



# ***Examining ACG health measures as outcomes in longitudinal research within a public health system***

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# Overall Texas DMIE Study Design



- ▶ Does a coordinated set of health and employment supports help adult workers with significant health issues remain working and independent?
- ▶ Harris County Hospital District in Houston, TX
- ▶ 1,616 participants: 904 intervention and 712 control
- ▶ Working adults 21-60 yrs. enrolled in Harris County indigent healthcare program
- ▶ Interventions
  - ▶ Free health and behavioral healthcare, prescriptions, dental care
  - ▶ Empowerment-oriented case management by vocational counselors, social workers and nurses
    - ▶ Planning, advocacy and coordination
    - ▶ Navigation of health system
    - ▶ Connection to community resources
    - ▶ Employment/vocational supports

# Who Is Working Well?



- ▶ Female (76%),
- ▶ Minority (72%)
- ▶ Middle-aged (70% > 45 yrs)
- ▶ Divorced / separated (42%)
- ▶ High school diploma (33%) or less (30%)
- ▶ Low income (48% < 100% of poverty)
- ▶ Work on average 33 hours per week
- ▶ About 10% have a serious mental illness
- ▶ 41% report at least one functional limitation (ADLs and/or IADLs)
- ▶ Frequent self-reported health conditions include depression (51%) and anxiety (32%)

# Participant Data



- ▶ 1471 participants completed a 12 month survey (response rate = 91%) and were used in these analyses (Intervention=835 Control=636)
- ▶ Data sources:
  - ▶ Survey data from baseline survey at enrollment
    - ▶ Mental and Physical Health status (SF12v2)
    - ▶ Demographics (e.g., age, sex, race/ethnicity)
    - ▶ Functional status (ADLs, IADLs)
  - ▶ Medical encounter and pharmacy prescriptions filled data from HCHD administrative systems:
    - ▶ 12 months prior to study enrollment
    - ▶ 12 months post study enrollment

# Analysis



- ▶ Group comparisons on ACG outcomes over the first 12-month period of our study
- ▶ Group differences were adjusted for:
  - ▶ Age,
  - ▶ Gender,
  - ▶ Race/Ethnicity,
  - ▶ Recruitment Cohort (Mail/Phone versus Clinic In-person)
- ▶ Baseline value was included to adjust for initial score
- ▶ Ancova models were used to provide strongest test of group difference at 12 months post-test

# ACG Outcome Definitions



- ▶ Major Adjusted Diagnostic Groups (ADGs): A "major ADG" is an ADG found to have a significant impact on concurrent or future resource consumption. Count of major ADGs assigned to this patient.
- ▶ Chronic condition count: A count of expanded diagnostic clusters (EDCs) containing trigger diagnoses indicating a chronic condition with significant expected duration and resource requirements.
- ▶ Current health index: A concurrent weight assigned to this patient based upon their ACG group using local cost data.
- ▶ Future health index: ACG Predictive Model (ACG-PM) Predicted Resource Index (PRI) for Total Cost -- the estimated total costs (including pharmacy costs) for this patient for the year following the observation period. Based upon a reference database (with a mean of 1.0).

# Key Study Questions



- ▶ Do the intervention and control groups show differ at 12 months post enrollment on:
  - ▶ Current Health Index
  - ▶ Future Health index,
  - ▶ Major ADG count,
  - ▶ Chronic condition count?
- ▶ Did participants' initial status and change from baseline to 12 months on both self-reported SF12 scores (physical and mental) and functional status (activities of daily living) predict adjusted ACG post-enrollment scores controlling for participant characteristics?
- ▶ Did intervetion and control group differences on post-enrollment ACG scores depend on ACG scores measured 12 months prior to enrollment controlling for participant characteristics, SF12 scores and functional status?

# ACG Outcome Descriptives

## *n*=1471



ACG Outcome	Pre-Enrollment		Post-Enrollment	
	Mean	Std Dev	Mean	Std Dev
Future Health Index	2.63	1.93	2.68	2.47
Current Health Index*	2.86	3.15	2.05	2.87
Number of Chronic Conditions*	2.48	1.75	1.90	1.73
Number of Major ADGs*	.81	.92	.64	.89

**\*Pre-post mean difference statistically different at  $p < .05$**

# *Do the intervention and control groups differ at 12 months post enrollment?*



ACG Outcome	Intervention Adjusted Post-test Mean	Control Adjusted Post-test Mean	P-value	Model R-Square
Future Health Index	2.81	2.53	.010	39%
Current Health Index*	2.09	1.74	.050	13%
Number of Chronic Conditions*	1.96	1.66	.001	38%
Number of Major ADGs*	.71	.55	.001	19%

# *Other significant covariates*



- ▶ Age at enrollment: Higher age at enrollment was related to higher scores for all four ACG outcomes
- ▶ Hispanics had lower scores for Major ADGs, Current Health Index, and Future Health Index
- ▶ Participants recruited by mail/telephone had more chronic conditions and higher Future Health Index scores

# *Group comparison summary*



- ▶ Simple group comparisons of ACG outcomes suggest that intervention group participants became less healthy during the intervention.
- ▶ Given that that participants were in a large public healthcare system with limited health access, higher ACG scores for the intervention group may reflect increased access to healthcare which would result in more potential ICD diagnoses and prescriptions.

# *Did participants' initial status and change from baseline to 12 months on physical, mental and functional status predict adjusted ACG post-enrollment scores?*



<b>Dependent</b>	<b>Parameter</b>	<b>Estimate</b>	<b>Pr &gt;  t </b>
# of Major ADGs	Physical Health-Baseline	-0.01	.003
	Physical Health-Positive Change	-0.01	.009
	Mental Health-Positive Change	-0.01	.019
# of Chronic Conditions	Physical Health-Baseline	-0.02	.000
	Physical Health-Positive Change	-0.01	.016
Current Health Index	Physical Health-Baseline	-0.03	.003
	Physical Health-Positive Change	-0.04	.001
Future Health Index	Physical Health-Baseline	-0.03	.003
	Physical Health-Positive Change	-0.03	.002
	Mental Health-Positive Change	-0.01	.035

# *Physical, mental and functional health status summary*



- ▶ Better initial physical health was related to lower scores on all four ACG outcomes
- ▶ Higher positive physical health change was related to lower scores on all four ACG outcomes
- ▶ Higher positive mental health change was related to lower scores on number of major ADGs and total concurrent weight



## ***Additional exploratory questions:***

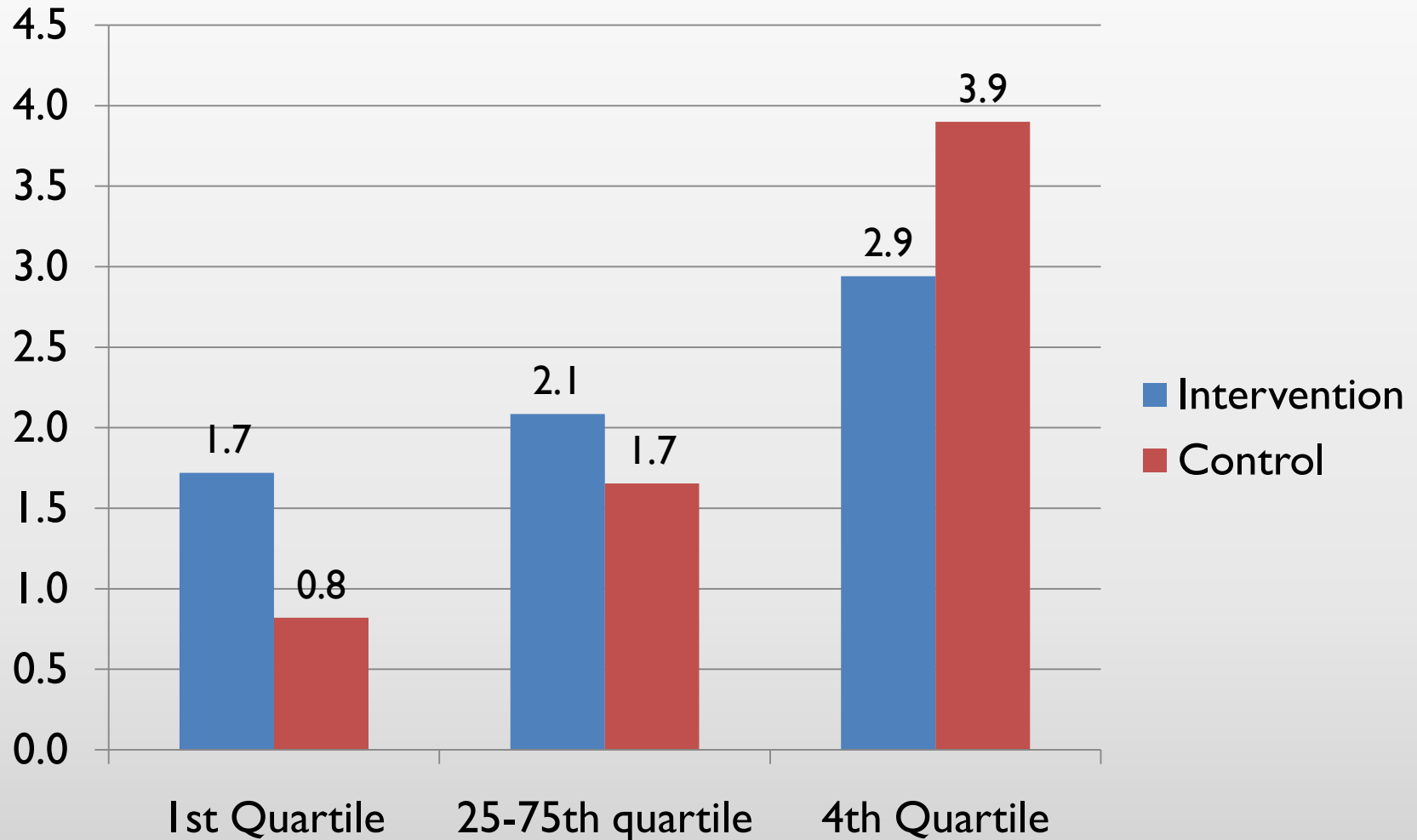
- ▶ Did intervention and control group differences depend on initial physical and mental health status and functional status?
  - ▶ Intervention group showed lower chronic conditions compared to control when they reported better physical health
  - ▶ Intervention group showed lower Future Health Index compared to control when they had higher initial functional limitations
- ▶ Did intervention and control group differences depend on change in physical and mental health status and functional status?
  - ▶ No interactions were significant

# *Did group differences depend on initial ACG outcome score?*



- ▶ Group differences were tested by interactions between baseline ACG outcome score and study group
- ▶ Only one interaction was significant: study group by Unscaled concurrent weight
- ▶ Interaction interpreted by examining group differences for three groups:
  - ▶ Group 1: Baseline scores below 25<sup>th</sup> percentile
  - ▶ Group 2: Baseline scores between 25<sup>th</sup> and 75<sup>th</sup> percentiles
  - ▶ Group 3: Baseline scores above 75<sup>th</sup> percentile

# Study group by Baseline Unscaled Concurrent Weight



# Implications



- ▶ ACG outcomes may be one way to assess the impact of increased access to health care in underserved populations given they can show increase access.
- ▶ Associations with self-reported SF12 scores and functional status help validate ACG scores ability to measure distinct changes participants could themselves perceive.
- ▶ The finding that group differences on Current Health Index depend on pre-enrollment scores suggests this ACG outcome may be more sensitive to differential change than other outcomes.
- ▶ Use ACG outcomes carefully and understand that higher scores may reflect greater access to healthcare.



# *Questions?*

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