Multimodal Assessment of ICD-Coded Sarcopenia Diagnoses in the Real-World Setting

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Background

- Sarcopenia is a progressive skeletal muscle condition characterized by declining muscle mass, strength, and function.[1]
- Sarcopenia is increasingly recognized in real-world data (RWD) as a critical predictor of delayed disease recovery and mortality.[1,2]
- Sarcopenia may be captured in the electronic health record (EHR) using multiple modalities, including:
  - Diagnosis (ICD-10-CM) coding
  - Procedure coding of body composition measurement
  - Indication in unstructured clinical notes
  - Physiological indicators of muscle mass computed from lab values and vitals
- Appendicular Skeletal Muscle Mass Index (ASMI) and the Sarcopenia Index (SI) serve as key sarcopenia indicators based on sex-specific diagnostic thresholds.[3,4]
- The relationship between diagnosis coding and other indicators of sarcopenia remains poorly characterized in real-world datasets.

Objective

- To characterize sarcopenia diagnoses in the real-world setting by comparing ASMI and SI against diagnostic thresholds using structured and unstructured EHR data.

Methods

- A retrospective analysis (January 2017–December 2025) was performed using electronic health records from the US-based OMNY Health real-world data platform.
- Patient encounters with a sarcopenia diagnosis code (ICD-10-CM M62.84) were selected.
- Encounters that had clinical notes containing the term “sarcopenia” were identified.
- Encounters with procedure codes corresponding to body composition measurement (dual x-ray absorptiometry, bioelectrical impedance analysis) or functional testing (physical performance, nutrition) were identified.
- ASMI was estimated at each encounter using the anthropometric model:

  $ASMI = [0.193(W) + 0.107(H) - 4.157(G) - 0.037(A) - 2.631] / H^2$

  where W = weight (kg); H = height (cm); G = gender coding (1=male, 2=female); A = age (years)
- SI was calculated at each encounter using the ratio of serum creatinine to cystatin C.
- Sarcopenia was defined using the following sex-specific diagnostic thresholds:
  - ASMI: < 7.0 kg/m^2 (males) and < 5.4 kg/m^2 (females).
  - SI: < 89.9 mg/dL (males) and < 79.0 mg/dL (females).

Results

- The study identified a total of 18,980 encounters representing 10,404 unique patients with a sarcopenia diagnosis code.
- Patient demographics are presented in **Table 1** :
  - The study population was 68.6% White and 51.4% female.
  - The mean age of all patients included in the study was 68.3.
  - 22.5% of encounters included in the study contained creatinine lab values while 2.3% had cystatin C.
- The intersection of supporting modalities for sarcopenia diagnosis are presented in **Figure 1**:
  - 17.8% of encounters had support from clinical notes and diagnosis coding.
  - 4.8% of encounters had support from procedure codes and diagnosis coding.
  - 1.9% of encounters had support from clinical notes, procedure codes and diagnosis coding.
- The distributions of computed ASMI and SI for males and females are presented in **Figure 2** :
  - Mean (SD) ASMI (n=8,630) were 7.8 (1.1) kg/m^2 for males and 6.3 (1.4) kg/m^2 for females.
  - Mean (SD) SI values (n=413) were 119 (63.7) mg/dL for males and 82.2 (40.3) mg/dL for females.
  - Many encounters did not meet the diagnostic threshold for ASMI (73.6%) or SI (49.2%).

Conclusions

- Sarcopenia is an increasingly critical predictor of mortality and delayed recovery from disease.
- ICD-coded sarcopenia frequently lacks corroborating evidence within clinical notes and procedure codes.
- A significant portion of patient encounters with an existing sarcopenia diagnosis code did not meet the defined diagnostic thresholds for ASMI or SI.
- Reliance on diagnosis coding alone may be insufficient for robust phenotyping and sarcopenia cohort definition in real-world datasets.

Table 1. Patient Demographic and Encounter Lab Characteristics

Patient Characteristic	Study Population N = 10,404
Demographics	
Gender, n (%)	
Female	5,344 (51.4%)
Male	5,022 (48.3%)
Age (years)	
n	10,404
Mean (SD)	68.3 (14.4)
Median (Q1,Q3)	70 (60,80)
Min, Max	17, 89
Race, n (%)	
White	7,140 (68.6%)
Non-White	3,264 (31.4%)
Encounter Lab Characteristics	
Creatinine lab value	4,835 (22.5%)
Cystatin C lab value	497 (2.3%)

Figure 1. Procedure Coding and Clinical Note Support for Sarcopenia ICD-10-CM Diagnosis

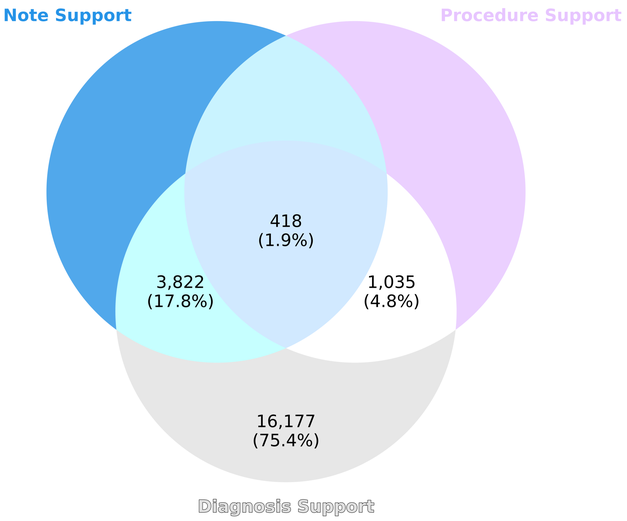
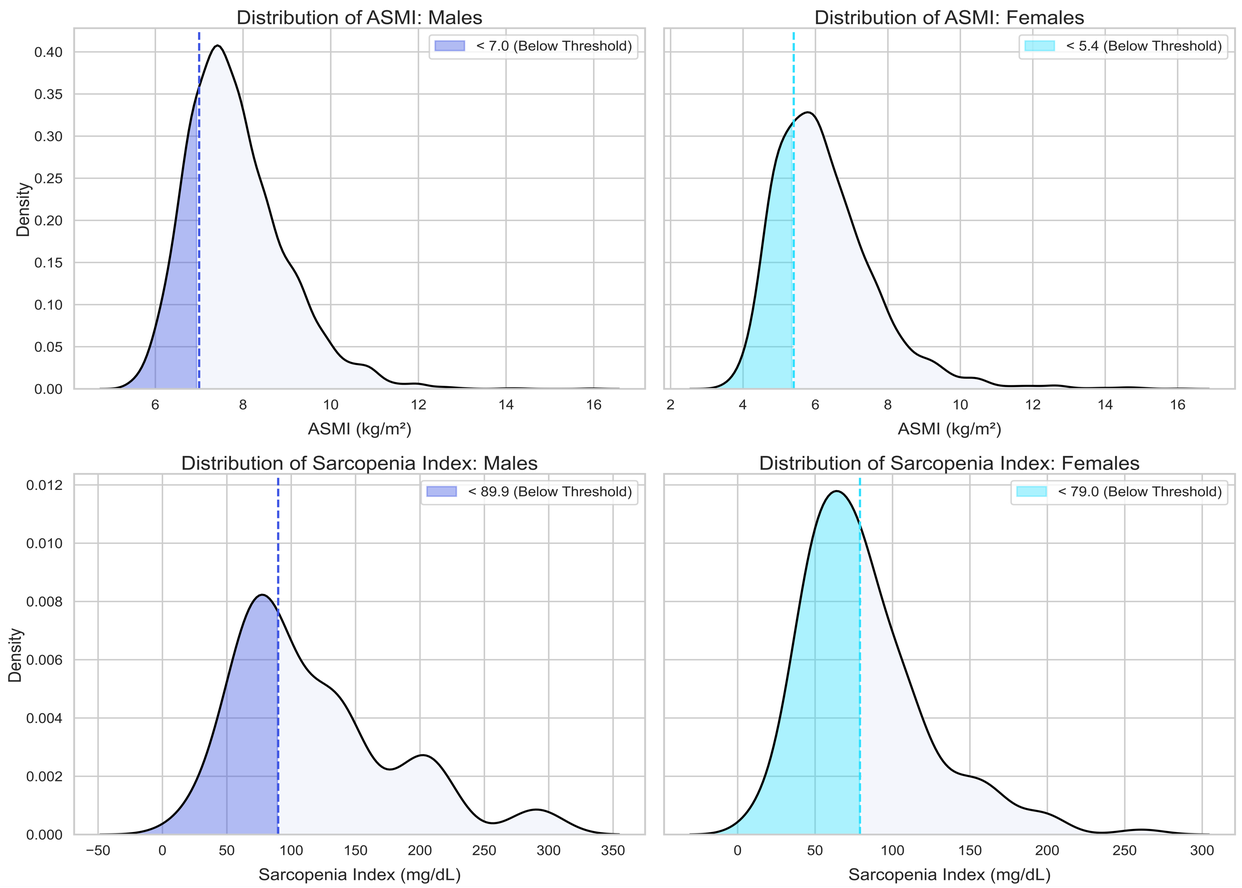


Figure 2. Distribution of ASMI and SI Against Sex-Specific Thresholds



Top Row)
Distributions of Appendicular Skeletal Muscle Mass (ASMI) for males only (left; n=4,291, mean=7.8 kg/m^2, SD=1.1 kg/m^2) and females only (right; n=4,232, mean=6.3 kg/m^2, SD=1.4 kg/m^2) at encounters with a sarcopenia diagnosis code present. Colored portions indicate the proportion of encounters that meet the sex-specific diagnostic threshold of sarcopenia when using ASMI.

Bottom Row)
Distribution of the Sarcopenia Index (SI) for males only (left; n=248, mean=118.1 mg/dL, SD=62.3 mg/dL) and females only (right; n=164, mean=82.2 mg/dL, SD=40.4 mg/dL) at encounters with a sarcopenia diagnosis code present. Colored portions indicate the proportion of encounters that meet the sex-specific diagnostic threshold of sarcopenia when using SI. SI values were computed only for encounters with both creatinine and cystatin C lab values.

Abbreviations:
ASMI = Appendicular Skeletal Muscle Mass; SI = Sarcopenia Index; ICD-10 = International Classification of Diseases, 10th Revision; n = numerator; SD = standard deviation.;

References:
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