Hereditary angioedema (HAE) laboratory testing and codes

To confirm an HAE diagnosis, laboratory testing is necessary. Patients should have the following measured[1,2]:

- Serum levels of C4
- Serum levels of antigenic and functional C1 esterase inhibitor (C1-INH)

LabCorp[a] 1-800-845-6167				
Test Name	Laboratory Code	CPT Code	ICD-10-CM Code	Normal Range
Hereditary Angioedema (HAE) (Panel includes all 3 tests below)	**123020**	**86160 (x2), 86161**	D84.1	**See below**
Complement C4, Serum	001834	86160		0 to 30 d: not established 1 mo to 17 y: 10-34 mg/dL >17 y: 12-38 mg/dL
Complement C1 Esterase Inhibitor, Serum	004648	86160		21-39 mg/dL
Complement C1 Esterase Inhibitor, Functional	120220	86161		% of mean normal activity: Normal: >67% Equivocal: 41%-67% Abnormal: <41%
Complement C1q, Quantitative[b]	016824	86160		Male 0 to 1 y: not established 2 to 5 y: 9.8-18.5 mg/dL 6 to 17 y: 10.2-19.6 mg/dL >17 y: 10.2-20.3 mg/dL Female 0 to 1 y: not established 2 to 5 y: 9.7-19.1 mg/dL 6 to 17 y: 10.2-19.4 mg/dL >17 y: 10.3-20.5 mg/dL

Quest Diagnostics[c] 1-800-222-0446				
Test Name	Laboratory Code	CPT Code	ICD-10-CM Code	Normal Range
Angioedema Panel, Hereditary, Comprehensive (Panel includes all 3 tests below)	**17706**	**86160 (x2), 86161**	D84.1	**See below**
Complement Component C4c	353	86160		Male 1 to 14 y: 14-44 mg/dL 15 to 80 y: 15-53 mg/dL Female 1 to 14 y: 13-46 mg/dL 15 to 80 y: 15-57 mg/dL
C1 Esterase Inhibitor, Protein	298	86160		21-39 mg/dL
C1 Inhibitor, Functional	297	86161		Normal: ≥68% Equivocal: 41%-67% Abnormal: ≤40%
Complement Component C1q[b]	981	86160		5.0-8.6 mg/dL

National Jewish Health (ADx)[d] 1-800-550-6227				
Test Name	Laboratory Code	CPT Code	ICD-10-CM Code	Normal Range
Complement 4 Level, C4	C4	86160	D84.1	0 to 2 mo: 13-38 mg/dL 3 mo to 19 y: 11-61 mg/dL ≥20 y: 19-52 mg/dL
C1-Esterase Inhibitor Level (C1-INH) Serum	CEILS	86160		20-37 mg/dL
C1-Esterase Inhibitor Level (C1-INH) Plasma	CEILP	86160		20-37 mg/dL
C1-Inhibitor (C1-INH) Function, Chromogenic Assay	INHF	86161		Units for CEICHR 74%-147% of Normal
C1q Level	C1Q	86160		83-125 mcg/mL

Exsera BioLabs[e] 1-303-724-7592				
Test Name	Laboratory Code	CPT Code	ICD-10-CM Code	Normal Range
Total C4	C4IM	86160	D84.1	16.9-55.1 mg/dL
C4a	C4ABD	86160		110-699 ng/mL
C1-INH Chromogenic Function	C1NHF	86161		70%-142% of STD
C1-INH ELISA Function	C1INHQ	86160		125%-187% of STD
C1q Level	C1QH	86160		9.1-15.6 mcg/mL

Current as of April 2024

[a]Laboratory Corporation of America® Holdings.
[b]Not part of the comprehensive testing panel.
[c]Quest Diagnostics Incorporated.
[d]Advanced Diagnostic Laboratories, National Jewish Health—Affiliated with the University of Colorado, Denver.
[e]Exsera BioLabs—Affiliated with the University of Colorado, Aurora.

When to suspect HAE

Prioritize testing for HAE if your patient presents with a history of recurrent angioedema attacks and/or has a family history of diagnosed HAE.

HAE should also be suspected in patients with[2]:

- Onset of swelling in childhood or adolescence
- Recurrent and painful abdominal symptoms from gastrointestinal angioedema
- Angioedema attacks failing to respond to antihistamines, corticosteroids, or epinephrine
- Exacerbation of angioedema symptoms with exogenous estrogens or ACE inhibitors
- Respiratory symptoms, including laryngeal edema
- Presence of prodromal signs or symptoms, including a tingling sensation or nonpruritic rash (erythema marginatum)
  - HAE is not associated with urticaria or pruritus

If you suspect HAE, don't delay testing. Misdiagnosis may contribute to diagnostic delays and result in unnecessary treatment, potentially increasing the risk of death.[3]

Testing results can indicate type I or type II HAE[2,4]

Angioedema Type	C4 Level	C1-INH Level	C1-INH Function
Type I HAE	**Low**	**Low**	**Low**
Type II HAE	**Low**	**Normal-High**	**Low**

When to use genetic testing[5,6]

If test results are unclear, genetic testing may be needed to draw a definitive conclusion on an HAE diagnosis. Visit Virant Diagnostics (**virantdx.com**), Invitae (**invitae.com**), or contact other laboratories offering HAE genetic testing, which may include testing for some or all of the following genes:

- *SERPING1* gene
- *F12* gene
- *KNG1* gene
- *ANGPT1* gene
- *PLG* gene
- *MYOF* gene
- *HS3ST6* gene

ACE=angiotensin-converting enzyme.

References: 1. Banerji A. *Ann Allergy Asthma Immunol.* 2013;111(5):329-336. doi:10.1016/j.anai.2013.08.019 **2.** Busse PJ, Christiansen SC, Riedl MA, et al. *J Allergy Clin Immunol Pract.* 2021;9(1):132-150.e3. doi:10.1016/j.jaip.2020.08.046 **3.** Longhurst HJ, Bork K. *Br J Hosp Med (Lond).* 2019;80(7):391-398. doi:10.12968/hmed.2019.80.7.391 **4.** Manning ME. *Allergy Asthma Proc.* 2020;41(suppl 1):S22-S25. doi:10.2500/aap.2020.41.200062 **5.** Genetic testing for angioedema. Virant Diagnostics, Inc. Accessed March 29, 2024. https://virantdx.com/testing-solutions/genetic-testing/hae/ **6.** Invitae hereditary angioedema panel. Invitae Corporation. Accessed March 29, 2024. https://www.invitae.com/us/providers/test-catalog/test-55680