ResDAC
RESEARCH DATA ASSISTANCE CENTER

Product Service ID (National Drug Code) and Associated Variables

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Introduction

- Who has not heard of the National Drug Code (NDC)?
- Where do you find (what is the variable name) the NDC in the PDE File?
- What is the NDC and how is it formatted?
- Who assigns/creates each NDC?

NDC Information in the PDE File

- PROD_SRVC_ID
  - This field identifies the dispensed drug using a National Drug Code (NDC). The NDC is reported in NDC11 format. In instances where a pharmacy formulates a compound containing multiple NDC drugs, the NDC of the most expensive drug is used. NDC code in the following format: MMMMMDDDDPP followed by 8 spaces.
  - SHORT NAME: PRDSRVID
  - LONG NAME: PROD_SRVC_ID

National Drug Classification (NDC) Codes

- Three segments to each NDC code
  - » Labeler code – 4 or 5 digits – not necessarily the manufacturer - assigned by FDA (Food and Drug Administration
  - » Product code- 3 or 4 digits – assigned by labeler
  - » Packaging code- 2 or 1 digit – assigned by labeler
- Always 10 digits of information, but not always the same format
  - E.g., the segments could be (4-4-2) (5-3-2) or (5-4-1)
- Medicare: Uses NDC 11 (5-4-2) Developed by the National Council on Prescription Drug Program) in response to HIPPA legislation

Example: NDC11 for Ramipril (Altace) an ACE Inhibitor

	Labeler	Product	Packaging	NDC	NDC-11
1.25 mg capsules in a 100 capsule bottle	61570	110	01	6157011001	61570011101
2.5 mg capsules in a 100 capsule bottle	61570	111	01	6157011101	61570011101
2.5 mg capsules in a 500 capsule bottle	61570	111	05	6157011105	61570011105

Different product codes for 1.25mg vs 2.5mg

Different packaging code for 100 versus 500 capsules

NDC-11 inserts a leading "0" so the product code is 4 digits and the format is always is 5-4-2

PROD_SRVC_ID Associated Variables in the PDE file

http://www.ccwdata.org/data-dictionaries/index.htm

Short SAS Name	Long SAS Name	Short Description
BN	BN	Brand Name*
GNN	GNN	Generic Name*
STR	STR	Drug Strength Description*
GCDF	GCDF	Dosage Form Code*
GCDF_DESC	GCDF_DESC	Dosage Form Code Description*

Note: These variables technically in the Drug Characteristics File, but are appended to the PDE records.

***Source: First DataBank**

PROD_SRVC_ID (NDC) and Drug Characteristic File Variables

Is there a Pharmacist in the room?

PROD_SRVC_ID	BN	GNN	STR	GCDF
00143147705	PREDNISONE	PREDNISONE	20MG	TA
66521011001	FLUVIRIN	INFLUENZA TVS 07-08 VACCINE/PF	45MCG/.5ML	HQ
00185007460	LOVASTATIN	LOVASTATIN	40MG	TA
62175011843	OMEPRAZOLE	OMEPRAZOLE	20MG	CE
49884040501	METOPROLOL SUCCINATE	METOPROLOL SUCCINATE	50MG	TI
00002411730	ZYPREXA	OLANZAPINE	10MG	TA

PROD_SRVC_ID (NDC) and Drug Characteristic File Variables

Partial Repeat to include the GCDF_DESC

GNN	STR	GCDF	GCDF_DESC
PREDNISONE	20MG	TA	TABLET
INFLUENZA TVS 07-08 VACCINE/PF	45MCG/.5ML	HQ	DISPOSABLE SYRINGE (ML)
LOVASTATIN	40MG	TA	TABLET
OMEPRAZOLE	20MG	CE	CAPSULE,DELAYED RELEASE (ENTERIC COATED)
METOPROLOL SUCCINATE	50MG	TI	TABLET, SUSTAINED RELEASE 24HR
OLANZAPINE	10MG	TA	TABLET

Examples of using the PROD_SRVC_ID (NDC code) and Associated Variables

- Example 1 - Studies of Part D program and policies
  - For example, “What are the top 10 drugs paid for by Medicare Part D?”
- Example 2 - Finding drug utilization for a cohort that has already been defined
  - Using Medicare Part A, B and/or C data
  - Using “your” cohort
- Example 3 - Identifying drugs or selecting a cohort based on type (name) of drug used

Example 1 - What are the top 10 drugs paid for by Medicare Part D?

- Used by beneficiaries versus paid for by Medicare Part D
  - Example – benzodiazepines
- Rank by prescriptions filled (paid for), cost of drug or people who used the drug?
- Let's use the PROD_SRVC_ID and associated variables in the PDE records to look at prescriptions filled
- Which variables are available and which would you use to count and rank the drugs?

Top 10 PROD_SRVC_ID (NDC) Codes

5% Part D Sample, 2008

Obs	PROD_SRVC_ID	BN	GNN	Frequency of PRDSERID	Percent
1	00006003144	FOSAMAX	ALENDRONATE SODIUM	444,257	0.81
2	00071015523	LIPITOR	ATORVASTATIN CALCIUM	438,247	0.80
3	00071015623	LIPITOR	ATORVASTATIN CALCIUM	376,981	0.68
4	00172208380	HYDROCHLOROTHIAZIDE	HYDROCHLOROTHIAZIDE	338,388	0.61
5	63653117101	PLAVIX	CLOPIDOGREL BISULFATE	329,238	0.60
6	00186504031	NEXIUM	ESOMEPRAZOLE MAG TRIHYDRATE	320,417	0.58
7	00008084181	PROTONIX	PANTOPRAZOLE SODIUM	307,816	0.56
8	00149047201	ACTONEL	RISEDRONATE SODIUM	301,102	0.55
9	00406035705	HYDROCODONE-ACETAMINOPHEN	HYDROCODONE BIT/ACETAMINOPHEN	279,363	0.51
10	00378021610	FUROSEMIDE	FUROSEMIDE	276,410	0.50

Top 10 Generic Names (GNN)

5% Part D Sample, 2008

Obs	GNN	Frequency of GNN	Percent
1	LEVOTHYROXINE SODIUM	1,724,895	3.13
2	LISINOPRIL	1,445,678	2.63
3	FUROSEMIDE	1,361,887	2.47
4	HYDROCODONE BIT/ACETAMINOPHEN	1,187,720	2.16
5	ATORVASTATIN CALCIUM	1,150,732	2.09
6	SIMVASTATIN	1,053,597	1.91
7	POTASSIUM CHLORIDE	1,045,856	1.90
8	AMLODIPINE BESYLATE	961,733	1.75
9	ATENOLOL	947,694	1.72
10	HYDROCHLOROTHIAZIDE	899,652	1.63

Top 10 Brand Names (BN)

5% Part D Sample, 2008

Obs	BN	Frequency of BN	Percent
1	LISINOPRIL	1,441,699	2.62
2	FUROSEMIDE	1,354,644	2.46
3	HYDROCODONE-ACETAMINOPHEN	1,177,218	2.14
4	LIPITOR	1,150,732	2.09
5	LEVOTHYROXINE SODIUM	1,102,098	2.00
6	SIMVASTATIN	1,040,919	1.89
7	ATENOLOL	944,953	1.72
8	HYDROCHLOROTHIAZIDE	899,489	1.63
9	METOPROLOL TARTRATE	822,249	1.49
10	METFORMIN HCL	770,273	1.40

So, what is the answer?

Example 2 – Finding Drug Utilization for a Cohort that is Already Defined

A. Specific drug(s) – to answer the question, "What percentage of my study population with disease X , or after procedure Y, or whatever filled a prescription for drug Z or a group of drugs?"

B . "Any drug" - to answer the question, "What was the average number of different medication taken per person in my study?"

- In SAS, PROC SORT NODUP by BENE_ID and ???
- PROD_SRVC_ID?
- BN?
- GNN?
- Another way?
- This is tough.

- What is a drug, anyway?
  - PROC FREQ on GCDF (Dosage Form Code) and Dosage Form Code Descriptor (See sheets in Handout at end of this Segment.)

Example 2 – Finding Drug Utilization for a Cohort that is Already Defined

A. Specific drug(s)

- Generic question – "What percentage of my study population with disease X , or after procedure Y, or whatever filled a prescription for drug Z or a group of drugs?"
- Specific example - Identify those beneficiaries with hypertension who filled prescriptions for a certain type of anti-hypertensive drug called ARBs (Angiotensin II Receptor Antagonists or Angiotension Receptor Blockers)

Generic and Brand Names in 2008 for ARB's

	GNN	BN
1	CANDESARTAN CILEXETIL	ATACAND
2	EPROSARTAN MESYLATE	TEVETEN
3	IRBESARTAN	AVAPRO
4	LOSARTAN POTASSIUM	COZAAR
5	OLMESARTAN MEDOXOMIL	BENICAR
6	TELMISARTAN	MICARDIS
7	VALSARTAN	DIOVAN

Generic and Brand Names in 2008 for Combination ARB Containing Drugs

	GNN	BN
1	AMLODIPINE BES/OLMESARTAN MED	AZOR
2	AMLODIPINE/VALSARTAN	EXFORGE
3	CANDESARTAN/HYDROCHLOROTHIAZID	ATACAND HCT
4	EPROSARTAN/HYDROCHLOROTHIAZIDE	TEVETEN HCT
5	IRBESARTAN/HYDROCHLOROTHIAZIDE	AVALIDE
6	LOSARTAN/HYDROCHLOROTHIAZIDE	HYZAAR
7	OLMESARTAN/HYDROCHLOROTHIAZIDE	BENICAR HCT
8	TELMISARTAN/HYDROCHLOROTHIAZID	MICARDIS HCT
9	VALSARTAN/HYDROCHLOROTHIAZIDE	DIOVAN HCT

Summary

- Not too difficult
- Type in all the GNNs or BNs – which ones?
- Do not make a typo
- Caution: These are the GNN and BN as used by First DataBank, and are truncated at 30 characters
  - Careful how you spell CHLORTHIAZIDE
- Would you type in all the PROD_SRVC_IDs?
  - See the PROD_SRVC_IDS for BENICAR – http://www.commondatahub.com/static/healthcare/pharmaceutical_codes/ndc_current_list.0000000031.html and the other ARBs?
- Finally, the empirical approach
  - Proc Freq the GNN or BN and review the list.

Example 2 – Finding Drug Utilization for a Cohort that is Already Defined

B . “Any drug” - to answer the question, “What was the average number of different medication taken per person in my study?”

- — In SAS, PROC SORT NODUP by BENE_ID and ?
- PROD_SRVC_ID?
- BN?
- GNN?
- Another way?
- This is tough.

- What is a drug, anyway? Let’s see what the PRD_SER
  - PROC FREQ on GCDF (Dosage Form Code) and Dosage Form Code Descriptor (See sheets in Handout at end of this Segment.)

Examples of GCDF Code (AA through BN)

Dosage Form Code	Dosage Form Code Description	Frequency	Percent
AA	AEROSOL (ML)	80	0
AB	AEROSOL (GM)	171130	0.29
AJ	AEROSOL W/ADAPTER (GM)	245695	0.42
AL	AMPUL FOR NEBULIZATION (ML)	28668	0.05
AN	VIAL, NEBULIZER (ML)	68056	0.12
AO	AEROSOL, BREATH ACTIVATED	1755	0
AP	AEROSOL, POWDER (GM)	20	0
AQ	AEROSOL, SPRAY, (GM)	19924	0.03
AS	AEROSOL, SPRAY (ML)	30518	0.05
AT	AEROSOL, SPRAY W/PUMP (ML)	92702	0.16
AU	SPRAY, NON-AEROSOL (ML)	1436	0
AW	AEROSOL, FOAM WITH APPLICATOR (GM)	206	0
AX	SPRAY, NON-AEROSOL (EA)	1435	0
AY	AEROSOL POWDER, BREATH ACTIVATED (EA)	7518	0.01
BD	SPRAY, NON-AEROSOL (GM)	6032	0.01
BE	VIAL, NEBULIZER (EA)	293	0
BH	AEROSOL POWDER, BREATH ACTIVATED (GM)	15934	0.03
BI	AMPUL, LUER TIP	26	0
BJ	HFA AEROSOL WITH ADAPTER (GM)	252841	0.43
BK	SPRAY, SUSPENSION	193528	0.33
BL	SUSP FOR RECON,DELAYED REL. IN A PACKET	494	0
BN	AEROSOL, SPRAY W/PUMP (GM)	102434	0.18

Examples of GCDF Code (CA through EX)

CA	CAPSULE (HARD, SOFT, ETC.)	3917037	6.71
CB	CAPSULE, SUSTAINED RELEASE 12 HR	12412	0.02
CC	CAPSULE, SUSTAINED RELEASE 24 HR	965294	1.65
CD	CAPSULE, WITH INHALATION DEVICE	224031	0.38
CE	CAPSULE,DELAYED RELEASE (ENTERIC COATED)	1869481	3.2
CG	CAPSULE, MULTIPHASIC RELEASE 30-70	402	0
CH	CAPSULE, MULTIPHASIC RELEASE 50-50	1371	0
CI	CAPSULE, MULTIPHASIC RELEASE 12 HR	78843	0.14
CJ	CAPSULE, MULTIPHASIC RELEASE 24 HR	40835	0.07
CK	CAPSULE, SPRINKLE	27980	0.05
CM	CAPSULE, MULTIPHASIC RELEASE	161	0
CN	CAPSULE, SUSTAINED RELEASE PELLETS	9227	0.02
CP	CAPSULE, 24HR SUSTAINED RELEASE PELLETS	58354	0.1
CR	CAPSULE, SUSTAINED ACTION 24 HR	35616	0.06
CS	CAPSULE, SUSTAINED ACTION	306907	0.53
CT	CAPSULE, DEGRADABLE CONTROLLED-RELEASE	88493	0.15
DP	DROPPERETTE, SINGLE-USE DROP DISPENSER	40241	0.07
DS	SUSPENSION,DELAYED RELEASE,RECONST.	181	0
EA	EACH	11769	0.02
EB	BAR	30	0
EH	STICK (EA)	71	0
EL	SWAB, MEDICATED	606	0
EN	TAPE, MEDICATED	848	0
ET	PADS, MEDICATED (EA)	15298	0.03
EX	TABLET, EXTENDED RELEASE 24 HR (2)	415765	0.71

Examples of GCDF Code (TA through YL)

TA	TABLET	38878732	66.59
TB	TABLET, SOLUBLE	823	0
TC	TABLET, CHEWABLE	38634	0.07
TE	TABLET, DELAYED RELEASE (ENTERIC COATED)	708528	1.21
TF	TABLET, EFFERVESCENT	2905	0
TG	GUM	18	0
TH	TABLET, HYPODERMIC	74	0
TI	TABLET, SUSTAINED RELEASE 24HR	1876858	3.21
TJ	TABLET, DISPERSIBLE	2374	0
TL	LOZENGE	89	0
TM	TABLET, SUSTAINED RELEASE 12HR	220087	0.38
TQ	TABLET, SUST.RELEASE,PARTICLES/CRYSTALS	550531	0.94
TR	TABLET, PARTICLES/CRYSTALS IN	25	0
TS	TABLET, SUSTAINED ACTION	889568	1.52
TT	TROCHE	7019	0.01
TU	TABLET, SUBLINGUAL	121247	0.21
TW	WAFER	33	0
UA	TABLET, SEQUENTIAL	390	0
UB	TABLET, MULTIPHASIC RELEASE	57866	0.1
UD	TABLET, DOSE PACK	107971	0.18
UE	TABLET, SUSTAINED ACTION SEQUENTIAL	101	0
UF	TABLET, SUSTAINED RELEASE 8HR	12	0
UG	CAPSULE, DOSE PACK	1662	0
UH	TABLET, DOSE PACK, 3 MONTHS	601	0
UI	TABLET, SR OSMOTIC PUSH 24HR	110738	0.19
UJ	TABLET, RAPID DISSOLVE, DELAYED RELEASE	38159	0.07
UL	TABLET, RAPID DISSOLVE	51491	0.09
UO	TABLET, MULTIPHASIC RELEASE 12HR	1059	0
UP	TABLET, MULTIPHASIC RELEASE 24HR	22822	0.04
UR	TABLET AND CAPSULE, SEQUENTIAL	16	0
YE	BANDAGE	146	0
YH	NEEDLE, DISPOSABLE	76230	0.13
YK	KIT	49700	0.09
YL	SYRINGE, EMPTY DISPOSABLE	217925	0.37

Repeating the Question:
How would you count the number of different drugs a person took in X time period?

- Would you count just using BENE_ID PRD_SRVC_ID?
- Would you count just using BENE_ID and BN?
- Would you count just BENE_ID and GNN?
- Tablets and capsules only?
- Maybe select different therapeutic classes of drugs or a range of therapeutic classes?
- Good luck!

Example 3 - Identifying Drugs or Selecting a Cohort Based on Drug Utilization

- Seems simple: Make a list of
  - PROD_SRVC_IDs or NDCs
  - Generic name(s), or
  - Brand name(s)
- And it can be simple if a small number of PROD_SRVC_IDs
- But CCW/Buccaneer will NOT do a search on generic name (GNN) or brand name (BN)
- So, you are stuck, I think.

Ways to Get Unstuck

- Work really hard copying PROD_SRVC_IDs that you would send as a finder file to CCW/Buccaneer
- Buy a commercial product that will help you
- TRANSITION – The commercial product that will help you will also help you with "Therapeutic Class"

Determining Therapeutic Class

- Many studies indicate that they studied a "therapeutic class" of drugs; e.g., anti-diabetics, anti-hypertensives, statins (HMG CoA reductase inhibitors), etc.
  - In fact, after you complete your list of PROD_SRVC_IDs that you send to CCW/Buccaneer, you will likely say we identified all beneficiaries who used ARBs or some other group (class) of drugs.
- How are the therapeutic classes determined and or where do you find them?
  - Medicare Part D Data Files?
  - Smart pharmacists and other colleagues?
  - Other?

Sources of Therapeutic Class Information and Designation

Other than smart friends

- **Public**
  - Food and Drug Administration (FDA)
- **Propriatary/commercial**
  - First DataBank http://www.firstdatabank.com/
  - Medi-Span http://www.medi-span.com/
    - » Medi-Span Master Drug Database Version 2.5
  - Multum http://www.multum.com/

Therapeutic Classification System (TCS) by Medi-Span

- A way to organize drugs in up to 99 therapeutic classes
- Uses their proprietary Generic Product Identifier (GPI) created based on active ingredients, route of administration, dosage form, strength or concentration and therapeutic use
- GPI categorize drugs by a hierarchical therapeutic classification scheme
- GPI consists of 14 digits with seven subsets, each providing increasingly more specific information about each drug (next slide)
- May choose your level (next slide) – Officially, the TCS is the first 6 digits.

TCS (Therapeutic Classification System) by Medi-Span GPI

GPI Subset	Record Type	Size	Representation	Example
12-xx-xx-xx-xx-xx-xx	1	2	Drug Group	*MISC. ENDOCRINE*
12-34-xx-xx-xx-xx-xx	2	4	Drug Class	*Posterior Pituitary**
12-34-56-xx-xx-xx-xx	3	6	Drug Subclass	*Vasopressin***
12-34-56-78-xx-xx-xx		8	Drug Name	Desmopressin
12-34-56-78-90-xx-xx	4	10	Drug Name	Acetate
12-34-56-78-90-12-xx		12	Dosage Form	Tablet
12-34-56-78-90-12-34	5	14	Strength	0.1MG

Issues

- Cost $$$ for a license
- What do you do with drugs that have multiple therapeutic indications; e.g. alpha blockers?
- Cannot get the First DataBank therapeutic classification information from CMS.
- Why we chose Medi-Span