

Overview

Useful For

Investigation of primary aldosteronism (eg, adrenal adenoma/carcinoma and adrenal cortical hyperplasia) and secondary aldosteronism (renovascular disease, salt depletion, potassium loading, cardiac failure with ascites, pregnancy, Bartter syndrome)

Testing Algorithm

See [Steroid Pathways](#) in Special Instructions.

Special Instructions

- [Renin-Aldosterone Studies](#)
- [Steroid Pathways](#)

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Collection Container/Tube:

Preferred: Red top

Acceptable: Serum gel

Submission Container/Tube: Plastic vial

Specimen Volume: 1.2 mL

Collection Instructions: 8 a.m. collection time (after the patient is active for 2 hours) is recommended; preferably no later than 10 a.m.

Additional Information: See [Renin-Aldosterone Studies](#) in Special Instructions for more detailed instructions.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:

-[General Request](#) (T239)

-[Cardiovascular Test Request](#) (T724)

Specimen Minimum Volume

1.2 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	28 days	
	Frozen	30 days	
	Ambient	4 days	

Clinical and Interpretive
Clinical Information

Aldosterone stimulates sodium transport across cell membranes, particularly in the distal renal tubule where sodium is exchanged for hydrogen and potassium. Secondly, aldosterone is important in the maintenance of blood pressure and blood volume.

Aldosterone is the major mineralocorticoid and is produced by the adrenal cortex.

The renin-angiotensin system is the primary regulator of the synthesis and secretion of aldosterone. Likewise, increased concentrations of potassium in the plasma may directly stimulate adrenal production of the hormone. Under physiologic conditions, pituitary adrenocorticotrophic hormone is not a major factor in regulating aldosterone secretion.

See [Steroid Pathways](#) in Special Instructions.

Reference Values

0-30 days: 17-154 ng/dL*

31 days-11 months: 6.5-86 ng/dL*

1-10 years:

< or =40 ng/dL (supine)*

< or =124 ng/dL (upright)*

> or =11 years: < or =21 ng/dL (a.m. peripheral vein specimen)

*Loeuille GA, Racadot A, Vasseur P, Vandewalle B: Blood and urinary aldosterone levels in normal neonates, infants and children. *Pediatrics* 1981;36:335-344

For International System of Units (SI) conversion for Reference Values, see <https://www.mayocliniclabs.com/order-tests/si-unit-conversion.html>

Interpretation

A high ratio of serum aldosterone (SA) in ng/dL to plasma renin activity (PRA) in ng/mL per hour, is a positive screening test result, a finding that warrants further testing. An SA/PRA ratio greater than or equal to 20 is only interpretable with an SA greater than or equal to 15 ng/dL and indicates probable primary aldosteronism.

Renal disease, such as unilateral renal artery stenosis, results in elevated renin and aldosterone levels. Renal venous catheterization may be helpful. A positive test is a renal venous renin ratio (affected/normal) greater than 1.5.

See [Renin-Aldosterone Studies](#) and [Steroid Pathways](#) in Special Instructions.

Note: Advice on stimulation or suppression tests is available from Mayo Clinic's Division of Endocrinology and may be obtained by calling 800-533-1710.

Cautions

The plasma renin activity (PRA) cannot be interpreted if the patient is being treated with spironolactone (Aldactone). Spironolactone should be discontinued for 4 to 6 weeks before testing.

Late p.m. levels can be up to 30% lower than early a.m. levels. Supine values are on average 50% lower than upright collections. Sodium deplete subjects have significantly elevated serum aldosterone (SA) levels, potentially exceeding the upper limit of the salt replete upright reference range by several fold. To account for these variables, at least in part, it is recommended that PRA is measured concomitantly. In situations of physiological variability, PRA should be altered in the same direction as aldosterone. See [Renin-Aldosterone Studies](#) in Special Instructions.

Angiotensin converting enzyme (ACE) inhibitors have the potential to falsely elevate PRA. Therefore, in a patient treated with an ACE inhibitor, the findings of a detectable PRA level or a low SA/PRA ratio do not exclude the diagnosis of primary aldosteronism. In addition, a strong predictor for primary aldosteronism is a PRA level undetectably low in a patient taking an ACE inhibitor.

Clinical Reference

1. Young WF Jr: Primary aldosteronism: A common and curable form of hypertension. *Cardiol Rev.* 1999;7:207-214
2. Young WF Jr: Pheochromocytoma and primary aldosteronism: diagnostic approaches. *Endocrinol Metab Clin North Am.* 1997;26:801-827
3. Hurwitz S, Cohen RJ, Williams GH: Diurnal variation of aldosterone and plasma renin activity: timing relation to melatonin and cortisol and consistency after prolonged bed rest. *J Appl Physiol.* 2004;96:1406-1414
4. Inoue K, Goldwater D, Allison M, Seeman T, Kestenbaum BR, Watson KE: Serum aldosterone concentration, blood pressure, and coronary artery calcium: The Multi-Ethnic Study of Atherosclerosis. *Hypertension.* 2020;76(1):113-120. doi:10.1161/HYPERTENSIONAHA.120.15006

Performance

Method Description

Aldosterone-d6 is added to serum and plasma samples as an internal standard. Aldosterone and aldosterone-d6 are extracted from the specimens using a Strata X cartridge. The eluate is dried down under nitrogen, reconstituted with 70/30 methanol/H2O containing estriol and analyzed by liquid chromatography-tandem mass spectrometry using multiple reaction monitoring in the negative mode.(Fredline VF, Taylor PJ, Dodds HM, Johnson AG: A reference

method for the analysis of aldosterone in blood by high-performance liquid chromatography-atmospheric pressure chemical ionization-tandem mass spectrometry. Anal Biochem. 1997 Oct 15;252(2):308-313)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

2 to 5 days

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees and 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 Regional Manager. 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. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information

82088

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
ALDS	Aldosterone, S	1763-2

Result ID	Test Result Name	Result LOINC Value
8557	Aldosterone, S	1763-2