Basic Medication Safety Module (Part II)

Pharmacy Services Program, MOH

Disclaimer: Only for learning purpose for MOH healthcare staff

Medication Safety Committee 2023
Pharmacy Practice and Development Division
Ministry of Health Malaysia

Basic Medication Safety for Pharmacist

01. Risk Factors Contributing to Medication Error

02. Risk Minimization Strategies

03. Safe Dispensing Practice

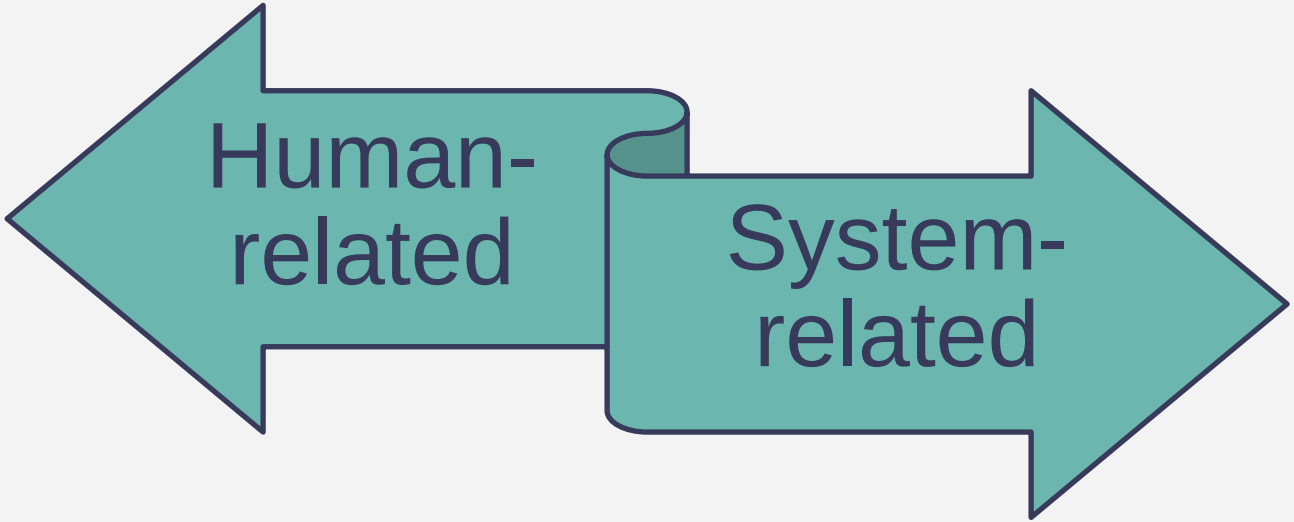
LEARNING OBJECTIVES

1. Identify system failure associated with medication errors
2. Discuss the impact of latent failures on medication safety
3. Review the best error prevention tools

01.

Risk Factors Contributing to Medication Errors

FACTORS CONTRIBUTING TO MEDICATION ERROR



HUMAN ERROR

- Defines as the unintentional deviation from safe acts of people on the front line (e.g.: nurses, physicians, pharmacists etc)
- Human error is “active failure” whose effect of error are felt immediately.

1. Sameera V, Bindra A, Rath GP. Human errors and their prevention in healthcare. J Anaesthesiol Clin Pharmacol. 2021 Jul-Sep;37(3):328-335. doi: 10.4103/joacp.JOACP_364_19. Epub 2021 Oct 12. PMID: 34759539; PMCID: PMC8562433.
2. Reason J. Human error: models and management. West J Med. 2000 Jun;172(6):393-6. doi: 10.1136/ewjm.172.6.393. PMID: 10854390; PMCID: PMC1070929.

FACTORS CONTRIBUTING TO HUMAN ERRORS

Associated with Pharmacy Staffs

- Lack of knowledge/experience/skills
- Low awareness on potential errors
- Overworked/fatigued
- Poor communication among healthcare workers
- Distraction
- Personal Issue

Team Factors

- Written communication issue
- Verbal communication issue
- Unclear roles & responsibility
- Lack of supervision
- Ineffective leadership
- Lack of support/help from colleagues

Source: Medication Errors: Technical Series on Safer Primary Care, World Health Organization 2016

MEDICATION USE PROCESS

Human are first line response to error in healthcare system

SYSTEM ERROR

- Failure or poor system design increase the tendency of error committed by human.
- System error are “latent error” whore effects are delayed, like accidents waiting to happen
- Faulty system design has two effects:
  - Causes human error
  - Makes it impossible to detect in time to prevent an accident.

Ref: Leape LL. System Analysis and Redesign: The Foundation of Medical Error Prevention (Chapter 1), 2016. Medication Errors, 2nd Edition. American Pharmacists Association

FACTORS CONTRIBUTING TO SYSTEM ERRORS

Associated with Work Environment

- Excessive workload and time pressure
- Distractions/ interruptions
- Lack of standardized protocols and procedures
- Insufficient resources
- Issues related to work environment (e.g. lighting, temperature and ventilation)

Associated with Medicines

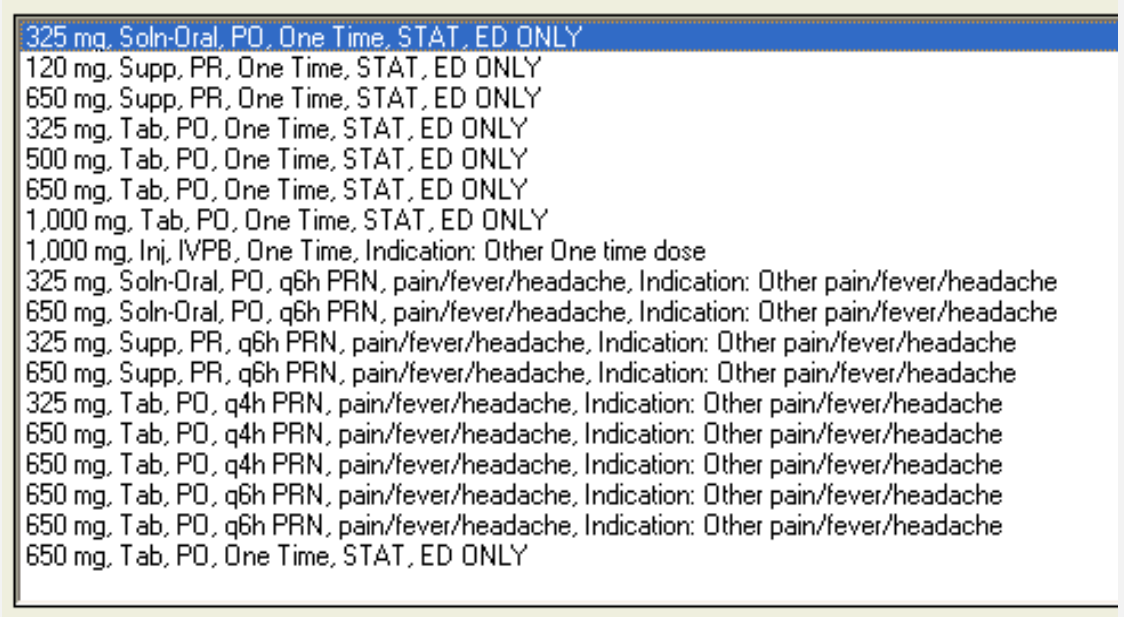
- Look Alike Sound Alike Medicines
- Similar Labelling & Packaging
- Arrangement of medications

Source: Medication Errors: Technical Series on Safer Primary Care, World Health Organization 2016

LOOK ALIKE MEDICATIONS

Source: MERS Report 2023

MULTIPLE DRUG VARIATION



Source: Fisicien, Hospital Information System (HIS), KKM

FACTORS CONTRIBUTING TO SYSTEM ERRORS

Associated with Technology

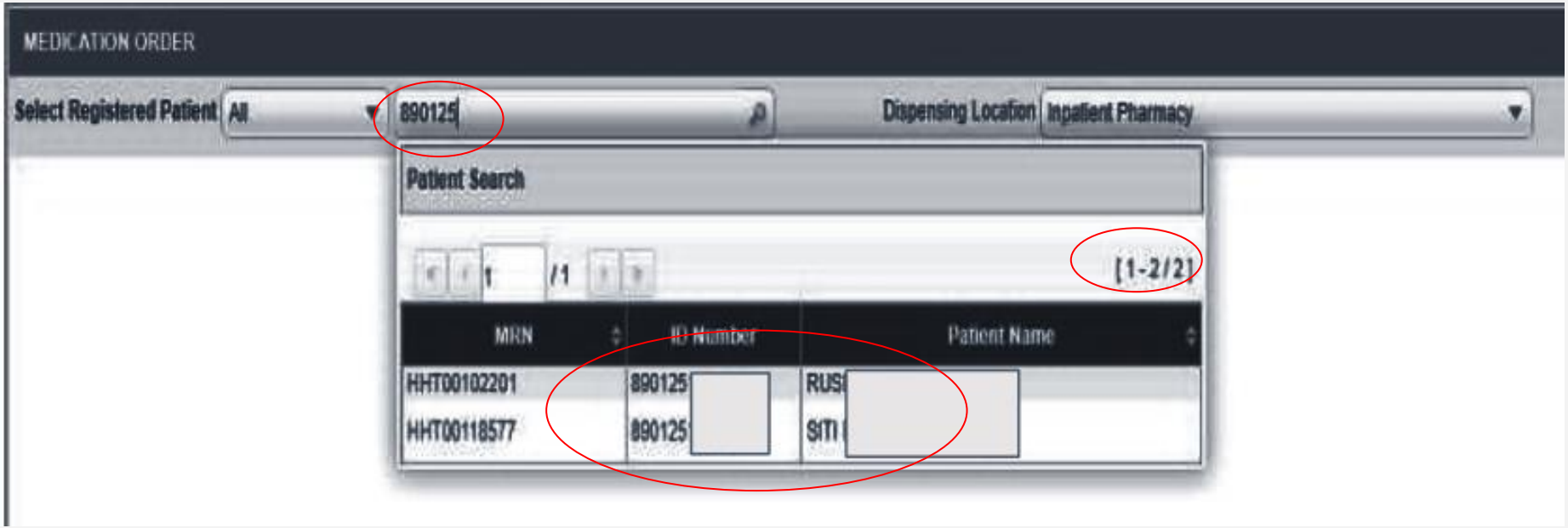
- Design failure
- Availability of protocol/procedure/guideline
- Availability an accuracy of health & patient information
- Computerized system error
- Decision making aids (checklist, protocols, computerized)
- Drug knowledge dissemination

Associated with Management

- Inadequate training
- Inappropriate work schedules
- Lack of teamwork
- Poor leadership

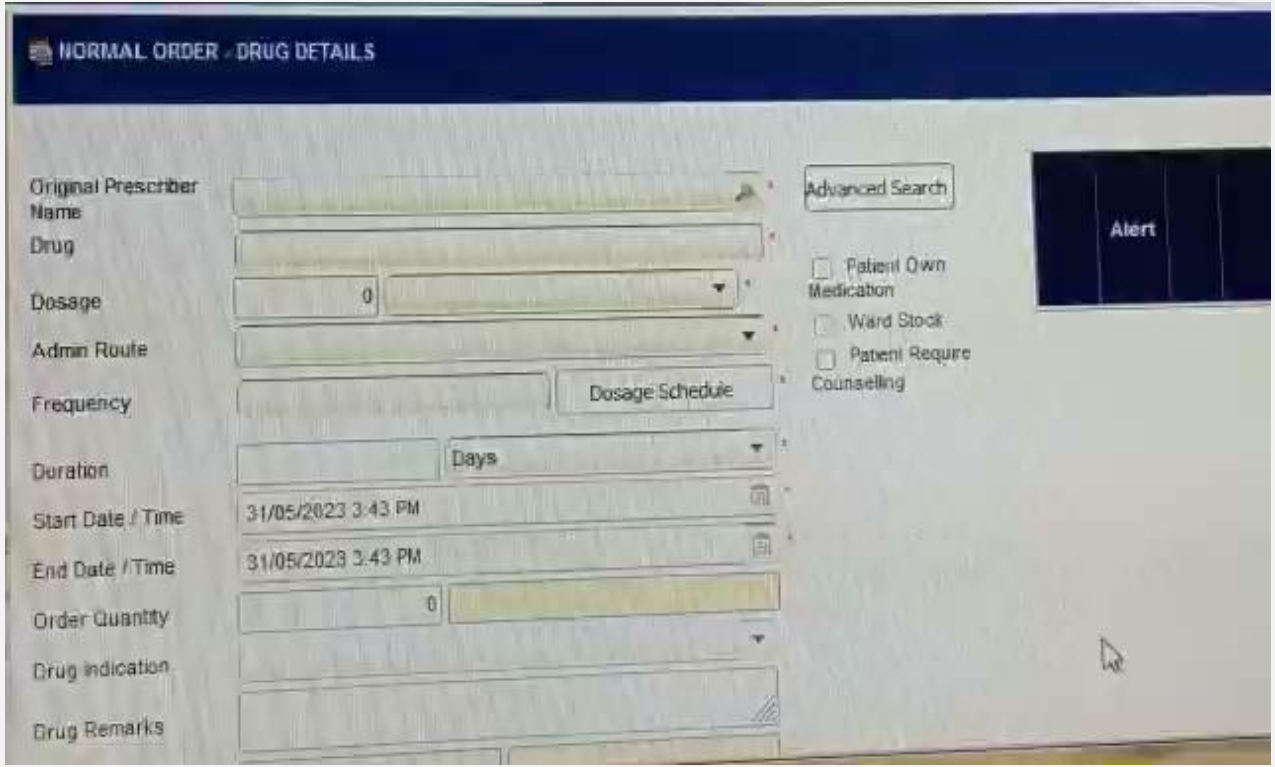
Source: Medication Errors: Technical Series on Safer Primary Care, World Health Organization 2016

WRONG PATIENT:SIMILAR PATIENT ID



Source: Pharmacy Information System (PhIS), KKM

DEFAULT SETTING OF DOSE



Source: Pharmacy Information System (PhIS), KKM

CONSIDER A CASE SCENARIO

Patient: A healthy baby with congenital syphilis.

Prescription: Penicillin G Benzathine 150,000 IM

Pharmacist: Prepared/dispensed 2 syringes of Inj. Penicillin G Benzathine 1.2MU/2ml with direction to administer 2.5ml of the medication (1,500,000 units)

Nurse: Concerned about large volume using 5 separate syringes, consulted a senior nurse and change to IV bolus to avoid painful IM injections

After administration of approximately 1.8ml of the benzathine penicillin G, the neonate became irresponsive and resuscitation efforts were unsuccessful.

PERSON APPROACH

1. Errors seen as the act of individualized human behavior/ attitude.
2. Puts emphasis on the individuals involved, which generally implies “blame”
3. Puts blame on the last person touching the patient

SYSTEM APPROACH

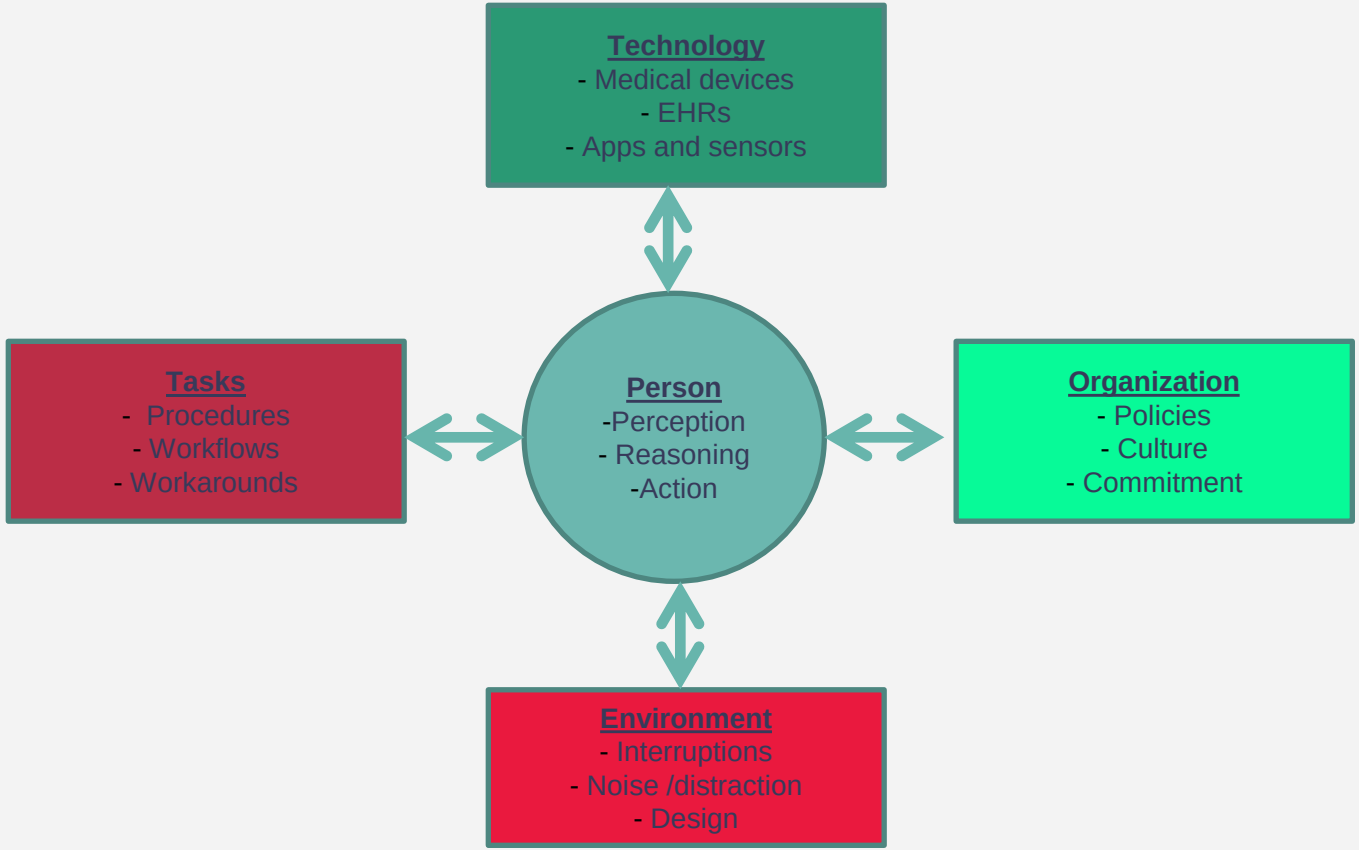
1. Errors are seen as consequences rather than causes.
2. Resulted from human failings in the context of a poorly designed system (management, technological advancement, working environment)
3. This approach believes that people come to work with good intention and are skilled and experienced, but may be led to commit error because of the way in which the design of the systems shapes their behavior.

Ref: Reason J. Human error: models and management. West J Med. 2000 Jun;172(6):393-6. doi: 10.1136/ewjm.172.6.393. PMID: 10854390; PMCID: PMC1070929.

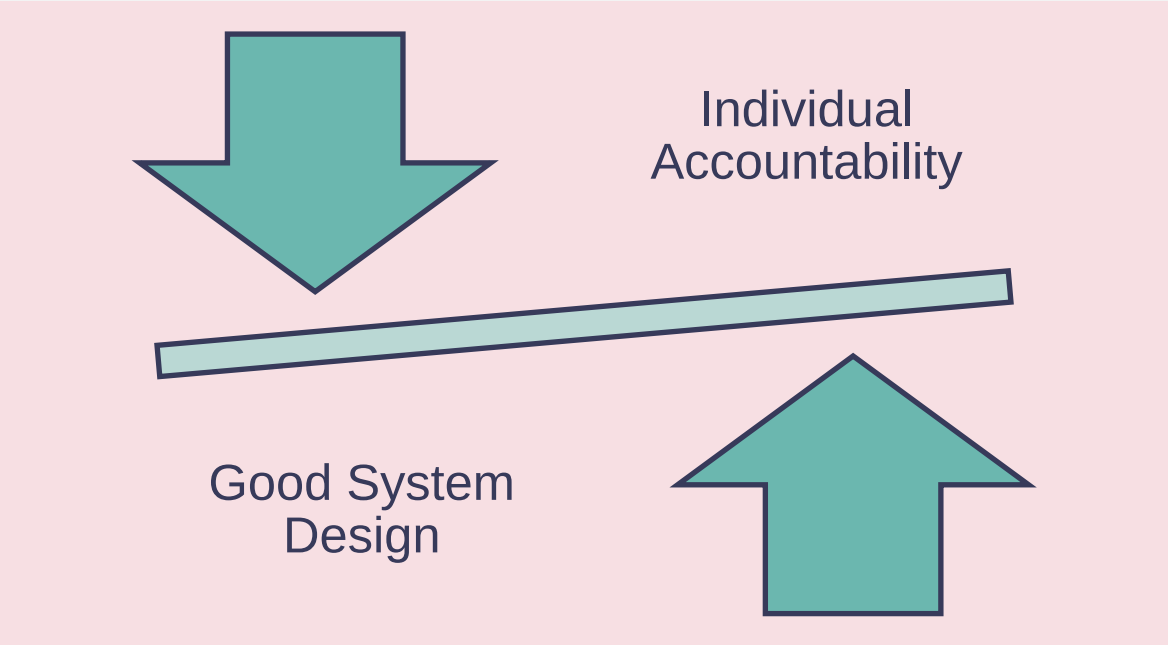
ACTIVE VS LATENT FAILURE

Failures	Active Failure	Latent Failure
Pharmacist	Wrongly presumed strength	Unclear label on medication container
	Wrong Calculation	Ignoring warning/lack patient information
	No independent counterchecking	Inappropriate allocation of staff
Nurse	Administered wrong dose/did not countercheck	Insufficient references/ unclear policy
	Wrong route of administration	Incomplete information warning/instruction

FOCUS ON SYSTEM FACTORS



JUST CULTURE:
CULTURE OF ACCOUNTABILITY



05.

Risk Minimization Strategies

ERROR PREVENTION STRATEGIES

	Strategy	Power (leverage)
1	Fail-safes and constraints	
2	Forcing functions	
3	Automation and computerization	
4	Standardization	
5	Redundancies	
6	Reminders and checklists	
7	Rules and policies	
8	Education and information	

Rank order of error reduction strategies. Adapted from: Institute for Safe Medication Practices (2013)

ERROR PREVENTION STRATEGIES

	Strategy
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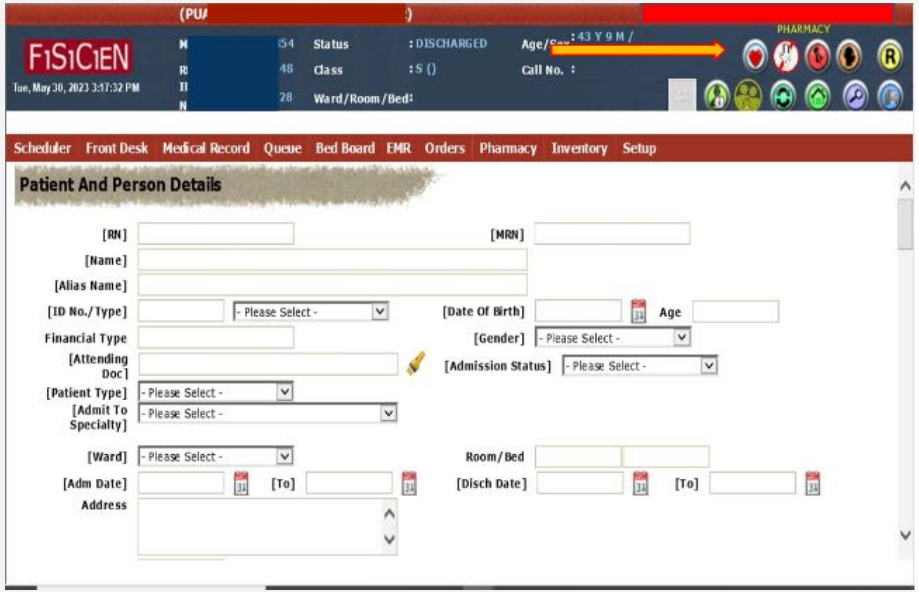
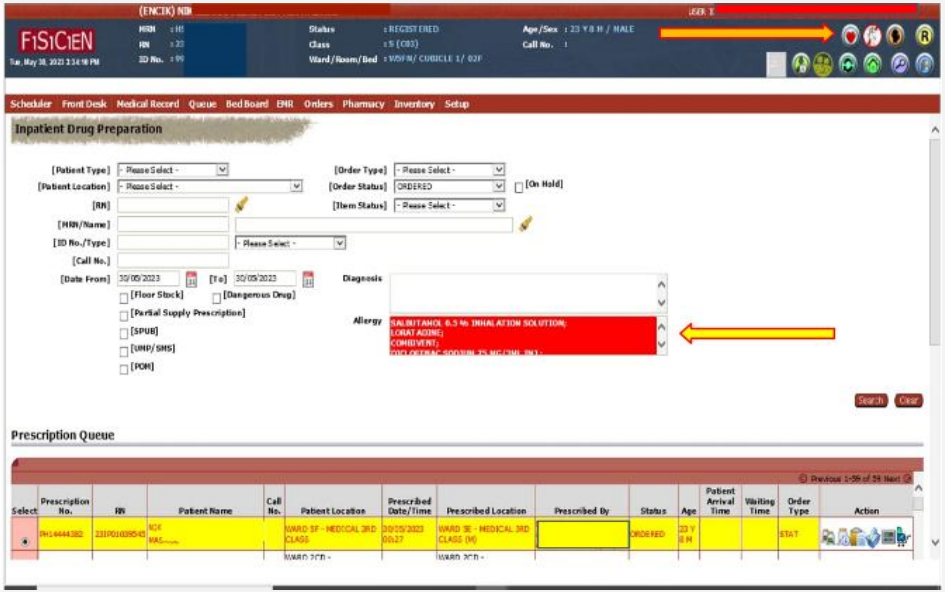
8	Education and information

- Most powerful and effective
- Involve true system changes so that errors are virtually impossible or difficult to make

Table 1: Rank order of error reduction strategies. Adapted from: Institute for Safe Medication Practices (2013)

FAIL SAFES TO PREVENT ALLERGY ERROR





Allergy Alert in FiSiCiEN

- Physician still can order drug(s) that patient is allergic to
- Allergy history is saved in a separate section ❤ that does not link to medication order

Source: Fisicien, Hospital Information System (HIS), KKM

ERROR PREVENTION STRATEGIES

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- “Lock and key” design
- Create a hard stop before proceeding
- Ensure that important information is provided

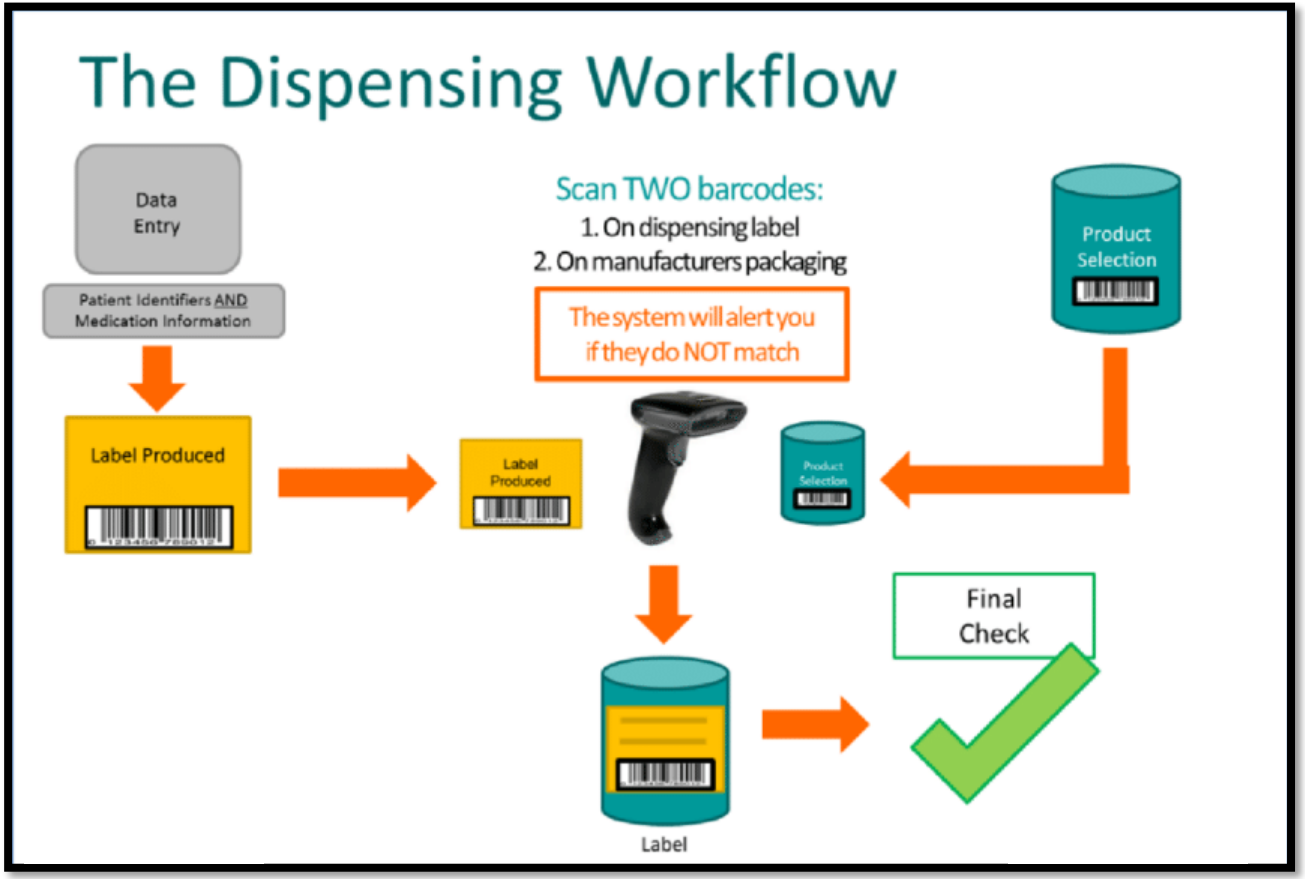
Table 1: Rank order of error reduction strategies. Adapted from: Institute for Safe Medication Practices (2013)

FORCING FUNCTION: BAR CODING SYSTEM

- It can help to reduce errors caused by lack of vigilance
- Avoid errors of patient identification prior to medication, transfusions, or procedures
- It also can automatically captures treatment information
- It has been reported will reduces medicine administration errors by 86%.

Ref: Point-of-care bar coded medication administration:experience in the United States (A. J. Vaida, M. R. Cohen, Institute for Safe Medication Practices, 2005)

Examples



June 2017 Barcoding and other scanning technologies to improve medication safety in hospitals Dr Mike Bainbridge and Dean Askew from ASE Health

Source: M. & Askew D. Barcoding And Other Scanning Technologies To Improve Medication Safety In Hospitals, 2017. ASE Health.

ERROR PREVENTION STRATEGIES

	Strategy
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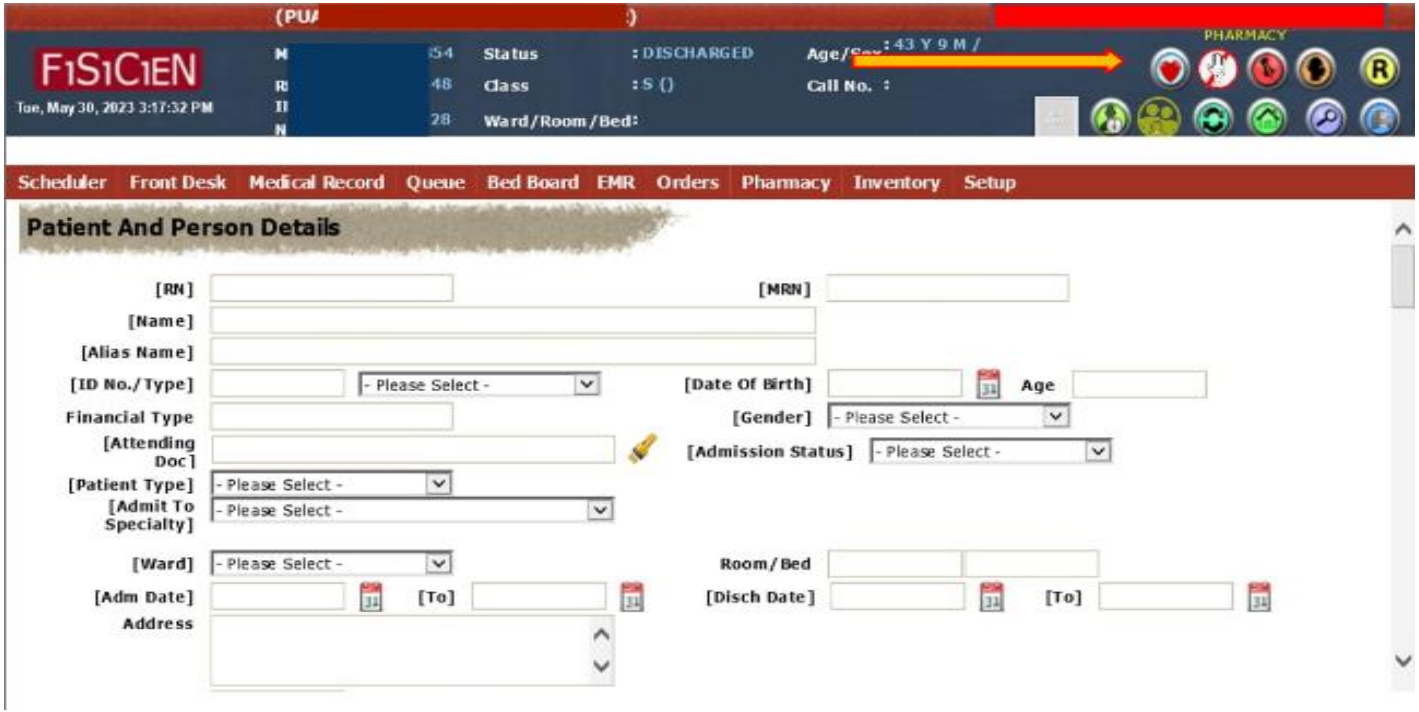
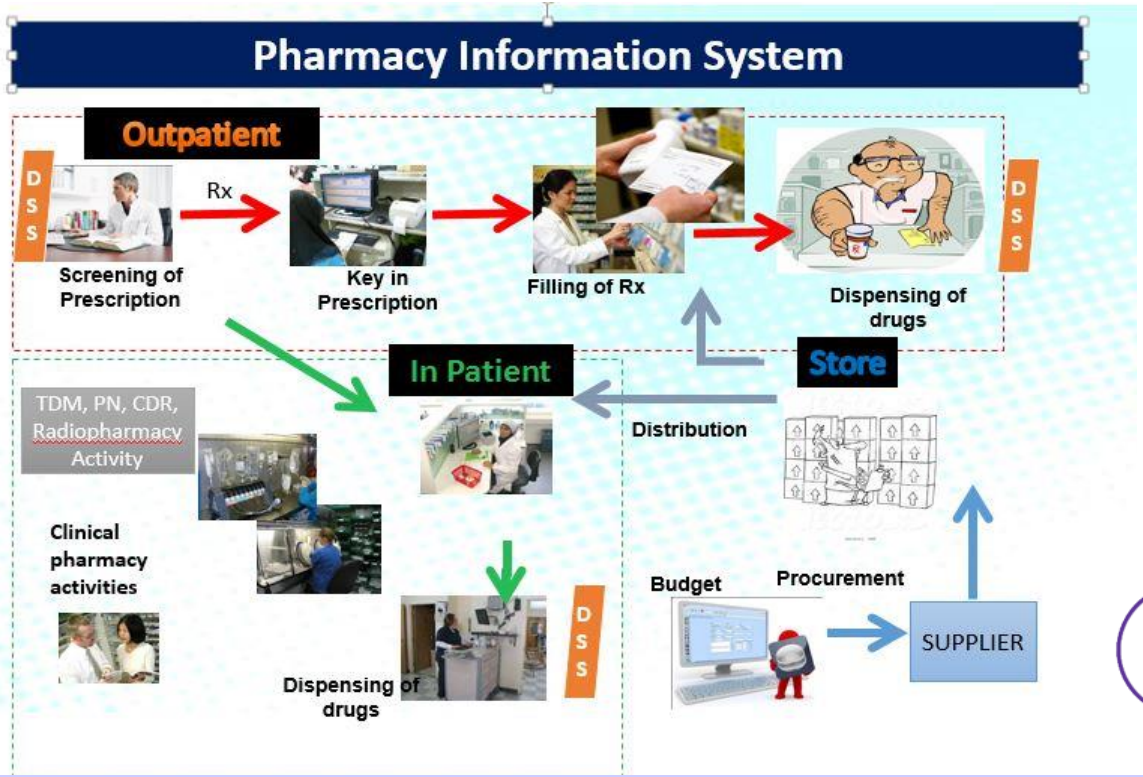
- Lessen human fallibility
- Limit reliance on memory
- Eliminate misinterpretations

Table 1: Rank order of error reduction strategies. Adapted from: Institute for Safe Medication Practices (2013)

COMPUTERISED PRESCRIBING ORDER ENTRY (CPOE)



AUTOMATION: PhIS



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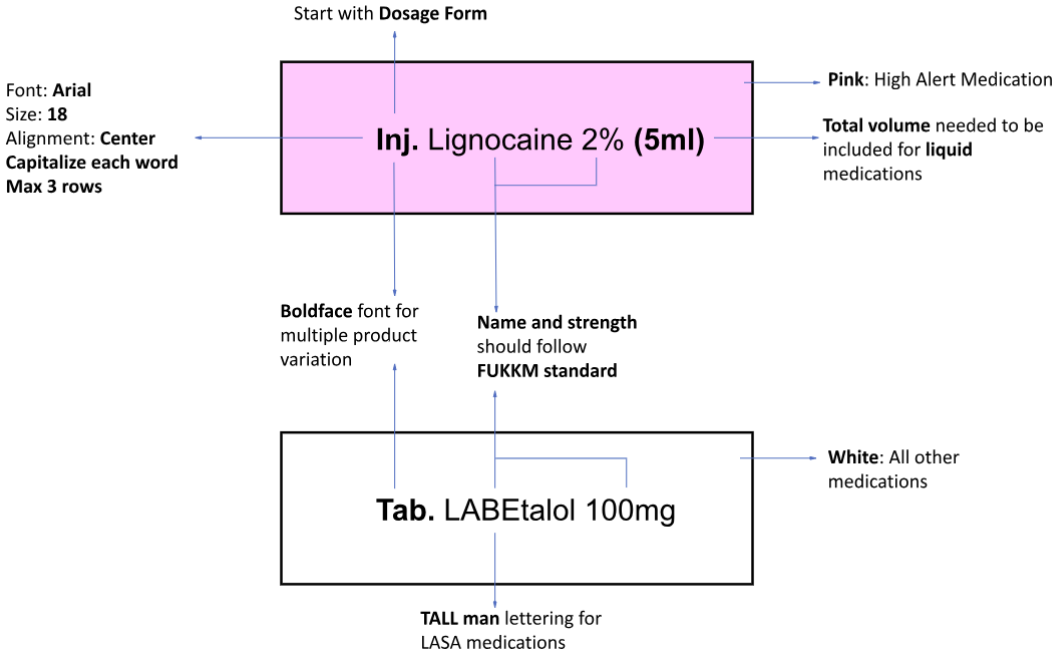
- Uniform model to adhere
- Reduce complexity and variation
- But rely on human vigilance to ensure the process is followed
- Less effective than strategies mentioned previously

Table 1: Rank order of error reduction strategies. Adapted from: Institute for Safe Medication Practices (2013)

STANDARDISATION: MEDICATION CONTAINER LABELS



Ref: HKL Medication Container Labelling Guide 2022

ERROR PREVENTION STRATEGIES

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- Incorporate duplicate steps
- Add another individual to force additional checks
- Reduce likelihood of making the same error
- But may be omitted or ignored

Table 1: Rank order of error reduction strategies. Adapted from: Institute for Safe Medication ctices (2013)

ERROR PREVENTION STRATEGIES

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- Make important information available
- Checklist ensures personnel health worker who handling the medication preparation take all the necessary steps

Table 1: Rank order of error reduction strategies. Adapted from: Institute for Safe Medicatio ctices (2013)

CHECKLISTS

Dispensing Checklists

Prescription requirements	
Signature of prescriber is present.	
Dated and within the 6 month validity/28 day validity.	
Address of the prescriber is present.	
The prescriber is an appropriate one.	
The dose is present, this does not need to be in words and figures.	
The formulation to be dispensed is stated, unless only one exists.	
The strength is specified, only if more than one exists.	
The total quantity to be dispensed is stated.	
The name of the patient is present.	
The address of the patient is stated. If no fixed abode then simply NFA is acceptable.	
The name of the medicine is present but this not a legal requirement.	
The directions for use are stated.	
Standard label requirements	
Name of patient	
Name and address of the supplying pharmacy	
Date of dispensing	
Name of the medicine	
If appropriate: for external use only	
Directions for use	
Precautions such as BNF warning labels	
Both outer container and inner product labelled, if applicable.	
PIL has been placed into bulk container alongside medication/product, if applicable.	

Nursing Procedure Checklist

Administering Oral Medications

Instruction: *Check under Correctly Done if identified skill is correctly performed; Incorrectly Done if skill is not performed correctly; and Not Done if the student failed to perform the skill.*

Procedure	Correctly Done	Incorrectly Done	Not Done
1. Gather equipment. Check each medication order against the original physician's order according to agency policy. Clarify any inconsistencies. Check the patient's chart for allergies.			
2. Know the actions, special nursing considerations, safe dose ranges, purpose of administration, and adverse effects of the medications to be administered. Consider the appropriateness of the medication for this patient.			
3. Perform hand hygiene.			
4. Move the medication cart to the outside of the patient's room or prepare for administration in the medication area.			
5. Unlock the medication cart or drawer. Enter pass code and scan employee identification, if required.			
6. Prepare medications for one patient at a time.			
7. Read the MAR and select the proper medication from the patient's medication drawer or unit stock.			
8. Compare the label with the MAR. Check expiration dates and perform calculations, if necessary. Scan the bar code on the package, if required.			
9. Prepare the required medications: a. *Unit dose packages:* Place unit dose-packaged medications in a disposable cup. Do not open wrapper until at the bedside. Keep narcotics and medications that require special nursing assessments in a separate container. b. *Multidose containers:* When removing tablets or capsules from a multidose bottle, pour the necessary number into the bottle cap and then place the tablets in a medication cup. Break only scored tablets, if necessary, to obtain the proper dosage. Do not touch tablets with hands. c. *Liquid medication in multidose bottle:* When pouring liquid medications in a multidose bottle, hold the bottle so the label is against the palm. Use the appropriate measuring device when pouring liquids, and read the amount of medication at the bottom of the meniscus at eye level. Wipe the lip of the bottle with a paper towel.			
10. When all medications for one patient have been prepared, recheck the label with the MAR before taking them to the patient. Replace any multidose containers in the patient's drawer or unit stock. Lock the medication cart before leaving it.			
11. Transport medications to the patient's bedside carefully, and keep the medications in sight at all times.			
12. Ensure that the patient receives the medications at the correct time.			
13. Identify the patient. Usually, the patient should be identified using two methods. Compare information with the MAR or CMAR. a. Check the name and identification number on the patient's identification band. b. Ask the patient to state his or her name. c. If the patient cannot identify him or herself, verify the patient's identification with a staff member who knows the patient for the second source.			
14. Complete necessary assessments before administering medications. Check allergy bracelet or ask patient about allergies. Explain the purpose and action of each medication to			

ERROR PREVENTION STRATEGIES

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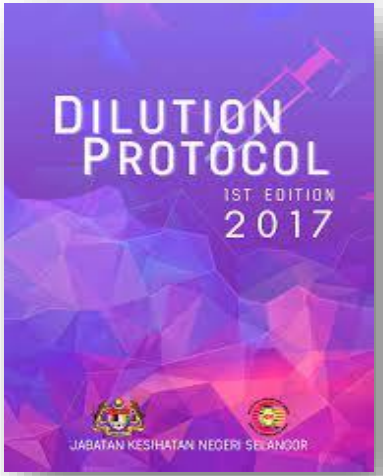
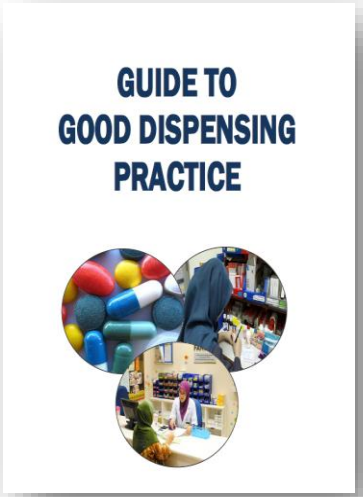
- Guide staff toward an intended positive outcome
- But rely on memory
- Only used as a foundation to support more effective strategies that target system issues

Table 1: Rank order of error reduction strategies. Adapted from: Institute for Safe Medicatio ctices (2013)

GUIDELINES & PROTOCOLS





Source: BAPF, KKM

ERROR PREVENTION STRATEGIES

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Table 1: Rank order of error reduction strategies. Adapted from: Institute for Safe Med

- Rely on individual's ability to remember
- Must be combined with other strategies to strengthen medication use system

Source: Kompilasi Kempen & Pameran Keselamatan Pengubatan, BAPF 2023.






Source: Kompilasi Kempen & Pameran Keselamatan Pengubatan, BAPF 2023.

IMPLEMENTING ERROR PREVENTION STRATEGIES

1

Low Leverage Strategies are not Effective when used alone

2

Employ Variety of Strategies

3

Routinely Evaluate Error Prevention Strategies

4

Consider More Powerful Strategies

Safe Dispensing Practice

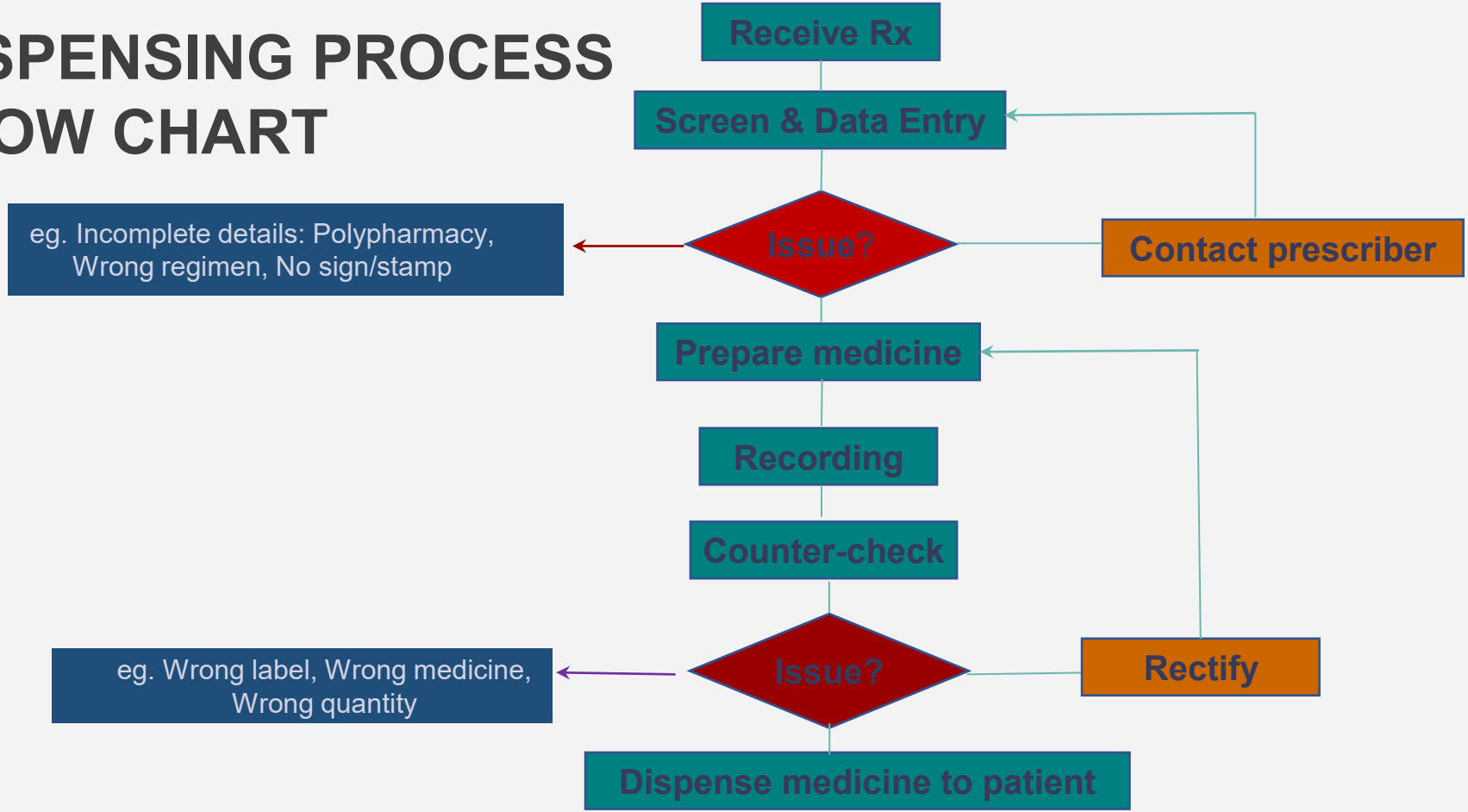
ISMP’s Ten Key Elements of the Medication Use System

10 Key Elements of Medication Use Process

1. Patient Information
2. Drug Information
3. Communication of Drug Orders and Other Drug Information
4. Drug Labeling, Packaging and Nomenclature
5. Drug Standardization, Storage and Distribution
6. Medication Delivery Device Acquisition, Use and Monitoring
7. Environmental Factors
8. Staff Competency and Education
9. Patient Education
10. Quality Processes and Risk Management

Caution in Dispensing Cycle Process

DISPENSING PROCESS FLOW CHART



Source: Guide to Good Dispening Practice, 1st Ed, 2016. BAPF KKM.

Medication Safety Committee 2023
Pharmacy Practice and Development Division
Ministry of Health Malaysia

Dispensing

Counter-checking

Preparation

Data Entry

Screening

CHECK & VALIDATE

Nama: *Mohd Abu bin Zamri*	Rx No. 123456
No. K/P: *891010-13-5678*	
No. Daftar: *ABC5678*	
Umur: *34 tahun*	*Tablet Paracetamol 1g TDS x 1/52* *Tablet Chlorpheniramine 4mg TDS x 3/7* *Hydrocortisone Cream 1% w/w BD on arm x 5/7*
Tarikh: *2 December 2022*	
Penyakit: *Urticaria*	*Nurul Hidayah Ibrahim* *Dr. Nurul Hidayah binti Ibrahim* *Pegawai Perubatan UD44* *MMC No. 123456* *Hospital ABC* Hospital ABC

ASK

PATIENT'S IDENTIFIER

ASK Patient/ Caregiver

IDENTIFY YOUR PATIENT:
2 IDENTIFIERS

STEP 1: **COMPULSORY**

Ask patient's full name

STEP 2: **AT LEAST ONE**

- Ask patient's I/C number or birthday
- Check patient's I/C
- Check patient's specific document
  (Eg: OPD card/discharge note/lab report)
- Check patient's wristband
  (For bedside dispensing only)
- Check Medical Record in ward
  (For bedside dispensing only)

Dispensing

Counter-checking

Preparation

Data Entry

Screening

1

Right Patient

1. right **name**
2. **AND identity card (IC) number**

2

Practice 5 Right

1. **Route**
2. **Medication Name**
3. **Dose & Strength**
4. **Frequency**
5. **Duration**

3

Drug Suitability

1. **Polypharmacy**
2. **Allergy/ADR**
3. **Interaction**

4

Clarify

any doubts before data entry

5

Aware

on **default setting or selection** in the computerized system

6

Ensure

no omission of information

Always cross check the filled medicines name & strength against the original prescription

Filling

- Practice 5R- Select the correct drug, strength, dosage form and quantity
- Check the expiry
- Beware of LASA or multiple product variation (check local formulary)

Dispensing | Counter-checking | Preparation | Data Entry | Screening

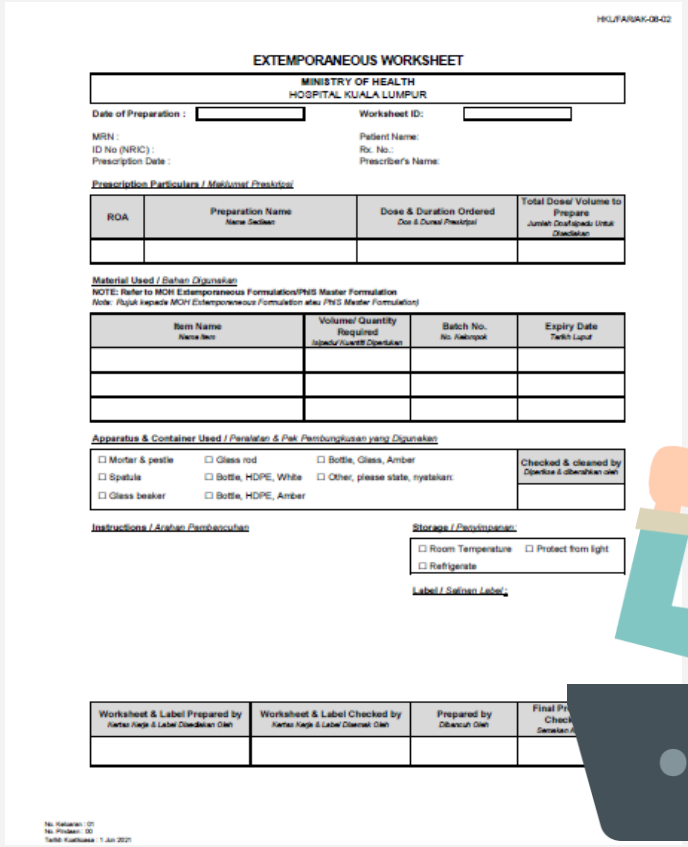
Always cross check the filled medicines name & strength against the original prescription

Extemporaneous Preparation/ Compounding

- Ensure preparation is prepared according to formulation from a reputable reference
- Prepare a worksheet for the compounding - should be counterchecked
- Practice 5R- select the correct drug, strength and quantity to be compounded
- Use an appropriate vehicle according to the formulation
- Use appropriate measuring tools

Dispensing
Counter-checking
Preparation
Data Entry
Screening

- ✔ Formula
- ✔ Ingredients and quantity used
- ✔ Batch number, and expiry date of ingredients used
- ✔ Patient & prescription details
- ✔ Name of person involved in preparation and counterchecking product
- ✔ Date of compounding
- ✔ Storage
- ✔ Copy of labels



HKL/FAR/AK-08-02

EXTEMPORANEOUS WORKSHEET

MINISTRY OF HEALTH
HOSPITAL KUALA LUMPUR

Date of Preparation : Worksheet ID:

MRN : Patient Name:
ID No (NRIC) : Rx. No.:
Prescription Date : Prescriber's Name:

Prescription Particulars / *Maklumat Preskripsi*

ROA	Preparation Name *Nama Sediaan*	Dose & Duration Ordered *Dos & Tempoh Preskripsi*	Total Dose/ Volume to Prepare *Jumlah Dos/Isipadu Untuk Disediakan*

Material Used / *Bahan Digunakan*
NOTE: Refer to MOH Extemporaneous Formulation/PhIS Master Formulation
Note: Rujuk kepada MOH Extemporaneous Formulation atau PhIS Master Formulation)

Item Name *Nama Item*	Volume/ Quantity Required *Isipadu/ Kuantiti Diperlukan*	Batch No. *No. Kelompok*	Expiry Date *Tarikh Luput*

Apparatus & Container Used / *Peralatan & Pek Pembungkusan yang Digunakan*

			Checked & cleaned by *Diperiksa & dibersihkan oleh*
☐ Mortar & pestle	☐ Glass rod	☐ Bottle, Glass, Amber	
☐ Spatula	☐ Bottle, HDPE, White	☐ Other, please state, nyatakan:	
☐ Glass beaker	☐ Bottle, HDPE, Amber		

Instructions / *Arahan Pembancuhan*

Storage / *Penyimpanan:*

☐ Room Temperature ☐ Protect from light
☐ Refrigerate

Label / *Salinan Label:*

Worksheet & Label Prepared by *Kertas Kerja & Label Disediakan Oleh*	Worksheet & Label Checked by *Kertas Kerja & Label Disemak Oleh*	Prepared by *Dibancuh Oleh*	Final Pr... Check...

No. Ketukan : 01
No. Pindaan : 00
Tarikh Kuatkuasa : 1 Jun 2021

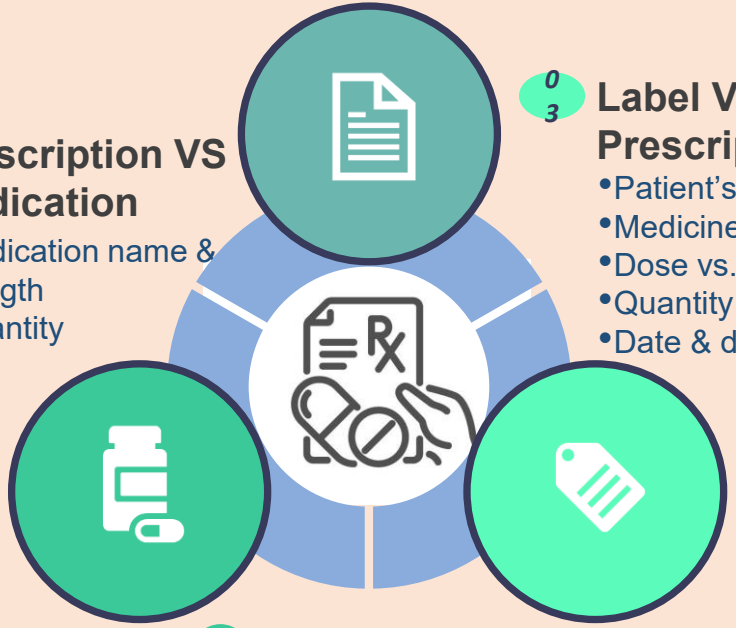
Always cross check the filled medicines name & strength against the original prescription

Labelling

- If label is handwritten, it should be neat & legible with clear instructions on use
- Practice triple point counterchecking
- Use appropriate auxiliary label if required (e.g. do not chew/crush tablet, may cause drowsiness)
- Ensure proper placement of the label. Do not hide the active ingredient on original packaging in order to assist counterchecking.

Dispensing
Counter-checking
Preparation
Data Entry
Screening

COUNTER-CHECKING PRESCRIPTION



01 Prescription VS Medication

- Medication name & strength
- Quantity

02 Medicine VS label

- Right medication
- Loose medication→ batch number and expiry on label
  - compare with original container
- Blister packaging→ medication name & strength

03 Label VS Prescription

- Patient's name, RN, ward
- Medicine name & strength
- Dose vs. instruction
- Quantity
- Date & duration of supply

Triple-point Checking

To ensure all the prescribed medicines are supplied and in the right quantity

Dispensing

Counter-checking

Preparation

Data Entry

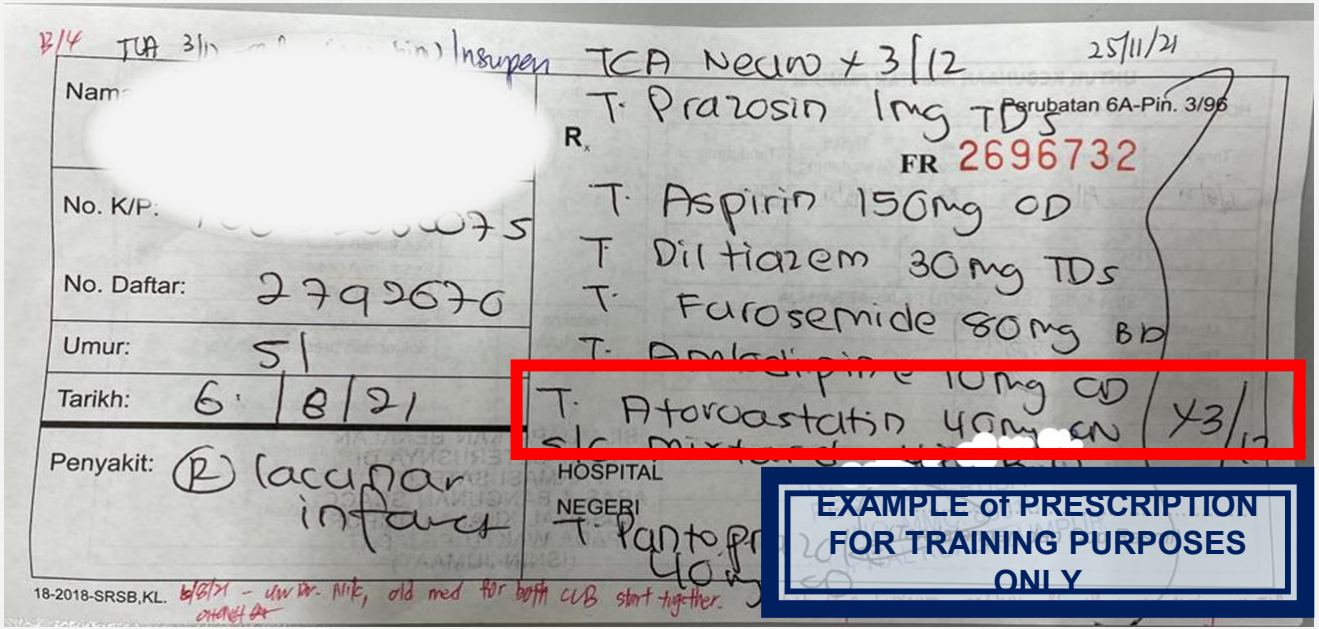
Screening

01

Should be done by second person, other than the staff who did previous filling & labelling tasks

02

Give clear instructions/counselling and proper advice on how to take/ use the medicines dispensed.


TCA Neuro x 3/12
25/11/21
Nam
No. K/P:
No. Daftar: 2792670
Umur: 51
Tarikh: 6/8/21
Penyakit: (R) lacunar infarct
Perubatan 6A-Pin. 3/96
FR 2696732
R/
T. Prazosin 1mg TDS
T. Aspirin 150mg OD
T Diltiazem 30mg TDS
T. Furosemide 80mg BD
T. Atorvastatin 40mg
HOSPITAL
NEGERI
18-2018-SRSB,KL.
EXAMPLE of PRESCRIPTION
FOR TRAINING PURPOSES
ONLY

Source: HKL, 2022

THANK YOU

Acknowledgement:

1. JK Induk Keselamatan Pengubatan 2023/24

External Reviewers

1. Dr. Norkasihan Ibrahim (UiTM)
2. Nalina Darsini A/P Panderengen (JKN WPKLP)