



The Johns Hopkins ACG[®] System

OVERVIEW

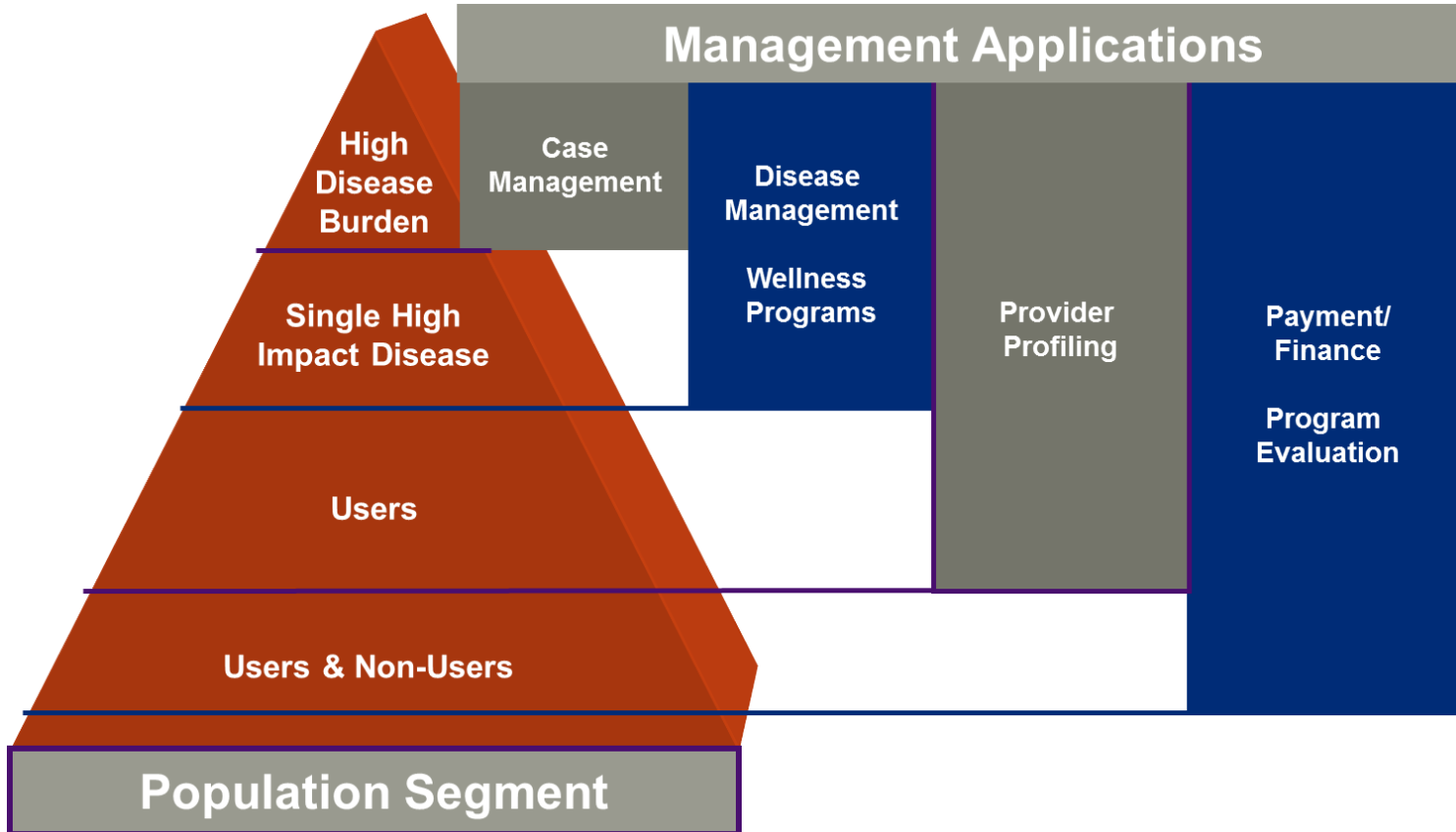
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ACG[®] BACKGROUND

- ▶ Developed and owned by Johns Hopkins University and the Bloomberg School of Public Health
- ▶ Based on clinical observations and research performed in the early 1980s when a pediatrician, Dr. Barbara Starfield, examined the relationship between morbidity or "illness burden" and health care services utilization among children in managed care settings
- ▶ ACGs were designed as a way to measure the "medical need" of populations – recognizing that patients usually present with "morbidity profiles", not a single specific disease
- ▶ The Johns Hopkins ACG Case-Mix and Predictive Modeling System has been made commercially available since 1992; DST Health Solutions has exclusive commercial distribution rights to market and license ACGs

ACG[®] APPLICATIONS IN HEALTH CARE



AGGREGATED DIAGNOSIS GROUPS (ADGs)

- ▼ **ADGs** classify diagnoses into a limited number of clinically meaningful, but not disease-specific, morbidity groups (for example “chronic unstable”). Each ADG is homogenous with respect to specific clinical criteria and their demand on healthcare services.
- ▼ **Criteria used to assign a Diagnosis into an ADG:**
 - **Duration**
 - Persistence/recurrence over time
 - Likelihood of return visit
 - **Severity**
 - Likelihood of disability or decreased life-expectancy
 - Likelihood of hospitalization
 - **Diagnostic Certainty**
 - **Etiology**
 - **Expected need for Specialty Care**

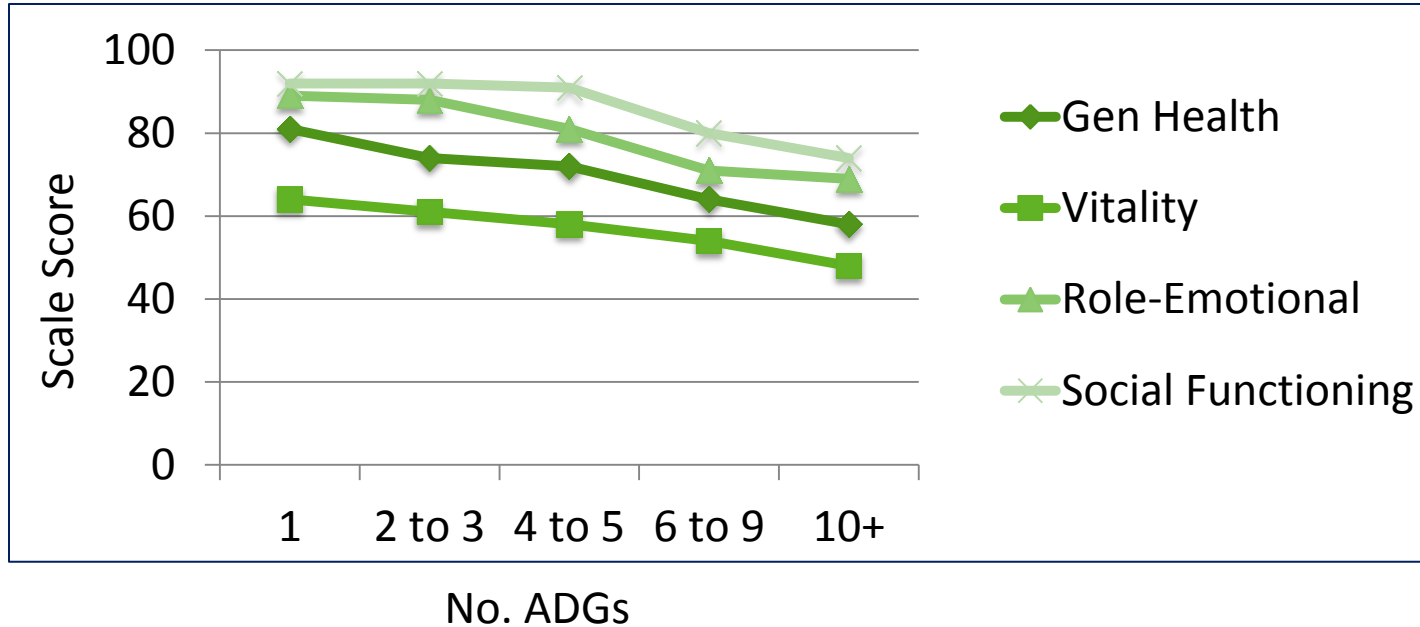
Examples of Decision Criteria for ADGs

ADG	Duration	Severity	Etiology	Diagnostic Certainty	Expected Need for Specialty Care
1. Time Limited: Minor	Acute	Low	Medical, non-infectious	High	Unlikely
2. Time Limited: Minor-Primary Infections	Acute	Low	Medical, infectious	High	Unlikely
3. Time Limited: Major	Acute	High	Medical, non-infectious	High	Likely
4. Time Limited: Major-Primary Infections	Acute	High	Medical, infectious	High	Likely
5. Allergies	Recurrent	Low	Allergy	High	Possibly

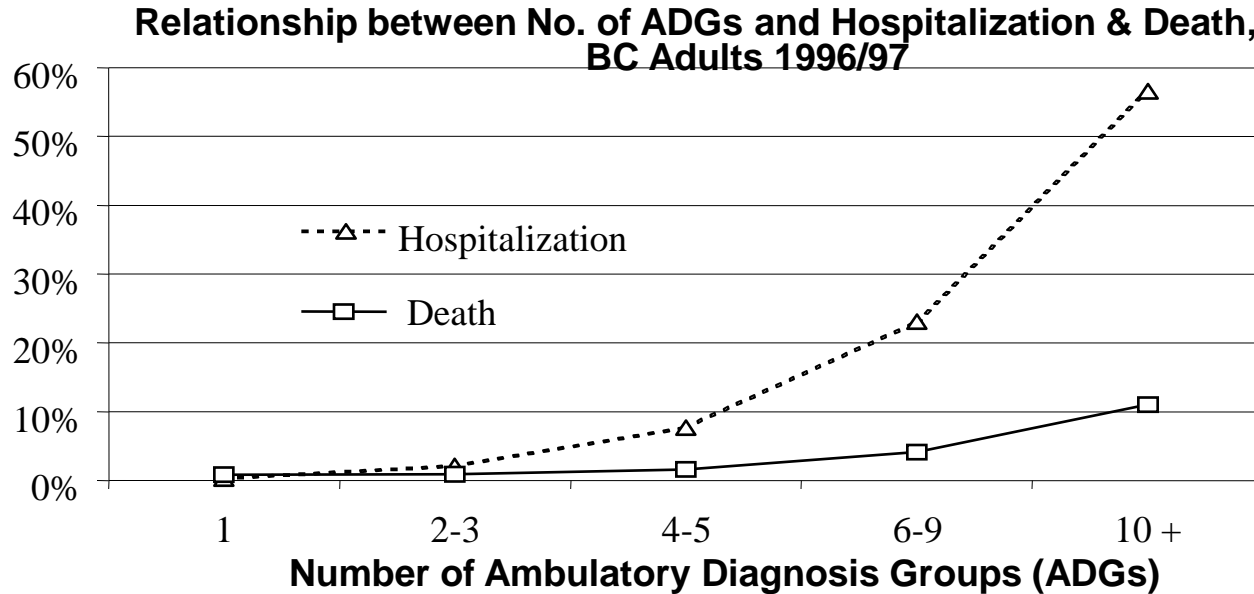
EXAMPLES OF THE 32 ADGs

ADGs	Example Diagnosis
1: Time Limited Minor	Dermatitis
3: Time Limited Major	Acute Cholecystitis
9: Likely to Recur Progressive	Diabetic Ketoacidosis
10: Chronic Medical: Stable	Essential Hypertension
11: Chronic Medical: Unstable	Sickle-Cell Anemia
25: Psychosocial: Recurrent or Persistent Unstable	Schizophrenia
26: Signs/Symptoms: Minor	Headache
32: Malignancy	Hodgkin's Disease

No. ADGs by SF-36 Scores



ADGs and Health Care Needs Evidence from BC



MAJOR ADGs

Pediatric Major ADGs (ages 0-17)	Adult Major ADGs (ages 18 and up)
3. Time Limited: Major	3. Time Limited: Major
9. Likely to Recur: Progressive	4. Time Limited: Major-Primary Infections
11. Chronic Medical: Unstable	9. Likely to Recur: Progressive
12. Chronic Specialty: Stable-Orthopedic	11. Chronic Medical: Unstable
13. Chronic Specialty: Stable-Ear, Nose, Throat	16. Chronic Specialty: Unstable-Orthopedics
18. Chronic Specialty: Unstable-Ophthalmology	22. Injuries/Adverse Effects: Major
25. Psychosocial: Recurrent or Persistent: Unstable	25. Psychosocial: Recurrent or Persistent: Unstable
32. Malignancy	32. Malignancy

RELATIONSHIP BETWEEN NUMBER OF MAJOR MORBIDITIES IN YEAR 1 AND LIKELIHOOD OF SUBSEQUENT HIGH COST

Number of Year 1 Major Morbidities	Percent of Members	Positive Predictive Value	
		Percent High Cost in Year 2	Percent High Cost in Year 3
0 Major ADGs	77.1%	9.6%	11.0%
1 Major ADG	17.3%	20.9%	21.5%
2 Major ADGs	4.2%	34.7%	34.1%
3 Major ADGs	1.1%	43.6%	45.6%
4+ Major ADGs	0.4%	72.4%	70.1%

ADJUSTED CLINICAL GROUPS (ACGs)

- ▶ Patient-centric measure of health status
- ▶ Based on:
 - Commonly occurring combinations of ADGs
 - Age
 - Gender
- ▶ One ACG per person per time period
- ▶ 106 ACGs (only 92 active at a given time)

THE UNIQUE CONCEPTUAL STRENGTHS OF THE ACG SYSTEM

- ▼ ACGs avoid basing “patient complexity” on specific procedures or hospitalizations and thus patterns of practice.
- ▼ Unit of analysis is the patient and not visit or service.
- ▼ Person-focused: Captures longitudinal, multi-episode dimension of health care.
- ▼ Each ACG includes individuals with:
 - a similar pattern of morbidity
 - similar expected resource use

THE ACG DECISION TREE

The Whole Population

Non-Users	Single Morbidity (either acute or chronic)	Commonly occurring morbidity combinations	Complex morbidity combinations	Pregnant Women	Infants (<12 months of age)
<ul style="list-style-type: none"> •No utilization •No or Invalid diagnoses •Invalid Age 	<ul style="list-style-type: none"> •Acute Minor •Acute Major •Likely to Recur •Asthma •Chronic Medical •Chronic Specialty •Eye •Dental •Psycho-social •Preventive/ Administrative 	<ul style="list-style-type: none"> •Acute: Minor and Acute: Major •Acute: Minor and Likely to Recur •Acute: Minor and Chronic Medical: Stable •Acute: Minor and Eye/Dental •Acute: Minor and Psychosocial •Acute: Major and Likely to Recur 	<ul style="list-style-type: none"> •2-3 morbidities •4-5 morbidities •6-9 morbidities •10+ morbidities •Further differentiated by age, sex and major morbidities 	<ul style="list-style-type: none"> •0-1 morbidities •2-3 morbidities •4-5 morbidities •6+ morbidities •Further differentiated by major morbidities and delivery status 	<ul style="list-style-type: none"> •0-5 morbidities •6+ morbidities •Further differentiated by major morbidities and low birthweight

ACG Review



Male, Age 45	Male, Age 45	Male, Age 45
1 Encounter with Family Practice	2 Encounters with Family Practice	4 Encounters with Family Practice
Acute Sinusitis	Acute Sinusitis General Medical Exam Hyperlipidemia	Acute Sinusitis General Medical Exam Hyperlipidemia Type II Diabetes, Uncontrolled Acute Bronchitis/Wheezing
Doxycycline	Doxycycline Simvastatin	Doxycycline Simvastatin Insulin Glyburide/metformin
Cost: 79.58	Cost: 1350.51	Cost: 2233.34

Calculating ACG Relative Weights



ACG 0300, Acute Minor	ACG 2300, Acute Minor and Chronic Medical: Stable	4420: 4-5 Other ADG Combinations, Age>44, 1+ Major ADGs
Concurrent Weight: 0.162	Concurrent Weight: 0.492	Concurrent Weight: 1.682
Average cost this ACG: \$617.19	Average cost this ACG: \$1876.64	Average cost this ACG: \$6416.80
Average cost all members: \$3815.53	Average cost all members: \$3815.53	Average cost all members: \$3815.53

CONCURRENT RISK SCORES

- ▼ **Local Weight:** A concurrent weight assigned to a member based on their *ACG assignment* and expressed as a relative value. The weight for each ACG is calculated as the simple average total cost of all individuals assigned to each ACG category divided by the average total cost of all individuals in the source data file.
- ▼ **Reference Unscaled Weight:** An estimate of concurrent resource use associated with a given ACG based on a national reference database and expressed as a relative value.
- ▼ **Reference Rescaled Weight:** Reference weights that are rescaled so that the mean across the population in the source data file is 1.0.

Additional features of the ACG System

- \\ Classification of diagnoses into expanded diagnosis clusters (EDCs)
- \\ Classification of medications into pharmacy morbidity groups (Rx-MGs)
- \\ Predicted Risk Scores
- \\ Probability of hospitalization
- \\ Care Coordination Risk
- \\ Medication Adherence

Reporting Framework – data in scope

- \\ Dates of Service
- \\ Claims run-out
- \\ Product(s)
- \\ Months of enrollment
- \\ Dollar basis; claims truncation
- \\ Age constraints (note: age should be calculated as of end of observation period)
- \\ Paid claims

Reporting framework-data comparability

Number of diagnoses per record

- Institutional
- Professional

Data availability

- Capitated encounters
- Laboratory
- Vision
- Dental
- Behavioral health
- Retail pharmacy
- Specialty pharmacy

Reporting Framework – software options

- \\ Grouper version
- \\ Coding update
- \\ Diagnostic certainty criteria
- \\ Low Birthweight
- \\ Pregnancy
- \\ Delivery