

1. Coding systems

Overview

This section describes which data are **coded** in the Enroll-HD study database, how these coded data are integrated into PDS releases, and how these data can be used.

Enroll-HD is a multi-centered, multi-lingual observational study. People with different professional backgrounds from multiple countries enter data into the Electronic Data Capture (EDC) system. To facilitate data entry and to make the data analysis easier, many **free text entries** are **coded** using different coding systems.

Table. Coding systems overview.

	Coding performed by	Code available in PDS	Other codes available via SPS request
Medications and nutritional supplements	Central coding team	Internal treatment code, ATC	WHO-DD
Indication	Central coding team	Internal Condition code	MedDRA
Comorbidities	Central coding team	ICD-10	
Surgery/procedure	Central coding team	Internal Condition code	MedDRA
Event – mental health event requiring hospitalization	Central coding team	Internal Condition code	MedDRA
Occupation	Site/Central coding team	None	Snomed

Medication and nutritional supplements, indications, comorbidities and the reportable event – mental health event requiring hospitalization - are coded **centrally**. **Occupation** is coded either directly by the **site staff** or by the **central coding team**. Occupation data are *not* included in PDS releases, but may be obtained through **SPS request**, subject to Scientific Review Committee (SRC) approval.

Note that **coding systems** used in the Enroll-HD EDC database and the **PDS releases differ**. These differences are described below.

Medications and Nutritional Supplements in the PDS

For the PDS, an Enroll-HD internal drug code is used. Information about Enroll-HD participants' use of medications and nutritional supplements are provided in two files: *PharmacoTx* and *NutSuppl*.

The PDS file *PharmacoTx* includes the following Enroll-HD internal information about a participant's medications:



The Enroll-HD internal treatment code, an 11-character code (RX000000000), the active ingredients of a drug, as well as the Anatomical Therapeutic Chemical (ATC) codes a drug falls under.

Medications which are not codable using a specific drug code are put into a group, for example an entry of “birth control pill” is put into the group “contraceptives”.

Example: Database entry of “Xenazin” (typo with missing e)

Modified term	Enroll-HD treatment code	Active ingredients	ATC (level 4)
<i>cmtrt__modify</i>	<i>cmtrt__decod</i>	<i>cmtrt_ing</i>	<i>cmtrt_atc</i>
Xenazine	RX000090013	Tetrabenazine	N07XX

- cmtrt__modify*: Modified term
- cmtrt__decod*: Enroll-HD treatment code (RX followed by 9 digits)
- cmtrt_ing*: Main active ingredients, listed comma separated
- cmtrt_atc*: A list of all ATC codes a drug falls under, listed comma separated

Use search and filter functions (in Excel or your statistical analysis tool) to identify drugs which have the **same active ingredient** but have several **different trade or generic** names (modified term).

For example, search or filter *cmtrt_ing* for the ingredient Tetrabenazine to find all drugs containing Tetrabenazine. This will provide a listing that contains all instances of different trade names like Xenazine, Nitoman, Tetmodis, Xenazina, Xenazine, etc. that contain Tetrabenazine as the active ingredient.

In addition to the Enroll-HD treatment code, the ATC code is provided. The ATC groups medications according to respective organ systems.

To facilitate the search for codes of interest refer to: http://www.whocc.no/atc_ddd_index/.

1. **Example:** Continuing with the above example of Tetrabenazine:

The ATC categorization for this drug is as follows:

```
Tetrabenazine:      ATC code: N07XX
                    N NERVOUSSYSTEM
                    N07 OTHERNERVOUS SYSTEM DRUGS
```



N07X OTHER NERVOUS SYSTEM DRUGS

N07XX Other nervous system drugs

2. **Example:** Using ATC codes to find medications of interest

To search for all antidepressants, or more specifically for SSRIs, search the *cmtrt_atc* variable for N06AB as described below:

Nervous system codes:

N NERVOUS SYSTEM All drugs for the nervous system

N06 PSYCHOANALEPTICS Subgroup Psychoanaleptics

N06A ANTIDEPRESSANTS Sub-Subgroup Antidepressants

N06AB Selective serotonin reuptake inhibitors Sub-Sub-Subgroup SSRIs

To find the codes of interest, either select all codes starting with “N” for all Nervous system drugs, or select only Antidepressants by choosing the ATC to start with “N06A” or only select the specific ATC “N06AB” for SSRIs.

Indications for a treatment in the PDS

Enroll-HD not only collects data on medications, but also information about **why** the medication was prescribed.

This is known as the **indication** for medication.

In the PDS file “*PharmacoTx*” the Enroll-HD **condition code** is provided (CX000000000). For example, if a participant was prescribed Tetrabenazine for the HD symptom chorea, the indication would be coded with the following code:

cmindc__modify – *cmindc__decod*

Chorea – CX997675208

Columns:

cmindc__modify: modified term

cmindc__decod: Enroll-HD condition code

Search and filter functions enable easy selection of participants taking medications and the indications for which a medication is taken.

Comorbidities in the PDS

For participants in the Enroll-HD Study with documented **comorbid conditions**, the data are contained in the “Comorbid” file of the PDS.

There are two different codes used to code comorbid conditions: ICD-10 code is used to code illnesses, and the Enroll-HD internal condition code is used to code surgeries and procedures.

The ICD-10 code hierarchy allows checking groups of diseases based on an organ system. The reference located at <http://apps.who.int/classifications/icd10/browse/2010/en> is a useful starting point for understanding these groupings.

For example, to search for all participants with mild depressive episode, first identify the high-level ICD-10 code:

Example:

mhterm__modify – *mhterm__decod*

Mild depressive episode – F32.0.

Next refer to the below two columns:

Column:

mhterm__modify: English term from the dictionary

mhterm__decod: Code

Search or filter the column *mhterm__decod* using substrings (e.g. codes beginning with “F32” to find F32.0, F32.1, F32.8, etc.) to identify further subsets of the comorbidity.

For procedures and surgeries, the Enroll-HD internal condition code (CX000000000) is used.

Example:

mhterm__modify – *mhterm__decod*

Appendectomy – CX110508107

Column:

mhterm__modify: English term from the dictionary

mhterm__decod: Enroll-HD condition code

Occupation in the PDS

Occupation data are not available in the PDS. Refer to the below section *Coding systems in the EDC* for further information.

Data handling and management tips

In Enroll-HD PDS, the data files Pharmacotherapy ('PharmacoTx'), Non-Pharmacologic Therapies ('NonPharmacoTx'), Nutritional Supplements ('NutSuppl'), and Comorbid Conditions ('Comorbid') contain a variable labeled 'Ongoing' (coded into 1 'YES' and 0 'NO'). **This value is set at 1 'YES, ongoing' for all conditions and therapies that do not have a stop date** (e.g. the site staff confirmed that the participant was still taking the medication at the time of the last Enroll-HD visit). If the stop date is marked as missing, unknown, wrong, the ongoing field is set to "no". The assumption is that if there is an end to the drug even if not known it is not ongoing.

The data files 'PharmacoTx', 'NonPharmacoTx', 'NutSuppl' and 'Comorbid' may include some **entries that might seem like a duplication** (e.g. the entry of two different allergies which are both coded as "Allergy, unspecified"). Most of the entries are recorded **intentionally** and are likely the result of two or more exact medications or comorbidities that also share the **same start and end date**.

Other Coding systems in the EDC available by SPS request

CHDI has obtained licenses for coding systems used in the Enroll-HD Study. In the PDS Enroll-HD internal codes are being provided. **End users who have obtained WHO-DD or MedDRA licenses can receive the data coded with these alternative coding systems.** A specified dataset (SPS) needs to be requested.

WHO-DD:

The WHO Drug Dictionary (<https://www.who-umc.org/whodrug/whodrug-portfolio/whodrug-global/>) is used for coding participant medications in the EDC. These are coded by a central coding team. If there is uncertainty, central coders communicate with the clinical study site to obtain clarification.

MedDRA:

The [Medical Dictionary for Regulatory Activities](https://www.meddra.org/) (MedDRA -<https://www.meddra.org/>) is used to code participants' surgeries and procedures as well as coding for the indication of prescription medication. MedDRA is managed by a Maintenance and Services Support Organization and the IP is held by The [International Federation of Pharmaceutical Manufacturers and Associations](#) (IFPMA) as the Trustee of the International Conference on

Harmonization (ICH) Steering Committee. These items are coded to the Lowest Level Term (see example below) by a central coding team. If there is uncertainty, central coders communicate with the clinical study site to obtain clarification.

Example: MedDRA structure:

Lowest Level Term (LLT):	Difficulty sleeping
Preferred Term (PT):	Insomnia
High Level Term (HLT):	Disturbances in initiating and maintaining sleep
High Level Group Term (HLGT):	Sleep disturbances (incl subtypes)
System Organ Class (SOC):	Nervous system disorders

ICD-10:

The [International Classification of Diseases](https://www.who.int/classifications/icd/en/) in the 10th revision (ICD-10 - <https://www.who.int/classifications/icd/en/>) copyrighted by WHO is used in the Enroll-HD Study for coding participants' comorbidities.

These are coded by a central coding team. If there is uncertainty, central coders communicate with the clinical study site to obtain clarification.

SNOMED:

The [Systematized Nomenclature of Medicine](http://www.snomed.org/) (SNOMED - <http://www.snomed.org/>) is a comprehensive nomenclature used to capture patient encounters in electronic health systems. In the Enroll-HD study SNOMED is used to code participant's occupation. Occupation is coded by Enroll-HD site staff.



Data coding support and assistance

If you have **specific questions** regarding data coding in Enroll-HD, please email coding@enroll-hd.org.