Session 11, Evaluating Onsite Healthcare's Impact on Population Health, Healthcare cost, and Workforce Productivity

2019 Health Meeting

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Session 011

Evaluating Onsite Healthcare's impact on population health, healthcare cost, and workforce productivity.

June 24, 2019

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John Dawson, Chief Actuary and Senior Vice President
Healthstat, Inc

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Opportunity for Improvement

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70%
Lifestyle

$245B
Diabetes

$316B
Heart Disease

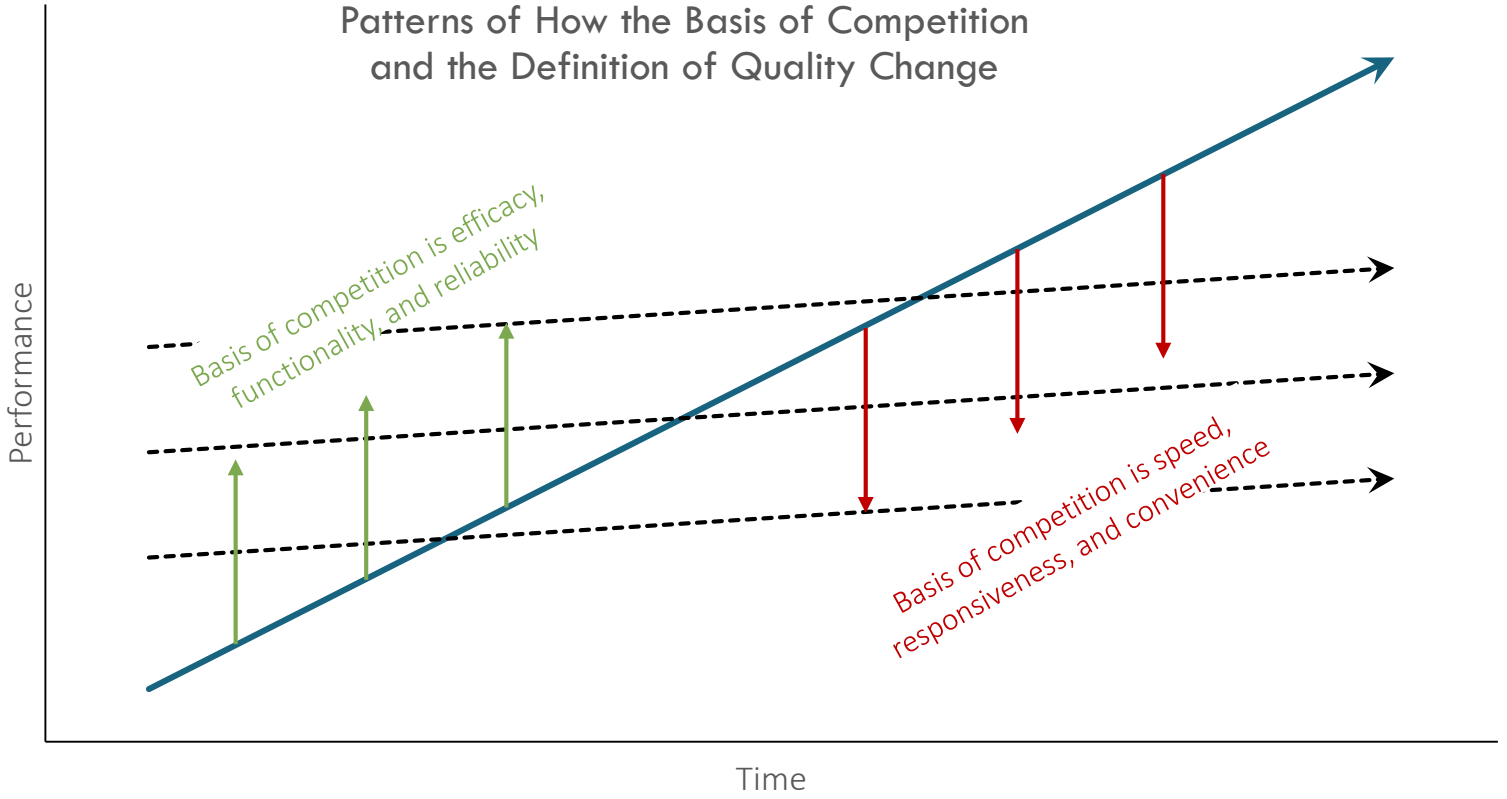
$249B
Excessive Drinking

$300B
Smoking

86%
Chronic Disease

$147B
Obesity

Disruptive Innovation



Onsite Healthcare Basics

- Disruptive innovation that brings healthcare *closer to the consumer*
- Care may be delivered by a physician, physician assistant, or nurse practitioner
- Incentives are commonly used to encourage clinic utilization and engagement
- Onsite dispensary drives utilization and medication compliance.
- Routine labs can be processed on site; some larger clinics offer imaging services
- Scope of services vary widely from one clinic and onsite healthcare provider to the next

Behavior Change

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Capabilities + Motivation	>	Barriers + Temptations

Source: *The 11th Habit* by Andrew Sykes and Hanlie Van Wyk

Behavior Change

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Progress

PRE-CONTEMPLATION
Change has not crossed the mind

CONTEMPLATION
Change is on the mind

PREPARATION
Getting ready for change

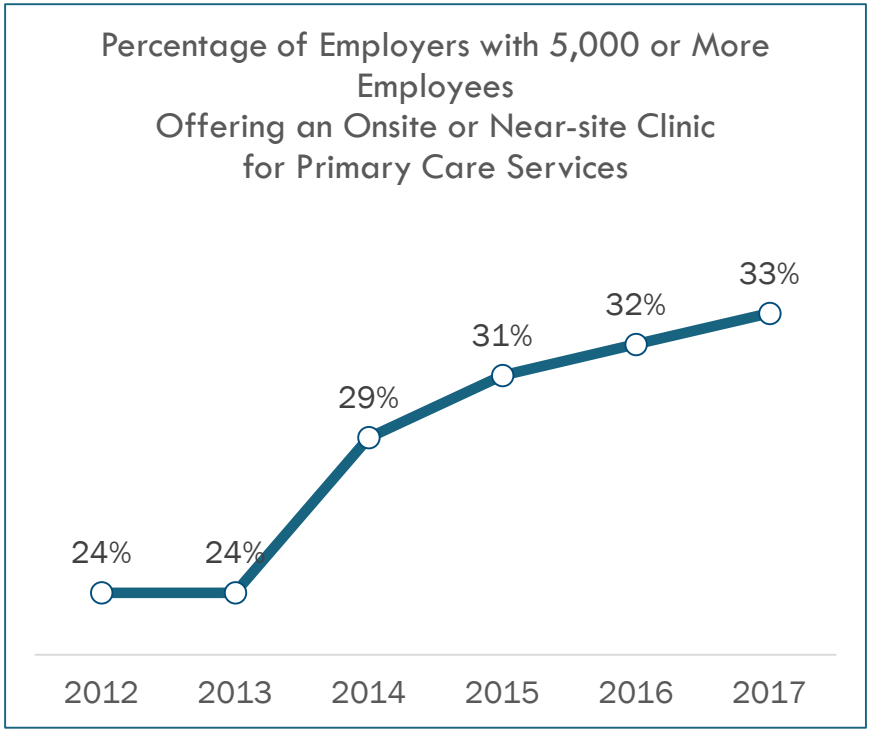
ACTION
Beginning the change

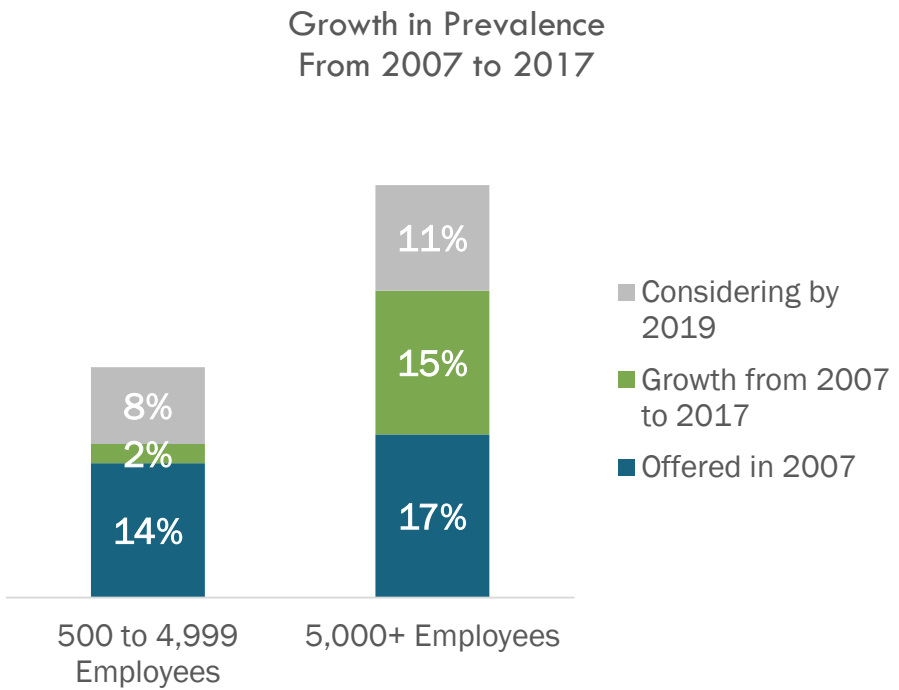
MAINTENANCE
In the midst of change

TERMINATION
100% confidence in maintaining change

Relapse

Worksite Clinic Prevalence





Source: National Association of Worksite Health Centers/Mercer , *Worksite Medical Clinics 2018 Survey Report*

Measuring Results

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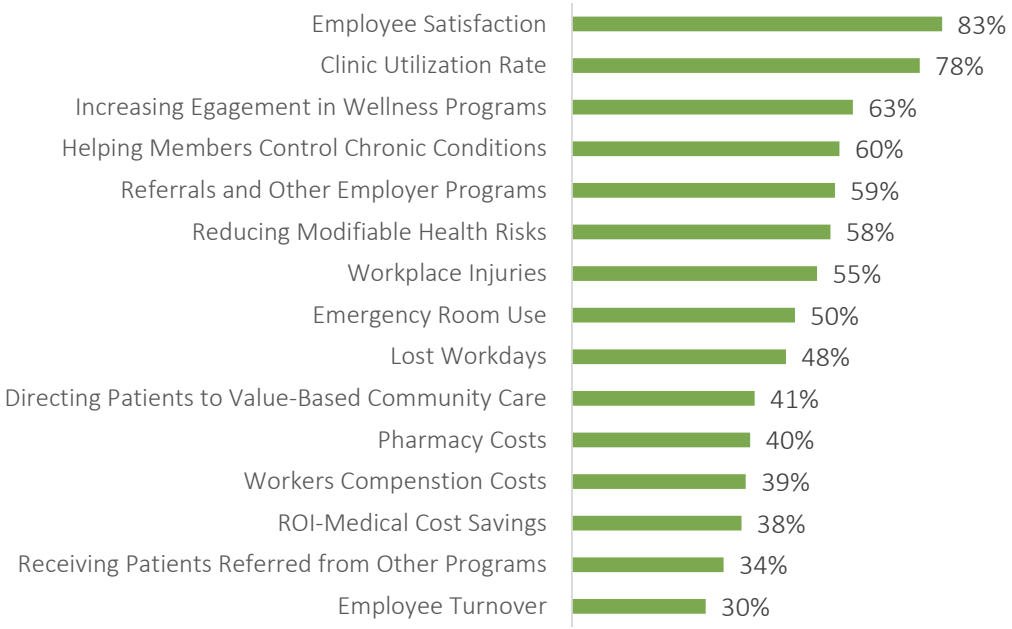
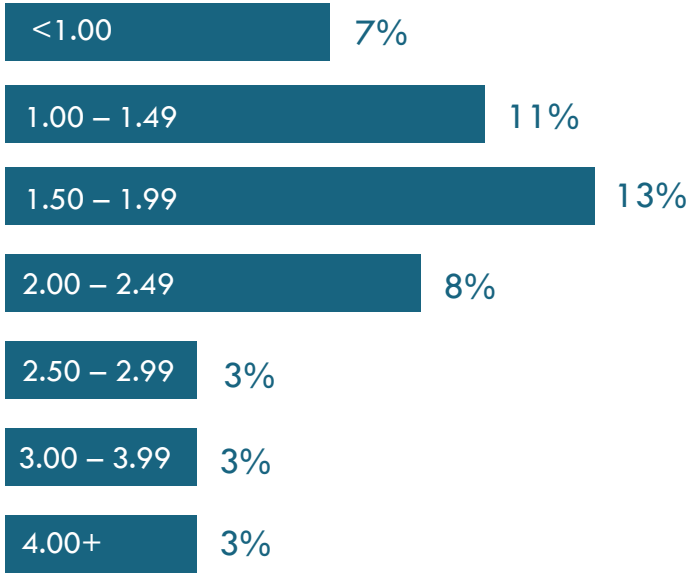
Percentage of Respondents Rating Clinic Performance as Successful

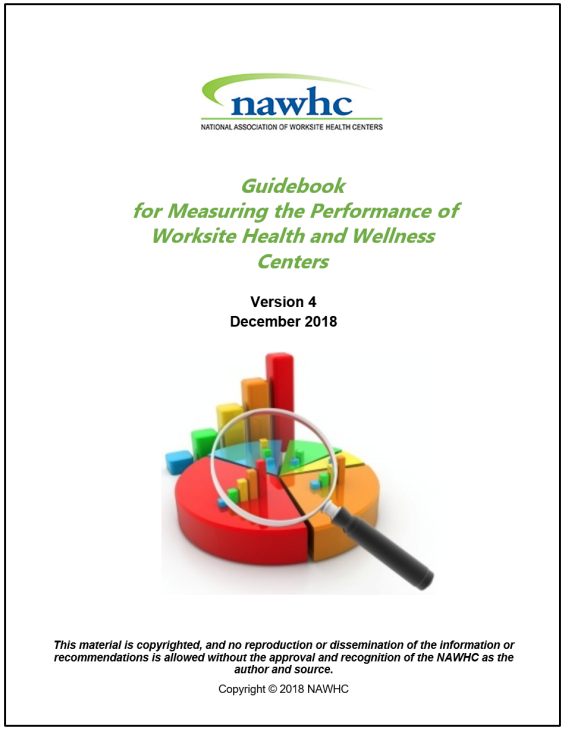


ROI Among Those That Measured It



Source: National Association of Worksite Health Centers/Mercer , *Worksite Medical Clinics 2018 Survey Report*

Measuring Results



- The objectives to be measured
- The types of centers used by employers to provide various levels of medical and occupational health services
- The metrics and methodology to be used
- The definitions to be agreed on
- The population to be measured
- The areas to be measured
- The data required and available for use; and
- The types and frequency of the reports for various areas being measured

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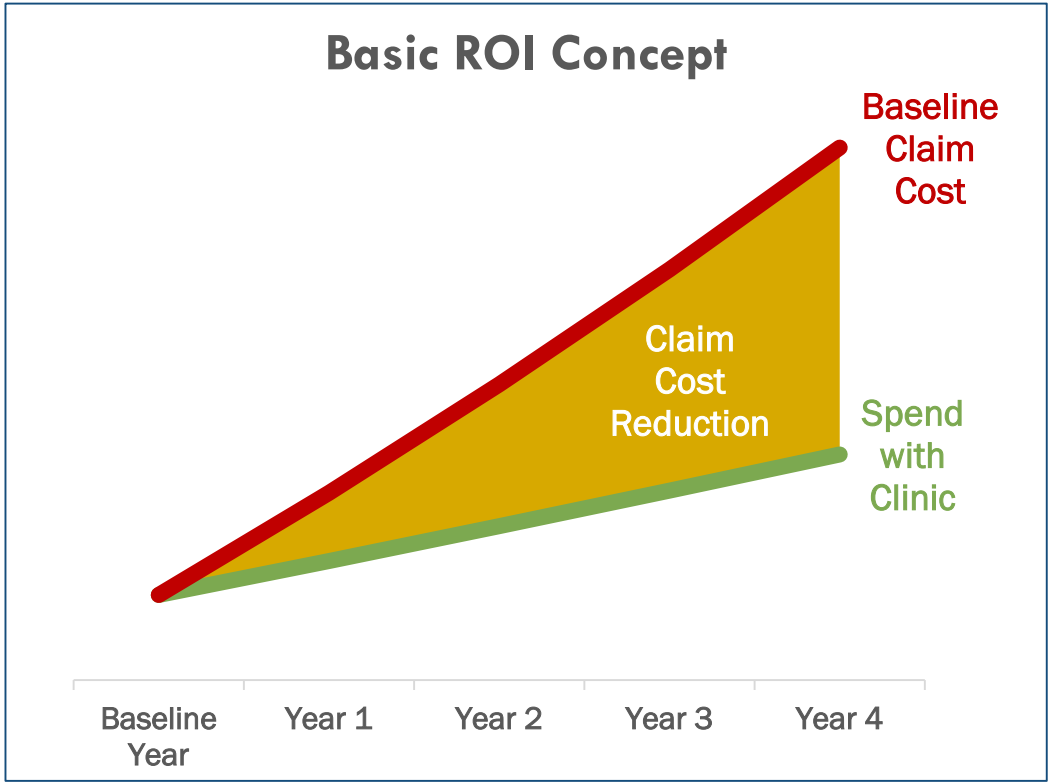
Diversion of Care

$$\left(\begin{matrix}Cost\ per\\ Visit\end{matrix}_{\begin{matrix}Community\\ Based\\ Care\end{matrix}} - \begin{matrix}Cost\ per\\ Visit\end{matrix}_{\begin{matrix}Onsite\\ Healthcare\\ Clinic\end{matrix}}\right) \times Clinic\ Visits$$

This formula may be appropriate for acute care clinics that focus on diverting care into a lower cost setting.

But, this formula applies the ***wrong paradigm*** for an onsite healthcare program focused on engaging members in reducing risk and improving health.



A more comprehensive approach compares actual claim costs to a baseline to determine claim cost reduction over time.

When coupled with health improvement metrics, this approach can validate an employer's investment in an onsite healthcare program.

MOUNT VERNON
PASSION FOR PERFECTION

Gary Williams, Vice President of Human Resources
Mount Vernon Mills, Inc.

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Mount Vernon at a Glance

- Privately owned 100% Domestic Textile Manufacturing Company – yes, we still exist!!
- 2,400 Employees – 6,200 in 1999
- Close to $500 Million in Sales
- Operating 12 locations in 5 States – South Carolina, North Carolina, Georgia, Alabama, Mississippi

What We're Facing

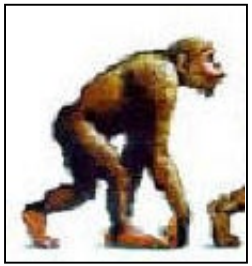
- Average age approaching 50 YOA
- Benefits at a premium
- Competing in a global market with high capitalization and low margin products
- Customers continue to dictate pricing and requirements
- Example of how the "price rollbacks" work

Medical Costs and Trend

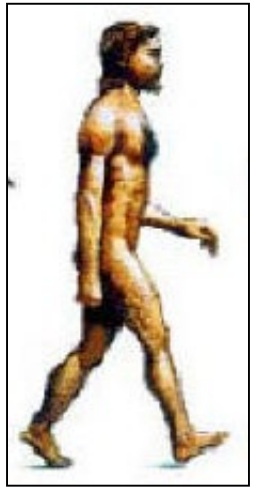
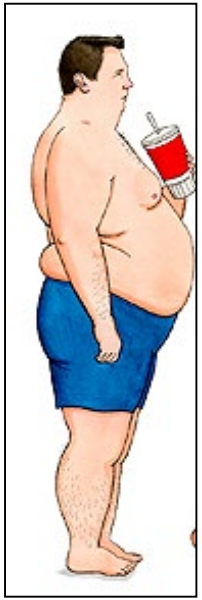
- The challenge for all of us – beating the trend!!
- Medical costs continue to increase as margins shrink.

  (Did I mention that we are a textile company?)
- **Total** Cost of Health Issues

The Health Hurdle



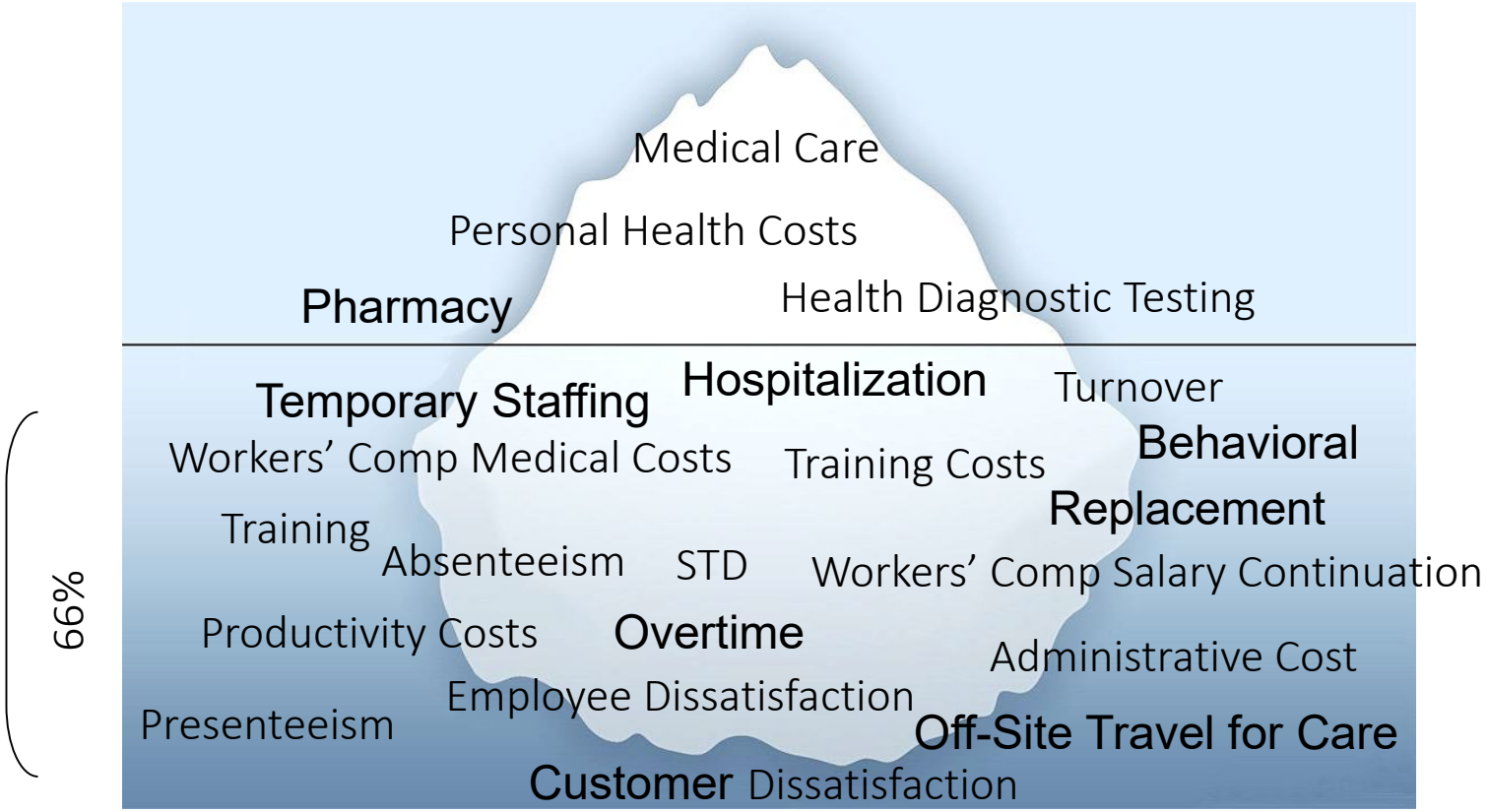


Millions of Years

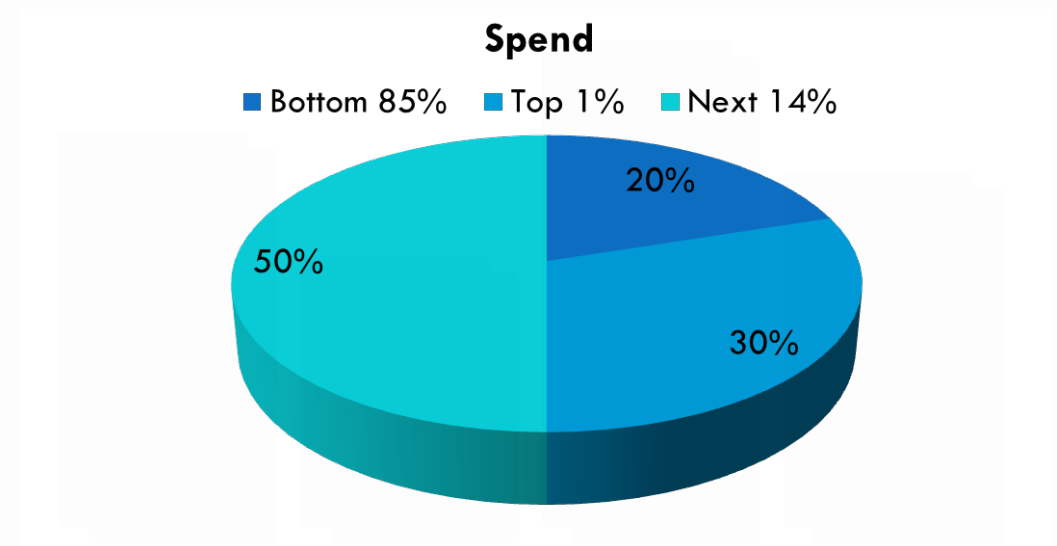
50 Years

The Full Cost of Employee Care



Number 1 driver of escalating Health Care Cost:

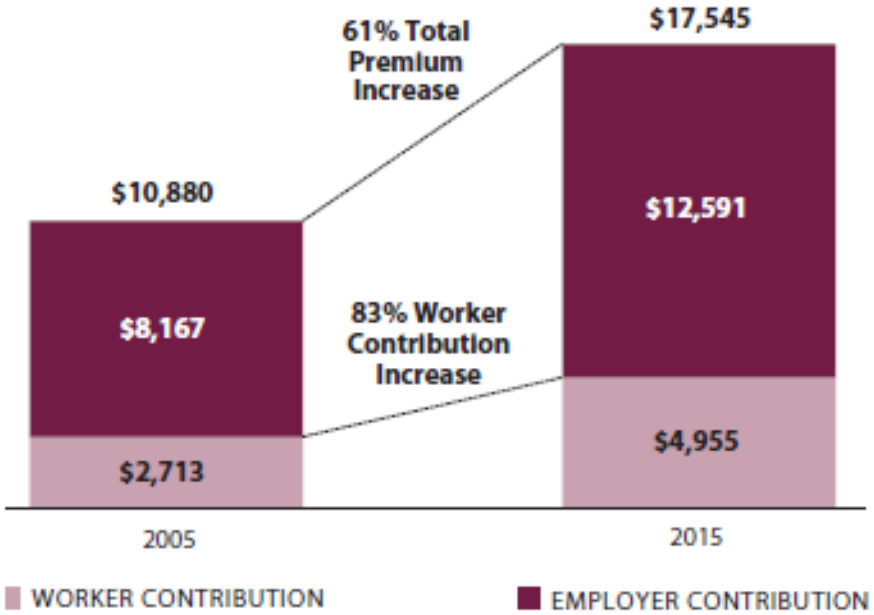
The Chronically Ill – Even worse than the 80/20 rule we have heard.



And most of these people spent less than $500 the year before their health exploded!

Premiums and Worker Contributions

Average Annual Health Insurance Premiums and Worker Contributions for Family Coverage, 2005–2015



SOURCE: Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2005–2015.

During the same period, workers' wages increased 1.9% and inflation declined 0.2%

Ideas for Controlling the Costs

- Managed Care
- Cost Sharing
- Consumer Driven
- Plan Design
- Health Fairs
- Disease Management

Clinic Advantages for Mount Vernon Mills

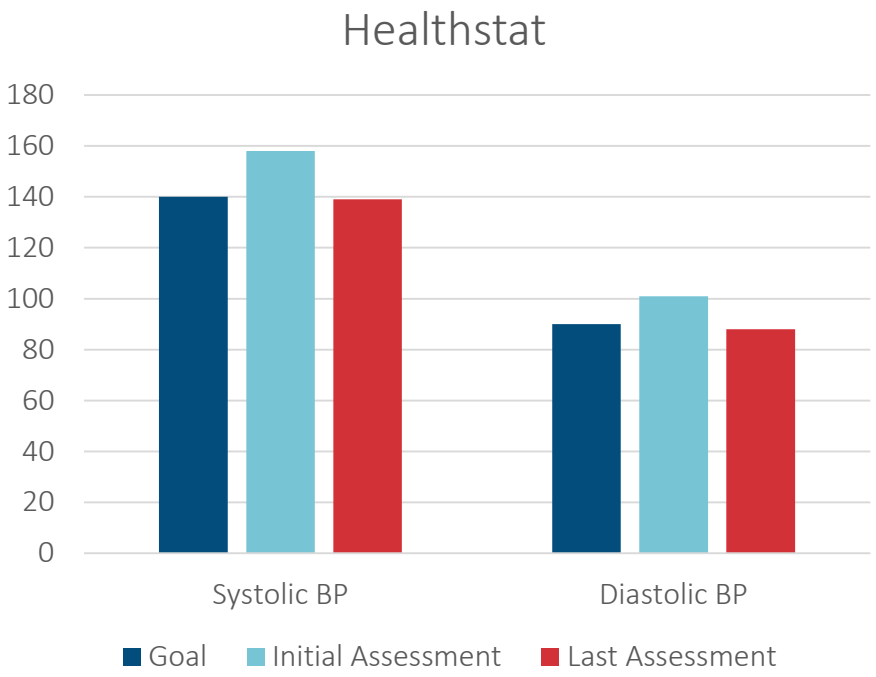
- Direct savings on medical costs.
- Allow changes to plan design – less painful?
- Time away from work savings.
- Employee satisfaction in a difficult situation

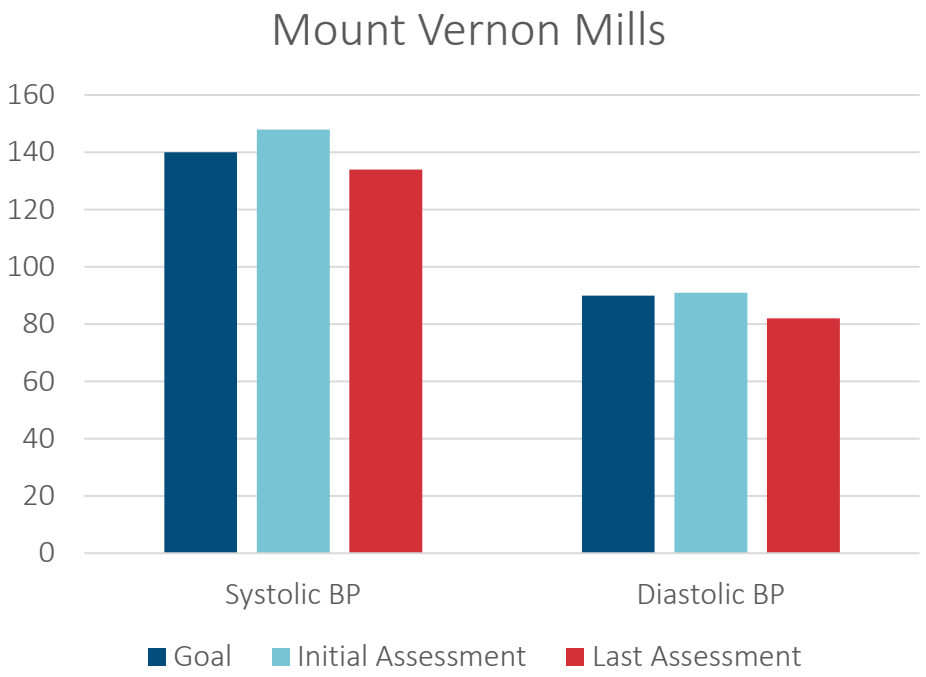
(did I mention we are in the textile industry?)

Clinic History at Mount Vernon Mills

- Started first clinic in Trion, GA (1500 ee's) in September 2003 - voluntary for ee's
- Opened clinics at all other locations on or about July 2004. Eliminated co-pays at physician offices, allowed spouses, & **no fee to see the Nurse Practitioners**
- Required employee participation in Jan. 2005
- Required spouse participation in 2006
- Clinics run from 8 to 36 hours per week depending on plant size
- Required compliance for employees in 2013 – spouses required for 2015

Program Results: BP of 20% Highest Risk





Health Impact

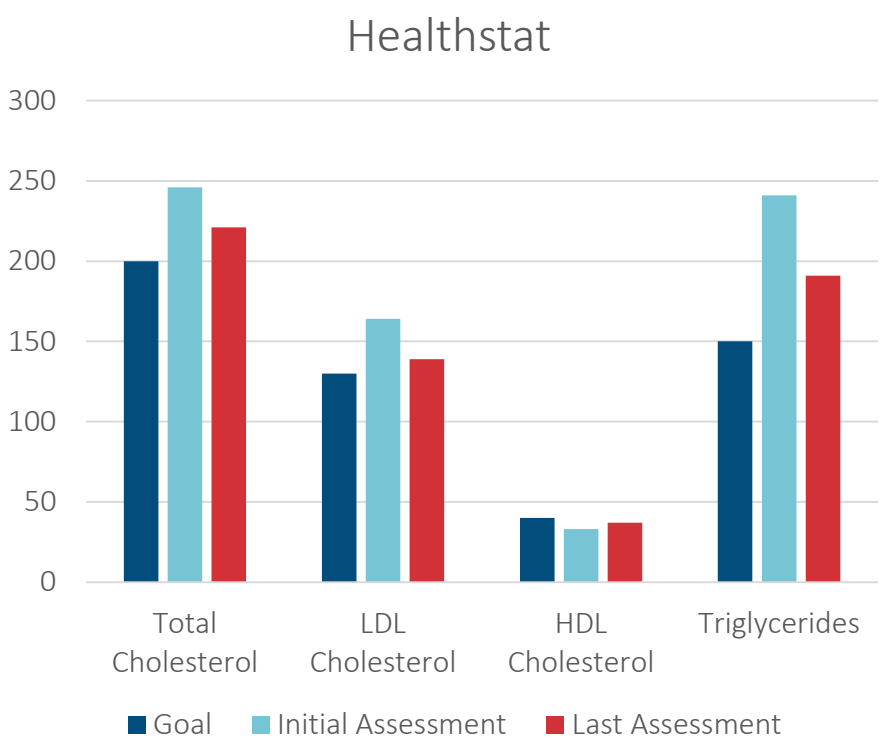
HEALTHSTAT

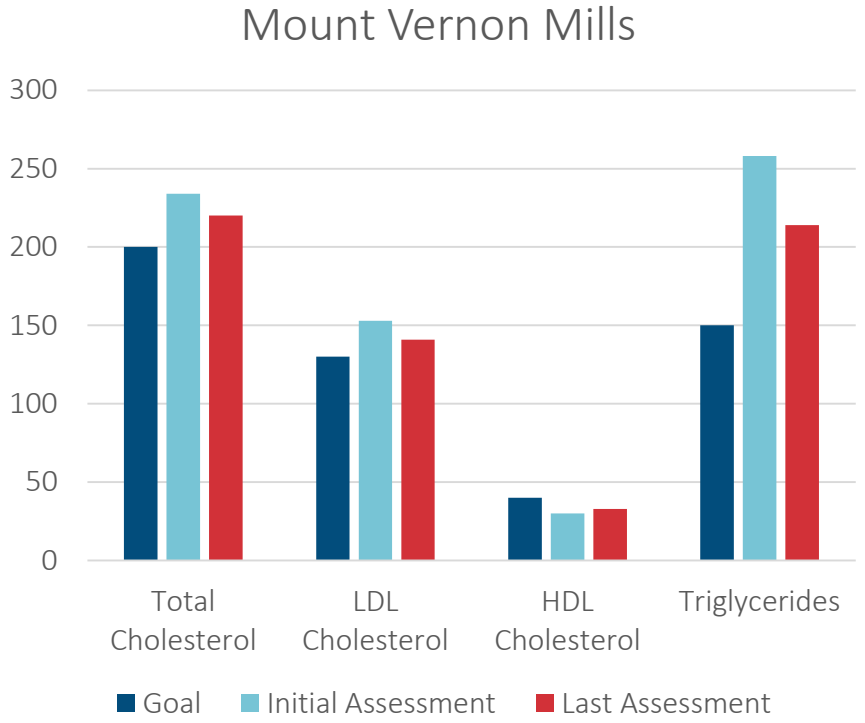
The change in blood pressure reduced risk of 10-year cardiovascular mortality rate complications by 24%

MOUNT VERNON MILLS

The change in blood pressure reduced risk of 10-year cardiovascular mortality rate complications by 34%

Program Results: Lipids of 20% Highest Risk





Health Impact

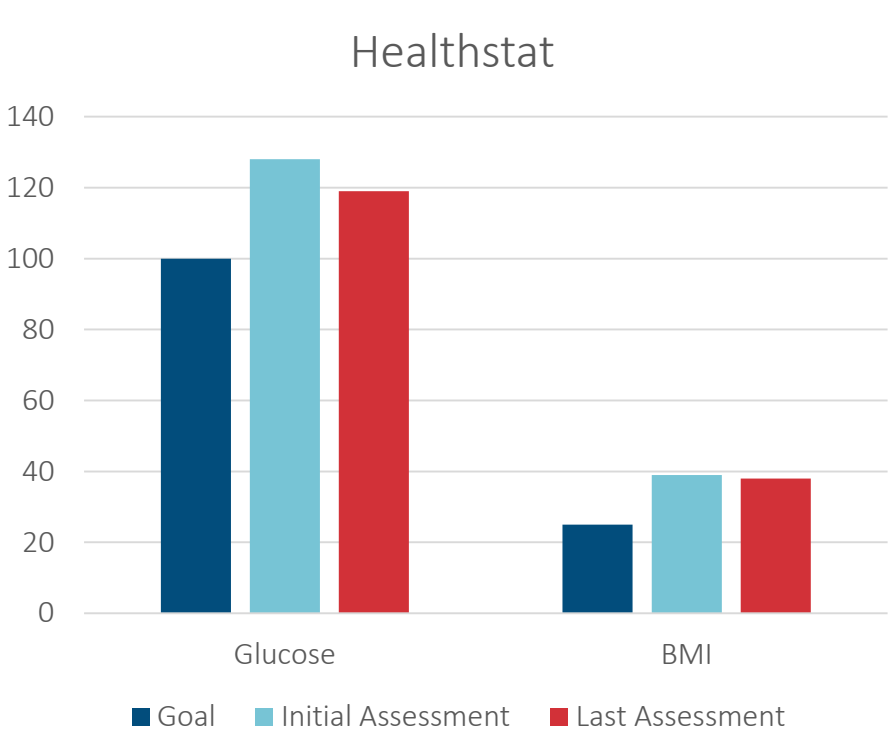
HEALTHSTAT

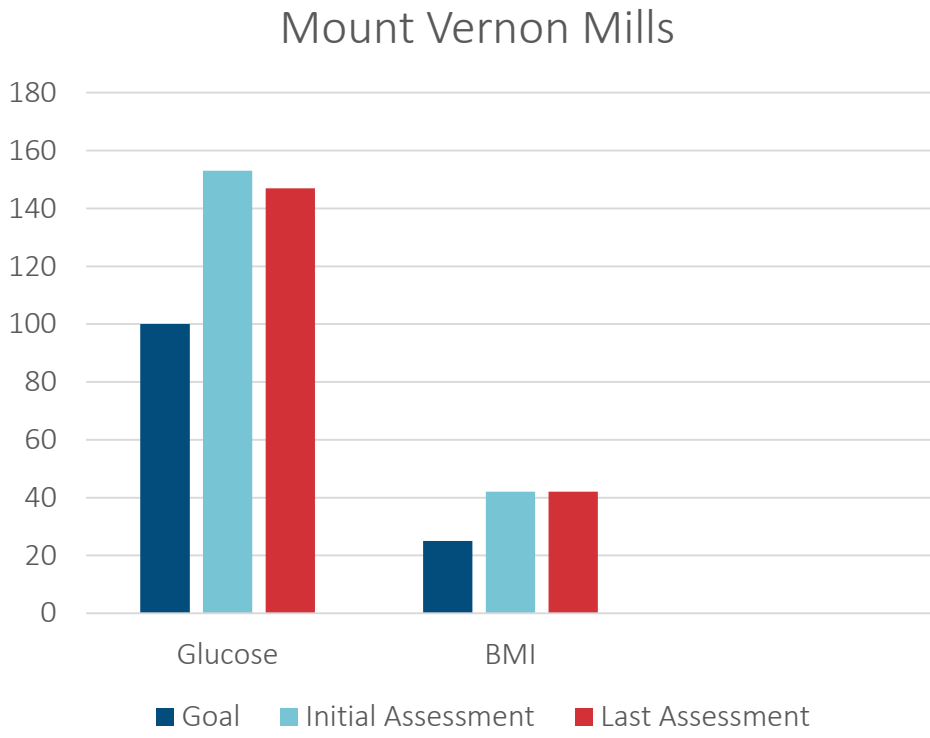
The change in total cholesterol reduced risk of cardiovascular complications by 20%

MOUNT VERNON MILLS

The change in total cholesterol reduced risk of cardiovascular complications by 22%

Program Results: Glucose & BMI of 20% Highest Risk

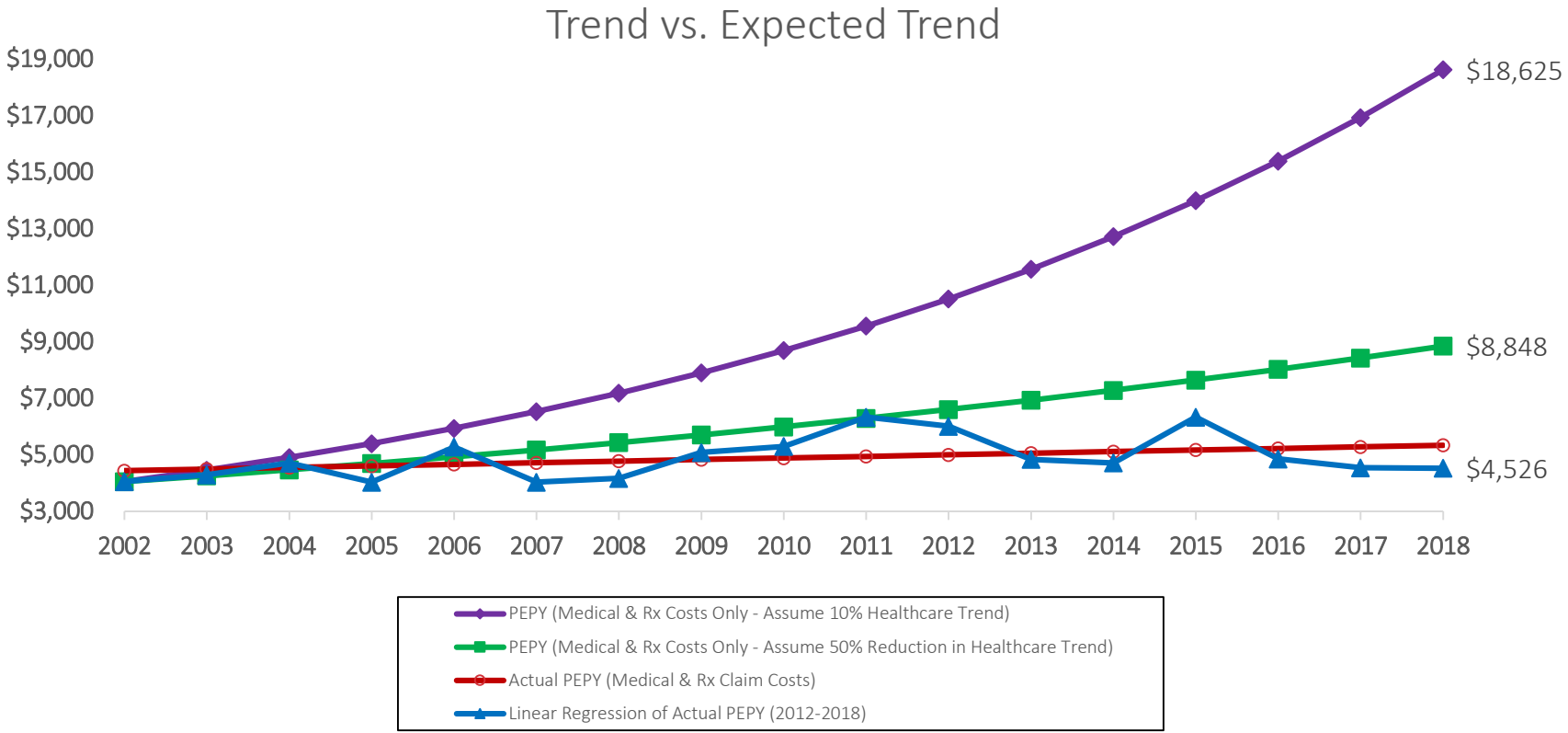




Health Impact

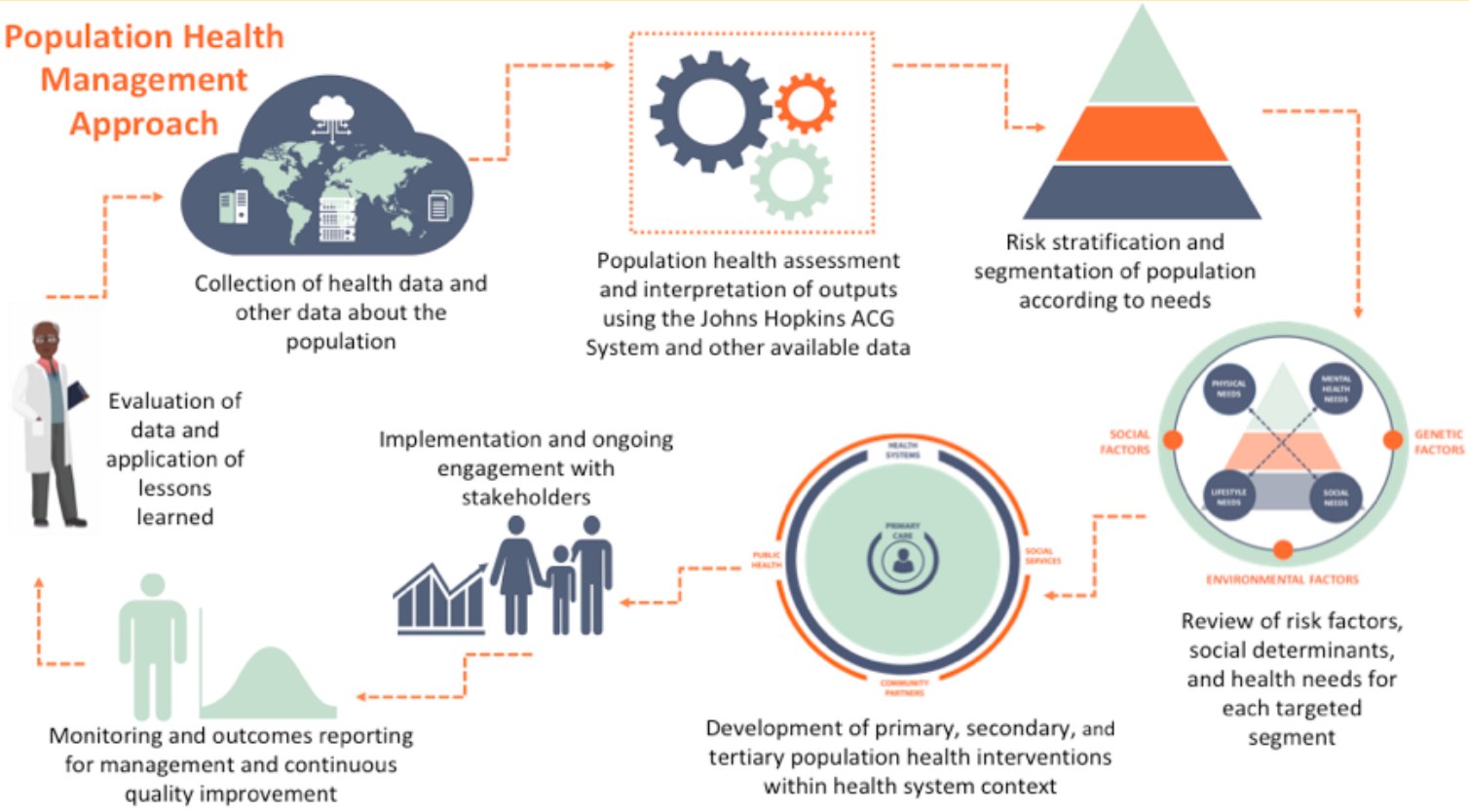
Reduced FBG is associated with decreased risk of heart attack and complications of diabetes (retinopathy, kidney disease, peripheral artery disease, and stroke).

Mount Vernon Mills Trends vs Expected Trend (includes clinic cost)

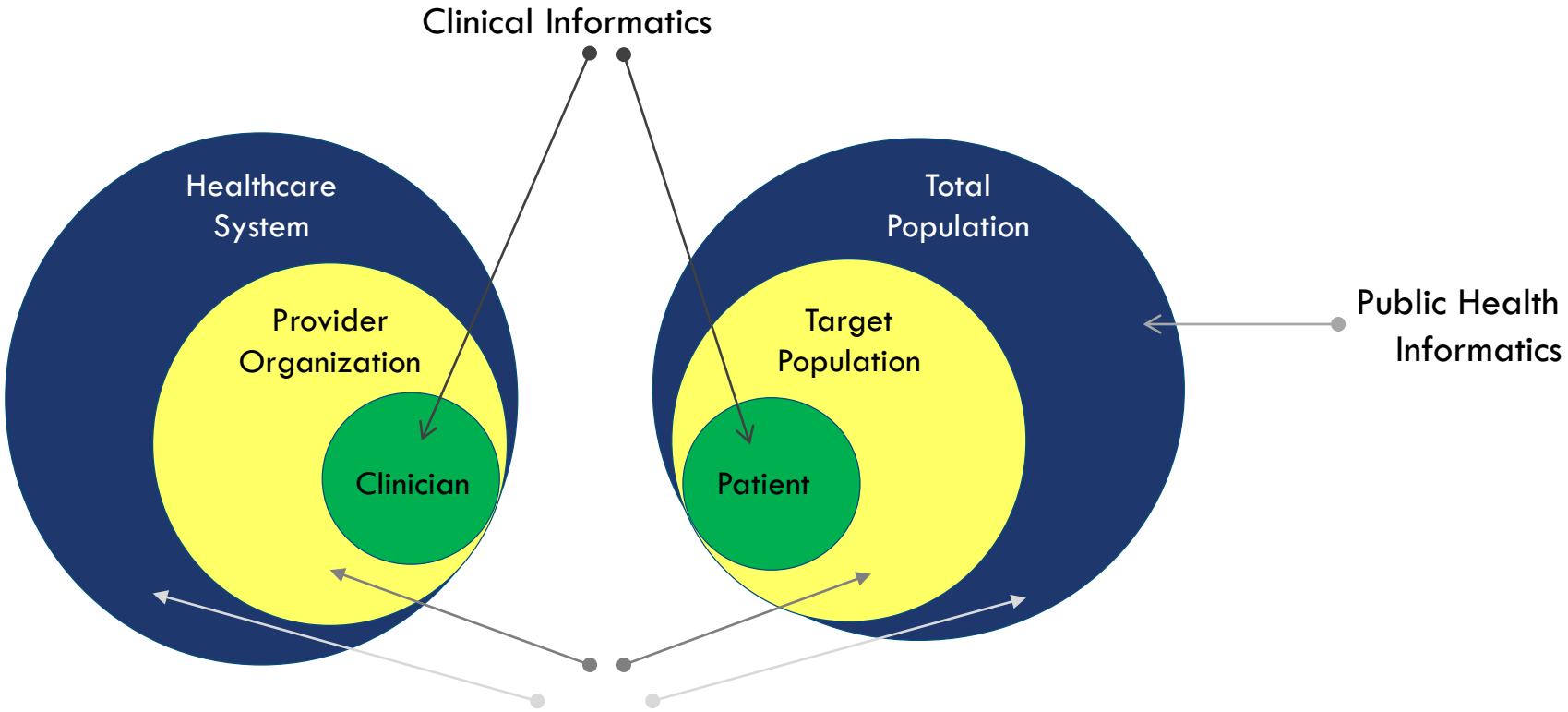


Kumar Subramaniam, DBA, Executive Director, Population Health Analytics
Johns Hopkins HealthCare Solutions

Approach

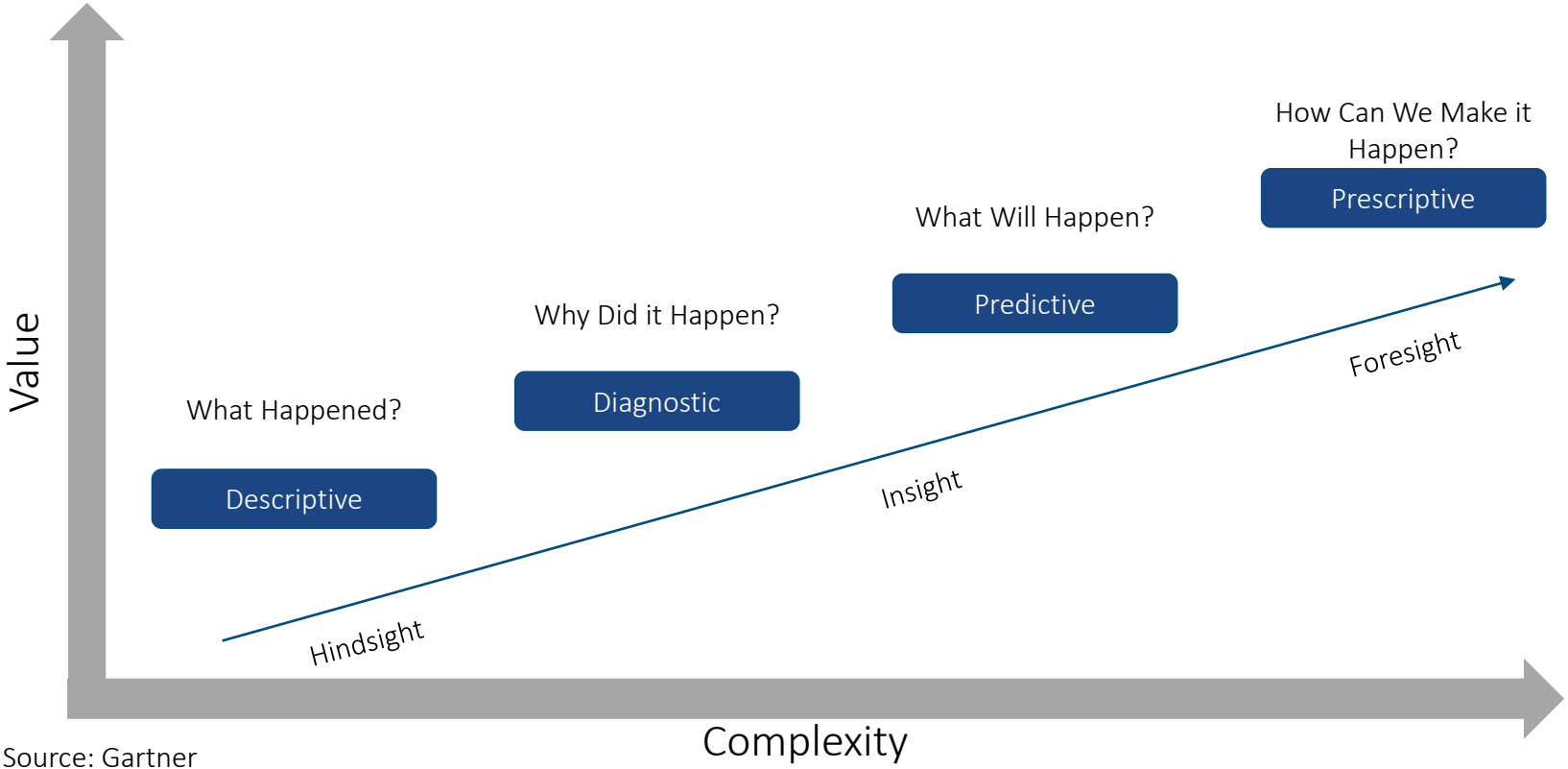

Population Health Management Approach
Collection of health data and other data about the population
Population health assessment and interpretation of outputs using the Johns Hopkins ACG System and other available data
Risk stratification and segmentation of population according to needs
Review of risk factors, social determinants, and health needs for each targeted segment
Development of primary, secondary, and tertiary population health interventions within health system context
Implementation and ongoing engagement with stakeholders
Evaluation of data and application of lessons learned
Monitoring and outcomes reporting for management and continuous quality improvement

Where Population Health Informatics Fits



Source: CPHIT White Paper in *JAMIA* - Kharrazi H. et. al. - https://www.ncbi.nlm.nih.gov/pubmed/27018264

Analytics Value Scale



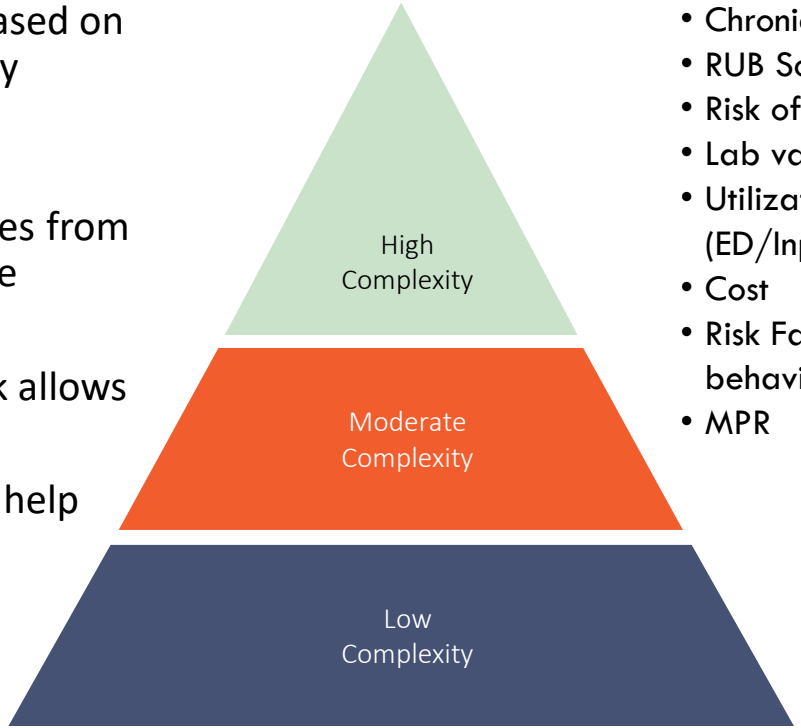
Source: Gartner

Challenges in Using Data for Healthcare Analytics

- Outcomes are only as good as the quality – completeness, accuracy, consistency, reliability – of the sourced data and methods used.
- Some - though not all - data relevant to population health are unstructured and "messy" (e.g., clinicians notes and social networks).
- Some data streams (imaging, sensors, genomics) are huge, but most others are reasonably sized (by today's tech standards)
- Until interoperability (both within and external to care delivery) is surmounted, much data will be missing and difficult to link.
- So called "machine learning" / "AI" is only a small part of the solution and often over-rated. Logic, evidence and "domain expertise" are still essential.
- Tools to share practical information with humans is key.

Risk Stratification to Inform Intervention

- Hopkins Healthcare uses predictive models based on claims, labs, and other data sources to identify individuals by risk level
- Resource Utilization Bands (RUB scores), hospitalization risk scores, and other risk scores from the Johns Hopkins ACG System help categorize individuals by level of risk
- Risk-based stratification of populations by risk allows us to identify subgroups for intervention
- Predictive modeling and patient stratification help match patients' health needs to appropriate interventions



Risk stratification and segmentation of population according to needs

- Chronic condition count
- RUB Scores
- Risk of hospitalization
- Lab values
- Utilization (ED/Inpatient)
- Cost
- Risk Factors (social, behavioral, mental)
- MPR

ACG – A Unique Population Health Analytics Tool

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A Unique Approach

"Clustering of morbidity is a better predictor of resource use than the presence of a specific disease"

Developed by a Pediatrician - Barbara Starfield and continually maintained by CPHIT team at Johns Hopkins Bloomberg School of Public Health

Used within JH & Commercially

Used by:

- All 4 JHHC LOBs
- Payers
- Providers
- Self-Insured Employers
- Governments
- Integrators
- The UK, Italy, Spain, South Africa, Norway, Sweden, Germany and many others

Clinically Validated

Validated in over 20 countries

Used to actively monitor & manage 170+ million lives

Referenced in +/- 900 peer-reviewed journal articles

The ACG System is …

Clinically Cogent

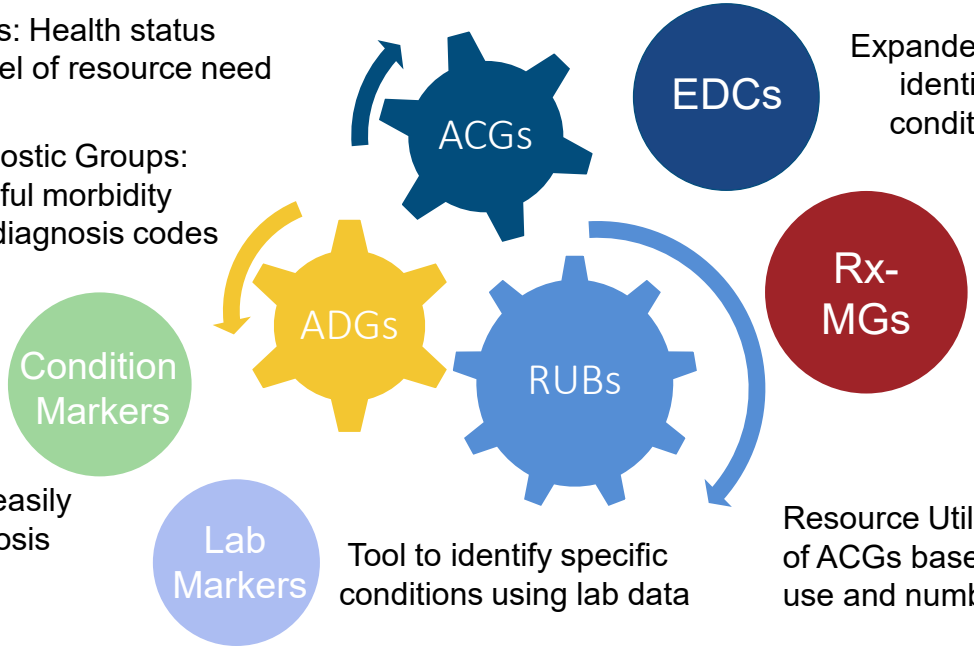
Flexible & Customizable

A revenue source for JHHC and JHBSPH

The ACG System uses an integrated set of tools to identify individuals for proactive, targeted interventions

Adjusted Clinical Groups: Health status categories based on level of resource need

Aggregated Diagnostic Groups: Clinically meaningful morbidity groups based on diagnosis codes



Expanded Diagnostic Clusters: Tool to identify individuals with specific conditions and condition clusters

Rx-Defined Morbidity Groups: Tool to identify individuals in similar morbidity groups by drug class

21 common conditions easily identified through diagnosis & pharmacy data

Tool to identify specific conditions using lab data

Resource Utilization Bands: Groupings of ACGs based on concurrent resource use and number of comorbidities

ACG System – Core Applications and Use Cases

Core Applications and Use Cases

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1 Population health management

- Population segmentation & risk stratification
- Identify high risk patients and gaps in care
- Identify misuse of ED, risk of admission and readmission

2 Care coordination

- Coordinate patient care effectively to contain costs and improve patient outcomes

3 Provider engagement

- Allocate resources equitably amongst providers based on case mix adjustment
- Evaluate whether providers are efficiently using allocated resources based on patients' needs

Population Segmentation & Risk Stratification

What is the current risk of a population or sub-group compared to a benchmark?

What are the specific risk factors that are contributing to resource use?

ACG SYSTEM APPROACH

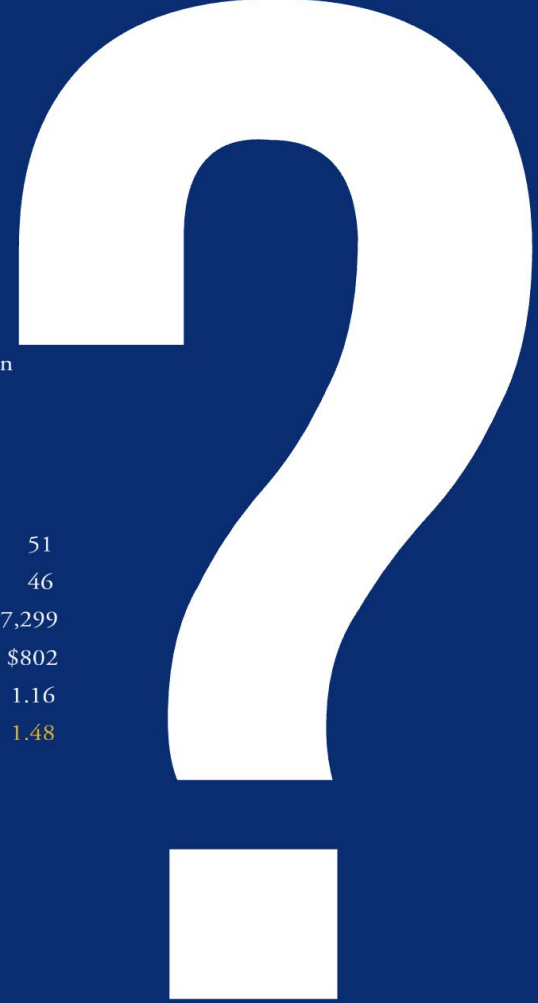
Begin by segmenting the population to understand the current risk of the population compared to the average.

Here we see that this patient population's utilization of resources is 50% higher than a comparison group based on their patterns of morbidity.

Population

Patient Count	2,062	Average Age	51
Total Cost	$21,789,386	Local Average Age	46
Pharmacy Cost	$2,056,048	Local Average Total Cost	$7,299
Total Cost PMPY	$10,567	Local Average Pharmacy Cost	$802
Pharmacy Cost PMPY	$997	Local Age-Gender Concurrent Risk	1.16
Truncated Patient Count	0	Local ACG Concurrent Risk	1.48
Truncated Total Cost	$0		

Population Segmentation & Risk Stratification



Understand which risk factors are more present than average

Population Risk Factors	Subgroup	Reference
1+ Hospital Dominant Morbidit(ies)	17.99%	4.76%
Frailty Condition	5.72%	2.16%
1+ Chronic Condition(s)	68.57%	49.89%
Psychosocial Condition	26.24%	24.61%

Population Segmentation & Risk Stratification

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SMR is an epidemiological technique where individuals get classified and compared to a reference population, against people of similar age/gender.

This can identify conditions that have a disproportionate prevalence compared to what would be expected in the reference population.

Disease Prevalence (Top 30 Conditions)

EDC	Description	Patients	Obs/1000	Age-Sex Exp/1000	SMR	Sig
ADM06	Preventive Care	1,307	633.85	503.21	1.26	+
ADM05	Administrative concerns and non-specific laboratory abnormalities	624	302.62	287.43	1.05	
CAR14	Hypertension, w/o major complications	544	263.82	276.67	0.95	
CAR11	Disorders of lipid metabolism	489	237.15	235.79	1.01	
MUS17	Musculoskeletal disorders, other	487	236.18	87.66	2.69	+
MUS01	Musculoskeletal signs and symptoms	332	161.01	226.51	0.71	-
EAR11	Acute upper respiratory tract infection	251	121.73	131.75	0.92	
NUR01	Neurological signs and symptoms	241	116.88	38.85	3.01	+

Population Segmentation & Risk Stratification

Similarly, RxMG prevalence allows us to see which medications are most prevalent compared to what would be expected.

RxMG Prevalence (Top 30 Conditions)

RxMG	Description	Patients	Obs/1000	Age-Sex(+) Exp/1000	SMR	Sig
INFx020	Infections / Acute minor	770	373.42	403.54	0.93	-
PAIx040	Pain / Severe Pain	427	207.08	201.77	1.03	
CARx030	Cardiovascular / Hypertension	403	195.44	284.16	0.69	-
CARx040	Cardiovascular / Hyperlipidema	334	161.98	215.00	0.75	-
PSYx040	Psychiatric / Behavioral / Depression	273	132.40	143.09	0.93	
IFAx030	Inflammatory / Systemic: High Impact	215	104.27	98.58	1.06	
RESx040	Repiratory / Airway Hyperactivity	207	100.39	98.42	1.02	
SKNx020	Skin / Acute and Recurrent	201	97.48	124.47	0.78	-
IFAx020	Inflammatory / Systemic: Low Impact	199	96.51	110.42	0.87	-
CARx070	Cardiovascular / Edema	193	93.60	144.99	0.65	-
PSYx030	Psychiatric / Behavioral / Anxiety	173	83.90	106.73	0.79	-
GASx011	Gastrointestinal / Hepatic / Symptoms	172	83.41	68.99	1.21	+
GASx060	Gastrointestinal / Hepatic / Peptic Disease	170	82.44	84.33	0.98	

Population Segmentation & Risk Stratification

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Identify High Risk Patients

ive cost and resource use within the segmented population
upriate use of the ED, high risk opioid use, and other factors.
on emergent" ED usage than average.

tion	Visit Count	Percent	Age-Sex Adjusted Reference %	Reference %
	170	29.21	25.40	28.14
ble	101	17.35	20.22	22.55
ully avoidable	31	5.33	5.57	4.00
tentially avoidable	133	22.85	22.61	16.52
	97	16.67	16.50	20.26
	31	5.33	5.42	4.03
spitalization likely	1	0.17	0.40	0.24
	9	1.55	1.67	2.08
	1	0.17	0.35	0.54
	8	1.37	1.71	1.42

?

Which patients are at high risk for a hospitalization event in the next 12 months?

Are there opportunities to save costs by redirecting patients who are using the ED for non-emergency or primary care needs?

ACG SYSTEM APPROACH

Look at various risk markers that typically drive cost and resource use within the segmented population at the patient level. These may include inappropriate use of the ED, high risk opioid use, and other factors. For example, this health system has higher "non emergent" ED usage than average.

ED Visit Type	ED Visit Type Description	Visit Count	Percent	Age-Sex Adjusted Reference %	Reference %
NONEMERG	Non-emergent	170	29.21	25.40	28.14
EMERGPC	Emergent, primary care treatable	101	17.35	20.22	22.55
EMEDPA	Emergent, ED needed, potentially avoidable	31	5.33	5.57	4.00
EMEDNPA	Emergent, ED needed, not potentially avoidable	133	22.85	22.61	16.52
INJNOSEV	Injury, non-severe	97	16.67	16.50	20.26
INJSEV	Injury, severe	31	5.33	5.42	4.03
INJSEVIP	Injury, severe and inpatient hospitalization likely	1	0.17	0.40	0.24
PSYCH	Psychiatric	9	1.55	1.67	2.08
ALCH	Alcohol use	1	0.17	0.35	0.54
UNCLASS	Unclassified	8	1.37	1.71	1.42

Identify High Risk Patients

Focus on specific patients who are lower cost this year but predicted to be high cost next year (based on a Rank Probability High Total cost >0.4) as well as those at high risk of hospitalization or readmission.

For example, this health system has 65 patients predicted to be high cost next year. They can focus on these high risk patients to understand what's driving that cost risk, identify gaps in medication, and determine likelihood of care coordination issues, so they can make appropriate decisions about the patient's care.

Prospective Risk

		High Risk Patients	65
Rescaled Total Cost Predicted Risk	1.38	High Risk Patient Total Costs	$6,135,436
Rescaled Pharmacy Cost Predicted Risk	1.31	High Risk Patient Pharmacy Costs	$213,430

Identify High Risk Patients

Pulling a Comprehensive Patient Clinical Profile Report for each high-risk patient will help identify areas of opportunity to actively manage those patients according to their needs.

Identify High Risk Patients

Comprehensive Patient Clinical Profile Report

Age	70	Sex	F
PCP Id	FBAD	Product	HMO

Prior Costs

Total Cost	$118,246
Rx Cost	0
Resource Utilization Band	5
Local ACG Concurrent Risk	10.08
CSR Adjusted HHS Risk Score	

Case Complexity

Chronic Condition Count	8
Active Ingredient Count	0
Frailty Flag	Y
Frailty Concept(s)	Difficulty in walking, Major problems of urine retention or control.
Frailty Concept Count	2
Compassionate Allowance Conditions	N

Predictive Values

Rank Probability High Total Cost	0.56
Predicted Total Cost Range	$50,000 - $75,000
Rank Probability High Rx Cost	0.02
Predicted Rx Cost Range	$1,000 - $1,250
High Risk Unexpected Pharmacy	N
Probability of Persistent High User	0.11

Likelihood of Hospitalization

Hospital Dominant Morbidity Types	1
Probability Hospital Admission (6 mos)	0.37
Probability Hospital Admission (12 mos)	0.50
Probability ICU/CCU Admission	0.05
Probability injury-related Admission	0.03
Probability long-term Admission (12+ days)	0.34
Probability of Readmission	0.42

Utilization

Outpatient Visits	70
ER Visits	5
Inpatient Admissions w/o birth and injury	3
Unplanned 30-day Readmission	1
Inpatient Days	21
Major Procedure Performed	Y
Dialysis Service	N
Nursing Service	Y
Cancer Treatment	N
Psychotherapy Service	Y
Mechanical Ventilation	N

Coordination of Care

Coordination Risk	LCI
# Unique Providers Seen	15
# Specialty Types Seen	2
Generalist Seen	Y
Generalist Visit Count	14
Management Visit Count	39
% Visits Provided By Majority Source of Care	31
Care Density Ratio	2.28
Care Density Quantile	MID
Care Density Est. Cost Saving Ratio	15%
Care Density Est. Cost Saving	$15,000-$20,000

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QUESTIONS?


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