Slide 1

Back to Basics:
Why Medication Errors Occur
and
How to Reduce These

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品質 / 關懷 / 營運

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Medical Errorology

- *Anatomy of a Mistake*
- *Pathophysiology of an Error*
- *Diagnosis*
  (Incident Reporting)
  (Root Cause Analysis)
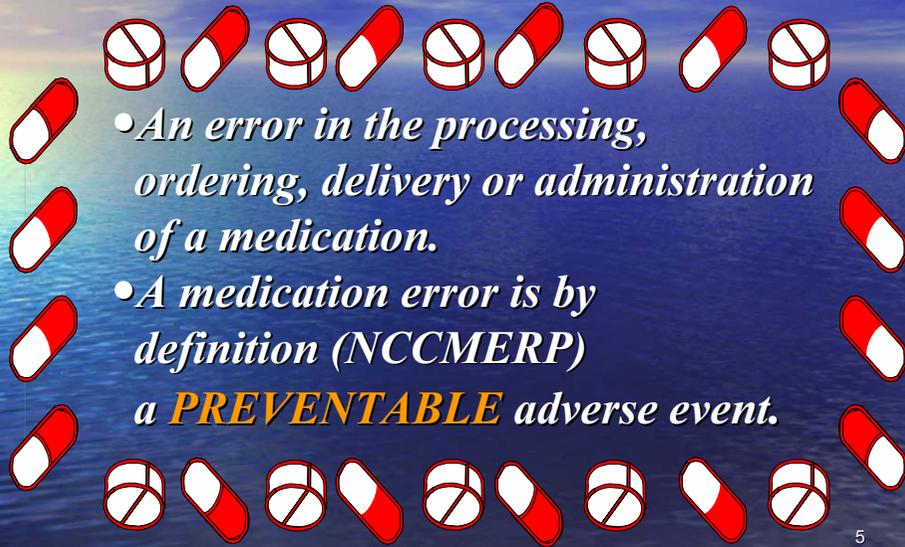- *Treatment(Preventive Countermeasures)*

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IOM REPORT (1999)
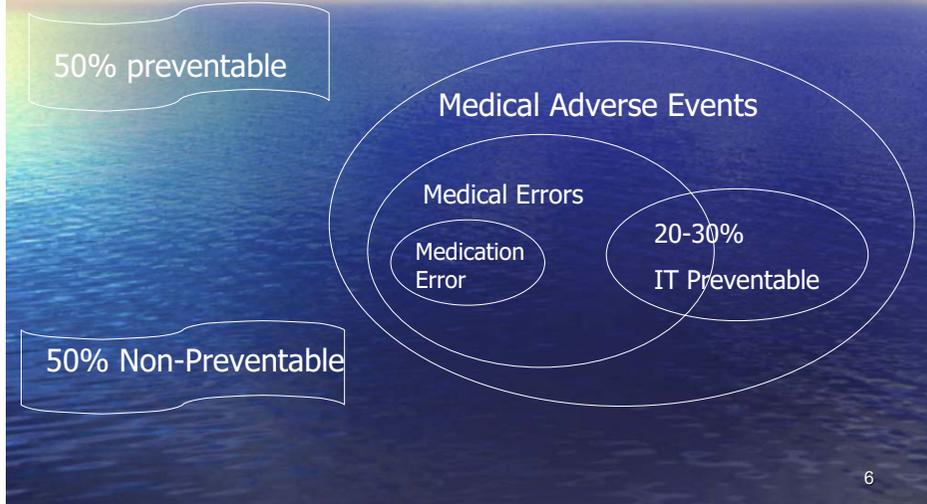*～ the catalyst for*
medication error reform

(請加入柯林頓的照片)

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Definition of Medication Error

- *An error in the processing, ordering, delivery or administration of a medication.*
- *A medication error is by definition (NCCMERP) a PREVENTABLE adverse event.*

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Preventable

50% preventable

Medical Adverse Events

Medical Errors

Medication Error

20-30% IT Preventable

50% Non-Preventable

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NEWS!

Iatrogenic Cause of Death

Released by	Year	Rank
IOM	1999	8
JAMA	2000	3
NIA	2003	1

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Scope of the Problem

- *Up to 7000 death per year attributed to medication errors alone*
- *2% of admissions have experienced a preventable adverse drug event*
- *Only 1-5% actually result in harm(ADE) or death*
- *Errors increased 500% over the last decade(UK)*
- *More than 20,000 reported to FDA since 1992*
- *Medication errors and Adverse Drug Events are the single leading cause of medical injuries accounting for 19.4% of all adverse events*

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THE SAFETY MOVEMENT IN MEDICINE IS IN ITS INFANCY

Ideals vs Reality

Theoretical vs Practical

Hallmark of Safety Culture

1. Non-punitive and open environment
2. Voluntary reporting system
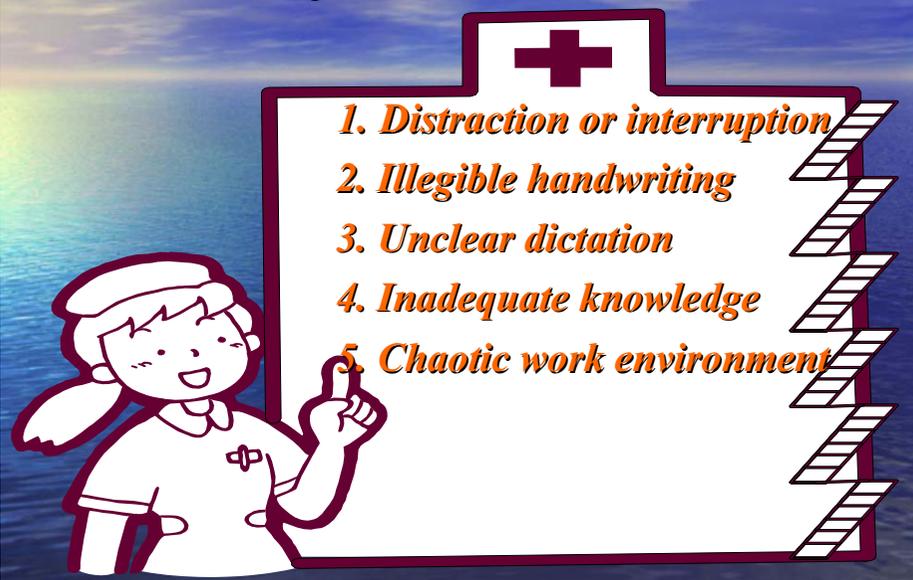3. Error prevention

Classification of Medical Errors

1. Physician-related med. error
2. Pharmacist-related med. error
3. Nurse-related med. error
4. Patient-related med. error

Occurrence of Medication Errors in Studies of Hospitalized Patients

Physician ordering 39-49% → Transcription 11-12%

Nursing administration 26-38% ← Pharmacy dispensing 11-14%

(Bates et al & Leape et al)
JAMA 1995;274:35-43

Causes of Medication Errors

1. Distraction or interruption
2. Illegible handwriting
3. Unclear dictation
4. Inadequate knowledge
5. Chaotic work environment

Most Common Causes of Medication Errors

- *Poor competency in drug calculation and knowledge deficits(44%)*
- *Communication errors(16%)*

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Most Frequently Reported Types of Medication Errors

1. Omission errors
2. Improper dose errors
3. Unauthorized drugs

(USP, 2000)

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Types of Human Factors

Pathological human factor

Physiological human factor

Physical human factor

Psychological human factor

Psychosocial human factor

Pharmaceutical human factor

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Types of Human Error

- *Confusions*
- *Omissions*
- *Incapacity*
- *Violations*
- *Insufficient knowledge*

  Can be rule-based, knowledge-based or skill-based mistake
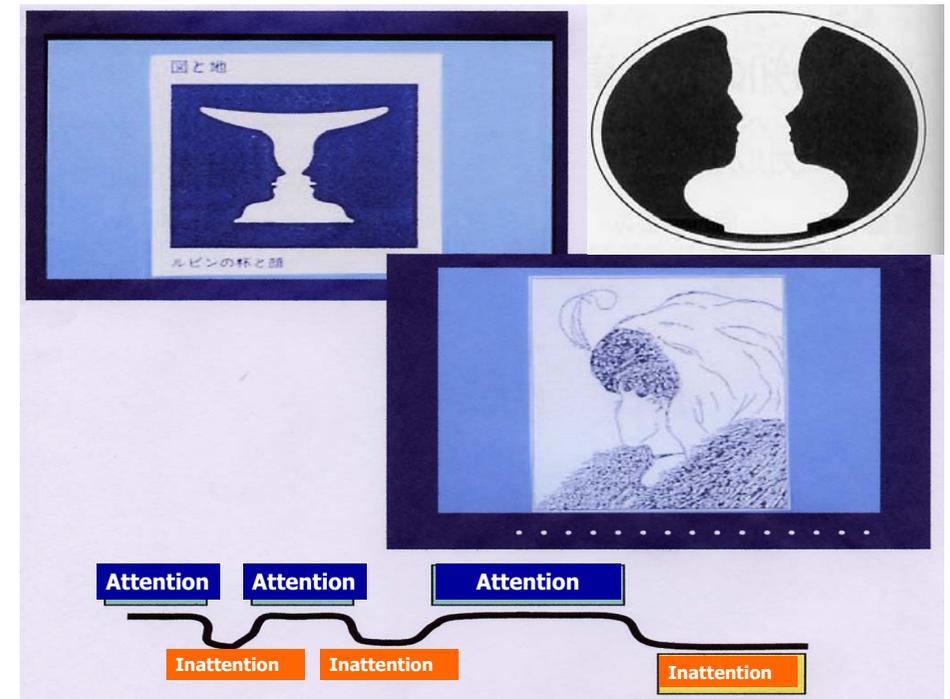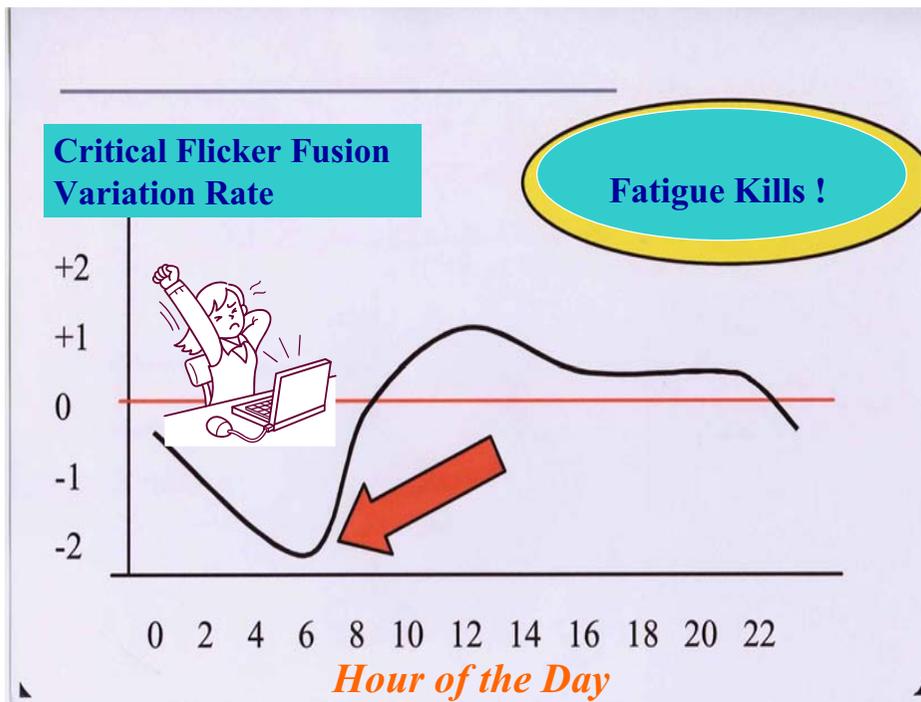
Environmental Factors

1. *poor lighting*
2. *noise*
3. *interruptions*
4. *too much workload*
5. *heat*
6. *confined space*

Error Probability vs Consciousness Level (Hayashi 1984)

Phase	Physical state & Consciousness level	Error Probability
0	Asleep	—
1	Obtunded/sleepy	> 1/10
2	Clear, resting	1/100-1/100,000
3	Clear, in action	<1/1,000,000
4	Over-tensed, panicky excited	>1/10

Risky Factors and Situations

1. Fatigue
2. Alcohol and/or CNS depressants
3. Inattention
4. Illness
5. Fear, anxiety and anger
6. Inexperience
7. Unsafe working conditions
8. Communication problems

Critical Flicker Fusion Variation Rate

Fatigue Kills !

Hour of the Day

Attention   Attention   Attention

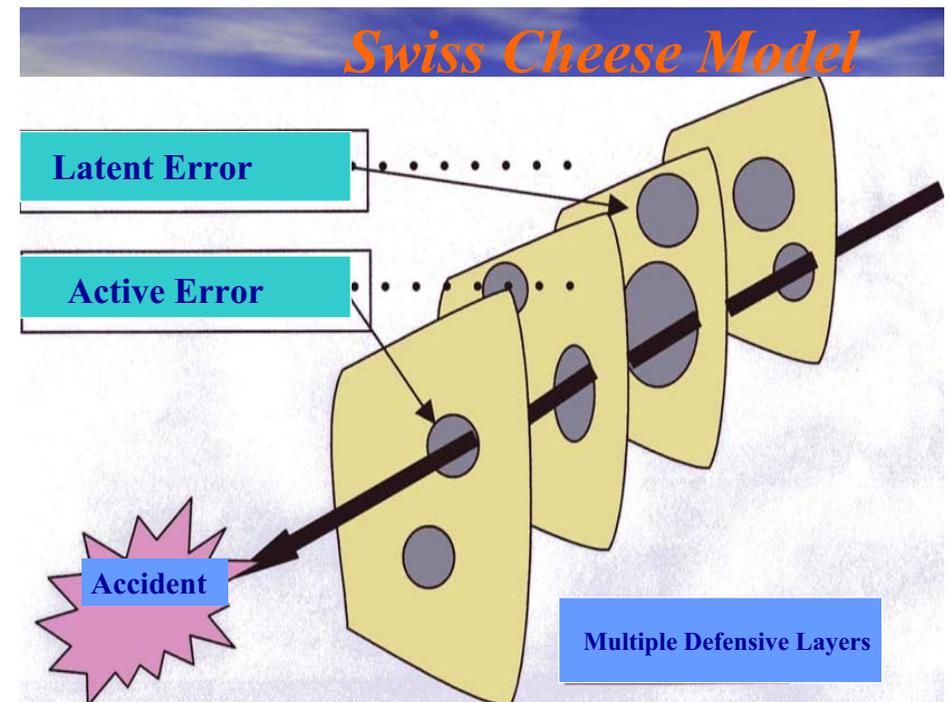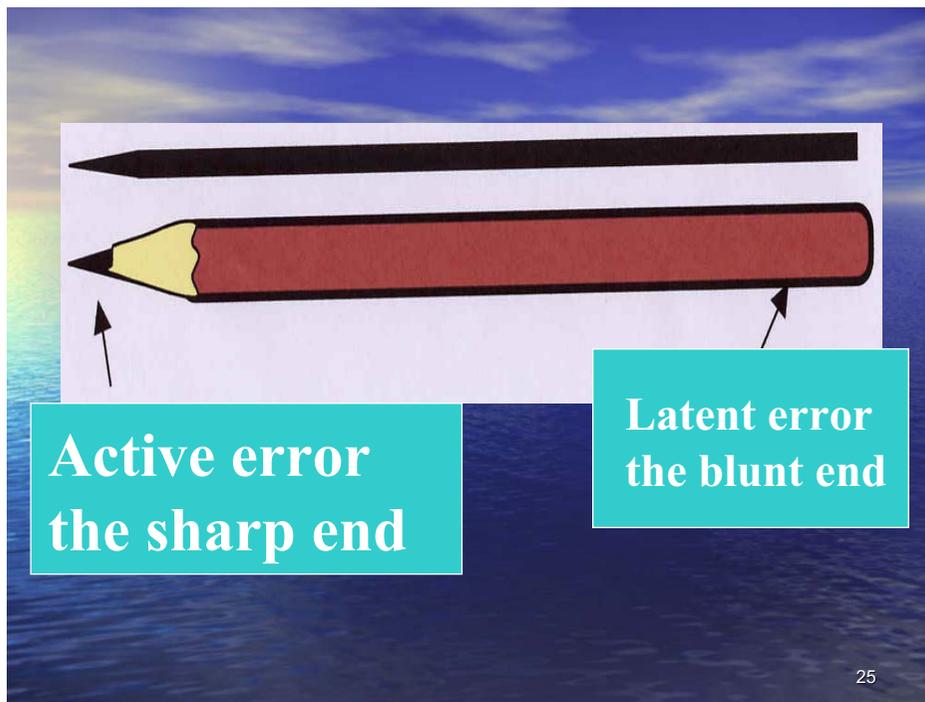Inattention   Inattention   Inattention

Factors and Situations (continued)

9. *Bad habit*
10. *Pressure to hurry*
11. *Hard-to-read handwriting*
12. *Very young and very old age*
13. *Poor facility*
14. *Equipment failure*
15. *Language barrier and/or limited literacy*

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Proximal Causes

- Lack of knowledge, information and standardization
- Violation of rules
- Faulty dose checking
- Faulty identity checking
- Inadequate monitoring
- Equipment error
- Transcription error
- Preparation error

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Active error
the sharp end

Latent error
the blunt end

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Swiss Cheese Model

Latent Error

Active Error

Accident

Multiple Defensive Layers

Organizational Approach to Patient Safety

* *Executive support*
* *Blame-free environment*
* *Encourage error reporting*
* *Focus on systems problems*
* *Educate the employees and sensitize the public*
* *Multidisciplinary teamwork*
* *Infrastructure investment*

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Strategy for Error Reduction

1. Minimum encounter
2. Minimum probability
3. Multiple detection

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Error-Reducing Strategies Based on Human Factors

1. Reduce reliance on memory
2. Reduce reliance on vigilance
3. Reduce handoffs
4. Reduce the need for calculation
5. Manage fatigue
6. Provide adequate human factors training
7. Provide adequate informational resources
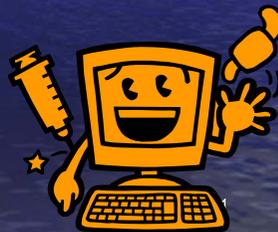8. Simplify and standardize processes

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Error Prevention Tools

1. forcing functions
2. automation and computerization
3. independent double check
   (ISMP)

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IT-based Medication Error Reduction Systems

1. Medication bar code technology at bedside
2. Computerized Physician Order Entry(CPOE) system
3. Automated dispensing
4. Pharmacy robotics

Benefits of CPOE

※ No misinterpretation of handwriting, decimal points or abbreviations
※ provides all kinds of information about potential drug complications: automatic checks on patient drug allergies, dosage and drug interaction
※ Paperless

Benefits of Bar Code Technology

- Positive Patient Identification and 4 Rights(drug, route, dose, time)
- Reduction of medication error rate by 65-85%
- Evidence-based and cost-effective
- Can prevent transfusion and lab specimen- collection errors
- Also helps eliminate billing mistakes
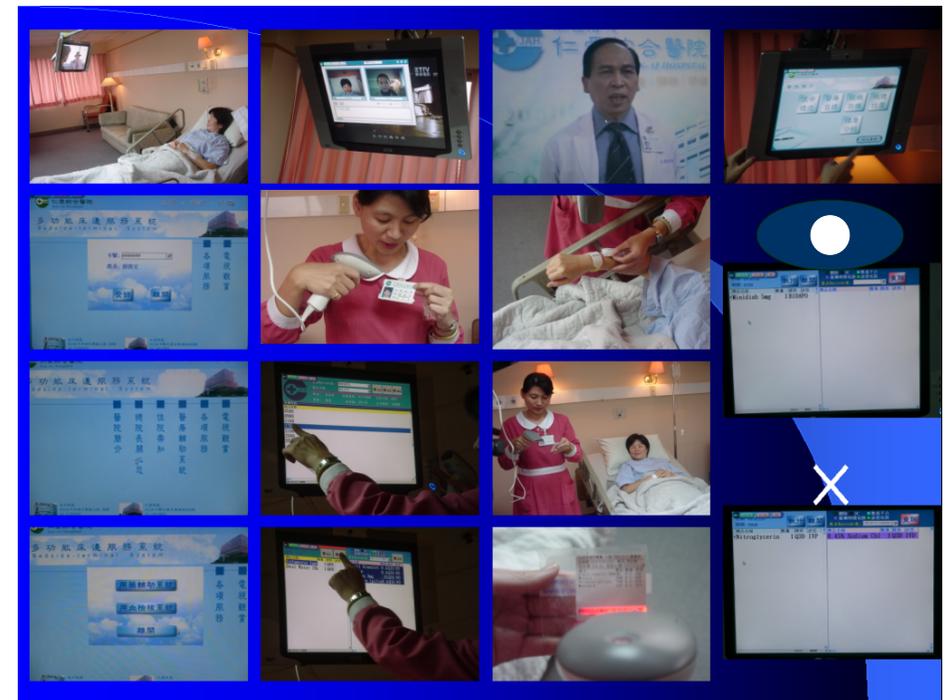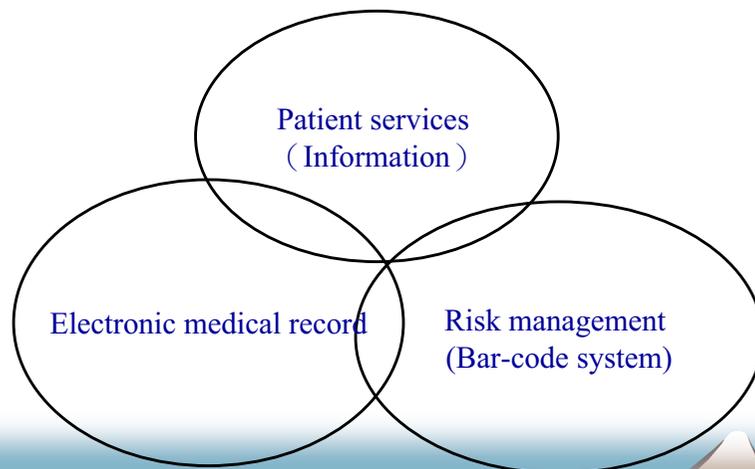
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Bar-code system

Medical staff

Patient

Bedside Terminal has 3 functions

Patient services
（Information）

Electronic medical record

Risk management
(Bar-code system)

Recommendations for Patients/Consumers

1. *Know what kind of errors occur*
2. *Find out what drug you are taking and what it is for*
3. *Find out how to take the drug*
4. *Keep a list of all drugs you take and inform your doctor or other healthcare provider*
5. *If in doubt, ask, ask and ask. Speak up.*

Recommendation for Physicians

1. Prescribe by standard nomenclature.
2. Make sure handwritten orders must be legible.
3. Drug orders should be complete. Use mg. Rather than 1 tablet or 1 vial
4. Be familiar with the medication-ordering system.
5. A leading zero should precede a decimal expression <1, e. g. 0.5
6. Use verbal orders only for emergency situation.
7. If possible, administer by oral rather than parenteral.
8. Speak with the patient or care-giver to explain cautions and possible side effects

Recommendations for Pharmacists

1. *Participate in drug therapy monitoring*
2. *Be available to prescribers and nurses for information.*
3. *Never assume or guess the intent of confusing orders. Always clarify.*
4. *Develop a list of standard abbreviations and publicize hospital-wide.*
5. *Maintain orderliness and cleanliness in the work areas.*
6. *Use the labels prudently.*
7. *Receive adequate education on the operation and use of any device for drug administration*
8. *Use the unit-dose system to the fullest extent possible*

Recommendations for Nurses

1. *Be familiar with the medication-ordering system*
2. *Be familiar with the operation of IV infusion and PCA pumps.*
3. *Verify 5 rights before drug administration*
4. *Speak with the patients or care-givers to make sure they understand how to…*
5. *Calculation for dosage should be checked by a second individual.*
6. *Review the patient's medication profile.*
7. *Ensure all doses are administered at scheduled times.*
8. *Acquire a sound knowledge of drugs*

Summarized Recommendations for Healthcare Providers

1. Educate before you medicate (at all levels)
2. Keep patient history and records complete
3. Limit access to high hazard drugs
4. Use protocols for high hazard drugs
5. Use unit-dose drug systems
6. Avoid abbreviations
7. Standardize drug packing, labeling and storage
8. Institute IT (CPOE and Bar Coding)

400 mg
DOPAMINE
HCl
and 5% Dextrose Inj., USP
1600 mcg/mL
micrograms/mL
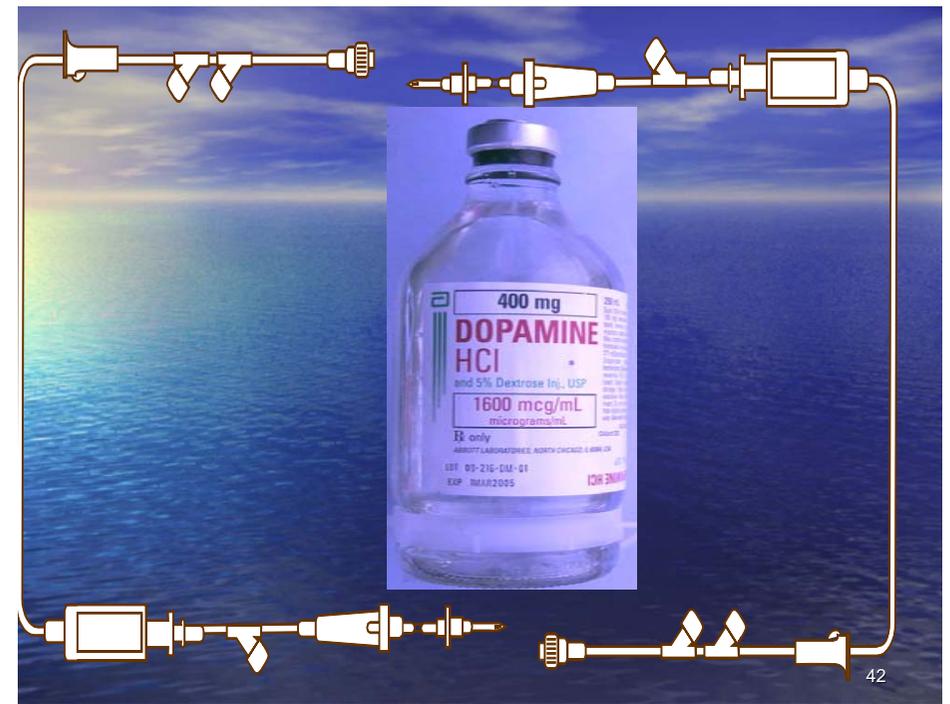
Drug Name Confusion (Sound-alike & Look-alike Medications)

- 15-25% of medication errors are blamed on name confusion
- pharmacists should separate similar drugs and use warning signs to help differentiate
- physicians should indicate both brand and generic names and for what is the drug intended to treat
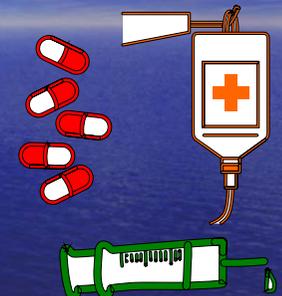- for list of examples: visit www.usp.org

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4 Major Classes of High Risk Drugs

- *Antibiotic*
- *Glycemic agents*
- *Anticoagulants*
- *Opioids*

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TOP 5 HIGH-ALERT DRUGS

1. Insulin
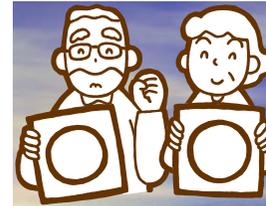2. Heparin
3. Warfarin
4. Morphine
5. Potassium chloride

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ISMP's List of Potenial High-Alert Drugs

※ anesthetic agents
※ inotropic agents
※ sedation agents
※ muscle relaxants

※ thrombolytic agents
※ hypoglycemic agents
※ narcotics
※ radiocontrast agents

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JCAHO Dangerous Abbreviation List
A national summit to be held in Nov. 2004

Other useful strategies

Use Ready-to-use products, when possible
➔ **Prefilled syringes**
➔ **Pre-mixed infusion**

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Taiwan's National Action Plans for Patient Safety

Patient Safety Awareness Week (Nov.8, 2004)
To launch phase 1 National Reporting System soon (JAH currently participates in the planning stages for more projects on patient safety initiatives)

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Slide 1

ASA: Anesthesiologists Beat Other Medical Specialties For Safe Medication Use

By Alison Palkhivala
Special to DG News

NEW ORLEANS, LA -- October 17, 2001 -- Anesthesiologists appear to make fewer medication-related errors than other hospital-based medical specialties.

Slide 2

RESOURCES FOR MEDICATION SAFETY PRACTICES

- American Society of Health-System Pharmacists (www.ashp.org)
- American Society for Healthcare Risk Management (www.ashrm,org)
- Institute for Healthcare Improvement (www.ihi.org)
- Institute for Safe Medication Practices (www.ismp.org)
- U. S. Pharmacopeia (www.usp.org)
- National Patient Safety Foundation (www.npsf.org)
- National Coordinating Council on Medication Error Reporting and Prevention (www.nccmerp.org)
- Massechusetts Coalition for Prevention of Medical Errors (www.mhalink.org/mcpme)
- Med-E.R.R.S. (www.med-errs.com)
- Joint Commission on Accreditation of Healthcare Organizations (www.jcaho.org)

Slide 3

Thank you