Validity and Accuracy of Asthma-Related ICD-10 Diagnosis Codes in United States Real-World Administrative Database

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Objectives

- Diagnosis codes in real-world administrative databases are increasingly used as proxies for clinical conditions.
- We aimed to evaluate the validity and accuracy of asthma-related International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes against clinical indications.

Methods

Data Source

- Geographically diverse, large US hospital-based administrative Premier Healthcare Database (PHD) + linked administrative claims

Study Population & Design

- Retrospective observational study
- Period: Oct 1, 2021 – Sep 30, 2022
- Inclusion criteria:
  Patients aged ≥ 18 years with asthma, a short-acting beta2-agonist (SABA) fill, and a history of asthma exacerbation
- Exclusion criteria:
  Patients with major respiratory diagnoses of malignancy, or pregnancy, or without continuous medical and pharmacy enrollment

Definitions

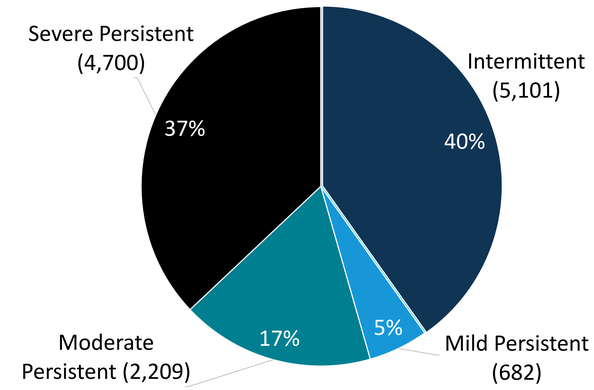
- True asthma severity levels was based on the presence and type of asthma maintenance medication fills during 12-month baseline period.

Asthma Severity	Study-Specific Treatment Criteria
Intermittent	SABA-only, OR with < 32 days of maintenance therapy
Mild Persistent	Use of SABA/ICS combination, OR only an LTRA, OR low-dose ICS, OR xanthine
Moderate Persistent	Use of a low-dose ICS/LABA, OR both a LTRA and a low-dose ICS, OR a low-dose ICS and xanthine, OR a medium-high-dose ICS only
Severe Persistent	Use of a medium-high-dose ICS/LABA, OR a medium-high-dose ICS and either a LTRA or xanthine, OR a biologic, OR a chronic corticosteroid user

- True asthma exacerbation episode was defined using asthma-related visit plus systemic corticosteroid fills during 12-month follow-up period.

Results

12,692 Eligible patients



Mean (SD) age: 38.7 (13.7) years

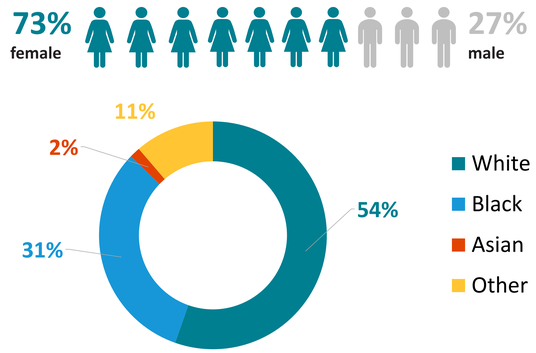


Figure 1. Sensitivity, specificity, PPV and NPV of asthma ICD-10-CM diagnosis codes

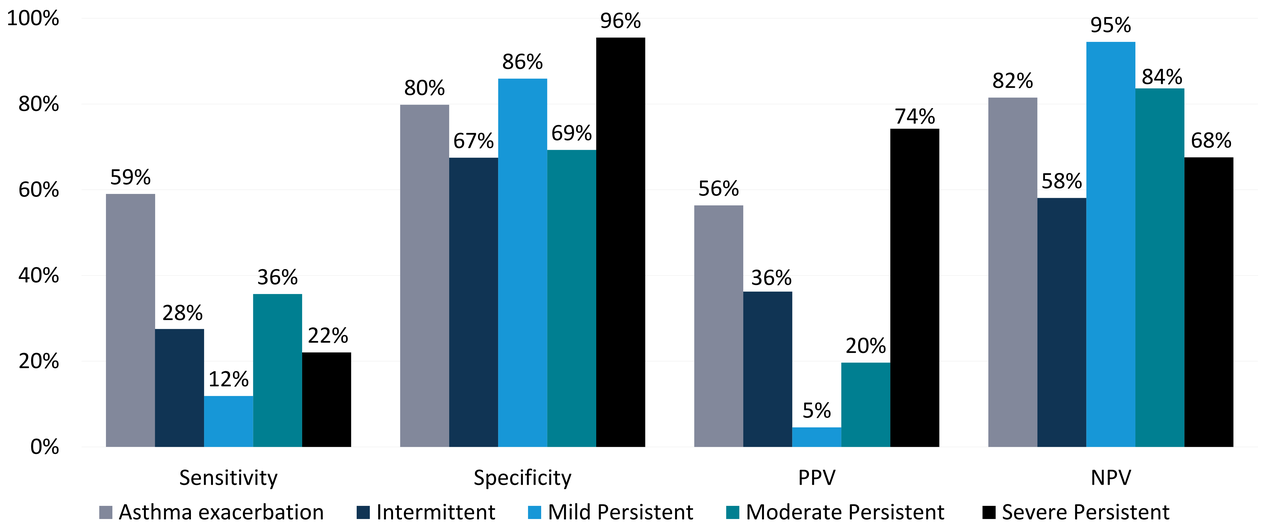
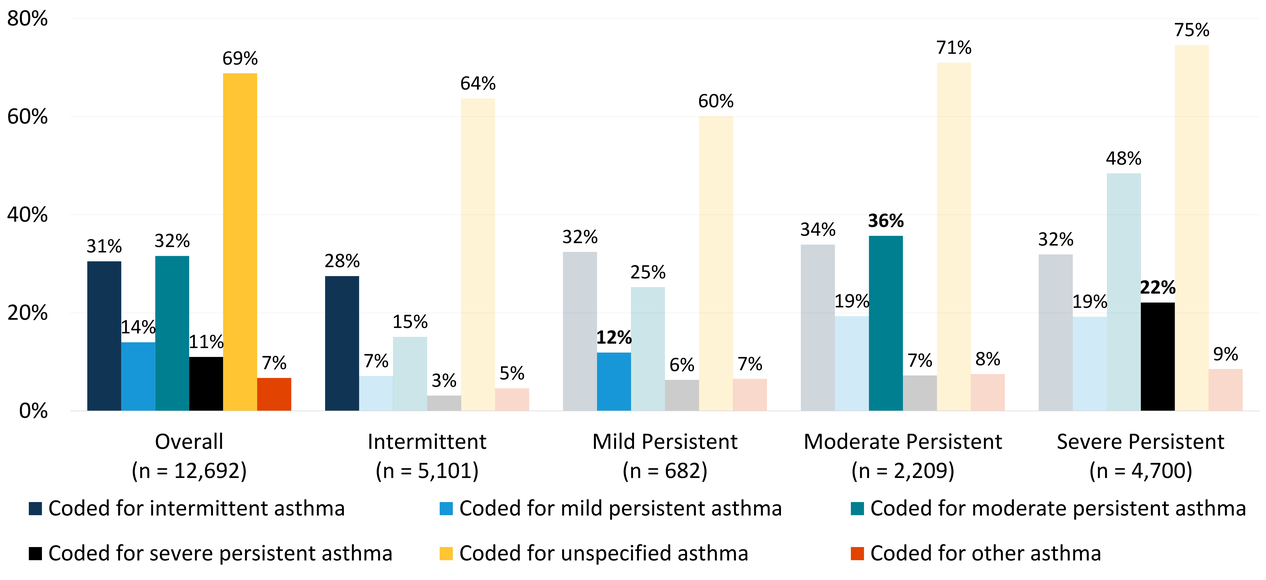


Figure 2. Sensitivity analysis for asthma severity level codes



- During follow-up period, 30.6% (n=3,889) patients had an asthma exacerbation episode.
- Asthma exacerbation codes had low sensitivity (59%) and PPV (56%), but high specificity (80%) and NPV (82%).
- Sensitivity was low (< 40%) for all severity levels of asthma codes - intermittent, mild persistent, moderate persistent, and severe persistent.
- Specificity was high (> 65%) for all severity levels, with the highest among severe persistent asthma codes.
- PPV was low (< 40%) for all severity levels of asthma codes except for severe persistent category.
- Among asthma patients who were not assigned the correct diagnosis codes, 60-75% were coded as unspecified asthma across the four asthma severity groups.

Conclusion

- Asthma severity levels, especially mild persistent asthma, are not accurately captured using diagnosis codes.
- Compared to the severity levels, asthma exacerbation episodes were captured better with ICD-10-CM codes.
- Codes for unspecified asthma were widely used.
- Caution is warranted for using diagnosis codes to assess prevalence of different asthma severity levels.

References

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Disclosure

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SABA: Short-acting beta$_2$-agonist; ICS: Inhaled corticosteroid; LABA: Long-acting beta$_2$-agonist; LTRA: Leukotriene receptor antagonist, PPV: Positive predictive value, NPV: Negative predictive value