Supply Chain Efficiency and Patient Safety

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12 February 2008

The global language of business

◆ **Healthcare in Hong Kong**

◆ **Hospital Authority's Supply Chains and Patient Safety**

- **Patient Safety / Risk Management**
- **Supply Chains to the Bed-side**
- **Tracking & Tracing of Critical Items**

◆ **Challenges**

Location of Hong Kong

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- **A Special Administrative Region of People's Republic of China**

- **Southern gateway to the Mainland China**

- **Located at the Pearl River Delta facing South China Sea**

- **Total 1,104km^2 comprising HK Island, Kowloon Peninsula, Lantau Island, the New Territories and 260 other islands**

- **Leading financial centre**

- **~25Mn visitors a year**

- **Densely populated**
  - **population 6.99Mn**
  - **95% are Chinese**

(34m H)

Chinese White Dolphin
(~80-140nos. in 2000)

Romer's Tree Frog - a species endemic to HK (a few thousand)

4

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One of the healthiest places in the world……

Major Health Indicator	2006
Crude birth rate (no. of registered live births per 1,000 population)	9.5
Crude death rate (no. of registered deaths per 1,000 population)	5.5
Age-standardized death rate (no. of deaths per 1,000 standard population	3.5
Infant mortality rate (no. of deaths per 1,000 registered live births)	1.8
Maternal mortality ratio (no. of deaths per 100,000 registered live births)	1.5
Life expectancy at birth (years)	(Male) 79.4 (Female) 85.5

Source: Department of Health

Rank	Leading Causes of Death	The epidemiology of top 10 Diseases
1	Malignant neoplasms	Schizophrenia
2	Diseases of heart	Malignant neoplasms
3	Pneumonia	Cerebrovascular disease
4	Cerebrovascular diseases	Lower respiratory infection
5	External causes of morbidity and mortality	Accidental fall
6	Chronic lower respiratory diseases	Mental Retardation
7	Nephritis, nephrotic syndrome and nephrosis	Chronic obstructive pulmonary disease
8	Septicaemia	Disease of urinary system (infection & stone)
9	Diabetes mellitus	Chronic renal failure
10	Chronic liver disease and cirrhosis	Ischaemic heart disease

As of 2005

Source: Census and Statistics Department
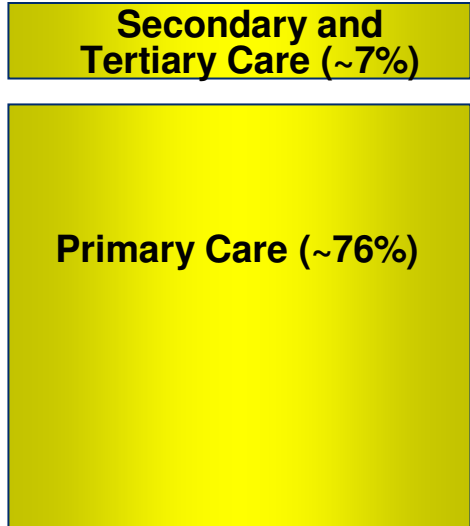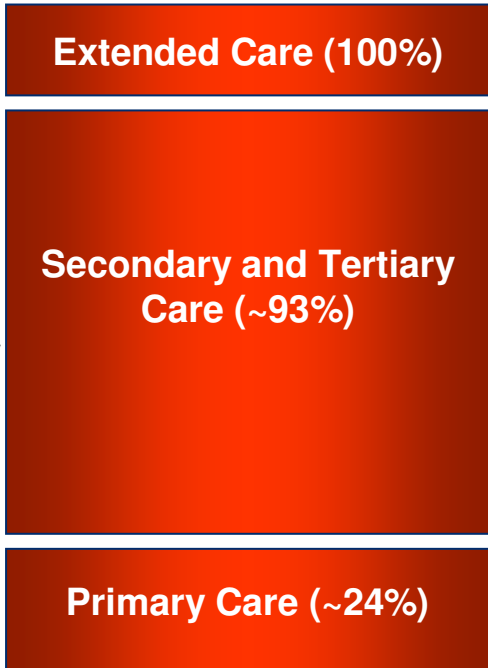
醫院管理局
HOSPITAL AUTHORITY
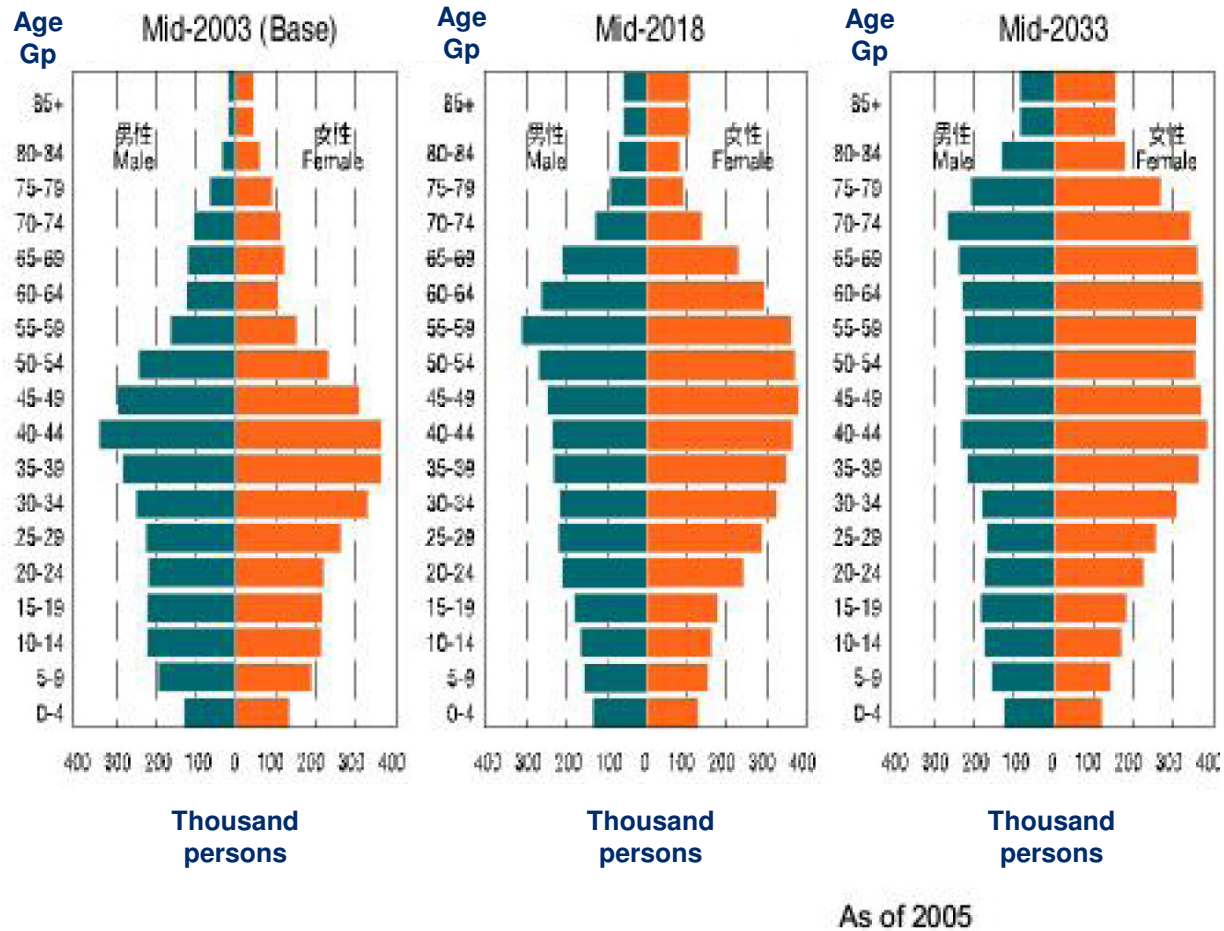
Healthcare Services in Hong Kong

Two-Pillar System

Public Services
(~95% subsidy)

Private Services
(non-subsidized services)

Dept of Health

- ~3% hosp beds
- Community health teams
- Health services centres

Hospital Authority

- 40 public hospitals (~89% hosp beds)
- 48 Specialist clinics
- 75 General clinics

Extended Care (100%)

Secondary and Tertiary Care (~93%)

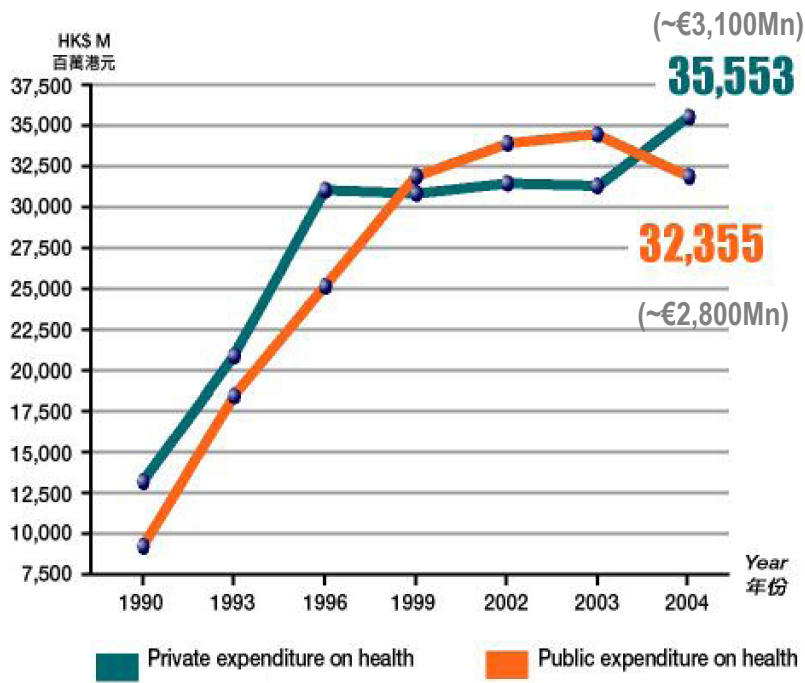Primary Care (~24%)

Secondary and Tertiary Care (~7%)

Primary Care (~76%)

- 12 private hospitals (~9% hosp beds)
- General Practitioners (~6,600nos.)
- Chinese Medicine Practitioners (~8,000nos.)

As of 2005
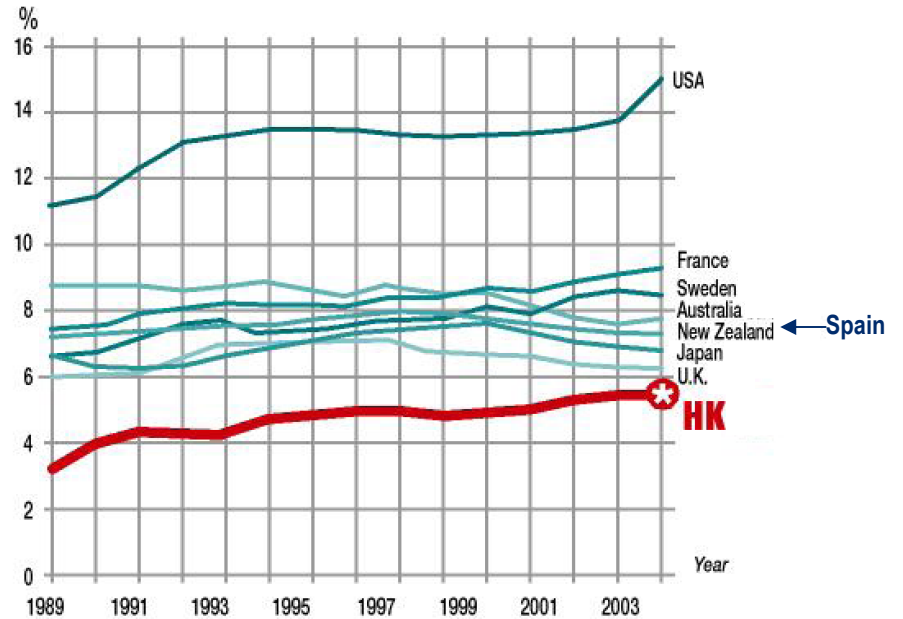
8

Medical and Healthcare Expenditure

Health Service Expenditure as Percentage of GDP

(~€3,100Mn)
35,553

32,355

(~€2,800Mn)

HK$ M
百萬港元

Year
年份

■ Private expenditure on health   ■ Public expenditure on health

As of 2005

Source: Census and Statistics Department

%

USA

France
Sweden
Australia
New Zealand ← **Spain**
Japan
U.K.

HK

Year

✪ **5.35% = 2.80% + 2.55%**
    GDP   Public   Private

As of 2005

Source: (1) Census and Statistics Department
(2) OECD Health Data 2005

9

Hospital Authority, Hong Kong

- **A statutory body established on 1 December 1990**

- **Manages all public hospitals in HK, and accountable to the Government through Secretary for Food and Health**

- **52,600 staff in Head Office, 40 public hospitals (in 7 clusters), 48 specialist clinics and 75 general clinics**

- **27,742 hospital beds in all public hospitals (3.8 hospital beds per 1,000 population)**

- **Total expenditure in 2005/06 ~HK$31 Billion (~€2.7 Billion) (~73% staff cost, ~2.6% building works projects, ~24.4% other expenditures)**
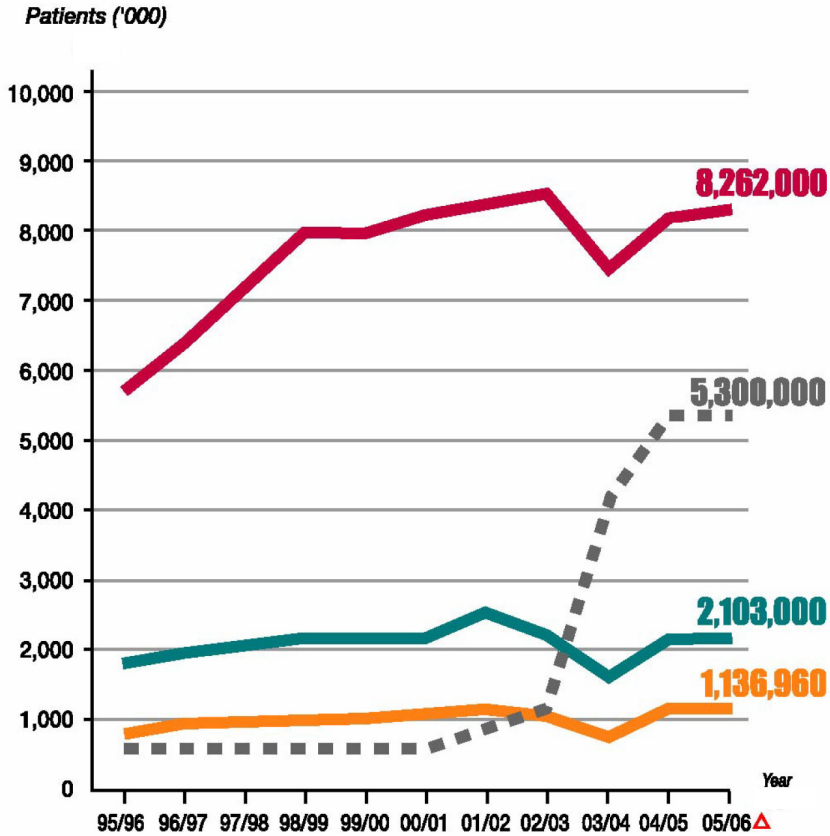
* Data as of 2006

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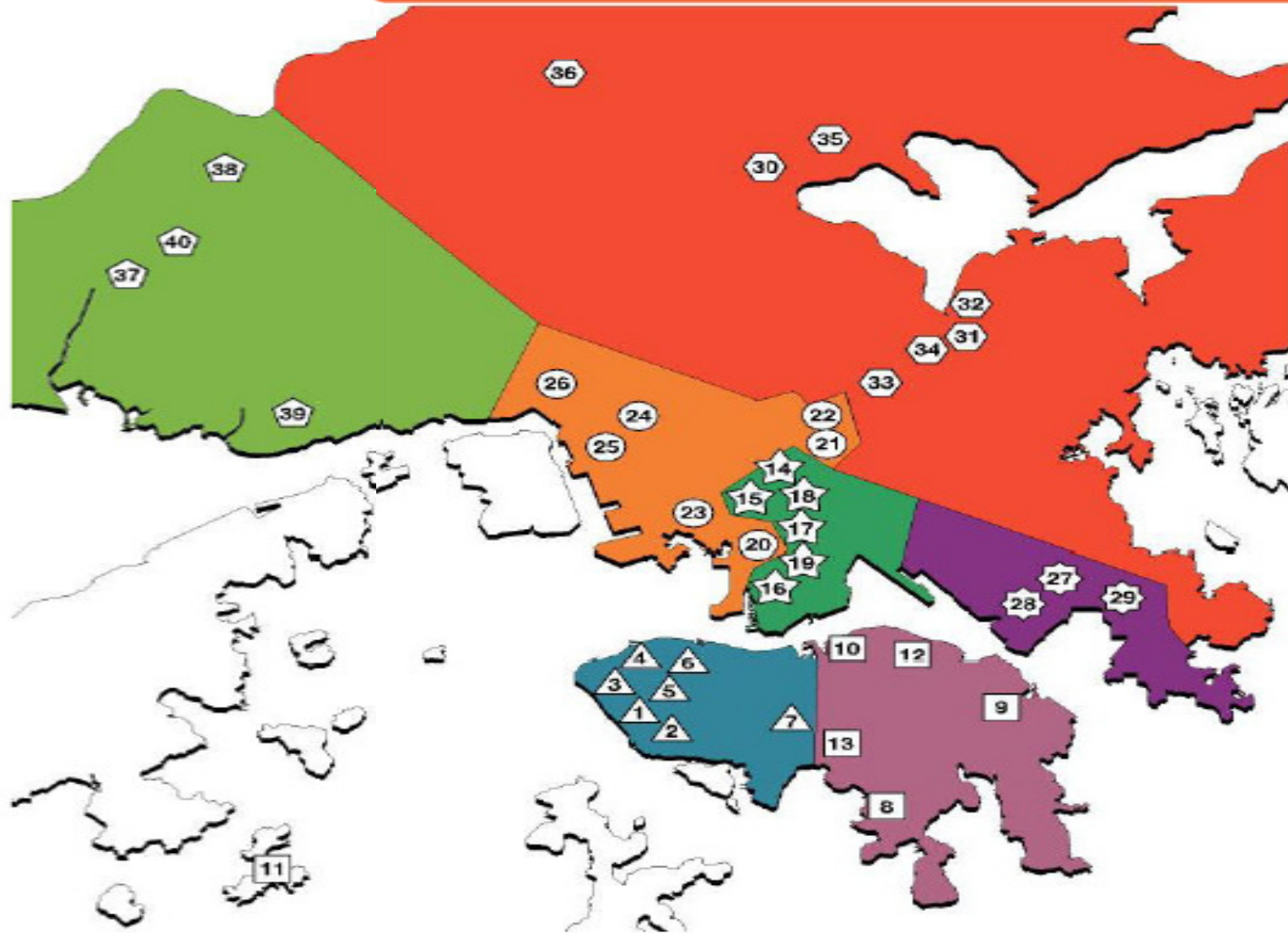
Patients ('000)

■ Specialist Out-patient Attendances ■ In-patients & Day-patients

■ Accident & Emergency Attendances ▮▮▮ General Out-patient Attendances

8,262,000

5,300,000

2,103,000

1,136,960

10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0

Year

95/96 96/97 97/98 98/99 99/00 00/01 01/02 02/03 03/04 04/05 05/06 △

Services	In-pt / Out-pt Discharges & Deaths	SOP Attendances	GOP Attendances
2001/02	1,208,427	8,543,360	887,328
2002/03	1,198,103	8,753,765	1,264,923
2003/04	975,381	7,645,651	4,301,386
2004/05	1,126,389	8,119,564	5,302,779
2005/06	1,136,960	8,262,000	5,300,000

△ Estimated figure   As of 2005

Hospital Authority's Supply Chains and Patient Safety
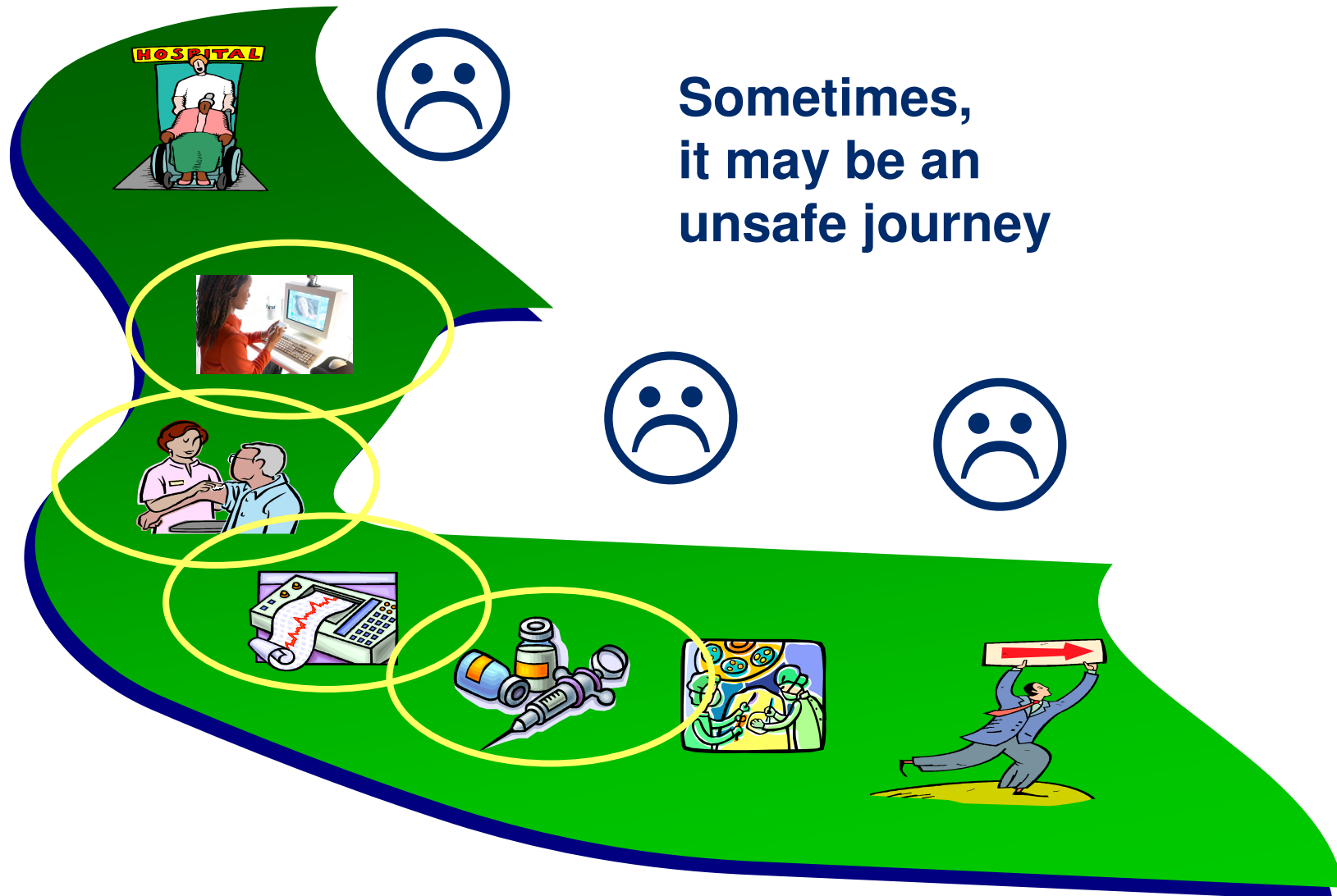
**Sometimes,
it may be an
unsafe journey**

- A web-based system fully rolled out since March 2006
- Facilitates **reporting, management, classification, analysis and monitoring** of incidents

NATURE OF INCIDENTS

1 ACCESS, ADMISSION, TRANSFER, DISCHARGE
2 EXAMINATION AND ASSESSMENT
3 INVESTIGATION / TREATMENT
4 CARE AND MONITORING
5 MEDICATION
6 BLOOD TRANSFUSION
7 COMMUNICATION AND CONSENT
8 INFECTION CONTROL
9 MEDICAL DEVICE, EQUIPMENT & PHARMACEUTICAL PRODUCTS (wef 4Q 2007)
10 PATIENT ACCIDENT
11 PATIENT BEHAVIOUR
12 ENVIRONMENT
13 FOOD SAFETY AND HYGIENE
14 OCCUPATIONAL SAFETY & HEALTH
15 HUMAN RESOURCES
16 INFORMATION TECHNOLOGY
17 MISCELLEANOUS

Top-5 Reported Incident Groups

RISK ALERT — ISSUE 1 NOV 2007

A Risk Management Newsletter for Hospital Authority Healthcare Professionals

NATURE	GROUP*	1Q 2007	2Q 2007
Patient (Injury / Behaviours)		1238	1360
	Patient falls	925	981
Staff (Occupational Safety & Health)		554	557
	Workplace violence (Physical assaults)	160	167
	Workplace violence (Threats / abuses)	183	208
Medication		523	477
	Prescription	236	207
	Dispensing	103	88
	Administration	199	199
Access, Admission, Transfer, Discharge		208	186
	Missing patient	138	127
Investigation		196	146
	Mislabeling	114	63

* Multiple groups can be selected for one case

Top-5 Causes of Medication Incidents

(in January – June 2007)

UNDERLYING CAUSES			
In-patient	Total 572	Out-patient	Total 296
1. Failure to comply with policies or procedures	36.4%	1. Failure to comply with policies or procedures	25.3%
2. Failure in communication/misinterpretation of order	11.4%	2. Incorrect computer entry	19.6%
3. Distraction	10.1%	3. Distraction	9.8%
4. Similar drug name/appearance	7.5%	4. Inadequate knowledge/skills	9.8%
5. Inadequate knowledge/skills	5.6%	5. Similar drug name/appearance	8.8%

No. of Medical Device Incident

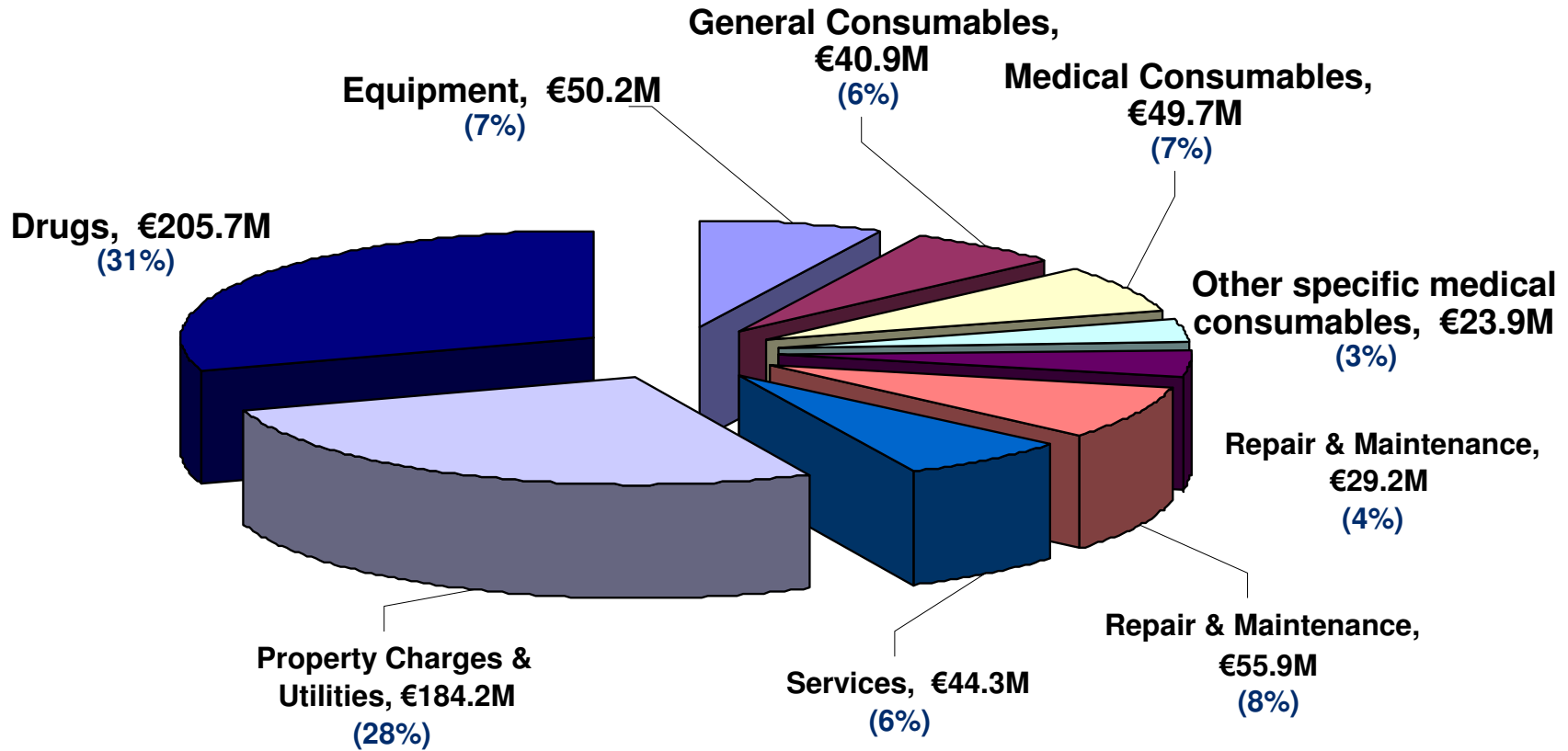| Category	2006
Anaesthesia Machines	1
Cardiac Devices	7
Medical Consumables	11
Diagnostic Equipment	3
Renal Machines	1
Electrosurgical Ablation Devices	1
Implants	1
Infusion Pumps	1
Life Support Equipment / Monitors	2
Pathology Equipment & Consumables	1
Radiological Equipment	2
Surgical Instruments	2
Others (e.g. beds, lifters, trolleys)	11
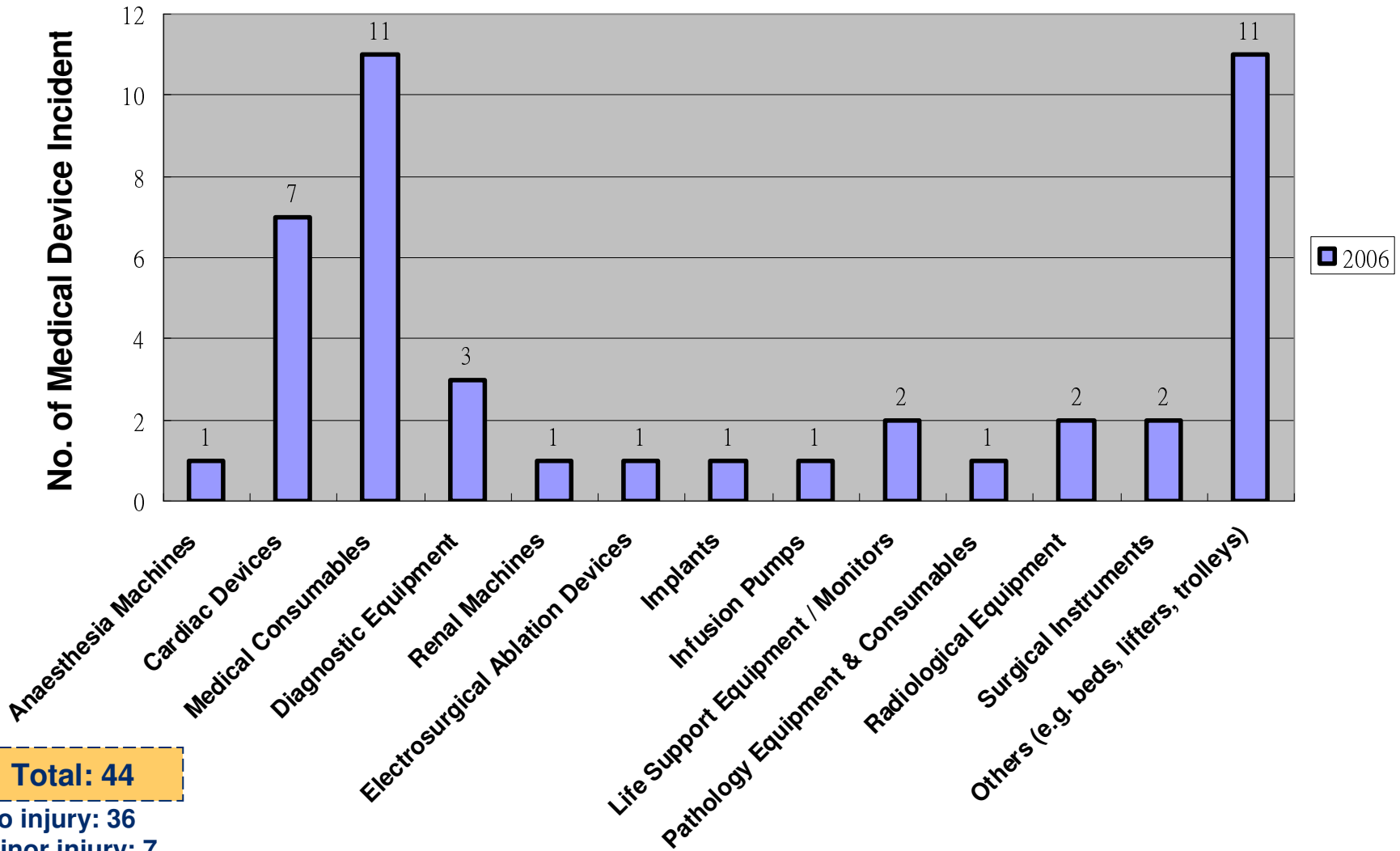
Total: 44

No injury: 36
Minor injury: 7
Temporary morbidity: 1

18

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Supply Chains to the Bed-side

HA Expenditure 2006/07
(excluding personal emolument and works projects)

General Consumables, €40.9M (6%)

Medical Consumables, €49.7M (7%)

Equipment, €50.2M (7%)

Drugs, €205.7M (31%)

Other specific medical consumables, €23.9M (3%)

Repair & Maintenance, €29.2M (4%)

Repair & Maintenance, €55.9M (8%)

Services, €44.3M (6%)

Property Charges & Utilities, €184.2M (28%)

Total : €684 Million

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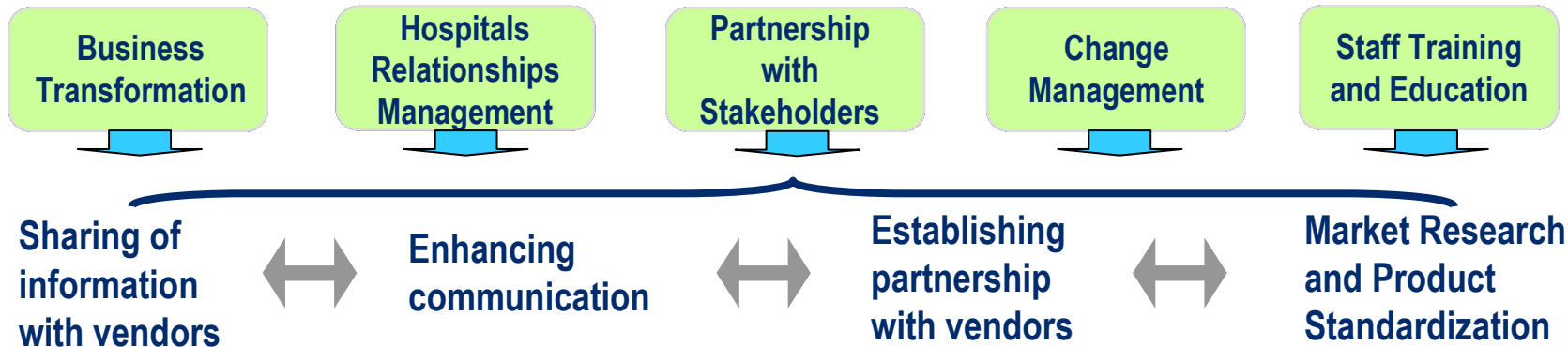醫院管理局
HOSPITAL AUTHORITY

Procurement and Materials Management in Hospital Authority

Vision

To establish VFM and seamless supply chain operation with maximal risk management

Objectives

1. To explore and implement improvements to procurement services by raising the skills and competency of staff, pursuing service excellence and industry best practices, and achieving best value for money.

2. To provide the best value-added products and services to end-users and patients through the supply chains in healthcare.

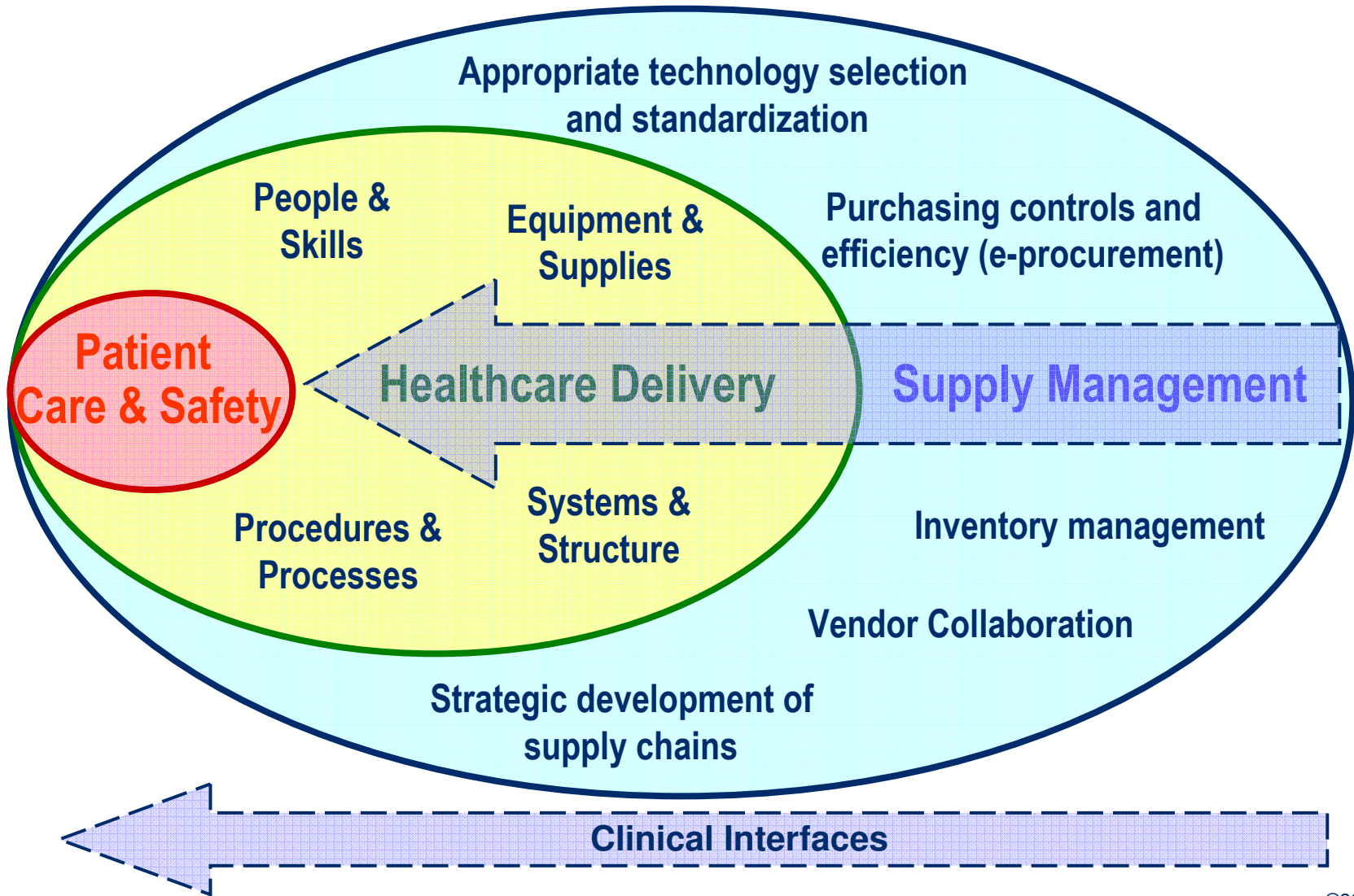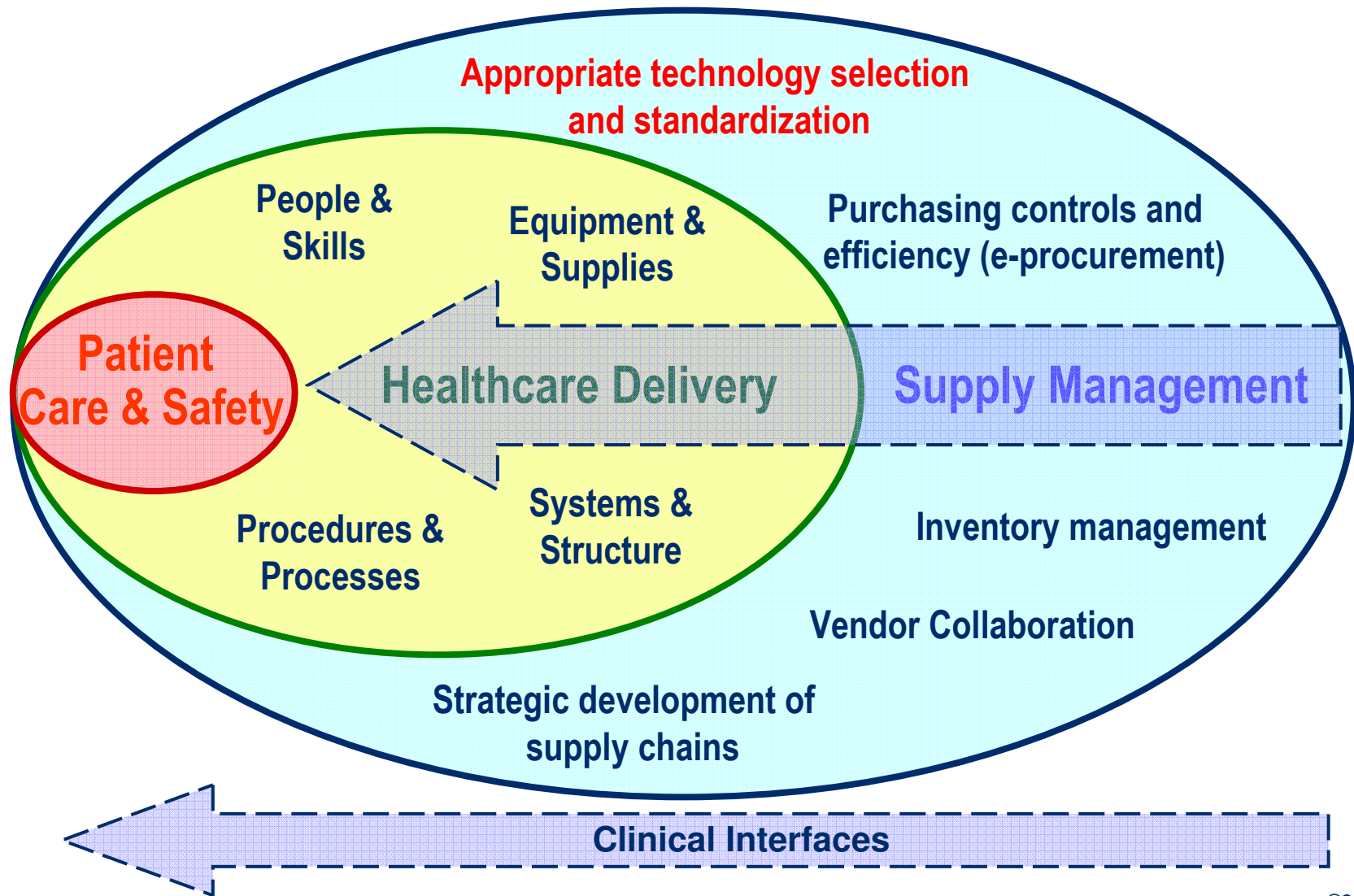## Key Strategies – Five Elements of Success

Business Transformation	Hospitals Relationships Management	Partnership with Stakeholders	Change Management	Staff Training and Education

Sharing of information with vendors ⟷ **Enhancing communication** ⟷ **Establishing partnership with vendors** ⟷ **Market Research and Product Standardization**

Key Targets

Procurement
high product safety; user interface & satisfaction; saving in price; saving in operational cost; reduction in lead time

Warehousing
lower inventory; lower operational cost; near-zero wastage; just-in-time delivery

21

Supply Chains to the Bed-side

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醫院管理局 HOSPITAL AUTHORITY

Appropriate technology selection and standardization

People & Skills

Equipment & Supplies

Purchasing controls and efficiency (e-procurement)

Patient Care & Safety

Healthcare Delivery

Supply Management

Procedures & Processes

Systems & Structure

Inventory management

Vendor Collaboration

Strategic development of supply chains

Clinical Interfaces

22

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Supply Chains to the Bed-side

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Clinical Interfaces

23

Appropriate Technology Selection and Standardization

Supply Chain to the Bed-side		Where are we	Where do we want to go
1	Product standardization with physician's participation and buy-in		
2	Customer service management		
3	Forecasting & demand planning		

How ??

Appropriate Technology Selection and Standardization – How ??

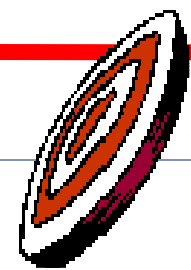|	Process Area	Better Practices
1	**Procurement function management**	**Single integrated procurement** system to enable quick and easy sharing of data and definitions across HA
2	**Centralized vendor database**	**Centralized vendor master** file maintenance across HA
3	**Product selection and supplier negotiation**	**Contracts for high value and strategic purchases** centrally negotiated and monitored
4	**Procurement planning**	**Demand forecast** to facilitate better planning

Supply Chains to the Bed-side

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26

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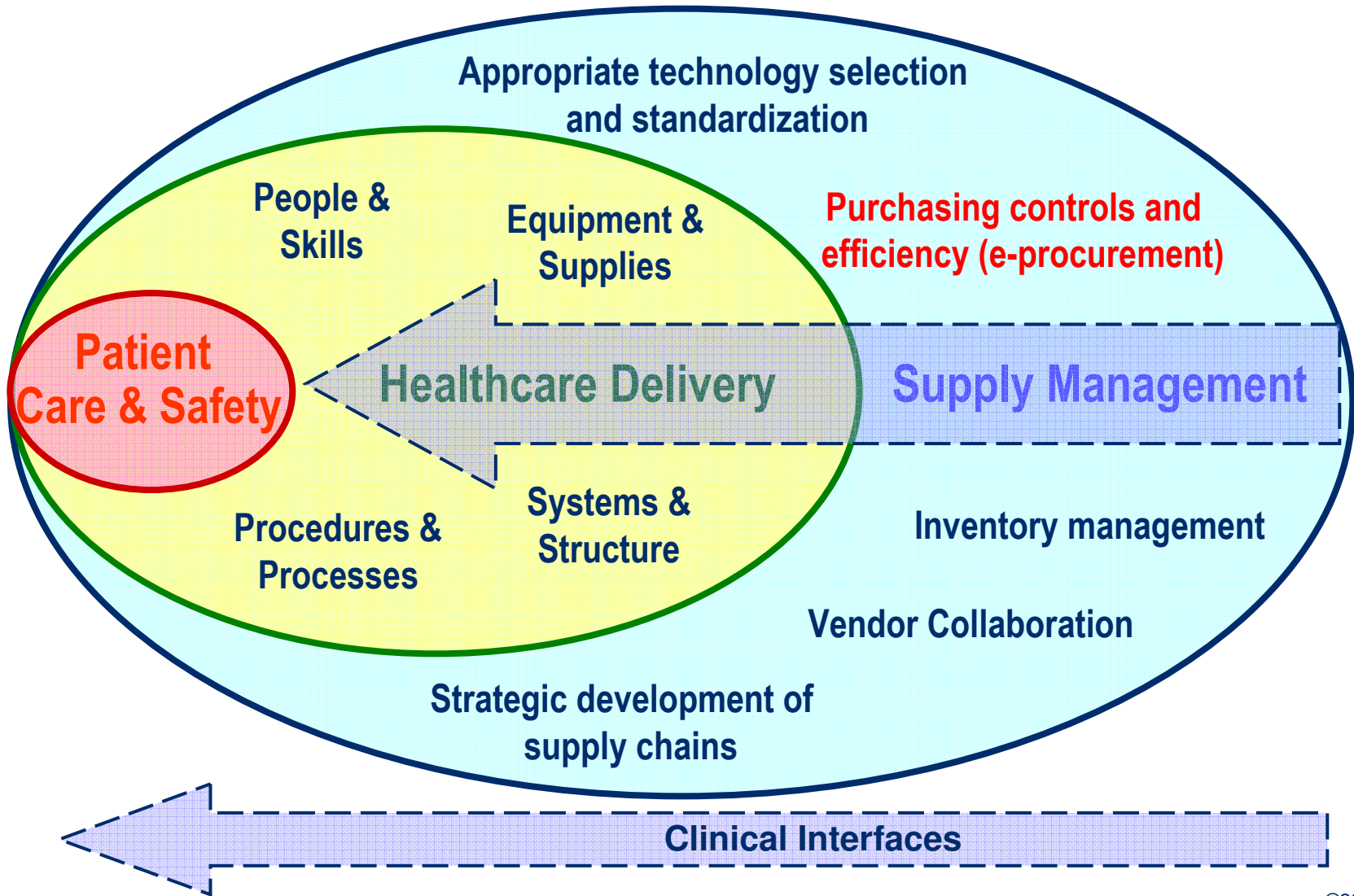
Purchasing Controls and Efficiency (e-procurement)

	Supply Chain to the Bed-side	Where are we	Where do we want to go
1	Use of IT Technologies including electronic commerce	*How ??* With ERPS	
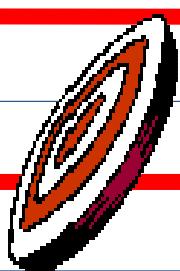
Purchasing Controls and Efficiency (e-procurement) – How?

	Process Area	Better Practices
1	Use of technology	Electronic exchange and transaction of supply chain data which include purchase orders, delivery notes, invoices and inventory information using standard protocols, i.e. EDI, XML, Fax, email etc
2	Use of universal data standard	Use of comprehensive universal data standards such as UNSPSC and e-Healthcare data standards such as EAN and HIBC
3	Process automation	Routing and approval verification automated through workflow
4	Process control	3-way and 4-way matching with automated delegation to speed up payment

Supply Chains to the Bed-side

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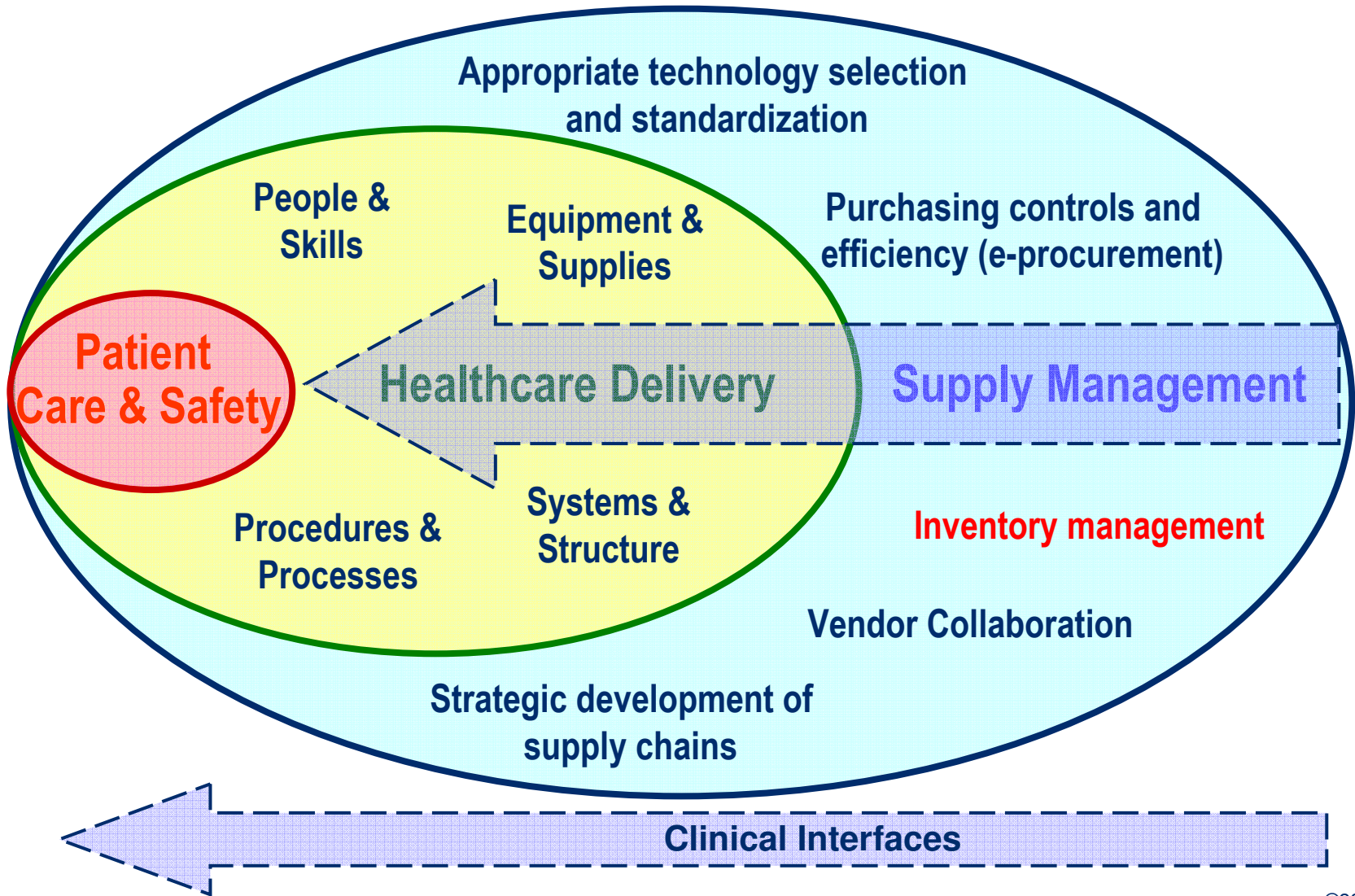
Inventory Management

	Supply Chain to the Bed-side	Where are we	Where do we want to go
1	Point-of-use systems		
2	Information management		
3	Process management		
4	Performance measurement		

How ??

Inventory Management – How?

Process Area		Better Practices
1	Product codification and classification	Standardized nomenclature and classification to facilitate procurement planning, inventory control, asset management and data analysis

Item Classification :

United Nation Standard Product and Services Code (UNSPSC)
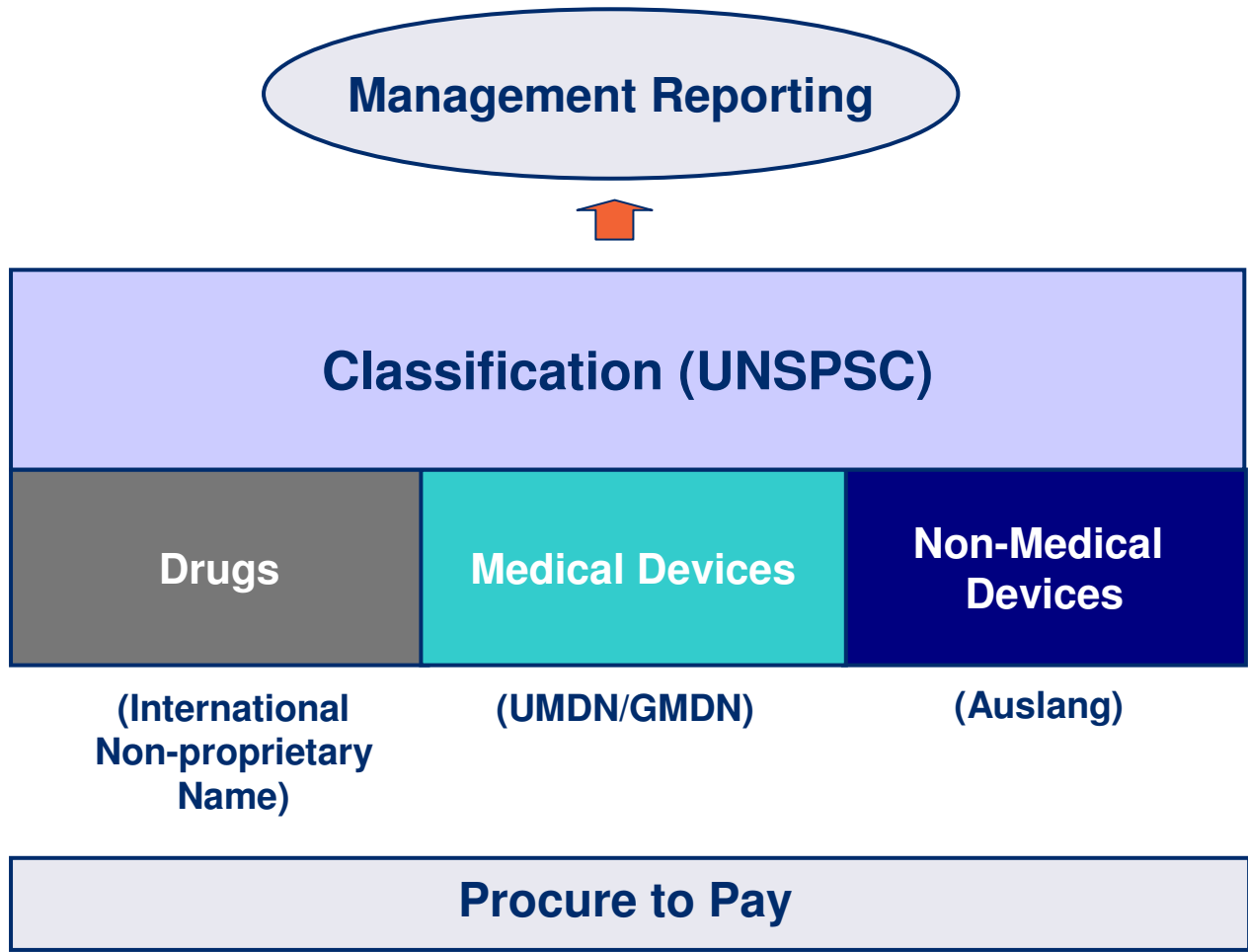
Item Description Nomenclature :

- **Drugs :** International Non-proprietary Name (INN)
- **Medical Device :**

  Primary - Universal Medical Device Nomenclature (UMDN)

  Secondary - Global Medical Device Nomenclature (GMDN)
- **Non-Medical Device :** AUSLANG

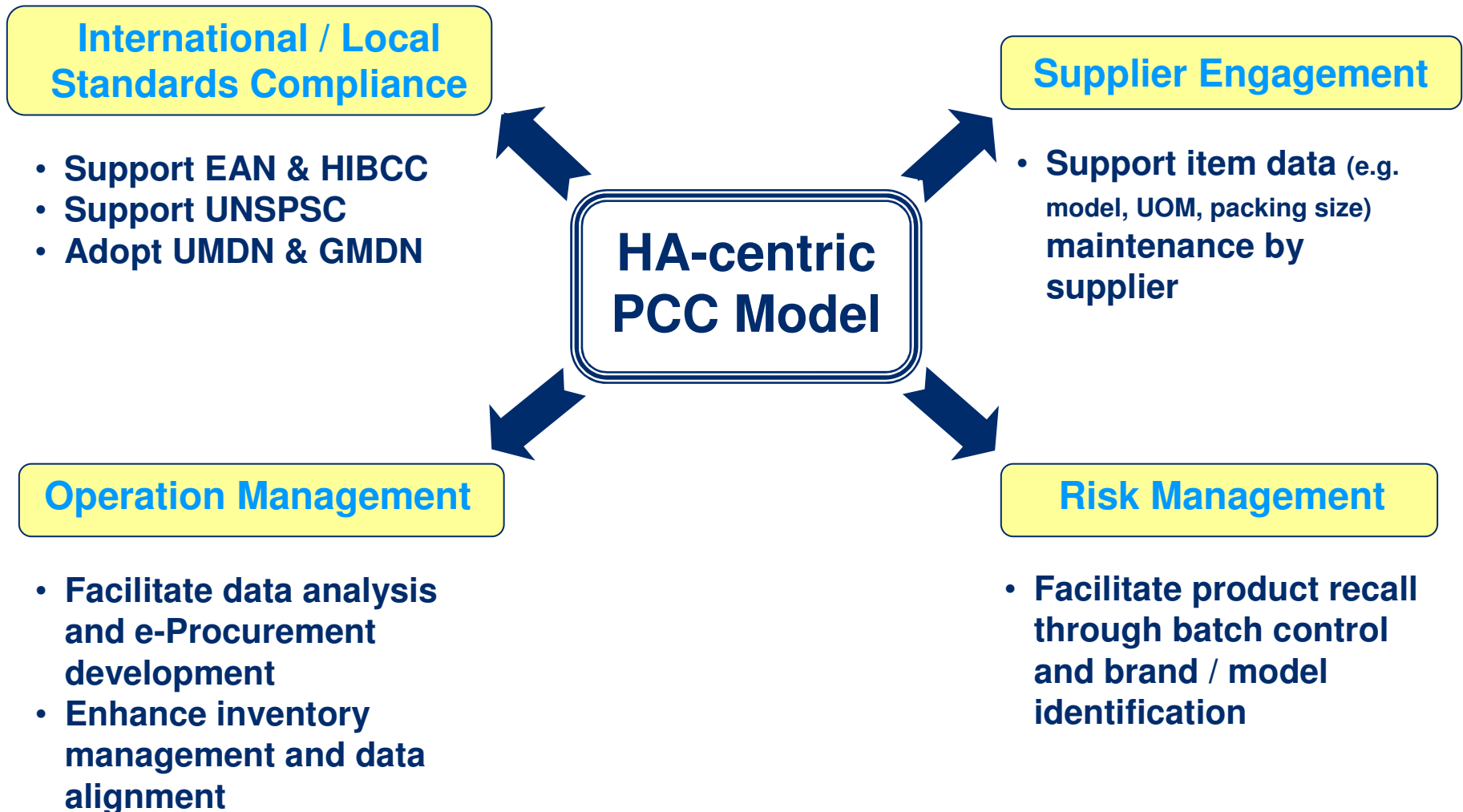## Product Identification Standard :

European Article Number (EAN)
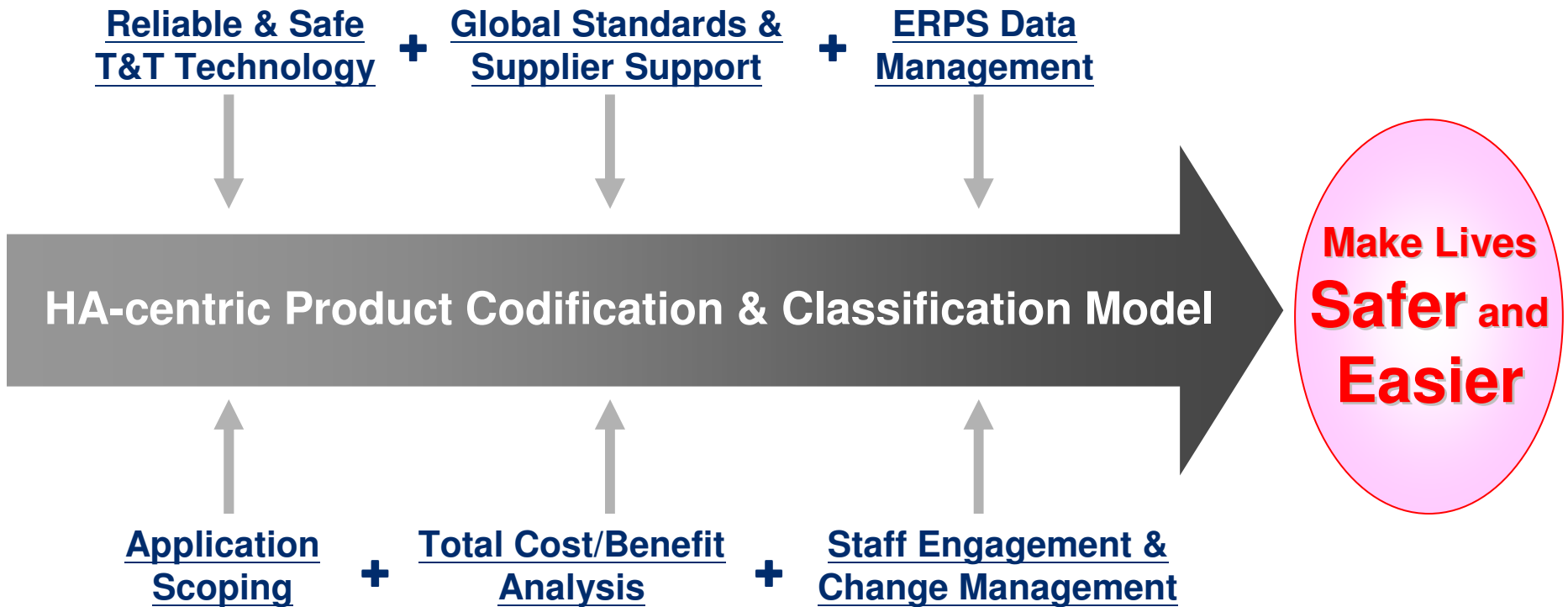
Health Industry Bar Code Standards (HIBC)

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HA-Centric Product Codification & Classification (PCC) Model

Management Reporting

↑

Classification (UNSPSC)

Drugs	Medical Devices	Non-Medical Devices
(International Non-proprietary Name)	(UMDN/GMDN)	(Auslang)

Procure to Pay

HA-Centric Product Codification & Classification (PCC) Model

International / Local Standards Compliance

- **Support EAN & HIBCC**
- **Support UNSPSC**
- **Adopt UMDN & GMDN**

HA-centric PCC Model

Supplier Engagement

- **Support item data** (e.g. model, UOM, packing size) **maintenance by supplier**

Operation Management

- **Facilitate data analysis and e-Procurement development**
- **Enhance inventory management and data alignment**

Risk Management

- **Facilitate product recall through batch control and brand / model identification**

HA-Centric Product Codification & Classification (PCC) Model

Reliable & Safe T&T Technology + **Global Standards & Supplier Support** + **ERPS Data Management**

HA-centric Product Codification & Classification Model

Application Scoping + **Total Cost/Benefit Analysis** + **Staff Engagement & Change Management**

Make Lives Safer and Easier

Inventory Management – How?

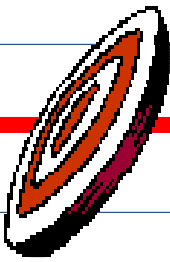|	Process Area	Better Practices
1	Product codification and classification	Standardized nomenclature and classification to facilitate procurement planning, inventory control, asset management and data analysis
2	Regulatory compliance	Adoption of UMDN/GMDN for medical devices in compliance with Medical Device Administrative Control System (MDACS) in HK
3	Process management	Enhanced internal relationship by extending inventory management with focus on alignment within disciplines
4	Performance monitoring and benchmarking	Setting of KPI(s) to manage the supply chain
5	Use of bar-coding technology	Bar-coding to automate data capturing and enhance risk management

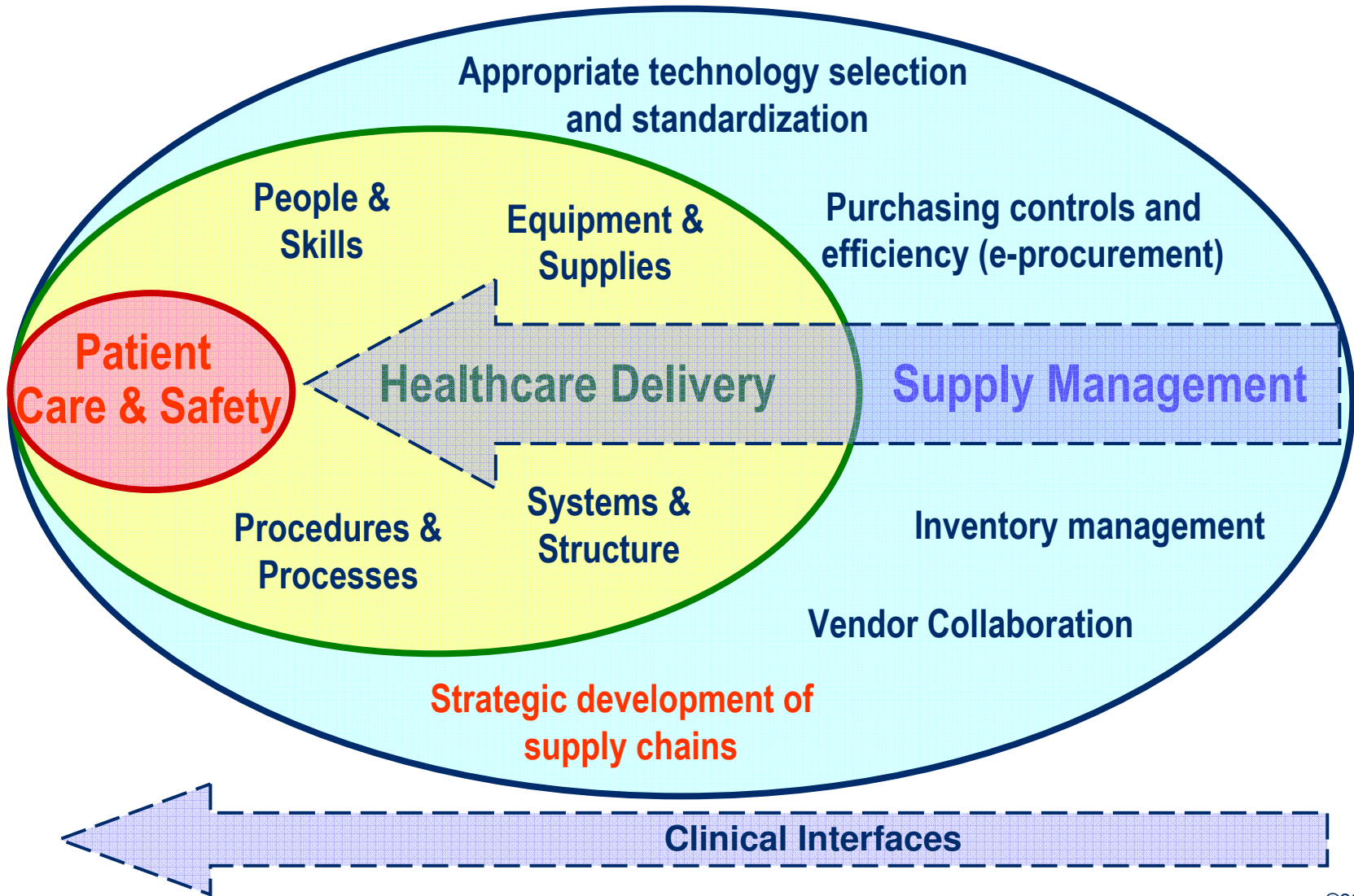Supply Chains to the Bed-side
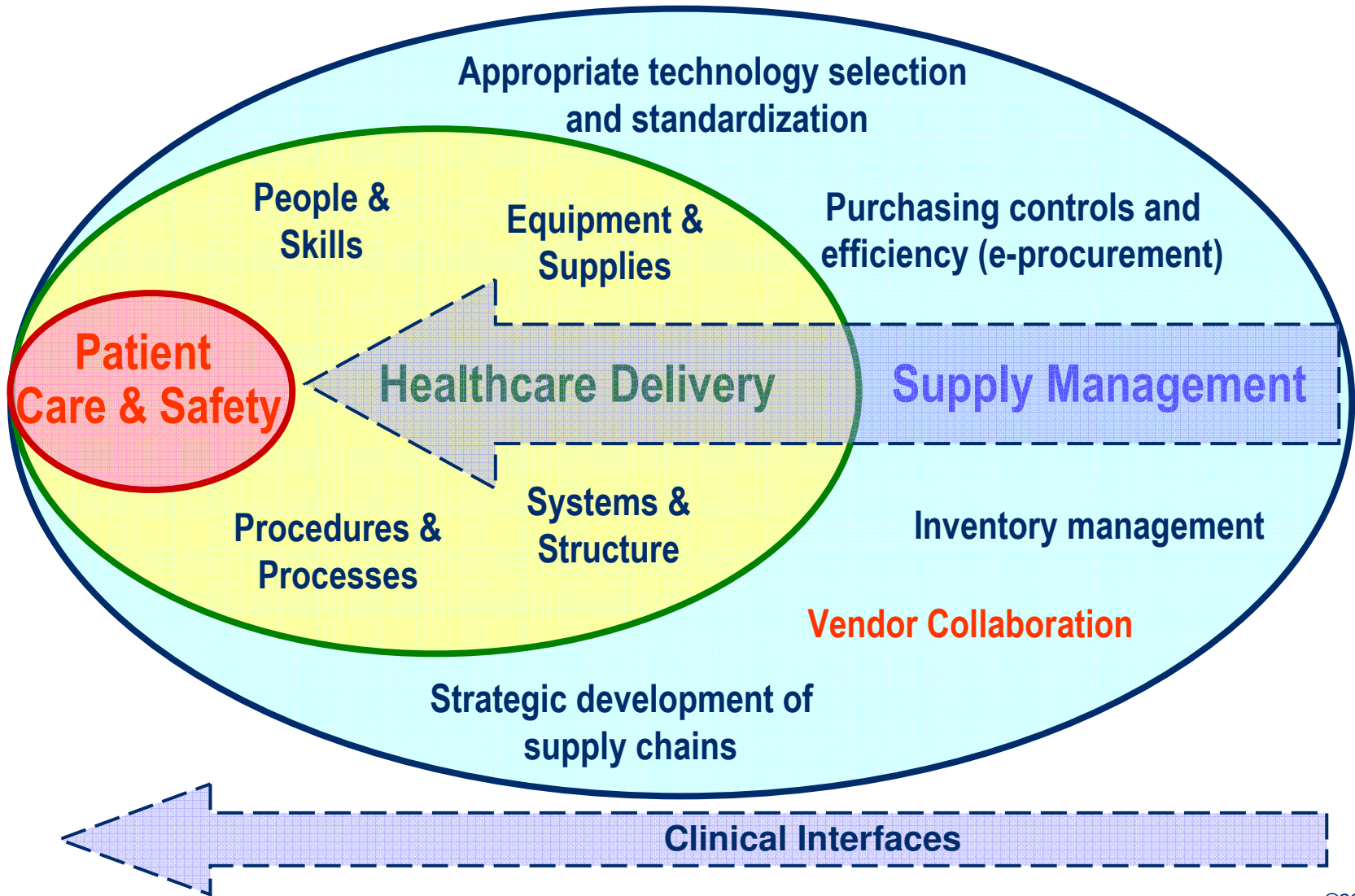
Vendor Collaboration

Supply Chain to the Bed-side	Where are we	Where do we want to go
1	Organizational Structure & Supply Positioning		
2	Strategic Supply & Sourcing Planning		
3	Bulk contracting		
4	Relationships with Suppliers & Service Providers		

How ??

Vendor Collaboration – How?

	Process Area	Better Practices
1	Sourcing strategies	Rationalization in overall numbers of suppliers and concentrated spending to leverage purchasing power
2	Spend analysis	Maintenance of central database of spend information to facilitate bulk buying
3	Supplier collaboration	Adoption of supply chain initiatives to support frontline operation
	(a) Vendor management inventory	
	(b) Consignment arrangement	
	(c) Total solution model	

Supply Chains to the Bed-side

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Clinical Interfaces

40

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Supply Chain to the Bed-side		Where are we	Where do we want to go
1	Supply chain automation		
2	Centralized responsibilities for supply management and centralized purchasing		
3	Better clinical interface		

How ??

Strategic development of Supply Chains – How?

	Process Area	Better Practices
1	Moving towards e-commerce	**Implementation of ERPS** to enhance integration both internally and externally
2	Improvement of core competency of procurement staff	Moving from transaction management to **strategic management and partnership development**
3	Measurable indicators to assess and review performance	KPI development and **benchmarking** for continuous improvement

Tracking & Tracing (T&T) of Critical Items

SCM Success Factors

- **Quality**
- **Just-in-time**
- **Traceability**
- **Transparency**

Patient Safety

- **Worries-free supply**
- **Product safety**
- **Clinical Information System Interface**

Risk and Crisis Management

44

Supply Chain Management Models

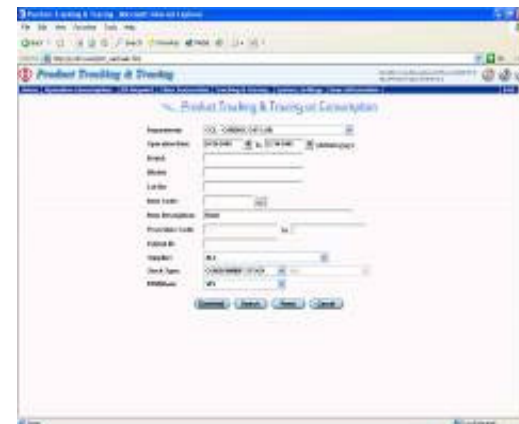| Commodity Group	Supply Chain Model	Procurement & Materials Management Strategy
Medical Equipment	Vendor – Hospitals	Bulk contracts Pilot RFID applications
General medical and non-medical consumables	Vendor – Hospital Bulk Stores	In-house inventory management supported by VMI and enhanced product tracking and tracing for high risk items
Pharmaceuticals	Vendor – Hospital Pharmacies	In-house inventory management
Specific surgical consumables (e.g. OT, Pathology and X-ray)	Vendor – Department Store	In-house inventory management
PTCA and O&T consumables	Consignment	Zero inventory supported by barcode-enabled Product Tracking and Tracing System
Low value and low risk consumables	Vendor – Ward/Department	Direct non-stock purchase
Cleansing materials, office supplies, stationery and linen	Distributor – Wards/Departments	Outsourcing of logistic and inventory management

Application: 1-D Bar-coding on inventory management …

Achievements…

- **Enhance risk management via efficient T&T down to patient consumption level**

- **Release frontline nurses for better patient care**

- **Improve data accuracy**

- **Facilitate product standardization** (e.g. ↓ no. of suture items by 27%)

- **Rationalize stock levels** (e.g. ↓ inventory in OT by 30%)

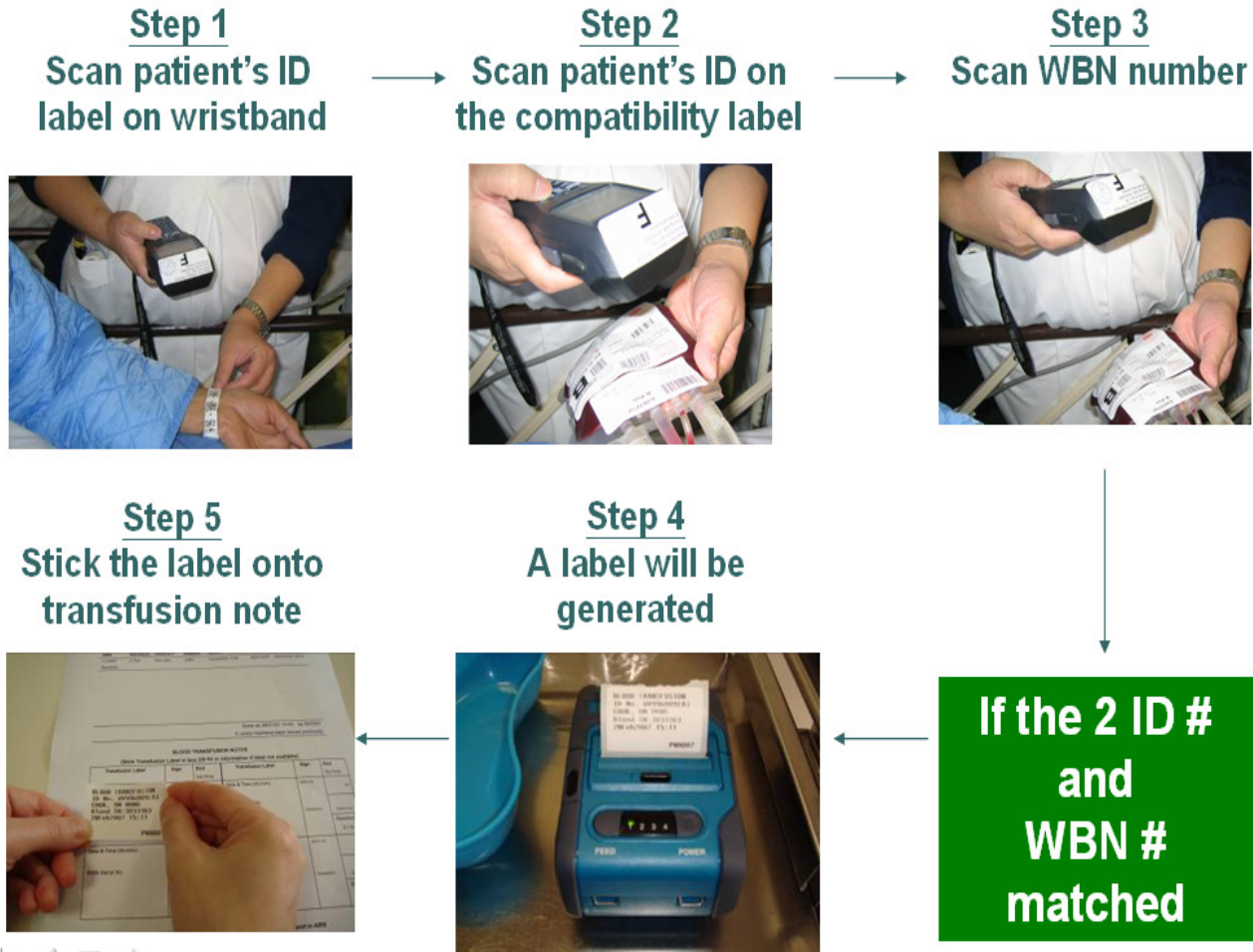- **Improve procurement efficiency** (e.g. ↓ PR to PO lead time by 50%)

Provide consumption report by patient

Application: 2-D Bar-coding on patient identification …

Enhance Blood Administration Safety

Step 1
Scan patient's ID label on wristband

Step 2
Scan patient's ID on the compatibility label

Step 3
Scan WBN number

Step 5
Stick the label onto transfusion note

Step 4
A label will be generated

If the 2 ID # and WBN # matched

48

Application: 2-D Bar-coding on patient identification …

Current Application	**Future Application & Development**
• Blood sampling for type and screen • Blood product administration • Last office procedures	• Administration of chemotherapy drug • Patient identification in operating theatres • Patient identification for other blood and laboratory tests

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Application: Pilot RFID applications …

- In two hospitals: Prince of Wales Hospital (1,427 beds) & North District Hospital (607 beds)
- Period of the pilot study: From January to March 2008

Explore Feasibility	Scope	Study Foci	Expected Benefits
Asset Stocktaking	On devices in Operation Theatre	• Costs and benefits analysis • Reading performance of RFID tags in hospital environment • Use of RFID tags with switches for utilization tracking • End-user acceptance	• Improve efficiency in stocktaking, asset searching and utilization reporting • Improve patient safety • Optimize inventory level and obsolescence management
Asset Location Tracking	On portable devices in wards e.g. infusion pumps and oximeters		
Equipment Utilization	On medical equipment used by various departments e.g. ultrasound scanning machines		

50

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Global Sourcing

- Bulk Contracts (with Technology Substitution) - Solution Tenders

Outsourcing of Non-Core Activities

- Office Supplies & Cleansing Materials - Equipment & Facility Maintenance
- Domestic & Support Services

Suppliers Collaboration

- Vendor Managed Inventory (VMI) for Operation Theatre Supplies
- Consignment Stock for Medical Consumables
- Public Private Partnership Project for Food Services

Integrated Data / Information Platform

- EDI - ERPS Development - Pilot RFID

Risk Management

- Corruption Prevention - Critical Supplies - Product Tracking & Tracing

Challenges

- **Technology maturity and affordability**
- **Supplier-centric vs Buyer-centric data architecture**
- **Global PCC standards**
- **Healthcare alliances**
- **Government legislations/ trade restrictions**
- **Product standardization vs market monopolization**
- **Increasing supply from developing countries e.g. China and India**

- **Technology maturity and affordability**

  - ◆ **Appropriateness**
  - ◆ **Standards**
  - ◆ **Right Mix**
  - ◆ **Right Level**

Challenges

- **Technology maturity and affordability**
- **Supplier-centric vs Buyer-centric data architecture**
- **Global PCC standards**
- **Healthcare alliances**

◆ **Standardization**

◆ **Transparency**

◆ **Collaboration**

Challenges

- Technology maturity and affordability
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- Global PCC standards
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- **Government legislations/ trade restrictions**
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Wish you a prosperous
Year of the Rat
&
Hope that the Rat's ingenuity and
enterprise inspires us all to believe in
the impossible

Q & A