

***Applying Adjusted Clinical Group (ACG)[®] Case-Mix
Adjustment to Demonstrate Efficacy
of a CHF Disease Management Program***

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Brown & Toland Physician Organization

- Independent Practice Association (IPA) formed in 1993
- 850 physicians in San Francisco area
- 120,000 HMO members (Commercial and Medicare Advantage)
- 185,000 PPO members
- 250 employees



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Congestive Heart Failure Program

- To meet the complex health care needs of members by assisting their physicians with treatment plan implementation, promoting patient education and activation and improving quality of life
 - Patient component: education, patient activation, medical management, coordination of services, screenings
 - Physician component: Support and enhance care plan, promote best practices, support physicians with high-risk patients
- Target Population
 - Any non Medicare Prime member with confirmed HF who is not on dialysis
- Dedicated Clinical Nurse Specialist
 - Face to face individualized patient evaluation and education
 - Support participant needs
 - Work closely with participant's health care team and support network



Pre/Post Methodology

- Program participants enrolled in 2008 were evaluated 1 year pre and post program enrollment
- Methodological flaw: regression to the mean



Quantifying Regression to the Mean

Fractional shift towards the mean is given by:

1 - r; where $r = (SD^2 - sd^2) / SD^2$

sd = within-subject standard deviation

SD = between-subject standard deviation

= **sd²/SD²**

Outcome	Magnitude of Regression to the Mean
ED Visits	0.456
Acute Admits	0.501
30-Day Readmits	0.284
ALOS	0.367

The larger this value the larger the shift towards the mean



Convenience Cohort Methodology

- Population identified using 2008 CHF disease registry
 - *Claims, Rx experience*
- Assumption: program participants and non-participants are similar except for program enrollment status
- Methodological flaw: selection bias



Convenience Cohort Population Characteristics

Risk Factor	Participants (N=102)	Non-Participants (N=1,047)	p-value
Age (mean)	76.2	72.6	0.02
Sex (%F)	44.5	46.1	0.76
# Chronic Conditions (% 5+)	87.3	77.5	0.04
Frailty (% w/ marker)	77.5	81.6	0.31
# Cardiologist Visits (% 2+)	67.6	53.9	0.05
Atrial Fibrillation (%)	40.2	34.4	0.24
Ischemic Heart Disease (%)	66.7	53.3	0.01
Hypertension (%)	90.2	93.2	0.26
Hyperlipidemia (%)	77.5	68.6	0.05
COPD (%)	19.6	18.3	0.75
Diabetes (%)	40.2	39.1	0.82
Depression (%)	28.4	21.3	0.05
β-blocker (%)	36.3	40.7	0.39
ACE/ARB (%)	65.7	70.2	0.51
Diuretic (%)	75.5	64.9	0.03

If selection bias were not a factor there would be fewer significant differences between the two groups



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ACG® Case-Mix Adjusted Comparison Group Methodology

- Controls matched to cases enrolled in the program in 2008 2 to 1 based on:
 - ACG®, Sex, Age (within 5 years)
- Reduces selection bias and regression to the mean is no longer an issue
- Utilization outcomes evaluated
 - Emergency Department Visits
 - Acute Admissions
 - Average Length of Stay (ALOS)
 - 30 Day Readmissions



ACG® Case-Mix Adjusted Population Characteristics

Risk Factor	Participants (N=102)	Non-Participants (N=204)	p-value
Age (mean)	76.2	74.3	0.34
Sex (%F)	44.5	44.5	0.93
# Chronic Conditions (% 5+)	87.3	83.2	0.15
Frailty (% w/ marker)	77.5	79.0	0.56
# Cardiologist Visits (% 2+)	67.6	65.5	0.37
Atrial Fibrillation (%)	40.2	40.9	0.24
Ischemic Heart Disease (%)	66.7	65.9	0.78
Hypertension (%)	90.2	91.8	0.32
Hyperlipidemia (%)	77.5	74.1	0.48
COPD (%)	19.6	22.4	0.20
Diabetes (%)	40.2	37.1	0.23
Depression (%)	28.4	30.0	0.45
β-blocker (%)	36.3	33.9	0.21
ACE/ARB (%)	65.7	69.8	0.17
Diuretic (%)	75.5	78.1	0.34

Selection bias is not present as evidenced by no significant differences between the two groups



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ACG® Case-Mix Adjusted Utilization Outcomes

Outcome	Odds Ratio*	p-value
ED Visits	0.72	<.0001
Acute Admits	0.84	0.02
30-Day Readmits	1.03	0.57
	Mean Difference*	p-value
ALOS	4.5 Days	0.03

*Participants compared to control group



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Summary

- In an IPA setting, ACG® case-mix adjustment offers more robust program evaluation compared to pre/post and convenience cohort methodologies
 - Minimizes biases typically found in other observational study methodologies
- Results of utilization outcomes measurement are more valid



Future Directions

- Apply methodology using ACG® risk adjusted comparison groups to evaluate all care management programs
- Use predictive modeling capability to proactively identify members for enrollment in care management programs



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Questions?



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Treating people, not just patients.

SM

