

# Using NAMCS and NHAMCS Drug Data: A Hands-On Workshop

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# Session Goals

- Understand 2007 NAMCS and NHAMCS drug data
  - ◆ File structure, drug characteristics, Multum Lexicon for generic ingredient and therapeutic classes
- Understand the 2007 drug ingredient file
  - ◆ Purpose of file, how to use it
- Understand how to manipulate multiple years of drug data for trending purposes
  - ◆ Changes in file structure prior to 2006
  - ◆ Use new mapping program and drug database file to append 2007 drug characteristics to older data
- New Ambulatory Care Drug Database online

# Acronyms Used

- NAMCS is National Ambulatory Medical Care Survey
- NHAMCS is National Hospital Ambulatory Medical Care Survey
- ED is Emergency Department
- OPD is Outpatient Department
- Rx is Prescription
- OTC is Over the Counter

# 2007 NAMCS/NHAMCS Drug Data

- Brief review of Patient Record form (PRF) items – NAMCS/OPD vs. ED
  - ◆ New vs. continued (NAMCS/OPD)
  - ◆ Given in ED/Rx at Discharge (ED)
- Up to 8 drugs collected per visit (MED1-8)
- We call entries of drugs on the PRF “drug mentions” – refers to drugs provided, prescribed or continued at the ambulatory care visit
- Visits with one or more “drug mentions” are “drug visits”

# 2007 NAMCS/NHAMCS Drug Data (cont.)

- Drug mentions are coded “as written” using an internal classification system developed in 1980
- Drug mentions = MED1 through MED8
- We add prescription status, composition status, controlled substance status, generic code, ingredients and therapeutic categories during data processing

# 2007 NAMCS/NHAMCS

## Drug Data (cont.)

- Starting in 2006, each MED code is associated with a DRUGID code (MED1 and DRUGID1, MED2 and DRUGID2, etc.)
- DRUGID represents the generic composition of the drug and encompasses multiple ingredients
  - ◆ based on Multum Lexicon, a proprietary database
  - ◆ Multum has ~ 2,000 single ingredient drugs and ~ 700 combination products. If a drug has more than one ingredient, it is covered by one code
  - ◆ alphanumeric variable, such as “d00015”
  - ◆ some DRUGID codes start with “a” or “c” – these codes were generated by NCHS

# 2007 NAMCS/NHAMCS Drug Data (cont.)

- Codes beginning with “a”
  - ◆ a match could not be found between a generic ingredient name on our pre-Multum database and the Multum Lexicon (about 800 substances)
  - ◆ combination products in our pre-Multum database could not be matched with Multum combination DRUGIDs (about 1,800 combinations)
- Codes beginning with “c”
  - ◆ we knew only the therapeutic effect of a substance on our pre-Multum database, ingredients not known

# 2007 NAMCS/NHAMCS Drug Data (cont.)

- Codes beginning with “n”
  - ◆ Replace “a” and “c” codes starting in 2008. “a” and “c” prefixes will still be used for older drugs, but any new drugs entering the system which cannot currently be coded to Multum are assigned prefixes of “n” starting with 2008 data

# 2007 NAMCS/NHAMCS Therapeutic Classification

- Multum assigns therapeutic classes (called drug categories) to DRUGID codes
- Multum Lexicon uses a 3-level therapeutic classification scheme
  - ◆ 19 first-level codes
  - ◆ More than 150 second-level codes
  - ◆ More than 175 third-level codes
- Not a hierarchical numbering system

# 2007 NAMCS/NHAMCS

## Therapeutic Classification (cont.)

- Each DRUGID can be associated with up to 4 therapeutic categories
  - ◆ MED1 is assigned DRUGID1, which is associated with RX1CAT1, RX1CAT2, RX1CAT3, RX1CAT4
  - ◆ These RXCAT variables will always reflect the highest level therapeutic code available (some drugs only have 1 or 2 levels)
  - ◆ So, running RXCAT variables may give you an assortment of first-, second-, and third-level codes all in one output
  - ◆ To provide an alternative, we put additional variables on the files that reflect the complete nested structure for each RXCAT variable

# 2007 NAMCS/NHAMCS Therapeutic Classification (cont.)

- Fluoxetine (marketed mainly as Prozac)
  - ◆ Has a single therapeutic category in Multum = 208, SSRI antidepressant
  - ◆ So, the RX1CAT1 value is 208
  - ◆ The full breakdown behind that value is as follows:
    - ◆ Level 1 (RX1V1C1) is 242 (psychotherapeutic agents)
    - ◆ Level 2 (RX1V2C1) is 249 (antidepressants)
    - ◆ Level 3 (Rx1V3C1) is 208 (SSRI antidepressant)
  - ◆ Whatever the finest level possible for the drug is, that is also the value of the RXCAT variable.

# 2007 NAMCS/NHAMCS Therapeutic Levels

- For MED1 – these are the drug characteristic variables:
  - ◆ DRUGID1, PRESCR1, CONTSUB1, COMSTAT1, RX1CAT1, RX1CAT2, RX1CAT3, RX1CAT4
  - ◆ For each RXCAT variable, there is a separate Level 1, Level 2 and Level 3 variable that shows the complete nested structure of the therapeutic category
  - ◆ For RX1CAT1:
    - ◆ The Level 1 codes are RX1V1C1, RX1V1C2, RX1V1C3, and RX1V1C4 (where V=level)
    - ◆ The Level 2 codes are RX1V2C1, RX1V2C2, RX1V2C3, and RX1V2C4
    - ◆ The Level 3 codes are RX1V3C1, RX1V3C2, RX1V3C3, RX1V3C4
  - ◆ This enables you to run drugs at either the first, second, or third level of classification
  - ◆ You can also concatenate the 3 levels to get a single complete nested structure for every DRUGID 'xxxxxxxxx'

# 2007 NAMCS/NHAMCS

## Conceptualizing Drug Data

- Can generate estimates of VISITS for a particular drug/class of drugs reported (# of visits where Prozac/antidepressants were provided, prescribed, or continued)
- Can generate estimates of DRUG MENTIONS (# of occurrences of fluoxetine hydrochloride provided, prescribed, or continued)
- Can generate estimates of therapeutic classes (# of occurrences of antidepressants (2<sup>nd</sup> level) or SSRIs (3<sup>rd</sup> level) provided, prescribed, or continued)

# 2007 NAMCS/NHAMCS

## Drug Ingredients

- Each medication (MED1-8) can have up to 6 ingredients in our public use data
- Multum calls ingredients “members”
- In Multum, therapeutic categories are assigned to DRUGIDs, but, for multi-ingredient products, the therapeutic code is not specific (for example, “bronchodilator combinations”)
- However, Multum also assigns specific therapeutic categories for each ingredient of a DRUGID
- We have a separate ingredient (or “member”) file that contains up to 4 therapeutic categories for each of a drug’s 6 ingredients (or members)
- Users will match on DRUGID to merge ingredient data with drug data on the public use file

# 2007 NAMCS/NHAMCS Ingredient Example (cont.)

## ■ EXAMPLE:

### ◆ MED1-DRUGID1

- ◆ Up to 6 ingredients – MEMBER1, MEMBER2...MEMBER6
- ◆ Up to 4 therapeutic category variables for each ingredient
- ◆ Just the most detailed level of therapeutic category is included (similar to RXCAT)

MEM1CAT1, MEM1CAT2, MEM1CAT3, MEM1CAT4  
MEM2CAT1, MEM2CAT2, MEM2CAT3, MEM2CAT4  
MEM3CAT1, MEM3CAT2, MEM3CAT3, MEM3CAT4  
MEM4CAT1, MEM4CAT2, MEM4CAT3, MEM4CAT4  
MEM5CAT1, MEM5CAT2, MEM5CAT3, MEM5CAT4  
MEM6CAT1, MEM6CAT2, MEM6CAT3, MEM6CAT4

# 2007 NAMCS/NHAMCS Ingredient Example (cont.)

## ■ EXAMPLE:

- ◆ MED1 – 14525 (HISTALET-DM SYRUP)
- ◆ DRUGID1 – d03370 (CHLORPHENIRAMINE;  
DEXTROMETHORPHAN; PSE)
- ◆ RX1CAT1 – 132 (UPPER RESPIRATORY  
COMBINATIONS)
  - ◆ RX1V1C1 – 122 (RESPIRATORY AGENTS)
  - ◆ RX1V2C1 – 132 (UPPER RESPIRATORY  
COMBINATIONS)
  - ◆ RX1V3C1 -- NO 3<sup>RD</sup> LEVEL FOR THIS DRUGID
- ◆ To obtain specific therapeutic categories for each  
separate ingredient, must go to INGREDIENT file

# 2007 NAMCS/NHAMCS Ingredient Example (cont.)

- Ingredients of HISTALET-DM SYRUP and Their Therapeutic Categories:
  - ◆ CHLORPHENIRAMINE – 123  
(ANTIHISTAMINE)
  - ◆ DEXTROMETHORPHAN – 124  
(ANTITUSSIVE)
  - ◆ PSEUDOEPHEDRINE – 127  
(DECONGESTANT)

# 2007 NAMCS/NHAMCS Trending Drug Data

- Background of NAMCS and NHAMCS drug data
  - ◆ 1980 – First year of drug data collection - up to 8 drugs collected in NAMCS
  - ◆ 1985-1994 - Up to 5 drugs collected
  - ◆ 1992 - NHAMCS began, same drug data collection as NAMCS
  - ◆ 1995-2002 – Up to 6 drugs
  - ◆ 2003-present – Up to 8 drugs

# 2007 NAMCS/NHAMCS Trending Drug Data (cont.)

- PRF items related to drugs
  - ◆ Is this a new medication? -- 1980-1992, 2005-present
  - ◆ Is this a continued medication? -- 2005-present
  - ◆ Is medication for primary diagnosis? – 1980-1990
  - ◆ Was medication from formulary list? -- 1997-2000
  - ◆ Was medication given in ED/Rx at discharge? – 2005-present

# 2007 NAMCS/NHAMCS

## Trending Drug Data (cont.)

Drug characteristics added during data processing --1980-2005

- ◆ Prescription status
- ◆ Controlled substance status
- ◆ Composition status
- ◆ Generic substance (for single ingredient drugs)
- ◆ Up to 5 ingredients (for multi-ingredient products)
- ◆ National Drug Code Directory (NDC) 2 digit therapeutic class – 1985-92
- ◆ NDC 4 digit therapeutic class – 1993-2005
- ◆ Single NDC class coded through 2001, 3 classes coded from 2002-2005
- ◆ We provided a program and file on the web that allowed researchers to replace drug characteristics from 1993-2004 with the most up-to-date drug characteristics from 2005. This has been superseded by our switch to Multum.

# 2007 NAMCS/NHAMCS

## Trending Drug Data (cont.)

- Between 1980 and 1992, we released two sets of public use files each year – one for visits and one for drugs.
- The visit file included PRF drug data (medications, related items) but not drug characteristics.
- The drug file was an “exploded” visit file, with one record for each drug mention.
  - For example, if there were 25,000 visit records and each one had 5 drug mentions on it, the drug file would have 125,000 records, or  $5 \times 25,000$ . Each record had all of the original visit information for each drug, plus the drug characteristics.

# 2007 NAMCS/NHAMCS Trending Drug Data (cont.)

- Starting in 1993, we began releasing a single file that combined the drug characteristics with the visit data.
- Each record reflects a visit, but the drug characteristics were added to the end of the record, repeated for each drug mention.

# 2007 NAMCS/NHAMCS Trending Drug Data (cont.)

- To trend drug data across any years before and since 2006, it is necessary to apply Multum drug characteristics to previous years of drug data
- This can be accomplished by using the DRUGID mapping program along with the 2007 drug database file containing the current drug characteristics.
- It is necessary to match MED codes from each year of pre-2006 data with MED codes on the 2007 drug database. The program we supply will drop the old characteristics and apply the current Multum characteristics for each MED code's DRUGID.

# The New Ambulatory Care Drug Database System

- Online application for looking up drugs in NAMCS and NHAMCS.
- Results shown for 2007 data from both NAMCS and NHAMCS combined.
- We also kept a copy of the older system for drugs using NDC classification. It's still useful for looking up drugs in pre-2006 data.
- At our web site, [www.cdc.gov/nchs/ahcd.htm](http://www.cdc.gov/nchs/ahcd.htm). Under Research Tools on the left navigation bar.

# Questions? Check the Public Use Data File Documentation – updates posted at our website

- Each booklet includes:
  - ◆ A description of the survey
  - ◆ Record format
  - ◆ Marginal data (summaries)
  - ◆ Various definitions
  - ◆ Reason for Visit classification codes
  - ◆ Medication & generic names
  - ◆ Therapeutic classes

# Where to get more information?

- <http://www.cdc.gov/nchs/ahcd.htm>
- Call the Ambulatory and Hospital Care Statistics Branch at 301-458-4600
- Email [SSchappert@cdc.gov](mailto:SSchappert@cdc.gov) for questions on public use data.
- Email [JWatts@cdc.gov](mailto:JWatts@cdc.gov) for questions on drug database.