MAYO CLINIC LABORATORIES

# Test Definition: BILIT

Bilirubin, Total, Serum

## Overview

### Useful For

Assessing liver function

Evaluating a wide range of diseases affecting the production, uptake, storage, metabolism, or excretion of bilirubin

Monitoring the efficacy of neonatal phototherapy

### Method Name

Colorimetric

### NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Shipping Instructions

Ship specimen in amber vial to protect from light.

### Necessary Information

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

### Specimen Required

**Supplies:** Amber Frosted Tube, 5 mL (T915)
**Collection Container/Tube:**
**Preferred:** Serum gel
**Acceptable:** Red top
**Submission Container/Tube:** Amber 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 an amber vial within 2 hours of collection.

### Forms

If not ordering electronically, complete, print, and send a Kidney Transplant Test Request with the specimen.

### Specimen Minimum Volume

0.25 mL

### Reject Due To

| | |
|---|---|
| Gross hemolysis | Reject |

### Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---|---|---|---|
| Serum | Refrigerated (preferred) | 7 days | LIGHT PROTECTED |
| | Ambient | 24 hours | LIGHT PROTECTED |
| | Frozen | 30 days | LIGHT PROTECTED |

## Clinical & Interpretive

### Clinical Information

Bilirubin is one of the most frequently used tests to assess liver function. Approximately 85% of the total bilirubin produced is derived from the heme moiety of hemoglobin, while the remaining 15% is produced from the red blood cell precursors destroyed in the bone marrow and from the catabolism of other heme-containing proteins. After production in peripheral tissues, bilirubin is rapidly taken up by hepatocytes where it is conjugated with glucuronic acid to produce mono- and diglucuronide, which are excreted in the bile.

A number of inherited and acquired diseases affect 1 or more of the steps involved in the production, uptake, storage, metabolism, and excretion of bilirubin. Bilirubinemia is a frequent and direct result of these disturbances.

Jaundice can occur as a result of problems at each step in the metabolic pathway. Disorders may be classified as those due to increased bilirubin production (eg, hemolysis and ineffective erythropoiesis), decreased bilirubin excretion (eg, obstruction and hepatitis), and abnormal bilirubin metabolism (eg, hereditary and neonatal jaundice).

The most commonly occurring form of unconjugated hyperbilirubinemia is that seen in newborns and referred to as physiological jaundice. Elevated unconjugated bilirubin in the neonatal period may result in brain damage (kernicterus). Treatment options are phototherapy and, if severe, exchange transfusion.

The rare genetic disorders, Crigler-Najjar syndromes type I and type II, are caused by a low or absent activity of bilirubin uridine 5'-diphospho-glucuronosyltransferase. In type I, the enzyme activity is totally absent, the excretion rate of bilirubin is greatly reduced, and the serum concentration of unconjugated bilirubin is greatly increased. Patients with this disease may die in infancy owing to the development of kernicterus.

The increased production of bilirubin, that accompanies the premature breakdown of erythrocytes and ineffective erythropoiesis, results in hyperbilirubinemia in the absence of any liver abnormality.

In hepatobiliary diseases of various causes, bilirubin uptake, storage, and excretion are impaired to varying degrees. Thus, both conjugated and unconjugated bilirubin is retained, and a wide range of abnormal serum concentrations of each form of bilirubin may be observed. Both conjugated and unconjugated bilirubin are increased in hepatitis,

space-occupying lesions of the liver, and obstructive lesions such as carcinoma of the head of the pancreas, common bile duct, or ampulla of Vater.

### Reference Values

0-6 days: Refer to www.bilitool.org for information on age-specific (postnatal hour of life) serum bilirubin values.
7-14 days: 0.0-14.9 mg/dL
15 days to 17 years: 0.0-1.0 mg/dL
> or =18 years: 0.0-1.2 mg/dL

### Interpretation

The level of bilirubinemia that results in kernicterus in a given infant is unknown. While central nervous system damage is rare when total serum bilirubin (TSB) is less than 20 mg/dL, premature infants may be affected at lower levels. The decision to institute therapy is based on a number of factors including TSB, age, clinical history, physical examination and coexisting conditions. Phototherapy typically is discontinued when TSB level reaches 14 to 15 mg/dL.

Physiologic jaundice should resolve in 5 to 10 days in full-term infants and by 14 days in preterm infants.

In preterm infants, the risk of a handicap increases by 30% for each 2.9 mg/dL increase of maximal total bilirubin concentration.

When any portion of the biliary tree becomes blocked, bilirubin levels will increase.

### Cautions

Specimens should be protected from light and analyzed as soon as possible.

Grossly hemolyzed specimens should be rejected because hemoglobin inhibits the diazo reaction and falsely decreased results may be seen.

Compounds that compete for binding sites on serum albumin contribute to lower serum bilirubin levels (eg, penicillin, sulfisoxazole, acetylsalicylic acid).

Results from certain multiple myeloma patient specimens may show a positive bias. Not all multiple myeloma patients show the bias, and the severity of the bias may vary between patients. In very rare cases, increased gamma globulin levels, in particular type IgM (Waldenstrom macroglobulinemia), may cause unreliable results.

### Clinical Reference

1. Rifai N, Chiu RWK, Young I, Burnham CD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023
2. Scharschmidt BF, Blanckaert N, Farina FA, Kabra PM, Stafford BE, Weisiger RA. Measurement of serum bilirubin and its mono- and diconjugates: Applications to patients with hepatobiliary disease. Gut. 1982;23(8):643-649
3. Practice parameter: management of hyperbilirubinemia in the healthy term newborn. American Academy of Pediatrics. Provisional Committee for Quality Improvement and Subcommittee on Hyperbilirubinemia [published correction appears in Pediatrics 1995 Mar;95(3):458-61]. Pediatrics. 1994;94(4 Pt 1):558-565

## Performance

### Method Description
Total bilirubin, in the presence of a suitable solubilizing agent, is coupled with 3,5-dichlorophenyl diazonium in a strongly acidic medium. The color intensity of the red azo dye formed is directly proportional to the total bilirubin and can be determined photometrically.(Package insert: Bilirubin Total Gen. 3. Roche Diagnostics; 01/2024)

### 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
82247

### LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| BILIT | Bilirubin Total, S | 1975-2 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|

| | | |
|---|---|---|
| BILIT | Bilirubin Total, S | 1975-2 |