Hospital Guidelines:
Inpatient Glycemic Management Guidelines

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Approved by:
Inpatient Glycemic Control Team

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Guideline Owner: Inpatient Glycemic Control Team
Information Resource: Diabetes Clinical Nurse Specialist

Selected Content:
- Blood Glucose Monitoring
- Oral and Injectable Non-Insulin Anti-hyperglycemic Agents
- Insulin Therapy:
  - Intravenous Insulin Protocols and Order Sets
  - Scheduled Subcutaneous Insulin
  - Subcutaneous Insulin Order Sets
  - Glucocorticoid Therapy
  - Insulin Pump
- Hypoglycemia
- Medical Nutrition Therapy
  - Enteral Nutrition
  - TPN
- Diabetes Self-Management Education (DSME)
- Discharge Planning

Scope

Target Population

All adults within hospital with hyperglycemia, the diagnosis of diabetes and pre-diabetes.

Disease/Condition(s)

- Type 1 diabetes
- Type 2 diabetes
- Gestational diabetes
- Pre-diabetes
- Hyperglycemia

Intended Users

- Physicians
- Physician Assistants
- Pharmacists
- Advanced Practice Nurses
- Nurses
- Dieticians
- Allied Health Personnel

Methodology

Method Used to Select the Evidence

Review of Diabetes Clinical Practice Guidelines from the American Diabetes Association, [1] American Association of Clinical Endocrinologists, [2] and American College of Physicians. [3]

- Rating system for strength of the recommendations by these guidelines from the American Diabetes Association and American Association of Clinical Endocrinologists.

Level of Evidence*	Description
A Strong	Clear or supportive evidence from adequately powered well-conducted, generalizable, randomized controlled trials Compelling nonexperimental evidence
B Intermediate	Supportive evidence from well-conducted cohort studies or case-control study
C Weak	Supportive evidence from poorly controlled or uncontrolled studies Conflicting evidence with the weight of evidence supporting the recommendation
E Not Evidence Based	Expert consensus or clinical experience

***Level of Evidence is indicated at the end of a sentence or paragraph with the applicable letter within parentheses.

Method of Guideline Validation

The Inpatient Glycemic Control Team reviewed recommendations and approved.

Introduction

In the Unites States, 8.3% of the population has been diagnosed with diabetes. Of adults aged 20 years or older, 35% have prediabetes (2011).[4] Patients with diabetes are more likely to be hospitalized and have longer length of stays by 1 to 3 days than those without diabetes.[5] A 2008 survey estimated that 22% of all inpatient days were incurred by patients with diabetes.[6] In the last 6 months of 2010, 24% of inpatients were diagnosed with diabetes or hyperglycemia at _____ Hospital and had on average 1.9 days longer length of stay than patients without diabetes or hyperglycemia.

Hyperglycemia in hospitalized patients has been associated with adverse outcomes in a wide range of conditions such as cardiac and non-cardiac surgery, acute MI, pneumonia, subarachnoid hemorrhage, blunt injury, and transplant.[6] Mortality risk is actually greater in hyperglycemic patients without a history of diabetes.[7] In addition, hyperglycemia induces vasoconstriction, inflammation, thrombosis, dehydration, fluid and electrolyte imbalances, and impaired gastric motility.[8] In patients with well controlled diabetes prior to hospitalization, poor glucose management undermines the patient's confidence in their hospital caregivers.

Initially, intensive treatment of hyperglycemia (80 to 110 mg/dL) was recommended for improved outcomes for hospitalized patients. Multiple studies since have shown improved benefit with higher glucose targets (140-180 mg/dL) with less hypoglycemia and mortality among hospitalized patients.[1,2,3]

Hospitalization is an opportunity to identify undiagnosed diabetes and intervene with patients who have poorly controlled diabetes. Hospital readmission within 30 days occurred with 31% of patients who had diabetes that was missed during hospitalization[9] as well as for patients with

diabetes.[10] Patients in the hospital should receive diabetes survival skill self-care management education and new glycemic control regimens if needed. At discharge, optimal transition consists of communication and follow-up visits with appropriate professionals, including primary care provider, endocrinologist, and diabetes educator along with appropriate prescriptions for diabetes care supplies and medications.

Recommendations

All patients with diabetes admitted to the hospital should have their diabetes identified in the medical record. (E)

BLOOD GLUCOSE MONITORING

All patients with diabetes should have orders for blood glucose monitoring, with results available for all members of the health care team. (E) Point-of-care (POC) blood glucose monitoring performed at the bedside is used to guide therapy. Any POC glucose result that does not correlate with the patient's status should be confirmed through conventional laboratory sampling of plasma glucose.[1]

Blood glucose monitoring should be ordered for any patient without the diagnosis of diabetes who receives therapy associated with high risk of hyperglycemia, including high-dose glucocorticoid therapy, enteral or parenteral nutrition, or other medications such as octreotide or immunosuppressive medications. (B) If hyperglycemia is documented and persistent, consider treating such patients to the same glycemic goals as patients with known diabetes. (E)

Glucose levels should be monitored minimally—

- before meals and bedtime for patients who are eating. The timing of glucose monitoring should be within 30 minutes before carbohydrate exposure.
- every 4 to 6 hours for patients who are NPO (4 hours if patient treated with rapid-acting insulin and 6 hours if patient treated with regular insulin)

More frequent blood glucose monitoring ranging from every 30 minutes to every 2 hours is required for patients on intravenous insulin infusion.[1]

For **pregnant** patients who are eating, glucose levels should be monitored minimally as follows—

- for women with gestational diabetes mellitus (GDM):
    - before breakfast (fasting) and 1 hour postmeals (timing to start from the first bite of food)
- for women with preexisting type 1 or type 2 diabetes :
    - before meals, 1 hour postmeals (timing to start from the first bite of food) and at bedtime.[1]

Blood Glucose Level Goals

For critically ill patients—140-180 mg/dL provided the target can be safely achieved. (A) Insulin therapy should be initiated starting at a threshold of no greater than 180 mg/dL.

For non-critically ill patients—<140 mg/dL if treated with insulin, with random blood glucose <180 mg/dL, provided these targets can be safely achieved. More stringent targets

may be appropriate in stable patients with previous tight glycemic control. Less stringent targets may be appropriate in those with severe co morbidities. (E)

For pregnant patients with GDM—fasting ≤95 mg/dL and 1 hour postmeals ≤140 mg/dL.

For pregnant patients with pre-existing type 1 or type 2 diabetes—premeal and bedtime 60-99 mg/dL; 1 hour postmeals ≤140 mg/dL, provided the target can be safely achieved.[1]

A1c levels should be obtained for all patients with diabetes or hyperglycemia if the results are not available within the previous 90 days. (E) Among patients without prior diagnosis of diabetes, the A1c should be used as a **screening** test for diagnosis based on the following:

A1c Result	Diagnosis
≤ 5.6	Normal
5.7 - 6.4	High risk/prediabetes; requires screening by glucose criteria
≥ 6.5	Diabetes; in the absence of unequivocal hyperglycemia, should be confirmed by repeating the test on a different day

For patients with known diabetes, an A1c level >7% generally represents suboptimal control. Diabetes self-management education and treatment in these patients should be improved prior to hospital discharge.[1,2]

ORAL AND INJECTABLE NONINSULIN ANTI-HYPERGLYCEMIC AGENTS

Oral anti-hyperglycemic agents and injectable noninsulin therapies (GLP1 analogs and pramlintide) have a limited role in acute care settings and should be discontinued while hospitalized in favor of insulin if reasonably expected to affect glucose levels and /or increase the risk for medication-related adverse events. (E) Oral agents are difficult to titrate with acute changes in patient status, such as NPO, or poor nutritional intake. Continuation of oral agents and injectable noninsulin therapies may be appropriate in selected stable patients who are expected to consume meals at regular intervals and they may be initiated or resumed in anticipation of discharge once the patient is clinically stable.

Avoid sulfonylurea agents in NPO patients, metformin in patients who are critically ill, have a creatinine greater than 1.4, or have received IV contrast, and avoid thiazolidinediones (glitazones) in patients with congestive heart failure.[2]

INSULIN THERAPY

For critically ill patients, Insulin therapy should be initiated for treatment of persistent hyperglycemia starting at a threshold of no greater than 180 mg/dL. (A)

Intravenous Insulin Protocols and Order Sets

Critically ill patients require an intravenous insulin protocol that has demonstrated efficacy and safety in achieving the desired goal glucose range without increasing risk for severe hypoglycemia. (E)

Indication for intravenous insulin infusion among nonpregnant adults with hyperglycemia include:

- DKA or HHS

- General preoperative, intraoperative, and postoperative care
- Organ transplantation
- MI or cardiogenic shock
- Stroke
- Exacerbated hyperglycemia during high-dose glucocorticoid therapy
- NPO status in type 2 diabetes
- Critically ill surgical patient requiring mechanical ventilation
- Dose-finding strategy, anticipatory to initiation or reinitiating of subcutaneous insuln therapy in type 1 or type 2 diabetes[8]

Insulin SUBACUTE 100-150 Infusion Protocol. For critically ill patients, cardiac surgery patients, and patients with significant hyperglycemia or unpredictable insulin requirements.

ADM Diabetic Ketoacidosis Order Set. For adult patients admitted with DKA. To be used only in critical care units.

ADM ICU Hyperglycemic, Hyperosmolar State Order Set. For patients admitted with HHS. To be used in only in critical care units.

Diabetes in Pregnancy-Secondary Order Set. For insulin dependent diabetes patients with scheduled cesarean birth or spontaneous labor or induction.

Scheduled Subcutaneous Insulin

Subcutaneous insulin with basal, nutritional, and correction components is the preferred method for achieving and maintaining glucose in noncritically ill patients. Use correction dose insulin to correct premeal hyperglycemia in addition to scheduled prandial and basal insulin. Prolonged therapy with exclusive use of correction (sliding scale) insulin is ineffective in the majority of patients and increases risk of both hyperglycemia and hypoglycemia.

Subcutaneous insulin orders should be specified as “basal,” “prandial,” or “correction.”

Basal insulin

Basal insulin is required to meet fasting needs. Options for basal insulin include glargine, detemir, or NPH. Basal insulin provides 100% of total daily insulin if the patient is NPO and about 50% of the total daily dose of insulin if the patient is eating. Patients with renal insufficiency may require less insulin than the calculated dose.

The following patients are predictably insulin deficient and will require basal insulin even when NPO:

- Type 1 diabetes
- History of pancreatectomy or significant pancreatic dysfunction

- History of wide fluctuations in blood glucose levels
- History of diabetic ketoacidosis
- History of insulin use for greater than 5 years
- History of diabetes for greater than 10 years (8)

Standard calculation of **total daily dose (TDD)** of insulin (normal body habitus) is 0.4 units/kg/day.

- If the patient is very lean, on hemodialysis or very sensitive to insulin use 0.3 units/kg/day.
- If the patient is overweight use 0.5 units/kg/day
- If the patient is obese, on steroids, or known to be insulin-resistant use 0.6 units/kg/day (or more)

For patients new to insulin and NPO: glargine or detemir 0.15-0.3 units/kg SQ q 24 hrs; **OR** total daily dose of correction scale (if glucoses at goal).

For patients **new to insulin** and eating: glargine or detemir 0.3-0.6 units/kg SQ q 24 hrs.

If patient **already taking glargine or determir**: continue same dose, even if NPO.

If patient **already taking NPH**: continue same dose, if eating. If NPO, reduce dose by 50%.

If patient is **taking mixed insulin** (basal/prandial mix) such as 70/30 or 75/25: change to a basal/prandial/correction insulin regimen if eating or basal/correction insulin regimen if NPO. Resuming mixed insulin can be initiated when nutritional intake is consistent.[11] Calculate TDD of insulin and dose 50% as basal insulin and 50% as prandial insulin (see "Prandial Insulin" and "Correction Insulin").

If patient is taking Regular U-500 insulin (this insulin covers basal and prandial), consistent carbohydrate intake is necessary to continue same dose.

Prandial Insulin

Prandial insulin is scheduled rapid-acting insulin that accompanies meals or enteral feeding(s) in anticipation of the glycemic spike that occurs due to carbohydrate ingestion. Options for prandial insulin include aspart. If the patient is taking lispro, glulisine, or regular insulin, aspart may be substituted unit for unit. Aspart is optimal because it mimics physiologic insulin with carbohydrate intake.

Prandial insulin provides about 50% of the total daily dose of insulin for patients with nutritional intake of 100%. Prandial insulin dose may be given up to 15 minutes before meal presentation or within 15 minutes after meal is eaten. Post-meal administration is beneficial for patients with variable nutrition intake by allowing the RN to assess quantity of meal/carbohydrate consumed before administering the insulin.

Add a prandial insulin dose if patient's fasting glucose is at goal, but pre-lunch, pre-dinner or bedtime glucose elevated. Add to breakfast, lunch and dinner if on glargine or detemir **OR** with breakfast and dinner if on NPH.

Prandial insulin can be dosed as a fixed meal dose or by carbohydrate content per carbohydrate choices.

Carbohydrate prandial dosing is the safest since it takes into account the patient's actual carbohydrate intake. Patients do not need to know how to count carbohydrates for this dosing since the carbohydrate content is available on the patient's meal tray ticket. Nursing staff can dose with this information. At discharge, patients can be prescribed fixed prandial dosing (if deemed the best option) based on the trend of the amount of insulin dosed at meals.

To calculate prandial insulin doses:

- Fixed prandial dose is determined by dividing the 50% of the total daily dose into 3 meals if on glargine or detemir. If on NPH, determine fixed dose by using 0.1 units/kg for breakfast and dinner.
- Carbohydrate dosing is based on a number of units of prandial insulin per carbohydrate choice. The number of units usually ranges from 0.5 to 3 units. A carbohydrate controlled diabetes diet is 4 carbohydrate choices. So the number of units of insulin needed per carbohydrate choice can be calculated by using a fixed prandial dose and dividing by 4 (if the prandial dose has been controlling glucoses).[8]

Re-evaluate and adjust the total daily dosing based on the glycemic control of the previous 24 hours:

- If any glucose greater than 180 and no threat of hypoglycemia, increase TDD by 10-20%.
- If glucose consistently greater than 180-200, increase TDD by 30%
- For episodes of easily unexplained hypoglycemia (less than 70), decrease TDD by 20%[11]

Correction Insulin

Correction insulin is used to "correct" premeal hyperglycemia and supplement scheduled prandial and basal insulin. **Correction doses should generally be used only if patients are first receiving basal insulin and should not be used as a substitute for prandial insulin.** Correction insulin may be appropriate as a short-term plan for patients without a prior diagnosis of diabetes. Examples include patients who present with an isolated elevated glucose or are scheduled to receive high dose steroids, TPN, or other interventions which may cause hyperglycemia. Consistent need for correction insulin doses suggests the need to add basal insulin, or modify the basal and/or prandial insulin schedule.

A correction insulin dosing scale is based on the patient's estimated insulin sensitivity. Scales available on order sets are low, medium, high, and individual. For patients who are eating, insulin should be dosed pre-meal and the bedtime correction dose should be 50% of mealtime scale. For patients who are NPO, regular correction insulin should be dosed every 6 hours and aspart correction insulin should be dosed every 4 hours.[8] Efficacy of the patient's current correction insulin dosing should be evaluated every 24 hours and a new scale ordered if appropriate.

See **Management of the Inpatient Hyperglycemia** algorithm for glucose management.

Subcutaneous Insulin Order Sets

Subcutaneous Insulin Injection Non-Carbohydrate Dosing Order Set. To be used for fixed prandial doing or NPO patients.

Subcutaneous Insulin Injection Prandial Carbohydrate Dosing Order Set. To be used for dosing by carbohydrate choices.

Transition from intravenous (IV) to Subcutaneous Insulin Therapy

First determine if it is safe for the patient to transition from IV to a subcutaneous regimen based on the following criteria:

- Stable blood glucoses 140-180 mg/dL for at least 4-6 hours consecutively

- Normal anion gap
- Resolution of acidosis
- Stable clinical status
- Not on vasopressors
- Stable nutrition plan or patient is eating

To maintain effective blood levels of insulin, short- or rapid-acting insulin is to be administered subcutaneously 1-2 hours before discontinuation of the IV insulin infusion. NPH, glargine or detemir must be injected 2-3 hours before discontinuation of the IV insulin infusion.

NPO Patient

1. Order basal and corrective dose SQ insulin.
2. Calculate 24 hour IV insulin requirement : consider adding total IV insulin infused in last 6 hours when the glucoses are stable, multiply by 4 to get 24 hr total. A safe estimate is to use 80% of this 24 hour IV insulin requirement for the basal insulin dose, if staying NPO.

Patient Eating

1. Order basal, prandial, and corrective dose SQ insulin.
2. Calculate 24 hour IV insulin requirement : consider adding total IV insulin infused in last 6 hours when the glucoses are stable, multiply by 4 to get 24 hr total. A safe estimate is 80% of this 24 hour IV insulin requirement.
3. Usually 50% of this adjusted TDD is the **basal** insulin dose.
4. 10-50% of the TDD is the **prandial** insulin dose depending on patient's nutritional intake. Note: If the aspart prandial dosing has already begun while on the IV insulin and was adjusted appropriately, then this can be continued 3 times daily with meals.[8,13]

Special Circumstances

Glucocorticoid Therapy

Steroid therapy commonly creates hyperglycemia and always worsens preexisting glucose intolerance. Post-prandial glucose is affected more than fasting levels.

For patients new to glucocorticoid and insulin therapy:

- Use correction insulin for 24 hours to assess insulin needs.

- If on oral glucocorticoid therapy, NPH dosed 2 hours post prednisone dose is recommended because it parallels the steroid induced hyperglycemia. Continue to use correction dose insulin.
- If on intravenous glucocorticoid therapy, IV insulin may be appropriate to determine insulin requirements.

For patient already being treated with a basal/bolus/correction subcutaneous insulin regimen:

- If on oral glucocorticoid therapy, increase prandial dosing over the time period of the oral therapy. Generally, the basal/prandial ratio is 30% basal, 70% prandial.
- If on intravenous glucocorticoid therapy, IV insulin may be appropriate to determine insulin requirements. [8]

Continuous Subcutaneous Insulin Infusion (CSII) Therapy (Insulin Pump)

Patients who use continuous subcutaneous insulin infusion therapy (insulin pump) in the outpatient setting may continue self-management in the hospital if they have the mental and physical capacity to do so. The patient or caregiver must be able to continuously make appropriate pump adjustments for safe insulin dosing.[1]

A physician order is necessary for the patient to continue self-management of insulin via their insulin pump. The **Continuous Self-Administered Subcutaneous Insulin Pump Order Set** is available and recommended.

A physician order necessary for insulin coverage when patient is off pump for diagnostic tests or surgery (in general patients can be off pump for up to one hour without additional coverage). While the patient is using a self-managed insulin infusion pump, no other subcutaneous or IV insulin is administered unless specifically ordered for off-pump periods or pump malfunction coverage.

Refer to **Continuous Subcutaneous Insulin Infusion (CSII) Pump – Care of the Patient** for procedure to determine appropriateness of CSII and to manage certain situations such as surgery, MRI and CT scans, diagnostic tests, NPO status, and equipment issues.

The Certified Diabetes Educator is to be automatically consulted for all patients continuing self-management of an insulin pump in the hospital.

HYPOGLYCEMIA

The hypoglycemia management protocol must be ordered for all patients treated for hyperglycemia. Episodes of hypoglycemia and treatment should be documented. (E) Diabetes order sets include the protocol as a default order. See **Hypoglycemia: Acute Management Protocol**.

The hospital provides multiple risk factors for hypoglycemia. Situations that associated with this increased risk include—

- altered nutritional state related to nausea/anorexia, procedures, meal delivery delays, discontinuation, decreased rate, or unexpected interruption of TPN or enteral nutrition
- malnutrition or low body weight
- known sensitivity to insulin, identified as a low total daily dose of insulin, such as Type 1 diabetes or lean body habitus
- advanced age
- heart failure, renal or liver disease, malignancy, shock, adrenal insufficiency, burns, alcoholism, or sepsis
- steroid dose reduction
- rate reduction of intravenous dextrose
- inappropriate timing and/or dose of prandial insulin[1,8]

Daily attention to glucose levels and awareness of above risks with proactive insulin and/or oral anti-hyperglycemic agent adjustment will contribute to prevent most hypoglycemic episodes.

MEDICAL NUTRITION THERAPY

Individuals who have prediabetes or diabetes should receive individualized medical nutrition therapy (MNT) as needed to achieve treatment goals, preferably provided by a registered dietician familiar with the components of diabetes MNT.

The goals of MNT are to:

- optimize glycemic control
- provide adequate calories to meet metabolic demands
- incorporate nutrition therapies to treat the complications of diabetes, including hypertension, CVD, dyslipidemia, and nephropathy
- address individual needs based on personal, cultural, religious, and ethnic preferences
- create a discharge plan for follow-up care.

The American Diabetes Association (ADA) does not endorse any single meal plan or specified percentages of macronutrients. The caloric needs of most hospitalized patients can be met through by providing 25-35 kcal/kg body weight.

Nutritional assessments should be conducted for patients not consistently reaching glucose targets. Consult a dietician for situations such as a new diabetes diagnosis, lack of knowledge regarding meal planning, altered nutritional intake, and tube feedings.

Consistent or controlled carbohydrate meal plans are preferred since they facilitate matching prandial insulin dose to the amount of carbohydrate consumed. A carbohydrate controlled diabetes diet is 4 carbohydrate choices (1 choice equals 15 grams of carbohydrate). Meals are based on heart-healthy diet principles. Meals can be adjusted by altering the amount of carbohydrate servings and snacks.

Carbohydrate content is listed on the meal tray tickets. This provides information needed for prandial insulin dosing and serves as a basis for teaching patients about meal planning.

Liquid diets

Sugar-free liquid diets are not appropriate for patients with diabetes because they do not contain calories and carbohydrates. Patients on clear and full liquid diets should receive about 200 grams of carbohydrate, equally spread throughout the day in meals and snacks (1, 8).

Enteral nutrition

For patients receiving continuous enteral nutrition

Consider using IV insulin for optimal control.

For subcutaneous injections, use glargine or detemir as the basal insulin because it can be continued without dose adjustment when nutrition is suspended. Use regular insulin as the nutritional insulin.

- Basal insulin dose: 0.4 x TDD, dosed once daily
- Nutritional insulin: 0.6 x TDD in 4 divided doses every 6 hours. Adjust the dose down if nutritional intake is less than 100%.
- Correction insulin: based on sensitivity
- Glucose monitoring every 6 hours

If the tube feed is held or interrupted, the nutritional regular insulin doses should be held.

For patients receiving bolus tube feeds

Use glargine or detemir as the basal insulin because it can be continued without dose adjustment when nutrition is suspended. Use rapid-acting insulin as the nutritional insulin.

- Basal insulin dose: 0.5 x TDD, dosed once daily
- Nutritional insulin: 0.5 x TDD in divided doses with the bolus tube feeds. Adjust the dose down if nutritional intake is less than 100%.

- Correction insulin: based on sensitivity
- Glucose monitoring before meals and bedtime, minimally.

If the tube feed is held or interrupted, the nutritional regular insulin doses should be held.

For patients receiving nocturnal tube feeds
Use NPH or regular insulin when feeds are initiated to cover the time period.[11]

TPN
The Pharmacy and Clinical Nutrition Departments shall be responsible for initiating and monitoring parenteral nutrition (PN) in adult patients when consulted by physicians. The pharmacist and dietitian will assist physicians in providing optimal nutrition therapy to patients unable to receive nutrition by the oral or enteral route. The dietician and pharmacist will estimate the patient's nutritional caloric needs using validated energy requirement calculation methods. The pharmacist will consider the patient's current nutrition status, disease states, clinical status, lab values, medications and IV fluids when initiating or adjusting a TPN. To initiate TPN therapy, use the **Adult Central Parenteral Nutrition Order Set**.

Insulin adjustment
At the time of TPN initiation, if the patient is not currently on corrective dose insulin or an insulin infusion protocol and does not have a hospitalist or intensivist currently consulted, the pharmacist will initiate subcutaneous corrective dose insulin using regular insulin per the **Adult Central Parenteral Nutrition Order Set** and enter the standard low scale doses. **Physicians will be responsible for making all insulin dose adjustments. If two consecutive blood glucose levels are 150 mg/dL, the pharmacist will notify the physician and recommend a hospitalist consult for management of hyperglycemia. Pharmacists will also decrease dextrose in the TPN formulation as able to minimize further hyperglycemic risk.**

Insulin may be added to the TPN bag at the physician's discretion after the patient has been stable on the Insulin SUBACUTE 100-150 Infusion Protocol for at least 24 hours. For any TPN containing insulin, all changes made by pharmacy to the dextrose concentration will be communicated to the physician. When any TPN containing insulin is discontinued, pharmacy will contact the physician for new insulin orders if not already addressed.

Refer to **Parenteral Nutrition Consultation and Monitoring Service for Adults and Adolescents** for the procedural care of patients receiving TPN.

Refer to the **Policy: Nutrition Intervention Policy** and the **Nutrition Intervention Protocol (NIP)** regarding MNT.

DIABETES SELF- MANAGEMENT EDUCATION (DSME)
The acute care setting is not conducive to learning diabetes self-management. For the hospitalized patient, diabetes "survival skills" education should be provided to patients and/or family for sufficient information and training to enable safe care at home. At discharge, assess the need for a home health referral or referral to a recognized outpatient diabetes education program.

Diabetes "survival skills" include:

- Nutritional management, including the role of carbohydrate intake in blood glucose management

- Self-blood glucose monitoring—how to obtain a blood glucose meter or instruction on the use of a blood glucose meter if available. Include:
    - Individualized blood glucose goals
    - A1c and/or estimated average glucose results and goal
- Medication management, including oral anti-hyperglycemic agents, injectable noninsulin therapies, and insulin administration as applicable. Patients taking insulin for the first time in the hospital should begin to self-administer insulin as soon as possible.
- Hyperglycemia and hypoglycemia recognition, treatment, and prevention
- Exercise
- Sick day guidelines
- Resources, including who to contact in case of emergency or for more information and plan for post-discharge education or self-management support

The goals of inpatient DSME are to:

- Assess current knowledge and practices of diabetes self-management and how they impact patient's health status and reason for hospitalization
- Initiate diabetes education for patients newly diagnosed with diabetes
- Provide information on basic self-management skills to help ensure safe care post discharge
- Work with the team of health care professionals (e.g., physicians, nurses, dieticians, case managers, and social workers) to coordinate care in the hospital and post discharge
- Provide information on community resources and diabetes education programs for continuing education
- Utilize the diabetes educator as a resource for nursing staff and other health care providers

Basic diabetes self-care management is to be done by the bedside RN. Physicians can further assist the process by providing consistent messages about diagnosis and treatment goals and daily review of diabetes control with the patient. Consults to the CDE/Diabetes Resource RN and Registered Dietician should be done for patients with newly diagnosed diabetes and patients hospitalized as a result of a crisis related to diabetes management or poor care at home.[1,8,14]

DISCHARGE PLANNING

Patients with hyperglycemia in the hospital who do not have a diagnosis of diabetes should have appropriate plans for follow-up testing and care documented at discharge. (E) The A1c is a useful test in hospitalized patients, both for diagnostic purposes and to gather objective information about recent glycemic control for a treatment plan.

Transition from the acute care setting is a high-risk time for patients with diabetes or new hyperglycemia. Diabetes discharge planning should begin at admission to the hospital and updated as projected patient needs change. Patient and caregivers should be empowered to actively participate in their care from hospital to home.

Information for outpatient providers should include the cause or plan for determining the cause of hyperglycemia, related complications and comorbidities, and recommended treatments.

For patients discharging to rehabilitation or skilled nursing facility, communicate medication and diet orders.

For patients discharging to assisted living or to home, consider the type and severity of diabetes, the effects of the patient's illness on blood glucose levels, and the capacities and desires of the patient. The discharge plan should include:

- medication reconciliation
- information on new or changed medication, pending tests and studies, and follow-up needs
- outpatient follow-up visit with primary care provider, endocrinologist or diabetes educator within 1 month of discharge

Patients should be provided with appropriate durable medical equipment, medication, supplies, and prescriptions at the time of discharge to avoid a potentially dangerous hiatus in care. These supplies/prescriptions may include:

- insulin (vials or pens)
- syringes or pen needles
- oral diabetes medications
- injectable noninsulin medication
- blood glucose meter, strips, and lancets
- urine ketone test strips (type 1 diabetes)
- glucagon emergency kit (insulin treated)[1,14]

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