



Establishment and Application of Medication Barcode System in Taiwan

President, Taiwan Healthcare Automation Association
Honorary President, Taiwan Society of Health-System Pharmacists
Clinical Professor, Kaohsiung Medical University
Director, Department of Pharmacy, Changhua Christian Hospital

Su-Yu Chien, RPh, M.S.



Organization Accredited
by Joint Commission International

CHANGHUA CHRISTIAN HOSPITAL

The Only Medical Center with History of 100 Years in Central Taiwan Area



CHANGHUA CHRISTIAN HOSPITAL



Changhua Christian Hospital Healthcare System



- Hospitals :10
- Patient beds :3232
- Staffs : 6358
- Pharmacists :189

Hospitals :10

Medical Center	1	District Hospitals	6
Regional Hospitals	2	Specialist Hospital	1



Organization Accredited
by Joint Commission International



Changhua Christian Hospital

-- Established under God's Love



Organization Accredited
by Joint Commission International

CHANGHUA CHRISTIAN HOSPITAL



Patient Centered Healthcare



Hundred year ago health care

Patient—Centered healthcare



Organization Accredited
by Joint Commission International

CHANGHUA CHRISTIAN HOSPITAL



Establishment and Application of Medication Barcode System in Taiwan

President, Taiwan Healthcare Automation Association
Honorary President, Taiwan Society of Health-System Pharmacists
Clinical Professor, Kaohsiung Medical University
Director, Department of Pharmacy, Changhua Christian Hospital

Su-Yu Chien, RPh, M.S.



CHANGHUA CHRISTIAN HOSPITAL



Outline

1

Medication Error can Occur in Any Step of Medical Process

2

Milestones of Taiwan Medication Barcode Project

3

Implementation obstacles

4

Strategy & Action Plan

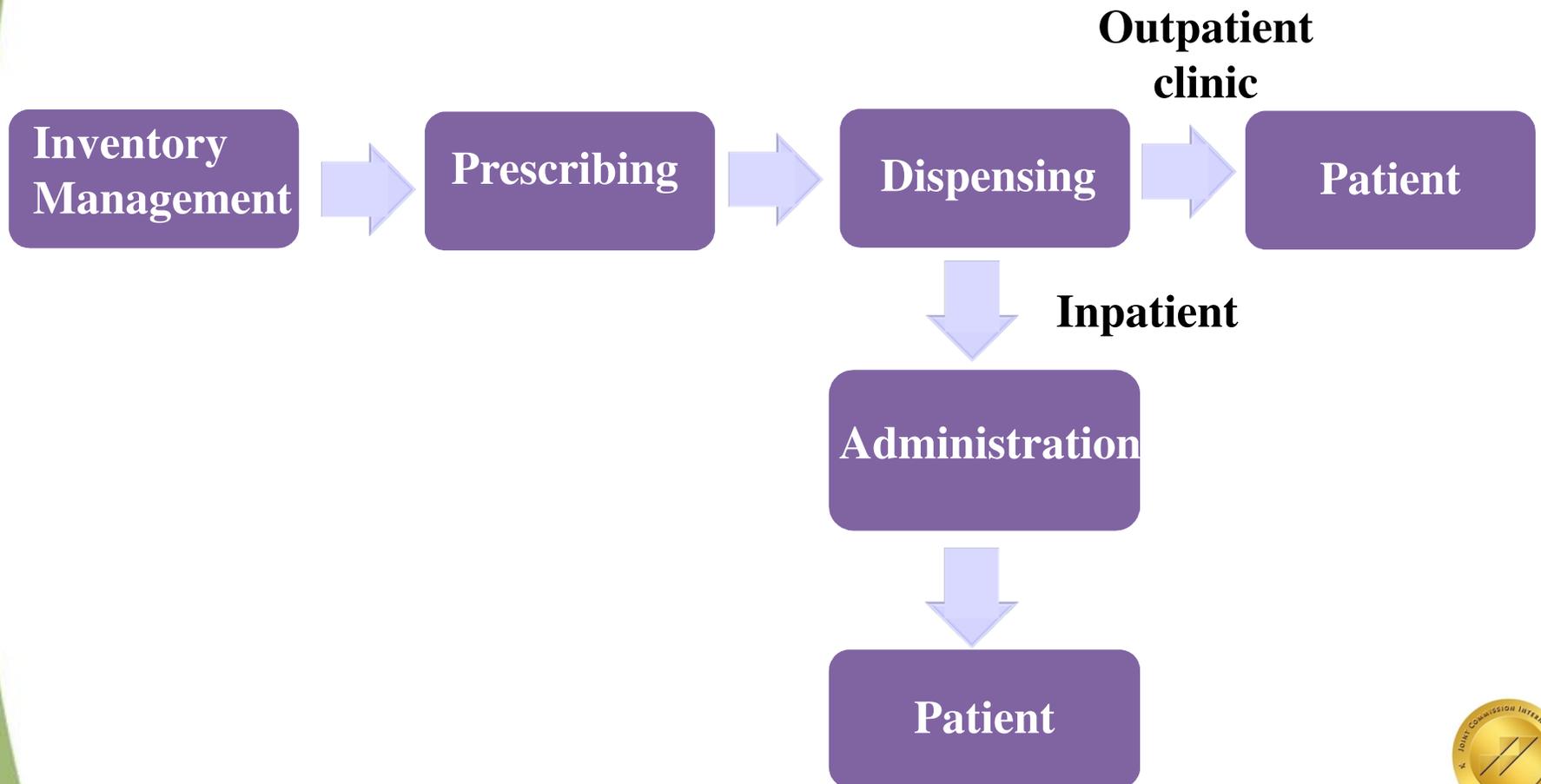
5

Summary & Recommendations





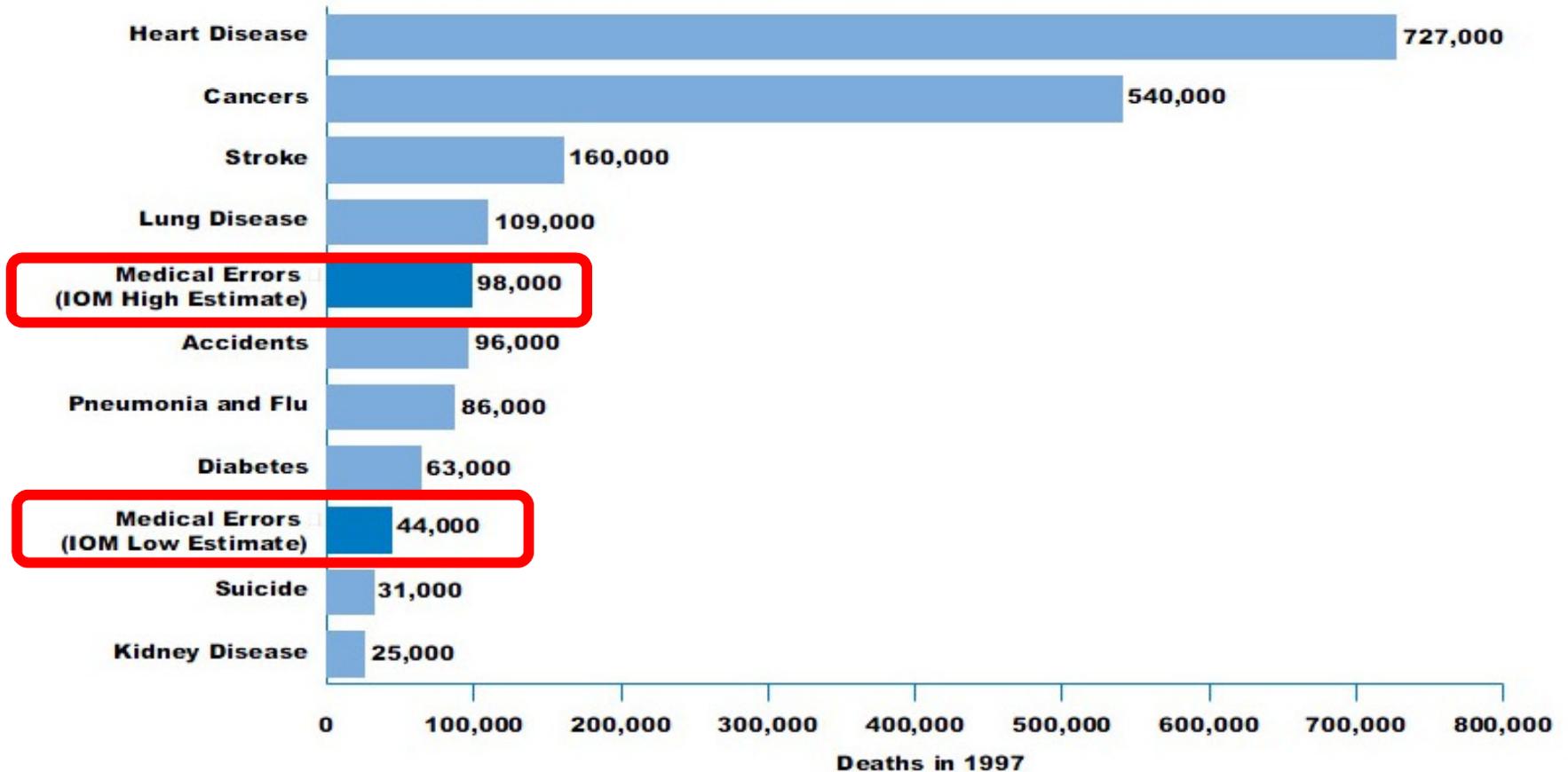
1. Medication Error can Occur in Any Step of Medical Process





Medical error is among of the top leading causes of death in the U.S.

Fig. 1. Estimated Deaths Associated with Medical Errors Compared to Leading Causes of Death in the U.S.



Source: Adapted from Leatherman et al., 2002⁹

IOM: Institute of Medicine

CHANGHUA CHRISTIAN HOSPITAL

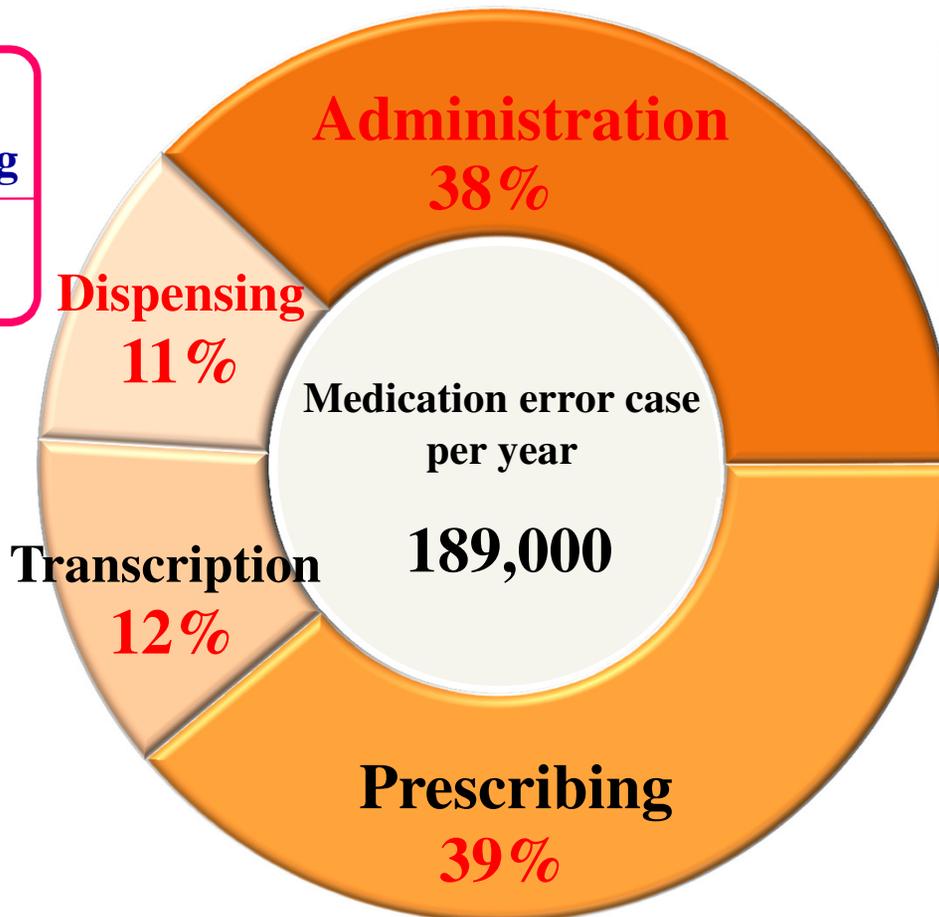
Organization accredited
by Joint Commission International



More than 50% Medication Error Reduction with Barcode Scanning

- With pharmacy bar-code scanning
- **67% reduction**

- With eMAR
- **100% reduction**



- With bar-code eMAR
- **51% reduction**

- With CPOE
- **55% reduction**

Serious Medication Errors

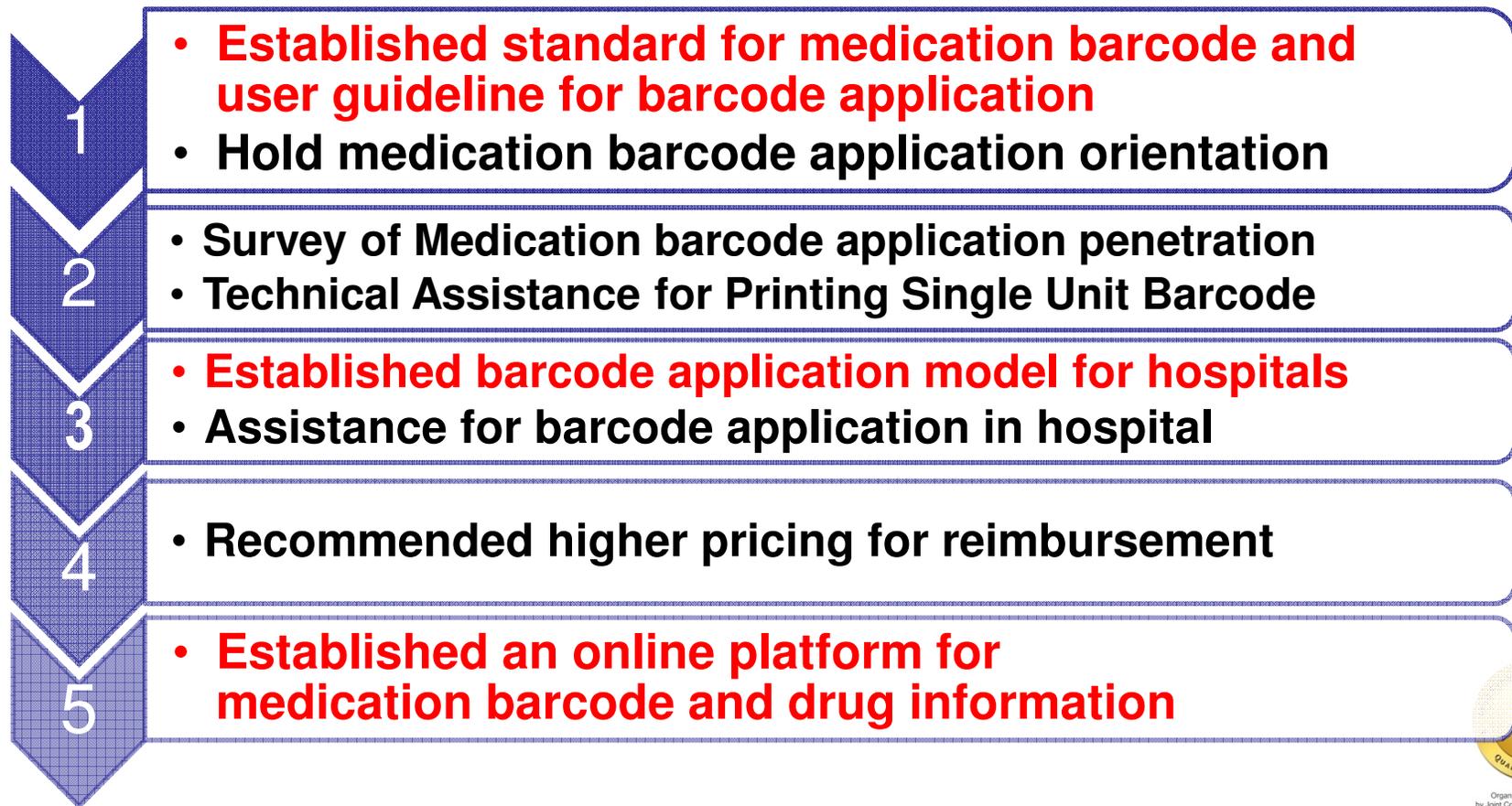
Source: NEJM 2010; 362; 1698-1707





2. Milestones of Taiwan Medication Barcode Project (since 2011)

Purpose: Promote medication safety and efficiency of medication management





Standards of Medication Barcode in Taiwan , 2011

- The package of drug should label generic name, brand name, dosage form, potency, lot number, expiration date.
- **Every package level** should have printed or patched GS1 barcode.
- The primary and second level adopt **DataMatrix** as a carrier.
- The third level adopts **GS1-128** as a carrier.



Organization Accredited
by Joint Commission International



Legislative draft of medication barcoding standard in Taiwan, 2012

	Medication Barcode content	Human-Readable content
Primary Level Package		
<ul style="list-style-type: none"> ■ Single unit blister medication 	<ul style="list-style-type: none"> • GTIN • <u>printed</u> expiration date • <u>printed</u> lot number 	Generic name, Chinese/English brand name, potency, lot number, expiration date.
<ul style="list-style-type: none"> ■ Blood products, vaccines 	<ul style="list-style-type: none"> • GTIN • expiration date • lot number 	
Secondary Level Package	<ul style="list-style-type: none"> • GTIN • expiration date 	
Tertiary Level Package	<ul style="list-style-type: none"> • lot number 	

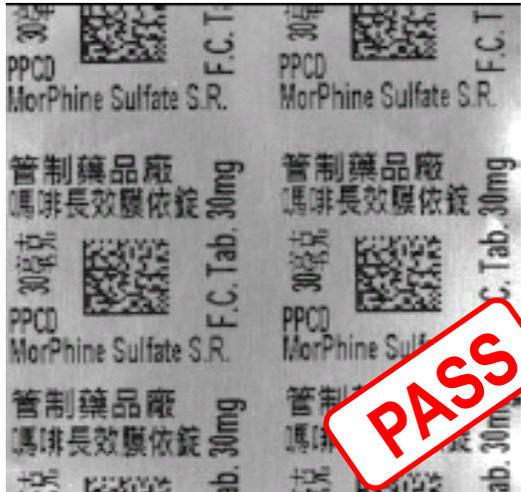
by Joint Commission International



Technical Assistance for Printing Single Unit Barcode in Taiwan

All passed GSI inspection for adhesiveness and readability

Examples:



Morphine Sulfate Tab. ®

TFDA, Controlled Substances
Pharmaceutical Company



**Dipachro S.R.
Film Coated Tab. ®**

Taiwan Biotech Co., Ltd





Technical Assistance recipients in Taiwan





Single Unit Barcoding Examples – Taiwanese Pharmaceutical Companies

信東



永信



健喬信元



景德



Organization Accredited
by Joint Commission International



Single Unit Barcoding Examples – Int'l Pharmaceutical Companies

AstraZeneca	Bristol-Myers Squibb	Boehringer Ingelheim	Lilly	Lilly
Sanofi-Aventis	Sanofi-Aventis	TEVA Pharma	UCB	第一三共



Medication Barcode Information Online Platform

The screenshot shows the 'Drug Barcode Query' (藥品條碼查詢作業) interface. At the top, it features the Department of Health, Taiwan, ROC logo and the text '藥品條碼共同平台 >'. Below this is a search form with the following fields:

- 藥品許可證字號 (Drug License Number): Includes a dropdown for '字號' (Number) and a text input field.
- 包裝型態 (Packaging Type): A dropdown menu.
- 中文品名 (Chinese Name): A text input field.
- 英文品名 (English Name): A text input field.
- 申請商名稱 (Applicant Name): A text input field.
- 製造廠名稱 (Manufacturer Name): A text input field.
- 健保片碼 (Health Insurance Code): A text input field.
- 藥品條碼 (Drug Barcode): A text input field with a '重新產生' (Regenerate) button.

Below the form are buttons for '開始查詢' (Start Query) and '清除條件' (Clear Conditions). The '查詢結果' (Query Results) section shows a table with columns: 檢視 (View), 許可證字號 (License Number), 中文品名 (Chinese Name), 英文品名 (English Name), 申請商名稱 (Applicant Name), 製造廠名稱 (Manufacturer Name), and 藥品類別 (Drug Category). Navigation controls include '共 1 筆' (Total 1 item), '上一頁' (Previous Page), '每頁顯示 10 筆 / 第 1 頁' (Show 10 items per page / Page 1 of 1), and '下一頁' (Next Page).

- ✓ All manufacturers provide drug information using standardized electronic form
- ✓ Reduction in information database establishment and maintenance cost for health institutes





Medication Barcode Model for Hospitals in Taiwan



Organization Accredited
by Joint Commission International



Scope of Medication Barcode System in Hospital

Inventory Management

- Inspection and receipt of medication
- Storage and shelving
- Delivering
- Stocktaking

Administration

- Courier receives medication
- Nurse double checks medication
- Nurse administers medication

Dispensing

- Prescription assessment
- Prescription filling
- Double checking
- Delivering
- Drug information inquiry
- Query patient's medication use
- Replenishment operation for dispensing machine
- Controlled substance management



Video clip



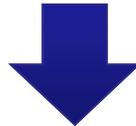
Organization Accredited
by Joint Commission International



3. Implementation Obstacles

Concerns from some manufacturers :

- Government authorities in other countries do not require barcode on single medication unit yet
- Technical difficulties
- Additional cost



Government authorities deferred announcement of barcode-printing regulations





Regulations in some countries

Country	Current regulations
USA	<ul style="list-style-type: none">● 2017: Serialized Product Identifiers<ul style="list-style-type: none">-each package and case-<u>human-readable</u> form and on a <u>machine-readable</u> data carrier-2D DataMatrix on Package, Linear or 2D Barcode on Case-National Drug Code(NDC), Serial number(SI) , lot number, and expiration date
Japan	<ul style="list-style-type: none">● General biological products should have GTIN, batch number, and expiration date on secondary and tertiary package; primary package should have GTIN● Special biological products should have GTIN, batch number, and expiration date <u>on all package</u>





Regulations in some countries (Cont.)

Country	Current regulations
Korea	<ul style="list-style-type: none">● 2012: Special drugs should have GTIN, batch number, expiration date● 2013: Prescription drugs should have GTIN, batch number, expiration date● 2015 : Prescription drugs should have GTIN, batch number, expiration date, <u>serial number</u>● OTC drugs need only GTIN
France	<ul style="list-style-type: none">● Only secondary and tertiary package need GTIN, batch number, expiration date





International professional associations strongly recommended the implementation of **single unit barcoding in medication packages**

ASHP Statements , 2008 --- Bar-Code-Enabled Medication Administration Technology

ASHP believes that pharmaceutical manufacturers should be required to place machine-readable coding that includes the NDC, lot number, and expiration date on **all unit dose, unit-of-use, and injectable drug packaging, using symbologies that are readily deciphered by commonly used scanning equipment.**

ASHP : The American Society of Health-System Pharmacists

Source: Automation and Information Technology Statements





EAHP Statement, 2010

Barcode Information on the **single unit**

- Including the identification of the drug (GTIN), the expiration date and the batch number.
- When the production facility is incompatible with an on-line printing of variable data, the barcode can **temporarily** be limited to the identification of the drug
- -- No serial number requested on the unit

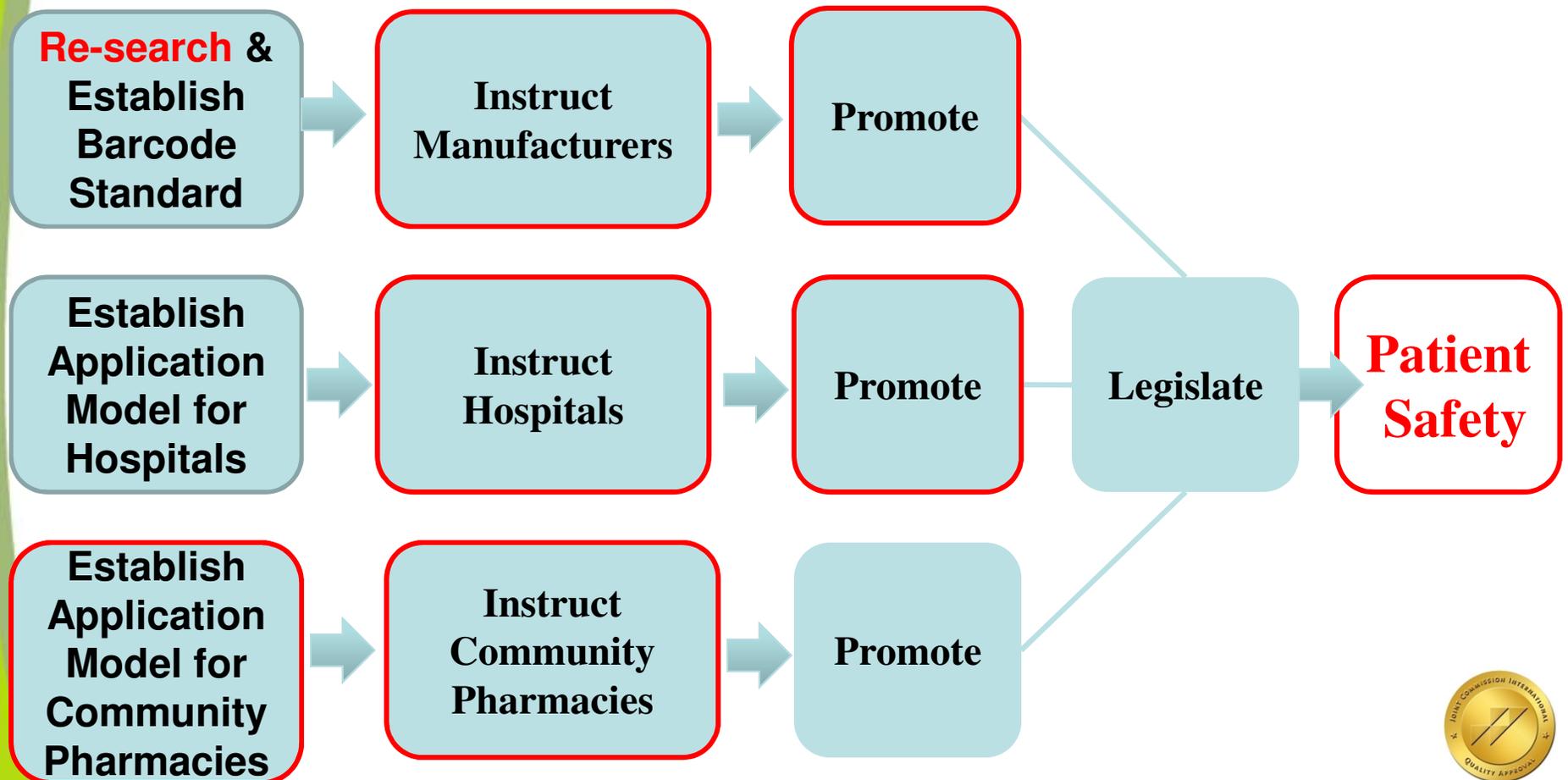
EAHP : The European Association of Health-System Pharmacists

Source: The European Association of Hospital Pharmacists





4. Strategy & Action Plan: intervene both supplier and user concurrently



Organization Accredited
by Joint Commission International



5. Summary

- Medication barcode application is an important tool to prevent human errors
- Distinct opinions between pharmacist associations and pharmaceutical manufacturers



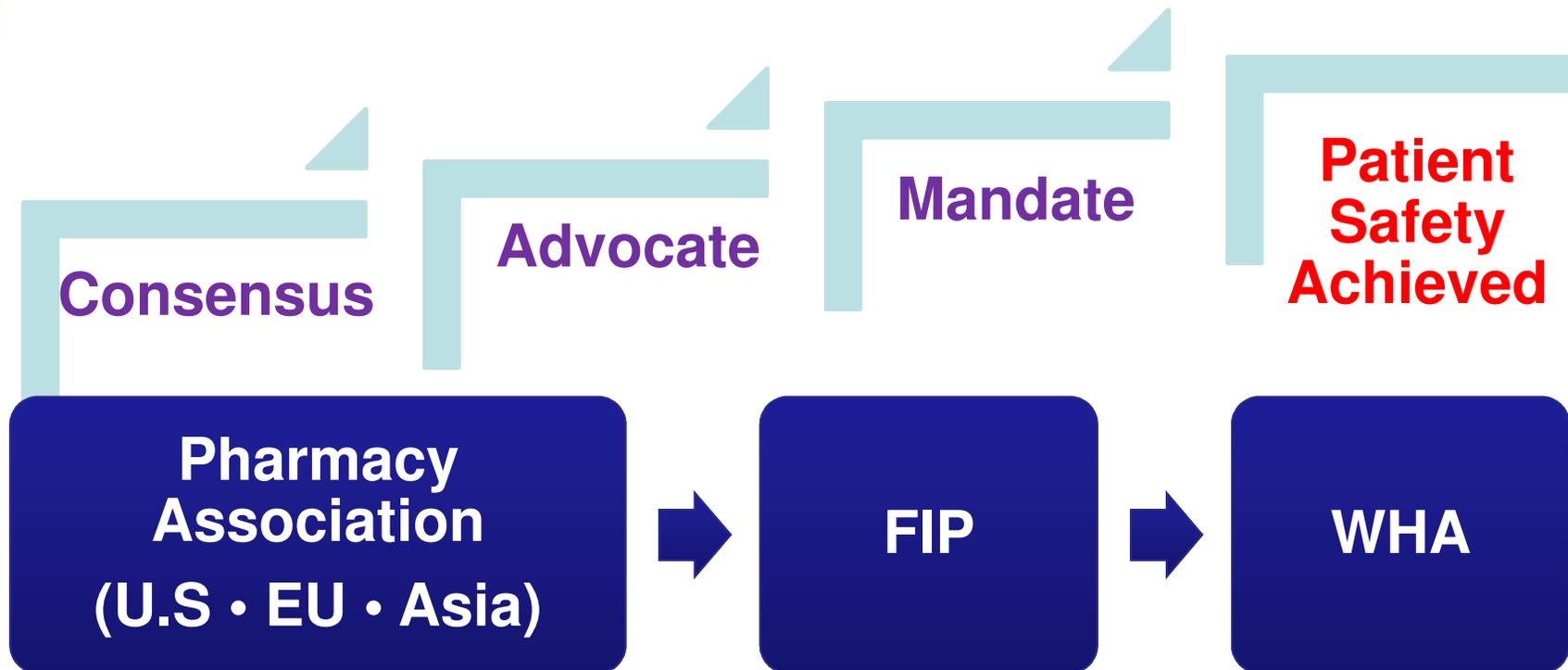
Patient safety should come first

- Urge government authorities to pass legislation for mandating single unit barcoding system to ensure patient safety





6. Recommendations





Thank you for your attention!



*Thank
you*



Organization Accredited
by Joint Commission International

CHANGHUA CHRISTIAN HOSPITAL