BACHA KHAN MEDICAL COMPLEX MEDICAL TEACHING INSTITUTE, SWABI	
Policy on High Alert Medications	
POL/C/CEN/PHARM-002/v.1	
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Original Date: **June 2022**	Revision Date: **June 2025**

HIGH ALERT / HIGH RISK MEDICATIONS:

1. DEFINITION:

High-alert medications are those medications involved in a high percentage of errors and/or sentinel events, as well as medications that carry a higher risk for abuse or other adverse outcomes. Example of high-alert medications include controlled medications, medications with a narrow therapeutic range, chemotherapy, anticoagulants, psychotherapeutic medications, investigational medications, look-alike/sound-alike medications (LASA) and medications approved by P & TC.

Concentrated electrolytes include potassium chloride (≥1 mEq/mL concentration), potassium phosphate (≥3 mmol/mL concentration), sodium chloride (> 0.9% concentration), and magnesium sulfate (≥10% concentration).

Controlled drugs are subject to misuse and/ or addictive in nature whose manufacture, possession, or use is regulated by government. These are listed in Schedule Drugs: KHYBER PAKHTUNKHWA ACT NO. XXXI OF 2019 / relevant provisional drug rules - Manual of Drug Laws.

2. ROLE OF PHARMACY AND THERAPEUTICS COMMITTEE (P & TC):

The Pharmacy and Therapeutics Committee reviews the hospital's formulary and trend analysis of medication errors to determine a list of High-Risk/High Alert medications. Additional input is incorporated from such organizations as the Institute for Safe medications practices (ISMP) and other national databases (e.g. drug laws) reporting information on the use of medications. The primary objective is to provide the highest quality pharmaceutical care with the minimum number of medication errors and the lowest potential for patient risk.

3. DETERMINATION OF QUALIFICATIONS FOR HIGH-RISK DRUGS:

3.1. The risk potential for a drug is identified after reviewing the literature.

3.2. All drugs including controlled medications, medications with a narrow therapeutic range, chemotherapy, anticoagulants, psychotherapeutic medications, investigational medications etc.

3.3. Look alike and/or sound alike potential medication will automatically be considered as High Alert / High Risk medicine.

3.4. Hospital specific data will be reviewed for determination of high alert drugs like ADR, medication errors, near misses, incident and complaints, which may cause harm more frequently, and the harm they produce is likely to be more serious when they are given in error will be selected. In addition, ISMP list of High Alert drugs will also be reviewed annually.

3.5. All drugs added to the high-risk drug policy will have consensus of the P&TC.

4. PROCEDURE:

4.1. Any high-risk drug addressed in this policy may be administered in any patient care area where the administration criteria may be met.

4.2. Any practitioner administering a high-risk drug will be familiar with dosing, expected outcomes, potential adverse effects and monitoring requirements. If prolonged monitoring is required, competent staff must be present to provide it.

4.3. All concentrated electrolyte injections intended for dilution before use will not be stocked in patient care areas (except MCCB, CCU and ICU) and may only be administered after proper dilution with administration sheet.

4.4. Additions and deletions of drugs may be made ONLY at the discretion of the Pharmacy and Therapeutics committee.

4.5. Absence of a drug from this list shall not imply lack of risk of using it in a patient care area.

4.6. High alert medication will only be dispensed on authorized prescription (except medical emergency)

4.7. Drugs used in the in-patient or out-patient surgical suites during surgery are not covered in this policy.

5. CIRCUMSTANCES INCREASING RISK ERRORS IN HIGH-RISK MEDICATIONS:

5.1. Poorly handwritten medication orders.

5.2. Verbal directions/orders.

5.3. Similar product packaging.

5.4. Similar medication name.

5.5. Improper packaging leading to improper route of administration.

5.6. Oral liquid in IV syringe.

5.7. Storage of products with similar names in the same location.

5.8. Similar abbreviations.

5.9. Improper storage of concentrated electrolytes.

6. STRATEGIES TO AVOID ERRORS INVOLVING HIGH RISK MEDICATIONS:

6.1. Formulary Selection & Procurement:

6.1.1. Review and Minimize look-alike, sound-alike formulary combinations at the level of drug addition in formulary.

6.1.2. References (ISMP medication list, drug literature & drug law).

6.1.3. Review at the level of Procurement.

6.1.4. Annually reviewing the LASA medications used in BKMC Swabi

6.2. PRESCRIBING:

6.2.1. Special Instructions.

6.2.2. Identify patient correctly before entering order / prescribing.

6.2.3. Prescribe accurately (drug, dose, route, rate & duration).

6.2.4. Follow elements of complete order.

6.2.5. Prescribe as per approved guidelines of the hospital.

6.2.6. No verbal order allowed (Except emergency/ code blue, or during procedure)

6.3 PRESCRIBER ORDER ENTRY:

6.3.1 Eliminates illegible handwriting.

6.3.2 Reduces opportunities for misinterpretation of verbal orders.

6.3.3 LASA drugs could still be confused by physicians (to avoid Tallman applied).

6.3.4 Tallman lettering (Generic name).

6.3.5 Prescribing to emphasize differences in medication names (example: hydrOXYzine vs. hydrALAzine)

6.4 STORAGE STRATEGIES:

6.4.1 STACKING:

6.4.1.1 Store HAM, LASA and controlled drugs in designated area with caution stickers for visual alerts.

6.4.1.2 Colored stacking plan with uniform label.

6.4.1.3 Identify LASA & High Alert drugs with separate stacking & Identification.

6.4.1.4 Tallman lettering - Labelling to emphasize differences in medication names (example: metoPROlol vs. METOclopramide)

6.4.2 PREPARATION & DISPENSING:

6.4.2.1 LASA & HAM identification and Tallman lettering on the label.

6.4.2.2 Use double check technique.

6.5 ADMINISTRATION:

6.5.1 Emphasize the need to carefully read the prescription/label each time a medication is accessed and again prior to administration, rather than relying on visual recognition, location, or other less specific cues.

6.5.2 HAM & LASA drugs will be double checked before administration. (The process shall also include verification of appropriate indication, appropriate lab values, calculations and setting the infusion rate on infusion pump where required).

6.5.3 Double check for HAM and LASA drugs by two nurses.

6.6 MONITORING / RISK REDUCTION STEPS:

6.6.1 Effectiveness review of process once in a year (with ward stock audit.)

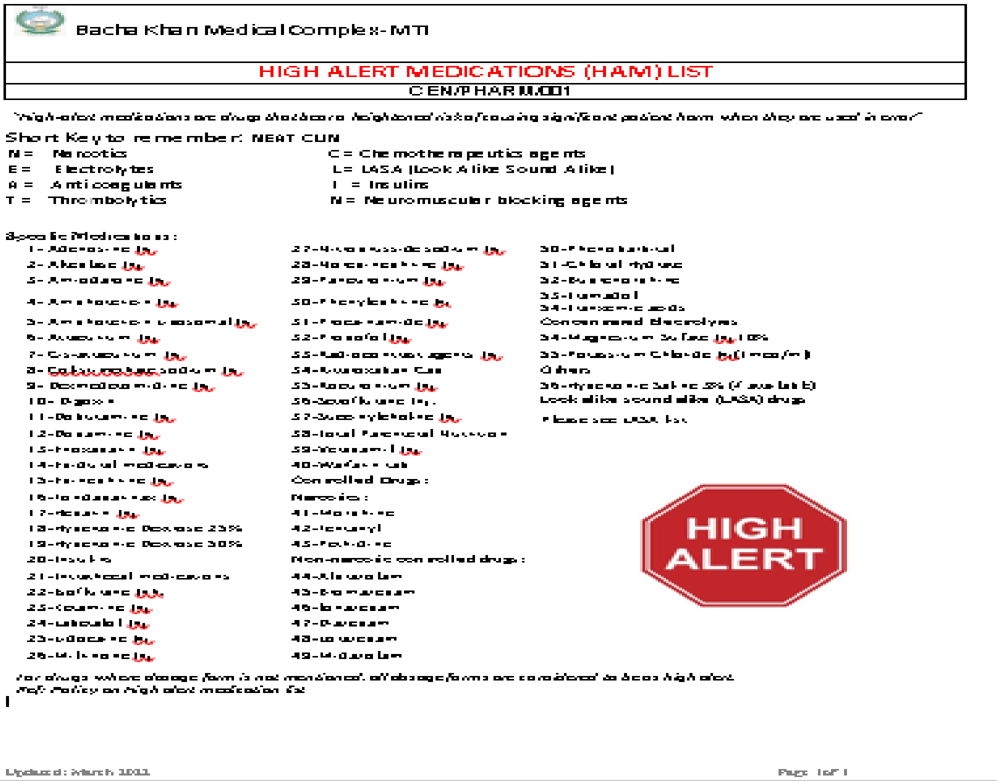
6.6.2 Review Incident reported for LASA, HAM and conc. Electrolytes.

6.6.3 Discuss potential drugs in P & TC

6.6.4 Ensuring that all steps in the medication management process are carried out by qualified and competent individuals.

6.6.5 Incorporating education on potential LASA medications into the educational curricula, orientation, and continuing professional development for health-care professionals.

Example of High alert medicines:


Bacha Khan Medical Complex-MTI

HIGH ALERT MEDICATIONS (HAM) LIST

CEN/PHARM/001

[illegible]

Short Key to remember: NEAT CLIN

N = Narcotics
E = Electrolytes
A = Anticoagulants
T = Thrombolytics
C = Chemotherapeutics agents
L= LASA (Look Alike Sound Alike)
I = Insulins
N = Neuromuscular blocking agents

Specific Medications:

[illegible]

Controlled Drugs:

Narcotics:

[illegible]

Non-narcotic controlled drugs:

[illegible]

Concentrated Electrolytes

[illegible]

Others

[illegible]

Look alike sound alike (LASA) drugs

Please see LASA list

[illegible]

*This is a list of confused drug names which includes look alike and sound alike name pairs

GENERIC LASA

Sound Alike

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LASA

BRANDS LASA

Sound Alike

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7. ADMINISTRATION GUIDELINES AND QUALIFICATION CRITERIA:

7.1 Administration of the high risk / alert medications requires independent double checks by two licensed individuals prior to administration. **This includes:**

7.1.1 A double check of the drug against the order.

7.1.2 A double check of the dose prepared.

7.1.3 A double check of any pump setting if a pump is used to administer the drug.

7.1.4 Documentation of double checks by both licensed individuals in the patient's record. **This includes the following drugs:**

7.1.4.1 Insulin - both continuous infusions and subcutaneous doses.

7.1.4.2 Heparin infusion, Warfarin, LMWH.

7.1.4.3 Any cancer chemotherapeutic agent.

7.1.4.4 Any drug used in epidural drips.

7.1.4.5 All intrathecal preparations.

7.1.4.6 Sodium Nitroprusside.

7.1.4.7 Potassium Chloride 1meq/ml.

7.1.4.8 **Magnesium Sulphate (10**%).

7.1.4.9 Digoxin.

7.1.4.10 Liposomal Prep (Liposomal Amphotericin).

7.1.4.11 Narcotics - infusions, including epidural narcotic infusions.

7.1.4.12 Sedation agents Midazolam or Propofol, Atracurium, Pancuronium or Rocuronium.

7.1.4.13 Radiocontrast agents IV.

7.1.4.14 Dextrose hypertonic equal to or greater than 20% concentration.

7.1.4.15 Sodium Chloride (greater than 0.9% concentration).

7.1.4.16 Controlled drugs.

7.1.4.17 Look Alike- Sound Alike Meds (LASA)

7.1.5 Administration of the following drugs requires the presence of an attending physician or qualified nurse, continuous bedside cardiac monitoring and immediate availability of resuscitative equipment.

7.1.5.1 Amiodarone injection.

7.1.5.2 Alpha-adrenergic blockers (Epinephrine)

7.1.6 The following drugs may only be administered in intubated, mechanically ventilated patients.

7.1.6.1 Propofol.

7.1.6.2 Neuromuscular blocking agents – no more than the immediate dose is to be drawn up.

7.1.7 The following drugs require personnel or patient protection.

7.1.7.1 All Hazardous drugs

8. CONTROLLED MEDICATIONS:

Controlled drugs are subject to misuse and/ or addictive in nature whose manufacture, possession, or use is regulated by government. These are listed in Schedule Drugs: (KHYBER PAKHTUNKHWA ACT NO. XXXI OF 2019) - Manual of Drug Laws. **Controlled drugs include:**

8.1 Narcotic medications:

This policy includes strong opioid controlled drugs (strong narcotics; i.e. Morphine, Fentanyl and Pethidine).

8.2 Non-narcotic medications:

This policy will cover non-narcotic controlled drugs and other opioids i.e. tramadol and buprenorphine as listed below:

8.2.1 Alprazolam.

8.2.2 Bromazepam.

8.2.3 Clonazepam.

8.2.4 Diazepam.

8.2.5 Lorazepam.

8.2.6 Midazolam.

8.2.7 Phenobarbital.

8.2.8 Chloral Hydrate.

8.2.9 Buprenorphine.

8.2.10 Tramadol

8.3 Prescribing Procedure:

8.3.1 Authorize physician will be able to prescribe narcotics for outpatients / In Patients.

8.3.2 Prescriptions of such medications must be complete as per the requirements of a complete order policy, including signature, ID / stamp of the prescriber.

8.3.3 Physician is not allowed to self-prescribe.

8.4 Storage:

8.4.1 **In pharmacy:**

These drugs must be stored segregated from other medicines, in a secured area within Pharmacy and dispensing under pharmacist supervision.

8.4.2 **In nursing units:**

8.4.2.1 All such patient medications must be kept in medication room/trolley under lock and key.

8.4.2.2 In Nursing units these are placed in designated cabinets under lock and key.

8.4.2.3 The keys must be with the authorized nurse at all times/shifts and are opened only when dose administration / inventory check is required.

8.5 Dispensing:

8.5.1 These medications must only be dispensed against a proper prescription, bearing all the elements, required for a valid and complete prescription. Appropriateness review will be done as for any other medication order and clarified from prescriber in case of any queries or confusion.

8.5.2 If the patient requests a lesser quantity than prescribed this must be documented on prescription, signed and dated by the pharmacist.

8.6 Administration:

Please see above Administration guidelines and qualification criteria.

8.7 Concentrated Electrolytes:

8.7.1 Concentrated electrolytes including Potassium chloride (1meq/ml) and magnesium sulfate injection (≥10%) not to be stored on any wards except intensive care units and Emergency Medication crash cart boxes/ trolleys.

8.7.2 Concentrated electrolytes e.g. IV potassium chloride will be Prescribed in appropriate dilution for the correctly identified patient according to the due time of medication use. (IV magnesium sulfate is available in emergency crash cart with padlock seal).

8.7.3 Following concentrated electrolytes are available with their location.

Sr. No.	Electrolyte	Location of concentrated electrolytes	Remarks
1	Potassium Chloride Inj	-Pharmacy - ICU, CCU	- ICU: Under lock and key for emergency situations only.
2	Magnesium Sulfate Inj	-Pharmacy -ICU, CCU - Medication crash cart trolleys	- ICU: Under lock and key for emergency situations only.

8.7.4 Potassium chloride ordering, stocking and administration:

Potassium chloride concentrated injection and other strong potassium solutions can be fatal if administered inappropriately. Research into common medication errors has identified potassium chloride concentrated injection as a potential high risk for patient safety.

Intravenous potassium chloride and other potassium salts are prescribed, administered and handled in a manner that is safe and protects patients from the risks of inadvertent administration of concentrated potassium solutions.

To reduce the potential for medication error by the following measures:

8.7.4.1 Concentrated Potassium chloride injections (1meq /ml) are not to be kept as ward stock in general wards except Intensive Care Unit (ICU).

8.7.4.2 Current potassium prescribing and administration guidelines to be accessible in all wards and departments where potassium administration may be required.

8.7.4.3 Instituting a double-check policy for administration of IV potassium chloride— two practitioners check the correct product, dose, dilution, labelling, route and rate before administration, as per the safe on-site preparation protocol.

8.7.4.4 Prescription with directions such as “KCl 20 mEq IV now” or “give KCl 10 mEq IV bolus” should be considered incomplete and unacceptable. Orders without instructions for dilution and infusion rate should not be accepted. The word “bolus” should never be used for IV potassium chloride solution orders.

8.7.4.5 Extra Potassium Chloride Must Never Be Added to Premixed Solutions as this may lead to confusion regarding the final concentration

8.7.5 Prescribing of Intravenous Potassium Chloride:

The management of mild to moderate hypokalemia potassium supplements are to be given orally whenever possible (see Table below).

Guidelines for Potassium Replacement	
Critical deficit **Serum K+ <2.0 mEq/L** OR **Serum K+ 2.0-2.5 mEq/L** and patient has severe acidosis pH<7.2 (eg diabetic ketoacidosis) or severe cardiac disease or ECG changes of hypokalemia	**Critical emergency – Consult ICU URGENTLY for management advice**
Severe deficit **Serum K+ 2.0-2.5 mEq/L** (without critical conditions as described above and without ECG changes)	IV OR oral replacement as follows **Oral** 40-120 mEq K+ / day OR **IV** 40mEq K+/ litre IV premixed bag at maximum rate of 5-10mEq per hour (up to 125 – 250 mL per hour) - Check potassium level every 6 hours - Repeat until serum potassium >3.2mEq/L. If this fails to raise potassium levels over 24 hours, or potassium falls into critical range, contact ICU for advice.
Moderate deficit **Serum K+ 2.5-3.0 mEq/L**	Oral (preferred) OR IV replacement. **Oral** 40-120 mEq K+ / day OR **IV** 30mEq K+/ litre IV premixed bag at maximum rate of 5-10mEq per hour (up to 166 – 325 mL/hour) - Check potassium level – every 24 hours - Repeat until serum potassium >3.2mEq/L. - If unsuccessful, use severe deficit guidelines (above)
Mild deficit **Serum K+ 3.0-3.5 mEq/L**	**Oral** 40-120 mEq K+ / day. Normal potassium requirement is approximately 1mEq/kg/day

Note: Orders for intravenous potassium that do not meet these guidelines must be authorized by the treating specialist or ICU specialist.

8.7.6 Potassium Chloride 7.46% (1mEq K+/1ml) Injection

ICU ONLY is permitted to stock Potassium Chloride 7.46% (1meq/ml) injection.

8.7.6.1 Storage of Potassium Chloride 7.46% (1mEq K+/1ml) Injection:

Potassium Chloride 7.46% concentrated injection must be stored as follows:

Locked in a receptacle with a label stating:

"**Potassium Injection: Concentrated Solution. Dilute before Use**"

Physically separated from Water for Injection and 0.9% sodium chloride ampoules

8.7.7 Administration of Potassium Solutions:

All IV maintenance infusions with KCl at a concentration greater than 40 mEq/L **must** be administered via an infusion pump.

8.7.7.1 Peripheral administration:

8.7.7.1.1 In adults, the **maximum concentration via peripheral line is 10 mEq/100 ml.**

8.7.7.1.2 In adults, the maximum amount of Potassium Chloride available in each IV minibag is 10 mEq. In neonates or pediatrics only two hours' worth of fluid volume will be added to the burette at any time. Only one-hour worth of fluid should be in a syringe pump.

8.7.7.1.3 The **maximum infusion rate via peripheral line is 10 mEq per hour**. In neonates and pediatrics, the maximum infusion rate via peripheral line is 0.5 - 1 meq/kg/hour.

8.7.7.2 **Central administration:**

8.7.7.2.1 In adults, the preferred concentration via central line is **20 mEq/100 ml**. The maximum concentration for fluid restricted patients is **20 mEq/50 ml**.

8.7.7.2.2 In adults, the maximum amount of Potassium Chloride available in each IV minibag is 20 mEq. In neonates or pediatrics only two hours' worth of fluid volume will be added to the burette at any time. Only one-hour worth of fluid should be in a syringe pump.

8.7.7.2.3 The maximum infusion rate via central line is 20 mEq/hr. In neonates and pediatrics, the maximum infusion rate via central line is 1 meq/kg/hour.

In adults, potassium levels must be checked after a total of 60 mEq has been administered. Potassium levels must be checked no sooner than 60 minutes after a given IV dose. In neonates and pediatrics, potassium levels must be checked after a total of 1 meq/kg has been administered.

8.7.7.3 **Oral Potassium Administration:**

8.7.7.3.1 Oral potassium chloride replacement should be considered in asymptomatic patients with serum potassium levels < 3.8 mEq/L.

8.7.7.3.2 Adult doses from 40-100 mEq/day may be required for potassium repletion given in 2 - 4 divided doses per day. In the neonate and pediatric patient, 1-3 meq/kg/day may be required for potassium repletion given in 2 - 4 divided doses per day.

8.7.7.3.3 In adults, start with 20-40 mEq/day and titrate to desired level. A 40 mEq dose may be given every 2 hours for a maximum dose of 120 mEq within a 6 hour period. In the

neonate, start with 0.5 - 1 meq/kg/day and titrate to desired level with the maximum dose of 3 meq/kg within a 6 h our period.

8.7.7.3.4 When oral potassium therapy is combined with parenteral supplementation for adults, a maximum total dose (IV + PO) is 120 mEq within a 6-hour period. For the neonate, a maximum total dose (IV + PO) is 3 meq/kg within a 6-hour period.

8.7.7.3.5 Do not use sustained release potassium products, when an immediate response is desired. The potassium chloride powder, dissolved in water, or potassium chloride solution, should be used for a quicker response.

Potassium preparations available at Market (BKMC-MTI, Swabi Pharmacy if available)

Oral Potassium Preparations	**Amount of Potassium contained**
Potassium Chloride Tablets 500mg	6.71 mEq Potassium per tablet
K-CL syrup	13.42 Eq potassium / 5ml
Premix solutions (if Aseptic area available) ***Containing 10mEq and 20mEq potassium*** 100 ml of sodium chloride 0.9% Or Ordered customized preparations to Pharmacy as per need basis	
i. Potassium Injections	**Amount of Potassium contained**
Potassium Chloride 7.4% (20ml)	20 mEq potassium per 20mL ampoule **NOT RECOMMENDED – USE PREMIXED FLUID WHENEVER POSSIBLE**
Potassium Chloride 7.4% (25ml)	25 mEq potassium per 25mL ampoule **NOT RECOMMENDED – USE PREMIXED FLUID WHENEVER POSSIBLE**