

APR-DRGs: A Research and Practical Update – Focused on Quality

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This Session Will Provide An Understanding of:

- General introductory comments on maximizing quality within a limited budget
- The use of severity to define and compare a patient population - by APR-DRG, by MDC, by facility and by physician or physician group.
- Using APR for quality management; APR-DRG and AHRQ; Public Reporting; Length of Stay (LOS); Ambulatory Care Sensitive Conditions (ACSC).
- Specific Suggestions pertaining to Pay for Performance in Maryland
- Current APR-DRG research – Potentially Preventable Complications; Readmissions;

Summary of P4P Maryland Suggestions – A Blended Upside Potential Drawn From Existing Funds and Consisting of the Following Variables

Year 1:

- AHRQ Quality Indicators – particularly mortality
- 30 Day Readmissions for Common surgical and medical admissions
- Begin collection present on admission flag. Collaborative project with Dr Kazandjian
- Public reporting of AHRQ quality indicators, 30 day readmissions.
- Other variables such as ACSC (in part tied in to readmissions), Patient satisfaction.
- Feedback loop of hospital quality variables into managed care/ HMOs

Year 2:

- Year 1 measures together with potentially preventable complications.

Value

Value = Maximum Quality/ Lowest Cost

Value can be measured for each type of health care encounter
Ambulatory Patient Groups (APGs) – Visits
All-Patient Refined DRGs (APR-DRGs) – Hospital Stays
Clinical Risk Groups (CRGs) – Episodes
APR-DRGs plus Health Status-Long Term Care

Quality

Cost

In Every Country There Are Four Sources for Variation in Health Services

- Patient/family variation
- Caregiver/clinician variation
- Hospital/system variation
- Community variation

It is the variation (defined as differences in quality and cost/underuse and overuse of services) in care that identifies the opportunities for cost reduction and quality improvement. Payers rarely tie financial or quality incentives to any of these sources of variation. Today we have the tools to measure these sources of variation for each type of health care encounter. Payers need to offer quality and financial incentives to aggressively control the costs and improve the quality of this variation.

Managing (Decreasing) this Variation with a Limited Health Care Budget Includes:

- Commitment of senior executives to leading on the basis of knowledge of quality and cost. This implies using the data to improve quality/decrease cost, instead of shifting costs to the consumer (the current strategy)
- Collection of data for each type of health care encounter (e.g. ambulatory visits, severity adjusted hospitalizations) for the purpose of understanding the activity of health care professionals/ organizations
- Dissemination (Profiling) of data to appropriate groups of health care professionals *and* consumers

Managing this variation (cont):

- Incentivizing (financial and quality incentives) consumers, health professionals, organizations (eg hospitals) to use health care data to:
 - improve coordination of care for patients with chronic health care problems
 - increase appropriate preventive care for all consumers
 - encourage consumer participation in their own care and choice of services

It is Important to Incrementally Collect Data for the Following Health Care Encounters

- Ambulatory visits: ICD-9 codes; procedure codes; pharmacy names/dosage; laboratory results
- Hospital stays: ICD-9 codes; pharmacy names/dosage;
- Episodes of illness excluding Long Term Care (LTC- nursing homes, rehab hosp, long home care): data elements from above linked to a patient
- Episodes of LTC: same data as above; need to add functional health status (e.g. activities of daily living)

**Risk Adjustment is the First Step
and the First Step only in the
quality improvement process**

APR-DRGs Are A Categorical Clinical Model

- **APR-DRGs are a clinical model that has been extensively refined with historical data**
 - Different clinical models are developed for 355 different types of patients
 - Clinical models verified with data
 - Final decisions were always clinical

Definitions

- ***Severity of Illness:*** The extent of physiologic decompensation or organ system loss of function
- ***Risk of Mortality:*** The likelihood of dying
- ***Resource Intensity:*** The relative volume and types of diagnostic, therapeutic and bed services used in the management of a particular disease

Severity Of Illness Is Composed Of Two Aspects Which Often, But Do Not Always Intersect

- Severity of intensity of service
- Sickness burden or classical severity of illness

Level of Secondary Diagnosis for Severity of Illness and Risk of Mortality can be Different

A patient with acute cholecystitis has a significant amount of organ decompensation, but a low risk of dying:

Severity of Illness: 3

Risk of Mortality: 1

APR-DRG Subclasses

- The base APR-DRG
- Two Subclasses
 - Severity of Illness (SOI): the extent of physiologic decompensation or organ system loss of function
 - Risk of Mortality (ROM): likelihood of dying
- Four Subclass Values
 - 1 is Minor
 - 2 is Moderate
 - 3 is Major
 - 4 is Extreme
- Subdivision of 314 base APR-DRGs into four subclasses plus two error DRGs (not subdivided) equals $(314 \times 4) + 2 = 1,258$ APR-DRGs

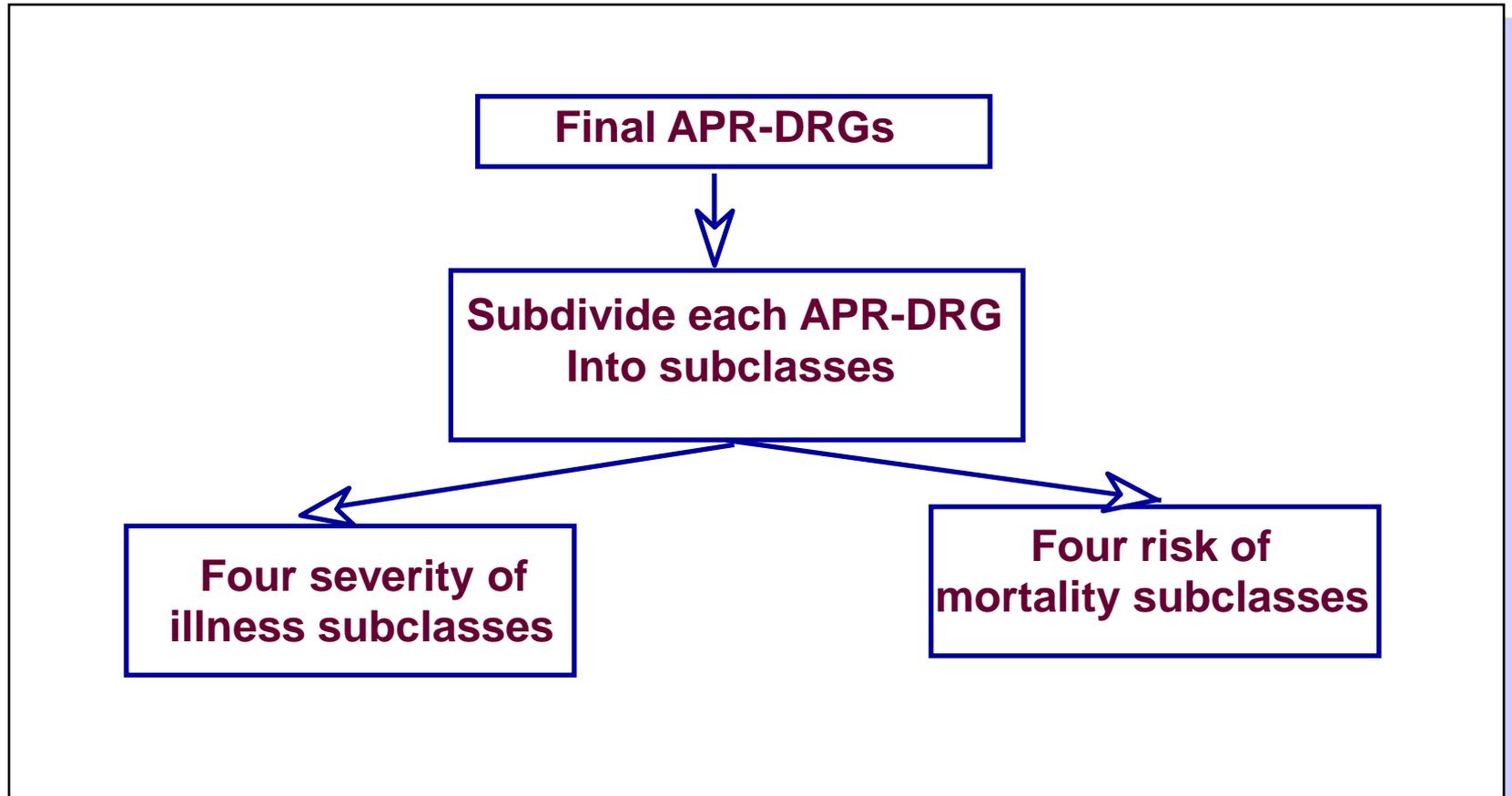
Overview of APR-DRG Subclass Assignment

- First Assign SOI level and ROM level to each SDX
 - “level” refers to the categorization of a sdx
 - “subclass” refers to one of the subdivisions of an APR-DRG
- Each SDX are assigned to one of four distinct SOI levels and one of four distinct ROM levels; 1 minor, 2 moderate, 3 major, 4 extreme
- SOI and ROM assignment take into account the interaction among SDX, age, PDX, and certain OR and non-OR procedures

Three Phases to Determine SOI/ROM Subclass

- Phase 1 Determine the SOI/ROM level of each secondary diagnosis
- Phase 2 Determine the base SOI/ROM subclass of the patient based on all the SDXs
- Phase 3 Determine the final SOI/ROM subclass of the patient by incorporating the impact of the PDX, age, OR procedure, non-OR procedures, multiple OR procedures, and combination of categories of SDXs

Summary of APR-DRGs



Current APR-DRG Research

- The new version was just released. – version 20
- Work on the complications module is being finalized
- We are completing work on a readmission index

Dr. XXX/ Hosp Attending LOS Profile with Outliers Excluded Adjusted by Severity

	Cases	APRDRG Sev. Index	% of Total Cases	ALOS	Risk Adj Expected ALOS	ALOS Variance
Pat. Sev. 1 Minor	174	0.5265	29.85	3.56	2.76	-0.8
Pat. Sev. 2 Mod.	263	0.6394	45.11	5.95	4.14	-1.61
Pat. Sev. 3 Major	117	1.4884	20.07	11.48	6.91	-4.57
Pat. Sev. 4 Extreme	29	5.4157	4.97	25.52	16.88	-8.84

APR-DRG 209 - Major Joint (Average Length of Stay and Charge Comparison for Severity Level 2 [Moderate])

of Days



Physicians Wanted to Know What Made a Difference:

- Did the patient get an epidural?
- What kind of pain medication was used?
- We also examined different practice issues, such as:
 - When drains were pulled
 - Whether or not CPM machines were used, and
 - When physical therapy was initiated

A simple step involved providing physical therapy on weekends

Conclusions

- The hospital and its physicians have joined forces to improve care in a key practice area - orthopedics
- St. Vincent has achieved a 40 percent decrease in average length of stay over a three-year period
- At the end of the second quarter of 1995, 86 percent of our major joint patients were discharged within six days, and 63 percent within four days. This is a big improvement over where we started. It also represents an approximate cost savings of \$205,000

Agency for Health Care Quality and the APR-DRGs

HCUP Quality Indicators - Version 2

Hospital Quality Indicators

- Three primary goals were established to accomplish the task of developing a new set of Hospital Quality Indicators:
 - Identify indicators in use and potential indicators
 - Evaluate existing HCUP indicators and potential indicators using both literature review and empirical analyses of indicator performance
 - Examine the need for risk adjustment of recommended indicators

Risk Adjustment of Hospital Quality Indicators

“We used the 3M APR-DRG System Version 12 with Severity of Illness and Risk of Mortality subclasses, as appropriate, for risk adjustment of the hospital quality indicators. For a few measures, no APR-DRG severity categories were available, so that unadjusted measures were compared to age-sex adjusted measures”

Final Indicator Sets

- Prevention Quality Indicators (done)
- Inpatient Quality Indicators (done)
- Patient Safety Indicators (in progress)
- Ambulatory care sensitive conditions
- Mortality following px
- Mortality for medical conditions
- Utilization of procedures
- Volume of procedures
- Post-operative complications
- Iatrogenic conditions

AMI mortality (#33)	In-hospital Mortality	Number of deaths per 100 discharges for AMI	APR-DRG
CHF mortality (#34)	In-hospital Mortality	Number of deaths per 100 discharges for CHF	APR-DRG
GI hemorrhage mortality (#35)	In-hospital Mortality	Number of deaths per 100 discharges for GI hemorrhage	APR-DRG
Hip fracture mortality (#36)	In-hospital Mortality	Number of deaths per 100 discharges for hip fracture	APR-DRG

Current Research: Readmission Module

- Hypothesis: Readmissions – e.g. within 30 days are useful for two purposes – identify opportunities for quality improvement in the index hospitalization and/or identify good candidates for care management after hospital discharge

Literature Review – Readmission Rates

- Not surprisingly the literature is not firm in its support for the hypothesis that substandard hospital care results in a higher rate of readmission.
 - Carol Ashton (Medical Care) et al provided the largest meta-analysis that would support the relationship. One meta-analysis examined 13 comparisons of readmission rates after substandard versus normative care, another examined 9 comparisons of readmission rates after normative versus exceptional care, and the third examined all 22 comparisons together.
 - **CONCLUSIONS:** Early readmission is significantly associated with the process of inpatient care. The risk of early readmission is increased by 55% when care is of relatively low quality, that is, substandard or normative instead of normative or exceptional.

Current APR-DRG Research: Readmission Module

- Hannan published a CABG study in which 15.3% of approximately 16,000 patients were readmitted within 30 days after discharge following CABG surgery. Of these readmissions, 85% were readmitted for purposes that were identified as complications directly related to the CABG.
- We are completing work on the APR-DRG readmission module
- Readmissions – e.g. within 30 days are useful for two purposes – identify opportunities for quality improvement in the index hospitalization and/or identify good candidates for care management after hospital discharge
- Many of these readmissions are ambulatory care sensitive conditions.

Research Approach

- Define related and unrelated readmissions for most common severity adjusted DRGs
- Specify classification system identifying which severity adjusted drgs we hypothesize as likely resulting in a readmission
- Present the classification system and methodology to interested clinical audiences
- Test the classification methodology with appropriate data bases
- Present the methodology and results to interested clinical audiences for re-evaluation

Coronary Bypass w Cardiac Cath

Severity Level	# Patients Readmitted	Total patients	% Readmits
1	107	1544	6.9
2	630	6082	10.6
3	382	2665	14.3
4	81	460	17.6

COPD – 30 Day Readmissions

Severity	# Readmits	# Patients	% Readmit
1	634	5568	11.4
2	1340	9355	14.3
3	700	4245	16.5
4	73	926	17.1

Clinical Redesign Utilizing APR-DRGs – A Case Example

- Clinical Redesign Utilizing APR-DRGs (All Patient Refined Diagnosis Related Groups)
 - published in *Pediatrics on Asthmatics* (a key Medicaid population)
- Clinical redesign of processes in hospitals that care for children has been limited by a paucity of severity-adjusted indicators that are sensitive enough to identify areas of concern. This is especially true of hospitals that analyze pediatric patient care utilizing standard CMS DRGs.

Validation

- To test whether utilizing APR-DRG severity adjusted indicators could identify resolvable problems in our care processes, and whether educating clinicians to this use would lead to sustained improvement in these indicators.
- Following analysis of internal data and meeting with clinicians to review the indicators, three separate clinical processes were targeted:
 - 1) Correct documentation of comorbidities and complications,
 - 2) Standardized preprinted orders were created with the involvement of the pediatric pulmonologists, and
 - 3) Standardized automatic education for parents was started on the first day of admission.

Validation Results

- Yearly data was reviewed and appropriate adjustments made in the education of staff.
 - In 2002, the ALOS dropped to $1.75 + .08$ days from $2.16 + .09$ ($p=0.0017$) .
 - In 2002 the NACHRI ALOS was 2.00 days ± 0.01 vs the ALOS of 1.75 days ± 0.0845 ($p=.0039$) indicating the ALOS dropped significantly lower than the NACHRI aggregate database over the three year period.
 - Cost per case of compared to NACHRI after the three years indicated that it was $\$3191 + 204$ vs. NACHRI $\$3345 + 22$ ($p=.4531$).

Severity Adjusted Indicators

- Severity adjusted indicators were useful for identifying areas appropriate for clinical redesign and contributed to the improvement in cost effective patient care without a detriment in quality indicators. This methodology of using a large comparative data base, having measures of severity, and utilizing internal analysis is generalizable for pediatric hospitals and can contribute to ongoing attempts to improve cost effectiveness and quality in medical care.

Potentially Preventable Complication Module – New Research Project

- The objective of this project is to examine a data base which includes “present on admission” data for secondary diagnoses, for the purpose of improving current hospital severity of illness/risk of mortality risk adjustment models

Previous Efforts to Examine Complications Using Administrative Data

- Previous attempts to compare complications rates across hospitals have been of questionable validity
 - Inability to determine if a potential complication occurred after admission
 - Inadequate methods to adjust for patient risk and severity of illness
- Title of recent *Medical Care* editorial by Geraci:
The Demise of Comparative Provider Complication Rates Derived from ICD-9-CM Code Diagnoses

Objectives

- Identify Potentially Preventable Complications (PPCs) from the secondary diagnoses not present at admission
- Determine whether the PPC was potentially preventable given the patient's reason for admission
- Determine a patient's expected risk of PPCs based on the reason for admission and severity of illness at admission
- Compute actual and expected rates of PPCs

Pneumonia PPC Category Rates for GI Surgery: Admission Risk Category by Admission SOI

Admission Risk Category	<u>Admission SOI Level</u>				<u>Total</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	
Minor GI Surgery	0.3	1.4	4.2	11.4	0.9
Mod GI Surgery	1.0	3.5	9.9	14.8	3.3
Major GI Surgery	<u>1.7</u>	<u>4.6</u>	<u>13.0</u>	<u>19.6</u>	<u>6.3</u>
Total GI Surgery	0.7	2.8	10.5	18.5	2.9

Rates of Pneumonia PPC from Statewide California Data

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