



1. Test Requisition Form

1. Use the requisition form supplied with the Iohexol – Short Renal Clearance Test Kit (T955).
2. Test is performed on a bed or procedure cart for the duration. Testing will require approximately 2 hours.
3. Before you begin the test, enter patient's name or initials and collection date on each of the 5 sample tubes.
4. Record patient's height and weight with shoes removed.
5. Explain the Glomerular Filtration Rate procedure to the patient.
6. Confirm that patient has been fasting for 4 hours, or 2 hours if patient is diabetic.
7. Confirm patient has not had a colonoscopy in the past 12 hours (increased risk of dehydration and diarrhea).
8. Confirm patient has not received radiology contrast dye in the past 24 hours.
9. Verify that patient does not have sensitivity to contrast.

- **MILD Allergy/Hives/Urticaria:** may continue with testing secondary to minimal dose (0.5 mL)

Symptoms:

- Raised red wheals
- Headache
- Nausea/vomiting
- Dizziness
- Urticaria
- Warmth (heat)
- Chills

- **Moderate or Severe Allergy:** contact provider

2. Iohexol Preparation

1. Instruct patient to drink 10 to 20 ounces of water or diet caffeine-free soda to allow for adequate urine production. (Amount of fluids may be less if patient is on an ordered fluid restriction).
2. Prepare contrast subcutaneous (SQ) injection using a 1-mL tuberculin syringe.
3. Dosing
 - Omnipaque 140 (302 mg/mL) administer the 1 mL (undiluted) subcutaneous once for patients greater than 40 kg.
 - Omnipaque 140 (302 mg/mL) administer the 0.5 mL (undiluted) subcutaneous once for patients greater than 10 kg, but less than or equal to 40 kg.
 - Omnipaque 140 (302 mg/mL) administer the 0.2 mL (undiluted) subcutaneous once for patients less than 10 kg.

3. U0–Urine Initial Pre-injection Urine Collection

1. Instruct patient to empty his/her bladder completely.
2. Record collection time (to the nearest minute).
3. Use a bladder ultrasound scan to ensure patient's bladder is empty. Scan bladder 5 times to ensure consistent bladder volume. Patient must be lying flat (bladder must be empty for an accurate test result). Acceptable urine residual readings are:
 - ≤ 10 mL or ≤ 10% of the voided urine volume, but not > 50 mL.
 - If bladder is not empty by acceptable residual guidelines, the patient is asked to re-void. Add additional urine to previous collection and re-scan. If patient is still unable to empty their bladder, an order for urinary catheterization should be considered.**Note:** Next collection urine volume added to the residual urine in the bladder creates an inaccurate result.
4. Aliquot 5 mL of urine into the first of the 10-mL urine containers.
5. Write "U0" on container.
6. If baseline U0 specimen cannot be obtained, continue the test and write "no specimen" on U0 container label.
7. Manage oral intake between U0/UE collections. Assess color and volume of urine to determine amount of oral intake to instruct patient to drink. Suggest 8–16 oz, depending on assessment.

4. SQ–Subcutaneous Iohexol Injection Time

1. Check patient's arms to determine which will be most suitable for blood collection. Use the patient's opposite arm to SQ inject the Iohexol dose. If neither looks promising, inject lateral thigh. This allows the option to use either arm.
2. Administer SQ Iohexol.
3. Record injection time to the nearest minute.
4. Patient should remain in bed or on a cart for the duration of the test. **Note:** Muscle movement releases creatinine.

HSRC / Iohexol Glomerular Filtration Rate: Detailed Collection Instructions (continued)

5. UE–Urine Equilibration Collection

- 1 hour after SQ injection time; instruct patient to completely empty bladder.
Note: If patient needs to void prior to 60 minutes, void, weigh, and **save**. Re-void at scheduled time and add urine to previous void.
- 2. Minimum of 30 mLs of urine output is required.**
3. Record void time (to the nearest minute).
4. Weigh/measure UE urine volume to the nearest mL.
5. Use a bladder ultrasound scan to ensure patient's bladder is empty. Scan bladder 5 times to ensure consistent bladder volume. Patient must be lying flat (bladder must be empty for an accurate test result). Acceptable urine residual readings are:
 - ≤ 10 mL or $\leq 10\%$ of the voided urine volume, but not > 50 mL.
 - If bladder is not empty by acceptable residual guidelines, the patient is asked to re-void. Add additional urine to previous collection and re-scan. If patient is still unable to empty their bladder, an order for urinary catheterization should be considered.
Note: Next collection urine volume added to the residual urine in the bladder creates an inaccurate result.
6. Aliquot 5 mL of urine into the second 10-mL urine container.
7. Write "UE" on the second urine container.
8. Manage oral intake between UE/U1 collections. Assess color and volume of urine to determine amount of oral intake to instruct patient to drink. Suggest 4–8 oz, depending on assessment. Fluid intake should be completed within 15 to 20 minutes.

6. P1–Plasma Collection

1. **Within 5 minutes** of the patient's UE void, collect 4 mL of blood from the non-injected arm.
2. **If more than 10 minutes passes before blood specimen is obtained:**
 - Patient must re-void **immediately after blood draw**.
 - Add additional urine to beaker, weigh, and record total volume.
3. Record the time of blood draw (P1) to the nearest minute.
4. Spin blood (centrifuge for 10 minutes at 3,000 rpm) and aliquot 1 mL of plasma.
5. Write "P1" on the vial.

7. U1–Urine Collection for Glomerular Filtration Rate (GFR) Testing

1. 45 minutes from UE void, instruct patient to completely empty bladder. **Note:** If patient needs to void prior to 45 minutes, void, weigh, and **save**. Re-void at scheduled time and add urine to previous void.
2. Use a bladder ultrasound scan to ensure patient's bladder is empty. Scan bladder 5 times. (Refer to UE No. 5 scanning criteria.)
3. Weigh/measure U1 volume to the nearest mL.
 - **Minimum volume for U1 collection is 100 mL.**
 - If urine volume is < 100 mL, the U1 collection can be extended to a maximum of 2 hours after UE void. Ask patient to re-void every 20–30 minutes until 100 mL volume is reached or 2 hours has been reached. Collect urine and add to the first U1 void. Verify bladder emptying and collect P2.
 - After a 2-hour U1 collection, the test may be completed with < 100 mL. Document "extended time" on form. The last void time is documented on the form.
4. Record the following information for the U1 collection:
 - a. U1 collection time (to the nearest minute).
 - b. U1 collection volume (to the nearest mL).
 - c. U1 collection duration (to the nearest minute). Duration time – the minutes between UE and U1 void time.
5. Aliquot 5 mL of urine into the third 10-mL urine container.
6. Write "U1" on the urine container.

8. P2–Plasma Collection

1. **Within 5 minutes** of the patient's U1 void, collect 4 mL of blood from the non-injected arm.
2. **If more than 10 minutes passes before blood specimen is obtained:**
 - Patient must re-void **immediately after blood draw**.
 - Add additional urine to beaker, weigh, and record total volume.
3. Record time of blood draw (to the nearest minute).
4. Patient can be dismissed.
5. Centrifuge blood for 10 minutes at 3000 rpm and then aliquot 1 mL of plasma into a plastic vial.
6. Write "P2" on the vial.

HSRC / Iohexol Glomerular Filtration Rate:

Detailed Collection Instructions (continued)

9. Troubleshooting

1. High bladder residual

- Ask patient to re-void in attempt to empty bladder.
- Ask the patient if they need to have a bowel movement.
- Escort patient to a bathroom.
 - Bring urine collection hat or beaker (males), instructing patient to void in receptacle and not in the toilet. All the urine volume is needed for accurate results.
 - Record collection to the nearest minute.
 - Continue bladder scanning process.

2. UE Urine contaminated with stool (diarrhea or formed)

- Do not** aliquot 5 mL specimen of urine from UE void.
- Collect P1 blood specimen within 5 minutes of UE void.
- Bladder scan patient immediately after UE void.
- Send **empty** UE collection container. Document “stool contaminated.”
- If patient is experiencing diarrhea, consider placing a urinary catheter for the remaining duration of the test to avoid stool contamination of U1 collection.

3. U1 Urine contaminated with stool (diarrhea or formed)

- The U1 collection will now become the UE collection.**
- Bladder scan immediately after U1 void.
- Discard** original UE urine and P1 blood blood specimens.
- Use extra specimen tube in kit to re-collect UE and P1 specimens.
- Draw blood specimen within 5 minutes of U1 void and:
 - Label tube** – P1 (P2 now becomes P1)
- Send **empty** “UE” collection tube:
 - Document on label and form “stool contaminated.”
- Change UE and P1 collection times on form.**
- If patient is experiencing diarrhea, consider placing a urinary catheter for the remaining duration of the test.
- Re-collect U1 and P2 specimens **45 minutes** from last void.

4. Difficult blood draw—collection takes longer than the 10-minute maximum time allowance from void time.

- Continue collection of blood specimen. When collected:
 - Ask patient to re-void, to empty bladder of additional urine. Combine additional urine with first urine.
- Goal: The blood collection time must be as close to an “empty bladder” as possible for accurate results.**

10. Collection Facility

Indicate contact name and phone number of a person who can answer any questions Mayo Clinic Laboratories may have regarding the collection of these specimens. Document any issues with collection to assist lab technicians to understand possible erroneous results.

Packaging Instructions

- Ensure that all specimens are labeled correctly and correct collection times are on the form.
- Put the plasma and urine aliquots into “Pink Refrigerated Specimen” transport bag.
- Verify that all the spaces on form are filled in completely.
- Insert a copy of the completed requisition form into outer pocket of transport bag.
- Store specimens at refrigerated temperature until specimens are shipped.
- Ship specimens at refrigerate temperature.