An Approach to Data Management and Evaluation for Evidence-Based Practice Projects

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Objectives

Within the context of the Doctorate of Nursing Practice:

- To describe effective approaches for managing and analyzing data for evidence-based projects
- To improve the quality of clinical data management for evidence-based projects.

"The focus for (DNP) faculty and students should be on the translation of evidence to improve the quality of care and patient outcomes"
(AACN, 2006)

Demonstrating "improvement" implies an understanding of:

- How to **define** improvement
- How to **measure** improvement
- How to **analyze** data for improvement
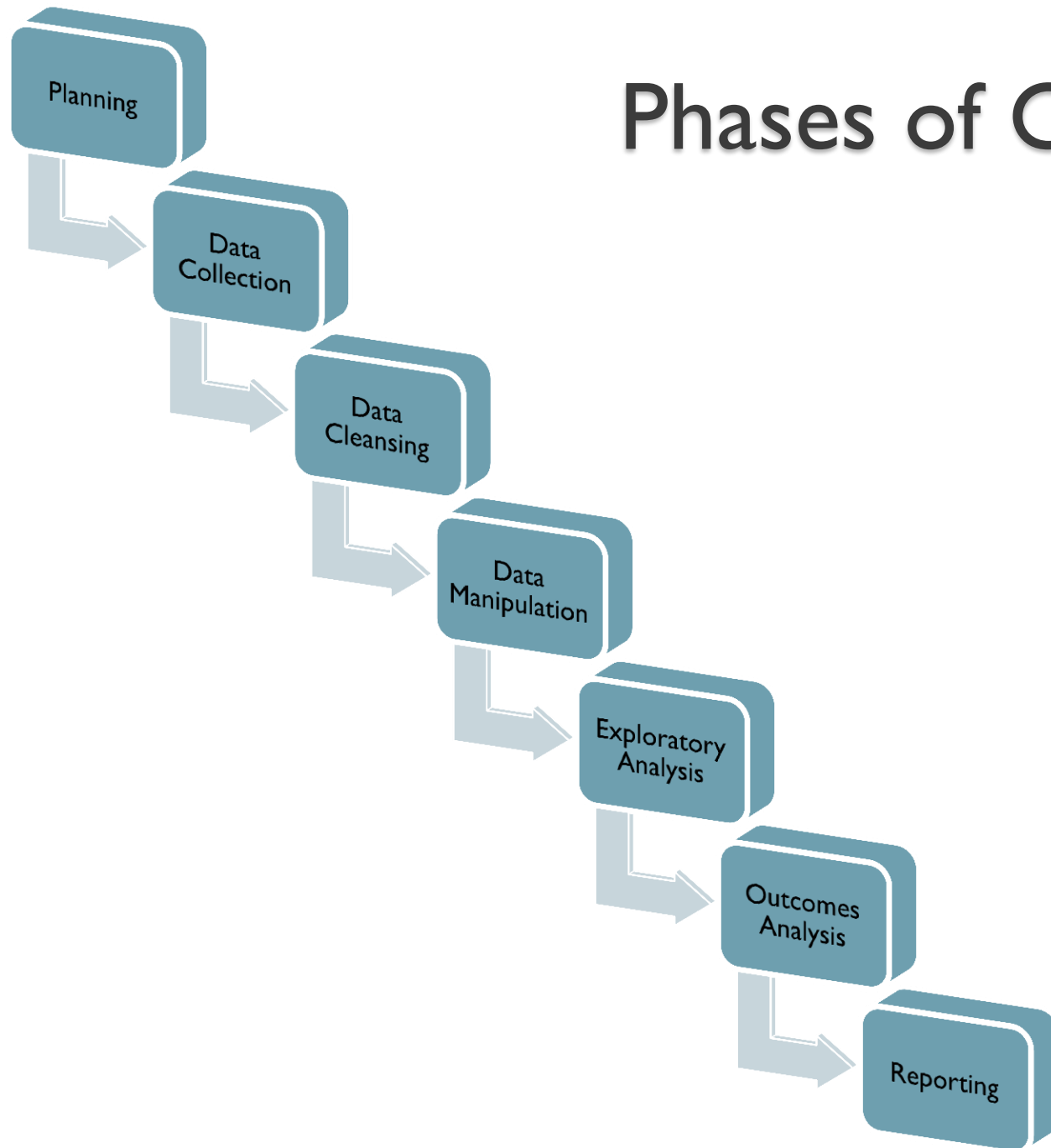- How to **demonstrate** improvement

Clinical Data Management (CDM)

Our Definition:

" The process of planning, designing, collecting, cleansing, manipulating, analyzing, and reporting data generated in the assessment, development, delivery, and evaluation of health-related interventions, products, and services."

Phases of CDM

Planning

Data Collection

Data Cleansing

Data Manipulation

Exploratory Analysis

Outcomes Analysis

Reporting

Practice Example of Process: Guided Care Pilot (GCP)

- Nurse-led, patient centered, comprehensive evidence-based project incorporating 7 successful innovations in chronic care:
  - Disease management
  - Case management
  - Self management
  - Geriatric evaluation and management
  - Transitional care
  - Lifestyle modification
  - Caregiver education and support

Sylvia ML, Griswold M, Dunbar L, Boyd C, Park M, Boult C. 2008. Guided Care: Cost and Utilization Outcomes in a Pilot Study. Disease Management 11(1). 29-36.

Planning

- What is your evidence-based project question?
- What is the design of your analysis?
  - Unit of analysis:
    - Groups/events
  - Eligibility criteria
  - Description of "intervention" and assignment of intervention group
  - Aims/outcomes/measures
  - Descriptive variables
  - Independent (IV) and dependent variables (DV)
  - Statistical tests/models
  - Power

GCP: Planning

Capstone Project Purpose
To Determine if there is a difference in the trend of costs between guided care and usual care enrollees

Define and Describe Population
2 groups of patients >=65, highly morbid, community dwelling, of 4 primary care providers (randomized) in same office

Aim: The GC group will have less costs than the comparison group

⤷ Outcomes: All costs of health care services

⤷ Measures: Mean costs over 6 months by group

⤷ Calculation: Sum of costs by group/total number of patients by group

Variable	Description	Data Source	Possible Range of Values	Level of Measurement	Statistical Test

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Data Collection

- New data sources, some considerations:
  - Procedures for survey administration or other newly created data fields
  - Validation of conditions under which data was collected
  - Quality checks during collection
- Existing data sources, some considerations:
  - Conditions under which the data was collected
  - Definitions of fields
  - Request for data from other sources: details, details…
  - Information that can be calculated/derived from existing data
- Planning for final data structure:
  - Systems for data entry/import
  - Unique identifiers for unit of measurement
  - Rows and columns
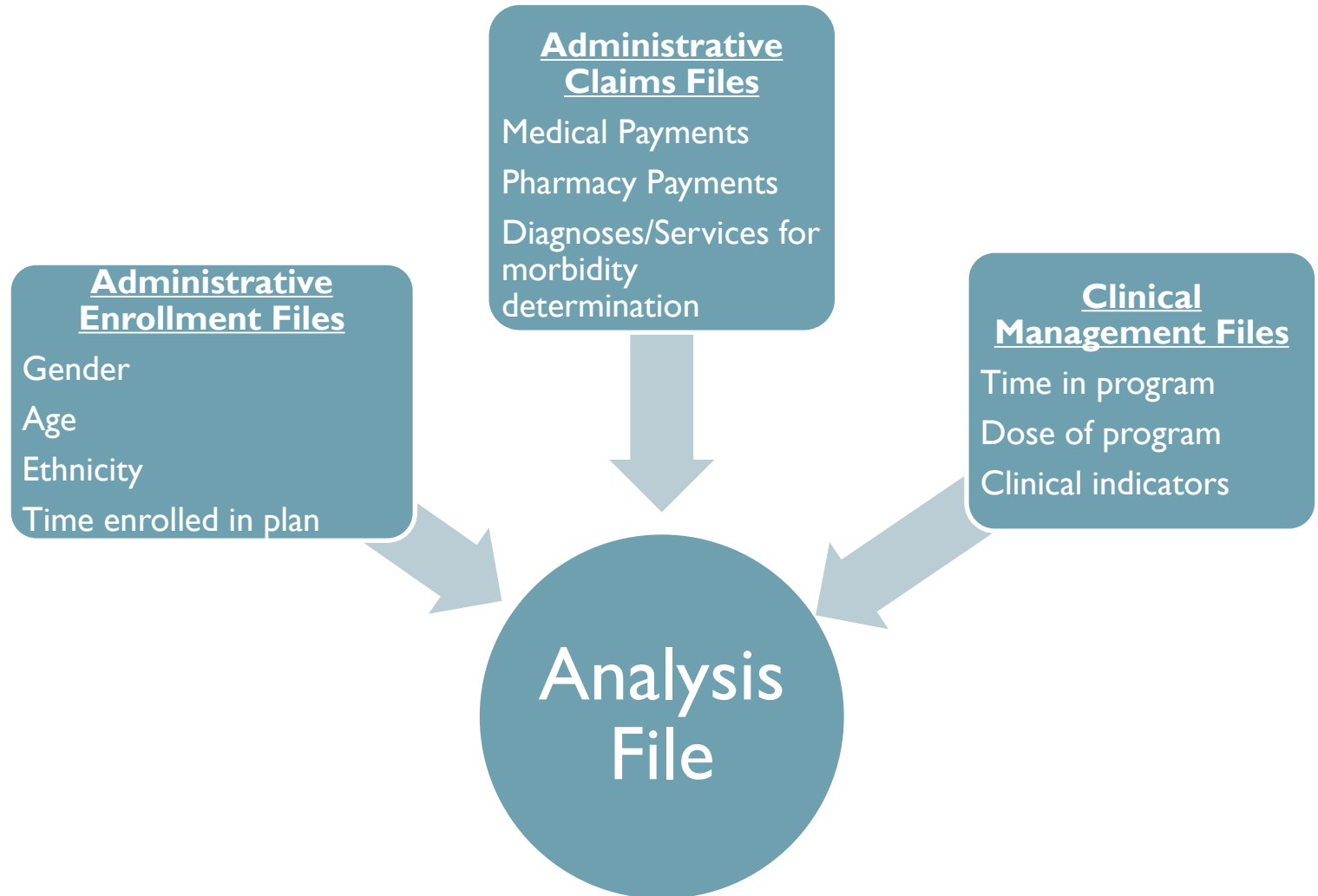 - Longitudinal vs. cross sectional

Data Cleansing

○ Importing data into SPSS or other similar software:

- Variable and value definitions, labels, etc.

○ Running descriptive statistics on each variable looking for:

- Missing values: setting rules
- Text in number fields and vice versa
- Erroneous values
- Values outside of set range of expected
- Looking for duplicate cases
- Combinations of values that should not occur

Data Manipulation

- ○ Creating final analysis data set
  - Merging/aggregating files
  - File restructuring
    - Transposing, cases to variables and vice versa
  - Transforming values
    - Calculating new values using functions
    - Recoding values
    - Banding values
    - Manipulating character values
    - Date and time values
  - Creating a data dictionary

GCP: Data Collection/Cleansing/Manipulation

Administrative Claims Files

Medical Payments

Pharmacy Payments

Diagnoses/Services for morbidity determination

Administrative Enrollment Files

Gender

Age

Ethnicity

Time enrolled in plan

Clinical Management Files

Time in program

Dose of program

Clinical indicators

Analysis File

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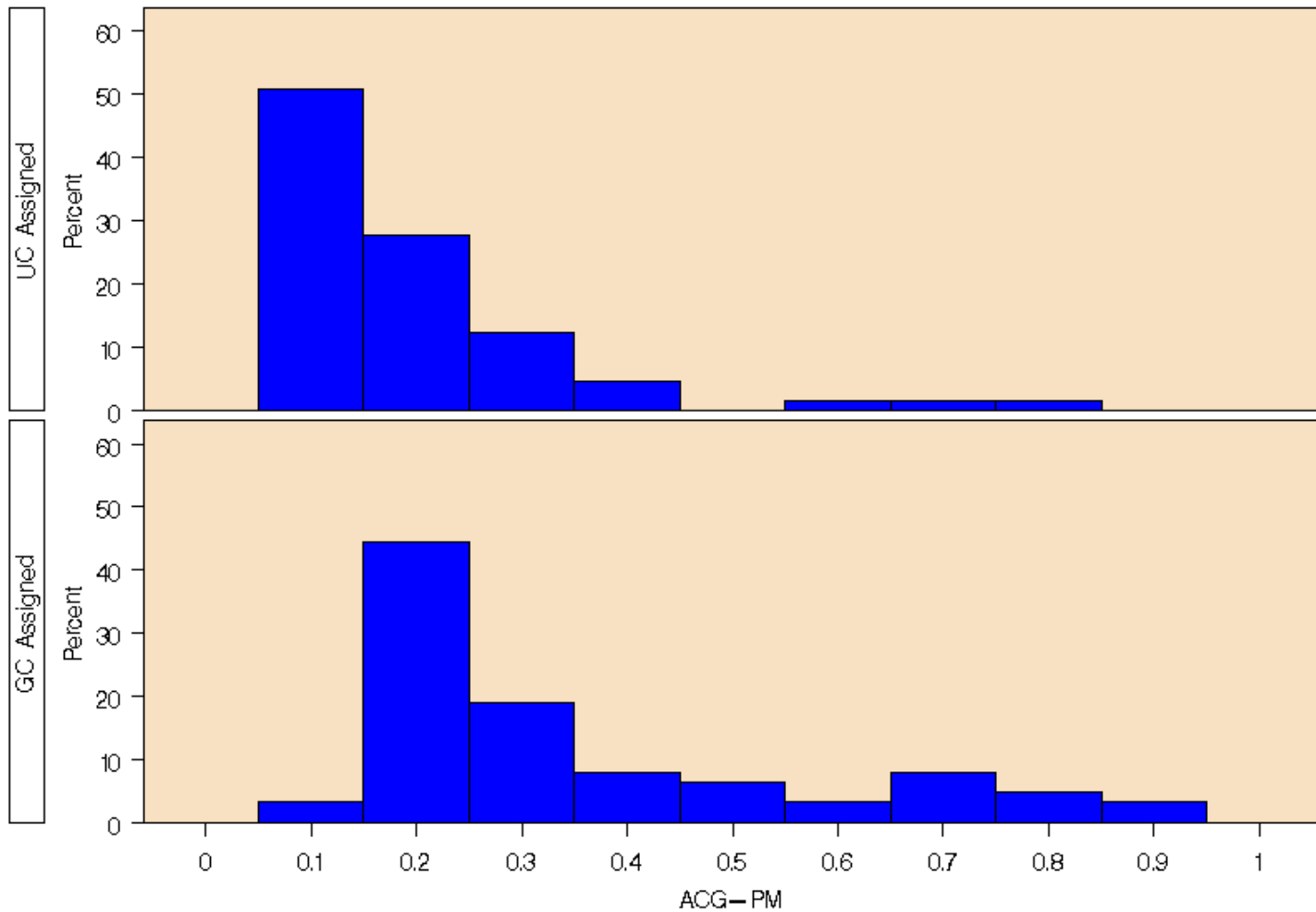
Exploratory Data Analysis

- Explore and describe distribution of independent and dependent variables

- Describe groups/events

- Explore differences in "other factors" between groups/events

- Determine confounding of relationship between independent and dependent variables

GCP: Exploratory Data Analysis

	GC (n=63)	UC (n=65)
Demographics		
Age	**76.1 (6.15)**	**75.8 (6.53)**
% Female	**60.3%**	**47.7%**
ACG-PM*	**0.34 (0.22)**	**0.20 (0.14)**
Health Status**		
# Chronic Conditions (max = 9)	**2.95 (1.54)**	**2.85 (1.31)**
Ischemic Heart Disease	**52.2%**	**49.2%**
Congestive Heart Failure	**31.7%**	**21.5%**
Hypertension	**88.9%**	**86.1%**
Diabetes	**30.2%**	**20.0%**
Osteoarthritis	**49.2%**	**46.1%**
Parkinson's Disease	**1.6%**	**7.7%**
Dementia	**7.9%**	**13.8%**
Depression	**12.7%**	**18.5%**
COPD	**20.6%**	**21.5%**

Statistically Significant p<0.05
Expanded Diagnostic Categories (EDCs) from ACG methodology used to define disease categories

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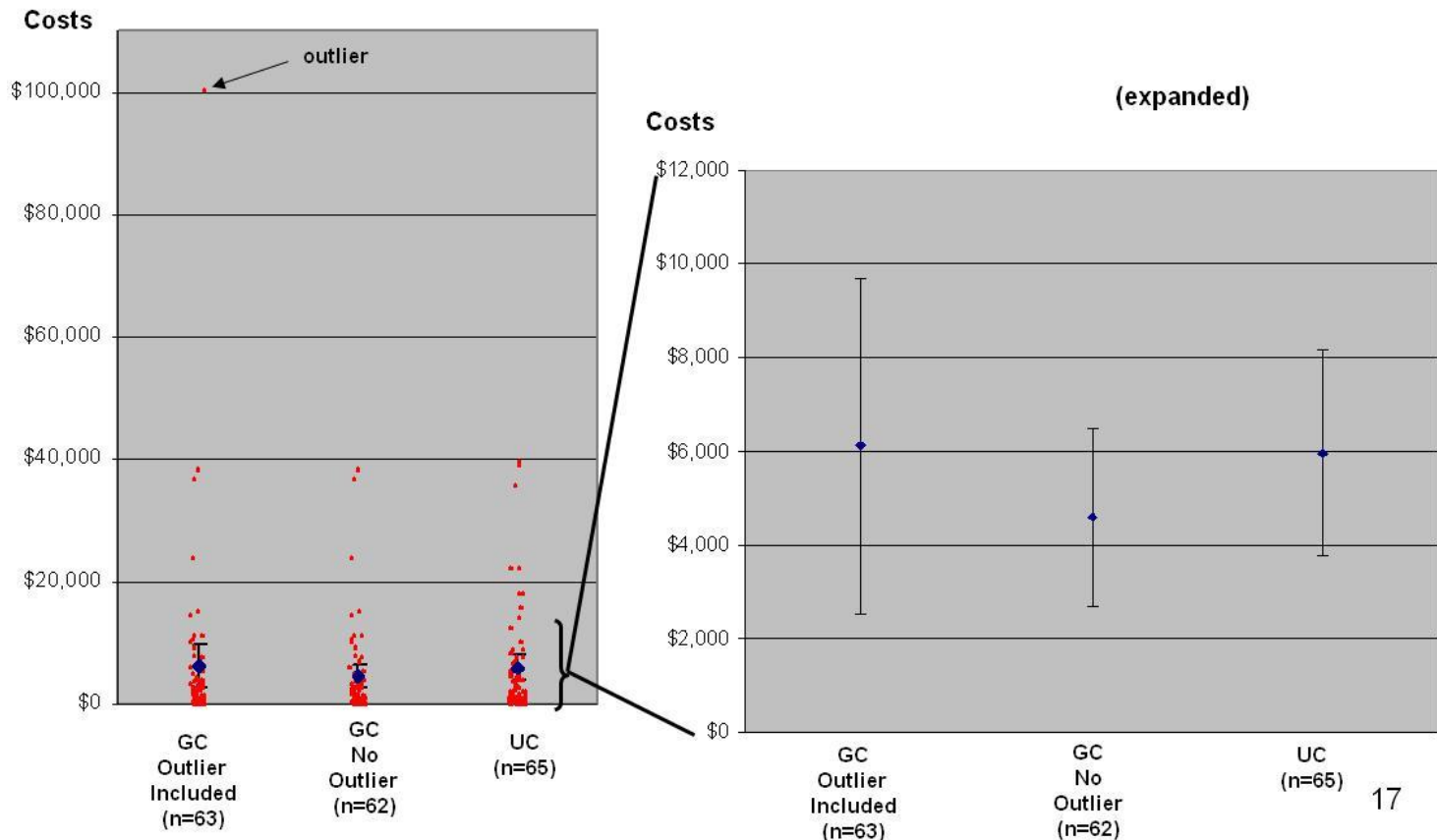
GCP: Exploratory Data Analysis

ACG—PM Distribution by GC Assigned and UC Assigned Groups

GCP: Exploratory Data Analysis

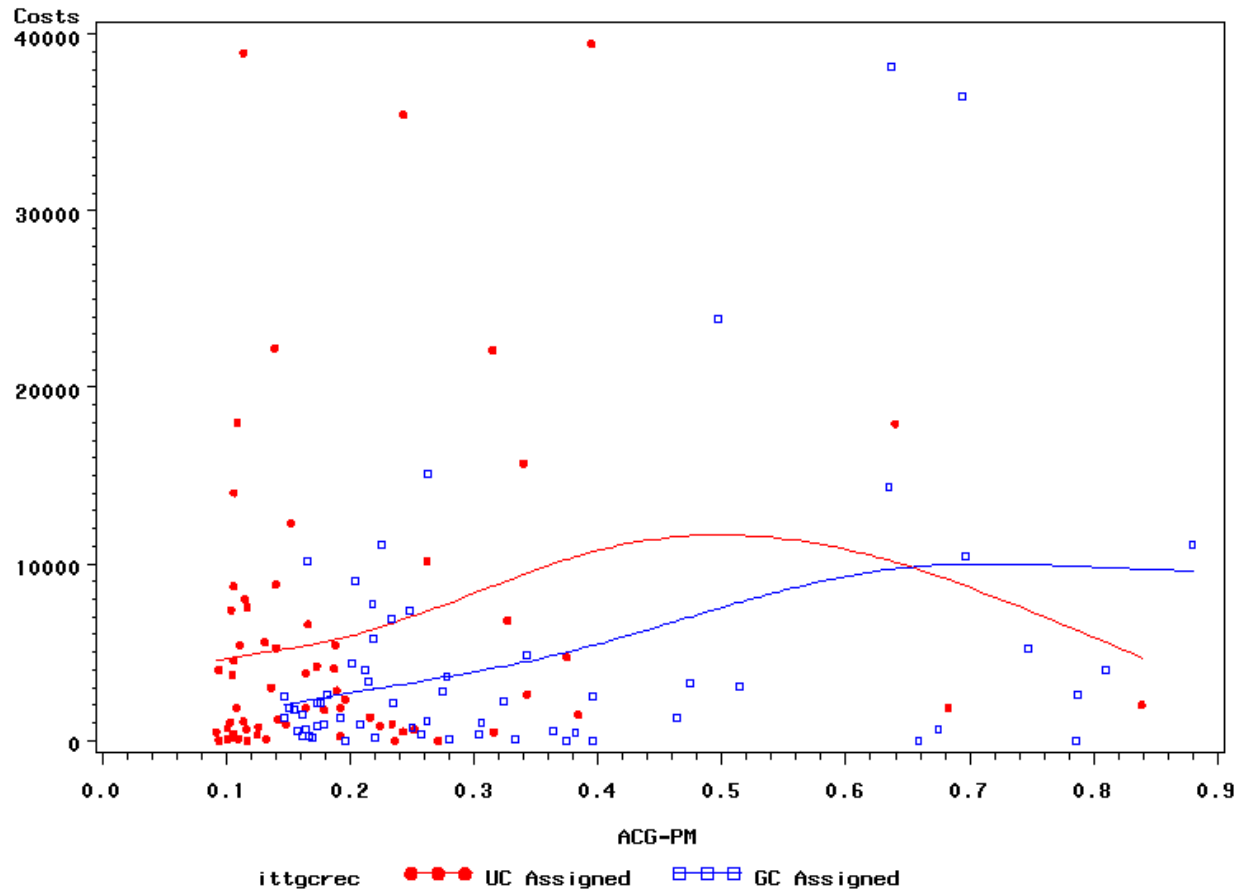## Costs per Member for 6-month Period Unadjusted

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GCP: Exploratory Data Analysis

Costs by ACG—PM Cutoff GC Assigned and UC Assigned
Smooth regressions with outlier removed

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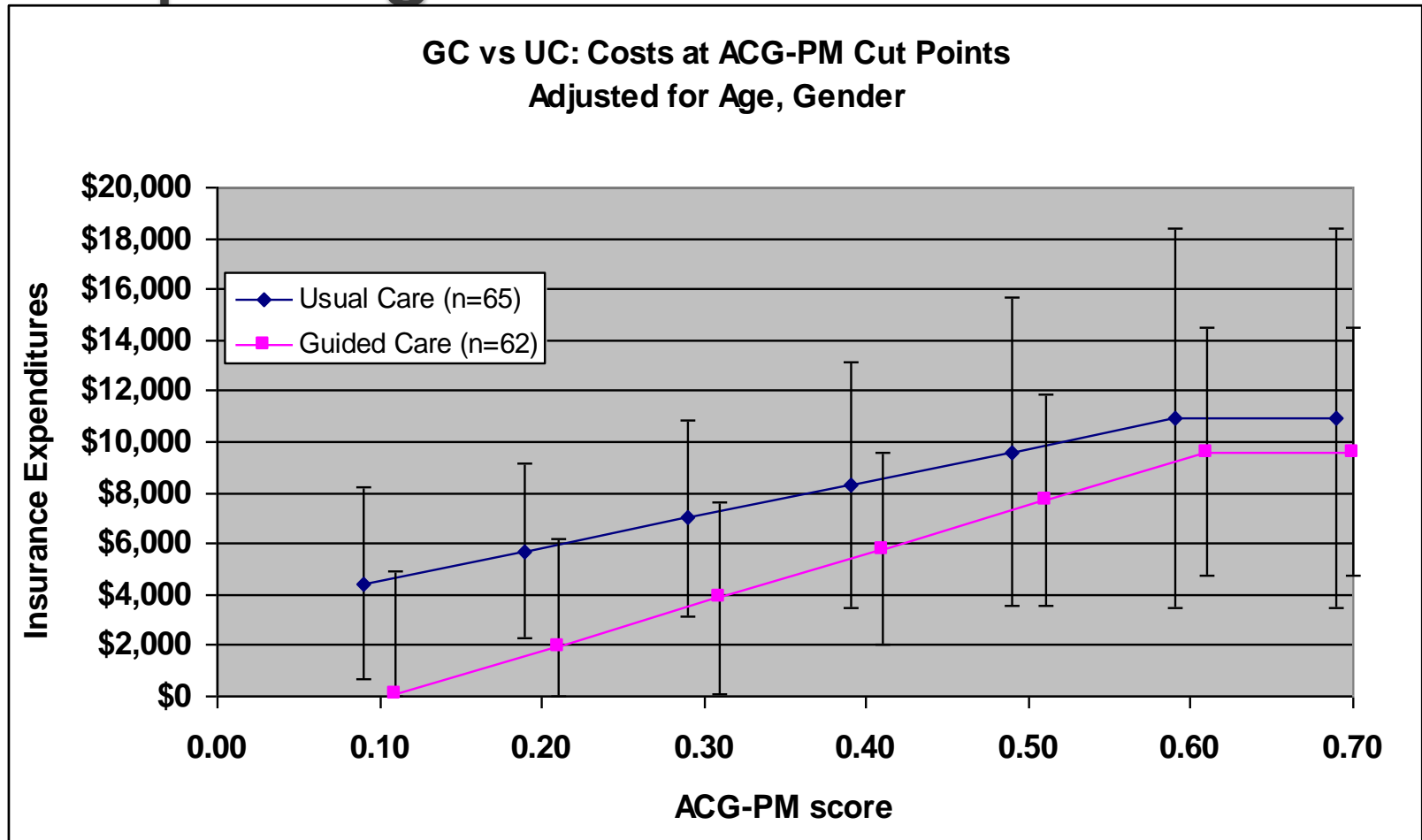
Outcomes Data Analysis

- Final determination of statistical tests/models
- Statistical testing of outcomes measures
- Statistical testing of outcomes measures adjusting for confounding

Reporting and Presentation

- Relevance and importance to stakeholders
  - Common methods used to display certain representations of data
    - Tables, graph types, flow charts, etc.
  - Summarizing:
    - Tables, graphs, diagrams
    - Written and oral presentation of findings

GCP Outcomes Data Analysis and Reporting

GC vs UC: Costs at ACG-PM Cut Points
Adjusted for Age, Gender

Legend:
- Usual Care (n=65)
- Guided Care (n=62)

Y-axis: Insurance Expenditures ($0 to $20,000)
X-axis: ACG-PM score (0.00 to 0.70)

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Summary

- Scholarly DNP projects using evidence-based practice frameworks require strong data management skills for management and evaluation
- This clinical data management process provides a methodical and rigorous approach to meet this challenge

Questions?

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