Test Definition: 12PU1

Protein, Total, 12 Hour, Urine

Overview

Useful For

Evaluation of renal disease

Screening for monoclonal gammopathy

Screening for postural (orthostatic) proteinuria

In select clinical situations, collection of a 12-hour specimen may allow more rapid detection of proteinuria states (eg, screening pregnant patients for preeclampsia)

Special Instructions

- Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens

Method Name

Turbidimetry

NY State Available

Yes

Specimen

Specimen Type

Urine

Necessary Information

12-Hour volume is required.

Specimen Required

Supplies: Sarstedt 5 mL Aliquot Tube (T914)
Container/Tube: Plastic, 5 mL tube
Specimen Volume: 4 mL
Collection Instructions:
1. Collect a 12-hour urine specimen. Specimens should be collected before fluorescein is given or not collected until at least 24 hour later.
2. No preservative.
3. Invert well before taking 4-mL aliquot.
4. Do not overfill aliquot tube, 4 mL at most.
Additional Information: See Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens for multiple collections.

Forms

If not ordering electronically, complete, print, and send a Renal Diagnostics Test Request (T830) with the specimen.

Urine Preservative Collection Options

Note: The addition of preservative or application of temperature controls **must occur within 4 hours of completion** of the collection.

Ambient (no additive)	OK
Refrigerate (no additive)	Preferred
Frozen (no additive)	OK
50% Acetic Acid	No
Boric Acid	OK
Diazolidinyl Urea	OK
6M Hydrochloric Acid	No
6M Nitric Acid	No
Sodium Carbonate	No
Toluene	No

Specimen Minimum Volume

1 mL

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	14 days	
	Ambient	24 hours	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

Protein in urine normally consists of plasma proteins that have been filtered by glomeruli and not reabsorbed by the proximal tubule, and proteins secreted by renal tubules or other accessory glands.

Increased amounts of protein in the urine may be due to:
-Glomerular proteinuria: defects in permselectivity of the glomerular filtration barrier to plasma proteins (eg, glomerulonephritis or nephrotic syndrome)
-Tubular proteinuria: incomplete tubular reabsorption of proteins (eg, interstitial nephritis)
-Overflow proteinuria: increased plasma concentration of proteins that exceeds capacity for proximal tubular reabsorption (eg, multiple myeloma, myoglobinuria)

-Urinary tract inflammation or tumor
-Preeclampsia
-Orthostatic proteinuria

In pregnant women, a urinary protein excretion of more than 300 mg/24 hours is frequently cited as consistent with preeclampsia and 12-hour total protein excretion highly correlates with 24-hour values in this patient population.(1,2)

Orthostatic proteinuria is characterized by increased protein excretion in the upright position but normal levels when supine. This condition can be detected by comparing urine protein levels in a collection split between day and night (see OPTU / Orthostatic Protein, Timed Collection, Urine). Orthostatic proteinuria is common in childhood and adolescence but rare after 30 years of age.

Reference Values

<163 mg/12 hours (day or night collection)
Reference values have not been established for patients <18 years of age.

Interpretation

Total urine protein determined to be greater than 500 mg/24 hours should be evaluated by immunofixation to assess if there is a monoclonal immunoglobulin light chain and, if present, identify it as either kappa or lambda type.

Urinary protein levels may rise to 300 mg/24 hours in healthy individuals after vigorous exercise.

Low-grade proteinuria may be seen in inflammatory or neoplastic processes involving the urinary tract.

Cautions

False proteinuria may be due to contamination of urine with menstrual blood, prostatic secretions, or semen.

After vigorous exercise, the urinary protein concentration may rise to 300 mg/24 hours in healthy individuals.

Normal newborn infants may have higher excretion of protein in urine during the first 3 days of life.

The presence of hemoglobin elevates protein concentration.

Protein electrophoresis and immunofixation may be required to characterize and interpret the proteinuria.

Clinical Reference

1. Delaney MP, Lamb EJ: Kidney disease. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:1256-1323
2. Rinehart BK, Terrone DA, Larmon JE, et al: A 12-hour urine collection accurately assesses proteinuria in hospitalized hypertensive gravida. J Perinatol. 1999;19:556-558
3. Adelberg AM, Miller J, Doerzbacher M, Lambers DS: Correlation of quantitative protein measurements in 8-, 12-, and 24-hour urine samples for diagnosis of preeclampsia. Am J Obstet Gynecol. 2001 Oct;185(4):804-807
4. Robinson RR: Isolated proteinuria in asymptomatic patients. Kidney Int. 1980;18:395-406
5. Dube J , Girouard J, Leclerc P, Douville P: Problems with the estimation of urine protein by automated assays. Clin Biochem. 2005 May;38(5):479- 485
6. Koumantakis G, Wyndham, L. Fluorescein interference with urinary creatinine and protein measurements. Clin Chem.

1991 Oct;37(10 Pt 1):1799

Performance

Method Description
The sample is preincubated in an alkaline solution containing EDTA, which denatures the protein and eliminates interference from magnesium ions. Benzethonium chloride is then added, producing turbidity.(Package insert: Total Protein Urine/CSF. Roche Diagnostics; 05/2024)

PDF Report
No

Day(s) Performed
Monday through Sunday

Report Available
Same day/1 day

Specimen Retention Time
7 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Main Campus

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification
This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information
84156

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
12PU1	Protein, Total, 12 HR, U	26801-1

Test Definition: 12PU1

Protein, Total, 12 Hour, Urine

Result ID	Test Result Name	Result LOINC® Value
TPU12	Protein, Total, 12 HR, U	26801-1
TM12A	Collection Duration	13362-9
VL12A	Urine Volume	13620-0
CONC7	Protein Concentration, U	12842-1