

Proteinuria and Albuminuria: What's the Difference?

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Q What exactly is the difference between the protein-to-creatinine ratio and the microalbumin in the lab report? How do they compare?

For the non-nephrology provider, the options for evaluating urine protein or albumin can seem confusing. The first thing to understand is the importance of assessing for proteinuria, an established marker for chronic kidney disease (CKD). Higher protein levels are associated with more rapid progression of CKD to end-stage renal disease and increased risk for cardiovascular events and mortality in both the nondiabetic and diabetic populations. Monitoring proteinuria levels can also aid in evaluating response to treatment.¹

Proteinuria and albuminuria are not the same thing. Proteinuria indicates an elevated presence of protein in the urine (normal excretion should be < 150 mg/d), while albuminuria is defined as an “abnormal loss of albumin in the urine.”¹ Albumin is a type of plasma protein normally found in the urine in very small quantities. Albuminuria is a very common (though not universal) finding in CKD patients; is the earliest indicator of glomerular diseases, such as diabetic glomerulosclerosis; and is typically present even *before* a decrease in the glomerular filtration rate (GFR) or a rise in the serum creatinine.¹

Albuminuria, without or with a reduction in estimated GFR (eGFR), lasting > 3 months is considered a marker of kidney damage. There are 3 categories of persistent albuminuria (see Table).¹ Staging of CKD depends on both the eGFR and the albuminuria category; the results affect treatment considerations.

While there are several ways to assess for proteinuria, their accuracy varies. The 2012 Kidney Disease: Improving Global Outcomes (KDIGO) guideline on the evaluation and management of CKD recommends the spot urine albumin-to-creatinine ratio (UACR) as the preferred test for both initial and fol-

TABLE
Persistent Albuminuria Categories

Category	Description	UACR
A1	Normal to mildly increased	< 30 mg/g (< 3 mg/mmol)
A2	Moderately increased	30-300 mg/g (3-30 mg/mmol)
A3	Severely increased	> 300 mg/g (> 30 mg/mmol)

Abbreviation: UACR, urine albumin-to-creatinine ratio.
Source: KDIGO. *Kidney Int.* 2012.¹

low-up testing. While the UACR is typically reported as mg/g, it can also be reported in mg/mmol.¹ Other options include the spot urine protein-to-creatinine ratio (UPCR) and a manual reading of a reagent strip (urine dipstick test) for total protein. Only if the first 2 choices are unavailable should a provider consider using a dipstick.

Reagent strip urinalysis may assess for protein or more specifically for albumin; tests for the latter are becoming more common. These tests are often used in a clinic setting, with results typically reported in the protein testing section. It is important to know which reagent strip urinalysis you are using (protein vs albumin) and how this is being reported. Additionally, test results depend on the urine concentration: Concentrated samples are more likely to indicate higher levels than may actually be present, while dilute samples may test negative (or positive for a trace amount) when in reality higher levels are present.

If a reagent strip urinalysis tests positive for protein, confirmatory testing is recommended using the UACR or the UPCR (if the former is not an option). A 24-hour urine screen for total protein excretion or an albumin excretion rate can be obtained if there are concerns about the accuracy of the previously discussed tests. A urine albumin excretion rate ≥ 30 mg/24 h corresponds to a UACR of ≥ 30 mg/g (≥ 3 mg/mmol).¹ Al-

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though 24-hour urine has been considered the gold standard, it is used less frequently today due to potential for improper sample collection, which can negatively affect accuracy, and inconvenience to patients.²

As a final note, if there is suspicion for nonalbumin proteinuria (eg, when increased plasma levels of low-molecular-weight proteins or immunoglobulin light chains are present), testing for specific urine proteins

is recommended. This can include assessment with urine protein electrophoresis.¹ —CS **CR**

REFERENCES

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