

# PDE File – Medication Utilization; Medication Possession Ratio

*Kyoungrae Jung, Ph.D.*

*Assistant Professor*

*Penn State University*

# Outline

- **PDE variables related to medication utilization**
- **Measures of medication utilization based on PDE records**

# PDE Variables Related to Medication Utilization (I)

- **Product Service ID (PROD\_SRVC\_ID)**
  - Identifies the dispensed drug using NDC
- **Variables associated with Product Service ID**
  - Brand Name (BN)
  - Generic Name (GNN)
  - Need to be spelled correctly

# Identifying Therapeutic Class

- If you are interested in examining a “therapeutic class” (e.g., anti-diabetics, anti-hypertensives, statins etc), identify all NDCs for the therapeutic class of interest
  - From a proprietary data-base (e.g., Medi-Span)
  - Use Product Service ID (PROD\_SRVC\_ID)
- If you know generic names of drugs, you can use Generic Name (GNN).
  - Spell out correctly

# PDE Variables Related to Medication Utilization (II)

- **Prescription Service Date (SRVC\_DT)**
  - Prescription initiation date
- **Prescription Days Supply (DAYS\_SUPLY\_NUM)**
  - Prescription amount

# Prescription Days Supply

- Key variable to construct medication adherence measures
- Median/Mode: 30 days
- Distributions:
  - 30 days: 66.85%
  - 1 - 29 days: 19.9%
  - 31-100 days: 13.24%
  - 101-180 days: 0.01%
- Records with 0 or >180 may be found (<0.01%)

# Measures of Medication Utilization

# Measures of Medication Utilization

- 1. Whether a recommended medication is used**
  - Can be used for a population with a specific condition
    - » Requires information on diagnosis
    - » Medicare Part A/B claims data are needed to construct this measure based on PDE records



# Measures of Medication Utilization

## 2. Medication adherence

- Captures whether a patient takes a prescribed medication according to a schedule
- Various measures have been used
- % of time with Rx vs. % of time without Rx
- Specified time period vs. during refill intervals

# PDE Data Fields to Construct Medication Utilization Measures

Variable Name	Description	Why Needed
PROD_SRV_ID	Product Service ID	Identify Rx or Rx class
SRVC_DT	Rx fill date	Initiation (fill) dates
DAYS_SUPLY_NUM	Rx days supplied	Amount of Rx

# Measures of Medication Utilization Based on PDE Data

- Measure acquisition of medications not consumption
- Cannot measure timing of taking medications
- Good for long-term follow-up

# Measures of Medication Adherence

Measure	Description	Terminology
Measures of medication availability	Proportion of days supply during a specified time period or over a period of refill intervals	<ul style="list-style-type: none"><li>-<u>Medication Possession Ratio (MPR)</u></li><li>-<u>Proportion of Days Covered (PDC)</u></li><li>-Medication Refill Adherence (MRA)</li><li>-Refill Compliance Rate (RCR)</li><li>-Continuous Measure of Medication Acquisition (CMA)</li><li>-Compliance rate (CR)</li><li>-Adherence Ratio</li></ul>

Hess, et al. Ann Pharm July/Aug 2006

Andrade et al. Pharm. and Drug Safety, 2006

# Medication Possession Ratio (MPR)

- Most commonly used measure of adherence
- Proportion of days supply during a given time period
- Can be defined differently depending on how a time period is specified

# Medication Possession Ratio (MPR)

- Two main definitions:

- 1) MPR

$$\frac{\text{Total Rx days supplied during specified period}}{\text{Total number of days during specified period}}$$

- 2) MPR<sub>m</sub>: MPR modified

$$\frac{\text{Total Rx days supplied} - \text{Rx days supplied from the last fill}}{\text{Total number of days between the first and last fill dates}}$$

# Specifying a Time Period

- **Fixed follow-up period (e.g., 1 year)**
  - With a fixed time period, numerator only (duration of therapy) can be used as an adherence measure
- **Evaluation period**
  - From the first fill to the end of the follow-up period
  - Denominator varies by patient

# Does Denominator Matter?

MPR vs. MPR<sub>m</sub>

Fill Day	Detail of Each Fill (4/19/09-4/18/10)		Adherence Value of Different Measures
	Days Supplied	Days in Interval	
April 27	35	26	MPR: 0.323
May 23	35	48	MPR <sub>m</sub> : 0.90
July 10	8	4	
July 14	30	42	
August 25	10	237	
<b>TOTALS</b>	<b>118</b>	<b>357</b>	

Source: Hess, et al. Ann Pharm July/Aug 2006 (Modified Table 1)



# Choosing an Adherence Measure

- **Study goal and relative advantage (Andrade et al., 2006)**
  - Whether therapy is generally prescribed for a defined period only or for a life-long condition should determine how to treat early termination (e.g., MPR vs. MPRm)
  - Dichotomous measure may be used if an appropriate cut-off (of adherence) can be justified

# Choosing an Adherence Measure

- **Data availability and cost**
  - MPR and related measures are easy to calculate (& interpret)

# Issues to Consider When Constructing Adherence Measures

- **Over-supply**
- **Medications provided during hospital admissions**
- **Taking multiple medications for a given condition**
  - **Metformin & sulfonylurea for diabetes**
  - **Diuretics & ACE inhibitors for hypertension**

# Example of "Excessive" Supply

Detail of Each Fill (6/16/09-6/15/10)		
Fill Day	Days Supplied	Days in Interval
June 19	35	21
July 10	35	35
August 14	30	30
September 13	30	30
October 13	30	31
November 13	30	35
December 18	30	15
January 2	30	38
February 9	30	26
March 7	30	5
March 12	30	58
May 9	30	36
June 14	30	1
<b>TOTALS</b>	<b>400</b>	<b>362</b>

# Handling Hospitalization and SNF Stay

- Medications provided during hospital admit
  - Exclude hospitalized subjects
  - Assume all Rx provided while in hospital, so add days to supply (numerator) or reduce interval (denominator)

# Handling Hospital/SNF Stay: Example

- 280 days of Rx in 1 yr w/ 20 day hospital stay
  - Ignore:  $280/365=0.767$
  - Add to days supply:  $(280+20)/365=0.822$
  - Reduce total interval:  $280/(365-20)=0.812$
- How addressed potentially changes outcome if adherence dichotomized (=1 if  $\geq 80\%$ )

# Other Decisions: Multiple Meds for a Given Condition

- **Create Rx-specific adherence & (unweighted) average**
  - **Benefits:** Summarizes overall adherence, simpler model
  - **Costs:** Potentially misrepresents adherence of each Rx if vastly different

# Other Decisions: Multiple Meds for a Given Condition

- **Create Rx-specific adherence & model separately**
  - **Benefits: Allows adherence to each Rx to be represented**
  - **Costs: More complicated modeling**



# Other Decisions: Timing

- **Measure adherence by year or by month?**
  - **Person-year**
    - » **Benefits:** Simpler model if one year of data
    - » **Costs:** May miss important within-year changes
  - **Person-month**
    - » **Benefits:** reflect realistic variation within a year
    - » **Costs:** More complicated modeling