

## Overview

### Useful For

Measuring the delta-9 carboxy-tetrahydrocannabinol to creatinine ratio as a part of a profile

### Special Instructions

- [Clinical Toxicology CPT Code Client Guidance](#)

### Method Name

Only orderable as part of a profile. For more information see THCCR / Delta 9-Carboxy-Tetrahydrocannabinol (THC-COOH) Confirmation and Creatinine Ratio, Random, Urine

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

### NY State Available

Yes

## Specimen

### Specimen Type

Urine

### Specimen Required

Only orderable as part of a profile. For more information see THCCR / Delta 9-Carboxy-Tetrahydrocannabinol (THC-COOH) Confirmation and Creatinine Ratio, Random, Urine

**Supplies:** Sarstedt Aliquot Tube, 5 mL (T914)

**Collection Container Tube:** Plastic urine container

**Submission Container/Tube:** Plastic vial

**Specimen Volume:** 3 mL

### Collection Instructions:

1. Collect a random urine specimen.
2. No preservative.

### Additional Information:

1. No specimen substitutions.
2. STAT requests are **not accepted** for this test.

### Specimen Minimum Volume

0.5 mL

**Reject Due To**

Gross hemolysis	OK
Gross icterus	Reject

**Specimen Stability Information**

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	14 days	
	Ambient	72 hours	
	Frozen	14 days	

**Clinical & Interpretive****Clinical Information**

Delta-9-tetrahydrocannabinol (THC) is the active agent of the popularly abused/used drug, cannabis/marijuana.

Following consumption of the drug, either by inhalation or ingestion, it is metabolized to a variety of inactive chemicals, one of them being delta-9-tetrahydrocannabinol carboxylic acid (delta-9-THC-COOH).

For confirmation of abstinence, urine analysis is a useful tool. The presence of delta-9-THC-COOH is a strong indicator that a patient has used cannabis/marijuana. However, increases in urine delta-9-THC-COOH concentrations resulting from changes in urinary output may be mistakenly interpreted as new drug use rather than carryover from previous drug exposure. Individuals continue to excrete THC-COOH for days after abstinence, and although concentrations generally decrease with time, the concentrations can fluctuate with levels of hydration. As a result, the division of urinary delta-9-THC-COOH concentrations by creatinine produces a metabolite/creatinine ratio that should decrease until a new episode of drug use occurs. Delta-9-THC-COOH/creatinine ratios of specimens collected over time can be compared to determine if new cannabis/marijuana use has occurred.

**Reference Values**

Only orderable as part of a profile. For more information see THCCR / Delta 9-Carboxy-Tetrahydrocannabinol (THC-COOH) Confirmation and Creatinine Ratio, Random, Urine

Not detected (Positive result is reported with a quantitative result)

Cutoff concentration by liquid chromatography tandem mass spectrometry:

Delta-9 Carboxy-Tetrahydrocannabinol: 5.0 ng/mL

**Interpretation**

Delta-9 carboxy-tetrahydrocannabinol (delta-9-THC-COOH) and creatinine concentrations must be obtained for at least 2 urine specimens with a known time interval (1-7 days) between collections. Using these creatinine-normalized delta-9-THC-COOH concentrations, a ratio is calculated between the concentration of any urine specimen (U2) divided by the concentration in a previously collected urine specimen (U1). The most conservative method for reporting new cannabis/marijuana use between collections would apply a U2/U1 decision ratio equal to the maxima listed in the Table. A more realistic decision ratio with reasonable certainty would be to use the 95% below limits in the same table. U2/U1 ratios above these limits would indicate new usage between those collection time points.

Table. Adapted from Smith ML et al. for less than daily users of cannabis/marijuana.(1)

Time interval between urine collections (hours)	Maximum ratio (U2/U1)	95% Below (U2/U1)
0-23.9	6.29	1.42
24-47.9	2.27	1.01
48-71.9	1.47	0.853
72-95.9	1.63	0.595
96-119.9	0.555	0.347
120-143.9	0.197	0.146
144-167.9	0.080	0.073

## Cautions

No significant cautionary statements

## Clinical Reference

1. Smith ML, Barnes AJ, Huestis MA. Identifying new cannabis use with urine creatinine normalized THCCOOH concentrations and time intervals between specimen collections. *J Anal Toxicol.* 2009;33(4):185-189. doi:10.1093/jat/33.4.185
2. Huestis MA, Cone EJ. Differentiating new marijuana use from residual drug excretion in occasional marijuana users. *J Anal Toxicol.* 1998;22(6):445-454. doi:10.1093/jat/22.6.445
3. Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. *Tietz Textbook of Laboratory Medicine.* 7th ed. Elsevier; 2023:chap 43

## Performance

### Method Description

This test includes immunoassay and confirmation with quantification by liquid chromatography tandem mass spectrometry.(Unpublished Mayo method)

### PDF Report

No

### Day(s) Performed

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Monday through Sunday

**Report Available**

3 to 5 days

**Specimen Retention Time**

2 weeks

**Performing Laboratory Location**

Mayo Clinic Laboratories - Rochester Superior Drive

**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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

**CPT Code Information**

G0480

80349 (if appropriate for select payers)

[Clinical Toxicology CPT Code Client Guidance](#)

**LOINC® Information**

Test ID	Test Order Name	Order LOINC® Value
THCCU	THC-COOH/Creatinine Ratio, U	19055-3

Result ID	Test Result Name	Result LOINC® Value
616334	Delta-9 Carboxy-Tetrahydrocannabinol by LC-MS/MS	20521-1
616335	Carboxy-THC Interpretation	69050-3
616336	THC-COOH/Creatinine Ratio	19055-3