

患病/酮控制

什么是酮？

酮是脂肪分解的废物。当身体没有足够的胰岛素将葡萄糖转入细胞内生成能量时，细胞就会饥饿。身体会通过分解脂肪获取能量来作出反应，这会导致血液和尿液中产生酮。

为什么要检测酮？

检测酮体**非常重要**！

体内高水平的酮会导致**糖尿病酮症酸中毒 (DKA)**，这可能会很严重。

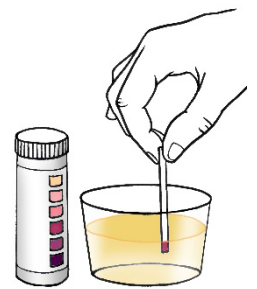
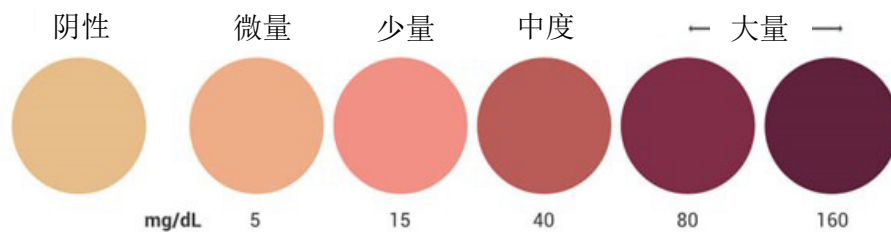
何时检测酮？

- 当血糖检测连续两次超过 250 mg/dL 时
- 当您的孩子生病时，无论血糖值多少
- 当您的孩子呕吐时

如何检测尿液或血液中的酮？

尿酮检测

1. 将一滴尿液滴在酮条的方形顶端上
2. 15 秒后立即将酮条颜色与瓶子上的色图进行对比



当您打开一瓶新的酮条时，在瓶子上写下今天的日期。

一旦打开，酮条可使用 2 到 6 个月，具体时间取决于制造商。

血酮检测

1. 将酮条放入仪表内，滴一滴血
2. 将仪表读数与下表进行比较

阴性、微量或少量	低于 0.6 mmol/L
中度	0.6 - 1.5 mmol/L
大量	超过 1.5 mmol/L



血酮仪表

如需了解更多详情

- 内分泌科
206-987-2640
- 请向您的孩子的医疗保健提供者询问
- seattlechildrens.org/patient-education

免费口译员服务

- 在医院内，向您的护士询问。
- 在医院外，拨打免费家庭口译专线电话
1-866-583-1527。告诉口译员您需要通话的人的姓名或分机号码。



酮胰岛素剂量

当您的孩子体内有**中度或大量酮**时，他们将需要额外的胰岛素来清除酮，无论是使用注射还是胰岛素泵。请查阅下表中的剂量指南。

在以下情况下检测酮：

- 血糖连续两次检测超过 250 mg/dL，或超过 300 mg/dL 超过 3 小时。
- 孩子患病，无论血糖值多少
- 孩子呕吐

酮剂量表

酮水平	需要采取的行动
阴性、微量或少量	<p>如果血糖超出范围：</p> <ul style="list-style-type: none">• 给予高血糖的常规校正剂量• 多喝水• 每 3 小时检测一次血糖和酮，直到酮呈阴性
中度	<p>如果血糖超过 200 mg/dL：</p> <ul style="list-style-type: none">• 常规校正剂量 $\times 1.5$ = 需要给予的胰岛素剂量• 多喝水• 每 3 小时检测一次血糖和酮，进行校正直到酮呈阴性 <p>如果血糖低于 200 mg/dL：</p> <ul style="list-style-type: none">• 给予含糖饮料，如佳得乐（Gatorade）（不要用胰岛素矫正）• 每 15 分钟复查一次血糖，直到血糖超过 200，然后给予中度酮的额外剂量胰岛素
大量	<p>如果血糖超过 200 mg/dL：</p> <ul style="list-style-type: none">• 常规校正剂量 $\times 2$ = 需要给予的胰岛素剂量• 多喝水• 每 3 小时检查一次血糖和酮，进行校正直到酮呈阴性 <p>如果血糖低于 200 mg/dL：</p> <ul style="list-style-type: none">• 给予含糖饮料，如佳得乐（Gatorade）（不要用胰岛素矫正）• 每 15 分钟复查一次血糖，直到血糖超过 200，然后给予大量酮的额外剂量胰岛素

如果孩子想吃东西，请务必是在您给予矫正剂量胰岛素的同时，而不是介于两者之间。

如果 6 小时后酮仍然是大量，请拨打糖尿病紧急寻呼号码 206-987-2000。

胰岛素泵的酮管理措施

- 如果血糖超过 250 mg/mL 持续____小时，请改变注射部位，无论上次注射部位是何时插入针头，都应更换注射部位。
- 如果在更换部位后 90 min 内血糖未下降，请取下泵，**检查酮体情况**，并按照上图中的步骤进行手动注射。
- 您可以在注射后 90 min 内继续进行胰岛素注射泵治疗。如果在使用自动化系统，等待至下一次胰岛素给药时间（3 小时）。
- 一些泵提供不同的配置。有些胰岛素泵提供不同的配置。如果您编写了孩子生病或出现酮体时使用的病日配置，这将在您的泵启动培训课程中进行讨论。
- 在清除血酮体时，需要将自动化系统的自动化模式停用或完全停止该系统。
- 如胰岛素注射泵故障或损坏，请立即联系您的制造商。
- 了解在泵故障情况下如何查找最近的给药信息，这可能是在 **MyChart** 中的最近一次访视后总结中，也可能是在支持泵的电话申请的报告部分。

重要提示：这些指南旨在与任何胰岛素泵系统配合使用。每个单独的系统处理酮体和病日的方式都不同。这将在您的泵启动课程中讨论。如果您打电话，重要的是要让与您交谈的人知道您孩子使用的是哪种泵，以及您已经采取了哪些措施来减少酮体。

医务人员签名： _____

日期： _____

当您的患糖尿病的孩子生病时

当您的孩子患感冒或流感时：

- 无论血糖值是多少，酮都更容易形成。由于疾病的压力反应，血糖水平可能会上升
- 可能需要更多的胰岛素来预防或治疗酮症
- 您需要在体内保留足够的胰岛素和碳水化合物，帮助抵抗感染

当您的孩子患病时，请遵守此处的指南：

- **每 3 小时**查一次血糖，直到您的孩子连续 24 小时酮呈阴性
- **每 3 小时**查一次酮，直到您的孩子连续 24 小时酮呈阴性
- **保持不脱水**。让您的孩子喝大量的饮料。
- 始终给予长效胰岛素（Lantus、Basaglar、Tresiba），即使您的孩子不在进食
- 有关胰岛素剂量的说明，请参阅本手册第 2 页中的酮剂量表

当您的孩子呕吐时：

- 每 15 分钟喝一小口（1 汤匙）清液含糖饮料（例如姜味汽水（Ginger Ale）或佳得乐（Gatorade））
- 如果 30 分钟后没有呕吐，每 15 分钟将饮料量增加到 2 盎司（1/4 杯）
- 如果再次呕吐，让孩子的胃休息一小时，然后重新开始喝少量饮料
- 继续每 3 小时查一次血糖和酮。有关胰岛素剂量的说明，请参阅本手册第 2 页中的酮剂量表

寻求帮助警告迹象是什么？

如果您的孩子体内有大量酮并出现以下任何症状，请前往急诊室：

- 胸闷
- 呼吸困难
- 精神状态改变
- 剧烈胃痛
- 您的孩子严重脱水，无法查尿酮
- 您的孩子已经呕吐两次，无法耐受任何食物或饮料

如果对以上任何说明不确定，请拨打电话号码 **206-987-2000**，要求儿童医院接线员为您传呼糖尿病团队成员。

Sick Days/Ketone Management

What are ketones?

Ketones are a waste product of fat breakdown. When your body does not have enough insulin to move glucose into the cells for energy, the cells are hungry. The body responds by breaking down fat for energy, which can result in ketones in your blood and urine.

Why check for ketones?

Checking ketones is **very** important!
A high level of ketones in the body can lead to **diabetic ketoacidosis (DKA)**, which can be serious.

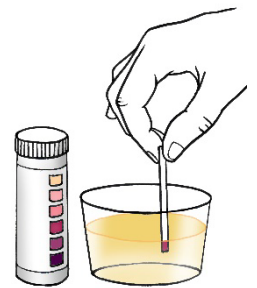
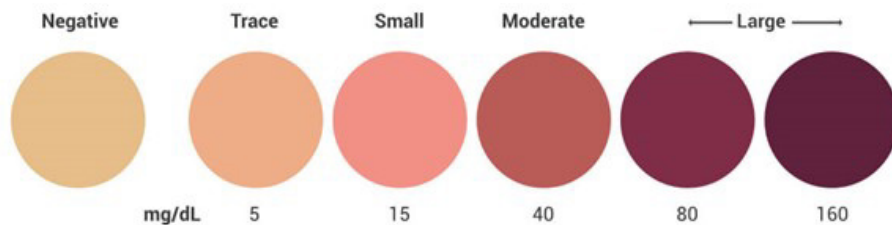
When to check for ketones?

- When the blood glucose is over 250 mg/dL twice in a row
- When your child is sick, regardless of the blood glucose numbers
- When your child is vomiting

How to check for ketones in urine or blood

Urine ketone check

1. Apply a drop of urine onto the square tip of the ketone strip
2. Compare the strip color with the color chart on the bottle **in exactly 15 seconds**



When you open a new bottle of ketone strips write today's date on the bottle. Once opened, they are good for 2 to 6 months depending upon manufacturer.

Blood ketone check

1. Put ketone strip into meter and apply a drop of blood
2. Compare the meter reading to the chart below

Negative, trace or small	Below 0.6 mmol/L
Moderate	0.6 to 1.5 mmol/L
Large	Above 1.5 mmol/L



Blood ketone meter

To Learn More

- Endocrinology
206-987-2640
- Ask your child's healthcare provider
- seattlechildrens.org/patient-education

Free Interpreter Services

- In the hospital, ask your nurse.
- From outside the hospital, call the toll-free Family Interpreting Line, 1-866-583-1527. Tell the interpreter the name or extension you need.



Ketone Insulin Dosing

When your child has **moderate or large ketones**, they will need extra insulin to clear the ketones. Regardless of if using injections or on an insulin pump. Please refer to the table below for dosing guidelines.

Check for ketones when:

- Blood glucose is over 250 mg/dL twice in a row, or if over 300 mg/dL for more than 3 hours.
- Child is sick, regardless of blood glucose numbers
- Child is vomiting

Ketone Dosing Table

Ketone level	Action to take
Negative, Trace or Small	<p>If blood glucose is above range:</p> <ul style="list-style-type: none"> • Give usual correction dose for high blood glucose • Drink extra water • Check blood glucose and ketones every 3 hours until ketones are negative
Moderate	<p>If blood glucose is above 200 mg/dL:</p> <ul style="list-style-type: none"> • Give usual correction dose x 1.5 = insulin dose to give • Drink extra water • Check blood glucose and ketones every 3 hour and give corrections until ketones are negative <p>If blood glucose is under 200 mg/dL:</p> <ul style="list-style-type: none"> • Give sugary liquids like Gatorade (do not cover with insulin) • Recheck blood glucose every 15 minutes until blood glucose is above 200, and then give extra insulin for moderate ketones.
Large	<p>If blood glucose is above 200 mg/mL:</p> <ul style="list-style-type: none"> • Give usual correction dose x 2 = insulin dose to give • Drink extra water • Check blood glucose and ketones every 3 hours and give corrections until ketones are negative <p>If blood glucose is under 200 mg/mL:</p> <ul style="list-style-type: none"> • Give sugary liquids like Gatorade (do not cover with insulin) • Recheck blood glucose every 15 minutes until blood glucose is above 200, and then give extra insulin for large ketones.

If child wants to eat, make sure it is at the same time you are giving corrections and not in-between.

If ketones continue to be large after 6 hours, call the diabetes urgent pager at 206-987-2000.

Actions for Ketone Management on Insulin Pumps

- If blood sugars are more than 250 mg/mL for ____ hours, change the injection site regardless of when last site was inserted. A bad site is the main cause of ketones on pumps.
- If blood sugar does not come down within 90 minutes of changing site remove the pump, **check for ketones** and give a manual injection following the steps on the chart above.
- You can continue with pump therapy 90 minutes after injection. if on an automated system, wait until the next dose of insulin would be due (3 hours).
- Some pumps offer different profiles. If yours does program a sick day profile to use when your child is ill or has ketones, this will be **discussed during your pump start class**.
- Automated systems will need to be taken out of automated mode or stopped completely while clearing ketones.
- If your pump has failed or is broken, contact your manufacturer right away.
- Know where to find your most recent dosing information in case of pump failure, this is either in your last **After Visit Summary** found in **MyChart**, or in the report section of the phone application that supports your pump.

Important: These guidelines are designed to work with any insulin pump system. Each individual system manages ketones and sick days differently. This is discussed in your pump start class. If you call, it is important to let the person you talk to know what pump your child is on and what actions you have already taken to reduce ketones.

Provider Signature: _____

Date: _____

When Your Child with Diabetes is Sick

When your child is sick with a cold or flu:

- Ketones are more likely to develop no matter what the blood glucose numbers are. Blood glucose levels may rise due to the stress response of illness.
 - More insulin may be required to prevent or treat ketones
 - You will need to keep enough insulin and carbohydrates in the body to help fight the infection
-

Follow these guidelines when your child is sick:

- **Check blood glucose every 3 hours** until your child has negative ketones for 24 hours
- **Check ketones every 3 hours** until your child has negative ketones for 24 hours
- **Stay hydrated.** Give your child lots of liquids.
- Always give long-acting insulin (Lantus, Basaglar, Tresiba), even if your child is not eating
- Refer to the Ketone Dosing Table on page 2 of this handout for instructions on dosing insulin

When your child is vomiting:

- Give small sips (1 tablespoon) of clear sugar-containing liquids (like Ginger Ale or Gatorade) every 15 minutes
- If there is no vomiting after 30 minutes, increase the amount of liquids to 2 ounces (1/4 cup) every 15 minutes
- If vomiting restarts, rest your child's stomach for another hour and then restart the small amount of liquids
- Continue checking blood glucose and ketones every 3 hours and refer to the Ketone Dosing Table on page 2 of this handout for instructions on insulin dosing

What are the warning signs to seek help?

Go to the Emergency Department if your child has large ketones and any of the following symptoms:

- Chest heaviness
- Trouble breathing
- Change in mental status
- Severe stomach pain
- Your child is too dehydrated to check for urine ketones
- Your child has vomited twice and can't keep anything down

If uncertain about any of these instructions, please call 206-987-2000 and ask the Children's operator to page the diabetes team for you.