# Add Health
## The National Longitudinal Study of Adolescent to Adult Health

# Medication Use - Biomarker Home Visit

**Report prepared by**

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This document summarizes the rationale, equipment, measurement, and protocol procedures for the medication inventories collected during the Wave V in-home biomarker exam. It also documents the protocol for assigning therapeutic classes to those medications. Whenever possible, data collection and methods in Wave V mirrored those of Wave IV to ensure comparability of data between waves. This document is one in a set of Wave V user guides. The following user guides are also available to describe protocols for other biological measures in Wave V:

- Anthropometric Measures
- Cardiovascular Measures
- Cardiovascular Measures: Baroreflex Sensitivity, & Hemodynamic Recovery
- Measures of Glucose Homeostasis
- Measures of Inflammation and Immune Function
- Measures of Lipids
- Measures of Renal Function

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<p style="text-align:center">Table of Contents</p>

1. **Introduction**

Data on respondent use of prescription and select over-the-counter (aspirin-containing and non-steroidal anti-inflammatory) medications were collected during the Wave V in-home exam. The process of collecting the prescription medication data, therapeutically classifying the prescription medications, and structuring a file of the therapeutic classifications for dissemination to users is described below.

2. **Collection of Prescription and Over-the-Counter Medication Use Data**

All data were collected during in-home visits performed by field examiners from two Add Health data collection partners: Examination Management Services, Inc. (2016-2017) and Hooper Holmes, Inc. (2018-2019). All examiners were trained and certified using a custom program specific to the Add Health protocol. Examiners used a 7" Samsung Galaxy Tab 4 tablet to record and later transmit their data. An Add Health data collection application (Open Data Kit or ODK) installed on the tablet guided the examiner through the home visit protocol. In addition, each examiner received a series of job aids, both on paper and on the tablet, to serve as quick reference guides when completing the protocol. Each tablet also contained an in depth Add Health training manual that could be accessed at any time.

### 2.1 Initial Contact

During a phone conversation confirming the interview appointment date and time, the field examiner notified the respondent that information on use of medications would be collected at the home visit. The examiner also suggested that it would help to have their medications handy at that time of the visit so they could be recorded properly. Doing so also alerted the respondent to bring medication containers to the visit if it was not conducted at their residence.

### 2.2 Home Visit

Medication data were collected during the home visit prompted by the ODK application on the tablet. The prescription medication inventory was collected after anthropometry and blood pressure measures, but before venous blood collection. The questions followed a preface read by the examiner to the respondent:

> *When we scheduled this visit, we said we would like to record all prescription medications that you have used in the past four weeks. These medications include solid and non-solid formulations that can be swallowed, inhaled, applied to the skin or hair, injected, implanted, or placed in the ears, eyes, nose, mouth, or any other part of the body.*

This preface was followed by **Question 67**:

> "Have you taken any prescription medications in the last four weeks?"

If the respondent answered "Yes", the examiner was presented with the following instruction:

*"If the exam is being conducted in the respondent's home or the medications are conveniently available (e.g., in a purse) ask the respondent to assemble the medications or their containers now so that you can record information about them. If the respondent is unable or unwilling to assemble then now, ask him/her to list them from memory."*

The examiner recorded whether the respondent presented each medication or its container at the visit or if they listed each medication name from memory. Next, the examiner typed the name of each medication (up to fifty) into the tablet (Exhibit 1).
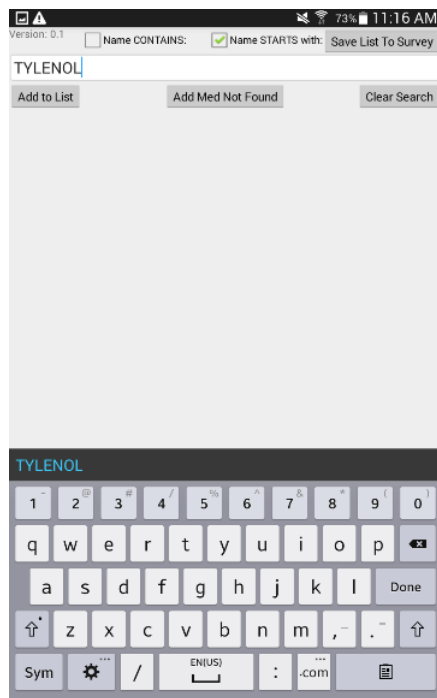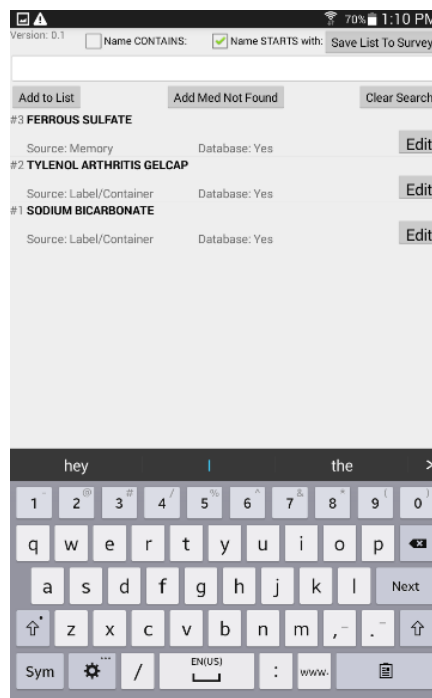


**Exhibit 1**          **Exhibit 2**

As the examiner began typing each medication name, a look-up list of medications with identical or similar names was displayed on screen. The look-up list was based on a medication information and classification database (Multum Lexicon$^{TM}$, Cerner Multum, Inc.; Denver, CO) created by excerpting all generic and brand names included in the most current quarterly update. All tablets automatically detected and downloaded quarterly updates on Wi-Fi connection.

The examiner had the choice of selecting medication names from the look-up list that "included" or "started with" the text that the examiner entered. The examiner highlighted and selected the name on the look-up list that matched each medication. In the absence of an identical match on the look-up list, the examiner manually entered the unmatched name into a free-text data entry field. When all prescription medications were entered, the examiner "Saved List to Survey"

4

(Exhibit 2), thereby importing all entered prescription medications into the main ODK questionnaire database.

After the prescription medications were inventoried, the examiner then asked the respondent two questions about whether they had taken either over-the-counter (OTC) aspirin-containing medications or OTC anti-inflammatory medications in the past 24 hours.

### Question 69:

"In addition to the prescription medicines that I just asked about, have you taken any over-the-counter (OTC) aspirin or aspirin-containing medications including cold and allergy medications or headache powders in the past 24 hours? Some examples of these are: Anacin, Aspirin, B.C., Backache Relief Extra Strength, Bayer, Excedrin, Goody's Pain Relief, Pain Reliever Extra Strength, or Vanquish. Please DO NOT include any acetaminophen or anti-inflammatory medicines such as: Advil, Aleve, Ibuprofen, Midol, Motrin, or Tylenol."

### Question 70:

"In the past 24 hours, have you taken other OTC anti-inflammatory medications? Common examples include: Advil, Aleve, Ibuprofen, Midol, Motrin, Naproxen, or Nuprin. Medications NOT to include: Anacin, Aspirin, B.C., Backache Relief Extra Strength, Bayer, Excedrin, Goody's Pain Relief, Pain Reliever Extra Strength, or Vanquish"

The respondent had the option of answering yes, no, or don't know to these two questions and affirmative answers have been captured in a combined variable (H5OTC24).

### 3. Therapeutic Classification of Prescription Medications (H5SET1 – H5SET4)

In 2019, a contract allowing for therapeutic classification of the prescription medications in the look-up list using an updated version of the Multum Lexicon$^{TM}$ (Cerner Multum, Inc.; Denver, CO) was executed. Of the 7,290 prescription medications reported by respondents, 27 ($< 1\%$) could not be automatically assigned to a therapeutic class using this database. A general internist and cardiovascular epidemiologist with expertise in medication classification manually assigned therapeutic classes to 26 of the 27 prescription medications using two on-line coding databases (Lexi- Comp® On-Line$^{TM}$, Lexi-Comp®, Inc.; Hudson, OH and MICROMEDEX® 1.0, Thomson Reuters Healthcare, Inc; Philadelphia, PA). The Wave V medication file therefore contains the therapeutic class for 7,289 prescription medications (Appendix 1).

In the data file, the nine-digit therapeutic classification codes associated with each prescription medication include a hierarchical series of up to three, three-digit codes representing, from left to right, the (general) therapeutic class, the (more specific) therapeutic subclass, and (most specific) therapeutic subgroup. For example, a prescription medication coded 001-009-161 is in the anti-infective class, cephalosporins subclass, and third generation cephalosporins subgroup. A

prescription medication coded 001-018-*** is in the anti-infective class and aminoglycosides subclass. In other words, three, right-sided asterisks (***) in the nine-digit code indicate that subgrouping was impossible and six (***-***) indicate that both subclassification and subgrouping were impossible. A prescription medication coded 998-998-998 indicates that classification of the medication was impossible. A prescription medication coded 999-999-999 indicates that the respondent reported taking a prescription medication(s), but the medication(s) was not entered into the tablet.

Because the study did not collect indications for treatment and some prescription medications are used on- or off-label to treat a variety of conditions, each prescription medication may be associated with up to four unique, nine-digit therapeutic classification codes, i.e. Sets 1-4.

## 4. Key Therapeutic Classes of Prescription Medications

Use of a prescription medication in the past 4 weeks in one or more of the listed therapeutic classes was assigned a value of 1. Non-use of a prescription medication in the past four weeks in one of the listed therapeutic classes was assigned a value of 0. Therapeutically classified use of prescription medication in particular classes may confound biomarker-based estimates of disease prevalence or risk. For example, use of anti-hypertensive medications may confound blood pressure-based estimates of hypertension prevalence or cardiovascular disease risk. However, the following (1,0) classifications should be used cautiously in the investigation or control of potential confounding, because selection biases often threaten the study of non-randomized medication exposures.

### 4.1 Antihypertensive Medication Use (H5AHT)
Respondents used ≥ 1 prescription medication in ≥ 1 of the following coded therapeutic classes:

| Class | Label | Variable |
|---|---|---|
| 040-042-xxx | Angiotensin converting enzyme (ACE) inhibitors | |
| 040-043-xxx | Anti-adrenergic agents (peripherally acting) | |
| 040-044-xxx | Anti-adrenergic agents (centrally acting) | |
| 040-047-xxx | Beta-adrenergic blocking agents | |
| 040-048-xxx | Calcium channel blocking agents | H5AHT |
| 040-049-156 | Thiazide diuretics | |
| 040-053-xxx | Vasodilators | |
| 040-055-xxx | Antihypertensives | |
| 040-056-xxx | Angiotensin II (AT2) inhibitors | |

## 4.2 Antihyperlipidemic Medication Use (H5C_MED2)

Respondents used ≥ 1 prescription medication in ≥ 1 of the following coded therapeutic classes:

| Class | Label | Variable |
|---|---|---|
| 358-019-173 | HMG-CoA reductase inhibitors | |
| 358-019-174 | Miscellaneous antihyperlipidemic agents | |
| 358-019-241 | Fibric acid derivatives | |
| 358-019-252 | Bile acid sequestrants | H5C_MED2 |
| 358-019-316 | Cholesterol absorption inhibitors | |
| 358-019-317 | Antihyperlipidemic combinations | |
| 358-019-484 | PCSK9 inhibitors | |

## 4.3 Antidiabetic Medication Use (H5C_MED)

Respondents used ≥ 1 prescription medication in ≥ 1 of the following coded therapeutic classes:

| Class | Label | Variable |
|---|---|---|
| 358-099-*** | Antidiabetic agents | |
| 358-099-213 | Sulfonylureas | |
| 358-099-214 | Non-sulfonylureas | |
| 358-099-215 | Insulin | |
| 358-099-216 | Alpha-glucosidase inhibitors | |
| 358-099-271 | Thiazolidinediones | |
| 358-099-282 | Meglitinides | H5C_MED |
| 358-099-309 | Miscellaneous antidiabetic agents | |
| 358-099-314 | Antidiabetic combinations | |
| 358-099-371 | Dipeptidyl peptidase 4 inhibitors | |
| 358-099-372 | Amylin analogs | |
| 358-099-373 | Incretin mimetics | |
| 358-099-458 | SGLT-2 inhibitors | |

4.4 Anti-Inflammatory Medication Use (H5CRP1 – H5CRP8)

Respondents used ≥ 1 medication identified by ≥ 1 of the following questions, coded therapeutic classes, or active ingredients:

| Question / Class | Label | Variable |
|---|---|---|
| Q069=yes<br>Q070=yes | Salicylate past 24 hours or<br>Non-Steroidal Anti-Inflammatory Drug (NSAID) past 24 hours | H5CRP1 |
| 057-058-061<br>057-058-062 | NSAIDs past 4 weeks or<br>Salicylate past 4 weeks or<br>Any oral medication that contains NSAID or Salicylate as an active ingredient[1] in a combination medication past 4 weeks | H5CRP2 |
| 057-058-278 | Cyclooxygenase-2 (COX-2) Inhibitor past 4 weeks | H5CRP3 |
| 122-130-296 | Inhaled Corticosteroids past 4 weeks | H5CRP4 |
| 097-098-300<br>097-098-301 | Corticotropin or<br>Glucocorticoid past 4 weeks | H5CRP5 |
| 105-192-***<br>105-270-*** | Antirheumatic or<br>Antipsoriatic past 4 weeks | H5CRP6 |
| 254-104-***<br>254-257-*** | Immunosupressive agents or<br>Immunosuppressive monoclonal antibodies past 4 weeks | H5CRP7 |
| Any of the above | Any of the above anti-inflammatories | H5CRP8 |

[1] Active Ingredients:

**NSAIDS**
- Bromfenac
- Dicloenac
- Diflunisal
- Etodolac
- Fenoprofen
- Flurbiprofen
- Ibuprofen
- Indomethacin
- Ketoprofen
- Ketorolac
- Meclofenamate
- Mefenamic Acid
- Meloxicam
- Nabumetone
- Naproxen
- Oxaprozin
- Piroxicam
- Sulindac
- Tolmetin

**Salicylates**
- Aspirin
- Choline salicylate
- Magnesium salicylate
- Salsalate
- Sodium salicylate
- Thiosalicylate

## 4.5 Narcotic Medication Use (H5NARC)

Respondents used ≥ 1 opioid-containing prescription medication in ≥ 1 of the following coded therapeutic classes:

| Class | Label | Variable |
|-------|-------|----------|
| 057-058-060 | Narcotic analgesics | |
| 057-058-191 | Narcotic analgesic combinations | |
| 057-073-179 | Skeletal muscle relaxant combinations | H5NARC |
| 122-124-*** | Antitussives | |
| 122-132-*** | Upper respiratory combinations | |

--and--

the prescription medication contained ≥ 1 of the following active ingredients:

- Alfentanil
- Codeine
- Fentanyl
- Levomethadyl
- Methadone
- Opium
- Pentazocine
- Sufentanil

- Buprenorphine
- Dezocine
- Hydrocodone
- Levorphanol
- Morphine
- Oxycodone
- Propoxyphene
- Tapentadol

- Butorphanol
- Dihydrocodeine
- Hydromorphone
- Meperidine
- Nalbuphine
- Oxymorphone
- Remifentanil
- Tramadol

## 4.6 Antidepressant Medication Use (H5AD_X, where X is defined in Exhibit 4)

Respondents used ≥ 1 prescription medication in ≥ 1 of the following coded therapeutic classes:

| Class | Label | Variable |
|-------|-------|----------|
| 242-251-079 | Psychotherapeutic combinations | H5AD_CMB |
| 242-249-076 | Miscellaneous antidepressants | H5AD_MSC |
| 242-249-208 | Selective serotonin reuptake inhibitors | H5AD_SRI |
| 242-249-209 | Tricyclic antidepressants | H5AD_TRI |
| 242-249-250 | Monoamine oxidase inhibitors | H5AD_MOI |
| 242-249-306 | Phenylpiperazine antidepressants | H5AD_PHE |
| 242-249-307 | Tetracyclic antidepressants | H5AD_TET |
| 242-249-308 | Selective serotonin norepinephrine reuptake inhibitors | H5AD_SNR |
| Any of the above | Any of the above antidepressants | H5AD_ANY |

## 4.7 Antipsychotic Medication Use (H5APS)

Respondents used ≥ 1 prescription medication in ≥ 1 of the following coded therapeutic

classes:

| Class | Label | Variable |
|---|---|---|
| 242-251-079 | Psychotherapeutic combinations | H5APS |
| 242-251-077 | Miscellaneous antipsychotic agents | |
| 242-251-210 | Phenothiazine antipsychotics | |
| 242-251-280 | Thioxanthenes | |
| 242-251-341 | Atypical antipsychotics | |

4.8 Anxiolytic, Sedative or Hypnotic Medication Use (H5ASH)
Respondents used ≥ 1 prescription medication in ≥ 1 of the following coded therapeutic classes:

| Class | Label | Variable |
|---|---|---|
| 057-067-068 | Barbituates | H5ASH |
| 057-067-069 | Benzodiazepines | |
| 057-067-070 | Miscellaneous anxiolytics, sedatives and hypnotics | |

4.9 Anticonvulsant Medication Use (H5ACO)
Respondents used ≥ 1 prescription medication in ≥ 1 of the following coded therapeutic classes:

| Class | Label | Variable |
|---|---|---|
| 057-064-199 | Hydantoin anticonvulsants | H5ACO |
| 057-064-200 | Succinimide anticonvulsants | |
| 057-064-201 | Barbiturate anticonvulsants | |
| 057-064-202 | Oxazolidinedione anticonvulsants | |
| 057-064-203 | Benzodiazepine anticonvulsants | |
| 057-064-204 | Miscellaneous anticonvulsants | |
| 057-064-311 | Dibenzazepine anticonvulsants | |
| 057-064-345 | Fatty acid derivative anticonvulsants | |
| 057-064-346 | Gamma-aminobutyric acid reuptake inhibitors | |
| 057-064-347 | Gamma-aminobutyric acid analogs | |
| 057-064-348 | Triazine anticonvulsants | |
| 057-064-349 | Carbamate anticonvulsants | |
| 057-064-350 | Pyrrolidine anticonvulsants | |
| 057-064-351 | Carbonic anhydrase inhibitor anticonvulsants | |

| 057-064-352 | Urea anticonvulsants |
| 057-064-446 | Neuronal potassium channel openers |
| 057-064-456 | α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA) receptor antagonists |

## 5. Quality Control of the Prescription Medication Data

Within a race/ethnicity- and sex-stratified random sample of 112 Add Health respondents among whom prescription medications were inventoried twice, on average 14.1 (95% confidence interval [CI]: 13.0-15.3) days apart, typically by the same examiner and at approximately the same time of day, the agreement (95% CI) between therapeutic classifications was 85% (79%-92%), kappa coefficient (95% CI) = 0.82 (0.71-0.93).  The observations suggest that in-home prescription medication data are reliable at Add Health Wave V.

Of the 12,300 Add Health respondents who completed the Wave V survey, 5,206 also completed an in-home exam.  Among them, prescription medication use was thereby inventoried twice (during the Wave V survey *and* in-home exam), albeit using somewhat different methods administered on average (95% confidence interval [CI]) 8.1 (7.9,8.3) months apart.  The agreement (95% CI) between therapeutic classifications was nonetheless 64% (63%-65%) and kappa coefficient (95% CI) was 0.62 (0.60-0.64).  The observations suggest that within Add Health Wave V, prescription medication data are comparable across the survey and in-home exam.

## 6. The Medication Data File (meds5.xpt)

### 6.1 Hierarchical Structure

The structure of the disseminated medication data file is hierarchical.  This means that it is a medication-level data file, where each therapeutically classified prescription medication and OTC medication appear in the data as single observations.  Therefore, if a respondent reported taking more than one medication, the respondent's identifying number (in the AID variable) will appear in the data file more than once.  Alternatively, the respondent's identifying number will appear in the data file just one time on a single observation if:  (a) the respondent reported using just one medication, (b) the respondent reported not taking any medications, (c) the respondent refused to answer the medication questions, or (d) the exam was terminated before the medication questions could be asked of the respondent.

### 6.2 Respondent-Level Overview of the Medication Responses

Given the complex hierarchical structure of the data file, this section provides an overview, **at the respondent-level**, of the medications reported by the respondents:

Of the 5,381 respondents who participated in the home visit, 3,327 (61.8%) took either prescription medications or OTC medications, 2,028 (37.7%) took no medications, 3 (<1%) refused to answer, and 23 (< 1%) were not asked medication questions because the exam had been terminated beforehand.

Of the 3,327 respondents who took medications, 1,940 (58.3%) took prescription medications only, 799 (24%) took both prescription and OTC medications, and 588 (17.7%) took OTC medications only.

From the 2,739 respondents who had taken prescription medications, a total of 7,290 prescription medications were presented/listed. Of these prescription medications, 4,813 (66.0%) were physically presented and 2,477 (34.0%) were recalled from memory.

### 6.3 The Variables

The medication data file includes the variables below, which are described in the corresponding codebook documentation that also contains frequencies. Please note, however, that the frequencies reported in the codebook are at the medication-level and **not** at the respondent-level.

| Variable Name | Variable Label |
|---|---|
| AID | Respondent Identifier |
| H5EXDATE | Date of Exam (YYYYMMDD) |
| H5EXCOMP | Flag that indicates if the respondent completed the exam |
| H5MEDUSE | Medications used by the respondent, if any |
| H5SET1 – H5SET4 | Therapeutic Classification – Set #1 – #4 |
| H5OTC24 | Type of OTC medication taken in the past 24 hours |
| H5MEDTOT | # of Prescription Medications inventoried |
| H5MEDMEM | # of Prescription Medications recalled from memory |
| H5MEDMAN | # of Prescription Medications entered manually |
| H5AHT | Antihypertensive |
| H5C_MED2 | Antihyperlipidemic |
| H5C_MED | Antidiabetic |
| H5CRP1 | CRP - NSAID/salicylate (24 hr) |
| H5CRP2 | CRP - NSAID/salicylate (4 wks) |
| H5CRP3 | CRP - Cox-2 inhibitor |
| H5CRP4 | CRP - Inhaled corticosteroid |
| H5CRP5 | CRP - Corticotropin/Glucocorticoid |
| H5CRP6 | CRP - Antirheumatic/Antipsoriatic |
| H5CRP7 | CRP - Immunosuppressive |
| H5CRP8 | Anti-Inflammatory |
| H5NARC | Narcotic |
| H5AD_ANY | Antidepressant |
| H5AD_CMB | AD - Pyschotherapeutic combinations |
| H5AD_MSC | AD - Miscellaneous |
| H5AD_SRI | AD - Selective serotonin reuptake inhibitors |

| H5AD_TRI | AD - Tricyclic |
|----------|----------------|
| H5AD_MOI | AD - Monoamine oxidase inhibitors |
| H5AD_PHE | AD - Phenylpiperazine |
| H5AD_TET | AD - Tetracyclic |
| H5AD_SNR | AD - Selective serotonin norepinephrine reuptake inhibitors |
| H5APS | Antipsychotic |
| H5ASH | Anxiolytic/Sedative/Hypnotic |
| H5ACO | Anticonvulsant |

*Given all of the former complexities, Add Health users possessing no to little prior experience working with medication data are strongly advised to collaborate with a health care professional familiar with the challenges and pitfalls associated with doing so.*

## Appendix 1

| Table. Therapeutic Classification Codes | |
|------|------|
| **Code** | **Name** |
| 001 | anti-infectives |
| 002 | amebicides |
| 003 | anthelmintics |
| 004 | antifungals |
| 005 | antimalarial agents |
| 006 | antituberculosis agents |
| 007 | antiviral agents |
| 008 | carbapenems |
| 009 | cephalosporins |
| 010 | leprostatics |
| 011 | macrolide derivatives |
| 012 | miscellaneous antibiotics |
| 013 | penicillins |
| 014 | quinolones |
| 015 | sulfonamides |
| 016 | tetracyclines |
| 017 | urinary anti-infectives |
| 018 | aminoglycosides |
| 019 | antihyperlipidemic agents |
| 020 | antineoplastics |
| 021 | alkylating agents |
| 022 | antineoplastic antibiotics |
| 023 | antimetabolites |
| 024 | antineoplastic hormones |
| 025 | miscellaneous antineoplastics |
| 026 | mitotic inhibitors |
| 027 | radiopharmaceuticals |
| 028 | biologicals |

| **Table. Therapeutic Classification Codes** | |
|------|------------------------------------------------|
| **Code** | **Name** |
| 030 | antitoxins and antivenins |
| 031 | bacterial vaccines |
| 032 | colony stimulating factors |
| 033 | immune globulins |
| 034 | in vivo diagnostic biologicals |
| 036 | erythropoiesis-stimulating agents |
| 038 | viral vaccines |
| 040 | cardiovascular agents |
| 041 | agents for hypertensive emergencies |
| 042 | angiotensin converting enzyme (ACE) inhibitors |
| 043 | antiadrenergic agents, peripherally acting |
| 044 | antiadrenergic agents, centrally acting |
| 045 | antianginal agents |
| 046 | antiarrhythmic agents |
| 047 | beta-adrenergic blocking agents |
| 048 | calcium channel blocking agents |
| 049 | diuretics |
| 050 | inotropic agents |
| 051 | miscellaneous cardiovascular agents |
| 052 | peripheral vasodilators |
| 053 | vasodilators |
| 054 | vasopressors |
| 055 | antihypertensive combinations |
| 056 | angiotensin II inhibitors |
| 057 | central nervous system agents |
| 058 | analgesics |
| 059 | miscellaneous analgesics |
| 060 | narcotic analgesics |
| 061 | nonsteroidal anti-inflammatory agents |
| 062 | salicylates |
| 063 | analgesic combinations |
| 064 | anticonvulsants |
| 065 | antiemetic/antivertigo agents |
| 066 | antiparkinson agents |
| 067 | anxiolytics, sedatives, and hypnotics |
| 068 | barbiturates |
| 069 | benzodiazepines |
| 070 | miscellaneous anxiolytics, sedatives and hypnotics |
| 071 | CNS stimulants |
| 072 | general anesthetics |
| 073 | muscle relaxants |
| 074 | neuromuscular blocking agents |
| 076 | miscellaneous antidepressants |

| Table. Therapeutic Classification Codes | |
|---|---|
| **Code** | **Name** |
| 077 | miscellaneous antipsychotic agents |
| 079 | psychotherapeutic combinations |
| 080 | miscellaneous central nervous system agents |
| 081 | coagulation modifiers |
| 082 | anticoagulants |
| 083 | antiplatelet agents |
| 084 | heparin antagonists |
| 085 | miscellaneous coagulation modifiers |
| 086 | thrombolytics |
| 087 | gastrointestinal agents |
| 088 | antacids |
| 089 | anticholinergics/antispasmodics |
| 090 | antidiarrheals |
| 091 | digestive enzymes |
| 092 | gallstone solubilizing agents |
| 093 | GI stimulants |
| 094 | H2 antagonists |
| 095 | laxatives |
| 096 | miscellaneous GI agents |
| 097 | hormones/hormone modifiers |
| 098 | adrenal cortical steroids |
| 099 | antidiabetic agents |
| 101 | sex hormones |
| 102 | contraceptives |
| 103 | thyroid hormones |
| 104 | immunosuppressive agents |
| 105 | miscellaneous agents |
| 106 | antidotes |
| 107 | chelating agents |
| 108 | cholinergic muscle stimulants |
| 109 | local injectable anesthetics |
| 110 | miscellaneous uncategorized agents |
| 111 | psoralens |
| 112 | radiocontrast agents |
| 113 | genitourinary tract agents |
| 115 | nutritional products |
| 116 | iron products |
| 117 | minerals and electrolytes |
| 118 | oral nutritional supplements |
| 119 | vitamins |
| 120 | vitamin and mineral combinations |
| 121 | intravenous nutritional products |
| 122 | respiratory agents |

| Table. Therapeutic Classification Codes | |
|---|---|
| **Code** | **Name** |
| 123 | antihistamines |
| 124 | antitussives |
| 125 | bronchodilators |
| 126 | methylxanthines |
| 127 | decongestants |
| 128 | expectorants |
| 129 | miscellaneous respiratory agents |
| 130 | respiratory inhalant products |
| 131 | antiasthmatic combinations |
| 132 | upper respiratory combinations |
| 133 | topical agents |
| 134 | anorectal preparations |
| 135 | antiseptic and germicides |
| 136 | dermatological agents |
| 137 | topical anti-infectives |
| 138 | topical steroids |
| 139 | topical anesthetics |
| 140 | miscellaneous topical agents |
| 141 | topical steroids with anti-infectives |
| 143 | topical acne agents |
| 144 | topical antipsoriatics |
| 146 | mouth and throat products |
| 147 | ophthalmic preparations |
| 148 | otic preparations |
| 149 | spermicides |
| 150 | sterile irrigating solutions |
| 151 | vaginal preparations |
| 153 | plasma expanders |
| 154 | loop diuretics |
| 155 | potassium-sparing diuretics |
| 156 | thiazide and thiazide-like diuretics |
| 157 | carbonic anhydrase inhibitors |
| 158 | miscellaneous diuretics |
| 159 | first generation cephalosporins |
| 160 | second generation cephalosporins |
| 161 | third generation cephalosporins |
| 162 | fourth generation cephalosporins |
| 163 | ophthalmic anti-infectives |
| 164 | ophthalmic glaucoma agents |
| 165 | ophthalmic steroids |
| 166 | ophthalmic steroids with anti-infectives |
| 167 | ophthalmic anti-inflammatory agents |
| 168 | ophthalmic lubricants and irrigations |

| **Table. Therapeutic Classification Codes** | |
|---|---|
| **Code** | **Name** |
| 169 | miscellaneous ophthalmic agents |
| 170 | otic anti-infectives |
| 171 | otic steroids with anti-infectives |
| 172 | miscellaneous otic agents |
| 173 | HMG-CoA reductase inhibitors (statins) |
| 174 | miscellaneous antihyperlipidemic agents |
| 175 | protease inhibitors |
| 176 | NRTIs |
| 177 | miscellaneous antivirals |
| 178 | skeletal muscle relaxants |
| 179 | skeletal muscle relaxant combinations |
| 180 | adrenergic bronchodilators |
| 181 | bronchodilator combinations |
| 182 | androgens and anabolic steroids |
| 183 | estrogens |
| 184 | gonadotropins |
| 185 | progestins |
| 186 | sex hormone combinations |
| 191 | narcotic analgesic combinations |
| 192 | antirheumatics |
| 193 | antimigraine agents |
| 194 | antigout agents |
| 195 | 5HT3 receptor antagonists |
| 196 | phenothiazine antiemetics |
| 197 | anticholinergic antiemetics |
| 198 | miscellaneous antiemetics |
| 199 | hydantoin anticonvulsants |
| 200 | succinimide anticonvulsants |
| 201 | barbiturate anticonvulsants |
| 202 | oxazolidinedione anticonvulsants |
| 203 | benzodiazepine anticonvulsants |
| 204 | miscellaneous anticonvulsants |
| 205 | anticholinergic antiparkinson agents |
| 208 | SSRI antidepressants |
| 209 | tricyclic antidepressants |
| 210 | phenothiazine antipsychotics |
| 211 | platelet aggregation inhibitors |
| 212 | glycoprotein platelet inhibitors |
| 213 | sulfonylureas |
| 214 | biguanides |
| 215 | insulin |
| 216 | alpha-glucosidase inhibitors |
| 217 | bisphosphonates |

| Table. Therapeutic Classification Codes | |
|---|---|
| **Code** | **Name** |
| 218 | alternative medicines |
| 219 | nutraceutical products |
| 220 | herbal products |
| 222 | penicillinase resistant penicillins |
| 223 | antipseudomonal penicillins |
| 224 | aminopenicillins |
| 225 | penicillins/beta-lactamase inhibitors |
| 226 | natural penicillins |
| 227 | NNRTIs |
| 228 | adamantane antivirals |
| 229 | purine nucleosides |
| 230 | aminosalicylates |
| 231 | thiocarbamide derivatives |
| 232 | rifamycin derivatives |
| 233 | streptomyces derivatives |
| 234 | miscellaneous antituberculosis agents |
| 235 | polyenes |
| 236 | azole antifungals |
| 237 | miscellaneous antifungals |
| 238 | antimalarial quinolines |
| 239 | miscellaneous antimalarials |
| 240 | lincomycin derivatives |
| 241 | fibric acid derivatives |
| 242 | psychotherapeutic agents |
| 243 | leukotriene modifiers |
| 244 | nasal lubricants and irrigations |
| 245 | nasal steroids |
| 246 | nasal antihistamines and decongestants |
| 247 | nasal preparations |
| 248 | topical emollients |
| 249 | antidepressants |
| 250 | monoamine oxidase inhibitors |
| 251 | antipsychotics |
| 252 | bile acid sequestrants |
| 253 | anorexiants |
| 254 | immunologic agents |
| 256 | interferons |
| 261 | heparins |
| 262 | coumarins and indanediones |
| 263 | erectile dysfunction agents |
| 264 | urinary antispasmodics |
| 265 | urinary pH modifiers |
| 266 | miscellaneous genitourinary tract agents |

| Table. Therapeutic Classification Codes | |
|---|---|
| **Code** | **Name** |
| 267 | ophthalmic antihistamines and decongestants |
| 268 | vaginal anti-infectives |
| 269 | miscellaneous vaginal agents |
| 270 | antipsoriatics |
| 271 | thiazolidinediones |
| 272 | proton pump inhibitors |
| 273 | lung surfactants |
| 274 | beta blockers, cardioselective |
| 275 | beta blockers, non-cardioselective |
| 276 | dopaminergic antiparkinsonism agents |
| 277 | 5-aminosalicylates |
| 278 | cox-2 inhibitors |
| 279 | gonadotropin-releasing hormone and analogs |
| 280 | thioxanthenes |
| 281 | neuraminidase inhibitors |
| 282 | meglitinides |
| 283 | thrombin inhibitors |
| 284 | viscosupplementation agents |
| 285 | factor Xa inhibitors |
| 286 | mydriatics |
| 287 | ophthalmic anesthetics |
| 288 | 5-alpha-reductase inhibitors |
| 289 | antihyperuricemic agents |
| 290 | topical antibiotics |
| 291 | topical antivirals |
| 292 | topical antifungals |
| 293 | glucose elevating agents |
| 295 | growth hormones |
| 296 | inhaled corticosteroids |
| 297 | mucolytics |
| 298 | mast cell stabilizers |
| 299 | anticholinergic bronchodilators |
| 300 | corticotropin |
| 301 | glucocorticoids |
| 302 | mineralocorticoids |
| 303 | agents for pulmonary hypertension |
| 304 | macrolides |
| 305 | ketolides |
| 306 | phenylpiperazine antidepressants |
| 307 | tetracyclic antidepressants |
| 308 | SSNRI antidepressants |
| 310 | echinocandins |
| 311 | dibenzazepine anticonvulsants |

| Table. Therapeutic Classification Codes | |
|---|---|
| Code | Name |
| 312 | cholinergic agonists |
| 313 | cholinesterase inhibitors |
| 314 | antidiabetic combinations |
| 315 | glycylcyclines |
| 316 | cholesterol absorption inhibitors |
| 317 | antihyperlipidemic combinations |
| 318 | insulin-like growth factor |
| 319 | vasopressin antagonists |
| 320 | smoking cessation agents |
| 321 | ophthalmic diagnostic agents |
| 322 | ophthalmic surgical agents |
| 324 | antineoplastic interferons |
| 325 | sclerosing agents |
| 327 | antiviral combinations |
| 328 | antimalarial combinations |
| 329 | antituberculosis combinations |
| 330 | antiviral interferons |
| 332 | radiologic adjuncts |
| 333 | miscellaneous iodinated contrast media |
| 334 | lymphatic staining agents |
| 335 | magnetic resonance imaging contrast media |
| 336 | non-iodinated contrast media |
| 337 | ultrasound contrast media |
| 338 | diagnostic radiopharmaceuticals |
| 339 | therapeutic radiopharmaceuticals |
| 340 | aldosterone receptor antagonists |
| 341 | atypical antipsychotics |
| 342 | renin inhibitors |
| 345 | fatty acid derivative anticonvulsants |
| 346 | gamma-aminobutyric acid reuptake inhibitors |
| 347 | gamma-aminobutyric acid analogs |
| 348 | triazine anticonvulsants |
| 349 | carbamate anticonvulsants |
| 350 | pyrrolidine anticonvulsants |
| 351 | carbonic anhydrase inhibitor anticonvulsants |
| 352 | urea anticonvulsants |
| 353 | anti-angiogenic ophthalmic agents |
| 354 | H. pylori eradication agents |
| 355 | functional bowel disorder agents |
| 356 | serotoninergic neuroenteric modulators |
| 357 | growth hormone receptor blockers |
| 358 | metabolic agents |
| 359 | peripherally acting antiobesity agents |

| Table. Therapeutic Classification Codes | |
|---|---|
| **Code** | **Name** |
| 360 | lysosomal enzymes |
| 361 | miscellaneous metabolic agents |
| 362 | chloride channel activators |
| 363 | probiotics |
| 364 | antiviral chemokine receptor antagonist |
| 366 | integrase strand transfer inhibitor |
| 368 | non-ionic iodinated contrast media |
| 369 | ionic iodinated contrast media |
| 370 | otic steroids |
| 371 | dipeptidyl peptidase 4 inhibitors |
| 372 | amylin analogs |
| 373 | GLP-1 receptor agonists |
| 374 | cardiac stressing agents |
| 375 | peripheral opioid receptor antagonists |
| 376 | radiologic conjugating agents |
| 377 | prolactin inhibitors |
| 378 | drugs used in alcohol dependence |
| 379 | fifth generation cephalosporins |
| 380 | topical debriding agents |
| 381 | topical depigmenting agents |
| 382 | topical antihistamines |
| 383 | antineoplastic detoxifying agents |
| 384 | platelet-stimulating agents |
| 385 | group I antiarrhythmics |
| 386 | group II antiarrhythmics |
| 387 | group III antiarrhythmics |
| 388 | group IV antiarrhythmics |
| 389 | group V antiarrhythmics |
| 390 | hematopoietic stem cell mobilizer |
| 392 | otic anesthetics |
| 393 | cerumenolytics |
| 394 | topical astringents |
| 395 | topical keratolytics |
| 397 | multikinase inhibitors |
| 398 | BCR-ABL tyrosine kinase inhibitors |
| 399 | CD52 monoclonal antibodies |
| 400 | CD33 monoclonal antibodies |
| 401 | CD20 monoclonal antibodies |
| 402 | VEGF/VEGFR  inhibitors |
| 403 | mTOR inhibitors |
| 404 | EGFR inhibitors |
| 405 | HER2 inhibitors |
| 406 | glycopeptide antibiotics |

| **Table. Therapeutic Classification Codes** | |
|---|---|
| **Code** | **Name** |
| 407 | inhaled anti-infectives |
| 408 | histone deacetylase inhibitors |
| 409 | bone resorption inhibitors |
| 410 | adrenal corticosteroid inhibitors |
| 411 | calcitonin |
| 412 | uterotonic agents |
| 413 | antigonadotropic agents |
| 414 | antidiuretic hormones |
| 415 | miscellaneous bone resorption inhibitors |
| 416 | somatostatin and somatostatin analogs |
| 417 | selective estrogen receptor modulators |
| 418 | parathyroid hormone and analogs |
| 419 | gonadotropin-releasing hormone antagonists |
| 420 | antiandrogens |
| 422 | antithyroid agents |
| 423 | aromatase inhibitors |
| 424 | estrogen receptor antagonists |
| 426 | synthetic ovulation stimulants |
| 427 | tocolytic agents |
| 428 | progesterone receptor modulators |
| 430 | anticholinergic chronotropic agents |
| 431 | anti-CTLA-4 monoclonal antibodies |
| 432 | vaccine combinations |
| 433 | catecholamines |
| 435 | selective phosphodiesterase-4 inhibitors |
| 437 | immunostimulants |
| 438 | interleukins |
| 439 | other immunostimulants |
| 440 | therapeutic vaccines |
| 441 | calcineurin inhibitors |
| 442 | TNF alpha inhibitors |
| 443 | interleukin inhibitors |
| 444 | selective immunosuppressants |
| 445 | other immunosuppressants |
| 446 | neuronal potassium channel openers |
| 447 | CD30 monoclonal antibodies |
| 448 | topical non-steroidal anti-inflammatories |
| 449 | hedgehog pathway inhibitors |
| 450 | topical antineoplastics |
| 451 | topical photochemotherapeutics |
| 452 | CFTR modulators |
| 453 | topical rubefacient |
| 454 | proteasome inhibitors |

| Table. Therapeutic Classification Codes | |
| --- | --- |
| **Code** | **Name** |
| 455 | guanylate cyclase-C agonists |
| 456 | AMPA receptor antagonists |
| 457 | hydrazide derivatives |
| 458 | SGLT-2 inhibitors |
| 459 | urea cycle disorder agents |
| 460 | phosphate binders |
| 461 | topical anti-rosacea agents |
| 462 | allergenics |
| 463 | protease-activated receptor-1 antagonists |
| 464 | miscellaneous diagnostic dyes |
| 465 | diarylquinolines |
| 467 | ACE inhibitors with thiazides |
| 468 | antiadrenergic agents (central) with thiazides |
| 469 | antiadrenergic agents (peripheral) with thiazides |
| 470 | miscellaneous antihypertensive combinations |
| 472 | beta blockers with thiazides |
| 473 | angiotensin II inhibitors with thiazides |
| 475 | potassium sparing diuretics with thiazides |
| 476 | ACE inhibitors with calcium channel blocking agents |
| 479 | angiotensin II inhibitors with calcium channel blockers |
| 480 | antiviral boosters |
| 481 | NK1 receptor antagonists |
| 482 | angiotensin receptor blockers and neprilysin inhibitors |
| 484 | PCSK9 inhibitors |
| 485 | NS5A inhibitors |
| 486 | oxazolidinone antibiotics |
| 487 | CFTR combinations |
| 488 | anticoagulant reversal agents |
| 489 | CD38 monoclonal antibodies |
| 490 | peripheral opioid receptor mixed agonists/antagonists |
| 491 | local injectable anesthetics with corticosteroids |
| 492 | cephalosporins/beta-lactamase inhibitors |
| 493 | anti-PD-1 monoclonal antibodies |
| 494 | PARP inhibitors |
| 495 | calcimimetics |
| 496 | VMAT2 inhibitors |
| 497 | cation exchange resins |
| 498 | antineoplastic combinations |
| 499 | carbapenems/beta-lactamase inhibitors |
| 500 | PI3K inhibitors |
| 501 | CDK 4/6 inhibitors |
| 502 | CGRP inhibitors |
| 503 | streptogramins |

| Table. Therapeutic Classification Codes | |
|---|---|
| **Code** | **Name** |
| 504 | antimanic agents |