

The key to ketoacidosis: Unlocking the potential for better DKA monitoring and detection

This activity is funded by an independent medical education grant from Abbott Diabetes Care Inc.

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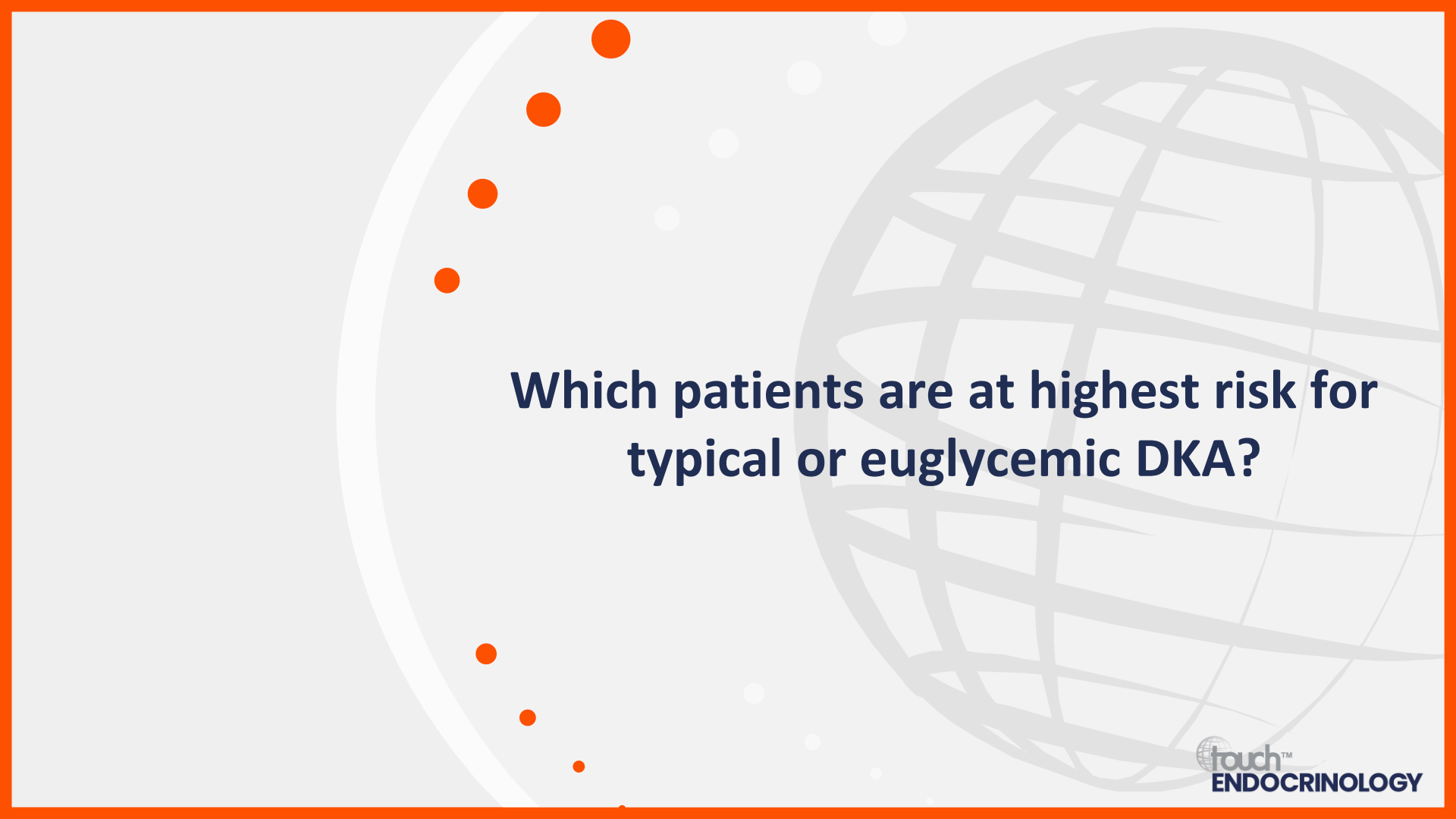
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Recognizing DKA: Typical and atypical presentations

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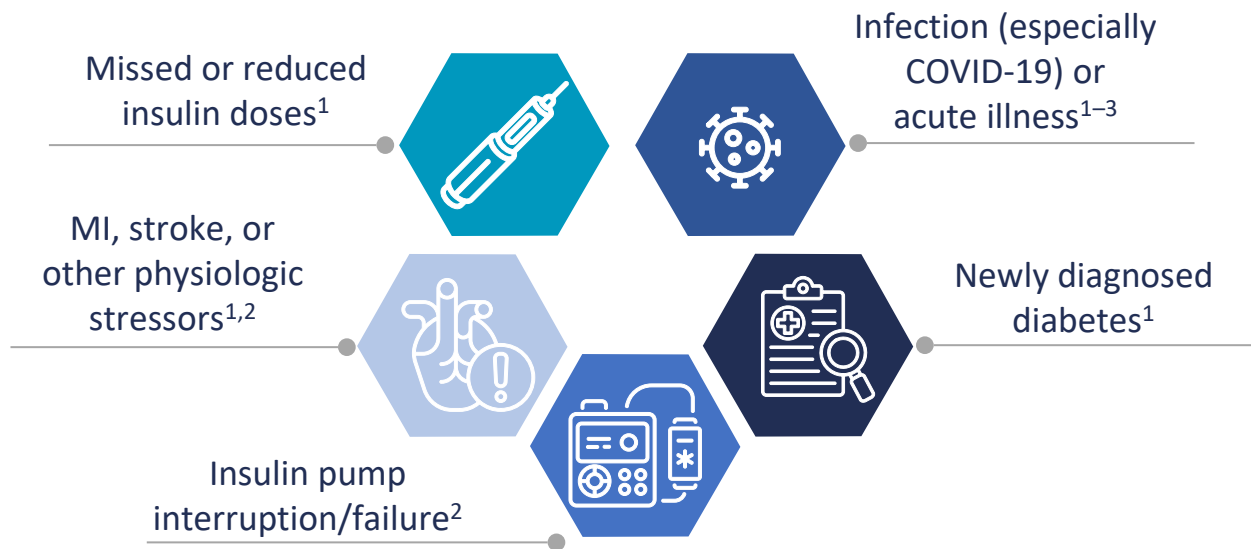




**Which patients are at highest risk for
typical or euglycemic DKA?**

Risk factors for DKA

Common risk factors for typical DKA



For lower-threshold DKA, common risk factors are¹

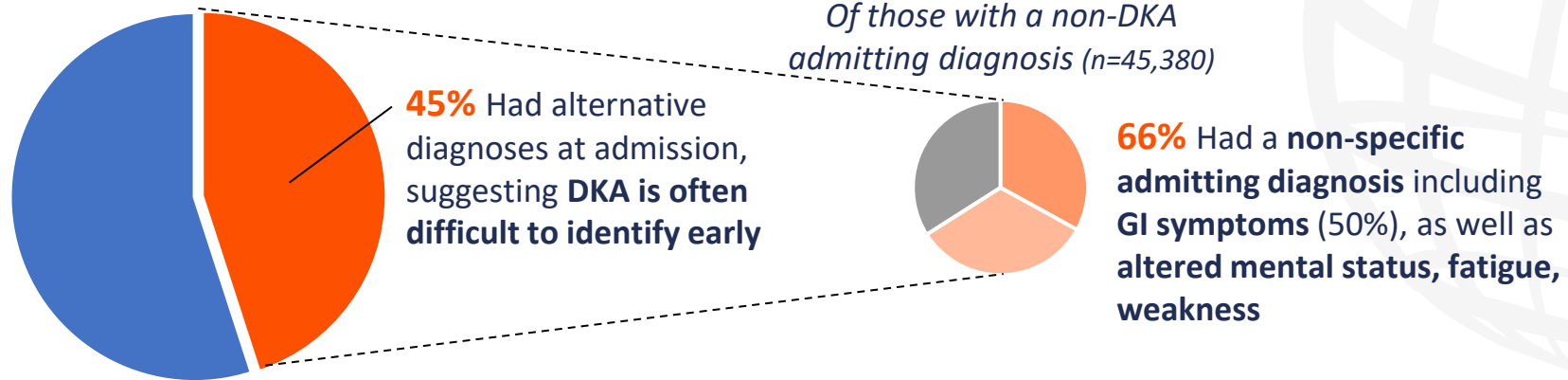
- Prolonged fasting
- SGLT2 inhibitors
- Pregnancy

Delays in DKA diagnosis are common

Initial clinical diagnoses of DKA hospitalizations vs. the proportion diagnosed as DKA at admission

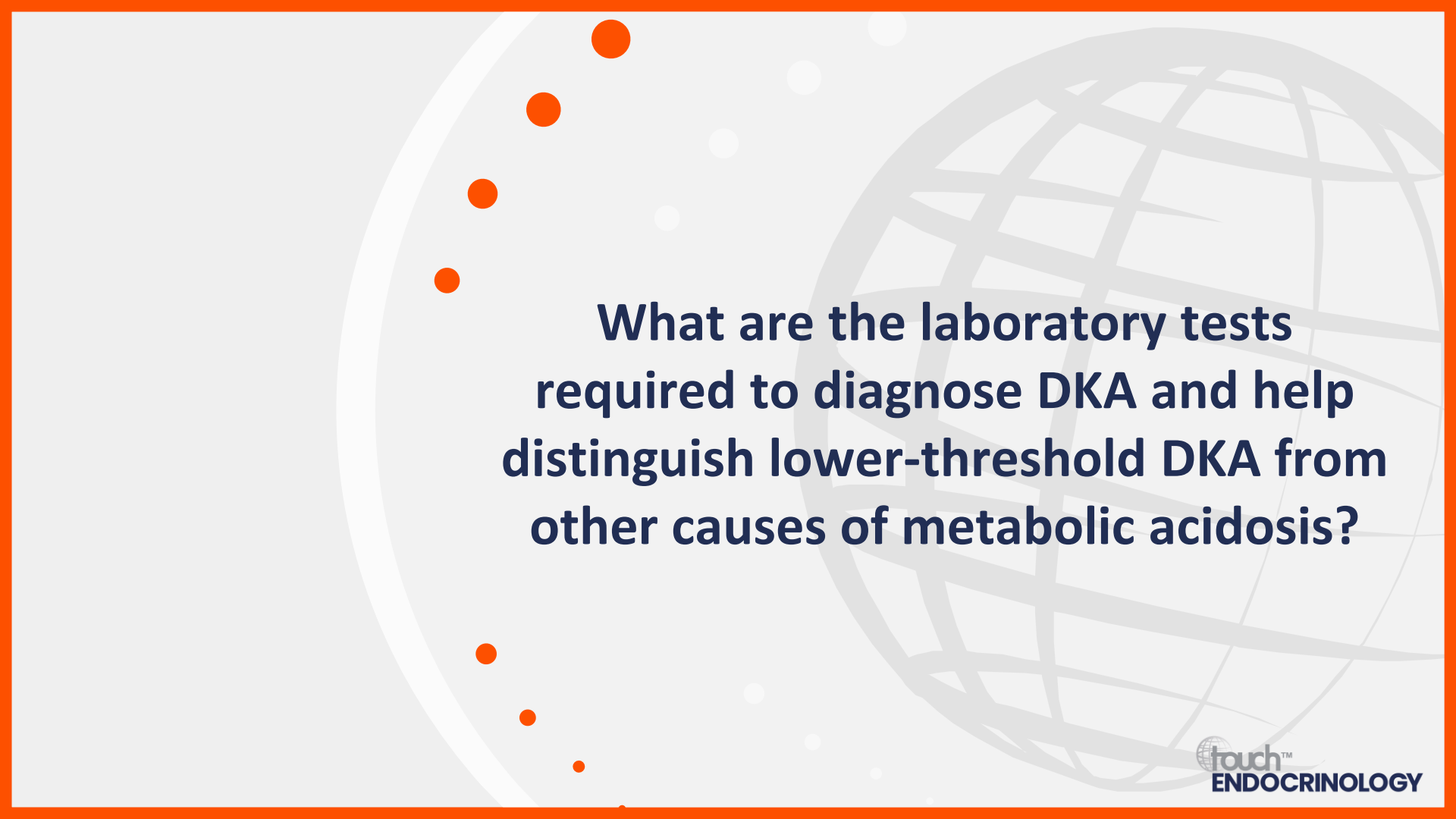


Individuals with T1D or T2D hospitalized with a primary diagnosis of DKA (N=100,334); CMS Limited data set (January 2017–March 2025), including Medicare and dually eligible Medicaid beneficiaries.



The background features a large, light gray globe with a grid of latitude and longitude lines. To the left of the globe, there is a series of orange dots of varying sizes, some of which are arranged in a curved path. The entire slide is framed by a thick orange border.

**What clinical signs and symptoms
should prompt immediate evaluation
for DKA?**



**What are the laboratory tests
required to diagnose DKA and help
distinguish lower-threshold DKA from
other causes of metabolic acidosis?**

Differential diagnoses for euglycemic DKA

Lower-threshold DKA is a diagnosis of exclusion, other causes of high anion gap metabolic acidosis must be excluded¹

Differential	Clinical history	Lab results
Alcoholic ketoacidosis¹	- History of binge alcohol consumption - No history of diabetes - Hypoglycemia not euglycemia	- Ketone bodies (predominantly β-hydroxybutyrate) not detectable on routine urine strip testing Serum ketones must be used
Starvation ketoacidosis^{1,2}	- History of dietary intake of <2,090 kJ/day (500 kcal/day) - No previous history of diabetes - No intercurrent illness and hypoglycemia	- Metabolic acidosis not profound - Bicarbonate levels usually >18 mmol/L
Lactic acidosis¹		High lactate levels with absence of serum ketones
Ketosis of pregnancy and hyperemesis²	Vomiting of hyperemesis gravidarum leads to excess counterregulatory hormone concentrations, predisposing to ketone formation	



**What are the immediate next steps
following recognition of
suspected DKA?**

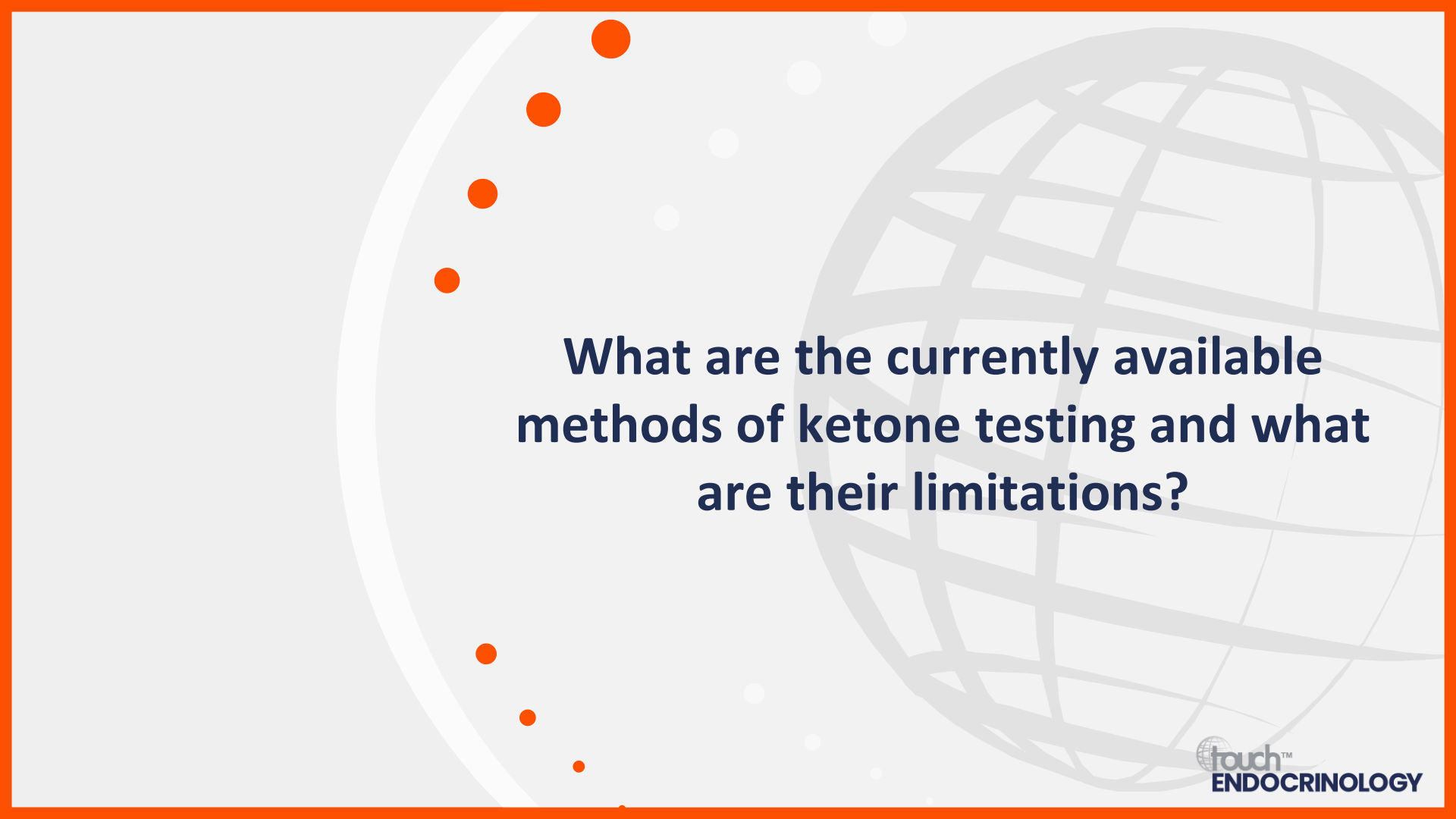
Ketone monitoring: Current tools and emerging CKM

Dr. Eden Miller, DO, D-ACD, D-ABOM

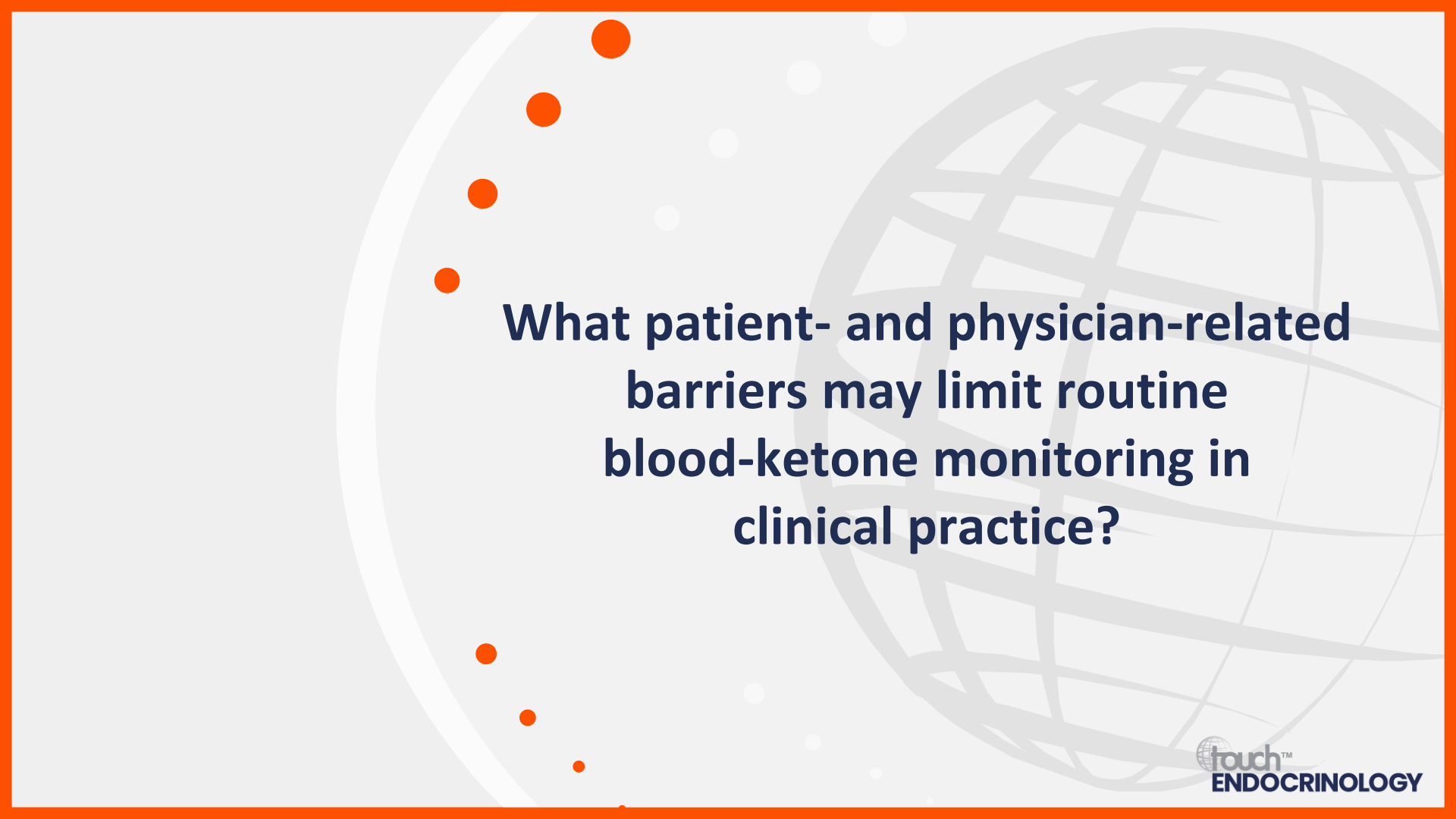
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**What are the currently available
methods of ketone testing and what
are their limitations?**



**What patient- and physician-related
barriers may limit routine
blood-ketone monitoring in
clinical practice?**

ATTD 2026: Barriers to ketone monitoring

Survey of adults with T1D in
French SFDT1 cohort
(N=553)¹

Reported awareness of severity of DKA

88%

Misattributed non-specific symptoms

30%

Barriers to ketone testing

- ✗ Poor symptom recognition (56%)
- ✗ Lack of equipment (52%)
- ✗ Time constraints (52%)

Survey of US adults with T1D and
ketone test kits
(N=1,491)²

Reported low confidence in
understanding ketone levels

19.5%

Compared with confident participants,
those with low confidence were:

- ✗ Less likely to test across high-risk situations ($p<0.05$)
- ✗ Unsure of prior DKA events ($p<0.005$)
- ✗ Extremely concerned about DKA ($p<0.05$)

Survey of endocrinologists on
ketone monitoring for T1D, T2D
(N=453)³

Correctly identified the recommended
threshold value to diagnose DKA

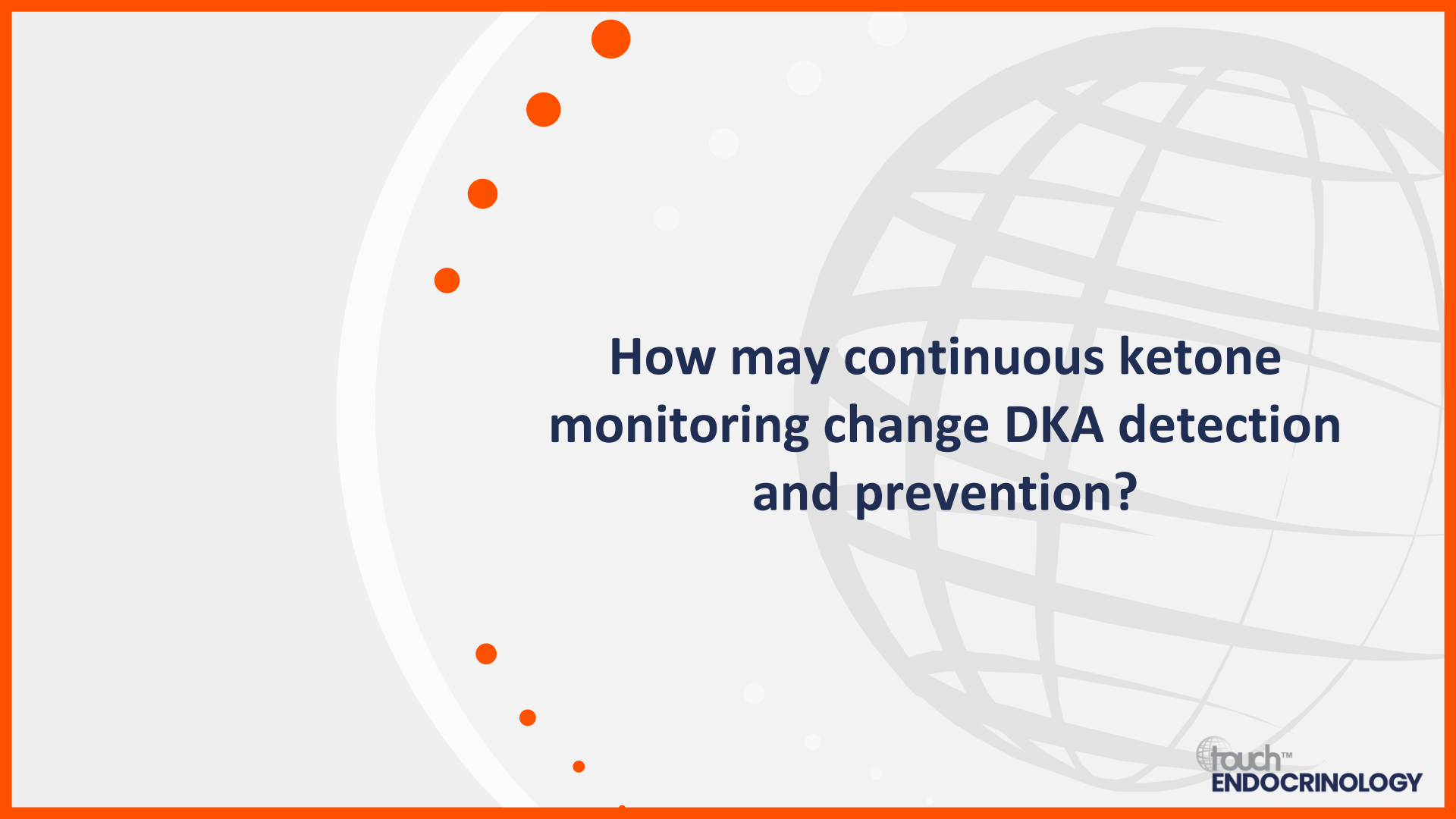
33.6%

“Not at all confident” in determining
when ketone monitoring is necessary

22.1%

Recognized lack of symptoms in early
ketosis is a common patient-reported
barrier to use of ketone monitors

27.7%



**How may continuous ketone
monitoring change DKA detection
and prevention?**

The clinical benefits of CKM

β -hydroxybutyrate detection



Primary ketone in DKA
Measured by CKM via the
interstitial fluid of
subcutaneous tissue

Early detection of ketone changes



CKM detects rising ketones
earlier than urine tests, helping
prevent life-threatening DKA

Versatile across care settings



Useful for diabetes management
in both inpatient and outpatient
settings



Ketone testing is limited by access and delays; CKM offers a real-time, proactive solution



**How could continuous ketone
monitors be integrated into
clinical practice?**

Patient guidance to actioning CKM levels

Ketone levels

Normal (<0.6 mmol/L)

- No action necessary

Elevated (0.6 – 1.5 mmol/L)

Symptoms include:*

- Nausea
- Vomiting
- Abdominal pain
- Fatigue

Action:

- Follow HCP guidance

High (>1.5 – <3.0 mmol/L)

Symptoms include:*

- Difficulty breathing
- Fruity breath
- Confusion, difficulty paying attention

Action:

- **Contact HCP**
- Follow HCP guidance

Urgent high (≥ 3.0 mmol/L)

Symptoms include:*

- Deep breathing
- Confusion, difficulty paying attention
- Frequent urination

Action:

- **Seek urgent care immediately**

Additional actions necessary:

- Monitor glucose levels frequently
- Check insulin pump, confirm insulin injections have not been missed
- **Take fluids, carbohydrates, and insulin as recommended**

*If CKM readings do not match symptoms then perform a capillary blood ketone test.

CKM, continuous ketone monitoring; HCP, healthcare professional.

Adapted from: Dhatariya K, et al. *Lancet Diabetes Endocrinol.* 2026;14:82–92.

ADA 2026: Interpreting and actioning CKM levels

Continuous ketone concentration (mmol/L)	Blood glucose meter/CGM value (check every hour)*,†		
	4.0–8.0 mmol/L (70–150 g/dL)	8.1–14.0 mmol/L (151–250 mg/dL)	>14 mmol/L (>250 mg/dL)
<0.6 Normal	- No extra insulin - Usual bolus to cover CHO + usual correction		5–10% TDD supplemental insulin or usual correction bolus - Usual bolus to cover CHO
0.6–1.5 Elevated Ketonemia <i>Consider rate of change arrow</i>	5% TDD supplemental insulin + usual bolus to cover CHO 30–45 g CHO every 2–4 h	10% TDD supplemental insulin or 1.5x correction bolus - Usual bolus to cover CHO 30 g CHO every 2–4 h	10% TDD supplemental insulin or 1.5x correction bolus - Usual bolus to cover CHO every 2–4 h
>1.5–<3.0 High Impending DKA <i>Consider rate of change arrow</i>	10% TDD supplemental insulin + usual bolus to cover CHO 30–45 g CHO every 2–4 h	20% TDD supplemental insulin or 2x correction bolus - Usual bolus to cover CHO 30–45 g CHO every 2–4 h	20% TDD supplemental insulin or 2x correction bolus - Usual bolus to cover CHO every 2–4 h
≥3.0 Urgent high Probable DKA	10% TDD supplemental insulin + usual bolus to cover CHO 30–45 g CHO every 2–4 h	20% TDD supplemental insulin or 2x correction bolus - Usual bolus to cover CHO 30–45 g CHO every 2–4 h	20% TDD supplemental insulin or 2x correction bolus - Usual bolus to cover CHO every 2–4 h
DKA is likely if ketones remain ≥3 mmol/L (continuous ketone system alarm) despite supplemental insulin			

Modified from Goldenberg RM, et al. *Diabetes Obes Metab.* 2019;21:2192–202. Recommendations for adults may be adapted for children and adolescents.

*If using an insulin pump, correct with a one-time bolus using the pump, if no change use insulin injection to bolus and change pump infusion set immediately.

†If symptoms do not match CGM readings, ensure a capillary blood-glucose test is performed before considering euglycemic DKA.

CGM continuous glucose monitoring; CHO, carbohydrate; DKA, diabetic ketoacidosis; TDD, total daily dose (of insulin).

Miller EM, et al. Presented at American Diabetes Association 2026 Scientific Sessions, New Orleans, LA, USA, June 5–8, 2026. Abstr. ADA-PN03-1.

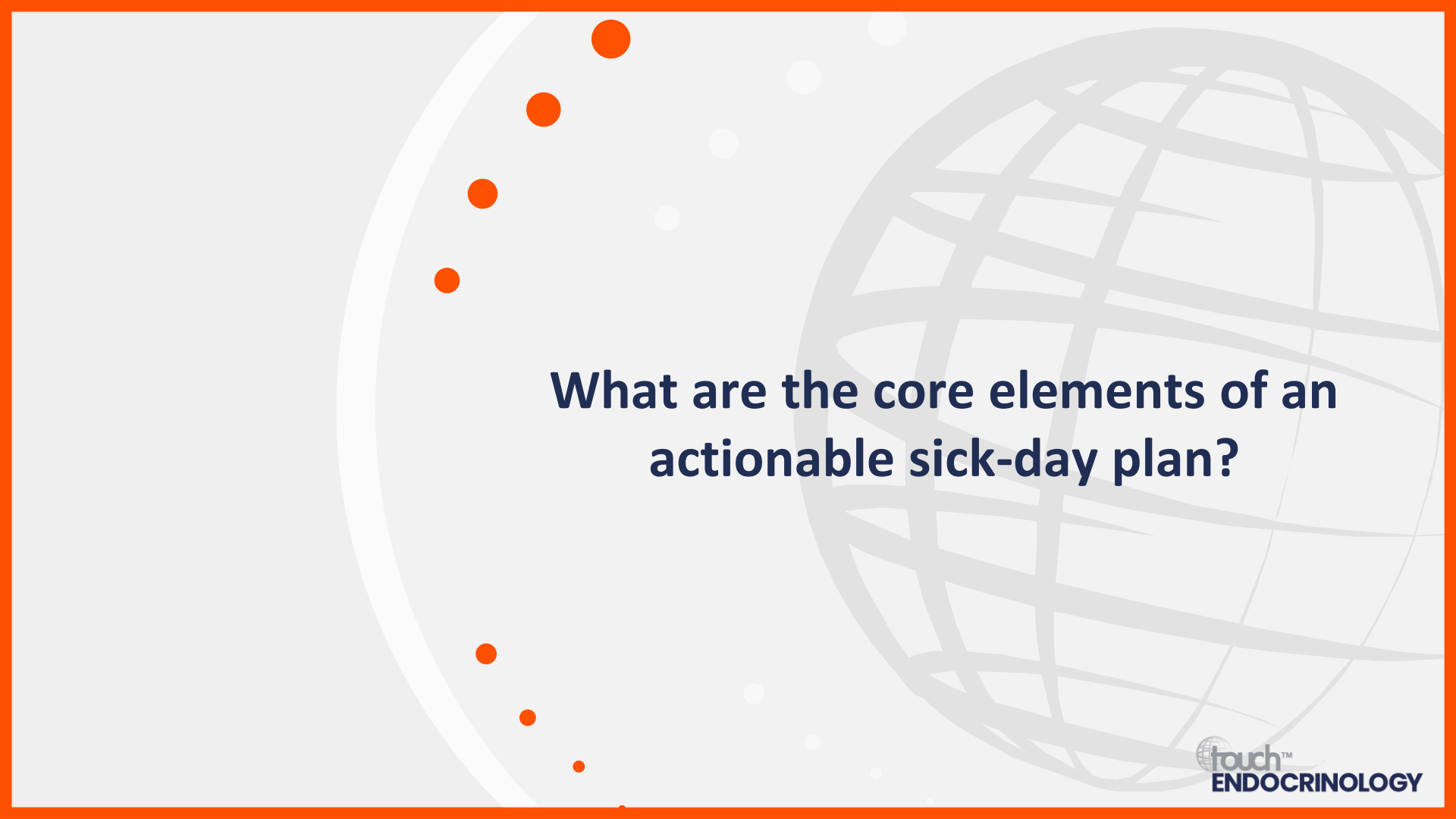
Patient and caregiver education: Actionable steps towards better outcomes

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**What are the core elements of an
actionable sick-day plan?**

Sick-day plan to reduce the risk of DKA

Medication and self-management

- Continue using regular insulin¹
- Temporarily halt SGLT2 inhibitor therapy²
- Stay hydrated¹
- Maintain carbohydrate intake¹
- Monitor and manage blood glucose¹
- Check for ketones every 4–6 hours^{1,3}

When to check ketones

- Acute illness^{4–6}
- Nausea/vomiting⁵
- Unexplained hyperglycemia^{4,5}
- Symptoms suggestive of DKA^{4–6}
- Missed insulin injection⁶

When to seek urgent care

- Persistent vomiting or diarrhea^{3,7}
- Worsening or high ketones^{3,7}
- Respiratory symptoms^{3,7}
- Inability to tolerate fluids⁷
- Blood sugar is <60 mg/dL⁷
- Lose ≥5 lbs (2.3 kg) during the illness⁷
- Fever over 101°F (38.3 °C) for 24 hours^{3,7}
- Confusion or severe fatigue^{3,6}

DKA, diabetic ketoacidosis; SGLT2, sodium-glucose co-transporter 2.

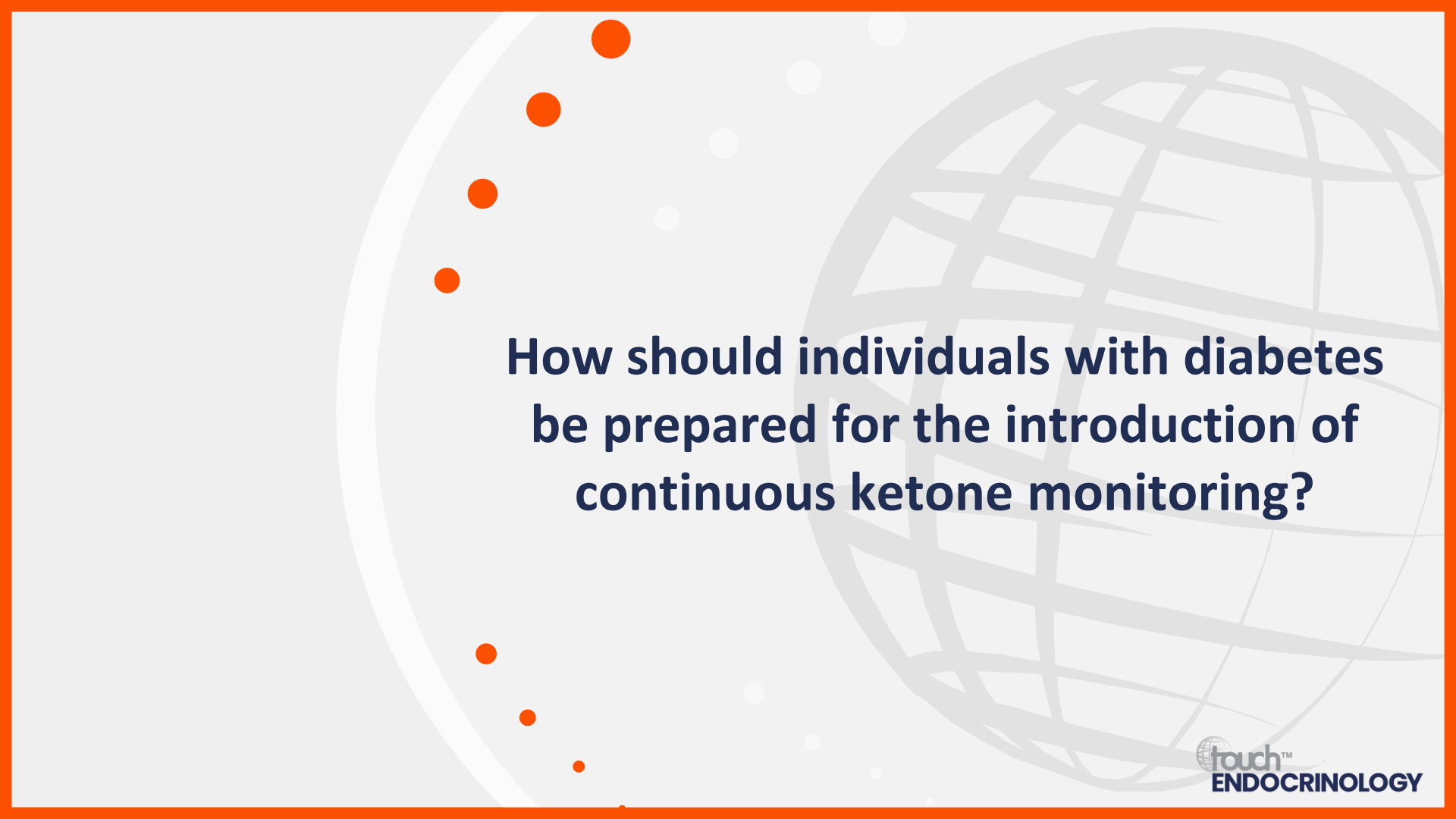
1. Breakthrough T1D. Available at: <https://bit.ly/4uriCLz> (accessed May 13, 2026); 2. Umpierrez GE, et al. *Diabetes Care*. 2024;47:1257–75; 3. American Diabetes Association. Available at: <https://bit.ly/4dEONRn> (accessed May 13, 2026); 4. CDC. 2024. Available at: <https://bit.ly/4djBZ1x> (accessed May 13, 2026); 5. American Diabetes Association. 2019. Available at: <https://bit.ly/42vGfWY> (accessed May 13, 2026); 6. Cleveland Clinic. 2023. Available at: <https://bit.ly/4twnWMC> (accessed May 13, 2026); 7. CDC Diabetes. 2024. Available at: <https://bit.ly/3OZbgIT> (accessed May 12, 2026).



**What barriers may lead to
sick-day education failure in
real-world practice?**



**What communication tactics
can be used to enable rapid
sick-day education?**



**How should individuals with diabetes
be prepared for the introduction of
continuous ketone monitoring?**