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# Collecting Medication Data in the 2004 National Nursing Home Survey



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention  
National Center for Health Statistics

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## Collecting Medication Data in the 2004 National Nursing Home Survey

Programs and Collection Procedures

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention  
National Center for Health Statistics

Hyattsville, Maryland  
March 2009  
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**Objectives**

This methods report provides an overview of how medication data were collected and processed in the 2004 National Nursing Home Survey (NNHS) and how analysts may use the medication data. The 2004 survey marked the first time that medication data were collected on sampled nursing home residents in the NNHS.

Information about medications, which are an important component of nursing home care, can help policy makers, researchers, and members of the long-term care community better understand which medications are taken by U.S. nursing home residents.

**Methods**

The medication data were collected in the Prescribed Medications (PM) module of the 2004 NNHS. The computer-assisted personal interviewing (CAPI) instrument, which included a drug lookup list, allowed interviewers to enter a maximum of 25 medications taken on the day before the facility interview and a maximum of 25 medications taken regularly but not on the day before the facility interview. This medication information, which is documented in residents' medication administration records, was collected during a face-to-face interview at the nursing home facilities. All data were provided by facility respondents who used residents' administrative and medical records to answer the survey items. The data were entered into the CAPI instrument that was loaded onto each interviewer's computer laptop.

**Results and conclusions**

Data were collected on 13,507 current residents, 98.5 percent of whom took one or more medications. A stand-alone PM Public-use File has been released. This file, which includes the sampling weight and design variables from the resident file, can be linked to the 2004 NNHS Current Resident Public-use File to generate national estimates on medications by various resident characteristics.

**Keywords:** medications • National Nursing Home Survey • nursing homes • nursing home residents

# Collecting Medication Data in the 2004 National Nursing Home Survey

by Lisa L. Dwyer, M.P.H., Division of Health Care Statistics

## Introduction

This methods report describes how medication data were collected in the 2004 National Nursing Home Survey (NNHS). The NNHS has been conducted periodically since 1973 and was redesigned after the 1999 survey. Information on medications was collected for the first time in the 2004 survey. The redesigned survey included the collection of many new data items, including medication information, because medications play a critical role in nursing home care. Many nursing home residents, the majority of whom are elderly and frail, take numerous medications to treat multiple chronic conditions. A 1991 study reported that “the highest use of medications by Americans is in the institutionalized elderly” (1). Information about medications taken by nursing home residents is of great interest to policy makers, long-term care planners, and health services researchers, particularly as the U.S. elderly population continues to grow. Previous federal and nonfederal data collection initiatives have collected information on medication use in nursing homes. However, the results from these efforts are dated (e.g., 1996 Medical Expenditures Panel Survey—Nursing Home Component) or not generalizable to the entire U.S. nursing home population (e.g., Medicare Current Beneficiary Survey, National Medication Usage Survey, Systematic Assessment of Geriatric drug use via Epidemiology, and the Minimum Data Set). Medication data from the 2004 NNHS may be used

to generate more current national estimates of medication use by U.S. nursing home residents.

## The National Nursing Home Survey (NNHS)

The NNHS is one in a series of surveys that makes up the National Health Care Surveys (NHCS) conducted through the Division of Health Care Statistics (DHCS) by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS). The survey used a nationally representative sample of U.S. nursing home facilities to collect data on facilities' staffing and services and on current residents (data on discharged residents were collected in previous survey years including 1999), including demographic information, health conditions, and services received. The redesign of the NNHS resulted in collecting medication data, as well as other new clinical survey items, for the first time in NNHS history. These data were collected in the Prescribed Medications (PM) module (see [Appendix I](#)).

The 2004 NNHS medication data are available online in a public-use file. The file includes the name and characteristics of medications taken by sampled nursing home residents. The data can be linked to the Current Resident Public-use File, which includes residents' demographic, health status, and payment information and information on services received.

Information on medication dosage, strength, frequency, and route was not collected in this survey. The data from the 2004 NNHS are the most recent nationally representative data available on medications taken by nursing home residents.

## Sample Design

The 2004 NNHS used a sampling frame of U.S. nursing homes drawn from the Centers for Medicare & Medicaid Services' Provider of Services file of U.S. nursing homes and state licensing lists compiled by SMG Marketing Group. The combined files were matched and unduplicated, resulting in a sampling frame of 16,628 nursing homes.

Sampling for the NNHS used a stratified two-stage probability design. The first stage was the selection of facilities and the second stage was the selection of residents. The primary strata of facilities were defined by bed size category and metropolitan statistical area status. Within primary strata, facilities were sorted by the following factors: certification status; hospital-based compared with nonhospital based status; ownership; geographic region; and state, county, and ZIP Code. Nursing homes were then selected using systematic sampling with probability proportional to bed size. For the 2004 NNHS, 1,500 nursing homes were selected to participate.

The second-stage sampling of current residents was carried out by the interviewers using a programmed algorithm in their laptops when they visited the facilities to conduct the interview. The sampling frame for current residents was the total number of residents on the facility rolls as of midnight on the day before the survey interview. Residents who were physically absent from the facility because of an overnight leave or a hospital visit, but had a bed maintained for them at the facility, were included in the sampling frame. A sample of up to 12 current residents per facility was selected.

## Pretest

The 2004 NNHS pretest was administered in 75 nursing homes in June and July 2003. The pretest allowed NCHS to gain direct experience with the PM module under normal interviewing conditions (2). Interviewers did not report any major problems in retrieving medication information from the residents' medication administration records (MARs) during the pretest. Some respondents retrieved the MARs from the nurses' stations to answer medication questions. In other cases, because the medication questions were mentioned in the Key Items for Data Collection (see [Appendix II](#)) sent to appointed facilities in the confirmation package prior to the interview, some nursing facilities included the MARs in the residents' charts, which facilitated collecting these data.

The main problem with using the MARs was in collecting data on the reason why the medication was prescribed, which is typically found with the drug order. For these cases, the interviewers were trained to enter "don't know." However, some conscientious respondents looked up information in the Drug Handbook, called other coworkers for drug classification information, or answered using their existing knowledge of the medication indication. These extra efforts increased administration time and were not performed by all respondents. This contributed to the inconsistent collection of this information, which ultimately was not released in the public-use file.

## National Response Rates

Of the 1,500 nursing home facilities selected to participate in the national survey, 283 refused to participate and 43 were considered out of scope for one or more of the following reasons: the nursing home had gone out of business, it failed to meet the minimum definition (i.e., a facility or unit licensed as a nursing home or a nursing facility by the state health department or some

other state agency and a facility that has three or more beds) used in this survey, or it was a duplicate of another facility in the sample. A total of 1,174 nursing homes participated at the first stage by providing facility information, resulting in a first-stage response rate of 81%. A total of 14,017 residents were sampled from the responding facilities. Of these residents, 8 were out of scope and for 502 residents the facilities refused to provide resident information or ran out of time. This yielded a second-stage response rate of 96%. The overall response rate for the resident component of the 2004 NNHS was 78%. Complete information was collected on 13,507 residents.

## The National Ambulatory Medical Care Survey (NAMCS) Drug Database

The 2004 NNHS medication data were collected using the National Ambulatory Medical Care Survey (NAMCS) drug database. The NAMCS is another survey within the family of National Health Care Surveys. NAMCS has a drug database to code and adjudicate the medication names collected in its survey. The 2004 NNHS used a lookup list of medications constructed from the NAMCS drug database during the pilot and pretest phases of the survey. The lookup list contained the names of 908 medications most frequently prescribed for nursing home residents; these medications were compiled from conditions most commonly reported by physicians of elderly patients in the NAMCS and by facility respondents in the Medicare Current Beneficiary Survey's long-term care facility component. Modeling the collection and coding of NNHS medication data after the NAMCS will allow NCHS to compare medications taken by elderly populations across different providers surveyed in the NHCS—nursing homes, physician offices, hospital outpatient facilities, and hospital emergency rooms.



Approximately 89.8% of the medications reported in the survey were in the 2004 NNHS CAPI lookup list. The NAMCS drug database, which holds information on more than 11,000 medications (prescription and over-the-counter (OTC) drugs) and their characteristics, can be accessed at <http://www.cdc.gov/nchs/about/major/ahcd/ambulatory.htm>.

## Drug Characteristics

The NAMCS drug database contains the following six characteristics for each medication:

1. Generic name code: A unique five-digit code for the chemical name of a drug (3).
2. Rx status code: A code that indicates whether the medication is available by prescription (Rx) only or as an OTC drug in the noninstitutionalized setting. In the nursing home setting, all medications given to a nursing home resident—even OTCs, including vitamin, mineral, or herbal supplements—must be ordered by a physician and, therefore, are considered prescriptions. Despite this, the NAMCS drug database contains information on how the medication is available in the noninstitutionalized setting:
  - 1 = Prescription.
  - 2 = OTC (over the counter).
  - 3 = Undetermined.
  - 4 = Illicit (although there are some illicit drugs in the NAMCS drug database, none were reported in the 2004 NNHS.)
3. Drug Enforcement Agency (DEA) status code: A code that describes the abuse potential of the medication (i.e., is a person more likely to become addicted to the medication) from least controlled to most controlled:
  - 1 = Schedule I (research only); high abuse potential.
  - 2 = Schedule II (high abuse potential; abuse may lead to severe psychological or physical dependence).
  - 3 = Schedule III (lower abuse potential).
  - 4 = Schedule IV (low abuse potential; abuse may lead to limited physical or psychological dependence).
  - 5 = Schedule V (lowest abuse potential).
  - 6 = Uncontrolled.
4. Composition (Comp) status code: A code that indicates the drug makeup as a single entity or combination product:
  - 1 = Single entity drug.
  - 2 = Combination drug.
  - 3 = Undetermined.
5. Ingredient code: A unique five-digit code for the active ingredient in a medication. An active ingredient is any component of a drug product intended to furnish pharmacological activity or other direct effect in the diagnosis, cure, mitigation, treatment, or prevention of disease, or to affect the structure or any function of the body of humans or animals (4). The NAMCS drug database can hold up to five active ingredients for each medication.
6. Drug class code: A four-digit code that describes the therapeutic effect of the medication based on the organ or system on which the medication acts and its chemical, pharmacological, and therapeutic properties (5). The NAMCS drug database allows up to three therapeutic classes per medication, although the majority of medications belong to only one or two therapeutic classes. The therapeutic classification system used to code new medications in the 2004 NNHS is the *1995 National Drug Code (NDC) Directory* (see [Appendix III](#)), which was the most current version at the time of the survey.

Facility Qualifications module and the Facility Characteristics module), two sampling modules (for residents and nursing assistants), and four resident-level modules. The Prescribed Medications (PM) module that collected the medication data was one of the four resident-level modules.

In the PM module, the following questions were asked about each sampled resident: What medications were taken by the resident during the 24 hours of the day before the facility interview, including standing or routine medications or PRN (i.e., as needed) medications? (question PM1A); and What medications were taken regularly by the resident but not during the 24 hours of the day before the facility interview, including standing orders for administration only, but excluding PRN medications (question PM2A)? The drug lookup list was used to enter responses to these two questions. The type of medication order (i.e., standing, routine, or PRN) for each medication was not collected; nor was dosage, strength, route, or frequency information collected.

The survey included these two separate medication questions because some medications are administered weekly or even monthly, as in the case of some osteoporosis drugs (e.g., alendronate) or commonly prescribed supplements (e.g., vitamin B-12). Therefore, the survey instrument was designed to capture information on medications taken every day through question PM1A and on medications taken regularly but not every day through question PM2A. The medication data provided by the facility respondent were collected as brand or generic name, whichever the facility respondent provided. The facility respondent, who was familiar with the residents and their care, was selected by the nursing home administrator to answer the data items in the resident-level modules.

## Data Collection

The 2004 National Nursing Home Survey was conducted from August 2004 through January 2005. The survey consisted of two facility modules (the

## Reason Why Medication Was Prescribed and Adverse Events

For each medication collected in the 2004 NNHS, information was collected on the reason the medication was prescribed and the adverse events experienced by the resident. These data were entered manually by the interviewer; they were not collected using a lookup list. After the data collection period ended, a corresponding *International Classification of Diseases, 9th Revision, Clinically Modified* (ICD-9-CM) code was assigned to each “Reason why prescribed” entry, using a computerized matching algorithm.

Because these data were not collected consistently, they were not included in the Prescribed Medications Public-use File (PM PUF). As mentioned previously, interviewers as well as observers of select interviews found that, in many cases, the reason why the medication was prescribed was not documented in the MARs and was reported inconsistently across respondents.

Data on adverse events were also collected for each medication reported in the 2004 NNHS. Medication errors and adverse events are prevalent in the U.S. health care system (6). However, because the number of adverse events reported in the NNHS was very low (less than 1% of all nursing home residents), cell sizes are small and estimates are unreliable, particularly if the data are analyzed by basic demographic variables (e.g., sex and age). As a result, NCHS omitted this information from the PM PUF.

## Data Processing

Medication names that field interviewers did not find in the drug lookup list at the time of interview were entered manually into the “Other, specify” field as text strings. These text strings were compiled into drug batches and later reviewed by the coding staff, who determined if the text strings could be back-coded to a pre-existing drug

name. If an exact match was found for the text string, then it was coded accordingly. If not, the coders searched for the medication name (i.e., text string) using various pharmacy references and documented any information found.

The next level of review was conducted by a pharmacist who reviewed the coders’ decisions and coders’ notes and attempted to assign codes to uncodeable medications. The pharmacist was able to override the coders’ initial decisions when appropriate. The pharmacist also added decision notes, particularly related to medications’ active ingredients. All medication text strings that were still uncodeable after review by the coders and the pharmacist were sent to NCHS for review and adjudication.

Adjudication included the review of the medication name entered into the CAPI, the drug name code assigned by the coders (and second drug name code if there was a discrepancy between the two coders’ assignments), the coders’ notes, the “Reason why prescribed” field, and the pharmacist’s notes. In adjudication, NCHS researched a medication name and its characteristics (i.e., generic name, active ingredients, composition status, DEA status, and therapeutic class) to determine if it was a valid drug. This research involved using a combination of pharmacology references and clinical staff or contacts who were familiar with medications commonly used in nursing homes. If NCHS was able to confirm that the medication was a valid drug, the drug information was entered into the NAMCS drug database, which automatically assigned the medication a unique five-digit drug name code. The drug name code has a two-digit prefix that corresponds to the year of data collection, followed by three digits—starting with 001—that are assigned in sequential order. Medications that were still “uncodeable” even after NCHS review were coded as 99980. These uncodeables resulted from incorrect spelling or data entry (e.g., in a few cases, the names of medical devices or manufacturer names were entered). In all, 6,186 unique drug entries were

coded. A total of 272 medications were added to the NAMCS drug database; the majority of them were vitamin or mineral supplements.

## File Edits

The majority of edits for the medication data were for the “Reason why prescribed” item. Because these data were entered manually by interviewers, there were varied spellings for many medical conditions. The ICD-9-CM was used to code the diagnoses and medical conditions. The coding entailed two steps, combining the efforts of interviewers and trained medical coders: unique conditions in earlier batches were matched to similar conditions in later batches to provide suggested codes, and exact matching to medical coding text-to-code tables from the field test and other in-house projects was used to provide suggested codes. The coders reviewed the suggested codes and the various spellings for reported medical conditions, combining the suggested codes into a “best” suggested code where possible. This coding was then thoroughly reviewed and finalized by the medical coders, who were trained certified nosologists.

Three major coding issues were identified for the “Reason why prescribed” survey item:

1. Inconsistent data entries.
2. Nondescript entries.
3. Dual coding.

Although this survey item was designed to collect information about medical conditions, it was found that dosage information (e.g., “bid” for twice daily), symptoms, and ICD-9-CM codes were reported as well. In other cases, the data entered were extremely vague or nondescript, forcing the coder to guess the field interviewer’s entry or to leave the corresponding ICD-9-CM field uncoded; examples include “SUPP,” “Mental,” “Blood,” and “Maintenance,” to name some. Finally, dual coding caused the most concern. In some cases, the “Reason why prescribed” field contained two conditions, such as “MI/CAD” for myocardial infarction

and coronary artery disease. This resulted in assigning two ICD–9 codes for dual conditions. Ideally, the field interviewer would have asked the respondent to provide the primary reason for why a medication was taken and then code that single condition. An NCHS in-house medical coder reviewed the dual coding cases and provided direction in editing these fields. Even after expending these resources for file edits, NCHS decided not to release the “Reason why prescribed” data in the PM PUF as these data failed to meet data quality standards. These data are available upon request through the NCHS Research Data Center.

## Disclosure Risk Review

Under Section 308(d) of the Public Health Service Act (42 U.S.C. 242m), the confidentiality of sampled establishments, providers, and patients in NCHS surveys is protected. As a result, all public-use files released by NCHS must complete the disclosure risk review process to protect the facilities and patients for whom data were collected from being identified. NCHS staff reviewed the 2004 NNHS medication data along with other resident data to ensure that no drug information could inadvertently disclose the identity of a nursing home or any of its residents.

## Prescribed Medications Public-use File (PM PUF)

The PM PUF is a stand-alone file of 13,507 records. The file was designed to make it easier for analysts to manipulate the data. If the residents’ medication information were included in the Current Resident Public-use File, the file would have been too large, requiring a great deal of computer memory; therefore, the PM

PUF is a separate file that can be linked to the Current Resident Public-use File when it is necessary to examine other resident variables.

Each record in the PM PUF represents a sampled resident who has a unique resident identification number (RESNUM) that can be linked to its counterpart in the Current Resident Public-use File. The RESNUM is randomly generated and assigned to a unique resident. The remaining variables in the PM PUF are for the 25 medications taken during the 24 hours of the day before the facility interview (i.e., PMCODE01–PMCODE25), the 15 medications taken regularly but not during the 24 hours of the day before the facility interview (i.e., OTHPMC01–OTHPMC15), the drug characteristics for each medication, the survey design variables, and the sample weights that are necessary to generate accurate national estimates of medication use. Additional information on design variables and sample weights is found in the following text. Each medication is identified by a unique five-digit drug code (unless the medication was uncodeable, in which case it remains coded as 99980). The drug characteristics provide further information about the medications as described in the previous Drug Characteristics section.

The PM PUF can be used to generate national estimates of medication use, such as the mean number of medications per resident. Other analyses that examine specific drugs or therapeutic classes can also be conducted by creating a subset of resident records with the corresponding drug name codes or therapeutic class codes and linking these records to the Current Resident Public-use File; this process facilitates creating a more manageable analytic file. The Current Resident Public-use File contains information on residents’ demographics, health status, services used, and sources of payment. The SAS and ASCII versions of the PM PUF may be accessed at [ftp://ftp.cdc.gov/pub/Health\\_Statistics/NCHS/Datasets/NNHS/nhhs04/](ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/NNHS/nhhs04/). Separate SAS, SPSS, and STATA input statements and variable label statements are also available at this

website. The data dictionary for the PM PUF is available at [http://www.cdc.gov/nchs/data/nhhsd/March07\\_WebPMfiledataadictionary.pdf](http://www.cdc.gov/nchs/data/nhhsd/March07_WebPMfiledataadictionary.pdf). The data dictionary provides the file layout with the variable names, file positions, field descriptions, formats (character or numeric), lengths, and values. The frequencies for responses to select variables in the PM PUF may be verified on pages 33–36 of the PM PUF data dictionary. The data dictionary for the Current Resident Public-use File may be accessed at [ftp://ftp.cdc.gov/pub/Health\\_Statistics/NCHS/Dataset\\_Documentation/NNHS/nhhs04/2004ResidentFile\\_DataDictionary\\_021607.pdf](ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NNHS/nhhs04/2004ResidentFile_DataDictionary_021607.pdf).

## Recodes

Four additional variables were created from the original medication data and were added to the PM PUF: ANYMEDS, RXMED, RXOTH, and RXTOT. ANYMEDS shows if the nursing home resident took any medications. The overwhelming majority of residents, 99%, took at least one medication. RXMED provides the total number of medications taken by the resident during the 24 hours of the day before the facility interview; the range is 0 to 25. RXOTH shows the number of medications a resident took regularly but not during the 24 hours of the day before the facility interview; the range is 0 to 15. Although the CAPI instrument was designed to collect up to 25 medications taken regularly but not during the 24 hours of the day before the facility interview for each resident, a maximum of 15 medications were reported for this item (i.e., no resident took more than 15 medications regularly but not on the day before the facility interview). RXTOT is the sum of RXMED + RXOTH; the range is 0 to 30.

## Design Variables

The PM PUF and the other NNHS public-use files include design variables that designate each record’s stratum marker and the first-stage unit (or cluster) to which the record belongs. These design variables must be used in

statistical software programs to obtain accurate variances of the survey estimates. Design variables compute the inter- and intra- cluster variances and adjust for the complex survey design.

## Survey Weighting Procedures

Because the NNHS is designed to produce unbiased national estimates for medications taken by nursing home residents, the data must have weights to inflate the numbers of sampled residents and their medications that would result if all U.S. nursing home residents were sampled; therefore, each record on the data file is assigned a weight. By aggregating these weights, counts can be obtained for nationally representative data. The weight is constructed to reflect the design of the sample: a stratified multistage, probability proportional to size, systematic design. The following are components of the sample weight:

### Inverse of the probability of selecting the nursing home resident

The probability of selecting a nursing home resident is a product of the two selection probabilities: the probability of selecting a facility in the NNHS sample and the probability of selecting the nursing home resident within the sampled NNHS facility. The inverse of the product of these probabilities is used in weighting.

### Adjustment for nonresponse

The second component for calculating the weight is adjustment for

nonresponse. There are three types of nonresponse. The first two types are facility level and the third is person level. The first type occurs when in-scope facilities do not respond to the NNHS. The second type occurs when an in-scope facility does not provide the number of nursing home residents within the facility. The third type occurs when the administrative and medical records of the sampled residents are not made available to complete the survey.

### Ratio adjustment and weight smoothing

The final components of calculating weights involve ratio adjustment and smoothing. Ratio adjustments are made within each of the groups defined by region to adjust for over- or under-sampling of facilities reported in the sampling frame. This adjustment is a multiplicative factor whose numerator was the number of nursing home facilities in the sampling frame within each region and whose denominator was the estimated number of nursing home facilities for that same group. Ratio-adjusted weights are smoothed only if there are disproportionately large weights. In smoothing, totals are preserved.

### Computing Estimates

Standard errors may be calculated for medication estimates using any statistical software package, as long as clustering within facilities and other aspects of the complex sample design are taken into account. Software products such as SAS and STATA have these capabilities. [Tables A, B, and C](#) provide information to generate national

medication estimates with the 2004 NNHS data using the respective software packages.

## Searching for Information on Specific Medications

Medication-specific information, such as drug characteristics and crude estimates of use by nursing home residents, is available at the NNHS website, <http://www.cdc.gov/nchs/about/major/nhhsd/drugdatabase.htm>. This website has two PDF files—*Drugs by NDC Class* and *Drug Estimates and Characteristics*—with information on each medication collected in the 2004 NNHS: unique drug names and codes, preliminary drug estimates, and drug characteristics. If an analyst wants to examine drug use by resident characteristics, he will need to access the PM PUF. The starting point for this type of analysis is the PDF files described in the following text to determine if there are enough cases of the medication (i.e., enough residents who took the medication of interest) to conduct meaningful analyses.

### PDF File 1: Drugs by NDC Class

The *Drugs by NDC Class* file lists every medication in the NAMCS drug database by major therapeutic class code and therapeutic subclass code in ascending order. The *1995 National Drug Code Directory* (see [Appendix III](#)), which was used to classify medications

**Table A. Computations using SUDAAN**

File	PROC statement	NEST statement	TOTCNT statement	WEIGHT statement
Prescribed medications file . . . . .	PROC x File=y DESIGN=WOR;	NEST RSTRATA FACNUM/ MISSUNIT;	TOTCNT POPFAC NPOPRES;	WEIGHT SAMWT;

**Table B. Computations using STATA**

File	Design description in STATA
Prescribed medications file . . . . .	Svysset [pw=SAMWT], strata (RSTRATA) psu (FACNUM) fpc(POPFAC) ll_n

**Table C. Computations using SAS survey procedures**

File	PROC	STRATA	CLUSTER	WEIGHT
Prescribed medications file . . . . .	PROC SURVEY_ DATA=Y;	STRATA RSTRATA;	CLUSTER FACNUM;	WEIGHT SAMWT;

reported in the 2004 NNHS, has 21 major therapeutic classes and 139 therapeutic subclasses. The major therapeutic class refers to the 21 broad categories in the NDC Directory that describes medications; each category generally includes the name of the body organ it is indicated to treat. For example, the major therapeutic class central nervous system (NDC code 0600) includes medications that treat disorders of the central nervous system. The therapeutic subclass further defines or describes the drug; for example, antidepressants (NDC code = 0630) is a subcategory of the central nervous system and is indicated to treat depression. In the NAMCS Drug Database that was used to code medications collected in the 2004 NNHS, most medications are assigned a therapeutic subclass if it is known; if not, then it is defined by its major therapeutic class.

The *Drugs by NDC Class* file provides a user-friendly format for data users to see which medications belong to each therapeutic class—major class and subclass—in the NAMCS Drug Database. The layout of this PDF file is as follows:

Column 1: Major therapeutic class code  
 Column 2: Therapeutic subclass code  
 Column 3: Drug name code  
 Column 4: Drug name

In this PDF file, generally the major therapeutic class code is found at the top of the page unless otherwise indicated.

## PDF File 2: Drug Estimates and Characteristics

All medications are identified by their unique five-digit drug name code

only; no drug names are spelled out anywhere in the PM PUF. Therefore, if an analyst wants to find drug-specific information beyond unique drug name code and therapeutic class code, he can find the crude estimate for the number of residents who took a given medication, the rate of use per 10,000 residents, and the drug characteristics associated with a given medication in the *Drug Estimates and Characteristics* file. This file contains the following 12 columns:

Column 1: Drug name  
 Column 2: Drug name code  
 Column 3: Drug estimate  
 Column 4: Drug rate per 10,000 residents  
 Column 5: Generic name  
 Column 6: Generic name code  
 Column 7: Rx status  
 Column 8: DEA status  
 Column 9: Comp status  
 Column 10: Drug ingredients  
 Column 11: Ingredient codes  
 Column 12: Drug class codes

Using the Edit-Find feature in this file, the data analyst can search for medications by name—brand or generic—to find the corresponding drug name codes and characteristics. First, enter the name of the medication in the Edit-Find box and click the Next key. If the drug name is in the *Drug Estimates and Characteristics* file, the drug name will be highlighted. This record will also have the five-digit drug name code, the weighted drug estimate, and the drug rate per 10,000 residents; the latter information will show if the medication was taken by any sampled residents in the NNHS. If these columns—drug estimate and drug rate per 10,000 residents—are blank, then the

medication was not taken by any sampled nursing home residents. If these columns are populated with numbers, then the drug name code should be noted, as it will be used to retrieve the residents' records.

The remainder of this section (Searching for Information on Specific Medications) illustrates how to use the two PDF files—*Drugs by NDC Class* and *Drug Estimates and Characteristics*—using antidepressants as an example. An analyst who wants to know which medications are classified as antidepressants, can perform the following steps:

1. Go to [Appendix III](#) to find the major therapeutic class code and subclass code for antidepressants. The major therapeutic class code for antidepressants, a central nervous system drug, is 0600; the subclass code is 0630 ([Figure 1](#)).
2. Go to the *Drugs by NDC Class* file and type 0600 in the Edit-Find box. Click Next or scroll through the document to find the page where 0600 appears in the first column.
3. Search for therapeutic subclass code 0630 by using the Edit-Find feature or scrolling to the page where this code first appears. Therapeutic subclass code 0630 starts with the medication Sarafem on page 53 ([Figure 2](#)).
4. Antidepressants are listed through to page 55. There are a total of 85 antidepressants listed in the *Drugs by NDC Class* file, complete with their unique drug name codes and drug names.

Analysts may also want to focus on a particular type of antidepressant, such as serotonin-specific reuptake inhibitors (SSRIs). (SSRIs are a newer class of antidepressant medications that was introduced into the market in 1987 with fluoxetine (7). SSRIs block the reuptake of serotonin and have fewer side effects

### 1995 Version of the NDC Directory Used to Adjudicate 2004 NNHS Data

<p>0100 ANESTHETIC DRUGS</p> <p>0117 Anesthetics, Local (Injectable)</p> <p>0118 Anesthetics, General</p> <p>0119 Adjuncts to Anesthesia/Analeptics</p> <p>0120 Medicinal Gases</p> <p>0121 Anesthetics, Topical</p> <p>0122 Anesthetics, Ophthalmic</p> <p>0123 Anesthetics, Rectal</p> <p>0200 ANTIDOTES</p> <p>0281 Antidotes, Specific</p> <p>0283 Antidotes, General</p> <p>0285 Antitoxins/Antivenins</p> <p>0286 Anaphylaxis Treatment Kit</p> <p>0300 ANTIMICROBIAL AGENTS</p> <p>0346 Penicillins</p> <p>0347 Cephalosporins</p> <p>0348 Erythromycins/Lincosamides/Macrolides</p> <p>0349 Polymyxins</p>	<p>0509 Relaxants/Stimulants, Urinary Tract</p> <p>0510 Calcium Channel Blockers</p> <p>0511 Carbonic Anhydrase Inhibitors</p> <p>0512 Beta Blockers</p> <p>0513 Alpha Agonist/Alpha Blockers</p> <p>0514 ACE Inhibitors</p> <p>0600 CENTRAL NERVOUS SYSTEM</p> <p>0626 Sedatives and Hypnotics</p> <p>0627 Antianxiety Agents</p> <p>0628 Antipsychotic/Antimanics</p> <p>0630 Antidepressants</p> <p>0631 Anorexiant/CNS Stimulants</p> <p>0632 CNS, Miscellaneous</p> <p>0633 Alzheimer-Type Dementia</p> <p>0634 Sleep Aid Products-OTC</p> <p>0635 Antiemetics</p> <p>0700 CONTRAST MEDIA/ RADIOPHARMACEUTICAL</p>
--	---

NOTE: NDC is the National Drug Code and NNHS is the National Nursing Home Survey.  
 SOURCE: [http://www.cdc.gov/nchs/data/nnhsd/Technicalnotes\\_April\\_6\\_2007\\_revision.pdf](http://www.cdc.gov/nchs/data/nnhsd/Technicalnotes_April_6_2007_revision.pdf).

**Figure 1. 1995 National Drug Code Directory listing of therapeutic classes that were used to classify medications collected in the 2004 National Nursing Home Survey**

NDC Class	NDC Number	Drug Name
0628	96173	ZYPREXA
0628	97002	OLANZAPINE
0628	97168	SEROQUEL
0628	98049	DONEPEZIL HCL
0628	99101	QUETIAPINE FUMARATE
0630	00318	SARAFEM
0630	00510	ADAPIN
0630	01009	LIMBITROL DS 10-25
0630	01029	EFFEXOR XR
0630	01064	WELLBUTRIN SR
0630	01525	AMITRIL
0630	01530	AMITRIPTYLINE
0630	01535	AMITRIPTYLINE HCL W/PERPHENAZINE
0630	01628	AMOXAPINE
0630	02119	LEXAPRO
0630	02256	ESCITALOPRAM OXALATE

SOURCE: <http://www.cdc.gov/nchs/data/nnhsd/DrugsbyNDCClass3.pdf>, P 53.

**Figure 2. Drugs by National Drug Code Class file that shows where the listing of antidepressants begins**

than the older antidepressants (8).) An analyst who knows the names of particular SSRIs can identify the drug names among the list of antidepressants. After finding the drug name codes for the SSRIs (use the *Drugs by NDC Class* file and the Edit-Find function to locate the SSRI names), the analyst can check the *Drug Estimates and Characteristics* file to find out which SSRIs were taken by the sampled nursing home residents. The next example focuses on finding the antidepressant Lexapro in the two PDF files. The *Drugs by NDC Class* file shows that the drug name code for Lexapro is 02119 (Figure 3).

If the analyst then goes to the *Drug Estimates and Characteristics* file and types in 02119 in the Edit-Find search feature, the medication will appear on page 111 in row 11 (Figure 4). This summary file allows analysts to obtain crude estimates of medication use and to easily identify drug characteristics without downloading and manipulating the PM PUF.

Lexapro was taken by an estimated 300 residents and the rate per 10,000 residents is 2. Additional information shows that the generic name for Lexapro is escitalopram oxalate; the generic name code for escitalopram oxalate is 70466. The Rx status field shows that Lexapro is a prescription medication, its DEA status is undetermined, and its composition status is single entity. If one scrolls across to the last field of the Lexapro record (not shown in Figure 4), the therapeutic class code shows that it is 0630, an antidepressant.

## Naming Conventions for Medication Variables

Each medication reported in the PM PUF has 13 variables associated with it, which include codes for drug name,

generic name, composition status, ingredients, DEA (or control) status, Rx (prescription) status, and therapeutic classes. As mentioned before, the large number of variables led to creating the PM PUF as a stand-alone file; the many variable names also resulted in developing a naming convention. The first medication in the file has the suffix “01” or “1” to indicate that the variable refers to the first medication collected on each sampled resident (Table D). The second medication in the file has the suffix “02” or “2” to indicate that the variable refers to the second medication collected on the sampled residents. The remaining medications follow a similar pattern. Also, in the PM PUF data dictionary, the medications taken regularly but not on the day before the facility interview are referred to as “Other medications.” The variables for these medications start with the letter “O” for “Other” (Tables E).

The variable labels listed in Tables D and E are provided to orient

	0628	96173	ZYPREXA
	0628	97002	OLANZAPINE
	0628	97168	SEROQUEL
	0628	98049	DONEPEZIL HCL
	0628	99101	QUETIAPINE FUMARATE
	0630	00318	SARAFEM
	0630	00510	ADAPIN
	0630	01009	LIMBITROL DS 10-25
	0630	01029	EFFEXOR XR
	0630	01064	WELLBUTRIN SR
	0630	01525	AMITRIL
	0630	01530	AMITRIPTYLINE
	0630	01535	AMITRIPTYLINE HCL W/PERPHENAZINE
	0630	01628	AMOXAPINE
	0630	02119	LEXAPRO
	0630	02256	ESCITALOPRAM OXALATE

SOURCE: <http://www.cdc.gov/nchs/data/nhstd/DrugsbyNDCClass3.pdf>, P 53.

Figure 3. Drugs by NDC Class file, highlighting listing of antidepressant Lexapro

Drug Name	Drug Name Code	Drug Estimate	Drug Rate per 10,000 Residents	Generic Name	Generic Name Code	Rx Status	DEA Status	Comp Status
ZALEPLON	02107	304	0002	ZALEPLON	70115	1	4	1
NOROXIN	21385	304	0002	NORFLOXACIN	53969	1	6	1
BENADRYL ALLERGY	03332	303	0002	DIPHENHYDRAMINE HCL	70344	2	6	1
BILBERRY EXTRACT	02204	302	0002	BILBERRY EXTRACT	70487	2	6	1
SECTRAL	61330	302	0002	ACEBUTOLOL HYDROCHLORIDE	50008	1	6	1
BLEPH-10	93030	300	0002	SULFACETAMIDE	55525	1	6	1
CEFUROXIME SODIUM	91070	300	0002	CEFUROXIME SODIUM	50967	1	6	1
ALMORA	01070	300	0002	MAGNESIUM GLUCONATE	53180	1	6	1
PENTOXIL	04381	300	0002	PENTOXIFYLLINE	54297	1	6	1
BISAC-EVAC	04324	300	0002	BISACODYL	50630	2	6	1
LEXAPRO	02119	300	0002	ESCITALOPRAM OXALATE	70466	1	7	1
COVERA HS	96131	300	0002	VERAPAMIL	56163	1	6	1
FML	00259	298	0002	FLUOROMETHOLONE	52320	1	6	1
OMNICEF	99014	298	0002	CEFDINIR	70007	1	6	1
CARTIA XT	00254	295	0002	DILTIAZEM	51803	1	6	1
KETOCONAZOLE	91085	295	0002	KETOCONAZOLE	52972	1	6	1
CLEAR EYES	06895	295	0002	NAPHAZOLINE	53875	2	6	1
POLYCOSE	24450	295	0002	GLUCOSE	52425	2	6	1
NEPHRON	00006	294	0002	EPINEPHRINE	52040	2	6	1
METHAZOLAMIDE	19025	294	0002	METHAZOLAMIDE	53520	1	6	1
ISOPTIN S.R.	91031	292	0002	VERAPAMIL	56163	1	6	1
PTU	41845	291	0002	PROPYLTHIOURACIL	54910	1	6	1
TEMOVATE	61440	290	0002	CLOBETASOL PROPIONATE	51243	1	6	1

SOURCE: <http://www.cdc.gov/nchs/data/nnhsd/Drugs Estimates and Characteristics.pdf>, P 111.

Figure 4. Drug estimates and characteristics file, highlighting listing of Lexapro

the analyst to the PM PUF naming conventions; this is not the actual layout of the public-use file. The PM PUF file layout is found in the data dictionary at

[http://www.cdc.gov/nchs/data/nnhsd/March07\\_WebPMfiledatadictionary.pdf](http://www.cdc.gov/nchs/data/nnhsd/March07_WebPMfiledatadictionary.pdf). The order of the medications in the PM PUF does not have any significance; it

reflects only how the nursing home respondent read the resident’s medication information from the medication administration record.

Table D. Variable naming convention for medications taken on the day before facility interview (Medications 1–4)

Variable description	Medication number (variable labels)			
	1	2	3	4
Drug name code . . . . .	PMCODE01	PMCODE02	PMCODE03	PMCODE04
Generic name code . . . . .	GEN01	GEN02	GEN03	GEN04
Composition status code . . . . .	COMST01	COMST02	COMST03	COMST04
Prescription status code . . . . .	RXST01	RXST02	RXST03	RXST04
Drug Enforcement Agency (DEA) code . . . . .	CONTR01	CONTR02	CONTR03	CONTR04
Ingredient code 1 . . . . .	RX1ING1	RX2ING1	RX3ING1	RX4ING1
Ingredient code 2 . . . . .	RX1ING2	RX2ING2	RX3ING2	RX4ING2
Ingredient code 3 . . . . .	RX1ING3	RX2ING3	RX3ING3	RX4ING3
Ingredient code 4 . . . . .	RX1ING4	RX2ING4	RX3ING4	RX4ING4
Ingredient code 5 . . . . .	RX1ING5	RX2ING5	RX3ING5	RX4ING5
Therapeutic class code 1 . . . . .	DRG1CL1	DRG2CL1	DRG3CL1	DRG4CL1
Therapeutic class code 2 . . . . .	DRG1CL2	DRG2CL2	DRG3CL2	DRG4CL2
Therapeutic class code 3 . . . . .	DRG1CL3	DRG2CL3	DRG3CL3	DRG4CL3



**Table E. Variable naming convention for medications taken regularly but not on the day before facility interview (Medications 1–4)**

Variable description	Medication number (variable labels)			
	1	2	3	4
Drug name code . . . . .	OTHPMC01	OTHPMC02	OTHPMC03	OTHPMC04
Generic name code . . . . .	OGEN01	OGEN02	OGEN03	OGEN04
Composition status code . . . . .	OCOMST01	OCOMST02	OCOMST03	OCOMST04
Prescription status code . . . . .	ORXST01	ORXST02	ORXST03	ORXST04
Drug Enforcement Agency (DEA) code . . . . .	OCONTR01	OCONTR02	OCONTR03	OCONTR04
Ingredient code 1 . . . . .	OX1ING1	OX2ING1	OX3ING1	OX4ING1
Ingredient code 2 . . . . .	OX1ING2	OX2ING2	OX3ING2	OX4ING2
Ingredient code 3 . . . . .	OX1ING3	OX2ING3	OX3ING3	OX4ING3
Ingredient code 4 . . . . .	OX1ING4	OX2ING4	OX3ING4	OX4ING4
Ingredient code 5 . . . . .	OX1ING5	OX2ING5	OX3ING5	OX4ING5
Therapeutic class code 1 . . . . .	ODR1CL1	ODR2CL1	ODR3CL1	ODR4CL1
Therapeutic class code 2 . . . . .	ODR1CL2	ODR2CL2	ODR3CL2	ODR4CL2
Therapeutic class code 3 . . . . .	ODR1CL3	ODR2CL3	ODR3CL3	ODR4CL3

## Analyzing the Prescribed Medications (PM) Data

Many prescription medications (i.e., medications that require a doctor's prescription in the noninstitutionalized setting) are available in either brand name or generic drug form. In order for an analyst to obtain an accurate estimate of medication use that considers both forms, NCHS advises analysts to search for medications by generic name code in the *Drug Estimates and Characteristics* file online. If a medication is a single-entity drug, the generic name will be in the generic name column with its generic name code in the next column. If a medication is a combination product, the generic name is "combination product" (the generic name code for combination product is 51380), but the ingredient field will list the generic name of interest; the corresponding generic name code will follow in the ingredient codes column. The ingredient code that one would find if a medication had a single-entity generic name should be the same as the generic name code found in the ingredient codes column. The drug fluoxetine (hydrochloride) illustrates this point in the following text. Fluoxetine belongs to a subcategory of antidepressants called selective serotonin reuptake inhibitors (SSRIs). Fluoxetine is the generic or chemical name for this

SSRI, which helps improve a person's mood. One of several brand names for this medication is Prozac. Using the Edit-Find feature in the *Drug Estimates and Characteristics* file to locate fluoxetine takes the analyst to page 98, where the record for Prozac is found (Figure 5). This record also shows that the generic name code for fluoxetine is 80006.

By clicking Next in the Edit-Find feature to find more fluoxetine-containing medications, the analyst is taken to page 101, where fluoxetine is listed as a drug name (Figure 6). Here the generic name drug code is also 80006 as found for Prozac.

By clicking Next again, the analyst will arrive at Sarafem. This record on page 140 in the *Drug Estimates and Characteristics* file shows that fluoxetine is the generic name for Sarafem as well (Figure 7).

By clicking Next again, the analyst will find that, on page 168, fluoxetine is one of the active ingredients in Symbyax (drug name code is 04043 (Figure 8); cross-reference this drug name code in the *Drugs by NDC Class* file to check this drug name code).

The search for fluoxetine leads the analyst to four different records within the *Drug Estimates and Characteristics* file. To generate a nationally representative estimate of all fluoxetine-containing medications in the PM PUF, the SAS-callable SUDAAN program below is provided. This code will search the generic name code fields (GEN\_ \_ and OGEN\_ \_) and the ingredient code fields (RX\_ ING\_ and OX\_ ING\_ ) for

all medications that contain fluoxetine. This code will provide the count of unique nursing home residents who took one or more fluoxetine-containing medications; a resident can be counted only once even if he or she took more than one fluoxetine-containing medication.

- Using the generic name code for fluoxetine—80006—the SAS program in the following text will scan the generic name code fields and the ingredient code fields for medications taken the day before the facility interview and medications taken regularly but not on the day before the facility interview of each resident record to find fluoxetine hydrochloride. The resident records that contain at least one mention of fluoxetine will be flagged.

```

Libname meds '[filepath for PM
PUF]';
data test;
set meds;
fluoxetine=0;
array meds (240) GEN01–
GEN25 OGEN01– –OGEN15
RX1ING1– –RX25ING1
RX1ING2– –RX25ING2
RX1ING3– –RX25ING3
RX1ING4– –RX25ING4
RX1ING5– –RX25ING5
OX1ING1– –OX15ING1
OX1ING2– –OX15ING2
OX1ING3– –OX15ING3
OX1ING4– –OX15ING4
OX1ING5– –OX15ING5;
do i=1 to 240;
if meds (i)=80006 then

```

Drug Name	Drug Name Code	Drug Estimate	Drug Rate per 10,000 Residents	Generic Name	Generic Code	Rx Status	DEA Status	Comp Status
ACTONEL	00206	52014	0349	RISEDRONATE SODIUM	70168	1	6	1
DULCOLAX	10575	51004	0342	BISACODYL	50630	2	6	1
KCL	41850	49873	0334	POTASSIUM REPLACEMENT SOLUTIONS	54655	1	6	1
GLUCOPHAGE	95111	48596	0326	METFORMIN	57192	1	6	1
CELEXA	98115	45483	0305	CITALOPRAM HYDROBRIMIDE	59829	1	6	1
CARDIZEM	05789	45193	0303	DILTIAZEM	51803	1	6	1
FLOMAX	97126	44917	0301	TAMSULOSIN HYDROCHLORIDE	59731	1	6	1
XALATAN	96167	44913	0301	LATANOPROST	59639	1	6	1
MEGACE	18655	44810	0300	MEGESTROL	53295	1	6	1
EFFEXOR	94070	44419	0298	VENLAFAXINE	57096	1	6	1
PROZAC	25674	43293	0290	FLUOXETINE HYDROCHLORIDE	80006	1	6	1
DETROL	98065	41794	0280	TOLTERODINE TARITRATE	59811	1	6	1
DOCUSATE SODIUM	96027	38942	0261	DOCUSATE	51935	1	6	1
DARVOCET-N	08470	38785	0260	COMBINATION PRODUCT	51380	1	4	2
HYDROCHLOROTHIAZIDE	14930	38271	0256	HYDROCHLOROTHIAZIDE	52645	1	6	1
FUROSEMIDE	13118	38243	0256	FUROSEMIDE	52385	1	6	1
METAMUCIL	18930	37654	0252	PSYLLIUM	54965	2	6	1
REMINYL	01141	36589	0245	GALANTAMINE HYDROBROMIDE	70296	1	6	1
AMBIEN	93347	36554	0245	ZOLPIDEM TARTRATE	57048	1	4	1
DITROPAN	09995	36232	0243	OXYBUTYNIN	54105	1	6	1
ADVAIR DISKUS	01034	36095	0242	COMBINATION PRODUCT	51380	1	6	2
XANAX	35023	36034	0241	ALPRAZOLAM	50113	1	4	1
EXELON	00081	35773	0240	RIVASTIGMINE TARTRATE	70129	1	6	1
VASOTEC	61565	35090	0235	ENALAPRIL	52028	1	6	1

SOURCE: <http://www.cdc.gov/nchs/data/nnhsd/Drugsestimatesandcharacteristics.pdf>, P 98.

Figure 5. Drug estimates and characteristics file, highlighting listing of Prozac

- ```

fluoxetine=1;
end;
keep resnum fluoxetine;
run;

```
- This code will generate the frequency (n=461) of residents who took fluoxetine-containing medications and their resident IDs (Figure 9):

```

Proc freq data=test;
tables resnum;
where fluoxetine=1;
run;

```
  - This code will link the file produced from the array in Step 1 with the resident file. In this step, the additional variables that the analyst wants included in the analytic file from the Current Resident Public-use File should be indicated in the programming code:

```

Libname res '[file path for Current Resident Public-use File]';
Proc sort data=test nodupkey; by
resnum; run;

```
  - Check the newly created analytic file to make sure that all the variables the analyst needs for his or her specific analysis are in the data set (in this analysis, nine variables were selected) (Figure 10).
  - The following proc crosstab allows the analyst to obtain a more accurate weighted estimate for residents taking fluoxetine-containing medications (Figure 11). It is important to use the design variables and sample weight to generate precise estimates:

```

Proc format;
Value drgform 0='No' 1='Yes';
run;
Proc sort data=merged; by rstrata
facnum; run;
Proc crosstab data=merged
design=wor;
nest strata facnum/missunit;
totent popfac npopres;
weight samwt;
class fluoxetine;
table fluoxetine;
rformat fluoxetine drgform.; run;

```
  - This proc describe will allow the analyst to determine the weighted mean age at interview, by sex, of the residents reported to have taken fluoxetine-containing medications:

```

Proc format;
Value sexform
1='Males'
2='Females'; run;

```

| Drug Name            | Drug Name Code | Drug Estimate | Drug Rate per 10,000 Residents | Generic Name             | Generic Name Code | Rx Status | DEA Status | Comp Status |
|----------------------|----------------|---------------|--------------------------------|--------------------------|-------------------|-----------|------------|-------------|
| DEPAKENE             | 08835          | 5133          | 0034                           | VALPROIC ACID            | 56145             | 1         | 6          | 1           |
| OXYCODONE HCL        | 22303          | 5116          | 0034                           | OXYCODONE                | 54094             | 1         | 2          | 1           |
| STROVITE             | 95062          | 5050          | 0034                           | COMBINATION PRODUCT      | 51380             | 1         | 6          | 2           |
| METHADONE            | 18985          | 5001          | 0034                           | METHADONE                | 53475             | 1         | 2          | 1           |
| FLAGYL               | 12585          | 5000          | 0034                           | METRONIDAZOLE            | 53700             | 1         | 6          | 1           |
| BENZTROPINE MESYLATE | 60180          | 4999          | 0034                           | BENZTROPINE              | 50565             | 1         | 6          | 1           |
| PULMICORT            | 02279          | 4955          | 0033                           | BUDESONIDE               | 57124             | 1         | 6          | 1           |
| LACT-AID             | 16925          | 4882          | 0033                           | LACTASE                  | 52975             | 2         | 6          | 1           |
| LESCOL               | 94154          | 4878          | 0033                           | FLUVASTATIN              | 57108             | 1         | 6          | 1           |
| ZELNORM              | 02373          | 4873          | 0033                           | TEGASEROD MALEATE        | 70642             | 1         | 6          | 1           |
| MYSOLINE             | 20135          | 4868          | 0033                           | PRIMIDONE                | 54795             | 1         | 6          | 1           |
| FLUOXETINE           | 91079          | 4856          | 0033                           | FLUOXETINE HYDROCHLORIDE | 80006             | 1         | 6          | 1           |
| COMTAN               | 00054          | 4842          | 0032                           | ENTACAPONE               | 70122             | 1         | 6          | 1           |
| CERTAGEN             | 04031          | 4775          | 0032                           | MULTIVITAMIN COMBINATION | 51382             | 2         | 6          | 2           |
| TERAZOSIN            | 94133          | 4759          | 0032                           | TERAZOSIN HCL            | 56290             | 1         | 6          | 1           |
| HUMIBID LA           | 01026          | 4747          | 0032                           | GUAIFENESIN              | 52490             | 1         | 6          | 1           |
| LAMICTAL             | 95181          | 4730          | 0032                           | LAMOTRIGINE              | 57220             | 1         | 6          | 1           |
| ALPRAZOLAM           | 91062          | 4712          | 0032                           | ALPRAZOLAM               | 50113             | 1         | 4          | 1           |
| HEMOCYTE             | 93074          | 4709          | 0032                           | IRON PREPARATIONS        | 52885             | 2         | 6          | 1           |
| EPOGEN               | 93059          | 4586          | 0031                           | EPOETIN ALFA             | 52042             | 1         | 6          | 1           |
| HYZAAR               | 95171          | 4516          | 0030                           | COMBINATION PRODUCT      | 51380             | 1         | 6          | 2           |
| NORTRIPTYLINE        | 21403          | 4512          | 0030                           | NORTRIPTYLINE            | 53975             | 1         | 6          | 1           |
| MARINOL              | 60870          | 4509          | 0030                           | DRONABINOL               | 51978             | 1         | 2          | 1           |
| AZMACORT             | 02059          | 4401          | 0029                           | TRIAMCINOLONE ACETON     | 70006             | 1         | 6          | 1           |

SOURCE: <http://www.cdc.gov/nchs/data/nnhsd/Drugsestimatesandcharacteristics.pdf>. P 101.

Figure 6. Drug estimates and characteristics file, highlighting listing of fluoxetine

```
Proc descript data=merged
  design=wor;
  nest strata facility/missunit;
  totcnt popfac npopres;
  weight samwt;
  class sex;
  subpopn fluoxetine=1;
  table sex;
  var ageatint;
  rformat sex sexform.;
run;
```

The output shows that the mean age of males who took fluoxetine-containing medications was 74 and the mean age of women who took fluoxetine-containing medications was 79 (Figure 12).

A few medications in the *Drug Estimates and Characteristics* file may be incorrectly labeled as combination products (i.e., generic name code=51380) when, in fact, they are single-entity medications. If the analyst finds a medication that he or she knows is a single-entity medication but is labeled as a combination product (i.e.,

generic name code = 51380) in the *Drug Estimates and Characteristics* file, the analyst should use the Edit-Find feature to find its generic name and generic name code.

## Limitations to the PM Module and CAPI Instrument

The CAPI instrument facilitated the collection of medication data in the 2004 NNHS. Because the NNHS was designed to collect up to a total of 50 medications names per resident, the survey required a system that facilitated quick data entry by interviewers. The drug lookup list reduced data entry time by allowing field interviewers to type in the first three letters of a medication name and automatically retrieve a list of medications beginning with those letters.

Even with these features, there were some limitations to the PM module and the CAPI system. The wording of the two questions that ask for medication names was somewhat complex. The drug list was not exhaustive; therefore, many drugs had to be entered manually into the “Other, specify” field. This also increased the number of misspelled medications and the editing time required to correct them post-data collection. The survey did not specifically ask if the resident received a brand name medication or a generic medication. It is possible that the resident could have taken the generic form of a medication but the respondent found it easier to report the brand name (i.e., Prozac instead of fluoxetine hydrochloride). Finally, the system did not include a lookup list for the medical conditions collected for the “Reason why prescribed” item.

| Drug Name                     | Drug Name<br>Code | Drug<br>Estimate | Drug Rate<br>per 10,000<br>Residents | Generic<br>Name             | Generic<br>Code | Rx<br>Status | DEA<br>Status | Comp<br>Status |
|-------------------------------|-------------------|------------------|--------------------------------------|-----------------------------|-----------------|--------------|---------------|----------------|
| ULCEREASE                     | 00279             |                  |                                      | COMBINATION PRODUCT         | 51380           | 2            | 6             | 2              |
| ACETANILID                    | 00285             |                  |                                      | ACETANILID                  | 50015           | 1            | 6             | 1              |
| ACETATED RINGER'S             | 00290             |                  |                                      | COMBINATION PRODUCT         | 51380           | 1            | 6             | 2              |
| ZICAM                         | 00303             |                  |                                      | ZINCUM GLUCONICUM           | 70198           | 2            | 6             | 1              |
| AMINO-MAG                     | 00309             |                  |                                      | MAGNESIUM GLYCINATE         | 70199           | 2            | 6             | 1              |
| DILATING DROPS                | 00314             |                  |                                      | UNDETERMINED                | 50000           | 1            | 6             | 3              |
| SARAFEM                       | 00318             |                  |                                      | FLUOXETINE HYDROCHLORIDE    | 80006           | 1            | 6             | 1              |
| ACHROMYCIN                    | 00340             |                  |                                      | TETRACYCLINE                | 55725           | 1            | 6             | 1              |
| ACID-EZE                      | 00370             |                  |                                      | UNDETERMINED                | 50000           | 3            | 7             | 3              |
| ACIDULATED PHOSPHATE FLUORIDE | 00380             |                  |                                      | FLUORIDE                    | 52318           | 1            | 6             | 1              |
| ACNE                          | 00395             |                  |                                      | UNDETERMINED                | 50000           | 3            | 7             | 3              |
| ACNOMEAD                      | 00420             |                  |                                      | UNDETERMINED                | 50000           | 3            | 7             | 3              |
| ACTH                          | 00455             |                  |                                      | CORTICOTROPIN               | 51400           | 1            | 6             | 1              |
| ACTIDIL                       | 00470             |                  |                                      | TRIPROLIDINE                | 56020           | 2            | 6             | 1              |
| ACTIFED WITH CODEINE          | 00481             |                  |                                      | COMBINATION PRODUCT         | 51380           | 1            | 5             | 2              |
| ACTOL                         | 00485             |                  |                                      | COMBINATION PRODUCT         | 51380           | 2            | 6             | 2              |
| ADENOSINE                     | 00535             |                  |                                      | ADENOSINE                   | 50080           | 1            | 6             | 1              |
| ADRENAL CORTEX                | 00555             |                  |                                      | HYDROCORTISONE              | 52655           | 1            | 6             | 1              |
| ADRENERGIC AGENT              | 00563             |                  |                                      | UNDETERMINED                | 50000           | 3            | 7             | 3              |
| ADSORBONAC                    | 00590             |                  |                                      | SODIUM CHLORIDE             | 55315           | 2            | 6             | 1              |
| AEROSEB-DEX                   | 00610             |                  |                                      | DEXAMETHASONE               | 51635           | 1            | 6             | 1              |
| AFKO-LUBE SYRUP               | 00640             |                  |                                      | DOCUSATE                    | 51935           | 2            | 6             | 1              |
| AHF                           | 00668             |                  |                                      | ANTIHEMOPHILIC FACTOR HUMAN | 50320           | 1            | 6             | 1              |
| AKNE DRYING LOTION            | 00690             |                  |                                      | COMBINATION PRODUCT         | 51380           | 2            | 6             | 2              |

SOURCE: <http://www.cdc.gov/nchs/data/nnhsd/Drugsestimatesandcharacteristics.pdf>. P 140.

Figure 7. Drug estimates and characteristics file, highlighting listing of Sarafem

## Summary and Suggestions for Future Data Collection

Collecting medication data on nursing home residents is increasingly important. The majority of nursing home residents are elderly and frail and require numerous medications. The 2004 NNHS provided valuable lessons on collecting medication data that can enhance future surveys. Suggestions for future surveys include:

- Simplifying the medication questions.

- Adding a question about whether the medication taken by the resident was a brand name or generic drug.
- Adding a question about the documentation on the reason that medications were prescribed.
- Providing a lookup list of medical conditions that facilitates data entry for why the medications were prescribed.

Knowledge about medications taken by nursing home residents is useful to the long-term care community, which is striving to find ways to ensure quality care while containing costs. Medication data on other long-term care populations will be available through NCHS in the future; the 2007 National Home and

Hospice Care Survey collected medication information, which will add to our current understanding of pharmacotherapy in long-term care settings.

Additional information about the 2004 NNHS and the data collected is available from the NNHS website: <http://www.cdc.gov/nchs/nnhs.htm>. Public-use data files are available for download from the website. Questions about these data can be directed to the NCHS Office of Information Services, Information Dissemination Staff at 1-800-232-4363 or at [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov), or to the Long-term Care Statistics Branch at 301-458-4747.

| Drug Name | Drug Code | Drug Rate per 10,000 Residents | Generic Name                    | Generic Name Code | Rx Status | DEA Status | Comp Status | Drug Ingredients                       |
|-----------|-----------|--------------------------------|---------------------------------|-------------------|-----------|------------|-------------|----------------------------------------|
| 12665     | 4751      | 0032                           | FLUDROCORTISONE ACETATE         | 52295             | 1         | 6          | 1           |                                        |
| 02223     | 4467      | 0030                           | EZETIMIBE                       | 70494             | 1         | 6          | 1           |                                        |
| 03177     | 3148      | 0021                           | CALCIUM CARBONATE               | 50785             | 2         | 6          | 1           |                                        |
| 41860     | 2748      | 0018                           | FOLIC ACID                      | 52355             | 3         | 6          | 1           |                                        |
| 92120     | 2494      | 0017                           | DOXAZOSIN MESYLATE              | 51953             | 1         | 6          | 1           |                                        |
| 21144     | 2162      | 0014                           | NITROGLYCERIN                   | 53945             | 1         | 6          | 1           |                                        |
| 93204     | 1788      | 0012                           | SELEGILINE                      | 56630             | 1         | 6          | 1           |                                        |
| 22630     | 1624      | 0011                           | PANCRELIPASE                    | 54165             | 1         | 6          | 1           |                                        |
| 97159     | 1089      | 0007                           | CALCITRIOL                      | 59736             | 1         | 6          | 1           |                                        |
| 20095     | 989       | 0007                           | SIMETHICONE                     | 55240             | 2         | 6          | 1           |                                        |
| 95149     | 883       | 0006                           | COMBINATION PRODUCT             | 51380             | 1         | 6          | 2           | PIPERACILLIN SODIUM, TAZOBACTAM SODIUM |
| 30781     | 790       | 0005                           | COMBINATION PRODUCT             | 51380             | 1         | 6          | 2           | ATENOLOL, CHLORTHALIDONE               |
| 31775     | 600       | 0004                           | TOLAZAMIDE                      | 55870             | 1         | 6          | 1           |                                        |
| 04043     | 516       | 0003                           | COMBINATION PRODUCT             | 51380             | 1         | 6          | 2           | OLANZAPINE, FLUOXETINE HYDROCHLORIDE   |
| 00096     | 494       | 0003                           | COMBINATION PRODUCT             | 51380             | 2         | 6          | 2           | CHONDROITIN SULFATE, GLUCOSAMINE       |
| 12035     | 414       | 0003                           | COMBINATION PRODUCT             | 51380             | 2         | 6          | 2           | UNDETERMINED, ACETAMINOPHEN            |
| 11688     | 393       | 0003                           | COMBINATION PRODUCT             | 51380             | 1         | 6          | 2           | ACETAMINOPHEN, BUTALBITAL, CAFFEINE    |
| 99155     | 355       | 0002                           | LEVOCARNITINE                   | 57049             | 2         | 6          | 1           |                                        |
| 07740     | 312       | 0002                           | BISACODYL                       | 50630             | 2         | 6          | 1           |                                        |
| 93360     | 276       | 0002                           | ENOXACIN                        | 56720             | 1         | 6          | 1           |                                        |
| 92050     | 268       | 0002                           | POTASSIUM REPLACEMENT SOLUTIONS | 54655             | 1         | 6          | 1           |                                        |
| 02382     | 241       | 0002                           | DOXYCYCLINE HYCLATE             | 70655             | 1         | 6          | 1           |                                        |
| 02148     | 220       | 0001                           | DICLOFENAC SODIUM               | 80004             | 1         | 6          | 1           |                                        |
| 95101     | 200       | 0001                           | SALICYLIC ACID                  | 55160             | 2         | 6          | 1           |                                        |

SOURCE: <http://www.cdc.gov/nchs/data/nnhsd/DrugsEstimatesandCharacteristics.pdf>. P 168.

Figure 8. Drug estimates and characteristics file, highlighting listing of Symbyax

| The FREQ Procedure |           |         |                      |                    |
|--------------------|-----------|---------|----------------------|--------------------|
| RESNUM             | Frequency | Percent | Cumulative frequency | Cumulative percent |
| 111006             | 1         | 0.22    | 442                  | 95.88              |
| 111102             | 1         | 0.22    | 443                  | 96.10              |
| 111206             | 1         | 0.22    | 444                  | 96.31              |
| 111509             | 1         | 0.22    | 445                  | 96.53              |
| 111707             | 1         | 0.22    | 446                  | 96.75              |
| 111807             | 1         | 0.22    | 447                  | 96.96              |
| 111904             | 1         | 0.22    | 448                  | 97.18              |
| 112208             | 1         | 0.22    | 449                  | 97.40              |
| 112210             | 1         | 0.22    | 450                  | 97.61              |
| 112401             | 1         | 0.22    | 451                  | 97.83              |
| 112911             | 1         | 0.22    | 452                  | 98.05              |
| 113006             | 1         | 0.22    | 453                  | 98.26              |
| 113309             | 1         | 0.22    | 454                  | 98.48              |
| 113701             | 1         | 0.22    | 455                  | 98.70              |
| 113802             | 1         | 0.22    | 456                  | 98.92              |
| 113809             | 1         | 0.22    | 457                  | 99.13              |
| 113912             | 1         | 0.22    | 458                  | 99.35              |
| 114305             | 1         | 0.22    | 459                  | 99.57              |
| 114306             | 1         | 0.22    | 460                  | 99.78              |
| 115008             | 1         | 0.22    | 461                  | 100.00             |

NOTES: FREQ refers to frequency. RESNUM is the resident identification number.  
SOURCE: Generated by author for this report.

Figure 9. SAS output of resident identification numbers of those who took fluoxetine-containing medications generated from Step 2

| PUF resident id | Fluoxetine | FACNUM | SEX | Age at interview | RSTRATA | POPFAC | NPOPRES | SAMWT |
|-----------------|------------|--------|-----|------------------|---------|--------|---------|-------|
| 1204            | 0          | 12     | 2   | 91               | 17      | 372    | -1      | 23    |
| 1205            | 1          | 12     | 2   | 80               | 17      | 372    | -1      | 23    |
| 1206            | 0          | 12     | 1   | 86               | 17      | 372    | -1      | 23    |
| 1207            | 0          | 12     | 1   | 41               | 17      | 372    | -1      | 23    |
| 1208            | 0          | 12     | 2   | 77               | 17      | 372    | -1      | 23    |
| 1209            | 0          | 12     | 2   | 86               | 17      | 372    | -1      | 23    |
| 1210            | 0          | 12     | 2   | 72               | 17      | 372    | -1      | 23    |
| 1211            | 0          | 12     | 1   | 85               | 17      | 372    | -1      | 23    |
| 1212            | 0          | 12     | 2   | 86               | 17      | 372    | -1      | 23    |
| 1301            | 0          | 13     | 2   | 96               | 14      | 639    | -1      | 85    |
| 1302            | 0          | 13     | 2   | 92               | 14      | 639    | -1      | 85    |
| 1303            | 0          | 13     | 1   | 88               | 14      | 639    | -1      | 85    |
| 1304            | 0          | 13     | 2   | 90               | 14      | 639    | -1      | 85    |
| 1305            | 0          | 13     | 2   | 91               | 14      | 639    | -1      | 85    |
| 1306            | 0          | 13     | 1   | 84               | 14      | 639    | -1      | 85    |
| 1307            | 1          | 13     | 2   | 88               | 14      | 639    | -1      | 85    |
| 1308            | 0          | 13     | 2   | 87               | 14      | 639    | -1      | 85    |
| 1309            | 0          | 13     | 2   | 90               | 14      | 639    | -1      | 85    |
| 1310            | 0          | 13     | 1   | 84               | 14      | 639    | -1      | 85    |
| 1311            | 0          | 13     | 2   | 90               | 14      | 639    | -1      | 85    |
| 1312            | 0          | 13     | 1   | 77               | 14      | 639    | -1      | 85    |
| 1401            | 0          | 14     | 2   | 95               | 1       | 1201   | -1      | 53    |

NOTES: PUF resident id is the resident ID in the Public-use File. FACNUM is the facility identification number. RSTRATA, POPFAC, and NPOPRES are sample design variables needed to generate accurate national estimates. SAMWT is the weight for resident estimates.  
 SOURCE: Generated by author for this report.

Figure 10. Temporary SAS dataset created from merging the dataset from Step 1 with the Current Resident Public-use File

The CROSSTAB Procedure  
 Variance Estimation Method: Taylor Series (WOR)  
 by: FLUOXETINE.

|                           | FLUOXETINE<br>Total | No         | Yes      |
|---------------------------|---------------------|------------|----------|
| Sample Size               | 13507               | 13046      | 461      |
| Weighted Size             | 1492207.00          | 1443542.00 | 48665.00 |
| SE Weighted               | 11281.95            | 11308.30   | 2884.27  |
| Row Percent               | 100.00              | 96.74      | 3.26     |
| SE Row Percent            | 0.00                | 0.19       | 0.1      |
| Lower 95% Limit<br>ROWPER |                     | 96.34      | 2.90     |
| Upper 95% Limit<br>ROWPER |                     | 97.10      | 3.66     |
| Col Percent               | 100.00              | 96.74      | 3.26     |
| SE Col Percent            | 0.00                | 0.19       | 0.19     |
| Lower 95% Limit<br>COLPER |                     | 96.34      | 2.90     |
| Upper 95% Limit<br>COLPER |                     | 97.10      | 3.66     |
| Tot Percent               | 100.00              | 96.74      | 3.26     |
| SE Tot Percent            | 0.00                | 0.19       | 0.19     |
| Lower 95% Limit<br>TOTPER |                     | 96.34      | 2.90     |
| Upper 95% Limit<br>TOTPER |                     | 97.10      | 3.66     |

SOURCE: Generated by author for this report.

Figure 11. SAS output of PROC CROSSTAB of residents by fluoxetine-containing medication status (yes/no) generated from Step 5

```

Research Triangle Institute
The DESCRIPT Procedure

Variance Estimation Method: Taylor Series (WOR)
For Subpopulation: FLUOXETINE = 1
by: Variable, SEX.

```

| Variable            |                 | Sex<br>Total | Males      | Females    |
|---------------------|-----------------|--------------|------------|------------|
| Age at<br>Interview | Sample Size     | 461          | 115        | 346        |
|                     | Weighted Size   | 48665.00     | 12304.00   | 36361.00   |
|                     | Total           | 3798370.00   | 908630.00  | 2889740.00 |
|                     | Lower 95% Limit |              |            |            |
|                     | Total           | 3336043.76   | 690459.74  | 2501776.99 |
|                     | Upper 95% Limit |              |            |            |
|                     | Total           | 4260696.24   | 1126800.26 | 3277703.01 |
|                     | Mean            | 78.05        | 73.85      | 79.47      |
|                     | SE Mean         | 0.88         | 1.85       | 0.94       |
|                     | Lower 95% Limit |              |            |            |
|                     | Mean            | 76.33        | 70.22      | 77.64      |
|                     | Upper 95% Limit |              |            |            |
|                     | Mean            | 79.77        | 77.48      | 81.31      |

SOURCE: Generated by author for this report.

**Figure 12. SAS output of PROC DESCRIPT of residents who took fluoxetine-containing medications by sex, generated from Step 6**

## References

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2. Edwards B, Tourangeau K, Branden L, Lohr B, Vincent C. 2004 National Nursing Home Survey: Final report. Rockville, MD: Westat. 2005.
3. Definition taken from Medicinenet.com. Information accessed at <http://www.medterms.com/script/main/art.asp?articlekey=33074> on June 5, 2008.
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6. United States General Accounting Office. Adverse drug events: The magnitude of health risk is uncertain because of limited incidence data. GAO/HEHS-00-21. 2000.
7. Information accessed at <http://www.mayoclinic.com/health/antidepressants/MH00067> on June 13, 2008.
8. Ballington DA, Laughlin MM. *Pharmacology for Technicians*. EMC Paradigm, St. Paul. 1999.

# Appendix I

## List of Prescribed Medications (PM) Module Items

**PMPRE.**

THIS IS THE FIRST PAGE OF THE PRESCRIBED MEDICATIONS (PM) SECTION. STATUS = {STATUS}.  
 IF THIS SECTION HAS ALREADY BEEN COMPLETED, RETURN TO THE CHOOSE PERSON SCREEN.  
 PRESS 1 AND ENTER TO CONTINUE.  
 IF RECORDS FOR THIS PERSON ARE NOT AVAILABLE (RP), PRESS 2 AND ENTER.  
 IF CONSENT REQUIRED AND NOT OBTAINED FOR THIS PERSON (CP), PRESS 3 AND ENTER.

**PM1A.**

{Please give me the names of all the medications {SP} received yesterday, that is, from 12:01 AM to 12:00 midnight {DATE BEF CURRENT INTERVIEW}. Please include all the standing or routine medications, or PRN medications.}

{Any other medications?}

{TYPE THE FIRST 3 LETTERS OF THE MEDICATION. THEN USE ARROW KEYS TO LOCATE MEDICATIONS, AND PRESS ENTER TO SELECT. IF NO MEDICATIONS TAKEN, ENTER AAA. IF MEDICATION IS NOT LISTED, ENTER ZZZ.}

{ENTER 999 TO LEAVE ROSTER.}

| MEDICATION | MEDICATION (OTHER) | REASON PRESCRIBED |
|------------|--------------------|-------------------|
|            |                    |                   |
|            |                    |                   |
|            |                    |                   |
| PM [1-25]  | PM OS [1-25]       | WhyPM[1-25]       |

**PM1B.**

SPECIFY MEDICATION.

\_\_\_\_\_



**PM1C.**

Why was this medication prescribed for {SP}?

ENTER REASON.

\_\_\_\_\_

**PM2.**

Does {SP} receive any medications on a regularly scheduled basis that were not administered yesterday?  
Please include only medications with standing orders for administration. Please do not include PRN medications.

PRESS F1 FOR HELP SCREEN.

YES .....1  
 NO .....2  
 DK  
 RF

**PM2A.**

{Please give me the names of all of these medications.}

{Any other medications?}

{TYPE THE FIRST 3 LETTERS OF THE MEDICATION. THEN USE ARROW KEYS TO LOCATE MEDICATIONS, AND PRESS ENTER TO SELECT. IF MEDICATION IS NOT LISTED, ENTER ZZZ.}

{ENTER 999 TO LEAVE ROSTER.}

| MEDICATION    | MEDICATION (OTHER) | REASON PRESCRIBED |
|---------------|--------------------|-------------------|
|               |                    |                   |
|               |                    |                   |
|               |                    |                   |
| OthrPM [1-15] | OthrPMOS [1-15]    | WhyOthPM[1-15]    |

**PM2B.**

SPECIFY MEDICATION.

\_\_\_\_\_

**PM2C.**

Why was this medication prescribed for {SP}?

ENTER REASON(S).

\_\_\_\_\_

**PM3.**

{Since admission {FAD}/During the past 30 days, that is, since {PAST 30 DAYS}, did {SP} have any type of reaction to a drug or medication?}

PRESS F1 FOR HELP SCREEN.

YES .....1  
 NO .....2  
 DK  
 RF

**PM3A.**

{Please give me the names of all the drugs or medications to which {SP} had a reaction.}

{Any other medications?}

{TYPE THE FIRST 3 LETTERS OF THE MEDICATION. THEN USE ARROW KEYS TO LOCATE MEDICATIONS, AND PRESS ENTER TO SELECT. IF MEDICATION IS NOT LISTED, ENTER ZZZ.}

{ENTER 999 TO LEAVE ROSTER.}

| MEDICATION     | MEDICATION (OTHER) | REACTION      |
|----------------|--------------------|---------------|
|                |                    |               |
|                |                    |               |
|                |                    |               |
| Drug Name[1-5] | Drug Name OS[1-5]  | Reaction[1-5] |

**PM3B.**

SPECIFY MEDICATION.

\_\_\_\_\_

**PM3C.**

What kind of reaction did {SP} have?

ENTER REACTION.

\_\_\_\_\_

**PMEND.**

YOU HAVE COMPLETED PM FOR {SP}. PRESS 1 AND ENTER TO CONTINUE.

**PMNAV.**

YOU HAVE COMPLETED THE PM SECTION FOR {SP}. YOUR OPTIONS ARE TO:

- CONTINUE WITH PA {STATUS} FOR {SP} .....1
- CHOOSE A DIFFERENT SECTION FOR {SP} .....2
- CHOOSE A DIFFERENT PERSON .....3

## Prescribed Medications Section Help Screens

### PM2

The following are types of medications to include: Vitamin B-12, bisphosphonates (alendronate and risedronate), Lupron depot, depo provera, methotrexate.

### PM3

A drug reaction includes any unexpected, unintended, undesired, or excessive response to a medication that

- Requires discontinuing the medicine (therapeutic or diagnostic)
- Requires changing the medication therapy
- Requires modifying the dose (except for minor dosage adjustments)
- Necessitates admission to a hospital (e.g., an ED visit)
- Prolongs stay in a health care facility
- Necessitates supportive treatment
- Significantly complicates diagnosis
- Negatively affects prognosis
- Results in temporary permanent harm, disability, or death

## Appendix II

### Summary of Key Items for Data Collection

#### Facility Visit Activities

Approximately 40 minutes of the administrator's (or designee) time will be needed to answer questions about the facility, residents, and staff. Access to the following information will expedite the interview.

- Current number of residents with Medicare, Medicaid, and private pay as primary source of payment
- Payment rates for Medicaid and private pay residents
- Medicare and Medicaid facility ID numbers
- Number of admissions and discharges for 2003
- List of all current residents on the rolls of this facility as of midnight  
**[INSERT DATE BEFORE THE DATE OF INTERVIEW IN BOLD PRINT]**

#### Sampled Current Residents Information

The study collects information about the sampled current residents and discharges primarily from the person's medical record. Approximately 25 minutes per resident is required to collect the following information:

- Health status information from the Minimum Data Set (MDS) assessments
- Medications administered the day before interview date
- Hospital or emergency room visits during residency
- Vaccination/immunization status
- Expenditure information including: total charges, sources of payment, and amount paid by resident/discharge for all care during the first month/billing period and the most recent or final month/billing period

To collect this medical and billing information, we will need to work with staff familiar with the medical and billing records.

## Appendix III

### 1995 Version of the NDC Directory Used to Adjudicate 2004 NNHS Data

|      |                                         |      |                                          |
|------|-----------------------------------------|------|------------------------------------------|
| 0100 | ANESTHETIC DRUGS                        | 0600 | CENTRAL NERVOUS SYSTEM                   |
| 0117 | Anesthetics, Local (Injectable)         | 0626 | Sedatives and Hypnotics                  |
| 0118 | Anesthetics, General                    | 0627 | Antianxiety Agents                       |
| 0119 | Adjuncts to Anesthesia/Analeptics       | 0628 | Antipsychotic/Antimanics                 |
| 0120 | Medicinal Gases                         | 0630 | Antidepressants                          |
| 0121 | Anesthetics, Topical                    | 0631 | Anorexiant/CNS Stimulants                |
| 0122 | Anesthetics, Ophthalmic                 | 0632 | CNS, Miscellaneous                       |
| 0123 | Anesthetics, Rectal                     | 0633 | Alzheimer-type Dementia                  |
| 0200 | ANTIDOTES                               | 0634 | Sleep Aid Products—OTC                   |
| 0281 | Antidotes, Specific                     | 0635 | Antiemetics                              |
| 0283 | Antidotes, General                      | 0700 | CONTRAST MEDIA/<br>RADIOPHARMACEUTICAL   |
| 0285 | Antitoxins/Antivenins                   | 0789 | Diagnostics, Radiopaque & Nonradioactive |
| 0286 | Anaphylaxis Treatment Kit               | 0790 | Diagnostics—Radiopharmaceuticals         |
| 0300 | ANTIMICROBIAL AGENTS                    | 0791 | Therapeutics—Radiopharmaceuticals        |
| 0346 | Penicillins                             | 0792 | Miscellaneous                            |
| 0347 | Cephalosporins                          | 0800 | GASTROINTESTINAL AGENTS                  |
| 0348 | Erythromycins/Lincosamides/Macrolides   | 0874 | Disorders, Acid/Peptic                   |
| 0349 | Polymyxins                              | 0875 | Antidiarrheals                           |
| 0350 | Tetracyclines                           | 0876 | Laxatives                                |
| 0351 | Chloramphenicol/Derivatives             | 0877 | Miscellaneous Gastrointestinals          |
| 0352 | Aminoglycosides                         | 0878 | Antispasmodics/Anticholinergics          |
| 0353 | Sulfonamides and Trimethoprim           | 0879 | Antacids                                 |
| 0354 | Urinary Tract Antiseptics               | 0900 | METABOLIC/NUTRIENTS                      |
| 0355 | Miscellaneous Antibacterial Agents      | 0912 | Hyperlipidemia                           |
| 0356 | Antimycobacterial/Anti-leprosy Agents   | 0913 | Vitamins/Minerals                        |
| 0357 | Quinolones/Derivatives                  | 0914 | Nutrition, Enteral/Parenteral            |
| 0358 | Antifungals                             | 0915 | Repl/Regs of Electrolytes/Water Balance  |
| 0388 | Antiviral Agents                        | 0916 | Calcium Metabolism                       |
| 0400 | HEMATOLOGIC AGENTS                      | 0917 | Hematopoietic Growth Factor              |
| 0408 | Deficiency Anemias                      | 1000 | HORMONES/HORMONAL MECHANISMS             |
| 0409 | Anticoagulants/Thrombolytics            | 1032 | Adrenal Corticosteroids                  |
| 0410 | Blood Components/Substitutes            | 1033 | Androgens/Anabolic Steroids              |
| 0411 | Hemostatics/Antihemophilics             | 1034 | Estrogens/Progestins                     |
| 0500 | CARDIOVASCULAR-RENAL DRUGS              | 1035 | Anterior Pituitary/Hypothalamic Function |
| 0501 | Cardiac Glycosides                      | 1036 | Blood Glucose Regulators                 |
| 0502 | Antiarrhythmic Agents                   | 1037 | Thyroid/Antithyroid                      |
| 0503 | Antianginal Agents                      | 1038 | Antidiuretics                            |
| 0504 | Vascular Disorders, Cerebral/Peripheral | 1039 | Relaxants/Stimulants, Uterine            |
| 0505 | Agents Used to Treat Shock/Hypotension  | 1040 | Contraceptives                           |
| 0506 | Antihypertensive Agents                 | 1041 | Infertility                              |
| 0507 | Diuretics                               | 1042 | Growth Hormone Secretion Disorder        |
| 0508 | Coronary Vasodilators                   | 1100 | IMMUNOLOGICS                             |
| 0509 | Relaxants/Stimulants, Urinary Tract     | 1180 | Vaccines/Antisera                        |
| 0510 | Calcium Channel Blockers                | 1181 | Immunomodulators                         |
| 0511 | Carbonic Anhydrase Inhibitors           | 1182 | Allergenic extracts                      |
| 0512 | Beta Blockers                           | 1183 | Immune serums                            |
| 0513 | Alpha Agonist/Alpha Blockers            |      |                                          |
| 0514 | ACE Inhibitors                          |      |                                          |

|      |                                         |      |                                      |
|------|-----------------------------------------|------|--------------------------------------|
| 1200 | SKIN/MUCOUS MEMBRANE                    | 1700 | RELIEF OF PAIN                       |
| 1264 | Antiseptics/Disinfectants               | 1720 | Analgesics/General                   |
| 1265 | Dermatologics, Misc.                    | 1721 | Analgesics, Narcotic                 |
| 1266 | Keratolytics                            | 1722 | Analgesics, Non-narcotic             |
| 1267 | Antiperspirants                         | 1723 | Antimigraine/Other Headaches         |
| 1268 | Topical Steroids                        | 1724 | Antiarthritics                       |
| 1269 | Burn/Sunburn, Sunscreen/Suntan Products | 1725 | Antigout                             |
| 1270 | Acne Products                           | 1726 | Central Pain Syndrome                |
| 1271 | Topical Anti-infectives                 | 1727 | NSAID                                |
| 1272 | Anorectal Products                      | 1728 | Antipyretics                         |
| 1273 | Personal Care (Vaginal) Products        | 1729 | Menstrual Products                   |
| 1274 | Dermatitis/Antipuretics                 | 1800 | ANTIPARASITICS                       |
| 1275 | Topical Analgesics                      | 1860 | Antiprotozoals                       |
| 1300 | NEUROLOGIC DRUGS                        | 1862 | Anthelmintics                        |
| 1371 | Extrapyramidal Movement Disorders       | 1863 | Scabicides/Pediculicides             |
| 1372 | Myasthenia Gravis                       | 1864 | Antimalarials                        |
| 1373 | Skeletal Muscle Hyperactivity           | 1900 | RESPIRATORY TRACT                    |
| 1374 | Anticonvulsants                         | 1940 | Antiasthmatics/Bronchodilators       |
| 1400 | ONCOLYTICS                              | 1941 | Nasal Decongestants                  |
| 1479 | Antineoplastics, Miscellaneous          | 1943 | Antitussives/Expectorants/Mucolytics |
| 1480 | Hormonal/Biological Response Mod.       | 1944 | Antihistamines                       |
| 1481 | Antimetabolites                         | 1945 | Cold Remedies                        |
| 1482 | Antibiotics, Alkaloids, Enzymes         | 1946 | Lozenge Products                     |
| 1483 | DNA Damaging Drugs                      | 1947 | Corticosteroid-inhalation, Nasal     |
| 1500 | OPHTHALMICS                             | 2000 | UNCLASSIFIED/MISCELLANEOUS           |
| 1566 | Glaucoma                                | 2087 | Unclassified                         |
| 1567 | Cycloplegics/Mydriatics                 | 2095 | Pharmaceutical Aids                  |
| 1568 | Ocular Anti-infective/Anti-inflammatory | 2096 | Surgical Aids                        |
| 1569 | Miscellaneous Ophthalmics               | 2097 | Dental Preparation                   |
| 1570 | Decongestants/Antiallergy Agents        | 2098 | Dentifrice/Denture Products          |
| 1571 | Contact Lens Products                   | 2099 | Mouth Pain, Cold Sore, Canker        |
| 1600 | OTOLOGICS                               | 2100 | HOMEOPATHIC PRODUCTS                 |
| 1670 | Otic, Topical (Misc)                    |      |                                      |
| 1671 | Vertigo/Motion Sickness/Vomiting        |      |                                      |

NOTE: NDC is the National Drug Code and NNHS is the National Nursing Home Survey.

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For answers to questions about this report or for a list of reports published in these series, contact:

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