

BACKGROUND

- Medication, procedure, and diagnosis coding are fundamental to real-world data to support clinical research, impacting cohort selection, patient recruitment, and outcome measurement.
- Source vocabulary systems (e.g., ICD-10-CM, HCPCS, RxNorm) are updated regularly.
- Incorporating these changes into existing code sets is essential yet challenging to manage.

OBJECTIVES

- To quantify medication, procedure, and diagnosis code changes over time to assess the importance of maintaining updated code sets and provide a foundation for tool development.
- To design an informatics tool designed to facilitate routine code updates and interdisciplinary collaboration.

METHODS

- We analyzed the Healthcare Common Procedure Coding System (HCPCS), International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) and Procedure Coding System (ICD-10-PCS), and National Drug Codes (NDC).
- We summarized code changes and visualized trends in code additions, deletions, and revisions over time.

RESULTS

HCPCS: 2017 - 2025

- 4,730 HCPCS codes changes occurred
- 2,484 (52.5%) code additions from 2017 through 2025 (Figure 1)

ICD-10-CM: 2017 - 2026

- 7,889 changes overall
- Median (IQR) of 377.5 (275.0, 494.0) additions, 43.5 (29.5, 121.5) deletions, and 34.0 (24.0, 119.0) revisions occurring annually (Figure 2)

ICD-10-PCS: 2017 - 2026

- 5,284 changes overall
- Median (IQR) of 274.0 (43.5, 695.0) additions, 12 (1.5, 169.0) deletions, and 2.5 (0.0, 99.5) revisions occurring annually (Figure 3)

NDC: 2018 - 2025

- 73,919 new codes*
- Large cumulative increases demonstrate the frequency of updates (Figure 4)

CodeMapper tool description

- CodeMapper is a new web-based informatics tool integrating current and historical diagnostic, procedural, medication, and laboratory codes.
- With semi-annual source vocabulary updates, this tool helps maintain the code sets described above and offers the ability for interdisciplinary teams to collaborate and refine code lists for use in current or future research (Figure 5).

CONCLUSIONS

- Regular updates to medical coding systems are essential to support accurate research findings.
- The potential to under-ascertain codes within structured data is high, particularly in multi-year longitudinal studies where code sets from structured vocabularies may be fixed at the time of protocol development.
- Maintenance and integration of current and complete source vocabularies are critical for rigorous and generalizable clinical research both for trials and real-world evidence using observational electronic health record or claims data.

*Note cumulative increases do not include revisions and deletions.

Figure 1: HCPCS Changes from 2017 to 2025 Compared to Previous Calendar Year (n=4,730)

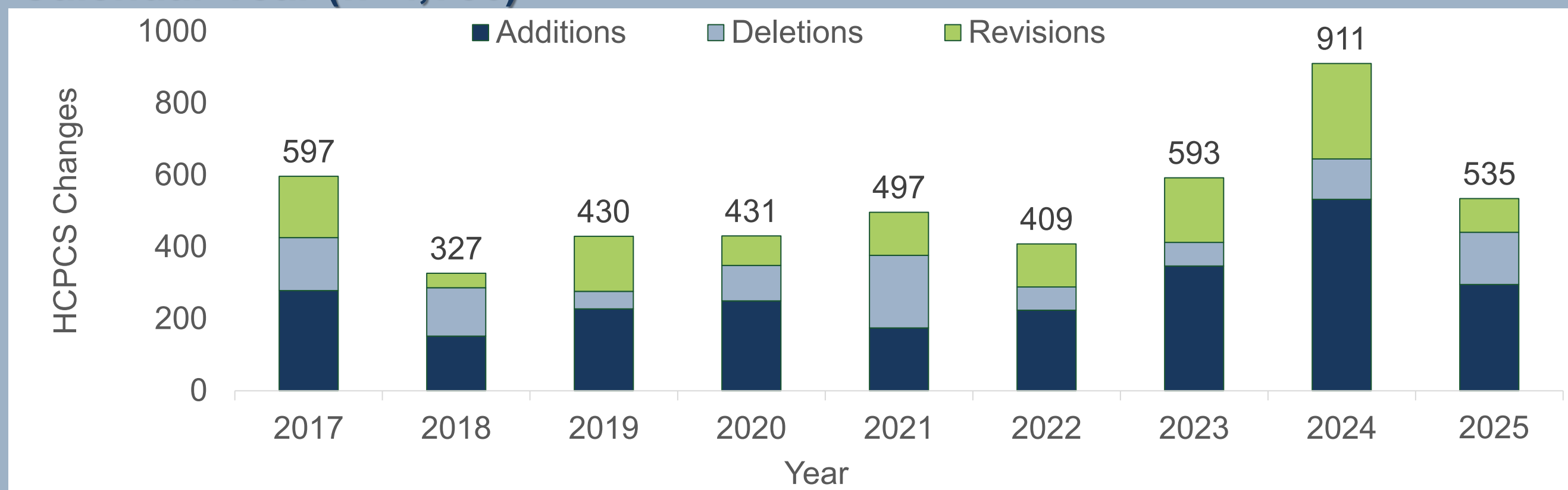


Figure 2: ICD-10-CM Changes from 2017 to 2026 Compared to Previous Calendar Year (n=7,889)

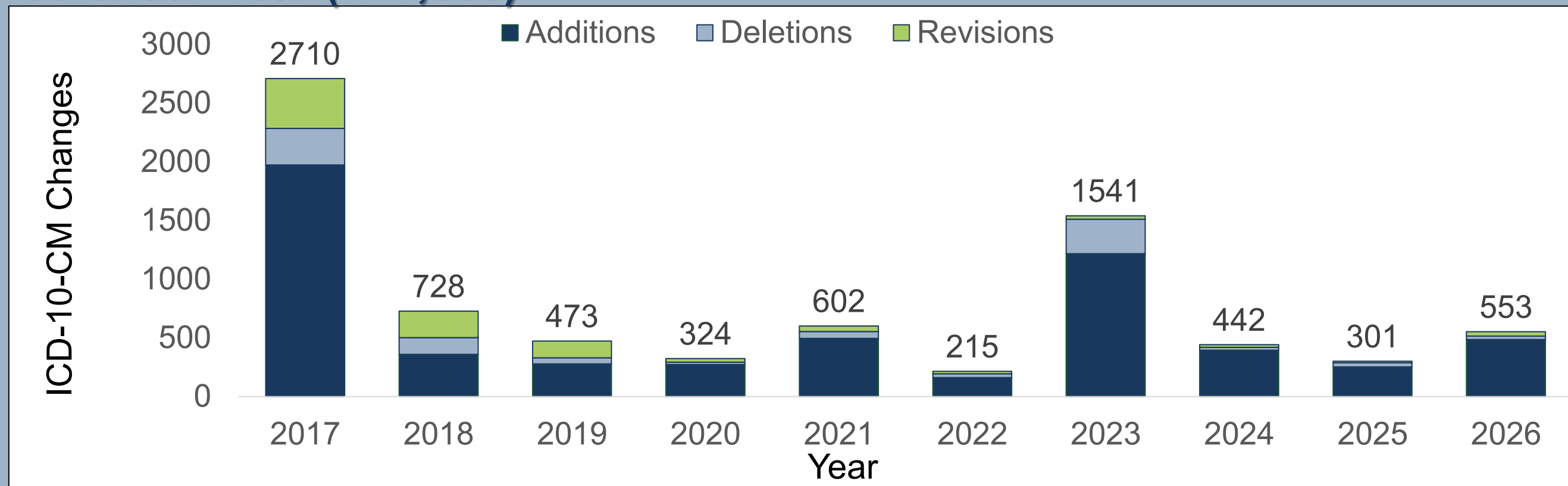
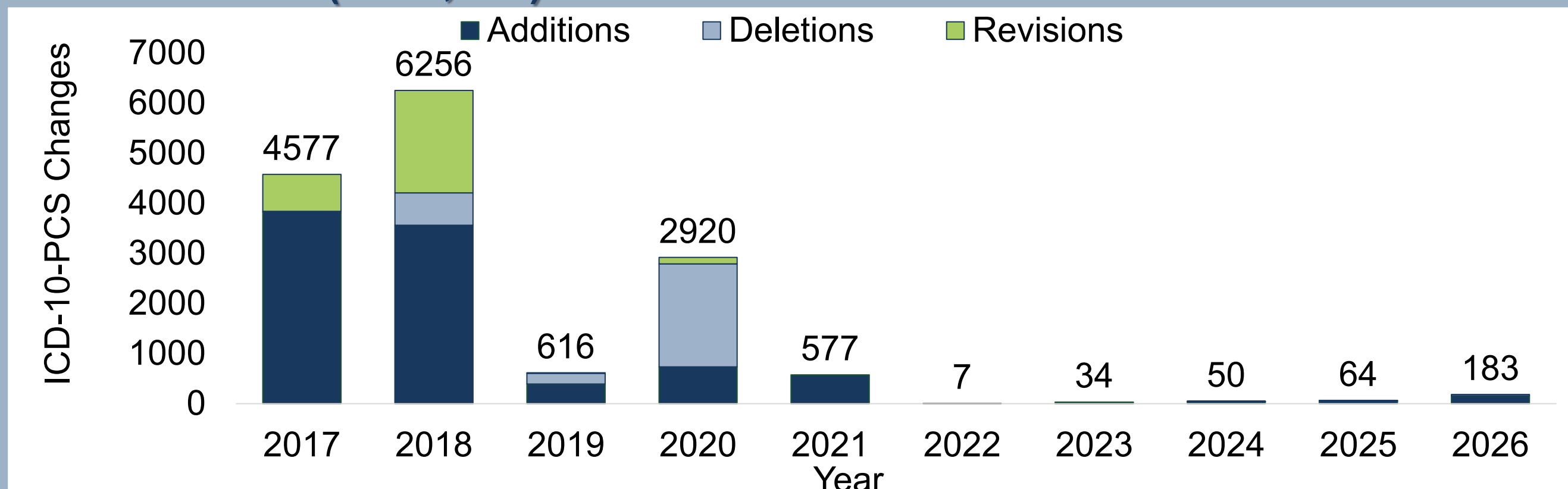


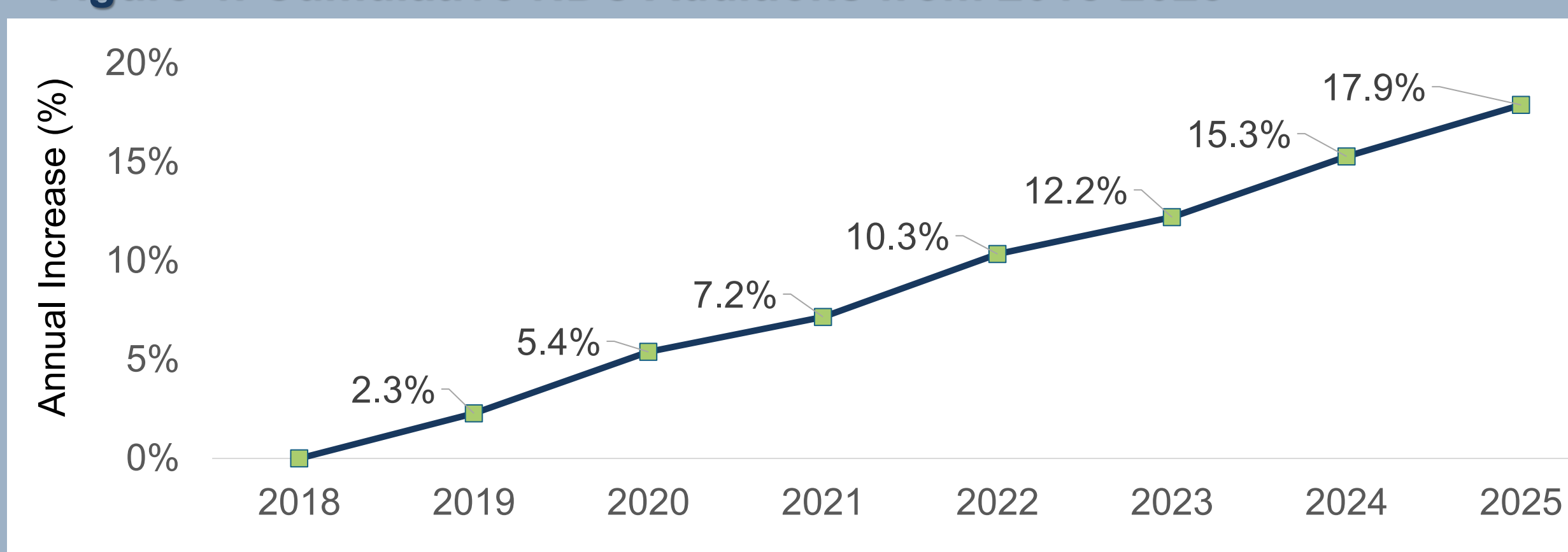
Figure 3: ICD-10-PCS Changes from 2017 to 2026 Compared to Previous Calendar Year (n=15,284)



HCPCS: Healthcare Common Procedure Coding System. ICD-10-CM/PCS: International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System.

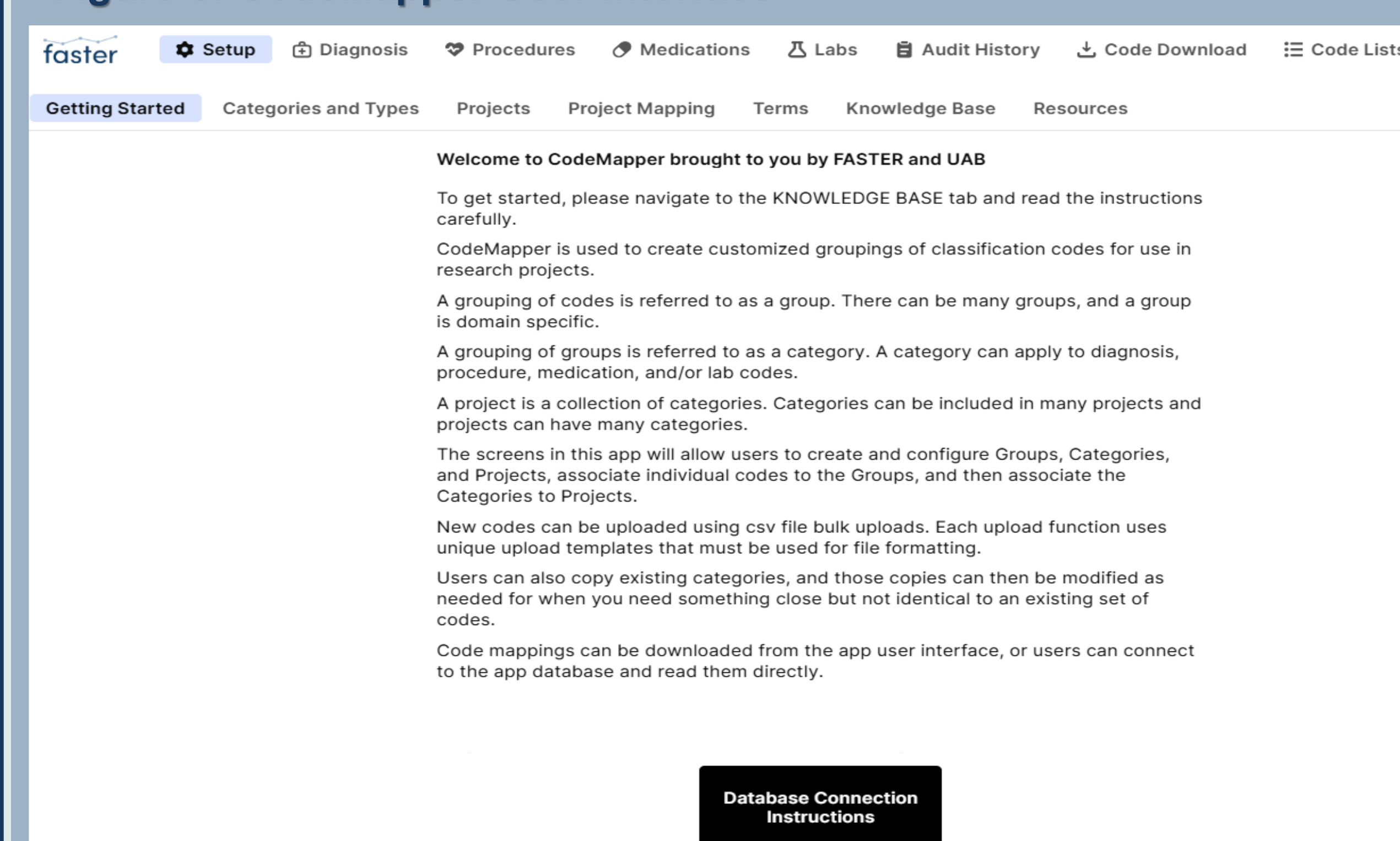
NOTE: Total HCPCS changes (n=4730) are comprised of 2484 additions, 1020 deletions, and 1226 revisions. Total ICD-10-CM changes (n=7889) are comprised of 5896 additions, 1000 deletions, and 993 revisions. Total ICD-10-PCS changes (n=15284) are comprised of 9380 additions, 2975 deletions and 2929 revisions.

Figure 4: Cumulative NDC Additions from 2018-2025



NDC: National Drug Code. Note: Percent increases do not include deleted or revised (e.g., strength, description, route) codes.

Figure 5: CodeMapper User Interface



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