Clinical and Economic Assessment of Disease Management Programs

The Symposium on eHealthcare Strategies

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Objectives

- Disease Management:Define the charcteristics
- Clinical/Financial Models:How do they work
- “Value”: What are the measures
- Severity Adjusters: Why they are required
- Web: Barriers and Opportunities

Disease Management should contain the following (1) :

- Definition of the disease that is managed
- Population Identification process based on actuarial/clinical data
- Risk identification and matching of interventions
- Evidence-based practice guidelines
- Collaborative practice model: physician, support staff other
- Patient self-management: education, prevention, behavior modification/compliance
- Process and outcomes measurement
- Reports: clear, concise ,real- time,and understandable: patient, physician, health plan and ancillary providers
- Appropriate use of management information technology
- Web Strategy

(1) Disease Management Association of America (modified)

Patient Identification, Stratification, and Severity

- Identification, stratification and severity, and linked to appropriate guidelines
- Stratification tool is “open” and not a “black box”
- Clinical/actuarial/clinical/behavioral models
- Re-stratification and change in treatment plan
- Documentation of interventions “real time” - improvement can be directly attributable to disease management product

Coordination among Physicians, Case Managers, Health Plan, and Other Disease Management Personnel

- Coordinate among physician, nurse practitioners, case managers and support staff
- Across the continuum of care
- Practice guidelines specific to the disease by severity and associated comorbidities

Definition and Accountability of Responsibilities

- Responsibilities of the disease management organization, health plan, physician and patient are established
- Measures of performance established and monitored
- Documentation of Variances:opportunities for quality improvement

Integration with Health Plan or Sponsoring Organization

- Full integration with the health plan, employer group or other sponsoring organization
- Contract for disease management program documents how the services are coordinated
- Frequent updates and communication of integration plan

Claims Data Analysis Issues

- Limited data – (e.g., small employer group)
- Incomplete data – physician group
- Incurred vs. paid
- Data reasonableness
- Extent of data editing
- Expenditures used (e.g., submitted, allowed or paid)
- Independence of data (development or validation)
- Inclusion or exclusion of nonusers
- Payment proration for deaths
- Nonclinical adjustments (e.g., eligibility status)
- Duration
- Length
- Comprehensiveness
- Age/gender adjustment
- Stop loss and reinsurance
- Prospective versus retrospective
- Substantial change in number, mix of population
- Benefits changes
- Provider network change
- Claims administrative change
- Other

MIS Reports

- Timely, accurate,concise,understandable
- Comparison to peer, benchmarks/best practices
- Methodology is specified and documented
- Meet requirements of third parties
- Measures of customer satisfaction and financial outcomes:independent assessment(performance guarantee)
- Linkage to Data Wherehouse

Severity-Adjusted Data Requirements

- Comparison can be made between “baseline” and the “savings” as a result of the product
- Profiles of entities with any stakeholder category (hospital, provider, health plan, different Disease Management programs)
- *Without severity adjustment,differences in clinical/financial outcomes may be attributed to variations among the types and intensities of diseases underlying the data(“my patients are sicker”)*

Disease Management Measurement Process

- Clinical utilization, actuarial and financial measures reflect all patients with primary targeted diagnosis and comorbidities
- “Baseline” and “study” or “contract” period for the analysis is documented prior to commencement of contract/program
- Real time monitoring of resource consumption and interventions
- Metrics / models precisely defined e.g., “inpatient day”
- Denominators for calculations should be total number of patients with targeted diagnosis e.g., days/1000/targeted lives
- Financial analysis should include total healthcare cost of the entire population of patients diagnosed with the disease

Reports:Outcomes

- Objective, evidence-based, achievable performance measures
- National benchmarks -local “interpretation”
- Contractual requirements for appropriate intervals of performance reports

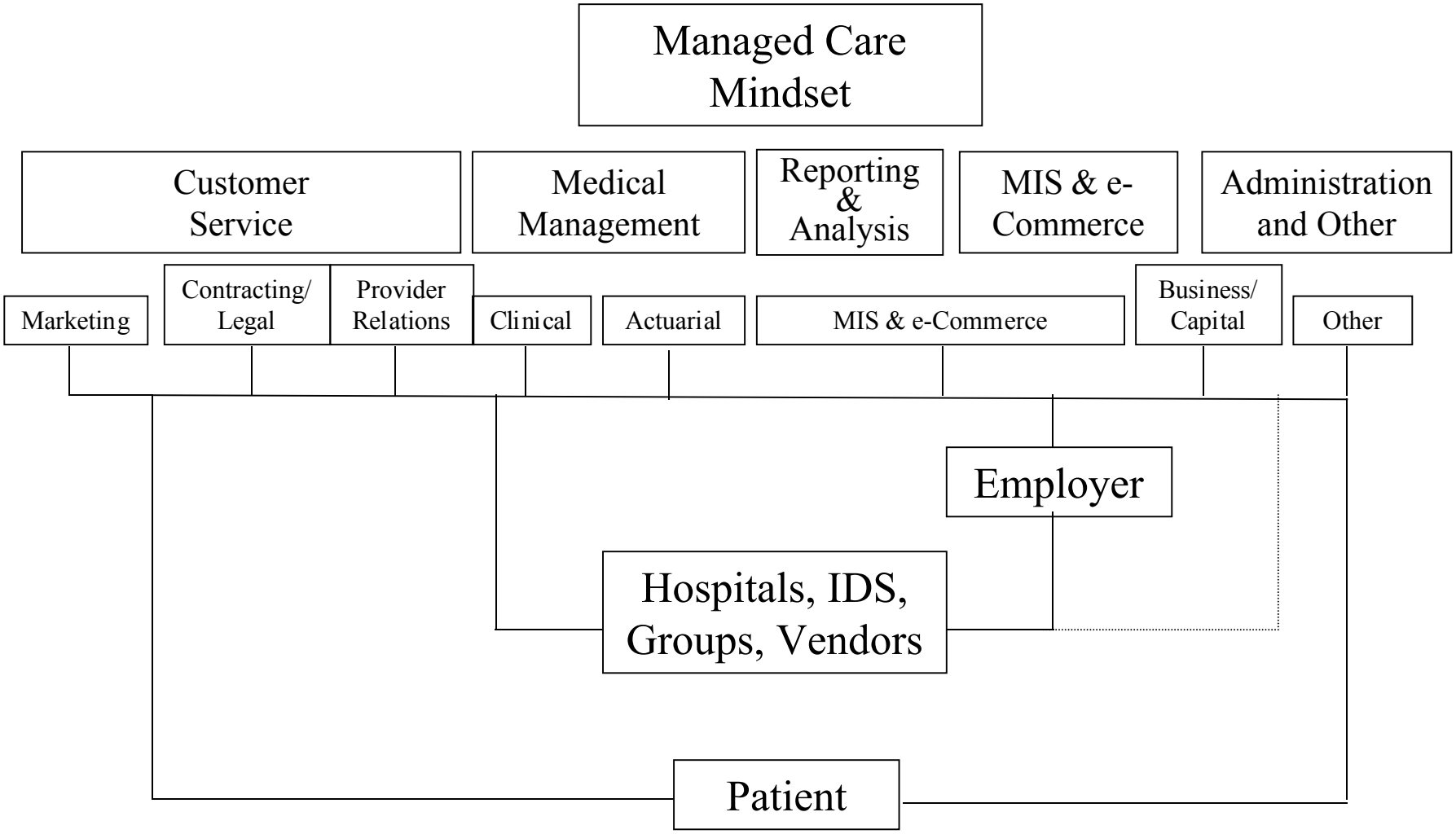
Patient Interaction

- Patient informed, educated of role of vendor, health plan
- Educational materials are accurate, peer-reviewed
- Informed of clinical practice guidelines
- Self-care, compliance, appropriate use of resources

Provider and Patient Communications

- Timely communication with members, families, caregivers, health plan and disease management organization
- Optimal recovery guideline and care pathways memorialized
- Documentation of communications among healthcare team members
- Web Strategy

Requirements to Manage Risk in Disease Management



Managing Risk: "Managed Care Mindset"

- Experienced professional management;
- Integrated actuarial/clinical/business models – severity-adjusted;
- Clinical guideline-driven care: physician-friendly; patient-centered; and evidence-based;
- Medical appropriateness and ROI across the continuum of care
- Appropriately structured capitated/risk contracts with aligned incentives;
- "Value" based clinical outcomes.

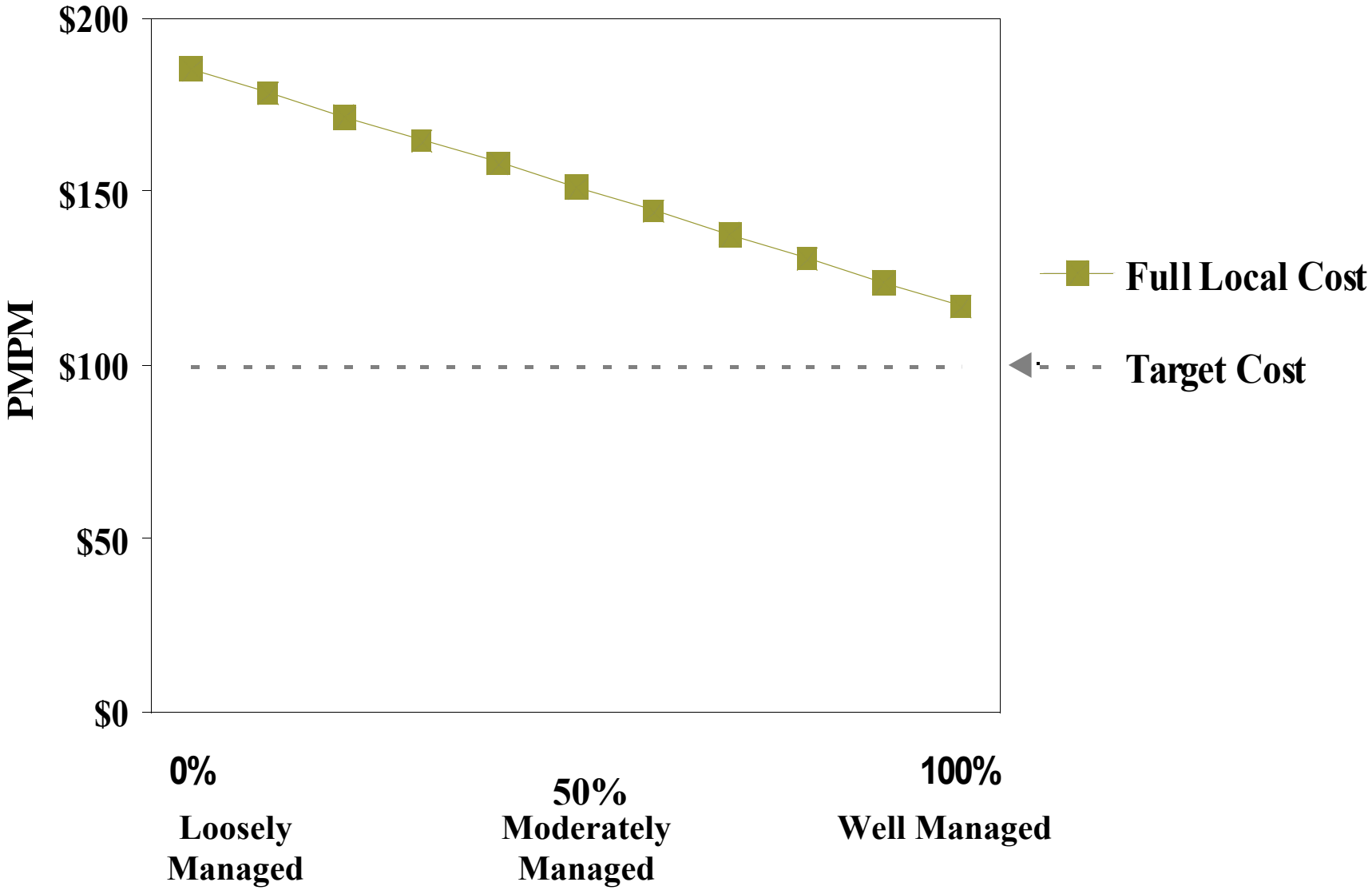
Disease Management: “Value”

- Directly attributable to the product;
- Comparable to “Best Practices;”
- Objectively quantified over a defined interval (contract);
- Significant; and
- Distinguishable from “environmental factors” i.e., conditions not related to the product, which might independently reduce utilization and costs.

Measures of “Costs”, “Savings” and “Value”

- Prices
- Unit cost
- Published charges
- Total costs
- Cost/charge ratio
- Discount future values to present (3-5%)
- Cost effectiveness
- Quality of adjusted life year (QALY)
- Contingency Valuation (Willingness To Pay)
- Intangible

Degree of Healthcare Management ("DoHM")



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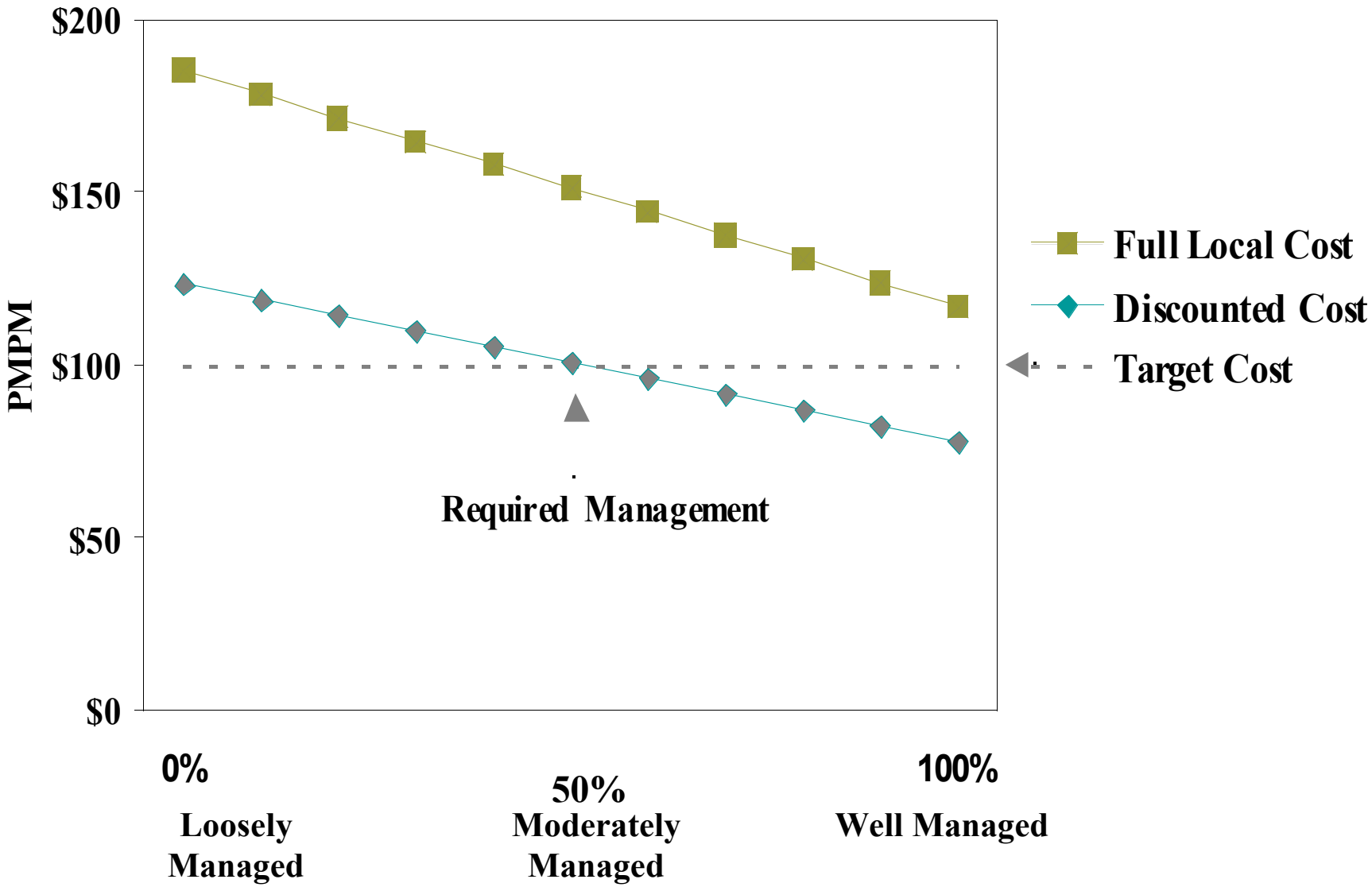

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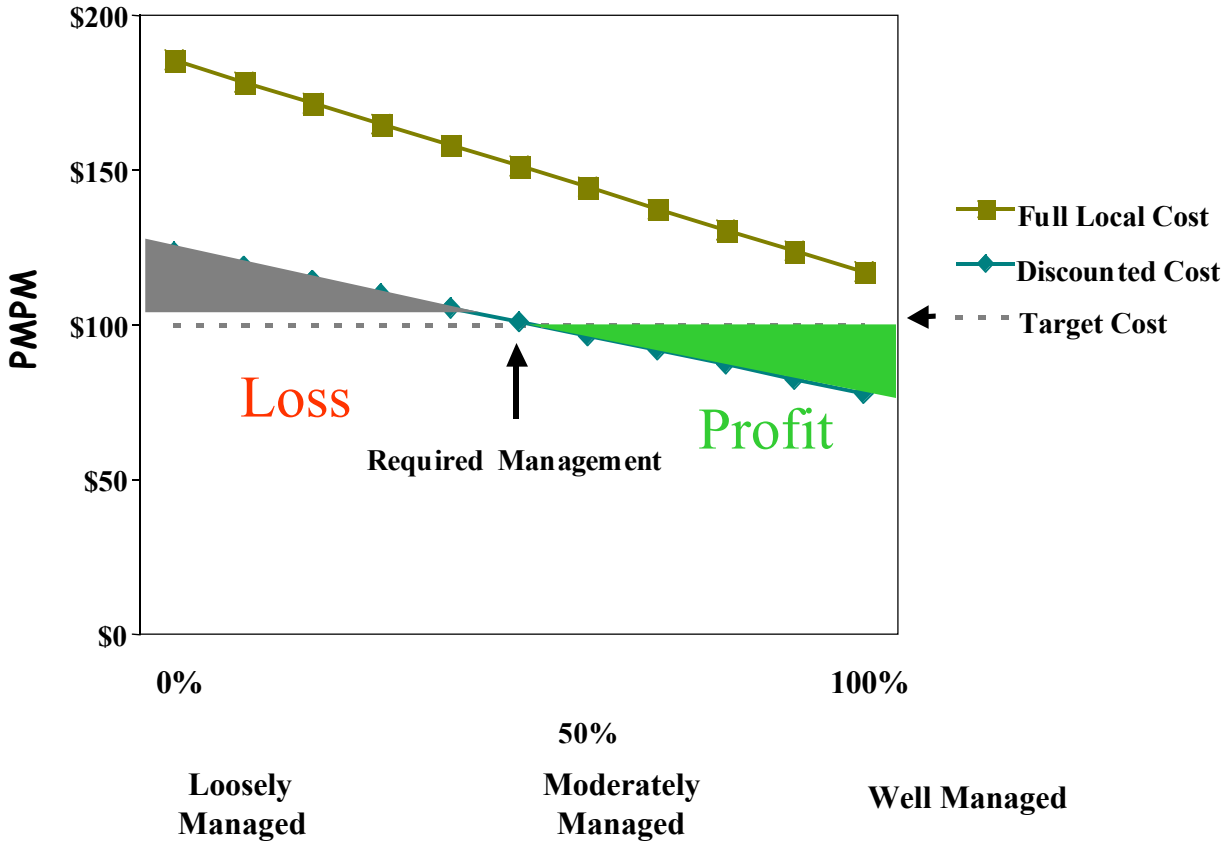
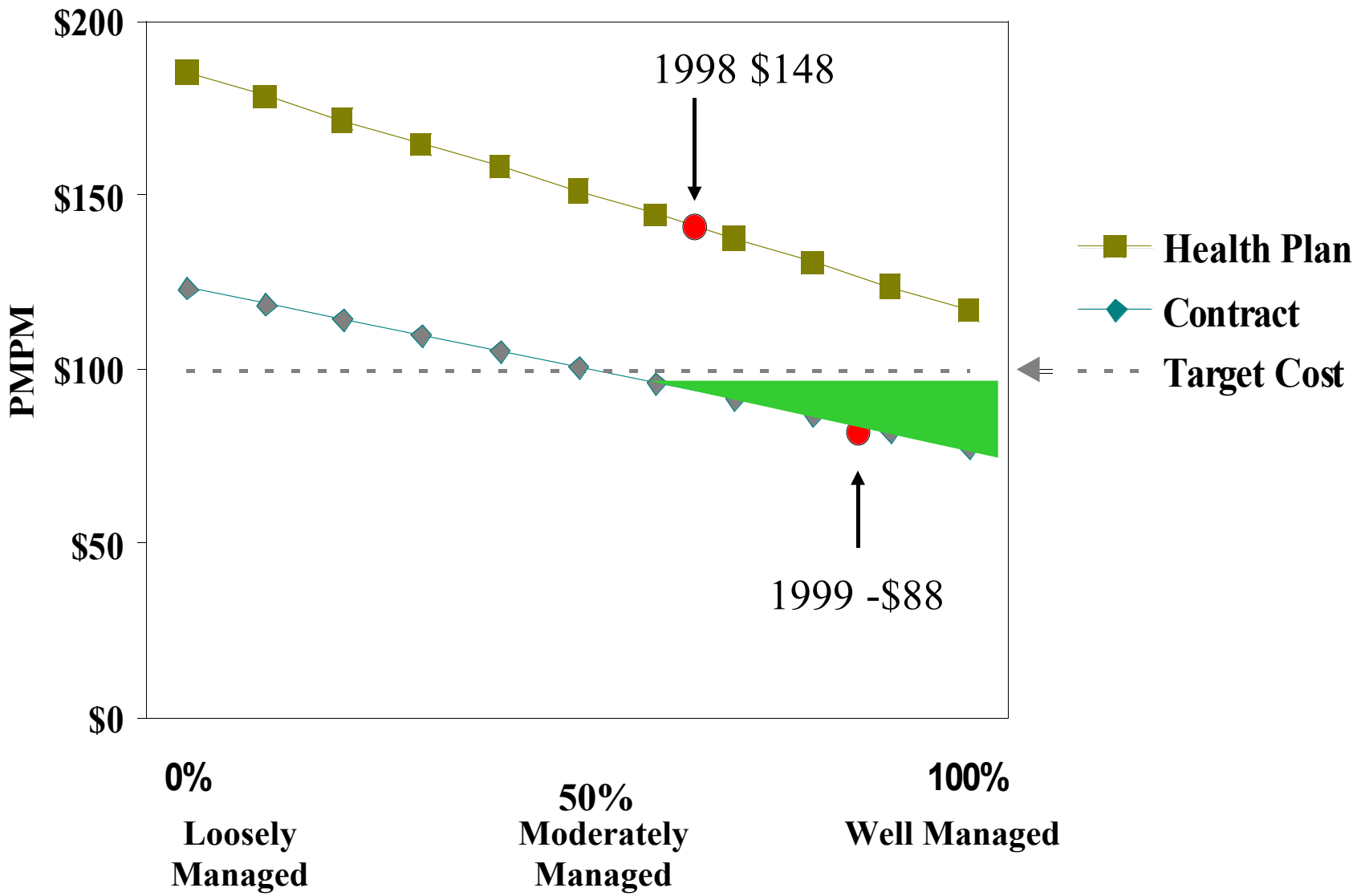


Degree of Healthcare Management ("DoHM"): CHF Case Study California



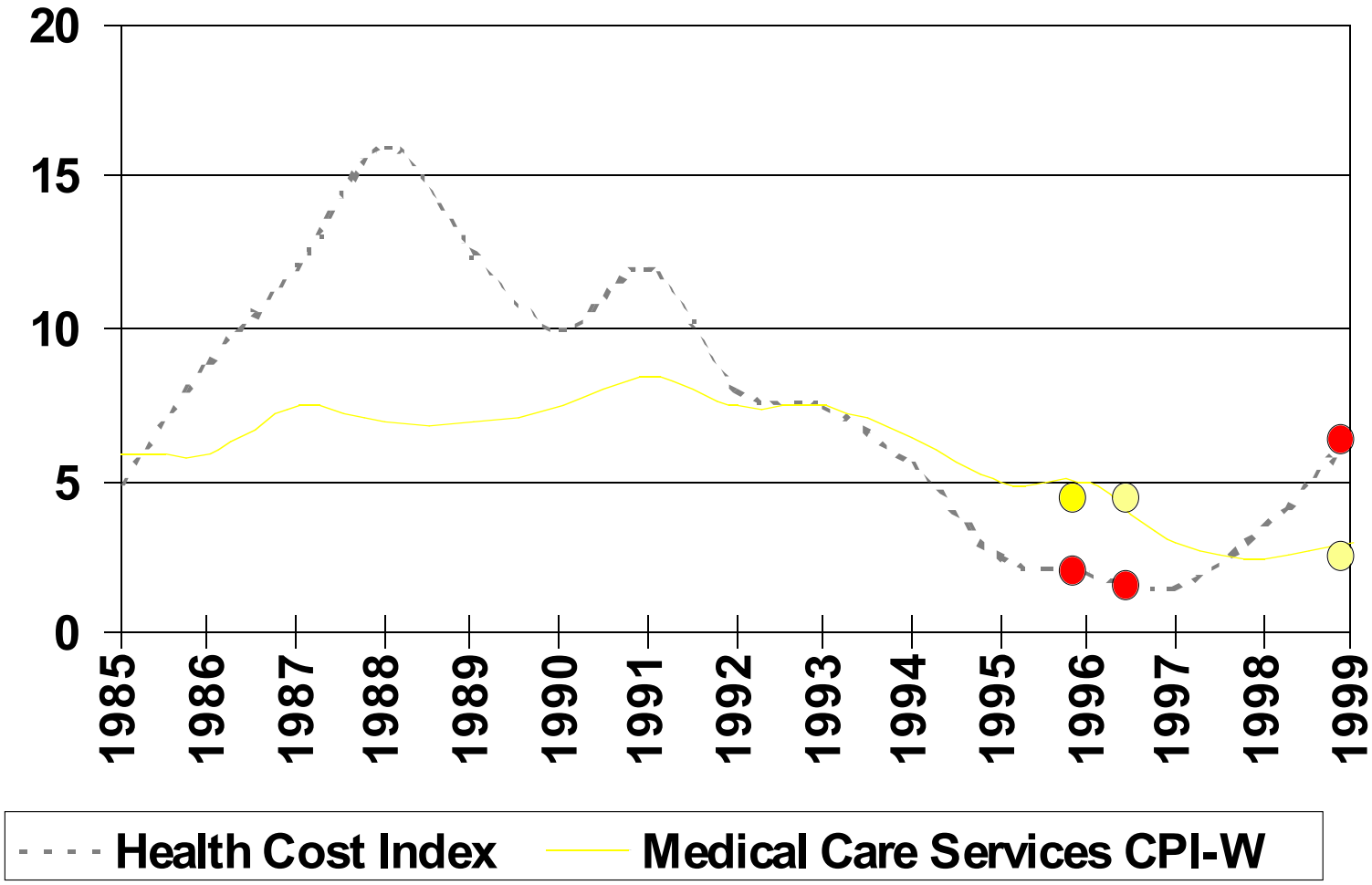
Expected “Savings” from Disease Management: Caveats

- Market: immature
- Models: unsophisticated
- Calculation of baseline:imprecise
- Calculation of “costs”: variable
- “Savings”: overstated
  - Multiple regression models
  - Lack of severity-adjustments
  - Reliance on payor claims
  - Catastrophic cases - from” % of charges”
- “Environmental Factors” –
  - Trends
  - Behavior(provider, patient, health plan)

Expected “Savings” Caveats (continued)

- High member turnover
- Long-term consequences of chronic diseases:unknown
- Pharmacy/supplier – subsidies program
- Changing incentives
- “Direct provider model”-reduces provider incentives

Annual Percentage Change in 12-Month Moving Costs Average:Selection of the Appropriate Index _

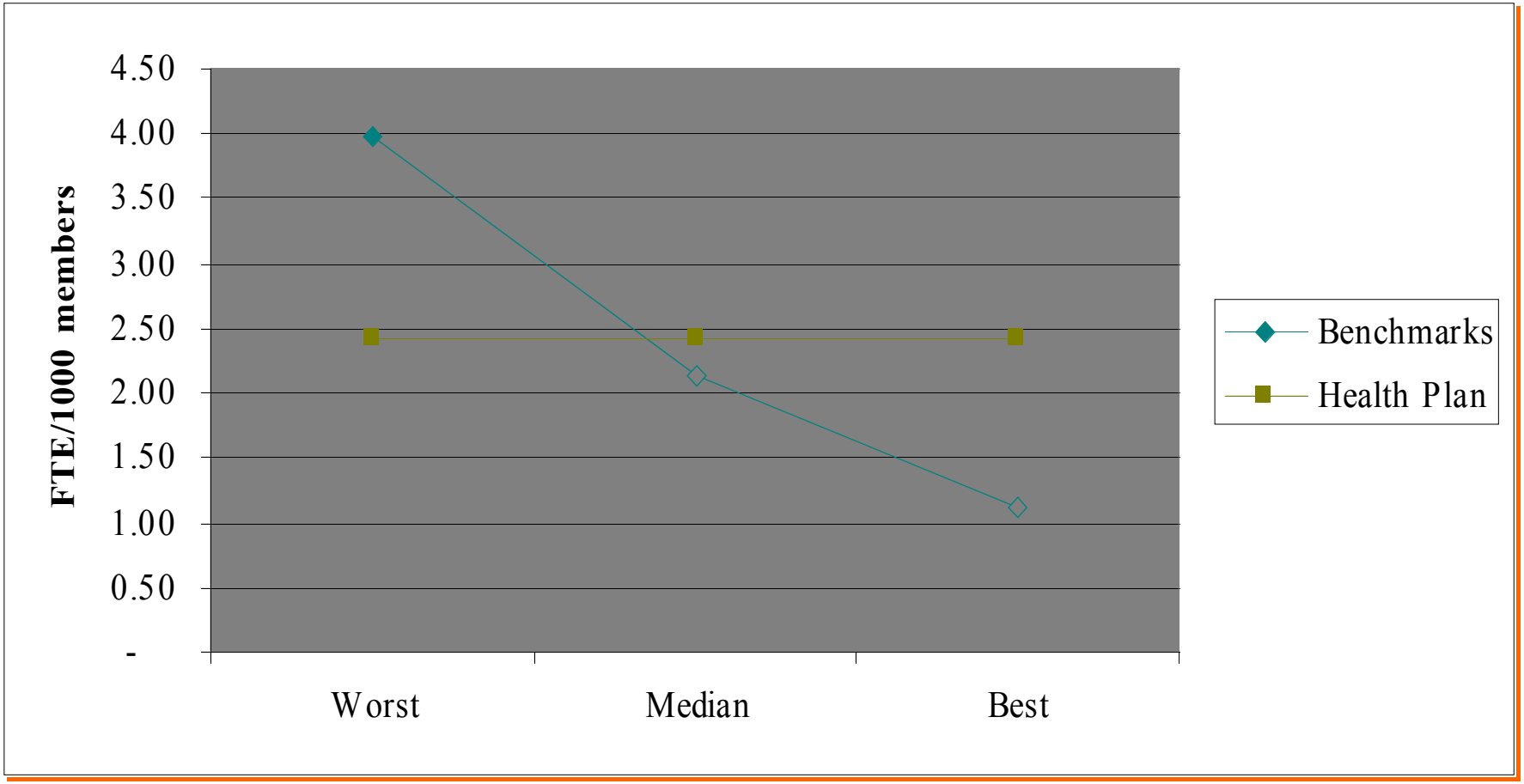


_Source: Health Cost Index Database®, Published by Milliman & Robertson, Inc.
_ $250 deductible, no underwriting/adverse selection factors

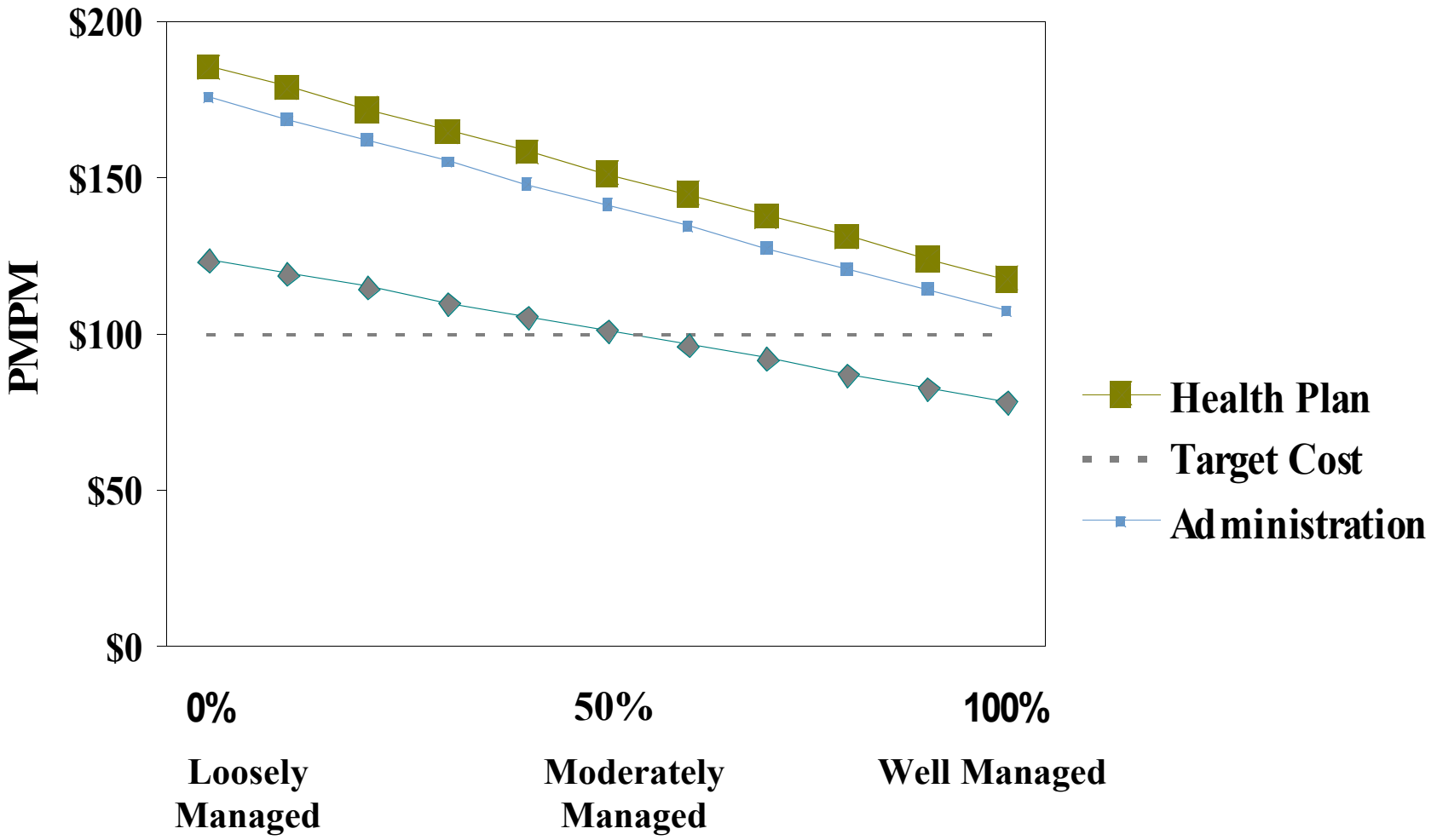
Degree of Administrative Management ("DoAM")

- $300 Billion annually: 30 - 50% potentially avoidable
- Benchmark of administrative efficiency:tangible,intangible
- Health plan, Disease Management Vendor vs. benchmark
- Establish baseline FTEs and cost
- Measure criteria for operational improvement
- Demonstrate administrative cost savings
- Reduction in risk based capital requirements
- Integrate with DoHM
- Integrate with "Intangibles"
- Value=DoHM+DoAM+intangibles

Degree of Administrative Management ("DoAM")



Net Savings: DoHM + DoAM



The Clinical/Actuarial Model

- Identify patients by unique risk group
- Stratify by level of severity
- Identify comorbidities, complications
- Determine resource consumption
- Linkage of Practice Guidelines by Severity
- Web strategy

Risk Adjusters Used In Disease Management Models

- APR-DRGs – All Patient Refined – inpatient
- CRGs – Clinical Risk Group_ – out/inpatient
- CRxG – pharmacy disease management
- APGs – outpatient

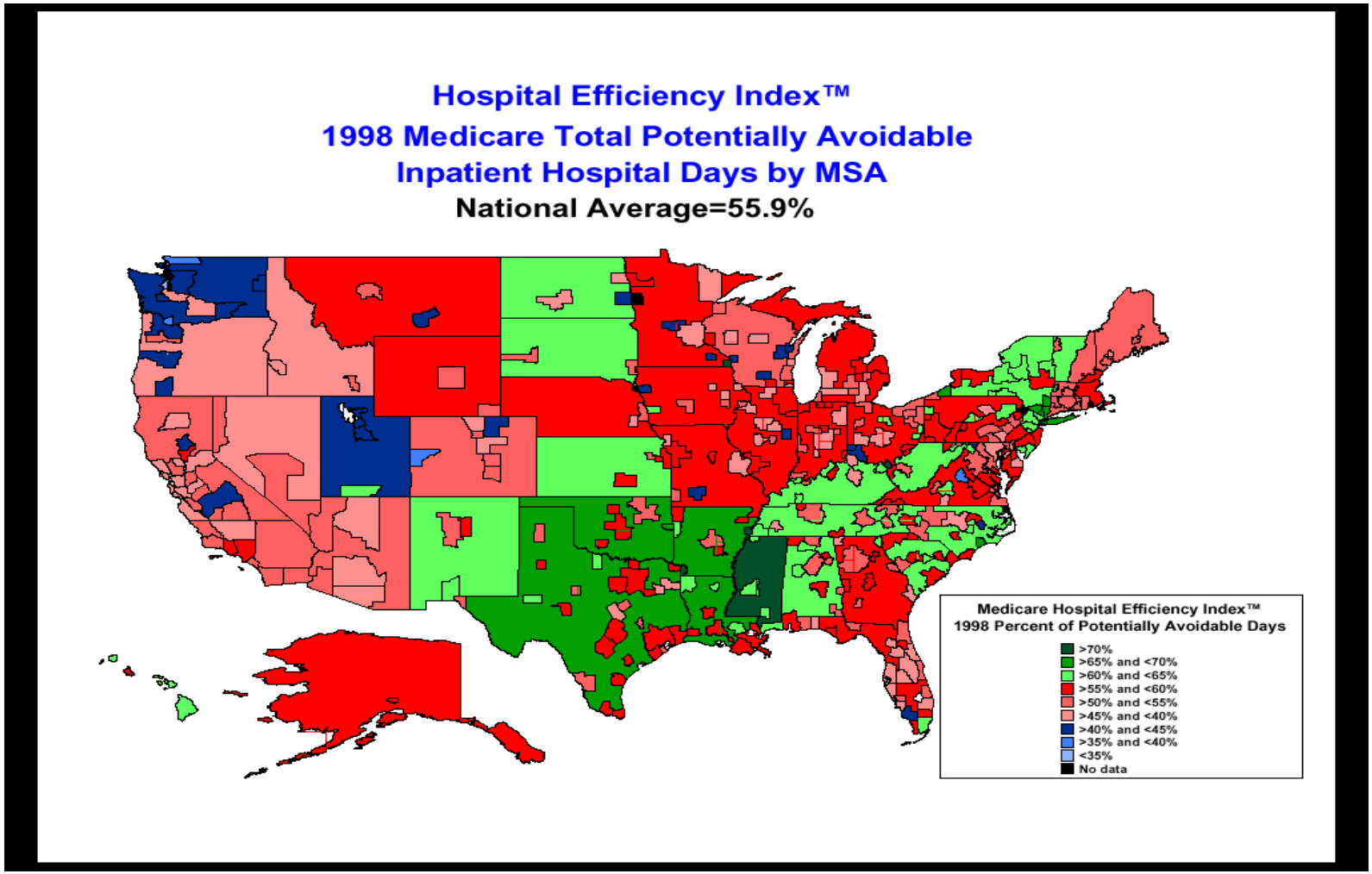
Disease and Utilization Management: Clinical/Actuarial Model Requirements

- Target patients who use most resources and benefit from Disease Management intervention
- Link Disease Management to targeted patients
- Manage comorbid conditions/complications proactively
- Adjust (CRG, APR-DRG) to reflect dynamic changes in patient
- Track real- time on line
- Adjust management to the “new “ CRG(s) or APR-DRGs.
- Incorporate into Data Warehouse

Role of APR-DRGs to Measure “Value” for Disease Management Customers

- Target customers
- Resource consumption
- Mortality
- Infection rates
- Readmission rates
- Complication rates
- Rates of ambulatory sensitive conditions

Hospital Efficiency Index: Target Disease To Be Managed



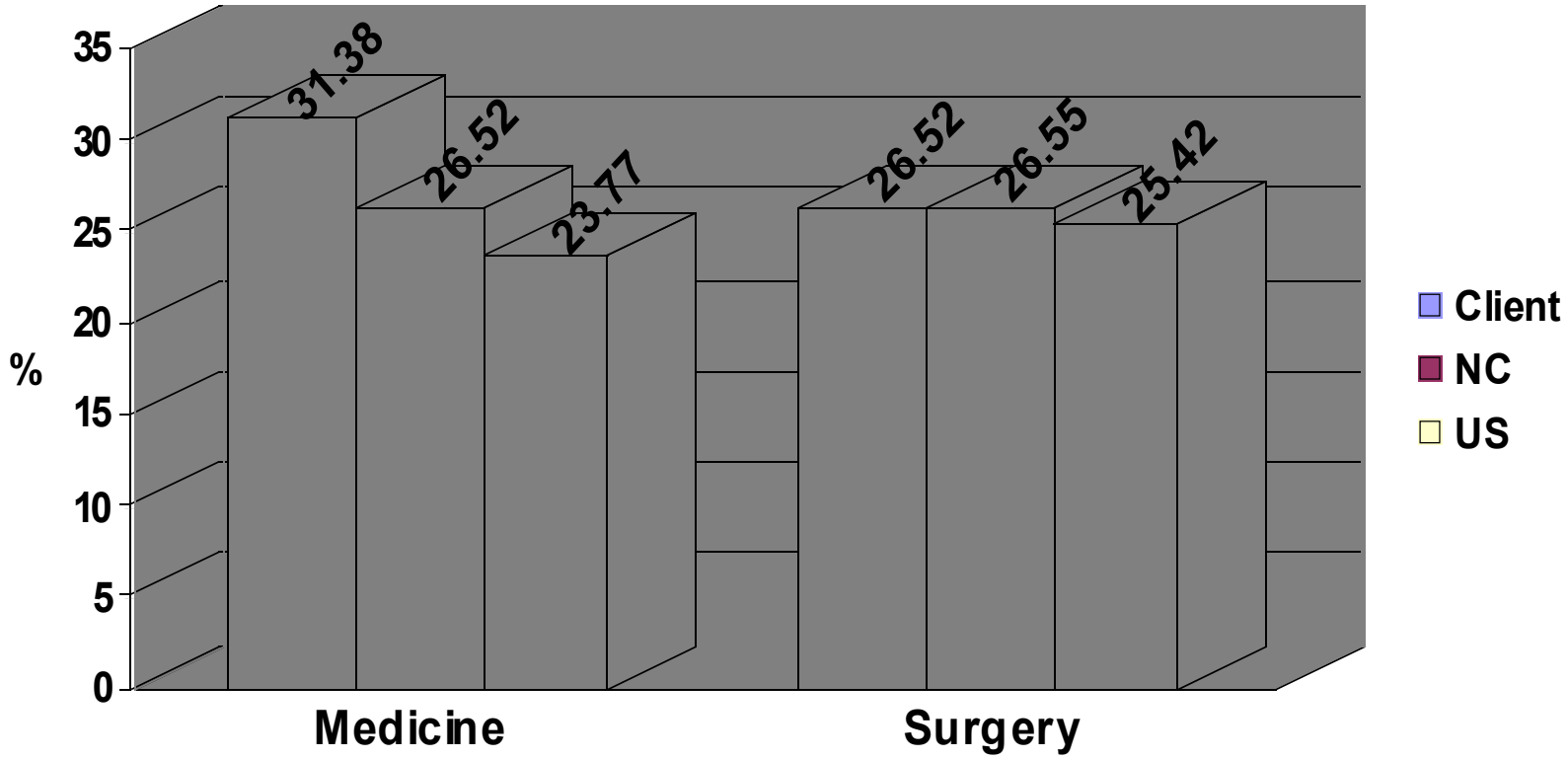
Avoidable Days by Major Diagnostic Category (MDC)

Potentially Avoidable Medicare Days Sorted by MDC and Total Days

MDC			Total Days
23	Rehab/LTC	LTC	4,245.19
05	Medical	Circulatory disorders	4,117.40
19	Mental	Mental health	3,741.76
04	Medical	Respiratory	3,678.04
01	Medical	Nervous system	1.741.27
05	Surgical	Circulatory	1,700.81
08	Surgical	Musculoskeletal	1,595.18
20	Substance	Alcohol/Drug	1,459.64
06	Medical	GI	1,291.80
00	Surgical	Special	818.13
05	Surgical	Cardiac	718.48
06	Surgical	GI	607.56
18	Medical	Infectious	543.05
11	Medical	Kidney	511.19
08	Medical	Musculoskeletal	423.06

Case Study Findings: Targeting of Disease Management Opportunities for a Client

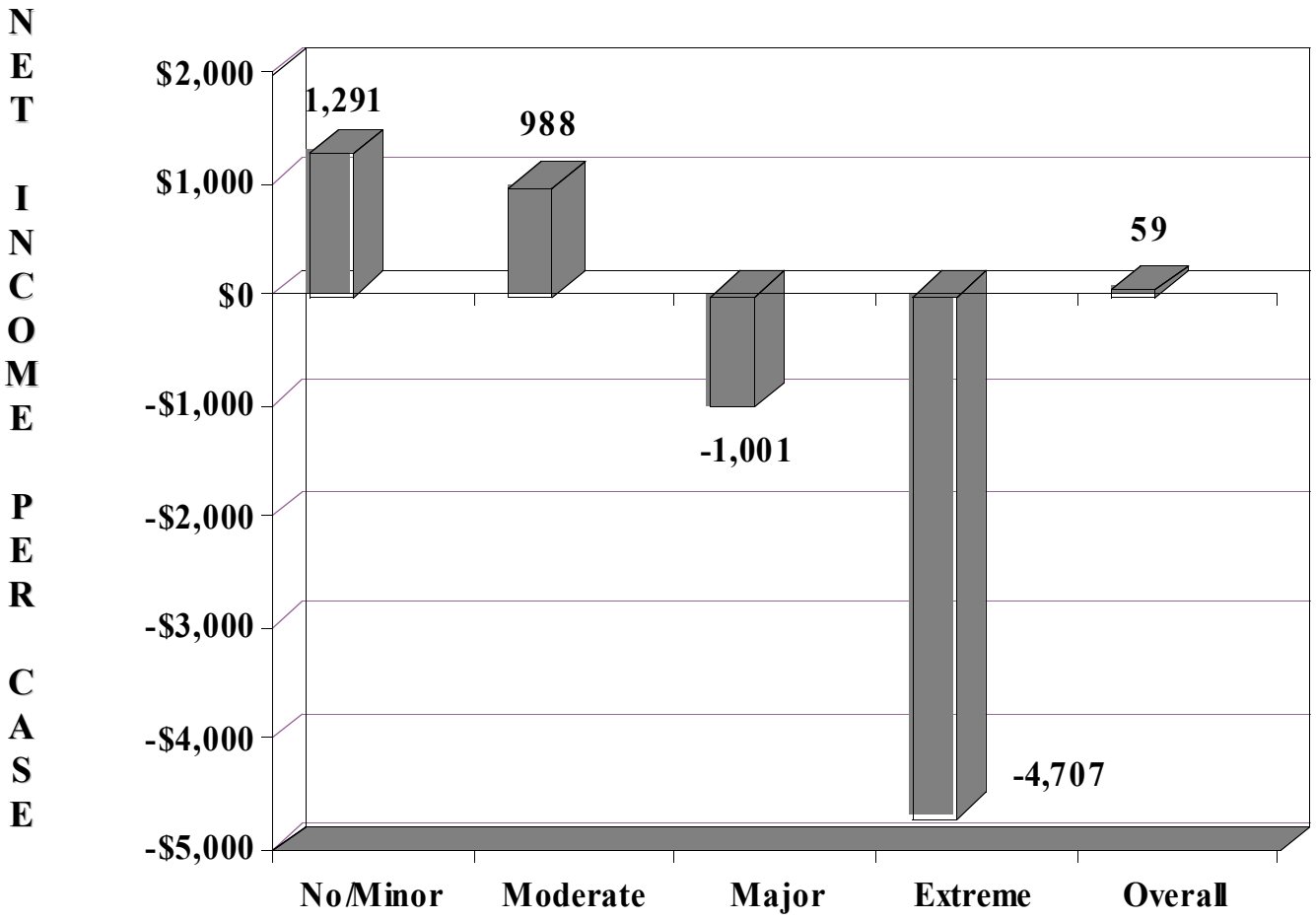
Potentially avoidable medical days at client are caused by an increased LENGTH OF STAY.



APR- DRG 127 Severity Index : CHF

	Cases	% of Total	Relative Weight
No/Minor Severity	86	17.6%	.6674
Moderate Severity	232	47.4%	.8562
Major Severity	112	22.9%	1.2167
Extreme Severity	59	12.1%	2.0645
Total APR-DRG 127	489	100%	1.0514

APR-DRG : Severity Adjusted Net Income Per Case of CHF_ Total Net Income $54,558



_APR-DRG 127

Determining Expected "Savings" Outpatient Congestive Heart Failure:APG/APC

APG/APC Category	Description	Type	Count	Paid Amount by Health Plan ($)	Total Cost ($)	Profit or Loss	Percent Profit or loss
71	Excercise tolerance tests	SP	1,056	160	150	10	6.67
72	Echocardiography	SP	969	210	224	-14	-6.25
74	Cardiac electropohysiologic tests	SP	4	1,250	1,524	-274	-17.98
75	Placement of transvenous catheter	SP	32	780	881	-101	-11.46
76	Diagnostic cardiac catheter	SP	224	1,310	1,940	-630	-32.47
77	Angioplasty and transcatheter procedure	SP	7	1,250	1,321	-71	-5.27

Outcome Measures Using APR-DRGs:

- Mortality
- Resource consumption
- Infection rates
- Readmission rates,
- Certain types of complications rates of ambulatory sensitive conditions, and
- Quality indicators

Description of Clinical Risk Groupings (CRGs)

- Categorical clinical model
- Severity adjusted
- Uses claims data to assign each patient to a single mutually exclusive risk category
- Each CRG is clinically meaningful
- Provides the basis for the prediction of future healthcare utilization and cost.

Features of Clinical Risk Grouping (CRGs)

- Based on standard claims data (Dx, procedure, age, site)
- Valid using varying degrees of data completeness
- Prospective methodology
- Retrospective capabilities
- Analyzes all or part of resource expenditures
- Compare “baseline”, “contract” period and external populations
- Contrast to Benchmarks

CRGs as a Disease Management Tool

- CRGs facilitate comparative reporting on individual cost and service components.
- Identifies problematic subgroups within the population and opportunities for improvement.
- Disease Management “expected” costs vs. “Savings”

Disease Management using CRGs: Clinical/ Actuarial Model

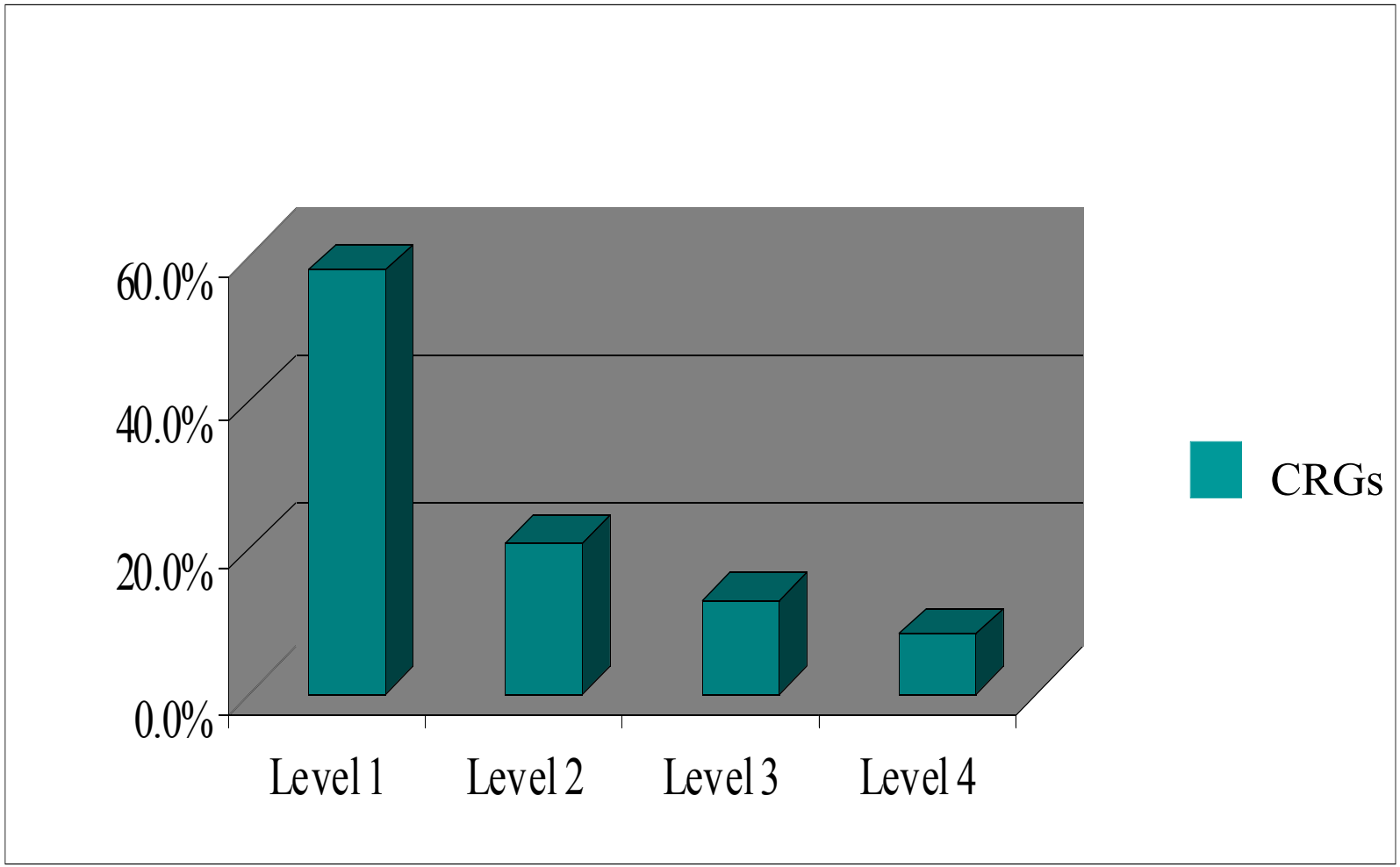
- Determine Clinical Risk Group (GRG) year 1
- Establish costs by each CRG year 1, 2
- Determine trend and future resource consumption
- Measure inpatient, outpatient, lab, pharmacy, utilization
- “Savings” in year 3 attributable to Disease Management “product”

Diabetes Mellitus CRG: Four levels of severity

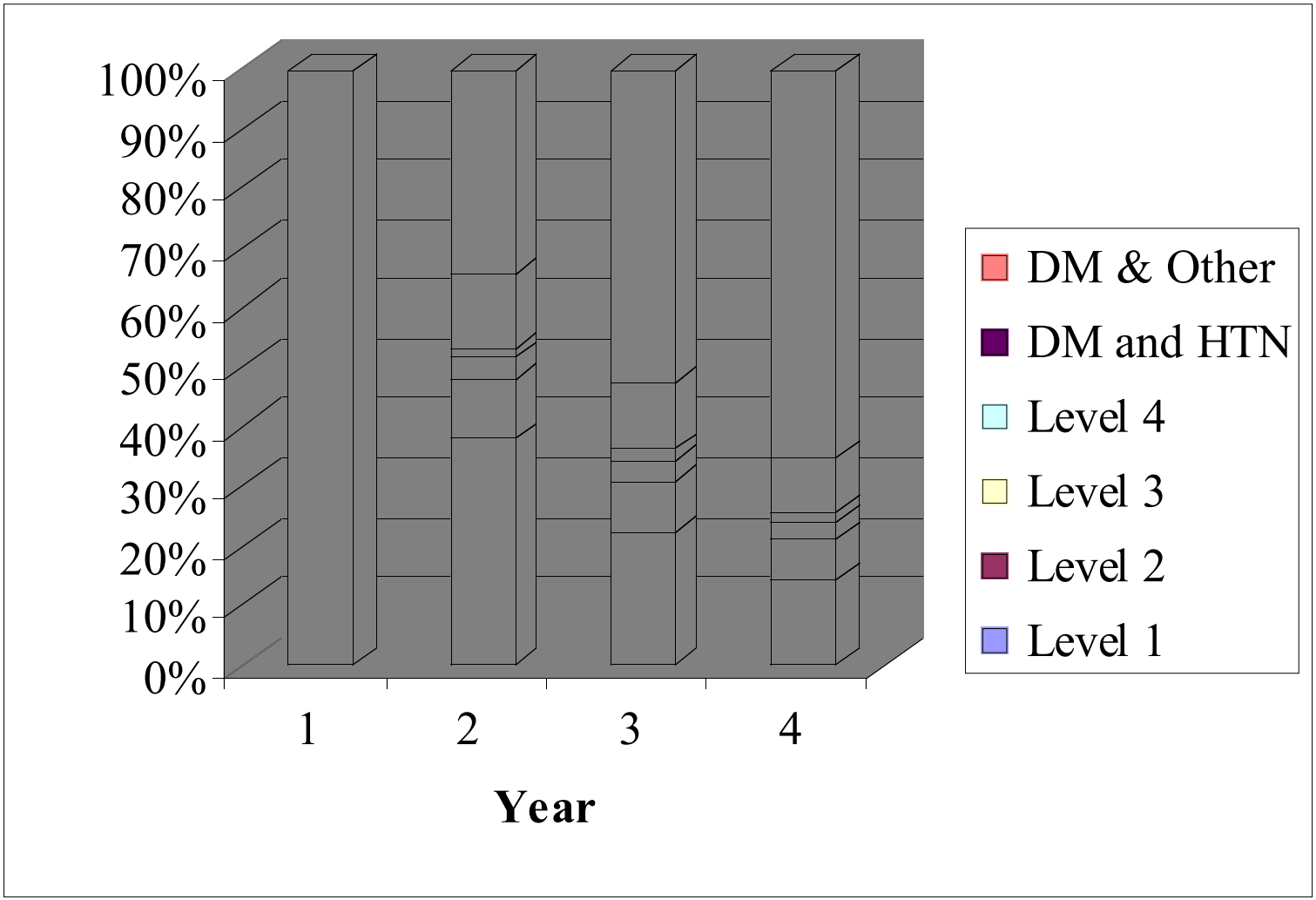
- Level 4
  - Nephritis 477
  - Atherosclerosis of Peripheral Vascular Disease with Major Complications 247
  - Above the knee amputation 361
- Level 3
  - Blindness 83
  - Atherosclerosis of Peripheral Vascular Disease with Major Complications 247
  - Pneumonia – Major 151
- Level 2
  - Vision Loss 85
  - Malignant and Other Significant Hypertension 202
  - Diabetes – Juvenile Onset 427
- Level 1

_PCD 424 Diabetes (DC)

Disease Management :Year 1 Diabetes Mellitus



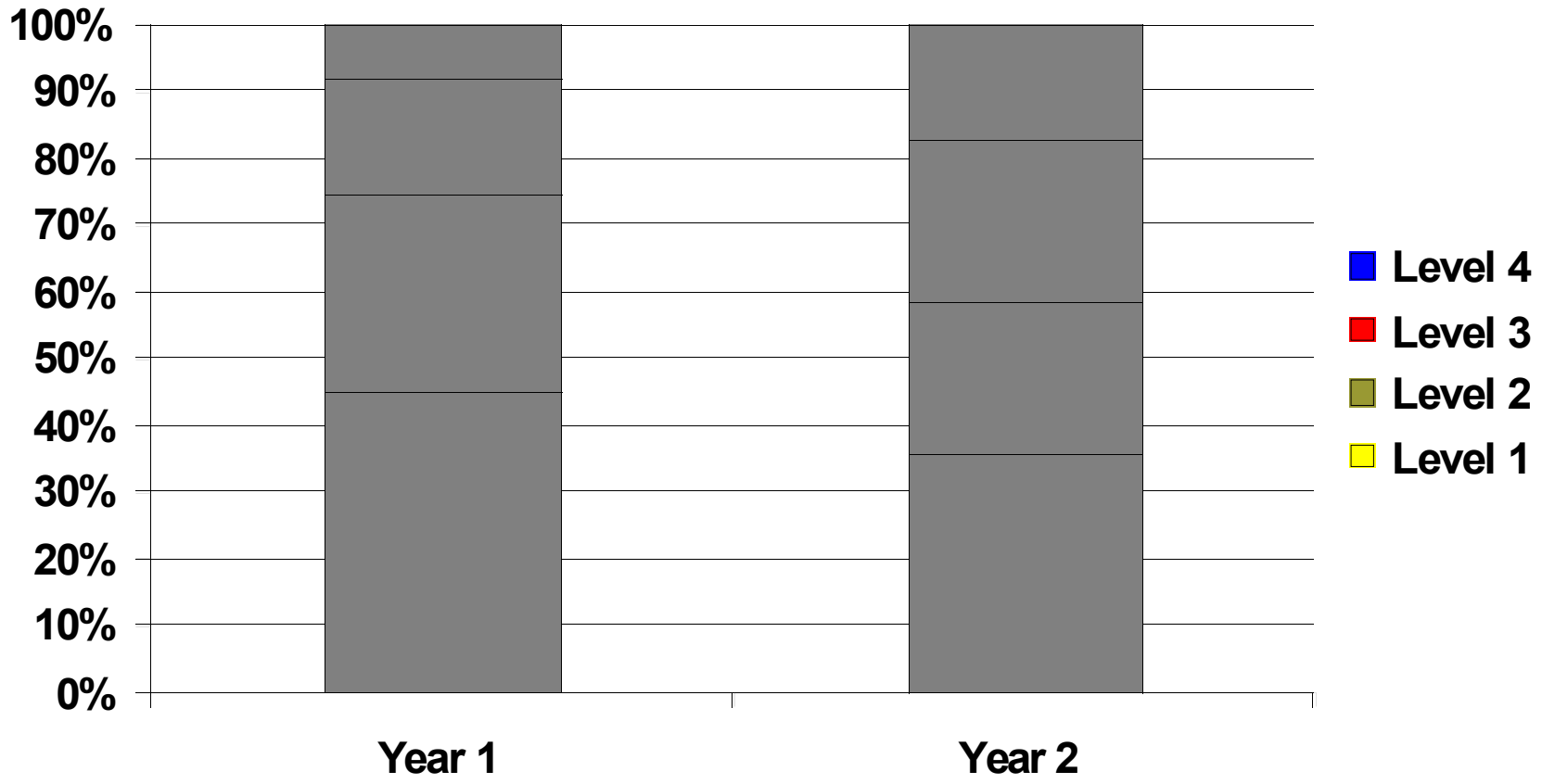
Resource Consumption Level 1 – Year 1-4



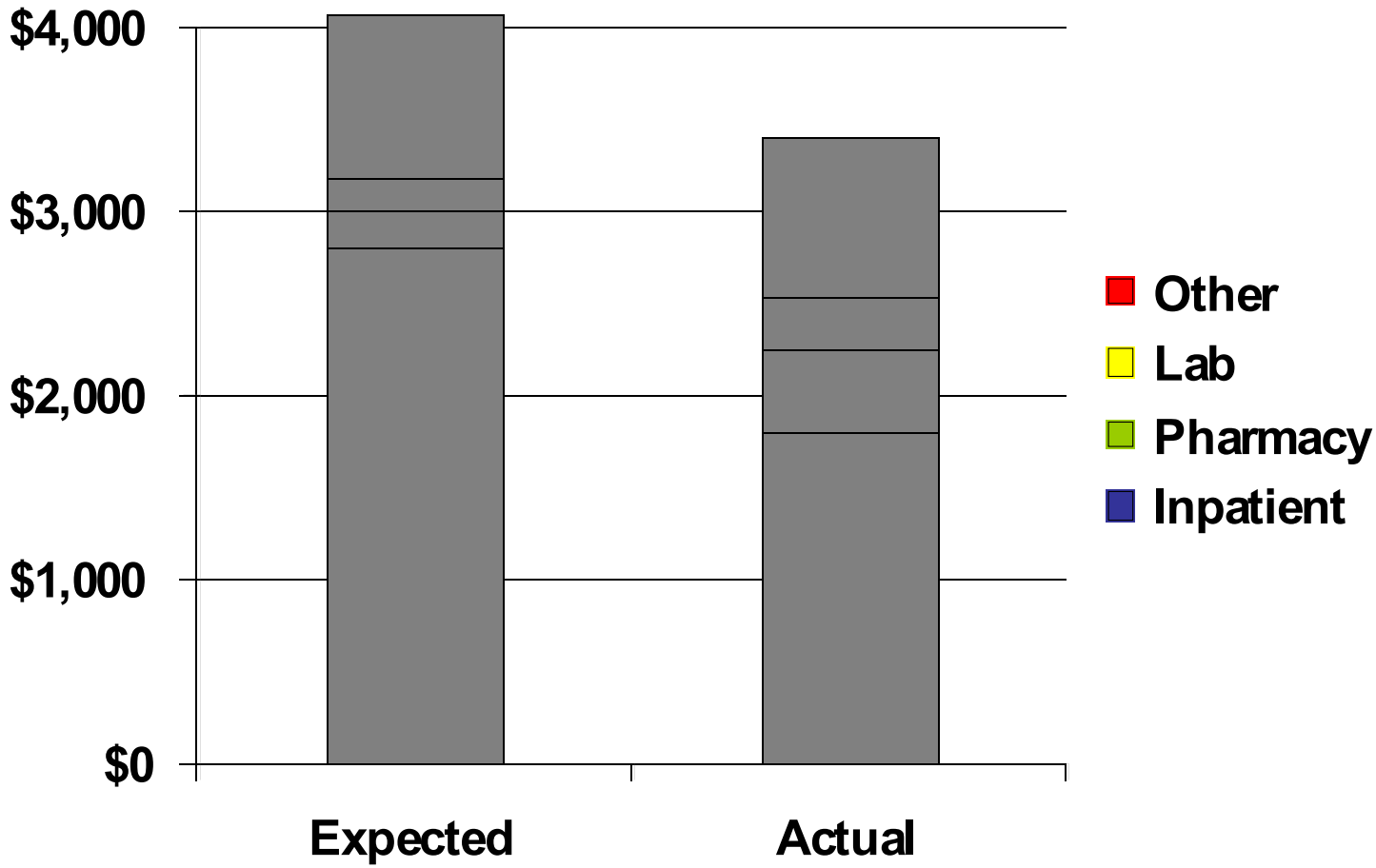
CRG:Diabetes Mellitus

Level	Cases	Average Cost
1	443	$739
2	389	$1,643
3	172	$2,061
4	94	$3,471

Disease Management
Severity of Illness Trends: CRG Diabetes Mellitus



Cost Savings Attributable to the Product: Diabetes Mellitus



Two CRGs:Congestive Heart Failure and Diabetes

Level	Cases	Average Cost
1	12	$773
2	29	$1,892
3	38	$2,101
4	27	$5,398
5	19	$7,062
6	25	$19,201

CRG Costs by Severity Level: DM, CHF and COPD (Medicare)

	Severity Level					
CRG	**1**	**2**	**3**	**4**	**5**	**6**
DM	**0.5953**	**0.7797**	**0.9246**	**1.3985**		
CHF	**0.8950**	**0.9782**	**1.1783**	**1.7863**		
COPD	**0.8426**	**1.0144**	**1.3077**	**2.2961**		
COPD & DM	**0.9925**	**1.1082**	**1.4112**	**1.7560**	**2.2504**	**3.3735**
DM & CHF	**1.0632**	**1.2664**	**1.6494**	**2.0645**	**2.6528**	**3.6650**
COPD & CHF	**1.0956**	**1.4792**	**1.7433**	**2.2875**	**2.8244**	**3.8638**
DM & COPD & CHF	**1.4588**	**2.1968**	**2.5539**	**3.2849**	**4.2358**	**5.7845**

(1) Medicare

CRGs Determine Costs by Severity Level: Medicare_

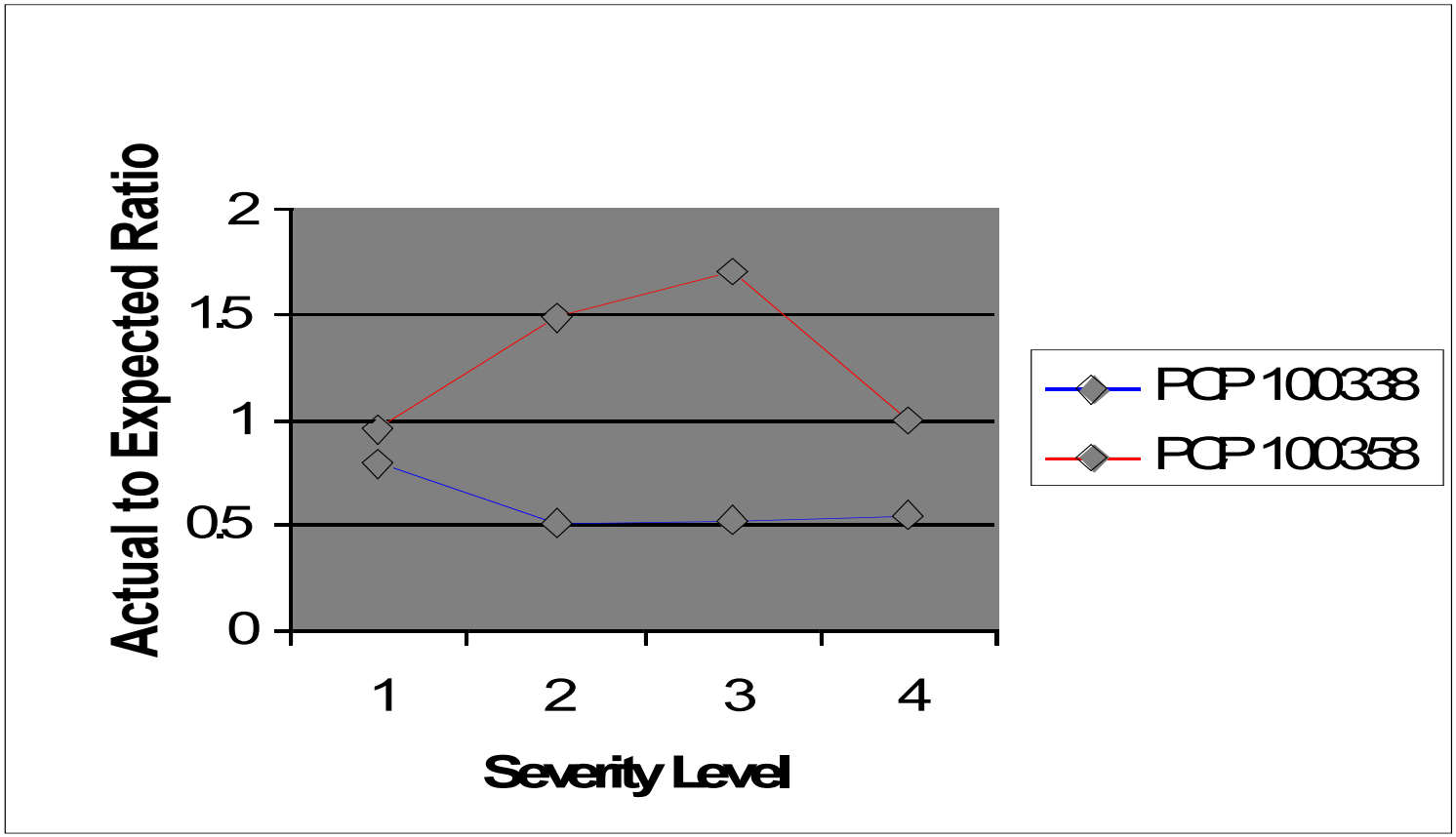
	Severity Level					
CRG Status	1	2	3	4	5	6
Healthy	0.2009					
History of Significant Acute Disease	0.4993					
Single Minor Chronic Disease	0.4266	0.5867				
Minor Chronic Disease in Multiple Organ Systems	0.4666	0.6540				
Single Dominant or Moderate Chronic Disease	0.5256	0.7189	0.9370	1.1841	2.0850	3.7962
Disease in Chronic Multiple Organ Systems	0.8857	1.4277	2.1845	2.9002	3.6478	6.1852
Dominant Chronic Disease in Three or More Organ Systems	1.3768	1.8098	2.5294	3.6102	4.9347	6.6154
Dominant and Metastatic Malignancies	1.4912	2.4280	4.0026	5.3719		
Catastrophic Conditions	1.5661	2.7608	5.3801	9.0080	10.8938	13.2945

ACRG3

Average Cost by Aggregated CRG(ACRG3)

Status Level	1	2	3	4	5	6
Healthy	$258					
Significant Acute	$1,741					
Minor Chronic	$1,128	$4,483				
Mult Min Chronic	$1,534	$2,298	$3,011	$9,117		
Dom or Mod Chr	$1,157	$2,796	$6,766	$11,830	$8,339	$8,606
Pairs	$3,098	$6,317	$7,347	$9,059	$19,295	$18,253
Triples	$3,483	$8,065	$8,654	$19,459	$40,735	$31,138
Malignancies	$4,297	$11,371	$17,154	$17,887	$26,842	
Catastrophic	$5,386	$3,033	$14,349	$27,857	$20,570	$45,846

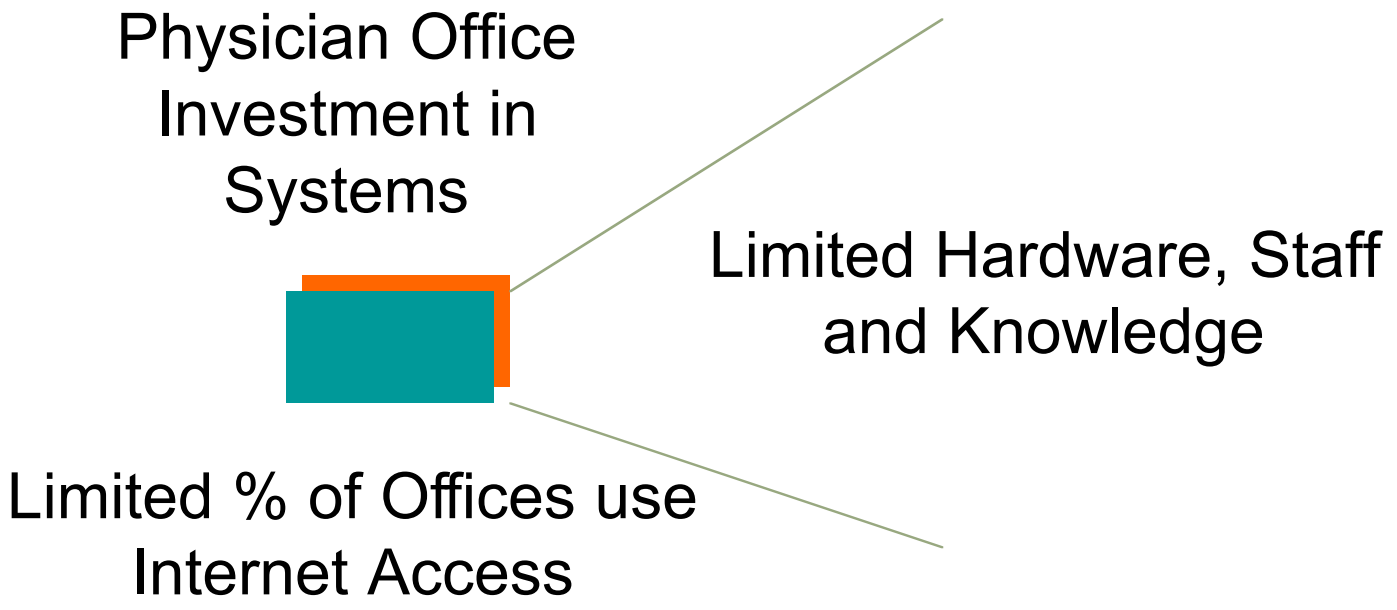
PCP Performance Profile by CRG:Asthma



Hospital Profile by CRG and APR-DRG

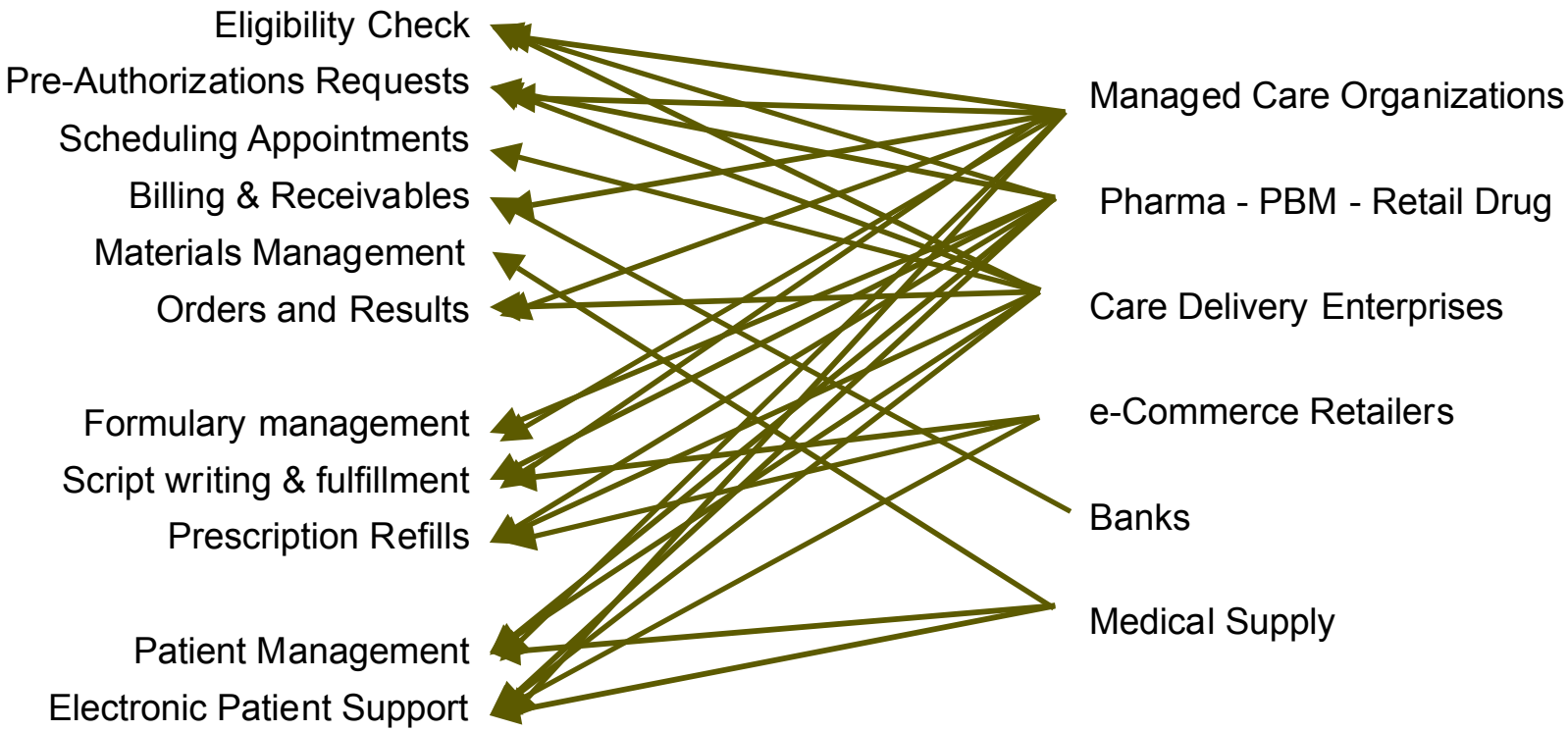
CRG DM	Outpatient Laboratory	Complications		Avg. APR-DRG Charges		Hospitalization Rate	
	Actl/Expt		Actl/Expt	Actl	Expt	Actl	Expt
Level 1	0.39 0.25	EDC	4…..7	3,700	4,106	1.4	0.5
Level 2	0.47 0.39	EDC	2…..9	4,700	5,757	2.8	1.2
Level 3	0.40 0.59	EDC	6…..12	12,537	9,085	3.1	3.5
Level 4	0.30 0.75	EDC	12…..18	33,445	21,695	6.8	9.6

Disease Management Web Barriers: Lack of Systems Investment and Incentives



Requirement: Provide system at little cost; provide incentives

Barriers: Workflow Integration of Multiple Partners



Requirement: incorporate web product in the office workflow

Web Enabled Disease Management: Barriers

- Variation
  - Paper
  - Partners,multiple
  - Practices
  - Payors
  - Payment
  - Protocols
- Requirements:Incentives
  - Physician
  - Office Staff
  - Others

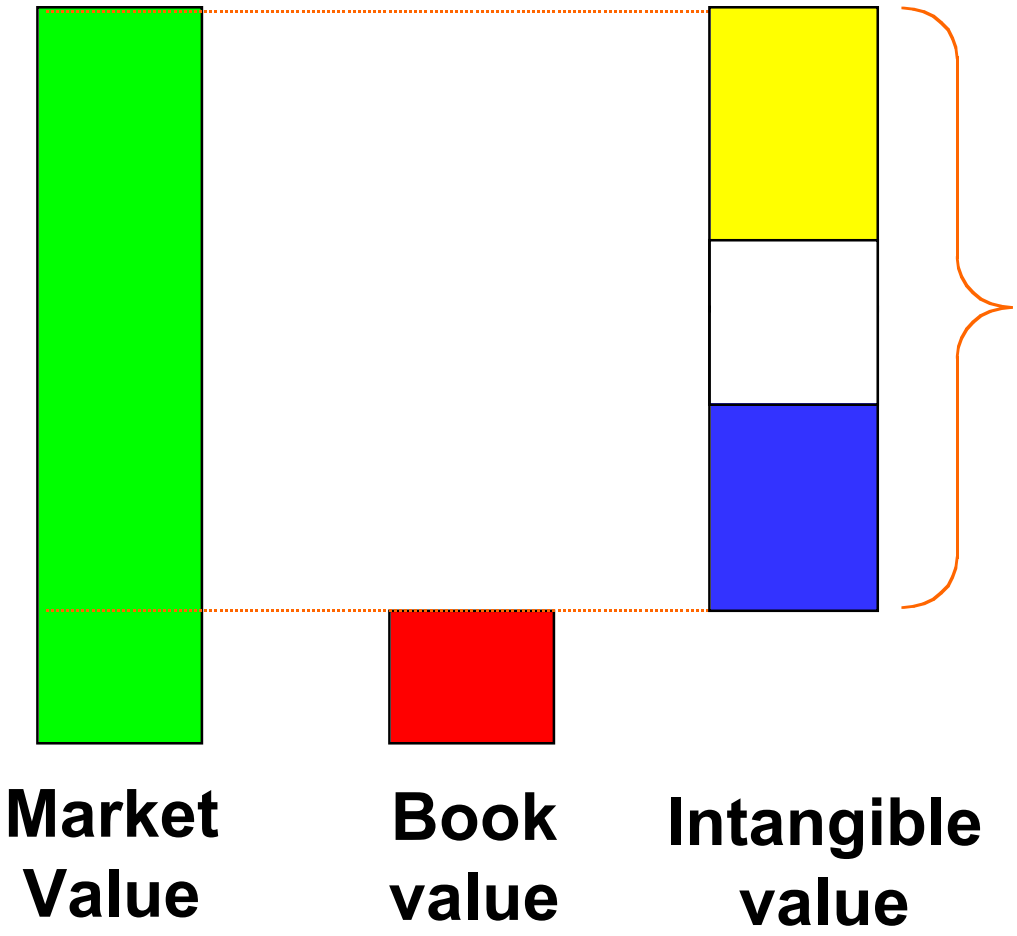
Implementation of Web Enabled Disease Management

- Standard Disease Management Clinical/Financial Definition (model)
  - Severity Adjusted
- Linkage of Transactions
  - Eligibility
  - Referral, precertification, etc.
  - Diagnostic test results
  - Medical history
- Linkage to Process Automation
  - Scheduling,registration
  - Clinical documentation
  - Guidelines
  - Adjudication, payment, EOB

Implementation (contd)

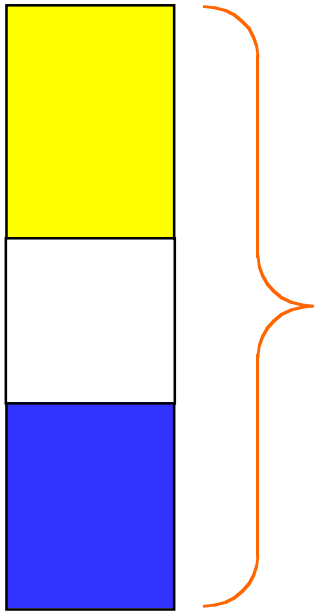
- Technical
  - Thin client “codeless” and component - based subscriptions
  - Universal practice information management systems
  - other

Web Solution can Provide Incentives: Intangible Value



1. **Customer Loyalty**
2. **E-Health**
3. **Clinical Outcomes**
4. **Community Health Leadership**

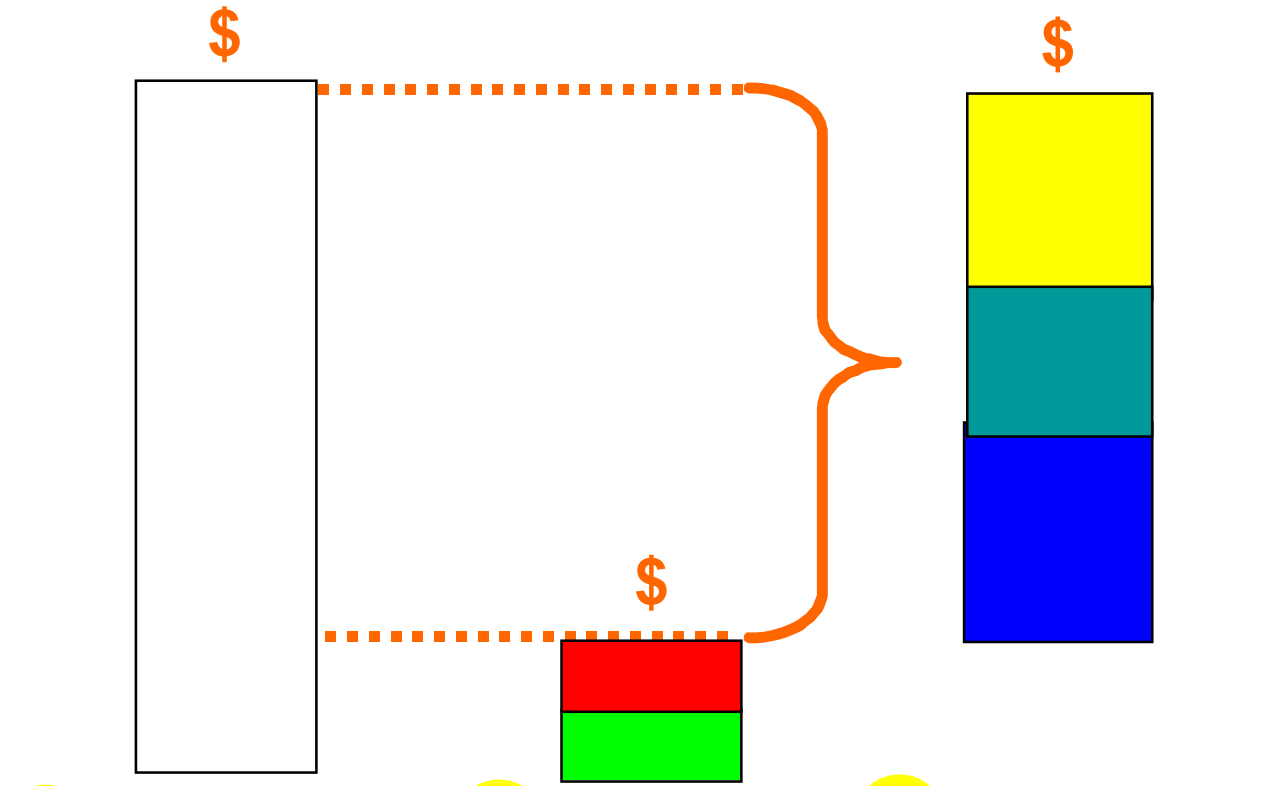
Leverage Assets to Create Value in the information Economy



Intangible value

Strategic Focus	Assets Leveraged Through Processes
1. Customer/Employee Loyalty	〈 Consumers 〈 Employees 〈 Physician Partners 〈 Brand
2. E-Health	〈 Consumers 〈 Physician Partners 〈 Supply Chain 〈 Brand 〈 Channels
3. Clinical Outcomes	〈 Physician Partners 〈 Employees 〈 Channels
4. Community Health Leadership	〈 Leadership 〈 Market Alliances 〈 Channels

Enterprise Value Leads to Intangible Value



A Market

Estimate Market Value using traditional valuation techniques

B Book

Determine Book Value from financial statements

C Market Intangible

Calculate Total Intangible Asset Value using Market less Book Value

Valuing The Intangible Assets: MARKET ALLIANCES

VALUE DRIVERS: MARKET ALLIANCES

- Value of additional consumer volume or business
- Value of additional leverage/advantage provided with Channel Partnerships

Valuing The Intangible Assets: SUPPLY CHAIN PARTNERSHIPS

VALUE DRIVERS: SUPPLY CHAIN PARTNERSHIPS

- Partner selection which provides competitive advantage
- Financial benefits from pricing or cost differentials
- Opportunity to leverage other intangible strengths due to synergistic partnering (shared human or process capital)
- Potential to capture “fair share” of value created **(*Obligations & Rewards)***

Valuing The Intangible Assets: PROCESS CAPITAL

VALUE DRIVERS: PROCESS CAPITAL

- (Best practice comparison)
- Comprehensive Medical Management (defining process)
  - Clinical effectiveness (outcomes)
  - Clinical process cost management (resource utilization, skill mix, supply/equipment standardization)
- Hospitality service management
  - Plant management systems (materials, maintenance)
  - Business management systems (AR, AP, budgeting, benefits)
  - Customer management systems
- CQI/TQM Culture (renewal & upgrading of all process capital)
  - Pervasiveness and intensity
  - Proof of results
- Value-creating information technology

VALUATION METHODOLOGY

	Cost	Market	Income
Consumer	*Costs of development and maintenance of customer relationships*	*Market transactions for sale of customer relationships*	*Present value of future income from customer relationship*
Brand	*Costs to develop and maintain a brand of similar stature*	*Market sales for similar brand strengths*	*Present value of future income attributed to brand over its remaining life*
		Capitalized Royalty Income & Income methods	*Method is a combination of Market*
Channel	*Cost to develop and ;maintain alliance*	*Cost to develop and ;maintain alliance*	*Present value of future income from Channel relationships*
Alliances	*Cost to develop and ;maintain alliance*	*Cost to develop and ;maintain alliance*	*Present value of future income for alliance*
Human Capital	*Costs to reproduce or replace the current work force*	*Market transactions for the sale of work force*	*Present value of future income for a single employee for their remaining tenure*
Physician Partners	*Costs to develop and maintain a specific level of physician partnership*	*Comparable market transactions*	*Present value of future income for a physician relationship*
Supply Chain Partners	*Costs to develop and maintain supply chain partnerships*	*Comparable market transaction*	*Present value of future income associated with Partnership*
Process	*Costs to develop and implement processes*	*Comparable market transactions*	*Present value of future income that process generates*

VALUATION METHODOLOGY DESIRABILITY

	Cost	Market	Income
Consumer	*Difficult to find cost data*	*Need comparable transaction – difficult for hospitals*	**Most Commonly Used**
Brand	*Difficult to find data*	**Either method is good; most commonly used is combination of the two: Capitalized Royalty Income Method**	
Channel	*Difficult to find data*	*Contracts are Individual Based – May be difficult to find market comparison*	**Most preferable- easiest to find data**
Alliances	*Difficult to find data*	*Contracts are Individual Based – May be difficult to find market comparison*	**Most preferable- easiest to find data**
Human Capital	**Most Commonly Used**	*No real market comparison*	*Difficult to estimate expected income from single worker*
Physician Partners	*May be difficult to find data*	*No real market comparison*	**Most preferable- easiest to find data**
Supply Chain Partners	*Difficult to find data*	*Contracts are Individual Based – No real market comparison*	**Most preferable- easiest to find data**
Process	**Any of these methods is equally good; depends upon availability of data needed for valuation**		

Web Management of the Continuum of Care