MAYO CLINIC LABORATORIES

Test Definition: THCCU

Delta-9-Carboxy-Tetrahydrocannabinol Confirmation and Creatinine Ratio, Random, Urine

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

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