

HCPCS and NDC codes change meaning over time. Solving it in OHDSI vocabulary and ETL

Title: Code reuse in OHDSI standardized vocabularies: scope of the problem and methods to solve

Background: 43 HCPCS and 82 NDC codes that changed their meaning in period from 2017 until now were identified. Their absolute count is small, but they contain novel therapies (see examples below)

Table 1. Examples of reused codes.

code	vocabulary	previous meaning	old meaning end date	current meaning start date	current meaning
J9350	HCPCS	Injection, topotecan , 4 mg (Deprecated)	2014-11-11	2023-07-01	Injection, mosunetuzumab-axgb , 1 mg
J1440	HCPCS	Injection, filgrastim (g-csf), 300 mcg (Deprecated)	2013-12-31	2023-07-01	Fecal microbiota , live - islm, 1 ml
J9380	HCPCS	Vincristine sulfate, 5 mg (Deprecated)	2014-11-11	2023-07-01	Injection, teclistamab -cqyv, 0.5 mg
G0327	HCPCS	END STAGE RENAL DISEASE (ESRD) RELATED SERVICES LESS THAN FULL MONTH, PER DAY; ...	2013-08-28	2021-07-01	Colorectal cancer screening; blood-based biomarker
Q2040	HCPCS	Botulinum Toxin Type A Injection	2011-12-31	2018-01-01	Tisagenlecleucel , up to 250 million car-positive viable t cells...
Q2041	HCPCS	von Willebrand factor 1 UNT Injectible Solution	2011-12-31	2019-01-01	Axicabtagene ciloleucel, up to 200 million autologous anti-cd19 car-positive viable t cells...
Q2042	HCPCS	17-alpha-Hydroxyprogesterone Injection	2011-12-31	2019-01-01	Tisagenlecleucel , up to 600 million car-positive viable t cells...
516550	86026NDC	Alprazolam 0.5 MG Oral Tablet	2013-03-01	2023-08-01	estradiol 0.5 MG Oral Tablet
516550	19326NDC	Furosemide 20 MG Oral Tablet	2013-03-01	2023-04-01	24 HR metoprolol succinate 100 MG Extended Release Oral Tablet

Note, the meaning shown in OHDSI vocabulary is in GREEN.

Currently several concepts with the same vocabulary_id and code aren't allowed, that's why either current or historical meaning is reflected, but never both

Proposed vocabulary solution:

Table 2. Proposed concept table:

concept_code	Concept_name	valid_start_date	valid_end_date	invalid_reason*	concept_id
J9380	Vincristine sulfate, 5 mg	1970-01-01	2014-11-11	R	1234
J9380	Injection, teclistamab-cqyv, 0.5 mg	2023-07-01	2099-12-31	R	5678

Each concept is treated separately in the other vocabulary tables having its own mappings, hierarchy (if standard) and synonyms

*Invalid_reason = 'R' means that concept is "reused", and requires special treatment by the ETL matching not only source codes and vocabulary, but event dates and concept valid_dates

Figure 1. Current CDM: drug exposure – same drug all the time



Figure 2. Resulting CDM: drug exposure – different drugs at different times



Figure 3. How to define Teclistimab exposure currently

Cohort Entry Events

Events having any of the following criteria:

- a drug exposure of **Any Drug**
- occurrence start is: after 2023-07-01
- Drug Source Concept is: **J9380 source codes**
- a drug exposure of **Teclistimab - RxNorm**

Figure 4. How to define Teclistimab exposure with applied changes

Cohort Entry Events

Events having any of the following criteria:

- a drug exposure of **Teclistimab - RxNorm**

Conclusion: OHDSI solves the HCPCS and NDC code reuse problem on the vocabulary / CDM level by mapping events from different time periods to different concepts, so researchers can address them directly, without specifying dates.

