Glucometer Testing for MCFRS EMT Users

Montgomery County Fire Rescue Service

July 1, 2014 Rollout

Forward

Newly added to your 2014 Maryland Medical Protocols is Blood Glucose Monitoring, an Optional Supplemental Program endorsed by our Medical Director, Rodger Stone, MD

One should consider this presentation an overview of the equipment selected for use by the Montgomery County Fire Rescue Service, a review of the applicable protocol, and didactic instruction for intended use of that monitoring equipment.

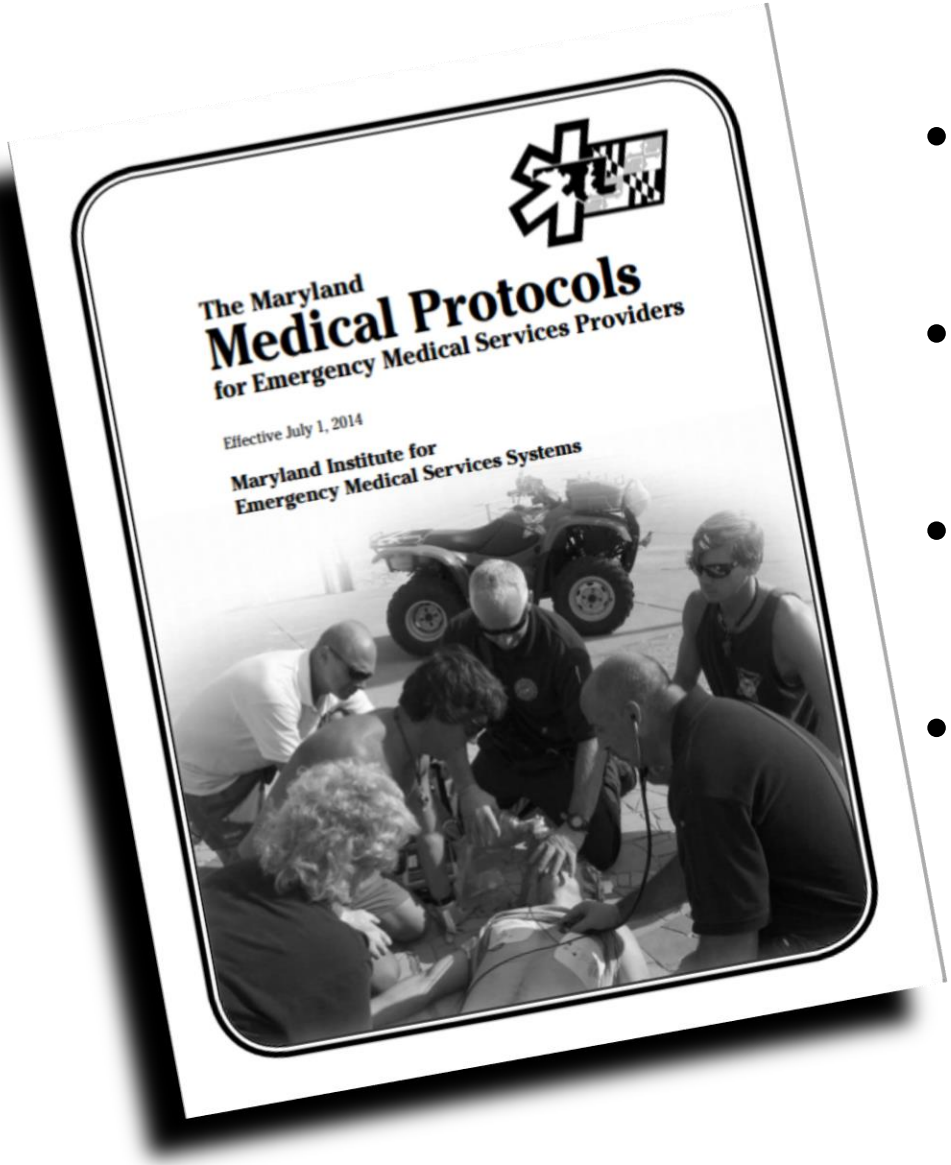
Objectives

- The viewer shall understand the indications for use of blood glucose testing through detailed explanation of the Maryland Medical Protocols Optional Supplemental Program effective July 1, 2014.
- Upon completion of this presentation, the viewer shall be familiarized with the function of the FreeStyle Precision H Blood Glucose Meter.

Objectives

- The viewer shall be exposed to all of the items issued in the glucometer kit, it's proper configuration, and can locate the items therein for correct and most importantly, safe use.
- Once complete, the viewer will have a thorough knowledge of and can demonstrate the proper steps for blood glucose testing, troubleshooting common issues and error codes, and steps to overcome them.

2014 Maryland Medical Protocols



- Optional Supplemental Program
- Endorsed by our Medical Director
- Applies to all MCFRS EMT's
- Page 274-6

OPTIONAL SUPPLEMENTAL PROGRAM
BLS GLUCOMETER PROTOCOL
(EMT ONLY) (NEW '14)

Q4. BLS GLUCOMETER PROTOCOL (NEW '14)

(EMT ONLY)

a) PURPOSE

The glucometer should be utilized by BLS providers to determine the blood glucose level in an attempt to determine the etiology of the patient's condition and provide treatment tailored to the needs of the patient before ALS intervention can be made.

b) INDICATIONS

The glucometer should be utilized for any patient presenting with an altered mental status, seizure activity, or unresponsiveness.

c) TREATMENT

Utilize the glucometer to determine the patient's blood glucose level. If the glucose level is less than 70 mg/dl:

(1) ADULT: Administer glucose paste (10–15 grams) between the gum and cheek. Consider single additional dose of glucose paste if not improved after 10 minutes.

(2) PEDIATRIC: Administer glucose paste (10–15 grams) between the gum and cheek; this may be accomplished through several small administrations. Consider single additional dose of glucose paste if not improved after 10 minutes.

IF THE GLUCOSE LEVEL IS GREATER THAN 100 MG/DL, DO NOT ADMINISTER GLUCOSE PASTE.

Causes of Altered Mental Status

- **A**lcoholism
- **E**pilepsy
- **I**nsulin
- **O**verdose
- **U**nderdose
- **T**rauma
- **I**nfection
- **P**sychiatric
- **S**troke

AEIOU-TIPS

Diabetic Emergencies

HYPO Glycemia

- Blood glucose level of 80 or less.
- Most calls for diabetic emergency.

HYPER Glycemia

- Blood glucose level of 120 or higher
- Most common but least calls to EMS

Causes of Hypoglycemia

- Small, delayed, or skipped meals
- Excessive doses of insulin, the wrong mixture, of diabetic medicines, often without eating a meal or enough of a meal
- Some rx interactions
- Increased exercise
- Excessive alcohol

Hypoglycemia

- Signs and symptoms:
  - Hunger
  - Nervousness or shakiness
  - Perspiration
  - Dizziness or light-headedness
  - Sleepiness or weakness
  - Confusion
  - Difficulty speaking
  - Unresponsiveness

Treatment of Hypoglycemia

- **<u>Conscious patient:</u>**
  - Keep the patient warm and dry and place them on high-flow oxygen
- If the patient has not already done so, check the patient's blood glucose level
- Administer oral glucose per protocol
- Consider calling for ALS

Treatment of Hypoglycemia

- **<u>Unconscious patient:</u>**
  - **CALL ALS IMMEDIATELY FOR ALL AMS / UNCONSCIOUS PATIENTS**
- Treat the patient for shock
- Assist ventilations as needed
- Check the patient's blood glucose level
- Administer oral glucose per protocol
- Take vital signs often and monitor for changes
- Be prepared for vomiting, seizures and/or cardiac arrest

Hyperglycemia

- Signs and symptoms
  - Frequent urination
  - Increased thirst
- May lead to Ketoacidosis

What is Ketoacidosis?!

Ketoacidosis

- D.K.A: “Diabetic Coma”
- Life-threatening issue
- Signs and symptoms:
  - Shortness of breath/ difficulty breathing
    - Kussmaul’s respirations
  - Fruity smelling breath
  - Nausea and vomiting
  - “Cotton-mouth”, constantly licking lips
  - Unconsciousness

Treatment for Ketoacidosis

- **<u>Conscious patient:</u>**
  - Keep the patient warm and dry and place them on high-flow O2
- If the patient has not already done so, check their blood glucose with a glucometer
  - Take vital signs often and watch the patient for changes in consciousness
  - Provide supportive care, consider ALS?
- There is no real pre-hospital “treatment” to correct hyperglycemia

Treatment for Hyperglycemia

- **<u>Unconscious patient:</u>**
  - **CALL ALS IMMEDIATELY FOR ALL AMS / UNCONSCIOUS PATIENTS**
- Treat the patient for shock
- Assist ventilations as needed
- Check the patient's blood glucose level
- Administer oral glucose per protocol
- Take vital signs often and monitor for changes
- Be prepared for vomiting, seizures and/or cardiac arrest

Pre-Hospital Care (per protocol…)

1. Scene Safety/Survey
2. Perform initial assessment
3. May require airway control, definitely oxygen
4. Ensure cervical spine immobilization as indicated
5. Consider ALS if early and request as necessary

Pre-Hospital Care (per protocol…)

5. Perform focused history and physical exam

   (a). **SAMPLE** history

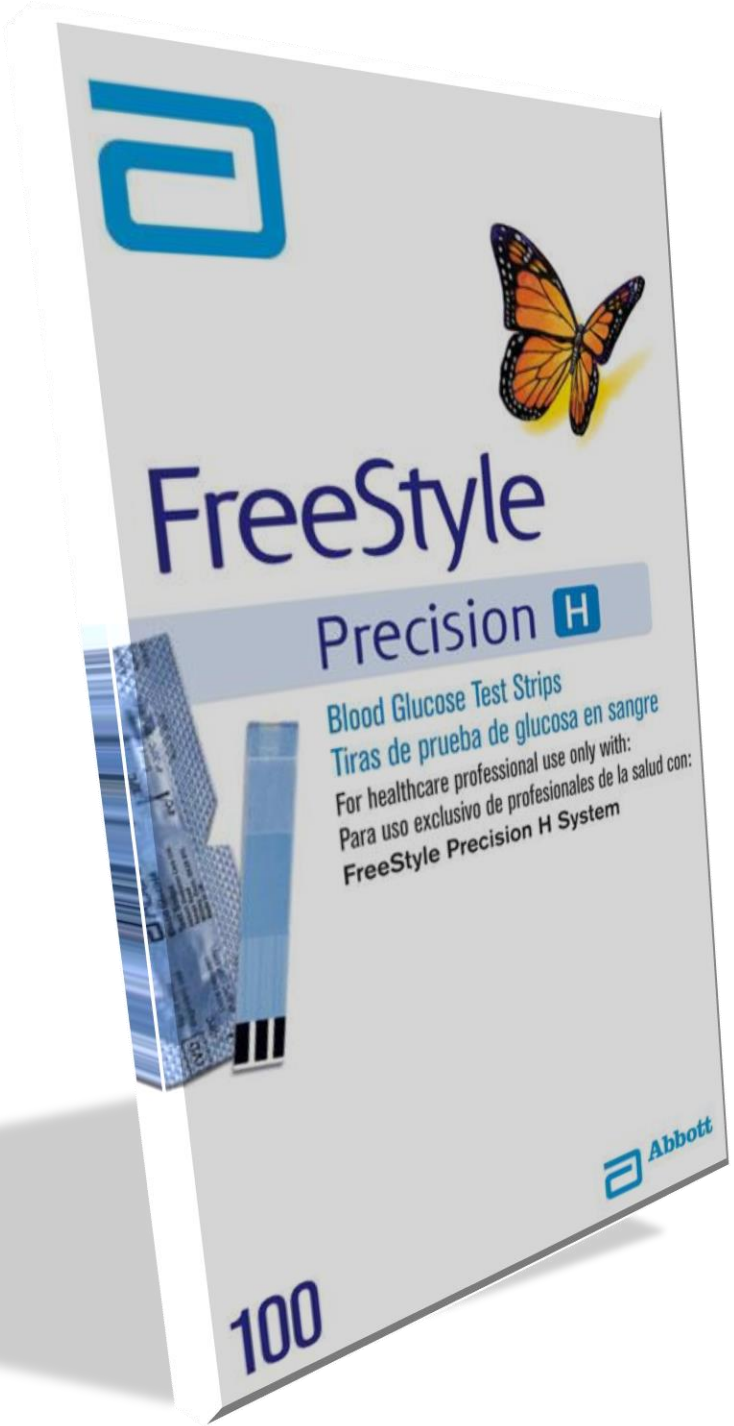
   1. **S**igns/**S**ymptoms (When did they start? How long did they last?)
   2. **A**llergies
   3. **M**edications (When & what was last taken?)
   4. **P**rior Medical History (Diabetes? Seizure disorder?)
   5. **L**ast oral intake (When did patient last eat?)
   6. **E**vents leading to illness/injury

Pre-Hospital Care (per protocol…)

- Focused history & physical exam, cont.
- Take base line vital signs
- Determine blood glucose level
- Evidence of hypothermia/hyperthermia?
- Can the patient swallow normally?

Pre-Hospital Care (per protocol…)

- Consider calling for ALS often – REASSESS!
- If patient is unconscious or has stopped seizing, transport on left side
- If patient's BP drops below 100 systolic; treat for shock
- Monitor VS Q 5 minutes if unstable; Q 15 minutes if stable
- Notify receiving hospital as soon as possible



FreeStyle Precision H Blood Glucose Meter

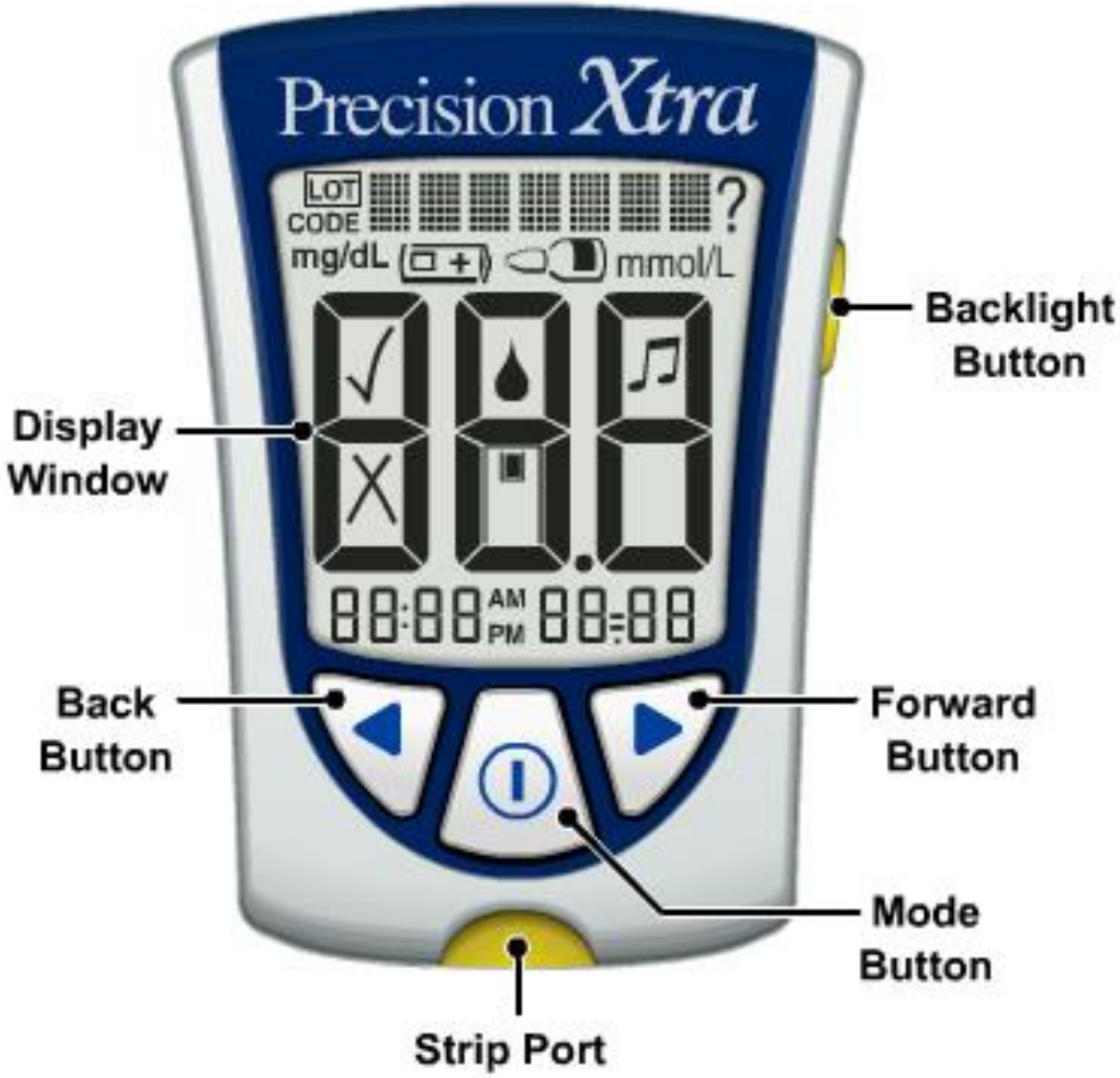
The FreeStyle Precision H Meter

- Is indicated for home or professional use in the management of patients with diabetes.
- Simple, durable, with a minimum of care from the user.

The FreeStyle Precision H Meter

- Is for monitoring glucose in **fresh** whole blood (for example, from the fingertip).
- Use only **Precision Xtra®** Blood Glucose Test Strips, other test strips may produce inaccurate results.
- Please refer to your test strip instructions for use for important information about sample types that may be used with these test strips.

Let's Get to Know Your Meter…



Display Window

- This shows…
- Blood glucose results.
- Previous test results and error messages.
- Blood glucose averages.
- Battery Level.
- Lot code.

Backlight Button

Backlight Button

- Use this button to:
- Turn the amber backlight ON and OFF.

Forward / Back Button

Back Button

Forward Button

- Use these buttons to:
- Review and select meter settings.
- Review results and averages.
- 450 saved tests
  - 7 – 14 – 30 day averages

Mode Button

Mode Button

- Use this button to:
- Turn meter ON and OFF.
- Access meter setup options.
  - Date, time, volume
- Access and save meter settings.

Strip Port

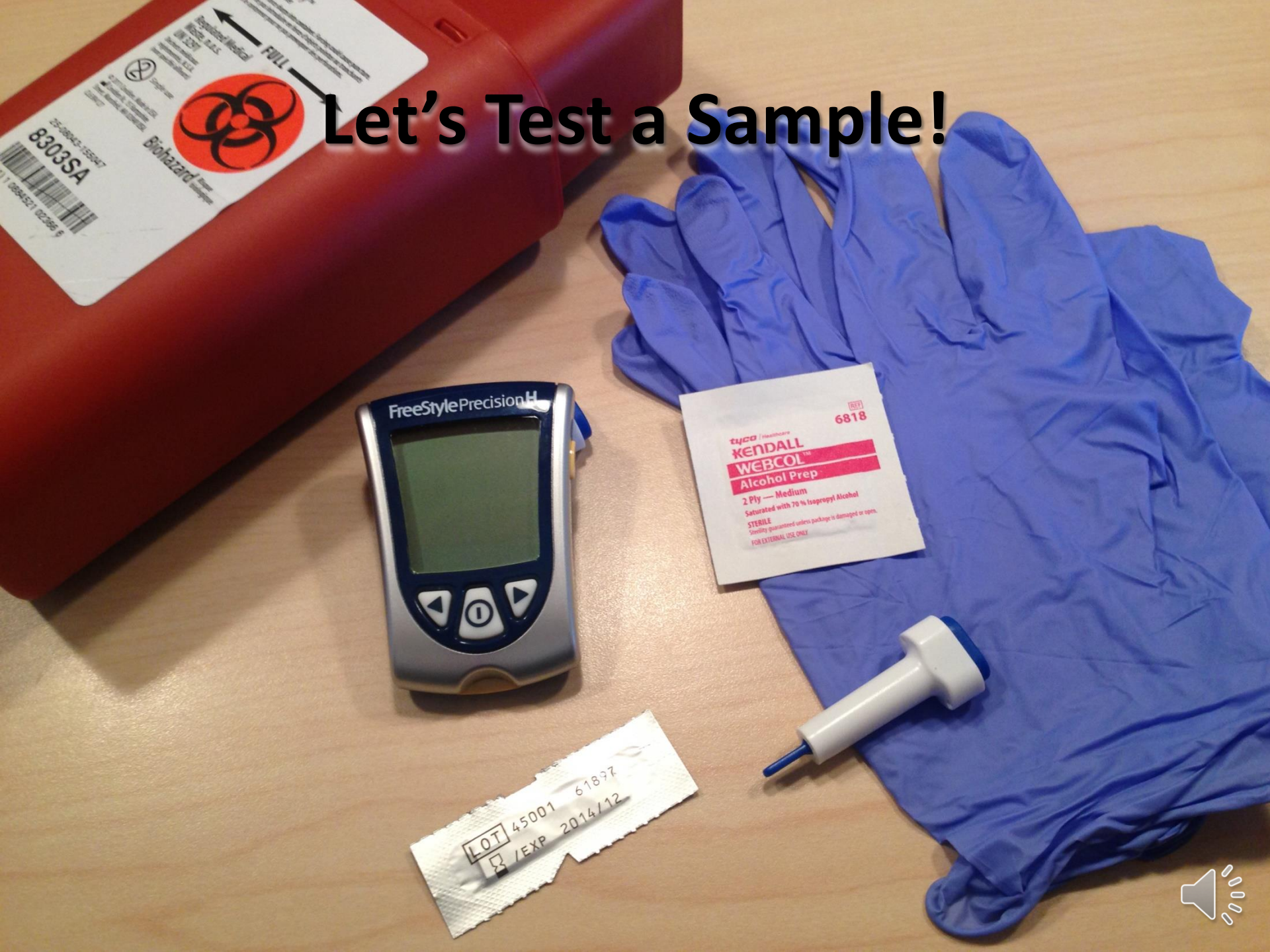
- This is where you insert:
- A blood glucose test strip.
- A coding strip.
- Once the strip port is activated, the unit will remain on for 30 seconds before timing out.

Battery Compartment

- This is where the battery is installed.
- Battery is good for 1,000 tests
- If your meter does not turn on, check that your battery is installed properly.

Here's What's in the Kit

Let’s Test a Sample!

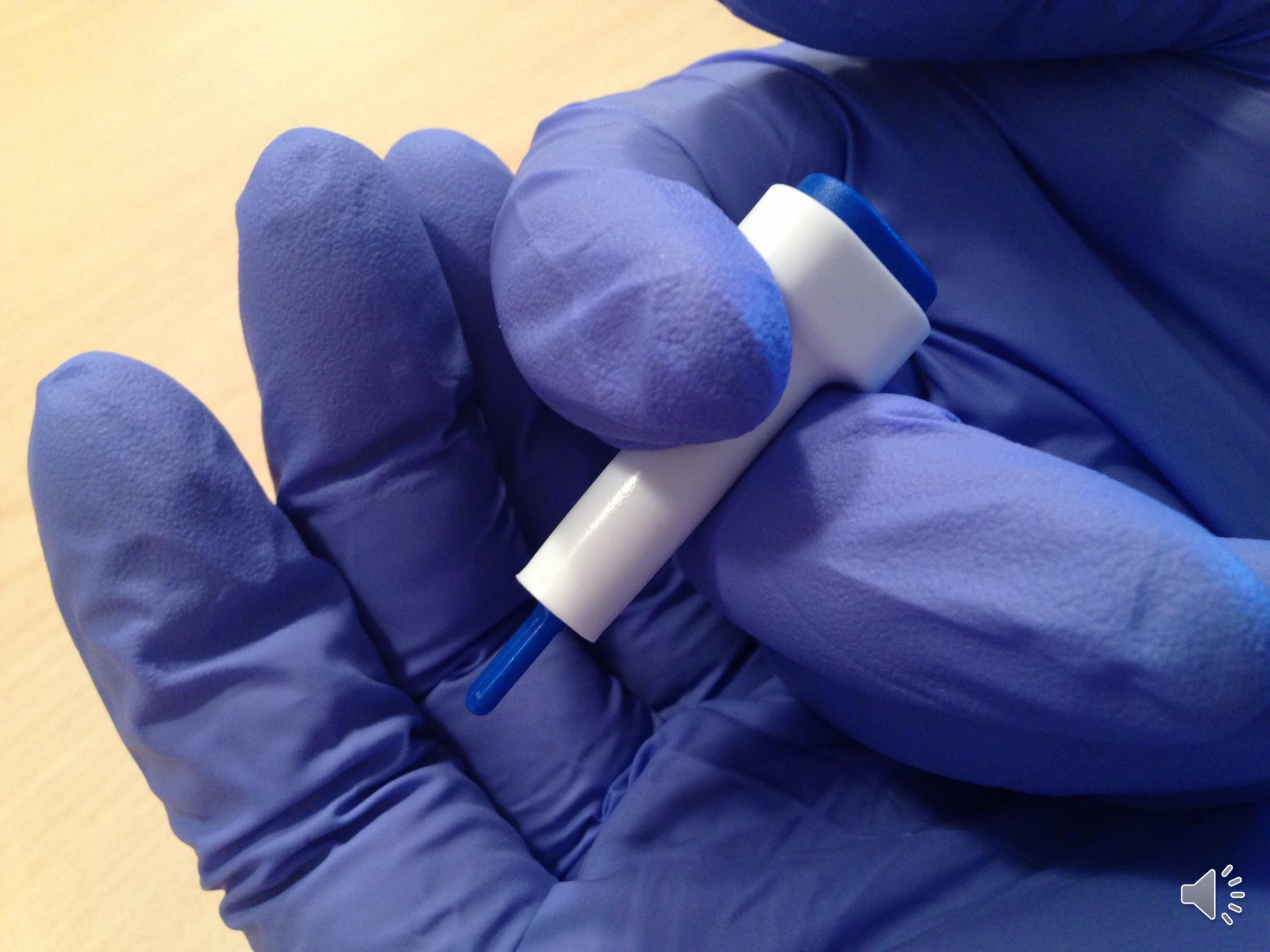


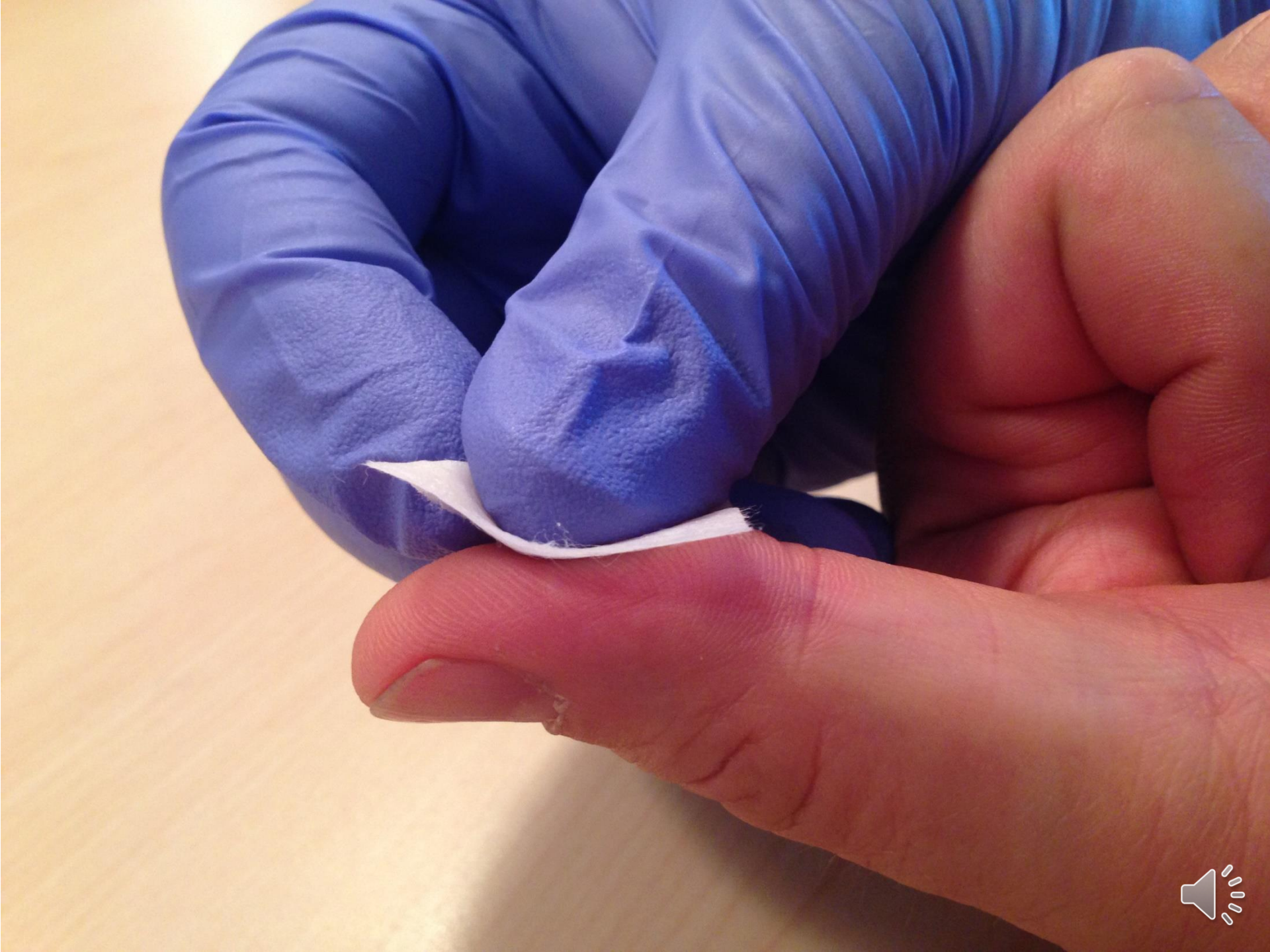

LOT 45001 61897
/EXP 2014/12


FreeStyle Precision H

FreeStylePrecision
IVD


FreeStylePrecision






FreeStylePrecisionH
61999


FreeStyle Precision H
:18


FreeStylePrecisionH
mg/dL
100
11:53
6:28

HI or LO Results?

HI equates to >500 mg/dL

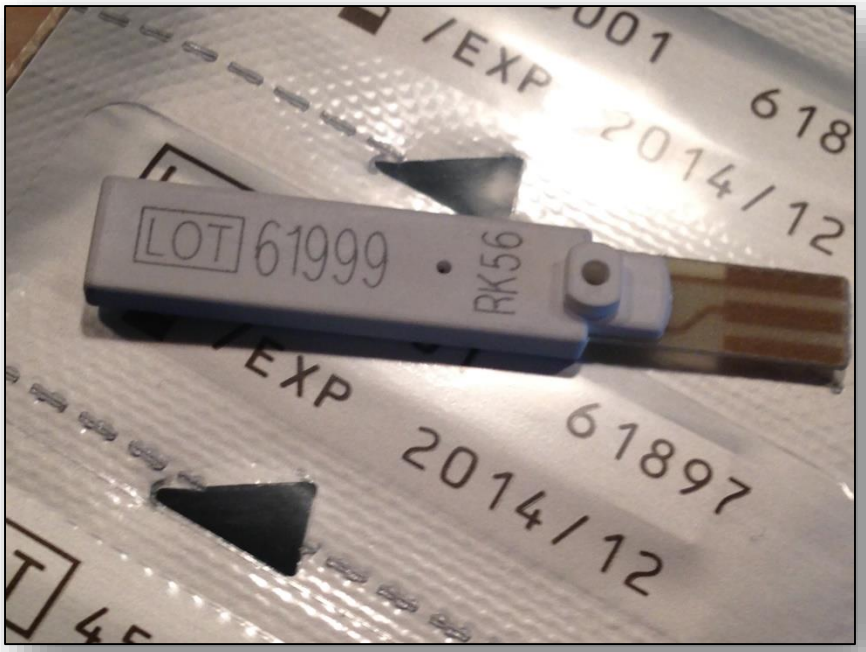
LO equates to <20 mg/dL

CALL ALS UNIT!

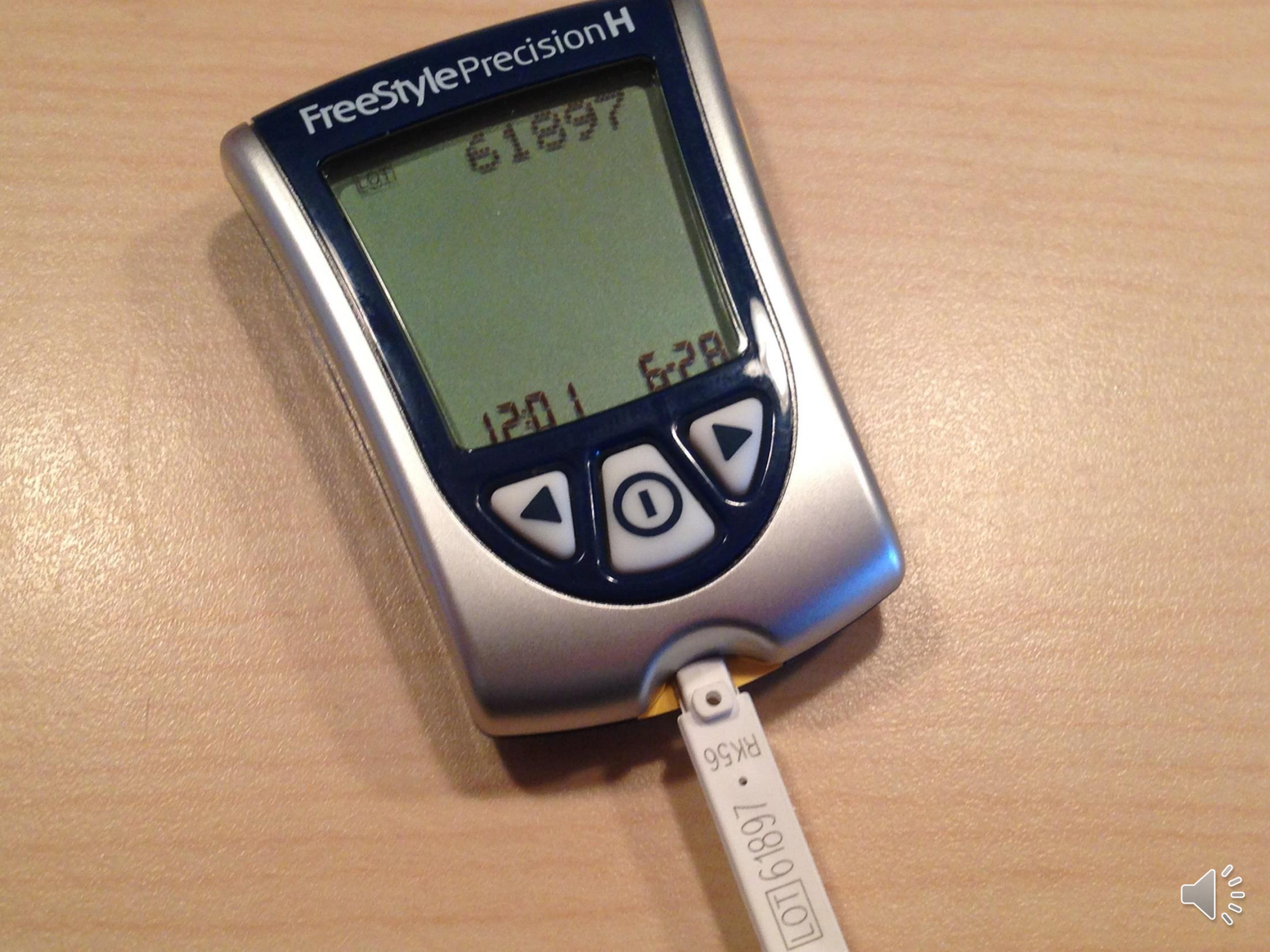
Changing Test Strips

- Package contains…
  - 100 test strips
  - Blood glucose test strip calibrator
  - Paper insert instructions

How Easy it is to Confuse?!?!



ALWAYS check the LOT code!


FreeStylePrecisionH
61897
LOT
12:01
6:28
RK56 • 61897
LOT

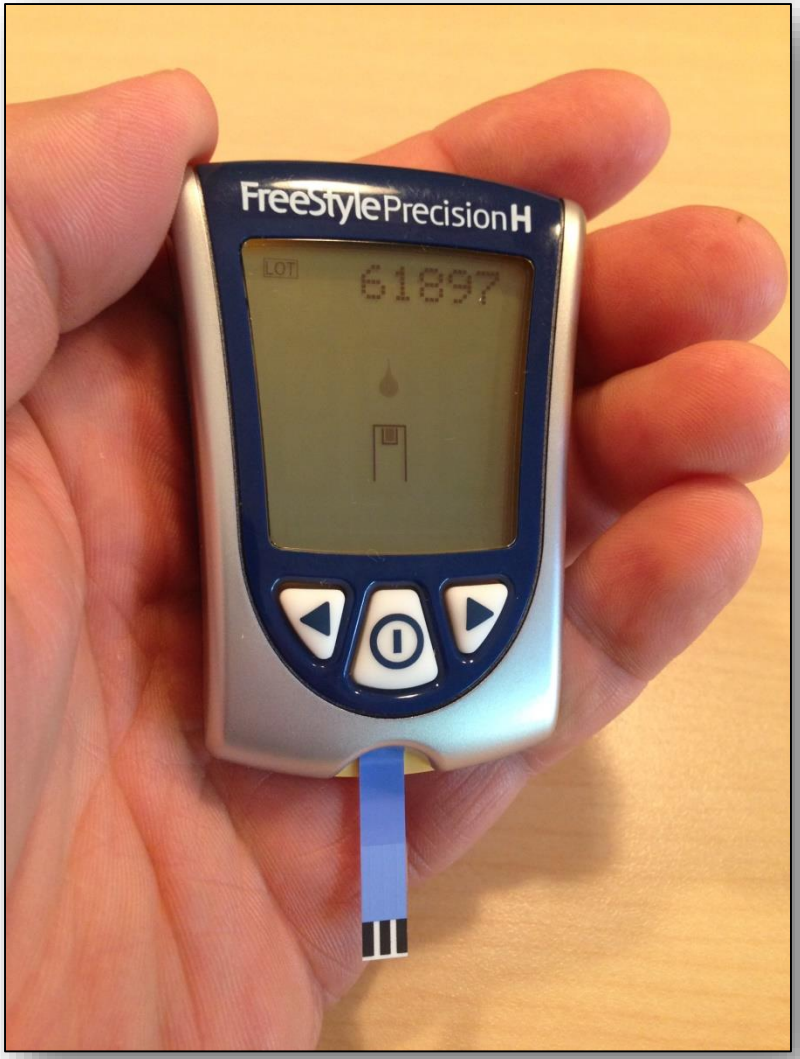
When to do a Control Test?

- When using your meter for the first time.
- To make sure that your meter and test strips are working properly.
- When opening a new box of test strips.
- When practicing with your meter to gain experience in it’s use.

Control Solution Testing

- Low, medium, high solutions
- Best results when shaken
- Control solutions do NOT change strip coding
  - Used in place of blood to confirm meter results

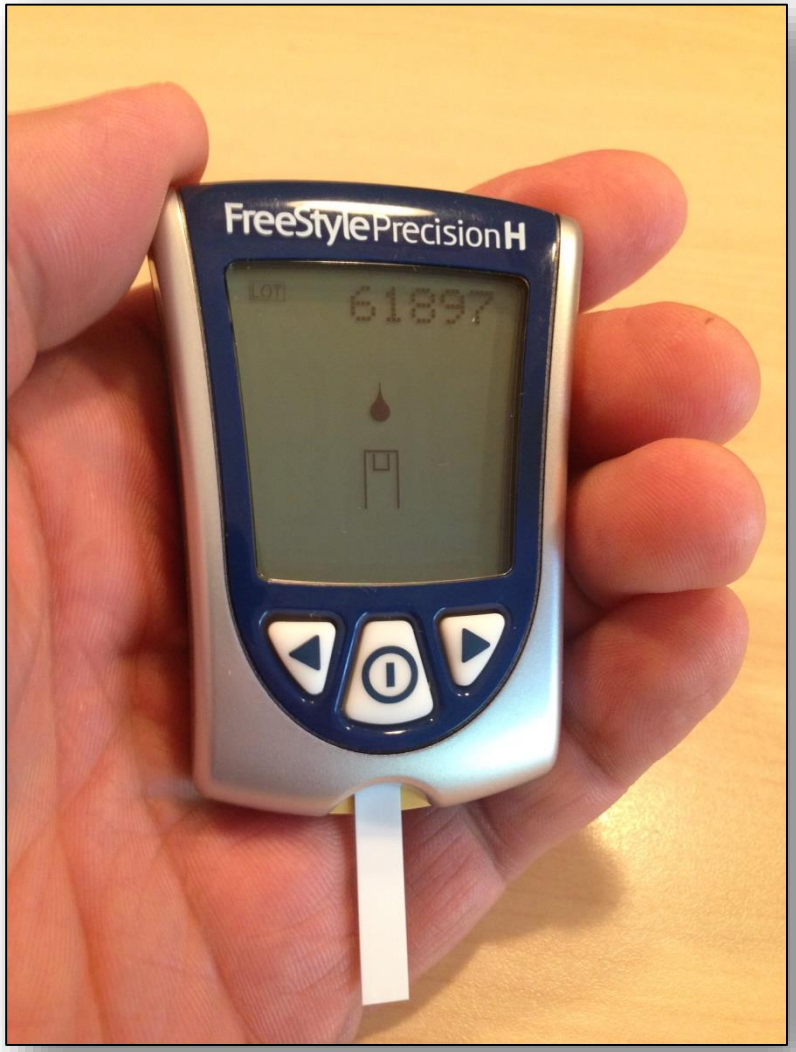
Troubleshooting Tips



- Strip installed backwards.
- Meter will continue to work and seek a blood sample.
- **Fix?**

Turn the strip around…

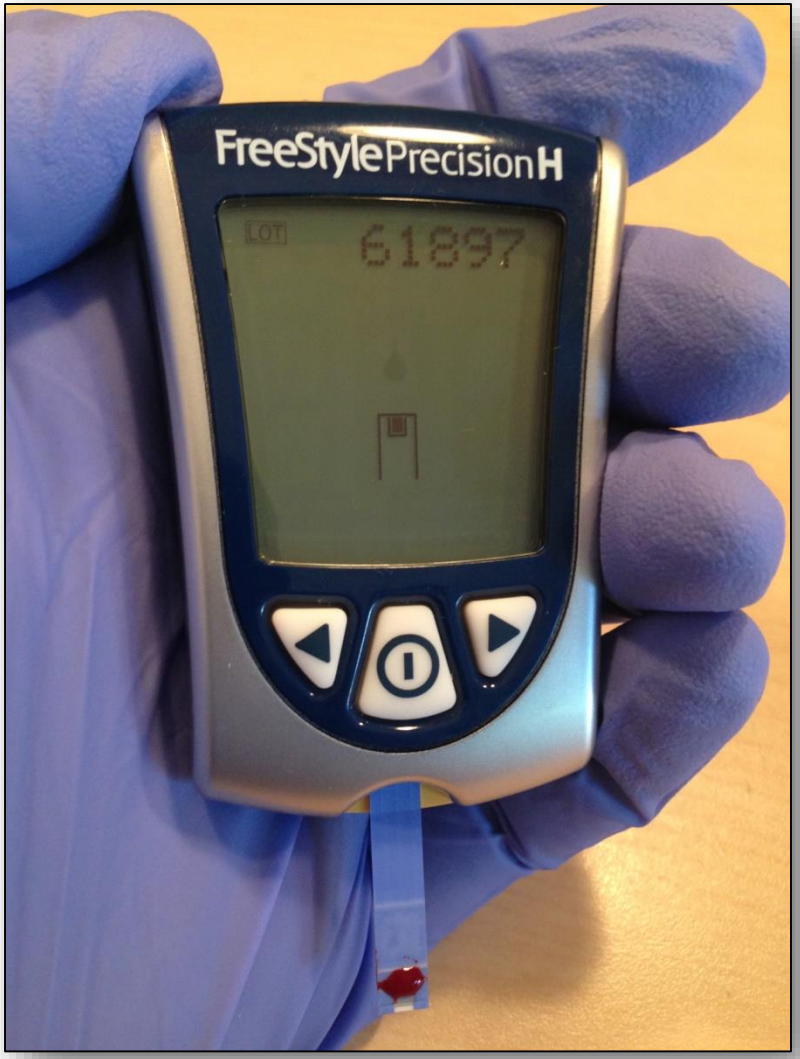
Troubleshooting Tips



- Strip installed upside down.
- Meter will continue to work and seek a blood sample.
- **Fix?**

Orient the test strip properly…

Troubleshooting Tips



- Improper placement of blood sample.
- Meter will continue to work and seek a blood sample.
- **Fix?**

Using a NEW test strip, place blood sample correctly…

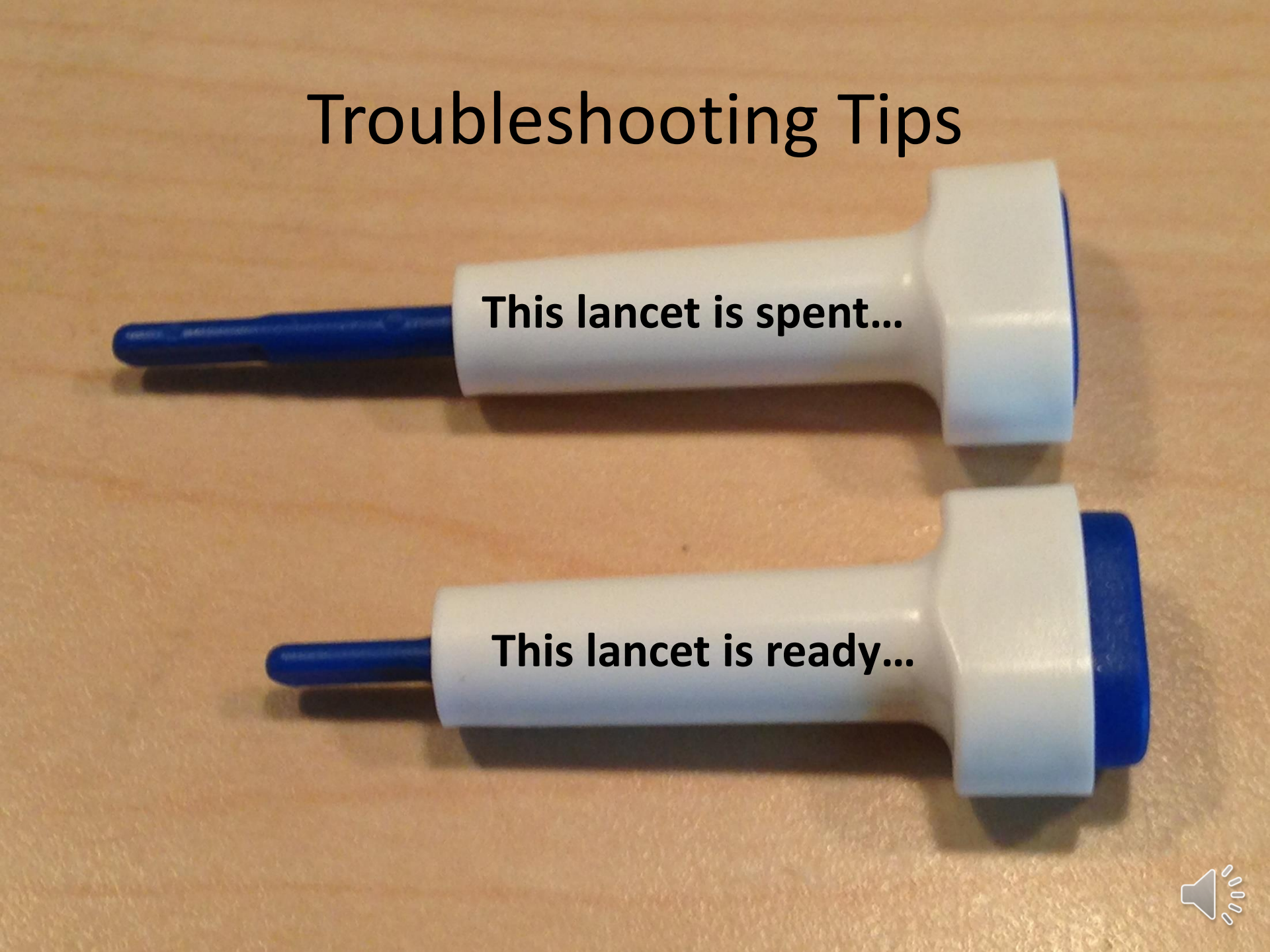

:19

Troubleshooting Tips

- Malfunctioning lancet
- Button won’t depress
- Lancet seems loose or wobbly
- Protective sheath isn’t locked in place
- **Fix?**

  Use a new lancet…

Troubleshooting Tips



Alternate Site Testing

- There may be times when alternative site results are different from fingertip results. This happens when blood glucose levels change rapidly (for example, after you eat a meal, after you take insulin, or during or after exercise).
- **Do not** use blood samples from alternative sites when:
  - You think your patient's blood glucose is low
  - The results from alternative sites do not match the way the patient appears
  - It is within two hours of eating a meal, taking insulin, or exercising

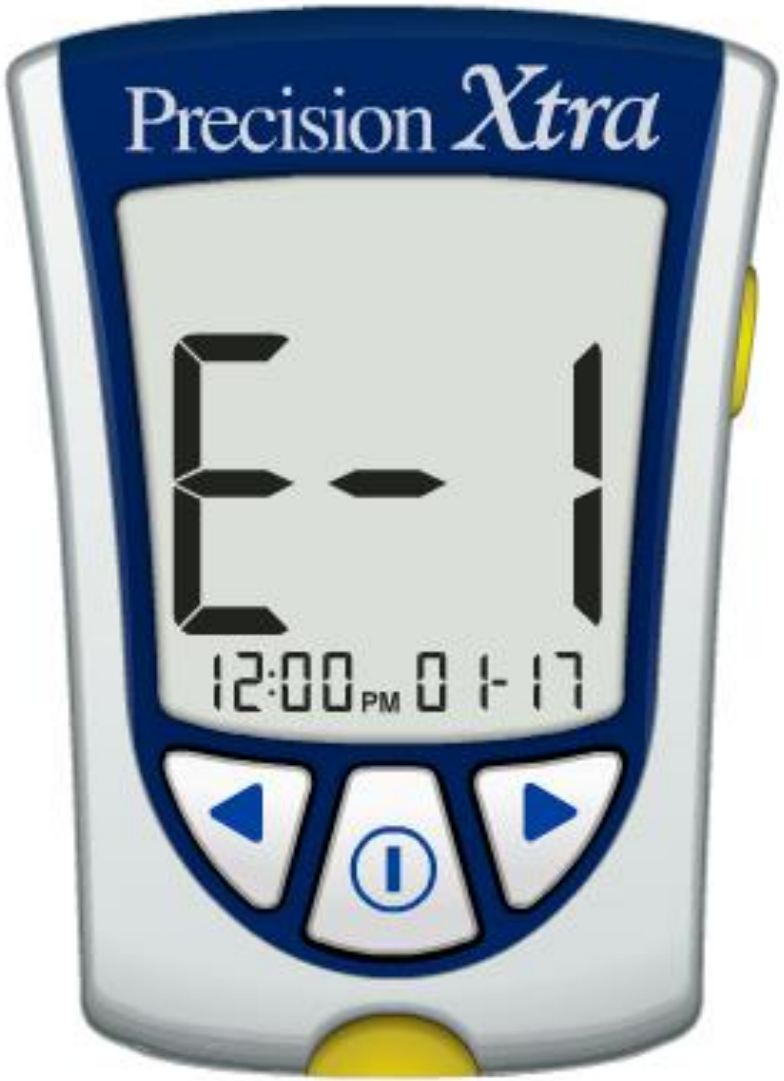
Is it Time to Replace the Battery?

- This means the battery is low.
- You may still use the meter and the results will be accurate.
- However, the backlight is not useable. Replace the battery at this time.

Is it Time to Replace the Battery?

- This means the battery must be replaced. The meter is not useable.
- The meter turns off automatically.

Error Code E-1

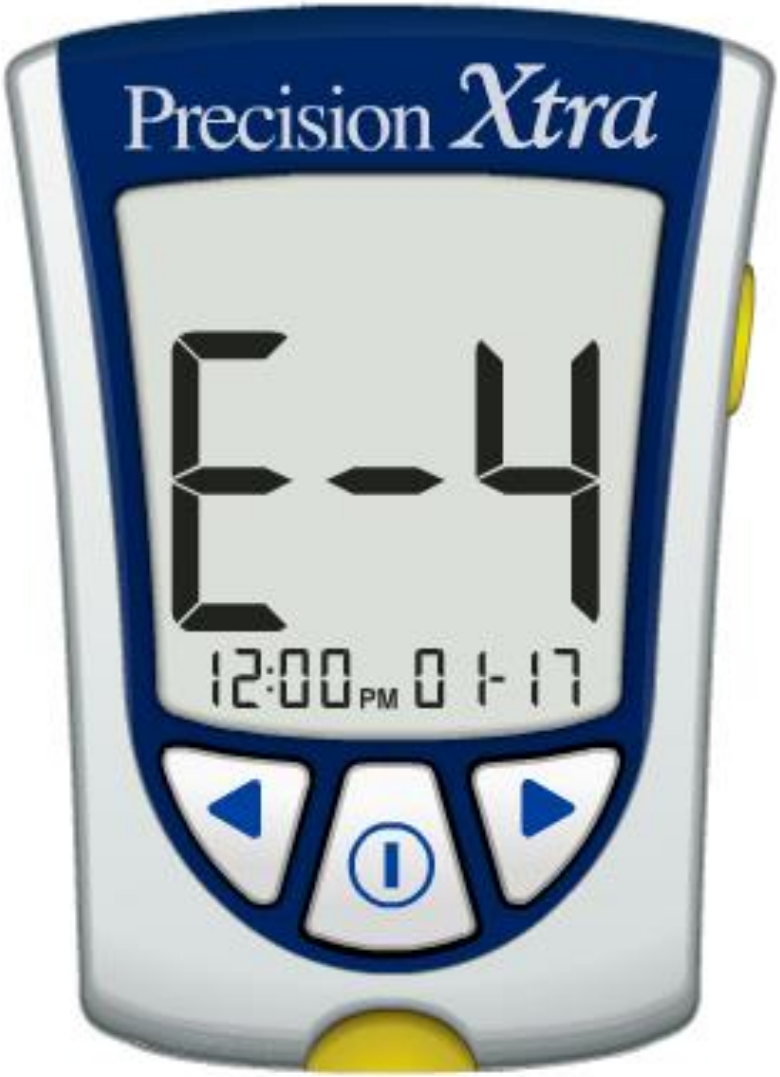


- Temperature is out of range
  - Move your meter and test strips to a location where the temperature is appropriate and monitor again with a new test strip.
  - You may have to wait for your meter to adjust to the new temperature.

Error Code E-3

- Blood glucose may be too low…
  - Retest using a new strip

Error Code E-4



- Blood glucose may be too high
  - Retest using a new strip

Continued E-3 / E-4 Errors?

CALL ALS UNIT!

Other Errors?

- Various reasons, but the fix is the same…
- Ensure correct test strip LOT …
- Retest with a new strip…

Review

- The 2014 MD Medical Protocols Optional Supplemental Program effective July 1, 2014, has been reviewed and explained to the viewer.
- The viewer should now understand the purpose, indications, and procedures for blood glucose testing using the FreeStyle Precision H Blood Glucose Meter as supplied by the Montgomery County Fire Rescue Service

Review

- The viewer now knows the proper treatment for adult and pediatric patients with blood glucose levels <70 mg/dL and blood glucose levels >100 mg/dL and that additional blood glucose testing may be required.
- The viewer has been shown the glucometer kit, what it contains, and what items must be kept with the kit ready for it’s safe use.

Review

- The viewer has seen tips for ease of use, troubleshooting, and various error codes and should know how to manage the FreeStyle Precision H Blood Glucose Meter through all of these in order to deliver accurate results enabling proper treatment of patients tested.

Questions?

- For questions using the meter, ask one of our Paramedics, they'll be happy to practice with you.
- Freestyle Precision H Manual (online)
- 2014 MD Medical Protocols Optional Supplemental Program (online)
- 2014 MD Medical Protocols Complete (online)

Credits

- Captain Lee Silverman, NRP
- FF/P Ian St. John, NRP
- Abbott Diabetes Care
- MIEMSS
- Montgomery County PSTA