr>
<tr>
<td>GLN (Global Location Number)</td>
<td>Identification of Location &amp; Legal Entity</td>
</tr>
<tr>
<td>GSRN (Global Service Relation Number)</td>
<td>Identification of Patient &amp; Care Giver</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application Identifier</th>
<th>Represented Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al(01)</td>
<td>Global Trade Item Number</td>
</tr>
<tr>
<td>Al(10)</td>
<td>Batch Number</td>
</tr>
<tr>
<td>Al(17)</td>
<td>Expiration Date</td>
</tr>
<tr>
<td>Al(21)</td>
<td>Serial Number</td>
</tr>
</tbody>
</table>

* GS1 keys & Application Identifiers are recognised by ISO.

**Data Structure of a GTIN**

GTIN-13

- **GS1 PREFIX**
  - To identify territory of the GS1 organization issuing the number. In Hong Kong, the GS1 Prefix assigned to GS1 HK is 489

- **GS1 COMPANY NUMBER**
  - To identify the member company assigned by the local GS1 organization

- **ITEM REFERENCE**
  - To identify the unique product and service assigned by the member company

- **CHECK DIGIT**
  - Calculated by modulo-10 formula to serve as an accuracy check on the entire number by scanning devices.

**Batch Level Identification & Expiration Control**

- For batch control or expiry date control, which are common to healthcare items, people may prefer encoding batch number and expiration date in barcode.

- GS1 System provides data structure standard for them as well:
  - Batch number – Alphanumeric data format with variable length up to 20 characters
  - Expiration date – Numeric data format (YYMMDD) with fixed length of 6 digits

---

Expiration date & batch no. must be used with GTIN and application identifier (Al) in a barcode.
What is required on the product to enable track and trace

there should be bar coded information on GTIN, Batch, Expiry Date and QTY at the primary packing
Is it feasible to have Bar-code track-and-trace all the way?

Target areas for direct-from-supplier bar-coding:
- item identity, batch no., expiry date
- item identity, batch no., expiry date
- item identity, batch no., expiry date
- item identity, batch no., expiry date
- item identity, batch no., expiry date
Legislation in Hong Kong on pharmaceutical products

• Pharmaceutical Product registration requirement by HKSAR
  – no legislative requirement on bar code on drug package
• Pharmaceutical industry not mandated to have the bar code printed
• Generally, the sales and marketing people are not concerned with this need
Examples of problems encountered on bar codes

- Difficulties to identify the correct bar code to scan
- Some bar codes are not in black and white
- AI (241) which is a customer Part Number and cannot be used as an item identifier
- Not a GTIN bar code, only a supplier Item bar code
Is it feasible to have Bar-code track-and-trace all the way?

Target areas for direct-from-supplier bar-coding

- item identity, batch no., expiry date
- item identity, batch no., expiry date

stop at the logistic units!
The process flow in Mobile Supply Chain Application

**External: From Suppliers**
- Entire shipment with bar coded SSCC on each logistic unit
- Advanced Shipping Notice (ASN)

**Internal: At Pharmacy stores**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Prior validation of manufacturer, country of origin, quantity, etc.</td>
</tr>
<tr>
<td>2.</td>
<td>Online provision of lot no, expiry date</td>
</tr>
<tr>
<td>3.</td>
<td>Scan outer pack bar code label to verify Purchase Order (PO)</td>
</tr>
<tr>
<td>4.</td>
<td>PO details displayed in scanner for inspection</td>
</tr>
<tr>
<td>5.</td>
<td>Confirm receipt &amp; instant update into system</td>
</tr>
<tr>
<td>6.</td>
<td>Pack-unpack containers to separate items</td>
</tr>
<tr>
<td>7.</td>
<td>Scan GTIN with lot no. expiry date and confirm qty</td>
</tr>
<tr>
<td>8.</td>
<td>Stock to pre-defined location in stores</td>
</tr>
<tr>
<td>9.</td>
<td>Enable lot-control with track-and-trace functionality</td>
</tr>
</tbody>
</table>
The electronic information exchange in MSCA process

The Key elements of Despatch Advice (ASN):
- SSCC (Serial Shipping Container Code)
- GTIN
- Batch/ Lot number
- Expiration Date
- and other elements...

*The Despatch Advice (ASN) should be sent 24 hours before the Physical Goods Delivery.*
Preparing for the Challenges

Support services

Pharmacy staff

System

Process

People

Place

Time

Scope

Methodology

Funding

Workflow

outbound

inbound

Internal

management

Support services

Pharmacy staff

External

vendors

HKGS1

Which clusters

Which pharmacies

Which vendors

Which

Pilots

Live run

Roll out

Internal

Exterior

Exterior

Methodology management

outbound

inbound

Which clusters

Which pharmacies

Which vendors

Pilots

Live run

Roll out

Infrastructure

Leadership

Technology

Resources
## Defining our action with stakeholders

<table>
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<tr>
<th>External</th>
<th>Internal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HKGS1:</strong></td>
<td><strong>Hospital side:</strong></td>
</tr>
<tr>
<td>- Technical guidelines</td>
<td>- Management buy in</td>
</tr>
<tr>
<td>- industry standards on ASN, SSCC, GTIN, GLN</td>
<td>- Support services</td>
</tr>
<tr>
<td><strong>Pharmaceutical vendors:</strong></td>
<td>- Pharmacies</td>
</tr>
<tr>
<td>– System interface to HA</td>
<td><strong>Engagement &amp; support:</strong></td>
</tr>
<tr>
<td>– GTIN on smallest order unit</td>
<td>– implementing MSCA</td>
</tr>
<tr>
<td>– bar code readiness to include GTIN, Qty, BN, Expiry date</td>
<td>– renovating stores &amp; facilities</td>
</tr>
<tr>
<td>– Bar coded Labels for shipper case &amp; logistic units</td>
<td>– adding manpower</td>
</tr>
<tr>
<td>– Testing and preparation</td>
<td>– supporting user training</td>
</tr>
</tbody>
</table>
Vendor Engagement started in 2010

- No less than 6 mega vendor briefings, 25+ meetings, training workshops, testing, emails, etc...
  - Clarifications on project objectives, process, technical requirement, time frame.....
  - Frequently Ask Questions
- Mock ups on bar code labels,
- EDI messages testing
- End to End testing with mock up products
- On site testing at pilot sites
- With HKGS1 assistance and support
Importance of GTIN in SCM

• GTIN is a compulsory requirement for EDI PO
• It is inevitably that some items would not carry a valid GTIN because
  – Free Goods, Sample Goods, Donated Goods, Clinical Trial Goods and duplicate item code created for special program...
  – Due to System limitation, one GTIN cannot be assigned to multiple item codes
  – GTIN may not be available when new items are introduced into HA
GTIN Allocation

different GTIN

Figure 5-5 Declared Change in Net Content - New GTIN
Locations - Types of GLN

A Universal Unique Number to Identify

Legal Locations
- Company
- Subsidiary

Physical Locations
- Warehouse
- Store

Functional Locations
- Accounting Dept
- Purchasing Dept
Standards provided by GS1

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The symbol including, its Quiet Zones, should be at least 1’’ thick stock edge to avoid damage.
# The Data String for Bar Code

<table>
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<tr>
<th>Application Identifier</th>
<th>Meanings</th>
<th>Example</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>(02)</td>
<td>The data follows (02) is the GTIN of [ordering base unit]</td>
<td>(02)04891668000022</td>
<td>Must be 14 digit no.</td>
</tr>
<tr>
<td>(17)</td>
<td>The data follows (17) is the expiration date</td>
<td>(17)110106</td>
<td>YYMMDD Format</td>
</tr>
<tr>
<td>(37)</td>
<td>The data follows (37) is the count of trade item</td>
<td>(37) 12345678</td>
<td>Up to 8 digit no.</td>
</tr>
<tr>
<td>(10)</td>
<td>The data follows (10) is batch/Lot no.</td>
<td>(10) ABCDEFGH</td>
<td>Up to 20 alphanumeric</td>
</tr>
</tbody>
</table>

= (02)04891668000022(17)110106(37)12345678(10)ABCDEFGH
for vendors with no in house IT system ability

Cat A – EDI Gateway (EDI PO, PO Response, PO Change, ASN, Invoice)

Programming and Integration is needed
ERP Capable Suppliers
Tendering of Hardware & printers & labels
Hospitals side – engagement with local management & pharmacy

- ERP System
  - Early engagement
  - Data preparation
  - Data cleansing
  - Data conversion
- MSCA / SCM
  - Hospitals Stores Facilities
- Manpower
- Training
How did we do it?
Defining the scope of the Supply Chain Modernisation Project
How did we do it?
Defining time frame for SCM implementation

by phase & batch approach:

**Phase I**
- Track from distributors into the main stores
- Applicable to all pharmacy stores in all hospitals
- Involve 2 batches of vendors on all their products

**Phase II**
- Track from pharmacy stores to the dispensing stores
- Pilot in two hospitals PWH and QEH on Dangerous Drugs
SCM Project implementation: by batch & phase approach

<table>
<thead>
<tr>
<th>Batch I vendors (live run in June 2013)</th>
<th>Batch II vendors (live run in April 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ 13+1 vendors</td>
<td>➢ + 13 vendors</td>
</tr>
<tr>
<td>➢ = about 70% of order lines</td>
<td>➢ = about 16% more order lines</td>
</tr>
<tr>
<td>➢ About 38% of item sources</td>
<td>➢ About 13% item sources</td>
</tr>
</tbody>
</table>

- **Batch I vendors**
  - BAXTER HEALTHCARD LTD
  - DKSH H.K. LTD
  - FERRING PHARMACEUTICALS LTD
  - FRESENIIUS MEDICAL CARE HK LTD
  - GAMBRO HK LTD
  - HIND WING CO LTD
  - JACOBSON MEDICAL HK LTD
  - JEAN-MARIE PHARMACAL CO LTD
  - KERRFLEX SUPPLY CHAIN SOLUTIONS LTD
  - LF ASIA (HONG KONG) LIMITED - HEALTHCARE DIVISION
  - LF ASIA (HONG KONG) LIMITED - UNIVERSAL DIVISION
  - LUEN CHEONG HONG LTD
  - U S SUMMIT CO LTD
  - ZIEULIG PHARMA LTD

- **Batch II vendors**
  - EUROPHARM LABORATOIRES CO. LTD.
  - HK MEDICAL SUPPLIES LTD
  - JOHNSON & JOHNSON (HK) LTD
  - MEDIPHARMA LTD
  - MEKIM LTD
  - PRIMAL CHEMICAL CO LTD
  - STAR MEDICAL SUPPLIES LTD
  - SYNCO (HK) LTD
  - THE INTERNATIONAL MEDICAL CO. LTD.
  - TRENTON-BOMA LIMITED
  - UNITED ITALIAN CORPORATION (HK) LTD.
  - VICKMANS LAB LTD
  - Y.C. WOO & CO. LTD.
SMART Achievement

Live run on
June 2012 in two clusters
Dec 2012 in three clusters
June 2013 in two more clusters
The Change - Goods Receipts from batch I vendors using ASN & SSCC
The Gains – a much improved goods receipts process assisted by technology
The Gains -
much better & improved storage facilities
Problems encountered
Requirement for Expiry Date Format

<table>
<thead>
<tr>
<th>e.g.</th>
<th>Expiry Date on Product</th>
<th>Expiry date format in ASN message CCYYMMDD</th>
<th>Barcode Format on Shipper Case YYMMDD</th>
<th>Expiry date printed on Shipper Case label</th>
<th>Expiry date printed on DN/Invoice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>28-Dec-2013</td>
<td>20131228</td>
<td>131228</td>
<td>28 DEC 2013</td>
<td>28 DEC 2013</td>
</tr>
<tr>
<td>B</td>
<td>Dec-28-2013</td>
<td>20131228</td>
<td>131228</td>
<td>28 DEC 2013</td>
<td>28 DEC 2013</td>
</tr>
<tr>
<td>C</td>
<td>28-12-2013</td>
<td>20131228</td>
<td>131228</td>
<td>28 DEC 2013</td>
<td>28 DEC 2013</td>
</tr>
<tr>
<td>D</td>
<td>12-28-2013</td>
<td>20131228</td>
<td>131228</td>
<td>28 DEC 2013</td>
<td>28 DEC 2013</td>
</tr>
<tr>
<td>E</td>
<td>Dec-2013</td>
<td>20131200</td>
<td>131200</td>
<td>DEC 2013</td>
<td>DEC 2013</td>
</tr>
<tr>
<td>F</td>
<td>122013</td>
<td>20131200</td>
<td>131200</td>
<td>DEC 2013</td>
<td>DEC 2013</td>
</tr>
<tr>
<td>G</td>
<td>201312</td>
<td>20131200</td>
<td>131200</td>
<td>DEC 2013</td>
<td>DEC 2013</td>
</tr>
<tr>
<td>H</td>
<td>12/13</td>
<td>20131200</td>
<td>131200</td>
<td>DEC 2013</td>
<td>DEC 2013</td>
</tr>
</tbody>
</table>
Mismatch Expiry date information on ASN and products

- Expiry date printed on products did not match ASN message -> When no date is specified, HA takes 1st day of month as the ‘used by’ date.
Batch Number Issues

users reported that the lot information printed on product packing did not match with the lot number printed on product
Some pharmacy stores are still temporary stores
Not all store rooms are properly setup
Vendor & Product readiness

For SCM EDI vendors:

• Bar codes are required on outer cartons, pellets with GTIN, Batch No, Expiry date
• These information are lost when the goods are removed from cartons and pellets
Way Forward

Patient & Medication Safety

Visibility

Traceability

where we want to go via the SCM Project
Way Forward
The Supply Chain Modernisation on Pharmaceutical Products

*IPMOE = In-patient Medication Order Entry
**DDAS= Drug Distribution and Administration System
### Track and Trace to the point of care

**IPMOE */ DDAS**

<table>
<thead>
<tr>
<th>Doctors</th>
<th>pharmacy</th>
<th>Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image of a doctor with a prescription form]</td>
<td>![Image of a pharmacy with a computer system]</td>
<td>![Image of a nurse with a BCMA device]</td>
</tr>
</tbody>
</table>

- Electronic prescribing by clinicians
- Vetting & dispensing with workflow reengineering at Pharmacies
- Drug administration by nurses using BCMA
HPAC Award – April 2014

25th Global GS1 Healthcare conference
Seoul, South Korea
Join HPAC?

- **Find out more:** [http://www.gs1.org/healthcare/hpac](http://www.gs1.org/healthcare/hpac)
- **Community Room:** [http://community.gs1.org/apps/org/workgroup/gs1hpac/](http://community.gs1.org/apps/org/workgroup/gs1hpac/)
- **Publications:**
  - Educational C-Suite Slide Deck
  - Position Statement on Barcode Issues:
  - Position Statement on Interoperability of IT Systems
- **Healthcare Provider Awards…** [http://www.gs1.org/healthcare/hpac](http://www.gs1.org/healthcare/hpac)
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