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## Medical Encyclopedia: Serum phosphorus

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### Alternative names

Phosphorus - serum; HPO<sub>4</sub>-2, PO<sub>4</sub>-3; Inorganic phosphate

### Definition

The serum phosphorus test measures the amount of phosphate 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. An elastic band is placed around the upper arm to apply pressure and cause the vein to swell 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 band 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.

For an infant or young child, the area is cleansed 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 bleeding.

### How to prepare for the test

The health care provider may advise you to stop taking drugs that may affect the test.

### 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

This test is performed to evaluate the blood level of phosphorus, particularly when the person has a disorder known to cause abnormal phosphorus levels.

Most of the body's phosphorus is combined with calcium in the bones, but about 15% exists -- as phosphate (PO<sub>4</sub>) ions -- in the blood and other soft tissues and body fluids. Dietary phosphorus is efficiently absorbed, so a low PO<sub>4</sub> level caused by dietary deficiency is unlikely in those on a normal diet unless the person has a malabsorption syndrome (inadequate absorption of nutrients in the intestinal tract).

PO<sub>4</sub> levels are controlled by PTH, 1,25-dihydroxy vitamin D. The 1,25-dihydroxy vitamin D increases absorption

of calcium and phosphate in the intestines. PTH:

- Increases calcium and PO<sub>4</sub> release from bone
- Decreases loss of calcium and increases loss of PO<sub>4</sub> in the urine
- Increases conversion of 25-hydroxy vitamin D to 1,25-dihydroxy vitamin D in the kidneys

### Normal Values

Normal values range from 2.4 to 4.1 mg/dl. Normal value ranges may vary slightly among different laboratories.

Note: mg/dl = milligrams per deciliter

### What abnormal results mean

Higher-than-normal levels may indicate:

- Bone metastasis
- Hypocalcemia
- Hypoparathyroidism
- Increased dietary or IV intake of PO<sub>4</sub>
- Liver disease
- Renal failure
- Sarcoidosis

Lower-than-normal levels may indicate:

- Diabetic ketoacidosis
- Hypercalcemia
- Hyperinsulinism
- Hyperparathyroidism
- Inadequate dietary intake of PO<sub>4</sub> or vitamin D resulting in rickets (childhood) or osteomalacia (adult)

Additional conditions under which the test may be performed:

- Multiple endocrine neoplasia (MEN) II
- Secondary hyperparathyroidism
- Tertiary hyperparathyroidism

### What the risks are

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

### Special considerations

Antacids can bind PO<sub>4</sub> and decrease absorption.

Nonpharmacological factors that can affect PO<sub>4</sub> measurements include: enemas containing sodium phosphate, excess vitamin D supplements, and intravenous glucose administration (because PO<sub>4</sub> enters cells along with

glucose).

Drugs that can increase PO<sub>4</sub> measurements include: laxatives containing Na<sub>2</sub>HPO<sub>4</sub> (sodium phosphate), methicillin, and excess vitamin D or 1,25-dihydroxy vitamin D.

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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