Grouping ICD-9-CM and CPT Procedure Codes into a Common Clustering Standard

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Background
The University of Virginia Clinical Data Repository (CDR) provides physicians, nurses, and other clinical staff direct access to patient data using a web-enabled interface. Users of the system obtain data by submitting interactively built ad-hoc queries that consist of a set of user defined search conditions. One common way to search and report is by procedure code. Procedures in the CDR are stored as a set of ICD-9-CM codes (from hospital billing sources) and CPT codes (from physician billing sources).

To simplify the query building process the CDR allows users to specify a set of ICD-9-CM codes using the Clinical Classifications Software (CCS). CCS is a standard clustering system for ICD-9-CM, which groups over 3,500 procedure codes into 231 classifications. All classifications are mutually exclusive. This scheme, in the public domain, was developed and is maintained by the Agency for Healthcare Research and Quality (AHRQ).

The use of CCS codes works well for finding patients with procedures encoded using ICD-9-CM but does not work when procedures are encoded with CPT codes because no mapping exists translating CPT codes to CCS codes.

A second problem is on the reporting side once a population of patients has been identified. It is much more convenient to report procedures clustered by CCS group rather than by the individual ICD-9-CM codes. However, patient procedures encoded with CPT codes cannot be reported this way.

Method
To make the CCS code search more effective we are attempting to map CPT codes to the single level CCS codes. The mapping will be done in these steps.

1. Automatically convert CPT codes to ICD-9-CM codes using a vendor crosswalk file\(^1\). Then convert ICD-9-CM codes to the single level CCS codes using the CCS software.
2. Eliminate some ambiguities automatically by assigning priorities to CCS choices.
3. Further eliminate ambiguities using a second vendor crosswalk\(^4\).
4. Eliminate remaining ambiguities by manual review by physicians.

Microsoft Access was used to manage the CPT, ICD-9-CM, CCS dictionaries and the vendor crosswalk files and to do the automated mapping steps.

Results
Of the 20,000+ CPT codes in the CPT dictionary 11,198 have been used in the CDR. 6,409 CPT codes were mapped using the vendor crosswalk files to single level CCS codes. Of these, 3,601 were unambiguous after completing Step 1. Most of the CPT codes that were ambiguously mapped to multiple CCS codes have only 2 possibilities, one of which can be easily chosen as the proper mapping. Consider this example of an ambiguously cross-walked CPT code:

43226 ESOPHAGUS ENDOSCOPY, DILATION

4. Eliminate remaining ambiguities by manual review by physicians.

The crosswalk maps this CPT code to these two CCS codes:
- Esophageal dilatation (69)
- Other OR upper GI therapeutic procedures (94)

Step 2 will designate the specific CCS code (in this case code 69) as the proper mapping for this CPT (rather than the general catch-all group 94). Steps 2, 3 and 4 are currently in development.

Conclusion
In the absence of a detailed understanding of ICD-9-CM and CPT codes, it can be difficult to accurately define a population based solely on these systems. Once our CPT/ICD-9-CM to CCS mapping is completed, users will be able to use CCS codes in a direct and convenient manner to identify their population of interest.

References
\(^1\) Scully, Schubart, Einbinder. Improving Search Results for Diagnoses or Procedures Using an ICD-9-CM Clustering Standard. AMIA Annual Fall Symposium, 2000. 1133.
\(^2\) URL: http://www.ahcpr.gov/data/hcup/ccs.htm
Only the single level CCS codes (formerly CCHPR codes) are referred to here.
\(^3\) URL: http://www.data-files.com/index.htm