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## Medical Encyclopedia: BUN

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### Alternative names

Blood urea nitrogen

### Definition

BUN (blood urea nitrogen) is a test that measures the amount of urea nitrogen (a breakdown product of protein metabolism) in the blood.

### How the test is performed

Blood is drawn from a vein, usually from the inside of the elbow or the back of the hand. The puncture site is cleaned with antiseptic, and a tourniquet is placed around the upper arm to apply pressure and restrict blood flow through the vein. This causes veins below the tourniquet to fill with blood.

A needle is inserted into the vein, and the blood is collected in an air-tight vial or a syringe. During the procedure, the tourniquet is removed to restore circulation. Once the blood has been collected, the needle is removed, and the puncture site is covered to stop any bleeding.

Infant or young child:

The area is cleaned with antiseptic and punctured with a sharp needle or a lancet. The blood may be collected in a pipette (small glass tube), on a slide, onto a test strip, or into a small container. A bandage may be applied to the puncture site if there is any continued bleeding.

### How to prepare for the test

There are no special preparations.

### How the test will feel

When the needle is inserted to draw blood, some people feel moderate pain, while others feel only a prick or stinging sensation. Afterward, there may be some throbbing.

### Why the test is performed

The BUN test is a somewhat routine test used primarily to evaluate renal (kidney) function. The test is often performed on patients with many different diseases.

Urea is formed in the liver as the end product of protein metabolism. During digestion, protein is broken down to amino acids. Amino acids contain nitrogen, which is removed as NH<sub>4</sub><sup>+</sup> (ammonium ion), while the rest of the molecule is used to produce energy or other substances needed by the cell. The ammonia is combined with other

small molecules to produce urea. The urea makes its way into the blood and it is ultimately eliminated in the urine by the kidneys.

Most renal diseases affect urea excretion so that BUN levels increase in the blood. Patients with dehydration or bleeding into the stomach and/or intestines may also have abnormal BUN levels. Numerous drugs also affect BUN by competing with it for elimination by the kidneys.

### Normal Values

7 - 20 mg/dl. Note that normal values may vary among different laboratories.

### What abnormal results mean

Greater-than-normal levels may indicate:

- Congestive heart failure
- Excessive protein catabolism (possibly due to starvation)
- Excessive protein ingestion
- Gastrointestinal bleeding
- Hypovolemia (possibly due to burns or dehydration)
- Myocardial infarction (heart attack)
- Renal disease (for example, glomerulonephritis, pyelonephritis, and acute tubular necrosis)
- Renal failure
- Shock
- Urinary tract obstruction (for example, tumor, stones, and prostatic hypertrophy)

Lower-than-normal levels may indicate:

- Liver failure
- Low protein diet
- Malnutrition
- Over-hydration

Additional conditions under which the test may be performed:

- Acute nephritic syndrome
- Alport syndrome
- Atheroembolic renal disease
- Chronic renal failure
- Complicated UTI (pyelonephritis)
- Dementia due to metabolic causes
- Diabetic nephropathy/sclerosis
- Digitalis toxicity
- End-stage renal disease
- Epilepsy
- Generalized tonic-clonic seizure
- Goodpasture's syndrome
- Hemolytic-uremic syndrome (HUS)
- Hepatorenal syndrome
- IgM mesangial proliferative glomerulonephritis
- Interstitial nephritis
- Lupus nephritis

- Malignant hypertension (arteriolar nephrosclerosis)
- Medullary cystic disease
- Membranoproliferative GN I
- Membranoproliferative GN II
- Type 2 diabetes
- Prerenal azotemia
- Primary amyloid
- Rapidly progressive (crescentic) glomerulonephritis
- Secondary systemic amyloid
- Wilms' tumor

### What the risks are

- Excessive bleeding
- Fainting or feeling light-headed
- Hematoma (blood accumulating under the skin)
- Infection (a slight risk any time the skin is broken)
- Multiple punctures to locate veins

### Special considerations

For people with liver disease, the BUN level may be low even if the kidneys are normal.

Some drugs affect BUN levels. Before having this test, make sure the health care provider knows which medications you are taking.

Drugs that can increase BUN measurements include allopurinol, aminoglycosides, cephalosporins, chloral hydrate, cisplatin, furosemide, guanethidine, indomethacin, methotrexate, methyldopa, nephrotoxic drugs (for example, high-dose aspirin, amphotericin B, bacitracin, carbamazepine, colistin, gentamicin, methicillin, neomycin, penicillamine, polymyxin B, probenecid, vancomycin), propranolol, rifampin, spironolactone, tetracyclines, thiazide diuretics, and triamterene.

Drugs that can decrease BUN measurements include chloramphenicol and streptomycin.

Veins and arteries vary in size from one patient to another and from one side of the body to the other. Obtaining a blood sample from some people may be more difficult than from others.

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