

Online Supplementary Material

Understanding Ehlers-Danlos Syndrome: A Claims-Based Analysis of Healthcare Cost Patterns. *JHEOR*. 2026;13(2):8-15. [doi:10.36469/jheor.2025.145941](https://doi.org/10.36469/jheor.2025.145941)

Table S1: Codes Identifying EDS and Related Comorbidities Diagnoses and Relevant Procedure Codes

Table S2: Excluded Codes

Table S3: Charlson Comorbidity Index

Table S4: Two-Part Model Equation

This supplementary material has been provided by the authors to give readers additional information about their work.



Table S1. Codes Identifying EDS and Related Comorbidities Diagnoses and Relevant Procedure Codes

Code Type	Codes	Description
ICD-10 CM diagnosis codes	Q79.60	Ehlers-Danlos syndrome, unspecified
	Q79.61	Ehlers-Danlos syndrome, classical type
	Q79.62	Ehlers-Danlos syndrome, hypermobility type
	Q79.63	Ehlers-Danlos syndrome, vascular type
	Q79.69	Ehlers-Danlos syndrome, other type

Abbreviation: ICD-10-CM, *International Classification of Diseases, Tenth Revision, Clinical Modification*.

Table S2. Excluded Codes

Code Type	Codes	Description
ICD-10 CM diagnosis codes	C00 – C97	Cancers, metastatic tumors, any malignancy, including lymphoma and leukemia
	Q90 - Q99	Chromosomal abnormalities, not elsewhere classified

Abbreviation: ICD-10-CM, *International Classification of Diseases, Tenth Revision, Clinical Modification*.

Table S3. Charlson Comorbidity Index

Code Type	Condition	Codes
ICD-10 CM diagnosis codes	Chronic heart disease	I05 I06 I07 I08 I10 I20
	Myocardial infarction	I21.x, I22.x, I25.2
	Congestive heart failure	I09.9, I11.0, I13.0, I13.2, I25.5, I42.0, I42.5-I42.9, I43.x, I50.x, P29.0
	Peripheral vascular disease	I70.x, I71.x, I73.1, I73.8, I73.9, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8, Z95.9
	Cerebrovascular disease	G45.x, G46.x, H34.0, I60.x-I69.x
	Dementia	F00.x-F03.x, F05.1, G30.x, G31.1
	Chronic pulmonary disease	I27.8, I27.9, J40.x-J47.x, J60.x-J67.x, J68.4, J70.1, J70.3
	Rheumatic disease	M05.x, M06.x, M31.5, M32.x-M34.x, M35.1, M35.3, M36.0
	Peptic ulcer disease	K25.x-K28.x
	Mild liver disease	B18.x, K70.0-K70.3, K70.9, K71.3-K71.5, K71.7, K73.x, K74.x, K76.0, K76.2-K76.4, K76.8, K76.9, Z94.4
	Diabetes	E10.0, E10.1, E10.2-E10.5, E10.6, E10.8, E10.9, E11.0, E11.1, E11.6, E11.8, E11.9, E12.0, E12.1, E12.6, E12.8, E12.9, E13.0, E13.1, E13.6, E13.8, E13.9, E14.0, E14.1, E14.6, E14.8, E14.9
	Hemiplegia or paraplegia	G04.1, G11.4, G80.1, G80.2, G81.x, G82.x, G83.0-G83.4, G83.9
	Renal disease	I12.0, I13.1, N03.2-N03.7, N05.2-N05.7, N18.x, N19.x, N25.0, Z49.0-Z49.2, Z94.0, Z99.2
	Moderate or severe liver disease	I85.0, I85.9, I86.4, I98.2, K70.4, K71.1, K72.1, K72.9, K76.5, K76.6, K76.7
	AIDS/HIV	B20.x-B22.x, B24.x

Abbreviations: CPT, Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System; ICD-10-CM, *International Classification of Diseases, Tenth Revision, Clinical Modification*.

Table S4. Two-Part Model Equation
Equation
For a given outcome Y_i (cost or utilization), let D_i be the indicator for a nonzero value: $D_i = \{1, \text{ if } Y_i > 0\} \{0, \text{ if } Y_i = 0\}$
Part 1: Logistic model (probability of any outcome) $\text{logit} [\text{Pr} (D_i = 1 X_i)] = \beta_0 + \beta_1 \text{Time}_i + \beta_2 \text{Age}_i + \beta_3 \text{Sex}_i + \beta_4 \text{Region}_i + \beta_5 \text{ComorbidityIndex}_i$
Part 2: Continuous/count model Cost outcomes (using a gamma distribution): $\ln [E (Y_i Y_i > 0, X_i)] = \gamma_0 + \gamma_1 \text{Time}_i + \gamma_2 \text{Age}_i + \gamma_3 \text{Sex}_i + \gamma_4 \text{Region}_i + \gamma_5 \text{ComorbidityIndex}_i$ Utilization outcomes (using a negative binomial distribution): $\ln [E (Y_i Y_i > 0, X_i)] = \gamma_0 + \gamma_1 \text{Time}_i + \gamma_2 \text{Age}_i + \gamma_3 \text{Sex}_i + \gamma_4 \text{Region}_i + \gamma_5 \text{ComorbidityIndex}_i$
Combined (unconditional) expected outcome: $E (Y_i X_i) = \text{Pr} (Y_i > 0 X_i) \times E (Y_i Y_i > 0, X_i)$ In these equations, X_i represents the set of covariates (post-index time period, age group, sex, region, and Charlson Comorbidity Index).