# High Alert Medications


Basic Medication Safety (BMS) Certification Course
King Saud bin Abdulaziz University for Health Sciences, Ministry of National Guard – Health Affairs

Saudi Medication Safety Center
المركز السعودي لسلامة الأدوية

# Learning Objectives

- Define and identify High Alert Medications
- Share our experiences / reporting
- Identify common risks
- Outline strategies to improve and minimize risks
- Reinforce policy & procedures

# High Alert Medications

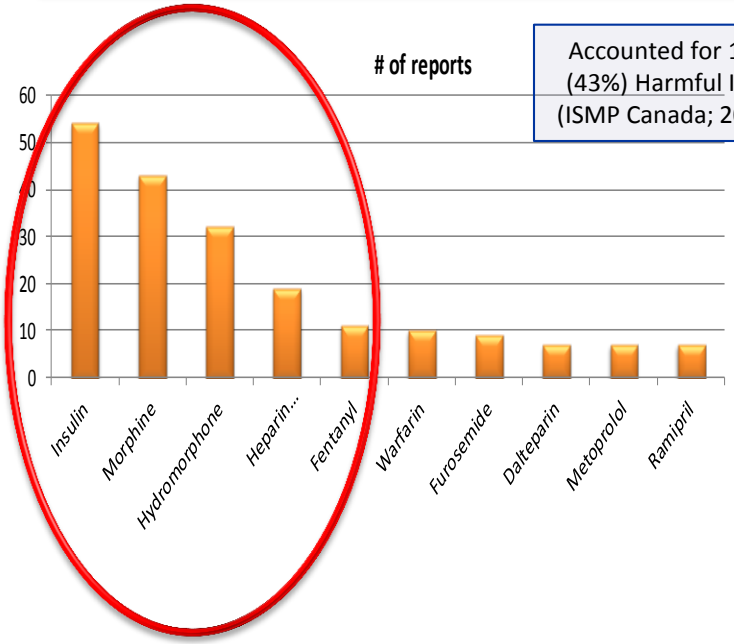
Medications that pose an **increased**

risk of causing significant **harm**

to patients if used in **error**

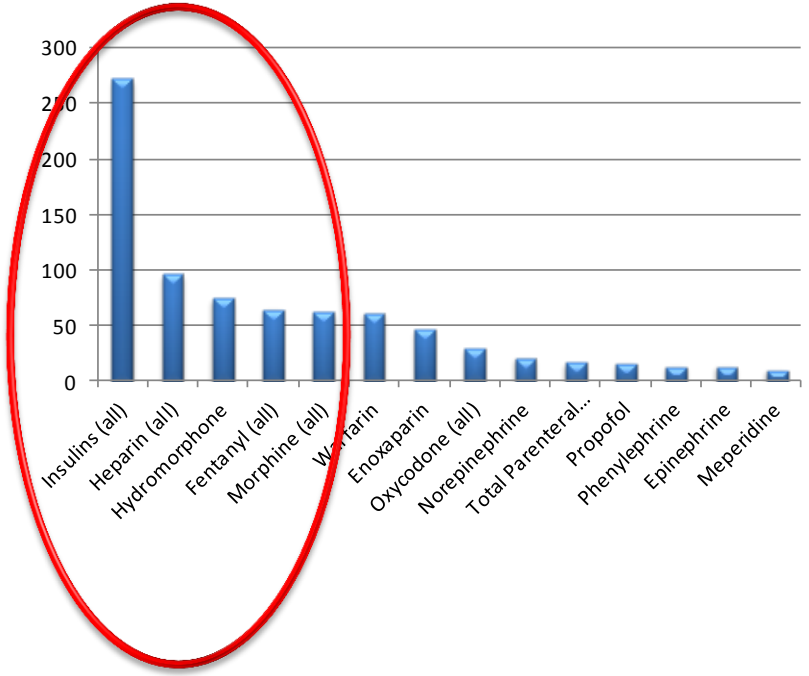
APP 1429-02 Look-Alike, Sound-Alike & High Alert Medication

## Top 10 Medications Reported as Causing Harm

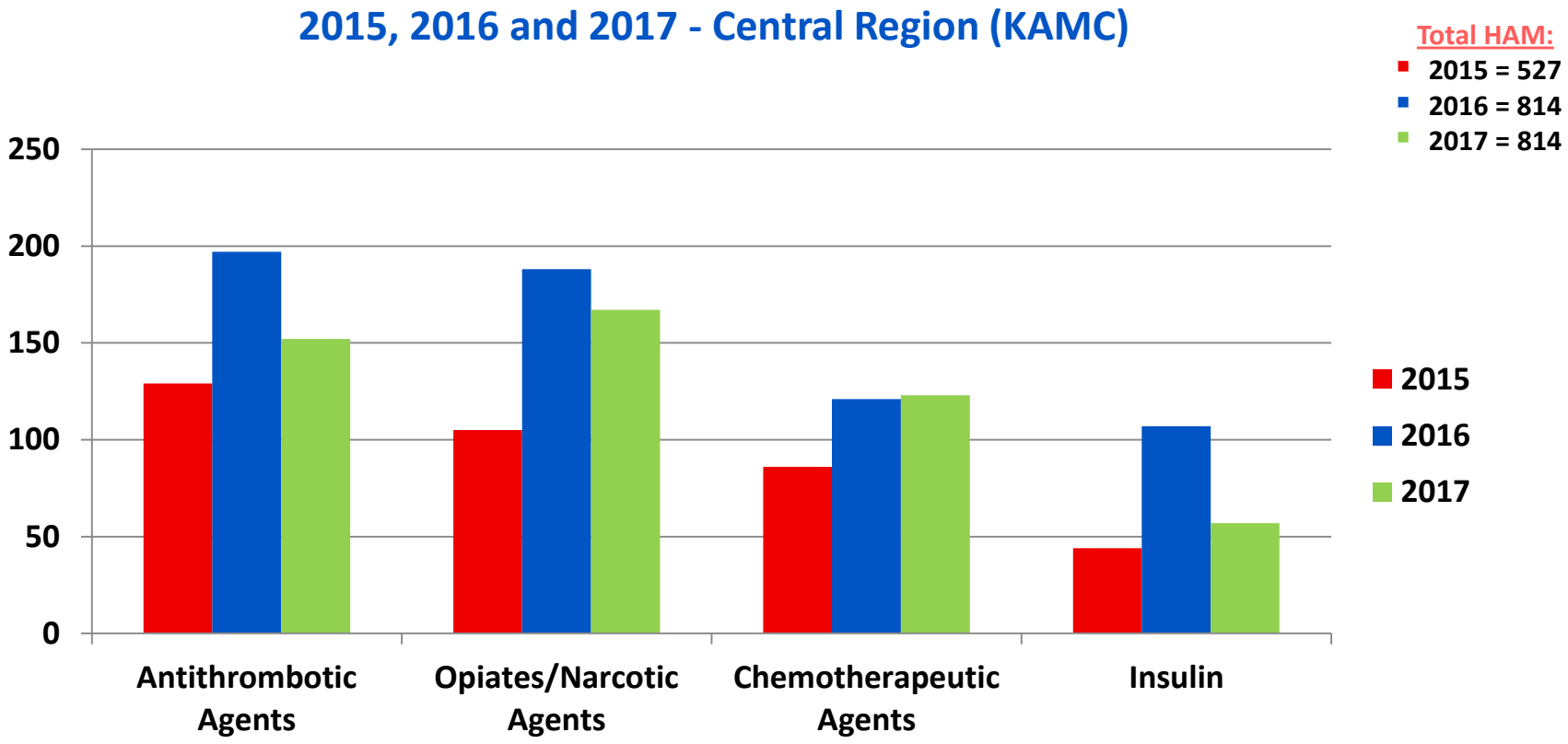



Accounted for 199 / 465 (43%) Harmful Incidents. (ISMP Canada; 2001-2005)

## MedMarx 2008 High Alert Meds with Harm Score E and Above



# Reported Medication Errors / Near Misses for Top Four High Alert Medications

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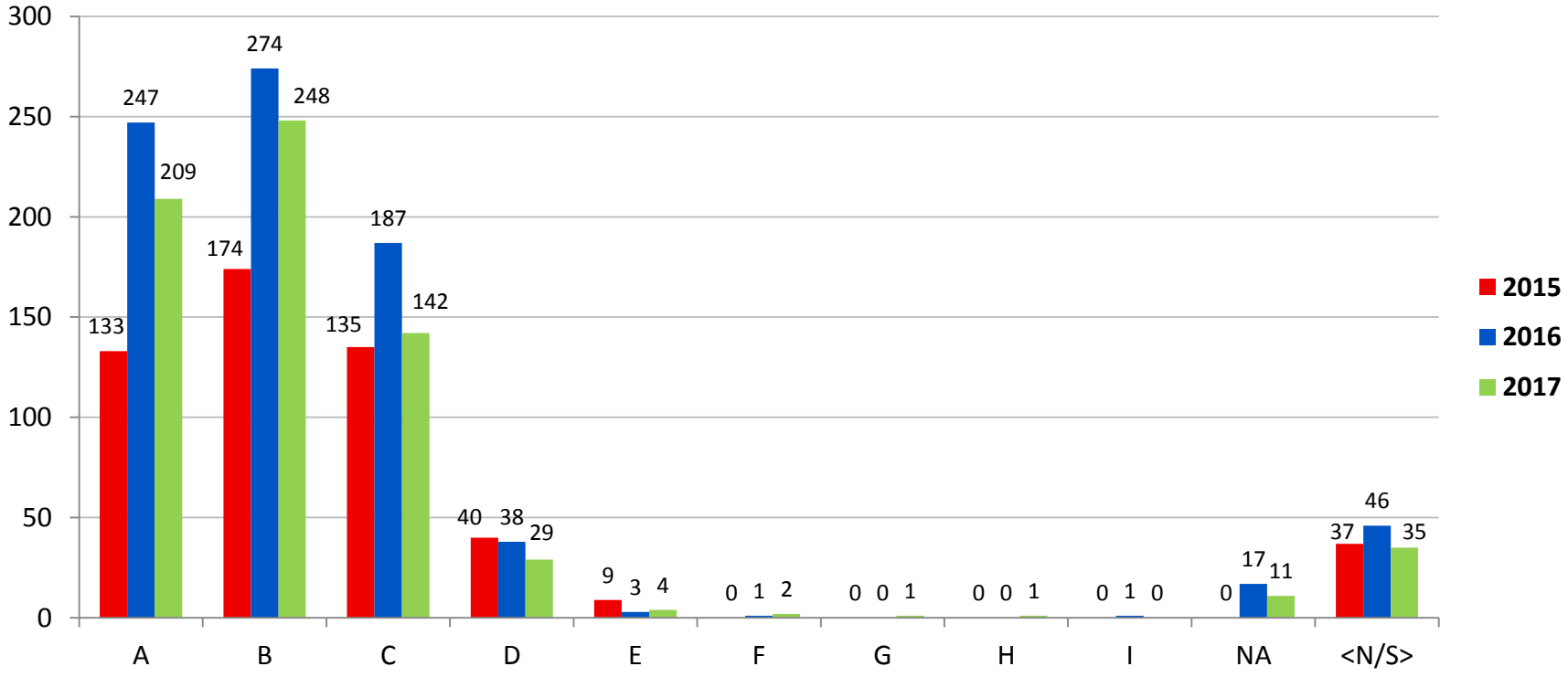
# NCCMERP Categorizing Medication Errors for All High Alert Medication Events

## 2015, 2016 and 2017 - Central Region (KAMC)

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# Half of Preventable ADEs involve:

| DRUG | TOO MUCH LEADS TO: |
|---|---|
| Opiates | Respiratory depression |
| Insulin | Hypoglycemia |
| Anticoagulants | Bleeding |

**U$3.5 billion is spent annually on extra medical costs of ADEs**

*Winterstein, A., Hatton, R., Gonzalez-Rothi, R., Johns, T., & Segal, R. (2002). Identifying clinically significant preventable adverse drug events through a hospital's database of adverse drug reaction reports. Am. J. Health Syst. Pharm., 59(18), 1742–1749. Retrieved from*

*Institute of Medicine. Committee on Identifying and Preventing Medication Errors. Preventing Medication Errors, Washington, DC: The National Academies Press 2006.*

# Case:

- 44 year old male
- History of PE on **Warfarin**

- Admitted for bilateral hydronephrosis, with acute renal failure for bilateral nephrostomy tube placement
- Post-nephrostomy tube the anticoagulation was resumed with **Enoxaparin 120 mg q 12 hr** in the setting of severely compromised renal function

- Patient was transferred to ICU with clinical picture of shock, which turned to be hemorrhagic, complicated by multi-organ failure and death

- Ultrasound of abdomen showed evidence of intra-abdominal collection

# Anticoagulants

## Percentage of Reported High Alert Medication Events

- 22% during 2017 at KAMC-Riyadh
- 24% during 2016 at KAMC-Riyadh


## Common Risks

- Lack of standardization in names and packs
- Complicated dosing regimens
- Low Molecular Weight Heparin (LMWH) syringe designed for adults only

# Anticoagulants

## Common Strategies

- Standardize labels, packaging
- Protected Standard Concentration
- Anticoagulation Services
- Counseling
- Use protocols / smart pumps
- Individualized monitoring and handoffs
- Medication Reconciliation
- Improved Information and Counselling for Patients
  - At start of therapy (prescription)
  - On hospital discharge
  - At the first anticoagulant clinic appointment
  - When necessary throughout course of therapy

# Opiates

## Percentage of Reported High Alert Medication Events

- 24% during 2017 at KAMC – Riyadh
- 23% during 2016 at KAMC – Riyadh


## Common Risks

- LASA (Morphine and HYDROmorphone)
- Lack of leading zero
  - Ordered **.8 mg**, patient received **8 mg** Morphine
- Bolus dose, failing to re-program maintenance dose
- Different rates and concentrations
- Improper disposable of Transdermal Patches

# Opiates

## Common Strategies

- Differentiate products
- Use TALL man lettering
- Use conversion tables
- Time Out prior to intrathecal injection and ONLY intrathecal meds will be in the procedure area
- Education for staff regarding PCA
- Develop a quick reference sheet on PCA
- Implement protocols for the use of PCA and other opioids
- Proper patient education

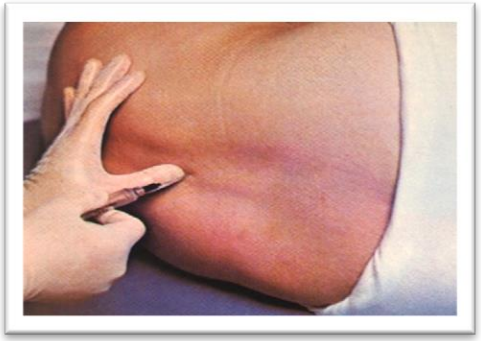
# Chemotherapy

## Percentage of Reported High Alert Medication Events

- 18 % during 2017 at KAMC-Riyadh
- 15 % during 2016 at KAMC-Riyadh


## Cases

| Drug | Error and Outcome |
|---|---|
| Methotrexate | Administering daily instead of weekly (approximately 25 fatalities reported) |
| VinCRIStine | Accidental Intrathecal administration - Fatal |
| Lomustine | Oral agent administered daily instead of every 6 weeks, hospitalization and death |
| CARBOplatin and CISplatin | CISplatin administered at dose intensity appropriate for CARBOplatin, fatal outcome |



# Chemotherapy

## Common Risks

- Miscommunication
- Total course (or cycle) dose given every day
- Substantial distance between Pharmacy and patient treatment area (lack of communication)
- Lack of health care information (labs, BSA)
- Excessive interruptions
- LASA / packaging
- Lack of protocols and education
- Route of administration:  Intravenous vs. Intrathecal

# Chemotherapy

## Common Strategies

- Drugs are **ONLY** stored in Pharmacy
- Standard chemotherapy order sets
- Orders must be signed by an authorized Consultant
- Double check against actual order / protocol
- No abbreviations / error-prone abbreviations
- Avoid excessive precision (round off 919.57)
- Non-Oncology indications: Order sets have dosing, route safeguards programmed in them

# Chemotherapy

## Common Strategies: Cont.

- Use of personal protective equipment to reduce employee exposure to hazards
- Dispense Vin**CRIS**tine (and other vinca alkaloids) in a minibag of a compatible solution and not in a syringe
- Weekly dosage regimen default for oral Methotrexate in electronic systems when medication orders are entered.
- Body Surface Area dosing (mg / m2), when applicable mg / kg
- Use updated lab information
- Patient / caregiver education
- Communication

# Insulin

## Percentage of Reported High Alert Medication Events

- 8% during 2017 at KAMC Riyadh
- 13% during 2016 at KAMC Riyadh


Only Insulin **IV** is High Alert Medication

## Common Risks

- Look-Alike Vials
- Use of “U” or “IU”
- Incorrect dose / rate
- Lack of dose checking

# Insulin

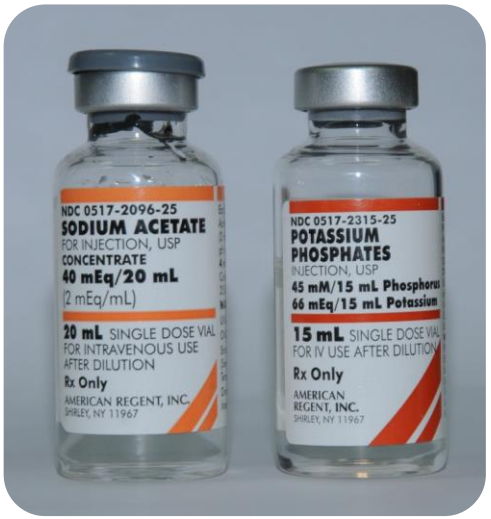
## Common Strategies

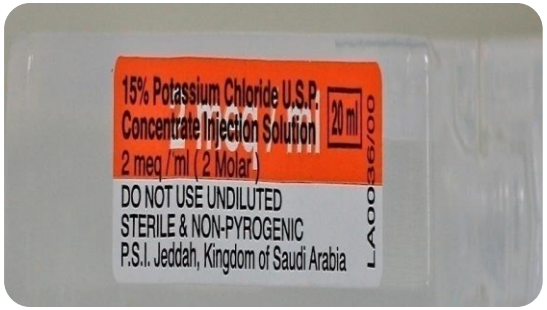
- Spell out “Units” and “Numbers”
- Smart pump / double-check
- Protected standard concentration of Adults
- Order sets for
  - Perioperative Management of a Diabetic Patient’
  - Regular
  - Insulin IV Infusion Scale in Intensive Care Department
- Insulin Infusion Protocol in Cardiac Sciences
- Basal-Bolus-Corrective Subcutaneous  Insulin Protocol in Internal Medicine
- Store separately / labels

# Concentrated Electrolytes

## Common Risks


**Injury / Death**

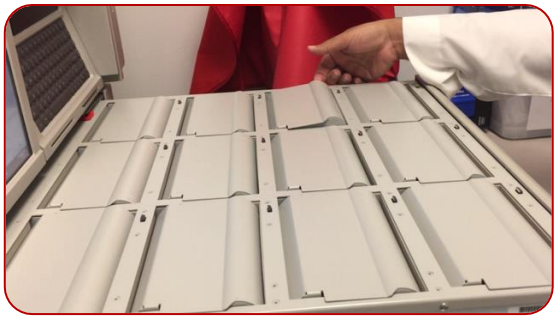


# Concentrated Electrolytes

## Common Strategies

- Stored in **Red Bins with Lids**
- Patient care areas: Stored in ADC locked Lidded
- Crash Cart / Black Box (as applicable)
  - Auxiliary label ***"High Alert / Conc. Electrolyte: Must Be Diluted"***
- Standardized medication labels

| 32762 |
| --- |
| Magnesium sulfate 50% (200 mEq / 50 mL) injection |
| HIGH ALERT / CONC. ELECTROLYTE: MUST BE DILUTED |

# Concentrated Electrolytes

## Common Strategies: Cont.

- Storage of Concentrated Electrolytes Outside of Pharmacy is Limited to (as applicable)

| Concentrated Electrolyte | Clinical Justification for Concentrated Electrolyte | Location by Clinical Care Area | Quantity |
|---|---|---|---|
| Magnesium sulfate 4 mEq/mL or higher concentration | • Cardioplegia<br>• Eclampsia<br>• Torsades de pointes | • Crash Carts<br>• Cardiac / Liver OR<br>• Emergency Medical Services (EMS)<br>• Main OR<br>• Surgical Tower OR | Determined by Region |
| Potassium chloride 2 mEq / mL or higher concentration | • Cardioplegia | • Cardiac / Liver OR<br>• Main OR | Determined by Region |

# General Strategies For High Alert Medications

# General Strategies for High Alert Medications

- TALLman lettering
- 'LASA' on label, when applicable
- "High Alert" on storage label
- High Alert Medications must be stored in **Red Bins** using Standardized Medication Labels
- Medication which must be stored in **Red Bins with Lids**
  - Concentrated Electrolytes
  - Parenteral Skeletal Muscle Relaxants (Paralyzing agents)
- Patient care areas: Stored in ADC locked Lidded
- CPOE with clinical decision support, providing immediate warnings if unsafe orders are entered

# General Strategies for High Alert Medications

- Use of smart infusion pumps with dose checking software enabled
- Order sets
- Independent Double-Check (IDC)
  Procedure in which two healthcare professionals separately check (alone and apart from each other, then compare results) each component of prescribing, transcribing, dispensing and verifying the medication before administering to the patient
  - Dispensing
  - Verifying at time of administration

**Done without distractions**

# General Strategies for High Alert Medications

APP 1429-02: Look-Alike/Sound-Alike And High Alert Medications, January- Appendix D

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**APPENDIX D**

**Risk Reduction Strategies For High Alert Medications**

| *Drug or Class | High-Alert Feature | RISK REDUCTION STRATEGIES FOR HIGH ALERT MEDICATIONS | | | | |
|---|---|---|---|---|---|---|
| | | Storage | Ordering | Dispensing | Administration | Monitoring |
| **Adrenergic Agonists IV** (Norepinephrine) | • Narrow therapeutic index | • TALL man lettering<br>• 'LASA' on label, when applicable<br>• High alert medications within Pharmaceutical Care Services (PCS) and patient care areas are stored in red bins with standardized medication labels<br>• For medications that cannot physically fit into the red bins a process will be used to physically separate medications and clearly identify them as "High Alert"<br>• "High Alert" on storage label | • Standardized concentrations<br>• No verbal/telephonic orders allowed for initiation of therapy (APP 1429-03)<br>• CPOE with clinical decision support, providing immediate warnings if unsafe orders are entered | • Pre-mixed bags are used when possible<br>• Infusion marked if non-standard strength (e.g., 'Double Strength')<br>• Label infusion, "High Alert Medication" (Oracle #119474)<br>• Prepared by PCS IV admixture service under sterile conditions as specified by USP <797> | • MNGHA Parenteral Therapy Manual outlines monitoring required during administration<br>• Use of smart infusion pumps with dose checking software enabled<br>• Standard Concentration Drip Charts on Intranet One Stop Resource<br>• Designated as 'High Alert Medication' on MAR<br>• Use of a needleless system to administer medications and fluids to prevent a potential risk of exposure from contaminated sharps | • APP 1435-03 Extravasation Management<br>• Monitoring by clinical pharmacist |
| | | | | | | |
| **Anesthetic agents (IV)** (e.g., Propofol) | • Risk of respiratory arrest | • Restricted to PCS, critical care areas, Emergency Department and Operating Room<br>• High alert medications within PCS and patient care areas are stored in red bins with standardized medication labels<br>• For medications that cannot physically fit into the red bins a process will be used to physically separate medications and clearly identify them as "High Alert" | • Physician credentialing | • Label infusion, "High Alert Medication" (Oracle #119474) | • Standard Concentration Drip Charts on Intranet One Stop Resource<br>• Designated as "High Alert Medication" on MAR<br>• Use of smart infusion pumps with dose checking software enabled<br>• Use of a needleless system to administer medications and fluids to prevent a potential risk of exposure from contaminated sharps | |

# General Strategies for High Alert Medications

APP 1429-02: Look-Alike/Sound-Alike And High Alert Medications, April 2017 - Appendix C

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**APPENDIX C**

**HIGH ALERT MEDICATIONS REQUIRING AN INDEPENDENT DOUBLE-CHECK**

| # | CATEGORIES/CLASSES OF MEDICATION<br>MNG-HA Drug Formulary (April 2017) |
|---|---|
| 1 | **Adrenergic Agonists IV** |
| | Norepinephrine |
| 2 | **Antithrombotic /Anticoagulants/Thrombolytics** |
| | Abciximab (IV) |
| | Alteplase (IV) |
| | Apixaban (Oral) |
| | Argatroban (IV) |
| | Dabigatran (Oral) |
| | *Enoxaparin (IV only) |
| | *Fondaparinux (IV only) |
| | *Heparin, unfractionated (IV only) |
| | Streptokinase (IV) |
| | Tirofiban (IV) |
| | Warfarin (Oral) |
| 3 | **Concentrated (Undiluted) Electrolytes (IV)** |
| | Magnesium Sulfate 4 mEq/mL or higher concentration |
| | Potassium Acetate 2 mEq/mL or higher concentration |
| | Potassium Chloride 2 mEq/mL or higher concentration |
| | Potassium Phosphate 3 mmol/mL or higher concentration |
| | Sodium Acetate 2 mEq/mL or higher concentration |
| | Sodium Chloride greater than 0.9% concentration |
| | Sodium Phosphate 3 mmol/mL or higher concentration |
| 4 | **General Groups** |
| | All Chemotherapeutic agents (IV & Oral) |
| | All Epidural and Intrathecal agents |
| | All Investigational (research/study) drugs |
| | All Opiates and Narcotics (All routes) |
| | Anesthetic agents (IV) (e.g., Dexmedetomidine, Etomidate, Ketamine, Propofol) |
| 5 | **Miscellaneous Drugs** |
| | *Insulin (IV only) |
| | Parenteral Nutrition (TPN) |
| 6 | **Neuromuscular Blockers (IV)** |
| | Cisatracurium |
| | Pancuronium |
| | Rocuronium |
| | Succinylcholine |
| Independent Double-Check (IDC) is required for all High Alert Medications; CBAHI Standard **MM.36.7** | |
| ***Storage requirements** for medications labeled '**High Alert – IV Only**': Store in **red bins** as a higher level of safety measure for when they may be used intravenously | |
| List may change based upon changes made to the MNG-HA Drug Formulary by the Corporate Pharmacy and Therapeutics Committee | |

# Information available at One Stop Resource

Name

Beyond_Use_Date __BUD_Labels

Chemo_Std_Med_Lbls_07Sept2015

High_Alert_Meds_Std_Med_Lbls_09Dec2015

LASA_Meds_Std_Med_Lbls_07Sept2015

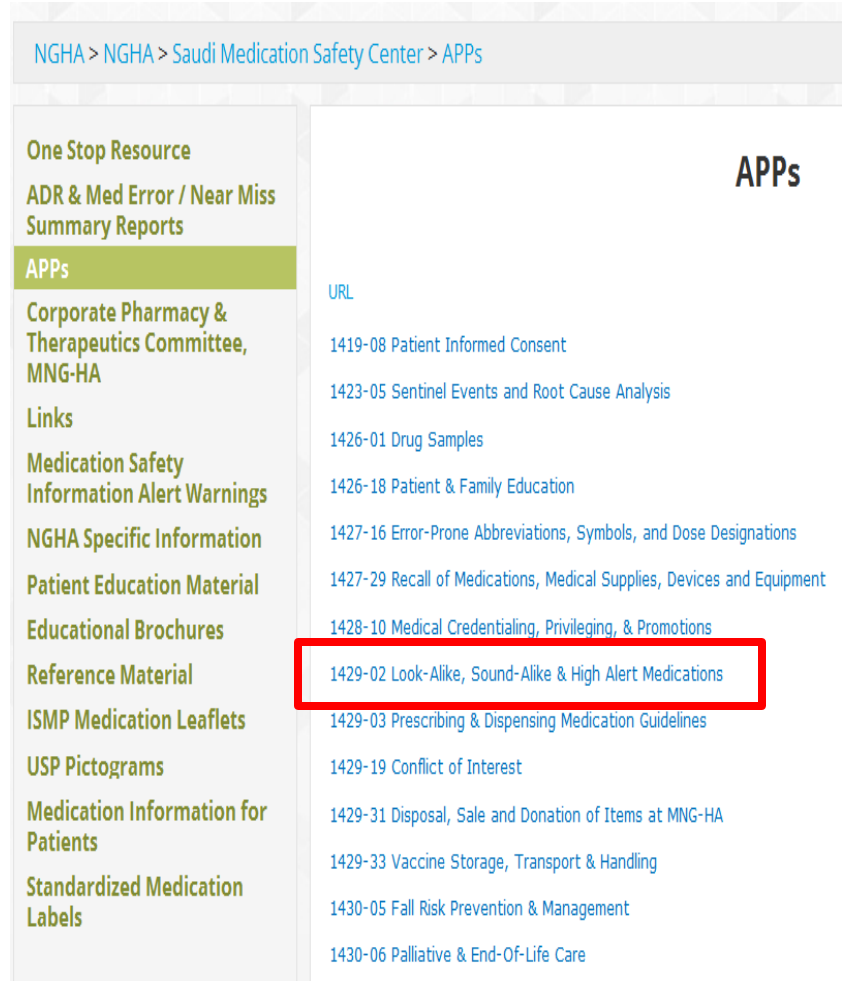
Med_Lbls_Std_Med_Lbls_07Dec2015

Narcotic_n_Controlled_Subst_Std_Med_Lbls_07Sept2015

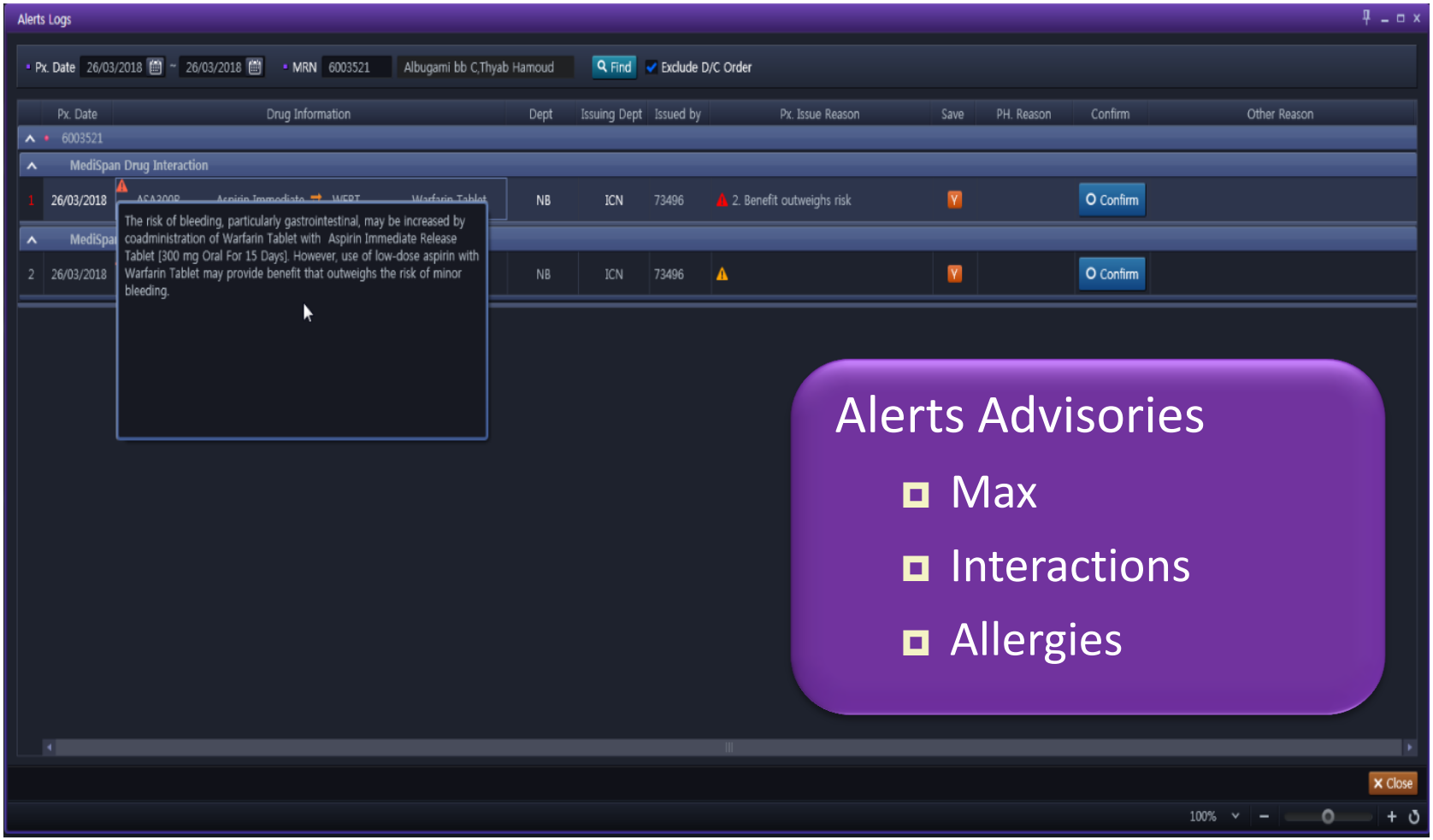
**32771**

Warfarin 2.5 mg tablet

**HAZARDOUS / HIGH ALERT**



# Alerts Advisories at HIS-CPR




Alerts Advisories

- Max
- Interactions
- Allergies

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STANDARDIZE

STANDARDIZE

STANDARDIZE

# Safe Patient Care Is Our Goal

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