reduced hospital stays and mortality in non-ICU settings.[1264] Thus, glucose targets <110 mg/dL are no longer universally recommended, and the AACE/ADA consensus statement on inpatient glycemic control favors more relaxed glycemic targets in the ICU, as high as 140 to 180 mg/dL.[105]

Treatment of Hyperglycemia in Persons in the Hospitalized Setting

Persons with DM have a 3-fold greater chance of hospitalization compared to those without DM, with 30% to 40% requiring 2 or more hospitalizations in any given year.[1264-1266] It is well established that hyperglycemia in persons with or without a prior diagnosis of DM increases both mortality and disease-specific morbidity in hospitalized persons,[91,105,1251,1267] and that goal-directed insulin therapy can improve outcomes.[92,94,101] This topic has been extensively reviewed in the AACE/ADA consensus statement on inpatient hyperglycemia,[105] 2021 ADA Standards of Medical Care in DM,[1268] and 2022 Endocrine Society clinical practice guideline titled Management of Hyperglycemia in Hospitalized Adult Patients in Noncritical Care Settings.[99]

The management of hyperglycemia in the hospital setting presents multiple challenges including variable nutritional status and altered levels of consciousness, as well as resource limitations for monitoring glycemia during these changes. Given the paramount importance of patient safety, reasonable glucose targets in the hospital setting should be set at modestly higher levels than targets for outpatients with DM. For noncritically ill persons, a premeal glucose target of <140 mg/dL and a random BG of <180 mg/dL are recommended, while avoiding hypoglycemia (BG <70 mg/dL). Additionally, glycemic targets should be modified according to clinical status. For persons who are able to achieve and maintain glycemic control without hypoglycemia, a lower target range may be reasonable. For persons with terminal illness, limited life expectancy, or high risk for hypoglycemia, higher target ranges may be reasonable.[100,1259,1269-1274] Refer to **Section 1 on Screening, Diagnosis, Glycemic Targets, and Glycemic Monitoring** for additional guidance.

We recommend to check A1C for all persons with known DM, unless the A1C level is available and had been checked within the prior 3 months. A1C levels provide an overview of prior glycemic control, can predict response to therapy in the hospital, and guide discharge therapy.[103,1275-1279]

Some studies have demonstrated that the use of specialized DM management teams can result in better hyperglycemia correction, and avoidance of hypoglycemia, with positive impacts on readmissions and costs.[1280-1283] The use of e-consults or virtual visits may be an alternative for hospitals lacking these services,[1284] or for postdischarge DM follow-up.[1285-1287]

Management of Adults with Inpatient Hyperglycemia in the ICU

Insulin therapy is the preferred method of glycemic control in most hospitalized persons. IV infusion of insulin is the preferred route of administration for persons in the ICU. In the critical care setting, a variety of CSII protocols have been shown to be effective in achieving glycemic control with a low rate of hypoglycemic events and also to improve hospital outcomes.[94,101,1288-1290]

For ICU settings, most hospitals use institutional-based, nurse-driven protocols, with several validated protocols published.[1291-1293] Automated, computerized, IV insulin protocols, including commercially available or institutional-based protocols, have improved glycemic control, with good acceptance by nursing personnel.[1294-1307] The preference will depend on local needs, support, and cost to the institution. Preference should be given to use of regular insulin for IV administration,[1308,1309] given lower cost and wide availability, and short-acting insulin analogs have shown effective glycemic control.[1308]

The management of hyperglycemic emergencies (including DKA and hyperosmolar state) should follow standardized protocols with aggressive fluid resuscitation, electrolytes replacement, and also insulin therapy.[28,1310,1311] Persons with severe DKA should typically receive IV insulin therapy, whereas mild-to-moderate crises may be managed with frequent subcutaneous insulin administration and glucose monitoring protocols.[28,1121,1310,1312] Caution is recommended in persons with advanced renal failure because standard IV fluid and insulin replacement may result in increased volume overload and hypoglycemia.[1313,1314] Prevention and correction of hypokalemia and hypoglycemia should be proactively part of any treatment protocol. Severe hypokalemia (K ≤2.5 mEq/L) and severe hypoglycemia (BG <40 mg/dL) have been associated with increased mortality.[1315]

The addition of noninsulin agents, such as DPP-4 inhibitors or GLP-1 RAs, before admission or during the perioperative period, has not reduced rates of stress hyperglycemia and may increase nausea and vomiting rates[1316-1324] among critically ill persons. While the use of these agents is safe and may result in lower glucose levels and insulin doses, we do not recommend addition of a DPP-4 inhibitor or GLP-1 RA to IV insulin therapy until efficacy is demonstrated.

Most persons with T2D and all persons with T1D in the ICU receiving IV insulin infusion will require transition to a subcutaneous insulin regimen.[105] Those who are suitable for this transition ideally have a stable infusion rate and BG levels in the target range. Several studies[1266,1325-1329] recommend starting at a daily insulin dose ~80% of the IV insulin used in the preceding 12 to 24 hours and splitting it into basal and bolus insulin.[105] Persons without DM but with stress or newly diagnosed hyperglycemia who have required an insulin rate less than 1 to 2 units/hour at the time of transition may not require a scheduled subcutaneous insulin regimen.[1330] Many of these individuals can be treated with correction insulin to determine if they will require scheduled subcutaneous insulin.

Management of Hospitalized Adults with Inpatient Hyperglycemia in the Non-ICU Setting

In the noncritically ill setting, scheduled subcutaneous insulin regimens with a combination of basal, nutritional, and correctional components is recommended. Prolonged use of “sliding scale” insulin as the sole method of glucose control is strongly discouraged. Clinicians should only consider using “sliding scale” insulin alone in persons whose glucoses are in the target range most of the time, and only occasionally exceed it (ie, with stress hyperglycemia or well-controlled DM).[1331,1332]

RCTs have shown that treatment with a basal prandial regimen using insulin analogs improved glycemic control with fewer hospital complications in general medical and surgical persons with T2D compared with sliding-scale regular insulin alone.[92,107,108,1333-1336] Persons with T1D should be treated with basal-prandial insulin regimens to avoid severe hyperglycemia and DKA. In insulin-naïve persons with T2D, a starting insulin TDD between 0.3 and 0.5 units/kg/day is effective and safe in those who receive care for general medicine and surgery. Persons with T2D receiving insulin therapy before admission are at risk for severe hyperglycemia in the hospital if insulin therapy is discontinued. Assessment of the need for modification of the home insulin regimen is important as requirements vary according to clinical stressors and altered caloric intake.[105,1337] Lower starting insulin TDD of 0.20 to 0.25 units/kg are recommended in persons with impaired kidney function[1338,1339] in the elderly, and in those with poor caloric intake.[1339,1340] In addition, for persons whose glucose is controlled with insulin prior to admission, reducing the insulin TDD by 20% to 25% is recommended for those with poor caloric intake to avoid hypoglycemia in in the hospital setting,[1340] though persons with uncontrolled DM may actually require higher doses. In a single-center RCT, the use of correctional insulin sliding scales for bedtime hyperglycemia did not improve glycemic control in persons with T2D.[1341,1342]