



The Johns Hopkins University's



2010 ACG International
Risk Adjustment Conference

MAY 10-12
Tucson, Arizona
Loews Ventana Canyon

From Measurement to Management

New ACG Features to Improve Case Identification



New ACG Features Present Opportunities for Management

- Coordination markers
- Pharmacy adherence metrics
- Hospitalization model
- Unexpectedly high pharmacy use markers



Presentation Goals

- Introduce the new features of V9.0
- Highlight potential management applications of some of these new features
- Point to sessions where you can learn more



What Do We Mean By Coordination?

“The extent to which a patient’s principal-care physician is aware of all treatments a patient is receiving and communicates with other providers.”

Tarlov, AR, et al. JAMA. 262(7):925-940, 1989

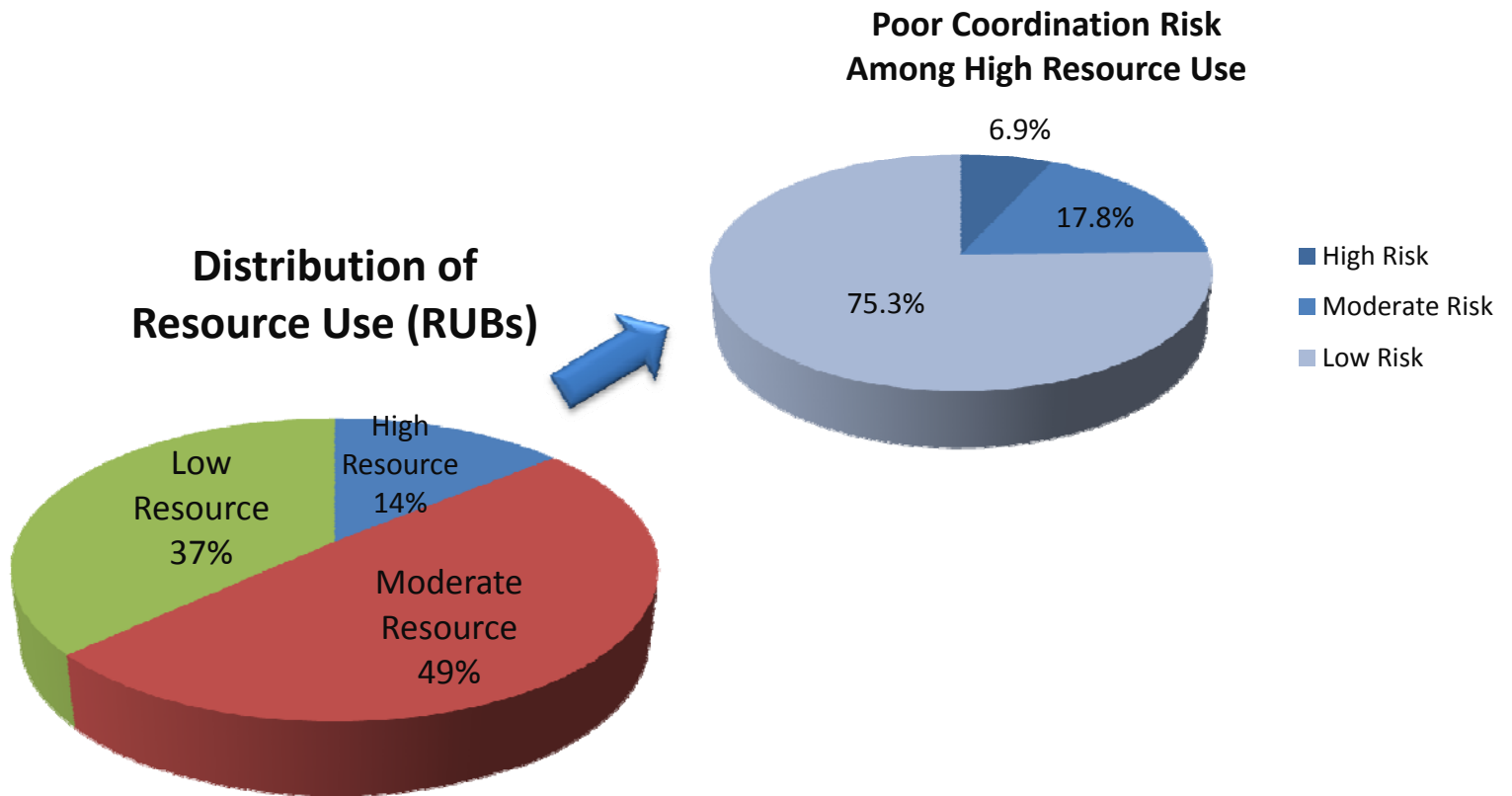


JHU Researchers Developed Four Coordination Markers

- A majority source of care (and percent of outpatient visits provided)
- A count of the number of unique providers
- A count of the number of specialty types (not the same as number of specialists seen)
- A marker for the **ABSENCE** of a generalist



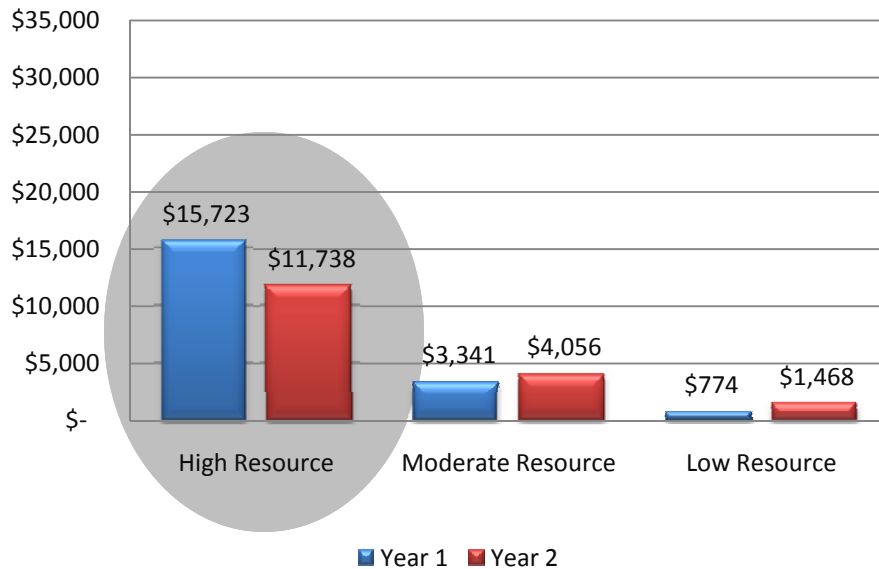
Coordination in High RUB



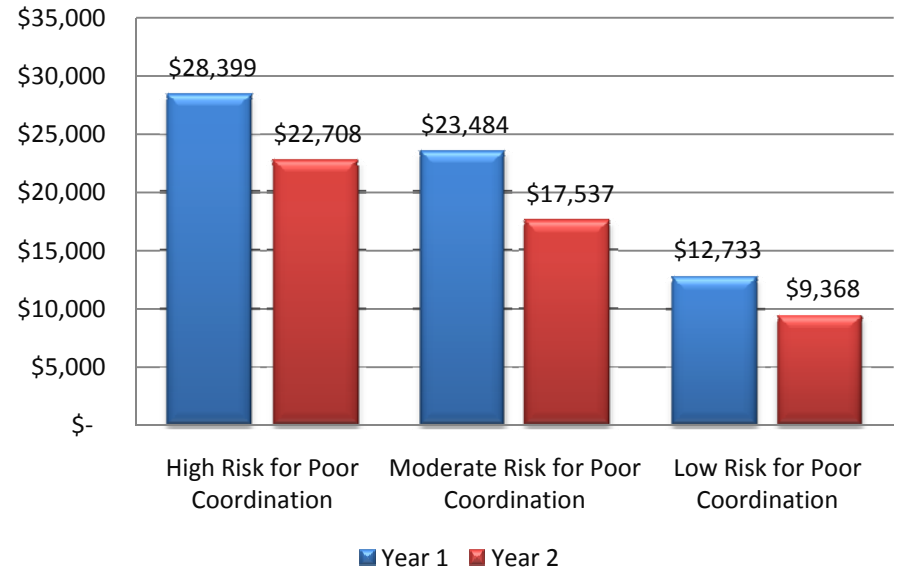


Mean Y1 & Y2 Expenditure in High RUB by Poor Coordination

Mean Expenditure by Resource Band



Mean Expenditure in the High Resource Group



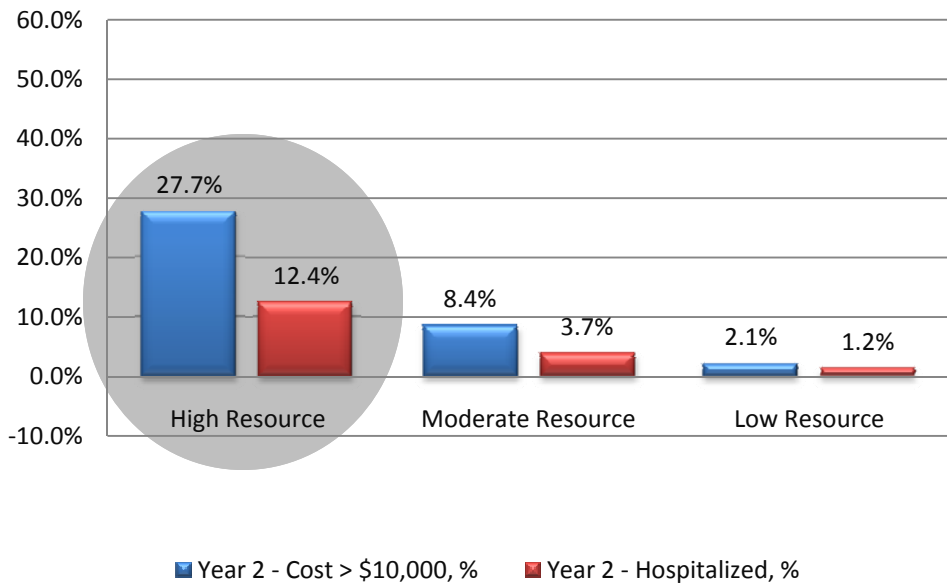


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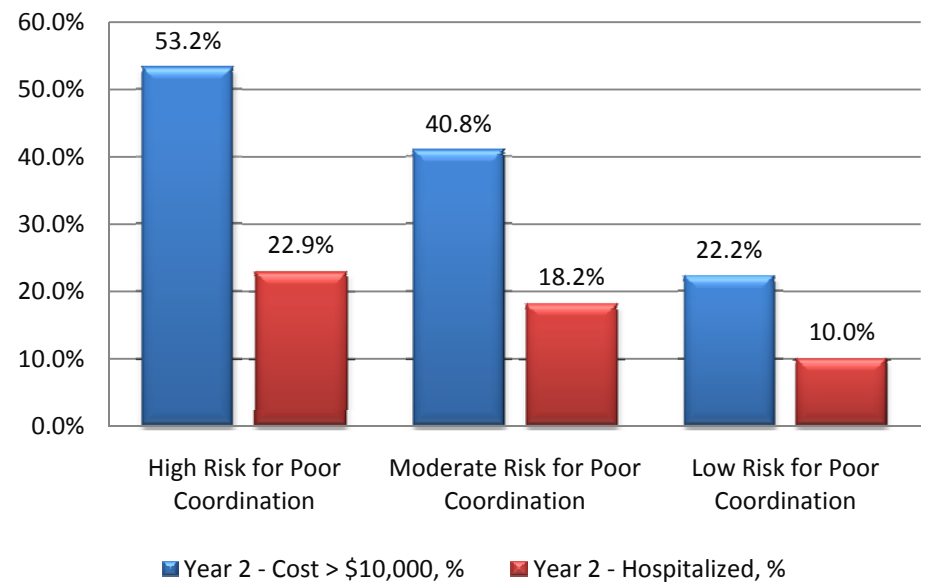
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% of > 10K Spenders and % Hospitalized in High RUB by Low Coordination

**% > \$10,000 and % Hospitalized in Year 2
 by Resource Band**



High Resource Group





What Is Pharmacy Adherence?

The extent to which patients take medications as prescribed by their health care providers.

“Drug’s don’t work in patients who don’t take them.”

C. Everett Koop, M.D.



Features of ACG Approach to Adherence

- Limit to 17 Conditions Where Chronic Administration of Medications Is Warranted
- Rollup Medications Into Therapeutically Equivalent Classes (44 Disease-Drug Class Pairs)
- Tailor Gaps Methodology to Reflect Different Treatment Patterns Associated with Each Disease
- Address Situations Where Adherence Might Be Distorted
- Provide Four Complementary Metrics



Four Adherence Markers Were Developed

- **Number of gaps:** *Count of occurrences where time interval between end of supply of one prescription and onset of next prescription is more than 15 days.*
- **Medication Possession Ratio (MPR):** *Total dispensing days (excluding final prescription) divided by the total prescribing days (days between the first and last prescription)*
- **Continuous Single-Interval Measure of Medication Availability (CSA):** *Ratio of days supply to days until the next prescription averaged across all prescriptions.*
- **Untreated.** *No evidence that receiving treatment with any designated class of pharmaceutical: one or no prescriptions in any associated regimen or a gap of 120 days or more.*

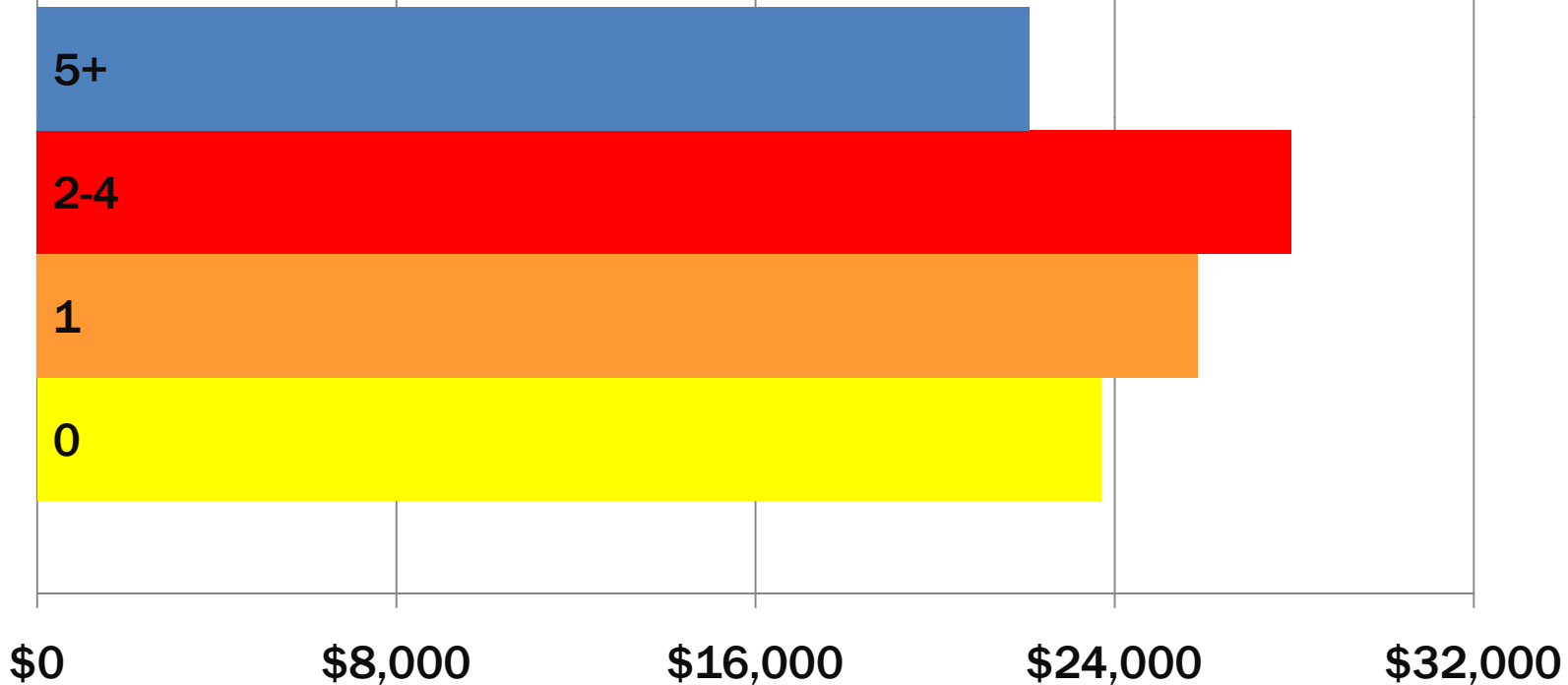


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Gaps in Adherence Have Immediate Cost Implications for Some Conditions

Subsequent Year Total Costs for Ischemic Heart Disease, RUBs 4&5, by Number of Gaps



Source: PharMetrics, a unit of IMS, Watertown, MA, 11,857 persons with IHD from a large national commercially insured population for 2005



Added New Predictive Models for Hospitalization

- Acute care hospitalization
 - excluding childbirth and injury
 - 2 prediction periods: 6 and 12 months
- Intensive care hospitalization (ICU/CCU)
- Extensive length of stay (12+ days cumulative)
- Injury-related acute care hospitalization



Multi-faceted Addition to ACG Toolkit

- Five hospital risk scores
- Two time horizons: 6 and 12 months
- Based on ACG predictive modeling framework
- Uses previous hospitalizations and HosDom
- Uses new data inputs: procedures / place of service / revenue center codes
 - Counts of previous hospitalization, emergency room, outpatient visits in patient file are optional
 - Prior cost and pharmacy inputs are optional



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Models Show Excellent Statistical Performance Profile

Category	Time Frame	Target Outcome	Top 5% Prob.Hosp. Average	Positive Predictive Value	Sensitivity	Area under ROC curve
non-injury, non-childbirth	6 months	Inpatient Hosp. 6mo.	.374	36.7%	17.6%	.728
	12 months	Inpatient Hosp.	.515	50.2%	14.7%	.721
		ICU/CCU Hosp.	.207	20.7%	17.1%	.727
		Extended Ip. Hosp.	.206	14.3%	27.0%	.786
injury		Injury Hosp.	.138	6.5%	20.5%	.756



High Pharmacy Utilization Model

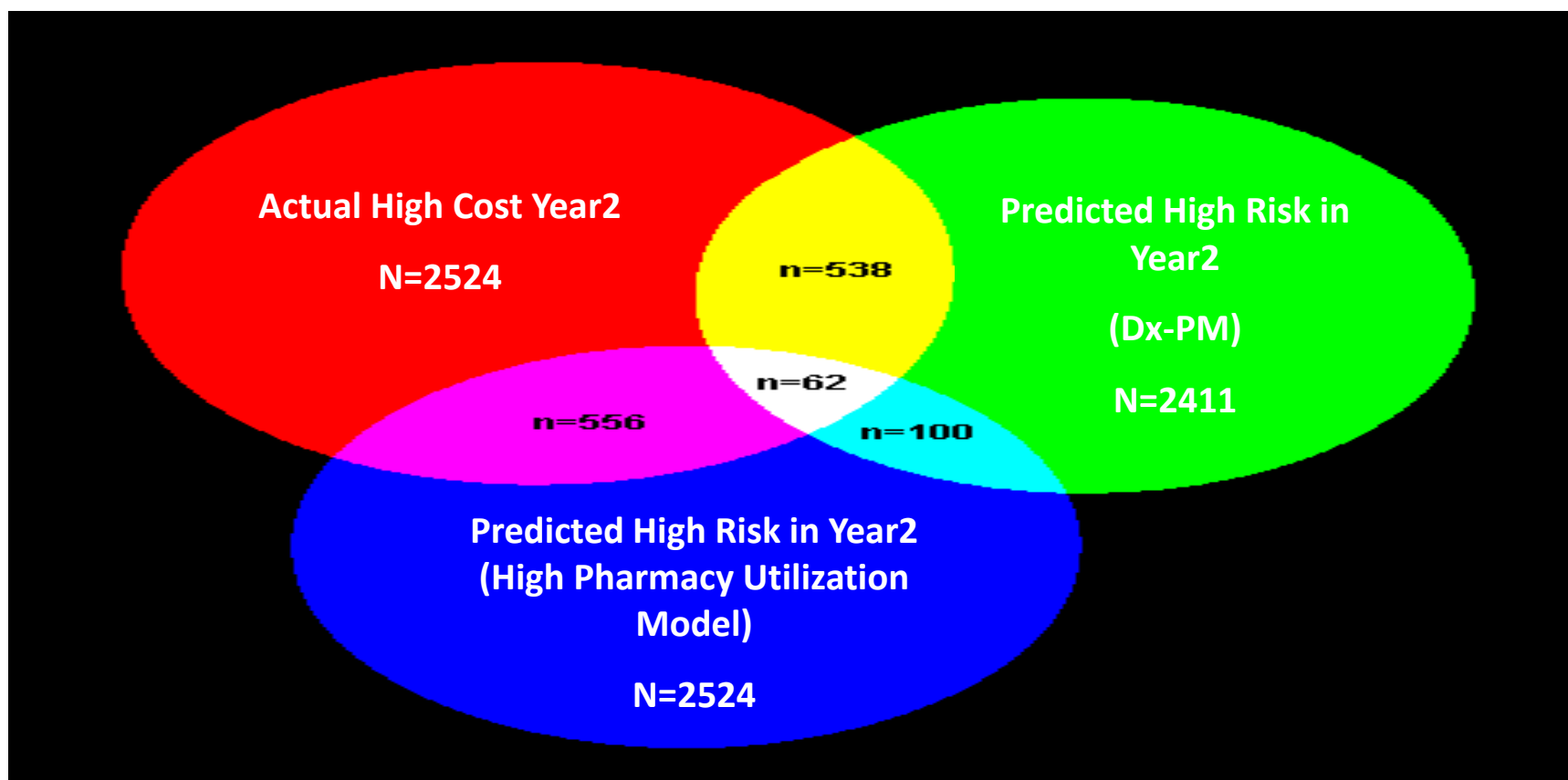
High Pharmacy Utilization Focuses on the Discontinuity Between Morbidity and Pharmacy Use and Asks: *“Can we identify (predict) individuals likely to use more drugs than anticipated based just on their morbidity profile?”*



Modeling Who Will Be Outliers

- Use Dx-PM to identify those who have unusually large pharmacy expenditures
- Use traditional ACG Predictive Modeling tools to predict these unexpected high users
 - ❖ Age/gender
 - ❖ A measure of overall morbidity
 - ❖ Individual disease markers
 - ❖ Pharmacy utilization markers
 - ❖ Prior use (when available)

Very Little Overlap In Identified Cases



Data from Aragon's Public Health Care System, 2006-2007. n=84,512



Why Does This Information Matter?

High Likelihood Suggests Potential Issues With ...

- **Inappropriate Care:** Physicians who prescribed expensive medications
- **Uncoordinated Care:** Potentially replicated prescriptions
- **Drug Abuse:** Patients shopping different providers for prescriptions
- **Data Problems:** Need to be ruled out



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Using Markers As A Basis for Intervention

ID	AGE	SEX	TOTAL COST	RX COST	ACG CODE	Pr HIGH TOTAL COST	Pr HIGH RX COST
5626AAAAAYYTHLM	96	F	\$1,811	\$338	4920	0.62	0.15
5626AAAAAYYTXVD	83	F	\$4,331	\$920	5060	0.62	0.03
5626AAAAAYYXBQL	96	F	\$3,018	\$920	5070	0.69	0.11
5626AAAAAYZAIPJ	96	F	\$4,831	\$920	5070	0.65	0.07

Condition Profile with Pharmacy Adherence

Condition	Present?	CSA	MPR	# Refill Gaps	Untreated
Congestive Heart Failure	ICD				Y
Depression	NP				
Diabetes	NP				
Glaucoma	Rx				
Human Immunodeficiency Virus	NP				
Disorders of Lipid Metabolism	TRT	0.39	0.38	1	N

	Condition	Present?	CSA	MPR	# Refill Gaps	Untreated
Chi	Ischemic Heart Disease	TRT	0.50	0.50	3	N
# U	Osteoporosis	Rx				
	Parkinson's Disease	NP				
# S	Persistent Asthma	BTH				
	Rheumatoid Arthritis	ICD				Y
No	Schizophrenia	NP				
	Seizure Disorders	Rx				
% \	COPD	NP				
	Chronic Renal Failure	ICD				
Fra	Low Back Pain	NP				

NP = Not Present, ICD = ICD Indication, Rx = Rx Indication, BTH = ICD and Rx Indication, TRT = Treated with Pharmacy

6416AAAAAAHXGCJT	76F	\$9,327	\$2,915	5060	0.62	0.64
6416AAAAAAFFURBA	62F	\$3,681	\$1,672	4100	0.62	0.27
6416AAAAAAFIJXJG	49F	\$7,819	\$1,492	4910	0.65	0.36
6416AAAAAAFIMFMZ	96F	\$5,367	\$2,790	5060	0.69	0.66



TO LEARN MORE

- **Coordination: Concurrent Session 4B: Improving Equity and Efficiency in Health Care Delivery** 9:45 AM-11:00 AM Wednesday Executive Board Room
- **Pharmacy Adherence: Concurrent Session 3A: Leveraging the Power of Pharmacy Data for Risk Prediction and Care Management Delivery** 3:00 PM-4:30 PM Salon D/E
- **Unexpected High Pharmacy: Concurrent Session 1A: Leveraging the Power of Pharmacy Data for Risk Prediction and Care Management** 3:00 PM-4:30 PM Salon D/E
- **Hospitalization Models: Concurrent Session IVA: Advanced Analytic Techniques: Making the Most of ACG Predictive Modeling** Wednesday 9:45 AM-11:00 AM Salon D/E



What to Expect in the Coming Months

- International Release That Substantially Expands Codesets That Can Be Used
- Creation of a Single Summary Score for Coordination
- Addition of the Disease-Drug Class Layer to the Adherence Module
- And Much More