LEARN ABOUT **CHECKING KETONES TO HELP PREVENT DKA.**

See the role ketones play in diabetes and how to recognize and address symptoms early to help prevent diabetic ketoacidosis (DKA)[1].

Please see references on the back cover.

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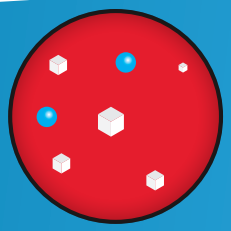
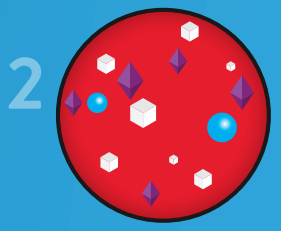
What are ketones and how do they form in the body?

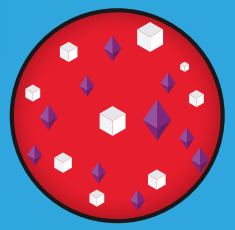
Ketones are something people with diabetes need to watch for to help prevent a life-threatening emergency called diabetic ketoacidosis (DKA)[2].



Hyperglycemia[3,4]
Your body doesn't have enough insulin to turn glucose into energy, causing the glucose level in your blood to get too high[2].



Ketosis[3,4]
Your body breaks down fat for energy instead, causing a by-product called ketones to build up in the blood[2].



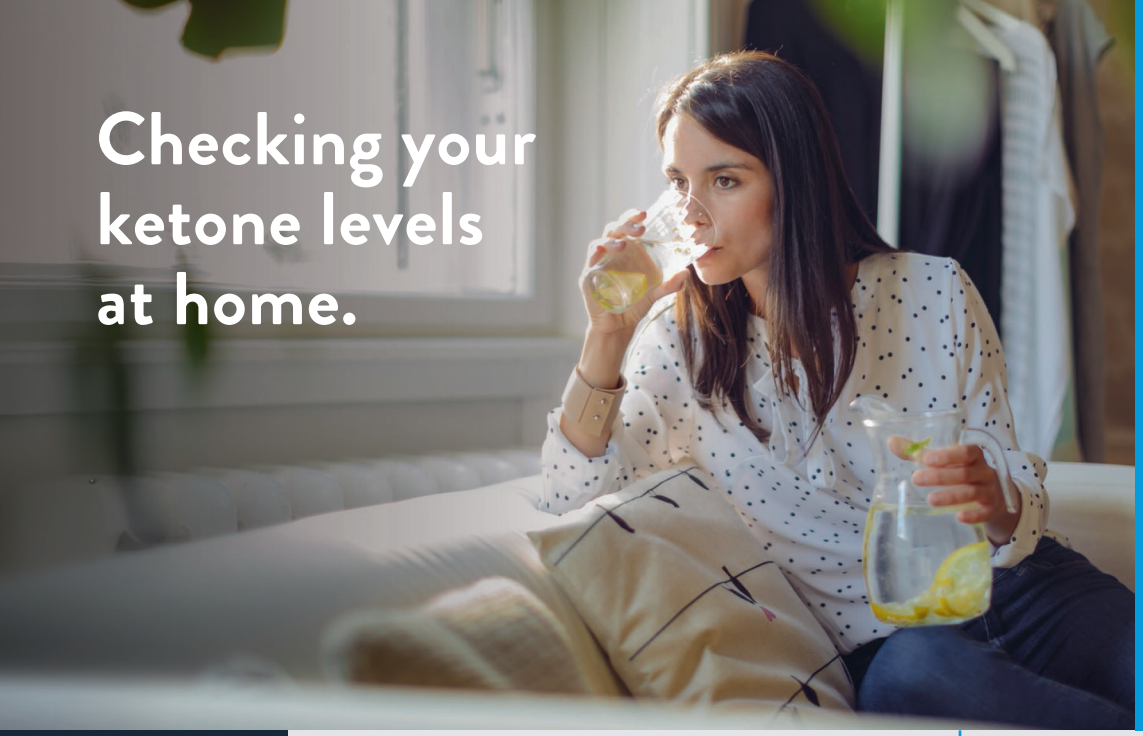
Ketoacidosis[3,4]
Ketone levels get dangerously high and make your blood acidic, which can lead to a DKA emergency that requires immediate medical care[2].

Symptoms you may notice[2,4,5]**:**	• Thirst • Dry mouth • Frequent urination • Blurred vision	• Upset stomach or constipation • Headache, brain fog, or insomnia • Fatigue • Bad breath	• Nausea, vomiting, or abdominal pain • Constant tiredness • Dry or flushed skin • Difficulty breathing • Fruity breath odor • Difficulty paying attention • Confusion
Glucose and ketone levels[2,4,6,7]**:**	• Glucose: ≥200 mg/dL • Ketones: normal to trace amount in urine or <0.6 mmol/L in blood	• Glucose: ≥200 mg/dL • Ketones: small amount in urine or 0.6 to 1.5 mmol/L in blood	• Glucose: ≥200 mg/dL • Ketones: moderate to large amount in urine or ≥1.6 mmol/L in blood

Taking SGLT2 (sodium-glucose co-transporter-2) inhibitors? High ketones and DKA can occur even when glucose levels are normal or only slightly elevated[3].

Using an insulin pump? When your glucose is high, always be sure to check your infusion site[1].

Please see references on the back cover.



Checking your ketone levels at home.

Current options for self-testing use urine or blood to confirm when ketone levels are elevated. It's important to test ketone levels when you[3,8]:

- Notice symptoms of rising ketones
- Miss insulin doses
- Have high glucose levels
- Are sick, injured, or stressed

Test	Urine ketone test strips	Blood ketone meter and test strips
How it works[6]	1. Dip the strip into urine sample 2. Compare color of strip to the provided ketone color chart	1. Prick finger 2. Collect blood on test strip 3. Insert strip into meter to read your ketone level
Results[4,6,9]	• Range from trace to large amounts of ketones • Can lag behind actual ketone levels by a few hours	• Range from <0.6 to >3.0 mmol/L • Real-time ketone levels (considered most accurate)
Keep in mind[5,9]	Urine test strips have a shorter shelf life.	Blood ketone test strips have a longer shelf life. Also, a separate blood ketone meter is required.

Urine and blood tests show ketone levels at a single point in time, so be sure to repeat testing to monitor changes in your condition[1,10].

Please see references on the back cover.

Do you feel prepared to recognize rising ketones and help prevent DKA?

Work with your healthcare provider to set yourself up for success[1].

- ☐ Ask how to include ketone monitoring in your diabetes care plan.
- ☐ Periodically review symptoms of rising ketones and what to do when they occur.
- ☐ Periodically review symptoms of a DKA emergency and when to seek immediate medical care.

Additional guidance from your healthcare provider:

Stay on top of rising ketones at home.

1. **Keep a stock of unexpired ketone testing supplies.**
   - Ketone urine test strips and/or blood test strips and meter

2. **Be mindful of common causes of rising ketones[3,8].**
   - Missed insulin doses
   - Illness or injury
   - Some medications
   - Drug or alcohol use

3. **Recognize early symptoms of DKA[3-5,7].**
   - Thirst or a very dry mouth
   - Frequent urination
   - Glucose level ≥200 mg/dL
   - Moderate amount of ketones in urine or 1.6 to 3.0 mmol/L in blood

4. **Know later symptoms when they turn into a DKA emergency[3,4,7].**
   - Nausea, vomiting, or abdominal pain
   - Constant tiredness
   - Dry or flushed skin
   - Difficulty breathing
   - Fruity breath odor
   - Difficulty paying attention
   - Confusion
   - Glucose level ≥200 mg/dL
   - Large amount of ketones in urine or ≥3.0 mmol/L in blood

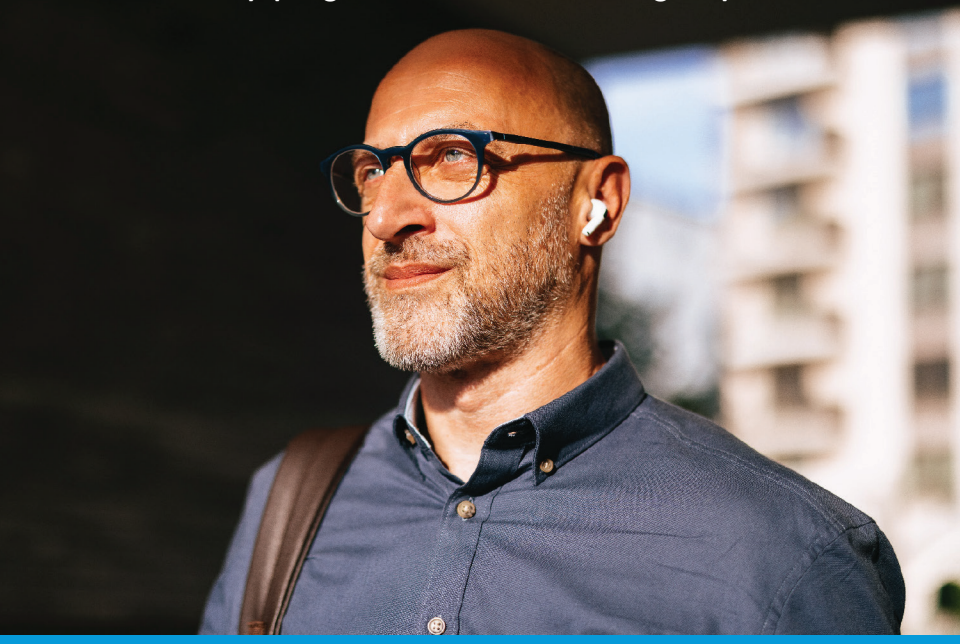
5. **Have a plan in place so you'll know when to take action.**
   - Talk with your healthcare provider so you'll know what to do when you experience symptoms of rising ketones and when to seek emergency care.

DKA=diabetic ketoacidosis.

Please see references on the back cover.

RECOGNIZE. CHECK. ACT.

Recognize the causes and early symptoms of rising ketones so you can check ketone levels and act before they progress into a DKA emergency[1].



DKA=diabetic ketoacidosis.

1. Nguyen, K. T. *Journal of Diabetes Science and Technology* (2022). https://doi.org/10.1177/19322968211042656. **2.** American Diabetes Association. "Diabetes & DKA (Ketoacidosis)." https://diabetes.org/about-diabetes/complications/ketoacidosis-dka/dka-ketoacidosis-ketones. **3.** Umpierrez, G. E. *Diabetes Care* (2024). https://doi.org/10.2337/dci24-0032. **4.** Cleveland Clinic. "Ketones in Urine." Accessed November 26, 2024. https://my.clevelandclinic.org/health/articles/ketones-in-urine. **5.** Mayo Clinic. "Hyperglycemia in Diabetes." Accessed November 26, 2024. https://www.mayoclinic.org/diseases-conditions/hyperglycemia/symptoms-causes/syc-20373631. **6.** Cleveland Clinic. "Ketones." Accessed November 26, 2024. https://my.clevelandclinic.org/health/body/25177-ketones. **7.** Danne, T. *Diabetes Care* (2019). https://doi.org/10.2337/dc18-2316. **8.** Centers for Disease Control and Prevention. "About Diabetic Ketoacidosis." Accessed November 26, 2024. https://www.cdc.gov/diabetes/about/diabetic-ketoacidosis.html. **9.** Huang, J. *Journal of Diabetes Science and Technology* (2024). https://doi.org/10.1177/19322968231152236. **10.** American Diabetes Association. "Planning for Sick Days." Accessed November 26, 2024. https://diabetes.org/getting-sick-with-diabetes/sick-days.

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