I. PURPOSE

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels. Symptoms of marked hyperglycemia include polyuria, polydispsia, weight loss, sometimes with polyphagia and blurred vision. Acute, life threatening consequences of diabetes are hyperglycemia with ketoacidosis or the nonketoic hypersmolar syndrome.

Diabetes Mellitus is classified into four different categories. The vast majority of cause falls into two broad etiopathogenic categories. In one category (Type I diabetes), the cause is an absolute deficiency of insulin secretion caused by cell-mediated immune destruction of pancreatic beta cells. Patients with this form of diabetes are susceptible to ketoacidosis. In the other, much more prevalent category (Type 2 diabetes), the cause is a combination of resistance to insulin action and an inadequate compensatory insulin secretory response. Patients with type 2 diabetes generally do not get diabetic ketoacidosis. Eight other specific types make up a third category of diabetes: genetic defects in B-cell function and insulin action, disease of the pancreas, endocrinopathies, drug or chemically induced pancreatic problems, infections that usually lead to destruction of the pancreas, uncommon forms of immune-mediated diabetes, and other genetic syndromes sometimes associated with diabetes. The fourth category is gestational diabetes.

This is to be performed by all personnel who are authorized and trained to perform Glucose Tolerance Collections.

GTT: Glucose Tolerance Test

II. MATERIALS

<table>
<thead>
<tr>
<th>Reagents</th>
<th>Supplies</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Glucola</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

III. PROCEDURE

1. Patient Preparation:
   a. The rest should be performed in the morning after at least three (3) days of unrestricted diet and physical activity.
   b. The patient should have fasted for a minimum of eight (8) hours.
c. The patient may drink water during the test, but should remain seated and refrain from smoking.
d. The patient should stay relaxed and not engage in any strenuous activity during the test.
e. The patient should not leave the designated waiting area.

2. **Procedure:**
   a. The length of the Glucose Tolerance Test (1-hour, 2-hour, 3-hour) will be determined by the physician and must be specified on the laboratory requisition.
   b. Collect the first blood specimen before the glucola is given. Label this specimen as “Fasting”, date and time.
   c. Have the patient drink the prescribed volume of glucola (see chart below). All of the glucola beverage should be consumed within 5-10 minutes

| Glucose Tolerance Specimen Dosages and Requirements |
|-------------------------------|-----------------|-----------------|
| 1 Hour GTT                    | 50gm of Glucola | Fasting, 1 hour specimen |
| 2 Hour GTT                    | 75gm of Glucola | Fasting, 1 hour, 2 hour specimen |
| 3 Hour GTT                    | 100gm of Glucola| Fasting, 1 hour , 2 hour , 3 hour specimen |

   d. Stay with the patient until the glucola drink is consumed and log the time that the patient finishes the beverage. Record this time on the glucose tolerance worksheet.
   e. Timing of the next specimens should begin after the patient has finished drinking the glucola beverage. Example: patient finishes glucola at 0810 AM; the 1 hour specimen is collected at 0910 AM, the 2 hour at 1010 AM etc.
   f. Collect blood in a serum separator tube. Make sure that you place the hour collected (i.e. fasting, 1,2,3 hour) on each tube submitted.
   g. For children (<12 yrs old), determine the volume of glucose tolerance beverage to administer using the following calculations
      1) Example: A child weighs 60 lb
         2) (weight in lb) / 2.2 = weight in kg
         3) 60 lb = 27.27 kg
   h. Dosage Rate:
      1) Dosage rate = 1.75 gm/kg
         2) 1.75 gm/kg x 27.27 kg = 47.72 gm of glucola needed
   i. Beverage Concentrations
      1) 50 gm Beverage
         - 50 gm Beverage has 5 gm dextrose/oz
         - 47.72 gm / 5 gm/oz = 9.54 oz beverage
      2) 75 gm Beverage
### Title: Glucose Tolerance Testing

- 75 gm beverage has 7.5 gm dextrose/oz
- \( \frac{47.72 \text{ gm}}{7.5 \text{ gm/oz}} = 6.36 \text{ oz of beverage} \)

3). 100 gm Beverage
- 100 gm beverage has 10 gm dextrose/oz
- \( \frac{47.72 \text{ gm}}{10 \text{ gm/oz}} = 4.77 \text{ oz of beverage} \)

j. Each container has a graduated oz. measurement on the side of the container to give approximate measurements.
k. For calculations totaling more than 75 gm of dextrose, only administer the maximum of 75 gm of dextrose. Example: If the child weighs 100 lb (calculated to 78 gm of dextrose), the child should only be given 75 gm of dextrose.

**Note:** If the patient gets sick and vomits after the ingestion of the beverage and before the 1, 2, 3, hour specimen is collected, the test must be discontinued. The test will be cancelled and the patient’s physician office must be notified.

### IV. QUALITY CONTROL

N/A

### V. CALCULATIONS/CALIBRATION

N/A

### VI. INTERPRETATIONS

N/A

### VII. METHOD PERFORMANCE SPECIFICATIONS

N/A

### VIII. REFERENCES

8. The Harriott Lane Handbook, The John Hopkins Hospital, ch9, pg 272, 17th ED., Elsevier Mosby, 2005

IX. RELATED DOCUMENTS
N/A
X. DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Minor Revision</th>
<th>Reason for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Laboratory Director’s Signature on Original Subsequent Document Attached)</td>
<td>2/10/14 New Document Control Format</td>
</tr>
<tr>
<td>Major Revision</td>
<td>6/23/14 Moved to Specimen Collection Manual</td>
</tr>
<tr>
<td>(Requires Laboratory Director &amp; Department Director Signature - where applicable)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laboratory Director:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natalie Depcik-Smith, M.D.</td>
<td>(Signature)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department Director:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert M. Gay, M.D.</td>
<td>(Signature)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Designee:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Print)</td>
<td>(Signature)</td>
</tr>
<tr>
<td>(Print)</td>
<td>(Signature)</td>
</tr>
<tr>
<td>(Print)</td>
<td>(Signature)</td>
</tr>
<tr>
<td>(Print)</td>
<td>(Signature)</td>
</tr>
<tr>
<td>(Print)</td>
<td>(Signature)</td>
</tr>
</tbody>
</table>