

is persistently >13.9 mmol/L (250 mg/dL), during a concurrent illness, or with symptoms such as nausea, vomiting, or abdominal pain. Blood measurement of β -hydroxybutyrate is preferred over urine testing with nitroprusside-based assays that measure only acetoacetate and acetone.

DKA and HHS are acute, severe disorders directly related to diabetes. DKA was formerly considered a hallmark of type 1 DM, but it also occurs in individuals with type 2 DM who can sometimes subsequently be treated with oral glucose-lowering agents (frequently in individuals of Hispanic or African-American descent). HHS is primarily seen in individuals with type 2 DM. Both disorders are associated with absolute or relative insulin deficiency, volume depletion, and acid–base abnormalities. DKA and HHS exist along a continuum of hyperglycemia, with or without ketosis. The metabolic similarities and differences in DKA and HHS are highlighted in [Table 404-6](#). Both disorders are associated with potentially serious complications if not promptly diagnosed and carefully treated.

TABLE 404-6 Laboratory Values in Diabetic Ketoacidosis (DKA), Hyperglycemic Hyperosmolar State (HHS), and Euglycemic DKA (Representative Ranges at Presentation)

	DKA	HHS	EUGLYCEMIC DKA ^c
Glucose, ^a mmol/L (mg/dL)	13.9–33.3 (250–600)	33.3–66.6 (600–1200)	<11.1–13.9 (<200–250) ^c
Sodium, meq/L	125–135	135–145	~135
Potassium ^{a,b}	Normal to ↑	Normal	Normal to ↑
Magnesium ^a	Normal	Normal	Normal
Chloride ^a	Normal	Normal	Normal
Phosphate ^{a,b}	Normal	Normal	Normal
Creatinine	Slightly to moderately ↑	Moderately ↑	Slightly ↑
Osmolality (mOsm/mL)	300–320	330–380	~300
Serum/urine ketones ^a	++++	+/-	++++
Serum β -hydroxybutyrate, mmol/L	>2.5	<1.0	>2.5
Serum bicarbonate, ^a meq/L	<18	>18	<18
Arterial pH	6.8–7.3	>7.3	6.8–7.3
Arterial PCO ₂ , ^a mmHg	20–30	Normal	20–30
Anion gap ^a (Na – [Cl + HCO ₃])	↑	Normal to slightly ↑	↑

^aLarge changes occur during treatment of DKA. ^bAlthough plasma levels may be normal or high at presentation, total-body stores are usually depleted. ^cSometimes occurs with SGLT2 inhibitor treatment; disproportionate glucosuria is consistent with SGLT2 inhibitor effect.

■ DIABETIC KETOACIDOSIS