Blood Glucose In-Office Lab Testing
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Point of Care Testing (POCT)

- Bedside / chairside / EMS
- Rapid, immediate results
- Easy, almost fool proof
- CLIA waived uses devices / kits FDA approved for home use by consumers
OSHA

- Concerned with employee and patient safety
- Universal Precautions, Blood Borne Pathogens Rules
  - Must keep log of all injuries from contaminated sharps
  - Employees must “have a say” in selection of protective devices
- Offer, at employer’s expenses, hepatitis injections to any employees who could be expected to come in contact with blood or other potentially infectious materials
- Requires use of gloves for those performing finger sticks and testing
  - Non-latex preferred
OSHA

- Gloves: required for finger sticks
- must have non-latex available
- Wash hands before &
- After gloving
Latex sensitivity
Latex covers

- Rare but can cause conjunctivitis in sensitive patients
OSHA

- Biohazard bags & boxes. Hardsides for sharps, bags for soft items
- Disposal
CLIA

- CMS regulates all lab tests on humans except research via Clinical Laboratory Improvement Amendments 1988
- Objective of the CLIA program is to ensure quality laboratory testing
• **All entities** who perform even 1 lab test, including waived tests, on materials from the human body for purpose of dx, prevention, or treatment of any condition must register with CLIA
  – Required even if not charging
CLIA Certificate
CLIA registration

- www.cms.gov/clia/
- CLIA categorizes laboratory tests according to complexity & states staff qualifications needed for each
  - Waived
  - Moderate / PPM
  - Complex
- The CLIA application form: CMS-116
Diabetes

• Diabetes is 7th leading cause of death in USA
• Leading cause of blindness in US
• 57 million people have pre-diabetes
Who to screen for DM

- Sx or asx patients who are overweight or obese
- Systemic or ocular diabetic sx
- Family hx especially siblings & parents
- Ethnic predisposition
- Ocular indications
Ethnic pre-disposition

- Hispanic Americans
- Native Americans
- South Asian Americans (Pakastani, Indian, etc)
- African Americans
- Pacific Islanders
Diabetic retinopathy

• How at risk is the diabetic patient for proliferative retinopathy?
  – How well-controlled is the patient?
    • Fasting plasma glucose
    • Glycosylated Hgb (A1C)
      – Diabetics strive for <7% or closest to normal can get without causing hypoglycemia
    • Protein in urine (proteinuria): strong predictor
    • Blood lipids: especially high LDL &/or low HDL
DM patients case hx

Ask them what their glucose and A1C values usually are

• Ask them if they self-test glucose or A1C
  – How often, when was last check?
• Ask when was last physical exam
• Ask if smoke, how much & how long
• Ask when last dental exam was
• Ask when last foot exam was
Why ask about the foot exam?

- More DM hospitalization days due to foot ulcers & complications than other causes
American Diabetes Association

- ADA site  www.diabetes.org
  - THE experts on everything diabetes
  - Layperson & professional sections
  - Continual updates
  - Dx criteria
  - Diabetic risk test available
Abbreviations

- **FPG**: fasting plasma glucose, one of the 2 tests of choice for dx of DM
- **PG**: plasma glucose
- **Random / casual glucose test**: anytime of day without regard to last meal
- **A1C**: glycosylated hemoglobin: 1 of the tests of choice for dx of DM: **NEWLY** recommended by ADA for Dx
• PP: post prandial (number of hours since last caloric intake)

• Fast period for glucose testing: minimum of 8hrs (if want fasting specimen)
Blood Glucose Dx Ranges ADA

- **Normoglycemia**
  - FPG: 70 to 100mg/dl
  - 2 hr OGT <140mg/dl

- **IGT Impaired glucose metabolism/pre-diabetes**
  - FPG 100-125mg/dl
  - 2 hr OGT 140-199 mg/dl
• Diabetes mellitus
  – FPG ≥ 126mg/dl or
  – 2 hr OGT ≥ 200 mg/dl or
  – Sxs of diabetes & random value of ≥200mg/dl
  – OR
  – A1C 6.5% or greater

  – For dx using blood glucose measurements should have abnormal tests results on 2 different days
IFG or IGT

• Impaired or pre-diabetic
• Risk factor for developing DM
• Variable study results re if intervention such as exercise, diet, etc prevent these people from progressing to DM
Low glucose values on screening (non-diabetics)

- May be error in technique-not enough blood on strip or taking too long to completely apply the blood to strip. Retest.
- May be due to long interval since last intake of calories; extra long fast
Unexpected or abnormal PG results

- Rerun the test
- Rerun the control
- Refer if still abnormal
  - Counsel need to see PC for further testing. Could indicate diabetes but physical exam and more testing needed for accurate dx as other conditions, various meds and not diabetes could have caused the elevated glucose values.
Who to refer

- **Refer** to pt’s PC if in impaired or diagnostic range
- Provide f/u to verify that those referred sought and received assistance
OGT or OGTT: oral glucose tolerance test

- Patient fasts for minimum of 8 hours
- Blood and urine specimens tested for glucose values fasting, and after drinking standard amount of glucose solution
- Fasting and 2 hour values are the most useful
- Not currently used much except for GDM or unclear cases
CPT CODES

- Blood glucose testing CPT 82962
- Finger puncture or other cap blood CPT 364.16
- Venipuncture blood collection CPT 364.15
In-office blood glucose screening procedure

- Inquire how long since last caloric intake
- Run control before sticking patient
- Perform finger stick and test patient
- Apply pressure and bandaid
- Record results of control, patient, time of day, hours since last caloric intake
- Interpret results, counsel patient, refer if indicated, tell when to ck glucose again
Control

• Control solutions contain known amounts of substance being measured
• Must run each day that tests are run & by each person running tests that day, whenever open new box of strips, whenever get unexpected test results
• Must be recorded in patient’s chart and in log
• Run exactly in same manner as test
What should the control read?
If the control reads too high or too low

• Could be due to:
  – Reagents: strips or control soln
  – Technique of the person performing the test
  – Faulty instrument-out of calibration: must return to manufacturer
  – Do not stick or test the patient if control is out of range
Finger “sticks”

- Use **only** instruments which **self–retract** i.e. **safety lancets**
- **Fresh lancets will be capped**
- **Dispose of in hardside sharps containers**
• Patient & clinician should wash & dry their hands
• Clinician must wear gloves
• Verify that using a new sterile lancet (capped)
• Select patient finger that is non-callused, clean with alcohol & dry
Wash & dry hands, clean selected finger with alcohol
Dry with clean cotton or gauze
Cap indicates new unused lancet

Only use devices which self-retract
Choose fleshy non-callused finger

- Grip finger tightly
Milk if needed
• **Good sample**

• **Not enough blood & too spread out**
AST

• Alternate site testing approved for some meters and puncture devices
  – For patients who do multiple sticks per day
  – Calf, thigh, palm, forearm
  – Nerve endings/pain receptors less concentrated

• *Not recommended for general screening purposes*
  – Less reliable if low or fluctuating results, or immediately following meals or exercise
For all meters

- Only use meters approved for in-home use/CLIA waived
- Do not reuse test strips—must use fresh strip for each test or control.
- Control should be run before the patient. Do not test the patient if the control value is not correct.
- Be sure the meter is on when the blood is applied.
• Apply blood to edge not top or bottom of strip
• Do not remove the finger from the strip too quickly.
• Reading will appear after allotted time
  – Just a few seconds
Follow instructions for that particular meter EXACTLY.
Meter being used today

- Embrace by Omnis Health
• Insert contact bars end of test strip into meter
• Temperature sensitive—won’t run if room too hot or cold
• When the blood drop symbol appears, apply a drop of blood or control to the marked edge of the strip. Reads in 6 sec
• Manually remove used strip without touching blood & place in sharps
Disposal of BH Waste

- Place all used strips into sharps container
- Place used lancet into sharps container
- Place soft contaminated gauze, gloves, and aprons into BH bag
- Disinfect work areas before and after use
Counseling / Patient Education

• Refer if in impaired or diabetic range
• When plasma glucose results are normal
  – Only a screening test: doesn’t absolutely rule out diabetes
  – Recheck in 1-3 years depending on age, family hx, personal hx
Assignment

- Record diabetic case hx
- Perform control test properly
- Perform finger stick properly on partner
- Measure value correctly on partner
- Record, interpret, and record what you would tell the patient
- Turn in assignment for grading
- Dispose of used materials properly