MAYO CLINIC LABORATORIES

# Test Definition: AMS

Amylase, Total, Serum

## Overview

### Useful For

Diagnosis and management of pancreatitis

Evaluation of pancreatic function

### Method Name

Colorimetric

### NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Necessary Information

**Patient's age and sex are required.**

### Specimen Required

**Collection Container/Tube:**

**Preferred:** Serum gel

**Acceptable:** Red top

**Submission Container/Tube: Plastic vial**

**Specimen Volume:** 0.5 mL

**Collection Instructions:**

1. Serum gel tubes should be centrifuged within 2 hours of collection.
2. Red-top tubes should be centrifuged, and the serum aliquoted into a plastic vial within 2 hours of collection.

### Specimen Minimum Volume

0.25 mL

### Reject Due To

| | |
|---|---|
| Gross hemolysis | Reject |
| Gross lipemia | OK |

### Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---|---|---|---|
| Serum | Frozen (preferred) | 30 days | |
| | Ambient | 7 days | |
| | Refrigerated | 30 days | |

## Clinical & Interpretive

### Clinical Information

The amylase enzymes are a group of hydrolases that degrade complex carbohydrates into fragments. Amylase is produced primarily by the exocrine pancreas where the enzyme is synthesized by the acinar cells and then secreted into the intestinal tract by way of the pancreatic duct system. Amylases also are produced by the salivary glands, small intestine mucosa, ovaries, placenta, liver, and fallopian tubes. Pancreatic and salivary isoenzymes are found in serum.

### Reference Values

0-30 days: 0-6 U/L
31-182 days: 1-17 U/L
183-365 days: 6-44 U/L
1-3 years: 8-79 U/L
4-17 years: 21-110 U/L
> or =18 years: 28-100 U/L

### Interpretation

In acute pancreatitis, a transient rise in serum amylase activity occurs within 2 to 12 hours of onset; levels return to normal by the third or fourth day. A 4- to 6-fold elevation of amylase activity above the reference limit is usual with the maximal levels obtained in 12 to 72 hours. However, a significant number of subjects show lesser elevations and sometimes none. The magnitude of the elevation of serum enzyme activity is not related to the severity of pancreatic involvement. Normalization is not necessarily a sign of resolution.

In acute pancreatitis associated with hyperlipidemia, serum amylase activity may be spuriously normal; the amylasemia may be unmasked either by serial dilution of the serum or ultracentrifugation.

A significant amount of serum amylase is excreted in the urine and, therefore, elevation of serum activity is reflected in the rise of urinary amylase activity. Urine amylase, as compared to serum amylase, appears to be more frequently elevated, reaches higher levels, and persists for longer periods. However, the receiver operator curves (ROC) of various serum and urine amylase assays demonstrated that all urine assays had poorer diagnostic utility than all serum assays. In quiescent chronic pancreatitis, both serum and urine activities are usually subnormal.

Because it is produced by several organs, amylase is not a specific indicator of pancreatic function. Elevated levels also may be seen in a number of nonpancreatic disease processes including mumps, salivary duct obstruction, ectopic pregnancy, and intestinal obstruction/infarction.

### Cautions

Amylase results may be elevated in patients with macroamylase. Macroamylase refers to a high-molecular weight form of amylase that is present in a patient's serum. Different causes of macroamylase have been suggested, the most

common being amylase complexed with an immunoglobulin. The large size of the macroamylase complex prevents its excretion in the urine. As a result, the serum amylase is usually elevated. This elevated amylase is not diagnostic for pancreatitis. By utilizing serum lipase and urinary amylase, the presence or absence of macroamylase may be determined.

### Clinical Reference

1. Soldin SJ: Pediatric Reference Ranges. 2nd ed AACC Press; 1997
2. Rifai N, Horvath AR, Wittwer CT, eds: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018
3. Swaroop VS, Chari ST, Clain JE: Acute pancreatitis. JAMA. 2004;291:2865-2868
4. Azzopardi E, Lloyd C, Teixeira SR, Conlan, RS, Whitaker, IS: Clinical applications of amylase: Novel perspectives. Surgery. 2016;160(1):26-37

## Performance

### Method Description

Defined oligosaccharides such as 4,6-ethylidene-(G7) p-nitrophenyl-(G1)-alpha-D-maltoheptaoside (ethylidene-G7PNP) are cleaved under the catalytic action of alpha-amylases. The G2PNP, G3PNP and G4PNP fragments so formed are completely hydrolyzed to p-nitrophenol and glucose by alpha-glucosidase. The color intensity of the p-nitrophenol formed is directly proportional to the alpha-amylase activity. It is determined by measuring the increase in absorbance.(Package insert: AMYL2 reagent. Roche Diagnostics; 11/2024)

### PDF Report

No

### Day(s) Performed

Monday through Sunday

### Report Available

Same day/1 to 2 days

### Specimen Retention Time

1 week

### 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

82150

### LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| AMS | Amylase, Total, S | 1798-8 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|
| AMS | Amylase, Total, S | 1798-8 |