

Application : Inpatient

Affected Role: Physician, RN, Pharmacist

Revision Date: 4/21/22

Epic Version: May 2021

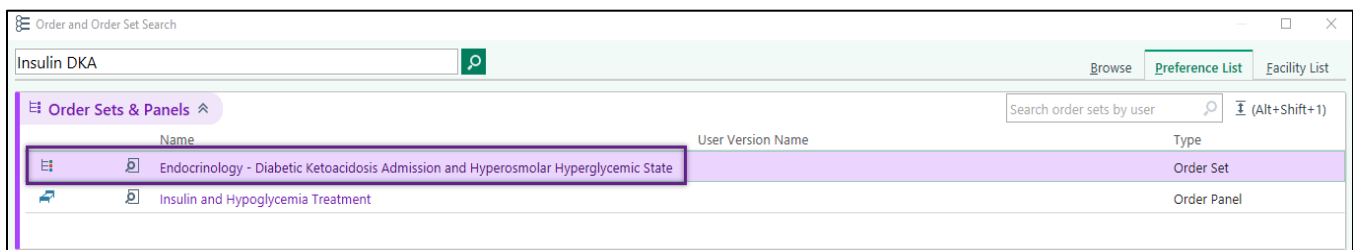
The Diabetic Ketoacidosis - Two Bag Method was developed to improve on conventional DKA management and will be the Trinity Health standard. The “two bags” of the two-bag method are:

1. Normal or half-normal saline with or without potassium
2. D10 with half-normal saline

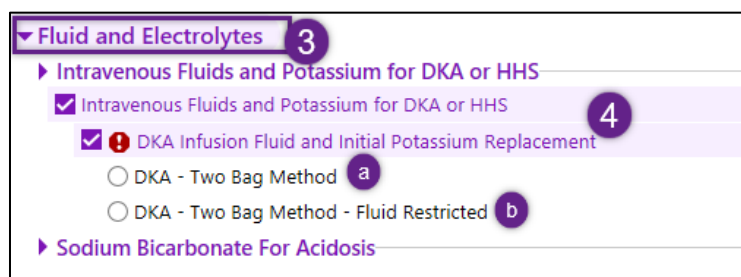
These are infused at a total combined rate of 250 mL per hour, and they will be available as pre-made solutions stored on the nursing units.

Try It Out - Ordering Two-Bag Method for DKA

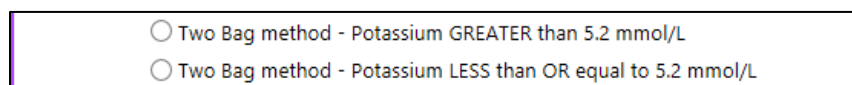
1. Search for **Insulin DKA**
2. Select **Endocrinology - Diabetic Ketoacidosis Admission and Hyperosmolar Hyperglycemic State**.



3. With the order set open, scroll down to **Fluid and Electrolytes** (near the bottom) where you will encounter cascading selections indicated by the ▶.
4. Under **Intravenous Fluids and Potassium for DKA or HHS, DKA Infusion Fluid and Initial Potassium Replacement** is pre-selected. This allows you the choice of one of the two cascading options:
 - a. Either the standard **DKA – Two Bag Method** option
 - b. Or the **DKA – Two Bag Method – Fluid Restricted** option



5. Now select fluids based on the patient’s current potassium level.



- a. Orders for **Potassium greater than 5.2 mmol/L** will contain only fluid orders.

Intravenous Fluids and Potassium for DKA or HHS

DKA Infusion Fluid and Initial Potassium Replacement

DKA - Two Bag Method

Two Bag method - Potassium GREATER than 5.2 mmol/L

Two Bag method - Corrected sodium GREATER than OR equal to 135 mEq/L

Two Bag method - Corrected sodium LESS than 135 mEq/L

- b. Orders for **Potassium less than or equal to 5.2 mmol/L** will contain fluid orders with potassium in the non-dextrose bag and orders for the initial potassium replacement.

6. The Two Bag methods require that the fluid level be based on the **Corrected Sodium** level. Two infusion orders with administration instructions for nursing are opened for your review.

Two Bag method - Potassium LESS than OR equal to 5.2 mmol/L

Two Bag method - Corrected sodium GREATER than OR equal to 135 mEq/L

Two Bag method - Corrected sodium LESS than 135 mEq/L

Infusion Fluids

sodium chloride 0.9 % with KCl 20 mEq/L infusion
0-250 mL/hr, intravenous, Continuous, Starting today at 1330
BAG ONE
For glucose level GREATER than 250 mg/dL: Infuse BAG ONE (potassium chloride 20 mEq in sodium chloride 0.9%) at 250 mL/hr. Do NOT infuse BAG TWO

For glucose level between 150 - 250 mg/dL: Infuse BAG ONE (potassium chloride 20 mEq in sodium chloride 0.9%) at 125 mL/hr AND BAG TWO (dextrose 10% - sodium chloride 0.45%) at 125 mL/hr

For glucose level LESS than 150 mg/dL: Infuse BAG TWO (dextrose 10% - sodium chloride 0.45%) at 250 mL/hr. Do NOT infuse BAG ONE

And

dextrose 10 % and sodium chloride 0.45 % infusion
0-250 mL/hr, intravenous, Continuous, Starting today at 1330
BAG TWO
For glucose level GREATER than 250 mg/dL: Infuse BAG ONE (potassium chloride 20 mEq in sodium chloride 0.9%) at 250 mL/hr. Do NOT infuse BAG TWO

For glucose level between 150 - 250 mg/dL: Infuse BAG ONE (potassium chloride 20 mEq in sodium chloride 0.9%) at 125 mL/hr AND BAG TWO (dextrose 10% - sodium chloride 0.45%) at 125 mL/hr

For glucose level LESS than 150 mg/dL: Infuse BAG TWO (dextrose 10% - sodium chloride 0.45%) at 250 mL/hr. Do NOT infuse BAG ONE

Potassium Replacement

DKA potassium replacement	
Blood potassium level mmol/L	Potassium chloride administration
GREATER than 5.2 mmol/L	None
GREATER than OR equal to 4 mmol/L or LESS than OR equal to 5.2 mmol/L	20 mEq Potassium Chloride
GREATER than OR equal to 3 mmol/L or LESS than OR equal to 3.9 mmol/L	40 mEq Potassium Chloride
LESS than OR equal to 2.9 mmol/L	60 mEq Potassium Chloride

Potassium Level 4 - 5.2 mmol/L - 20 mEq

Potassium Level 3 - 3.9 mmol/L - 40 mEq

Potassium Level LESS THAN or equal to 2.9 mmol/L - 60 mEq

DKA - Two Bag Method - Fluid Restricted

7. There is a link provided to assist in the calculation of the **Corrected Sodium** level

Intravenous Fluids and Potassium for DKA or HHS

Intravenous Fluids and Potassium for DKA or HHS

Fluid Replacement in Diabetic Ketoacidosis (DKA) or Hyperosmolar Hyperglycemic State (HHS) should correct estimated deficits within the first 24 hours

Corrected Sodium :

$$\text{Corrected Sodium [mEq/L]} = \text{Measured Sodium [mEq/L]} + 0.024 * (\text{Glucose [mg/dL]} - 100)$$
 - Sodium Correction in Hyperglycemia

Initial Fluid Replacement - sodium chloride 0.9 % bolus (\$\$)
20 mL/kg, intravenous, Administer over 2 Hours, Once

DKA Infusion Fluid and Initial Potassium Replacement

Fluid Replacement in Diabetic Ketoacidosis (DKA) or Hyperosmolar Hyperglycemic State (HHS) should correct estimated deficits within the first 24 hours

DKA - Two Bag Method

8. Scroll down and **Medications** is the next section of the Order Set.
 - a. Notice that **insulin is administered based on patient weight** and is not titrated unless the special circumstances shown are fulfilled.
 - b. Also, all Hypoglycemia Treatments are prechecked for patient safety.

Medications

Intravenous Insulin Therapy - DKA

Insulin Infusion - DKA

insulin regular (Humulin R) 100 Units in sodium chloride 0.9 % 100 mL (1 Units/mL) infusion (\$)
 0-20 Units/hr (0-20 mL/hr), intravenous, Continuous, Starting today at 1400
 -If serum potassium drops below 3.3mEq/L, the insulin infusion will be paused and then restarted once supplemental IV potassium is promptly initiated

1. Initial dose: Start insulin infusion at 0.1 units/kg/hour = Patient actual weight not available.

2. OVER THE FIRST TWO HOURS OF INSULIN INFUSION: If blood glucose (BG) INCREASES or does not DECREASE by at least 100 mg/dL, increase the insulin infusion to 0.15 units/kg/hour = Patient actual weight not available.

3. AT ANY TIME DURING INSULIN INFUSION: If blood glucose level decreases by more than 100 mg/dL per hour for 2 consecutive hourly checks, reduce insulin rate by 0.05 units/kg/hour to a minimum of 0.05 units/kg/hour = Patient actual weight not available.

- If BG drops below 100 mg/dL, HOLD insulin infusion and check BG will every 15 minutes while the dextrose infusion is adjusted and/or D50 given for BG <70mg/dL. Insulin will be restarted at 0.05 units/kg/hour once BG rises back to 100 mg/dL or higher.
 - Notify provider if blood glucose is LESS THAN 200 mg/dL and anion gap is LESS THAN OR EQUAL to 12 (RESOLUTION OF DKA)

Try It Out – DKA Infusion and Initial Potassium Replacement Orders – DKA Two Bag Method

1. **INITIAL one-time Potassium Replacement** orders are built into the fluid selection during ordering of the two-bag method.
2. If subsequent potassium replacement is required while in ED based on repeat lab levels, the potassium DKA panel is available to order for patients with an active DKA insulin infusion order:

Order Sets & Panels

Name

DKA Potassium Replacement - WILL NOT open unless insulin infusion ordered from DKA orderset

DKA Potassium Replacement - WILL NOT open unless insulin infusion ordered from DKA orderset Accept

DKA Potassium Replacement

DKA potassium replacement	
Blood potassium level mmol/L	Potassium chloride administration
GREATER than 5.2 mmol/L	None
GREATER than OR equal to 4 mmol/L or LESS than OR equal to 5.2 mmol/L	20 mEq Potassium Chloride
GREATER than OR equal to 3 mmol/L or LESS than OR equal to 3.9 mmol/L	40 mEq Potassium Chloride
LESS than OR equal to 2.9 mmol/L	60 mEq Potassium Chloride

Potassium Level 4 - 5.2 mmol/L - 20 mEq
 Potassium Level 3 - 3.9 mmol/L - 40 mEq
 Potassium Level LESS THAN or equal to 2.9 mmol/L - 60 mEq

Next Required Accept

3. The Potassium dose is based on potassium level, IV access (peripheral or central line), and ability to tolerate PO.

Potassium Level 4 - 5.2 mmol/L - 20 mEq
 Potassium Level 3 - 3.9 mmol/L - 40 mEq
 Potassium Replacement Oral/Feeding Tube and IV
 Potassium Replacement - IV only
 Potassium Level LESS THAN or equal to 2.9 mmol/L - 60 mEq