



BOLDGOAL

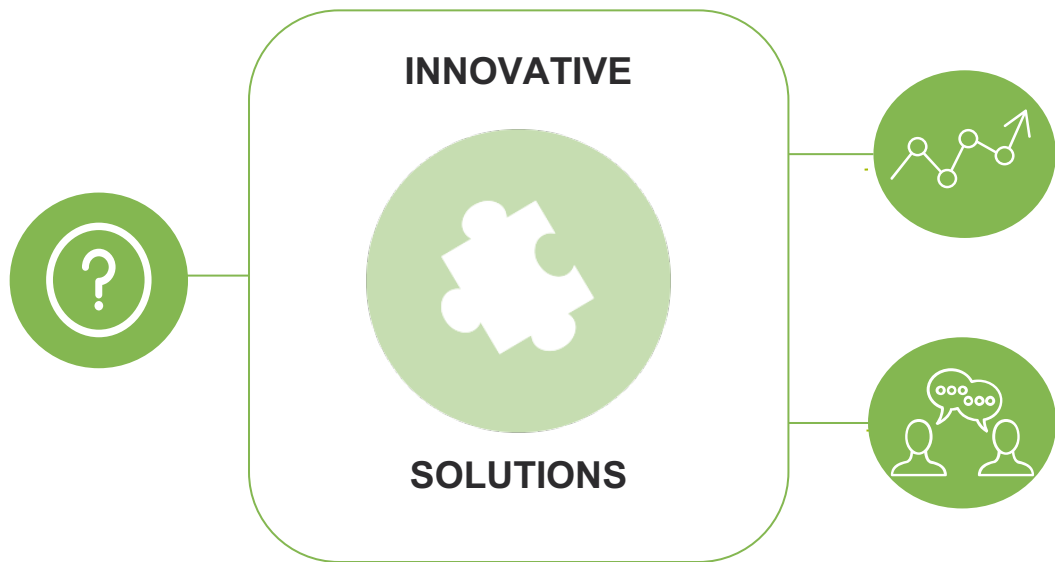
#MOREHEALTHYDAYS

Humana®

INNOVATIVE SOLUTIONS CONSULTING

Crystal Bui, Liana Cherian, Monica Kovuri, Laci Sherman and Ela Vashishtha

Helping Humana reach 20% healthier by 2020



***“To engage, analyze
and produce actionable
solutions for leading
healthcare
organizations”***



40%

**SOCIAL AND ECONOMIC
FACTORS**

30%

HEALTH BEHAVIORS

20%

CLINICAL CARE

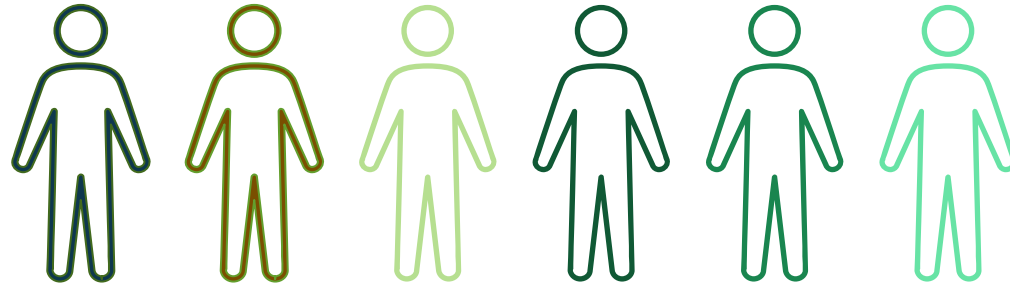
10%

**PHYSICAL
ENVIRONMENT**

POPULATION HEALTH

“The health outcomes of a group of individuals, including the distribution of such outcomes within the group”.

To improve the health of the communities Humana serves by 20% by 2020, by making it easy for people to achieve their best health.



HUMANA'S S.W.O.T. ANALYSIS

STRENGTHS

- Humana Ranks 4th Largest Insurance Company
- \$53 Billion Annual Revenue
- MA Contributes 66.2% in Annual Revenue
- 19% of Individual Market for MA

OPPORTUNITIES

- Market Shift → Population Health
- Member's Trusted Navigator
- Diverse Community Partnerships
- Shift to Value Based Care
- Expansion of Market Presence

WEAKNESSES

- Continuity in Patient Experience
- Payor-Consumer Relationship
- Employee Disengagement
- Bold Goal Progress Measurement Tools
- Scalability of Pilot Studies

THREATS

- UnitedHealth Group, Anthem, Aetna
- Attractive Premiums
- Barriers to Social Determinants

Humana.

LET'S MAKE HEALTH EASIER, TOGETHER.

Humana.com/BoldGoal

Humana

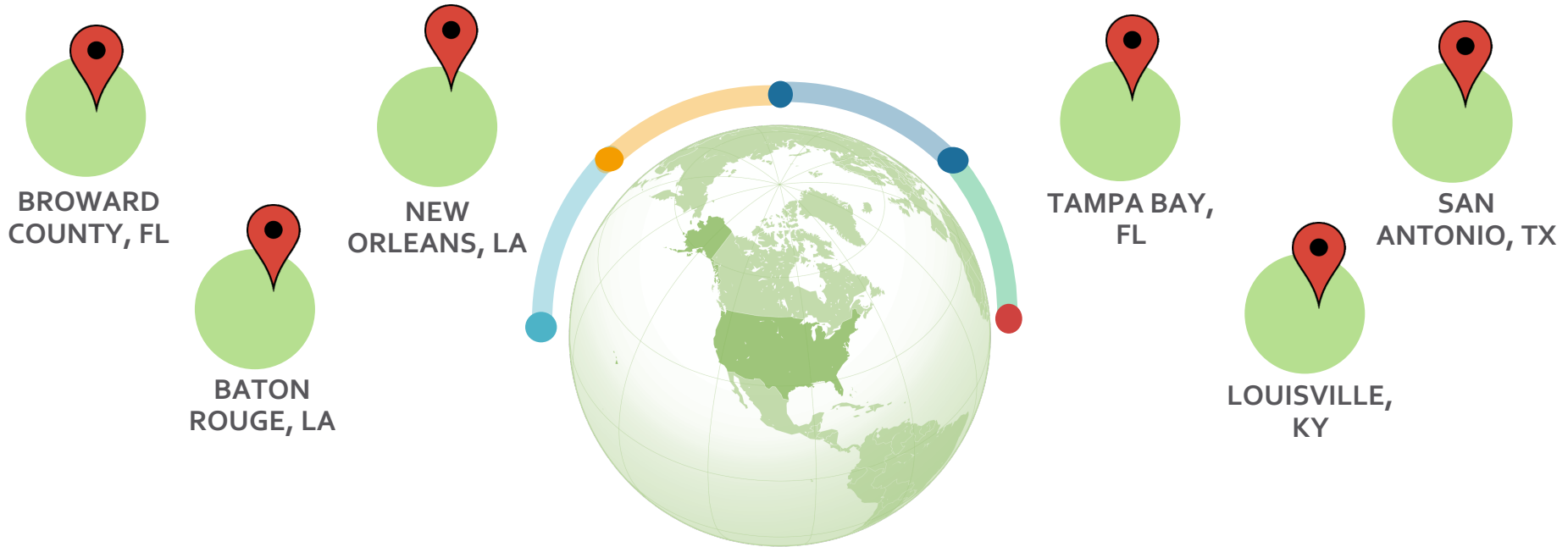


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Our Bold Goal | Humana

BOLD GOAL COMMUNITIES





Columbia University
MAILMAN SCHOOL
OF PUBLIC HEALTH

EMORY
UNIVERSITY

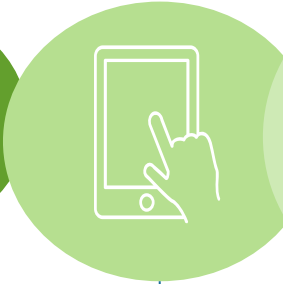


PARKS & RECREATION
SAN ANTONIO

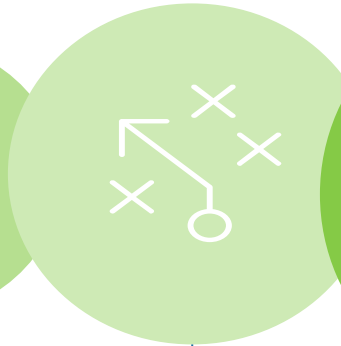
MEASURING PROGRESS



LEADING
INDICATORS



STUDY
DESIGN



SCALABILITY



MEASURING
TRUST



BUSINESS
IMPACT



MEET MR. JOE MORALES

LEADING INDICATORS

ENVIRONMENTAL DETERMINANTS

- People living in safe neighborhoods
- Air quality index greater than 100



ACCESS TO HEALTH SERVICES

- Number of adults with health insurance
- Persons with usual PCP care



CLINICAL PREVENTATIVE SERVICES

- Adults with hypertension whose blood pressure is under control
- Adult diabetic population with an HbA1c value greater than 7 percent



HEALTHY BEHAVIORS

- Adults meeting physical activity guidelines
- Ex. Obese adults



MENTAL HEALTH

- Adults having major depressive episodes
- Suicidal tendencies



SOCIAL DETERMINANTS

- Population experiencing healthy social environment
- Adults with high school education



PHYSICIAN DASHBOARD

LEADING INDICATORS

Health Behaviors	Prescribed Diet Plan
	Physical Activity Treatment plan
	Awareness (My Health app compliance)
	BMI
	HbA1C exam frequency
	HbA1C levels Screening
	Access to care (proportion of persons with PCP) (CDC)
	Blood Pressure
Clinical Care	LDL levels annually
	Screening for complications (Retinal exam, microalbumuria, foot exam)
	Oral medication adherence
	Mental health (Have you experienced stress, depression, or problems with emotion during the past 30 days?)
	Statin Therapy
	Total no of ER visits in last one year
	High school graduation (Did you graduate from high school?)
Social and economic factors	Unemployment (Are you unemployed?)
	Per capita income
	Community safety (How do you feel about your community safety?)
	Homeless persons (Do you have a sheltered or unsheltered home?)
Physical environment	Housing and transportation index (Do you live in affordable neighborhoods – where the cost of housing and transportation makes up 45% or less of the total income of the households?)
	Food insecurity (Did you not have enough money for food at least one time in the previous 12 months?)

TARGET

Patient 1

>=8/10 times	2
>=8/10 times	6
>=8/10 times	7
18.5-24.9	22
>2	5
<7% good	10%
83.90%	44.0%
(<120/80)	170/61
(<100)	135
1	1
% change	-9%
NO	No
% change	-13%
0	2
85%	No
3.50%	No
\$ 25,710.00	\$ 37,607.00
67.1	Good
1825	Yes
< 45%	No
<11.7%	Yes

LAGGING INDICATORS:

- Diabetes related morbidity and mortality
- Health care claims cost
- Quality of life and well being



OUTCOMES:

- Improved health and quality of life
- Reduction in diabetes unhealthy days: 34,440 days
- Reduction in diabetes related morbidity and mortality: 33% reduction in morbidity; 9,308 MA population
- Reduction in mental health related hospitalizations and mental unhealthy days: 70.4 days
- Reduction in health care claims cost



COST SAVINGS:

- Reduction in diabetes related morbidity and mortality \$538,641.6 reduction in monthly medical costs and approximately 96.8 admissions per month
- cost savings due to reduction in mental health related morbidities: \$ 1,101

SCALABILITY

The diagram consists of four overlapping circles arranged horizontally from left to right. The first circle is dark teal and contains the text 'Community Health Needs Assessment'. The second circle is a lighter teal and contains 'Retain Community and Stakeholder Engagement'. The third circle is a medium green and contains 'Rapid Cycle Change PDSA'. The fourth circle is a light green and contains 'Standardize Organizational Framework'. A blue arrow points from the right side of the fourth circle towards the right edge of the frame. A thick green horizontal bar is located at the bottom of the image.

Community
Health
Needs
Assessment

Retain
Community
and
Stakeholder
Engagement

Rapid Cycle
Change
PDSA

Standardize
Organizational
Framework

MEASURING TRUST

ANALYTICS



CONSUMER
EXPERIENCE



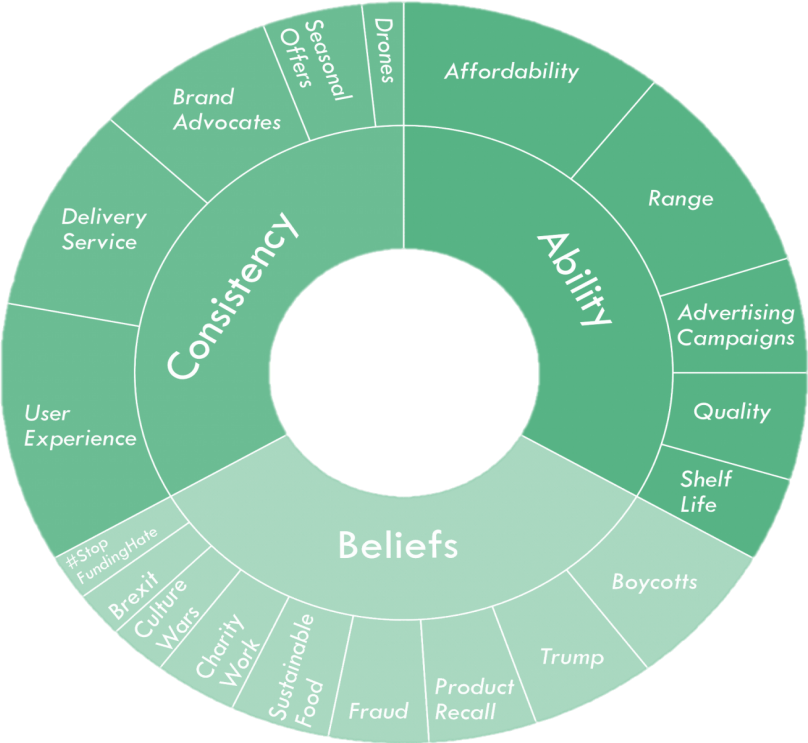
DIGITAL
EXPERIENCE



PROVIDER
COLLABORATION



METTLE'S ABC TRUST MODEL



“From paying claims to knowing customers”

Ability – “Does it work?”
Belief- “Do I care?”
Consistency- “Does it work over time”

ANALYTICS

CONSUMER EXPERIENCE

DIGITAL INTEGRATION

PROVIDER COLLABORATION

IMPACT ON BUSINESS PERFORMANCE

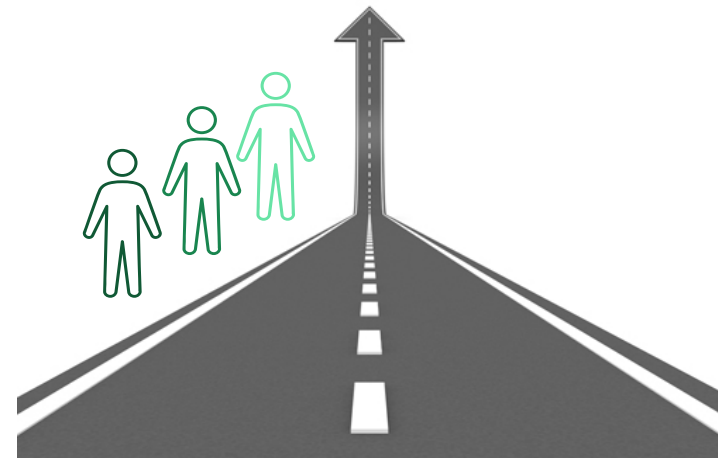
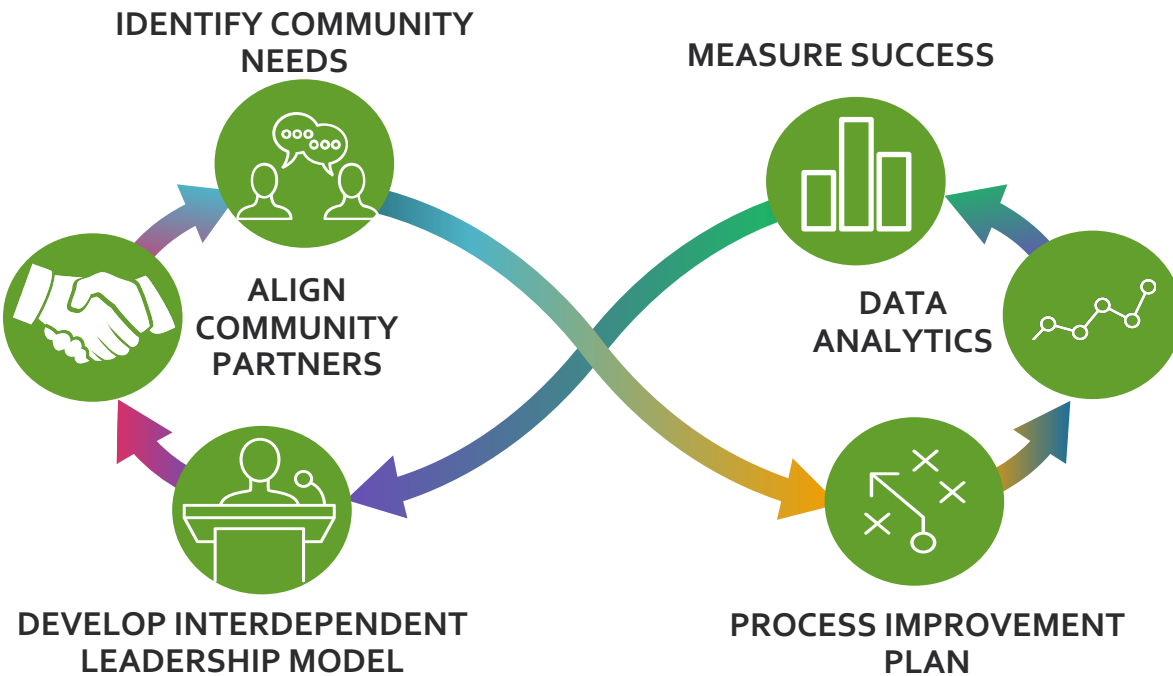
High Brand
Commitment

Recruitment
Strategy-
Focus on
Retention

Cost Savings of
\$15.64 per
month for Every
Reduced
Unhealthy Day

Improved
Health
Outcomes →
Reduction of
Costs

FROM INSURER TO LEADER IN POPULATION HEALTH





MR. JOE MORALES



**LET'S MAKE
HEALTH EASIER**
ONE HOMETOWN AT A TIME

Thank you!

The Gallup-Sharecare Well-Being Index.
Available at: <http://www.well-beingindex.com/about>

Healthypeople.gov. (2017). Healthy People 2020.
Available at <https://www.healthypeople.gov/>

Leading Health Indicators for Healthy People 2020

Available

at <https://www.integration.samhsa.gov/images/res/Leading%20Health%20Indicators%20for%20Healthy%20People%202010.pdf>

Data for the leading indicators appendix obtained from: Healthypeople.gov. (2017). Leading Health Indicators | Healthy People 2020. [online] Available at:
<https://www.healthypeople.gov/2020/Leading-Health-Indicators>

Sa2020.org. (2017). The Data Dashboard | SA2020. Available at: <https://www.sa2020.org/progress/>

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<http://map.feedingamerica.org/county/2015/overall/texas/county/bexar>

The Henry J. Kaiser Family Foundation. (2017). Data Note: Medicare Advantage Enrollment, by Firm, 2015.

Available at: <https://www.kff.org/medicare/issue-brief/data-note-medicareadvantage-enrollment-by-firm-2015/>

Slabaugh, S. L., Shah, M., Zack, M., Happe, L., Cordier, T., Havens, E., ... & Jia, H. (2017). Leveraging Health-Related Quality of Life in Population Health Management: The Case for Healthy Days. *Population health management*, 20(1), 13-22.

Emedicine.medscape.com. (2017). LDL Cholesterol: Reference Range, Interpretation, Collection and Panels. [online] Available at: <http://emedicine.medscape.com/article/2087735-overview>

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http://www.gacguidelines.ca/site/GAC_Guidelines/assets/pdf/DIAB05-IPrvntg_Scrng_Complications.pdf

Humana Bold Goal Progress Report 2017. Available at http://populationhealth.humana.com/documents/Humana_BoldGoal_2017_ProgressReport-v2.pdf

Slabaugh, S. L., Shah, M., Zack, M., Happe, L., Cordier, T., Havens, E., . . . Jia, H. (2016). Leveraging Health-Related Quality of Life in Population Health Management: The Case for Healthy Days. *Population Health Management*, 20(1), 13-22. doi:10.1089/pop.2015.0162 Available at <http://populationhealth.humana.com/wp-content/uploads/2016/05/leveraging-health-Related-quality-of-Life-1.pdf>

Healthy days calculation

Total MA enrolment in Texas	104,465
Humana MA percentage in Bexar County	27%
Humana MA population in Bexar County	28,206
Prevalance of diabetes in Bexar county	33%
Unhealthy days with diabetes	9.5
Unhealthy days without diabetes	5.8
Reduction in unhealthy days without diabetes	3.7
Increase in costs for an increase in one unhealthy day a month	\$15.64
Increase of hospital admissions with an increase in one unhealthy day a month	10.4
MA diabetes population in Bexar County	9307.98
Reduction in mental health related hospitalizations and mental unhealthy days	70.4 days
Reduction in diabetes unhealthy days	34440
Cost savings per month with reduction in diabetes related morbidity and mortality	\$538,634.2
Cost savings per month due to reduction in mental health related morbidities	\$1,101
Reduction in diabetes related admissions per thousand people per month	96.80

Rapid Cycle Change Repeated Use of The Cycle



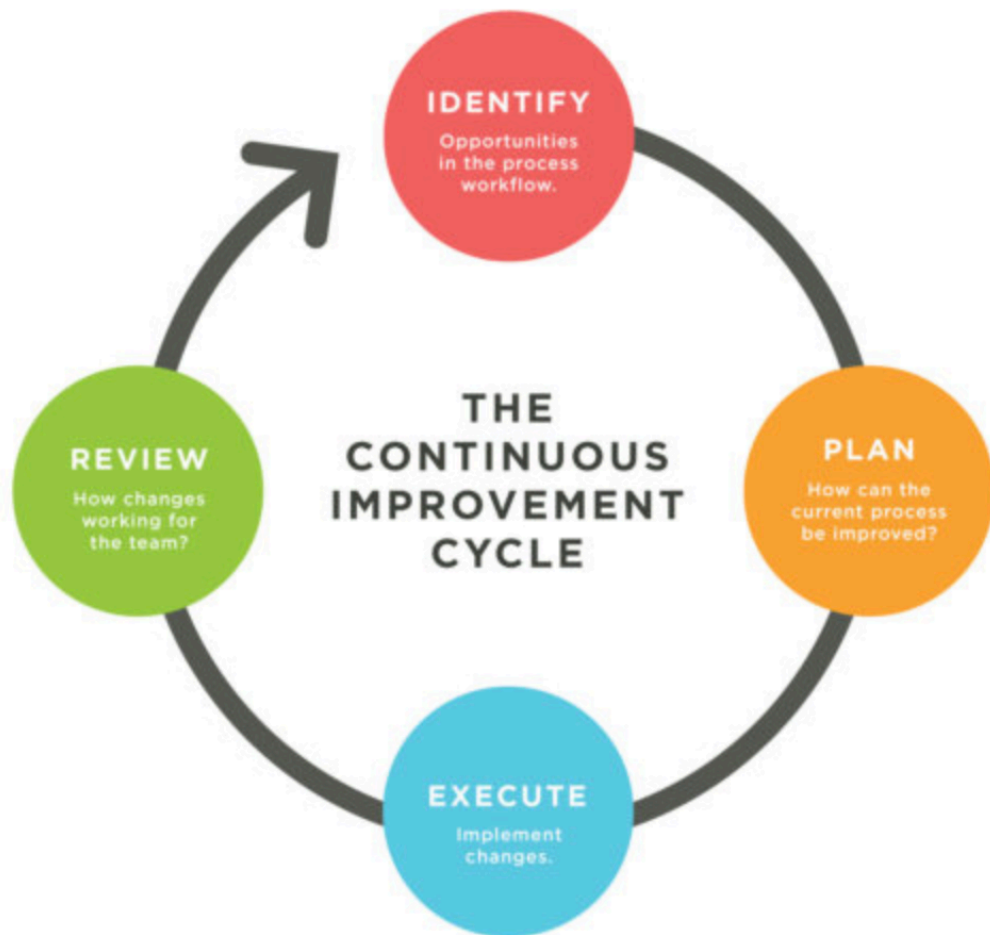
Hunches
Theories
Ideas



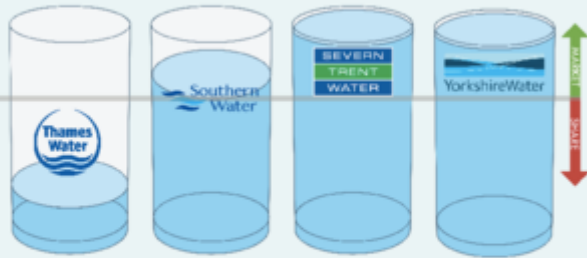
Use of Multiple PDCA cycles

Adapted from The Improvement Guide

Changes which result in Improvement After cycles have demonstrated that the change CAN work, use more cycles to help you figure out how the change WILL work, every day



Predicted direction of market share growth to Q1 2017



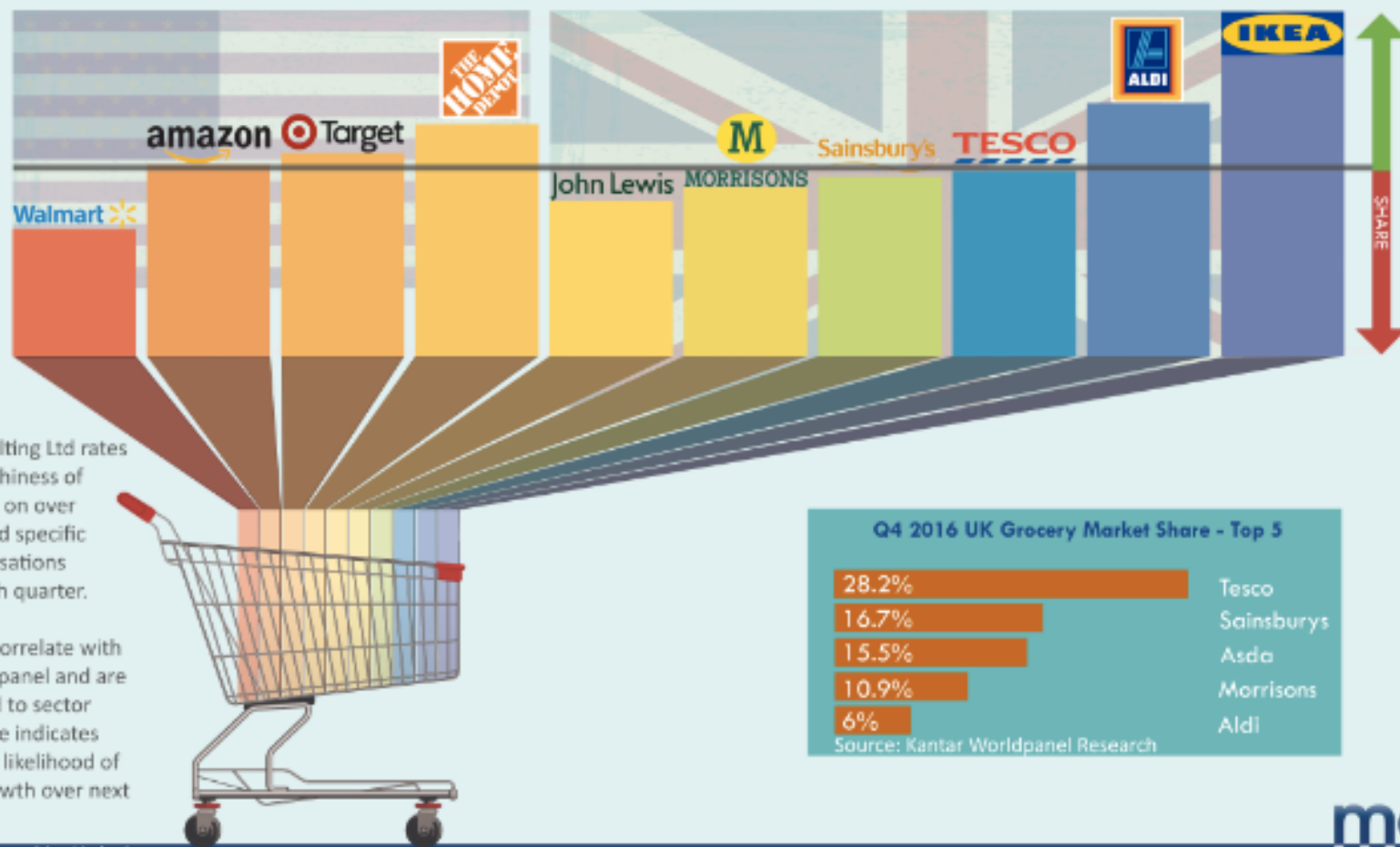
Mettle Consulting Ltd rates the trustworthiness of brands based on over 500,000 brand specific conversation collected each quarter.

Trust scores correlate with Ofgem's quarterly Consumer Supplier comparison data and are benchmarked to sector average.

Brands illustrated above the line are predicted to gain market share over the next 12 weeks, and brands illustrated below the line are predicted to lose market share over the next 12 weeks.



Predicted direction of market share growth to Q4 2017



Mettle Consulting Ltd rates the trustworthiness of brands based on over 500,000 brand specific digital conversations collected each quarter.

Trust scores correlate with Kantar Worldpanel and are benchmarked to sector average. Score indicates direction and likelihood of predicted growth over next 12 months

28.2%	Tesco
16.7%	Sainsbury's
15.5%	Asda
10.9%	Morrisons
6%	Aldi

Source: Kantar Worldpanel Research

Exhibit 1: Humana Revenue and Income by Segment

Summary Humana Financials by Reporting Segment in Millions, 2012-2015					
		2015	2014	2013	2012
Revenue from premiums					
	Retail	\$45,805	\$39,452	\$31,922	\$29,073
	Group	\$6,569	\$6,456	\$6,237	\$7,083
	Other Businesses	\$35	\$51	\$670	\$853
	Total Premium Revenue	\$52,409	\$45,959	\$38,829	\$37,009
Revenue from Services					
	Total Service Revenue	\$1,406	\$2,164	\$2,109	\$1,726
Operating Expenses					
	Benefits	\$44,269	\$38,166	\$32,564	\$30,985
	Operating Costs	\$7,318	\$7,639	\$6,355	\$5,830
	Total Operating Expenses	\$51,942	\$46,138	\$39,252	\$37,110
	Net Income	\$1,276	\$1,147	\$1,231	\$1,222

Exhibit 2: Revenue and Membership of Humana and Key Commercial Competitors, 2015

Healthcare Insurance Member Enrollment by Company, 2015****												
	Revenue, billions	Total members (thousands)	Total commercial members (thousands)	Total Medicare members (thousands)	Total Medicaid members (thousands)	Total Tricare (Military Service) members (thousands)	Total Other* (thousands)	Percent Commercial	Percent Medicare	Percent Medicaid	Percent Tricare	Percent Other
United-Health Group (UNH) **	\$157.1	42,305	29,730	3,235	5,305	-	4,035	70.3%	7.6%	12.5%	0.0%	9.6%
Humana (HUM)	\$54.3	14,223	2,077	3,238	374	3,074	5,460	14.6%	22.8%	2.6%	21.6%	38.4%
Anthem (previously WellPoint) (ANTM)	\$79.2	38,599	29,678	1,439	5,914	-	1,568	76.9%	3.7%	15.3%	0.0%	4.1%
Aetna (AET)	\$60.3	23,487	19,370	1,251	2,300	-	566	82.5%	5.3%	9.8%	0.0%	2.4%
CIGNA (CI) ***	\$37.9	14,999	2,502	502	65	-	11,930	16.7%	3.3%	0.4%	0.0%	79.6%
WellCare Health Plans (WCG)	\$13.9	3,767	-	354	2,388	-	1,025	0.0%	9.4%	63.4%	0.0%	27.2%
Health Net (HNT) **	\$16.2	6,122	1,120	269	1,891	2,820	22	18.3%	4.4%	30.9%	46.1%	0.3%
Molina Healthcare (MOH)	\$14.1	3,533	-	42	3,440	-	51	0.0%	1.2%	97.4%	0.0%	1.4%

* "Other" includes Medicare supplement and prescription drug plans (PDP), FEP plans, dual eligible (Medicare-Medicaid plan), and ASO (administrative services only) administration.

** United-Health also reported international membership of 4090 members. Including international members, UNH reported total medical membership of 46,395k.

*** Cigna's "Total Other" category includes total service membership, including international members.

**** Certain companies in the managed care sector do not include PDP members in their reported total medical membership. The following PDP membership levels have not been included in the chart above: UNH – 5,060k, ANTM – 371k, AET – 1,466k, CI – 1,476k. PDP membership for HUM and WCG have been included in the respective lines for each under the "Total Other" column, as each company includes PDP in its medical membership count.

Exhibit 3: Humana Enrollment by State and Line of Business, 2015

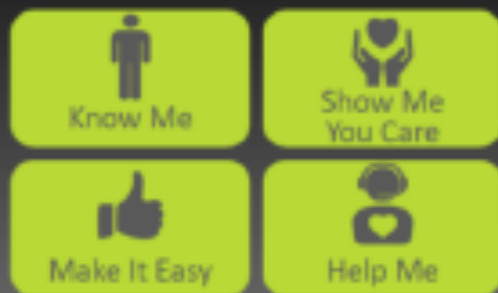
	Retail Segment			Group Segment							Total	Percent of Total
	Individual Medicare Advantage	Group Medicare Advantage	Medicare stand-alone PDP	Individual Commercial	State-based contracts	Fully insured commercial Group	ASO	Military services	Other Business			
	(In thousands)											
Florida	587.4	19.0	200.3	288.4	211.9	168.4	31.8	—	—	1,790.3	12.5%	
Texas	215.6	48.8	281.4	163.8	—	217.3	187.3	—	—	1,054.1	7.6%	
Georgia	183.2	2.5	315.0	270.2	—	135.3	38.8	—	—	666.8	4.7%	
Kentucky	69.9	58.1	285.8	17.6	—	189.3	185.5	—	—	632.2	4.6%	
Ohio	183.8	155.6	145.3	30.8	—	46.3	70.1	—	—	542.1	3.9%	
California	64.9	8.1	420.7	15.3	—	—	—	—	—	499.0	3.5%	
Illinois	81.7	28.8	134.1	11.3	12.0	82.4	55.8	—	—	437.3	3.2%	
Missouri/Kansas	180.6	3.4	282.0	38.7	—	52.8	9.4	—	—	567.0	4.1%	
Tennessee	136.8	2.0	97.5	36.5	—	47.8	34.8	—	—	347.7	2.5%	
Wisconsin	63.2	18.1	55.8	8.5	—	84.2	80.1	—	—	341.9	2.4%	
Louisiana	147.2	18.0	34.4	30.6	—	67.8	31.7	—	—	322.7	2.3%	
North Carolina	129.4	33.2	158.4	5.6	—	—	—	—	—	326.6	2.3%	
Indiana	88.1	3.7	120.2	12.1	—	22.4	17.2	—	—	263.7	1.9%	
Virginia	111.2	5.5	125.5	8.9	9.8	—	—	—	—	260.9	1.8%	
Michigan	48.8	14.1	135.8	19.4	—	6.5	0.5	—	—	225.1	1.6%	
Colorado	33.2	5.8	83.3	22.7	—	28.8	1.1	—	—	172.6	1.2%	
Arizona	57.8	1.2	75.3	8.4	—	38.4	1.2	—	—	172.3	1.2%	
Military services	—	—	—	—	—	—	—	3,074.4	—	3,074.4	21.8%	
Other	681.6	68.7	1,770.7	130.9	—	65.2	34.4	—	32.6	2,672.1	18.8%	
Totals	2,753.4	484.1	4,517.9	1,017.7	315.7	1,178.3	730.7	3,074.4	32.6	14,222.8	100.0%	

Source: Humana's 10-K form (2015)

Exhibit 4: The Consumer Perspective: One Humana

Humana: Creating simple, personalized, connected experiences

Consumer centricity to HUM



HUM's integrated care delivery model



Exhibit 5: Behavioral Segmentation

Segment	Percentage of Humana Beneficiaries	Description	Communication Preferences
Self-engaged Optimists (Healthy)	15%	"I need to verify it."	Activity on Web: High Inbound Calls: High Preventive Visits: High
Self-engaged Optimists (Chronic Illness)	9%	"I am inspired to do what is right."	Activity on Web: Low Inbound Calls: High Preventive Visits: High
Simplicity-seeking Followers (Healthy)	14%	"I do what's needed."	Activity on Web: Medium Inbound Calls: Low Preventive Visits: Medium
Simplicity-seeking Followers (Chronic Illness)	10%	"I do what's easy."	Activity on Web: Low Inbound Calls: Low Preventive Visits: Medium
Skeptical Control Seekers (Healthy—group #1)	13%	"I manage my health best."	Activity on Web: Low Inbound Calls: Low Preventive Visits: Low
Skeptical Control Seekers (Healthy—group #2)	8%	"I'm fine, really."	Activity on Web: Low Inbound Calls: Low Preventive Visits: High
Skeptical Control Seekers (Chronic Illness)	5%	"I'll do it my way."	Activity on Web: Medium Inbound Calls: Low Preventive Visits: Low
Health Services Maximizers (Healthy)	3%	"I do my part."	Activity on Web: High Inbound Calls: High Preventive Visits: High
Health Services Maximizers (Chronic Illness)	2%	"I'm overwhelmed."	Activity on Web: High Inbound Calls: High Preventive Visits: High
Autopilot Participators (Healthy)	6%	"I enjoy life."	Activity on Web: High Inbound Calls: High Preventive Visits: High
Autopilot Participators (Chronic Illness)	4%	"I need a push to do more."	Activity on Web: High Inbound Calls: Low Preventive Visits: Medium
Overwhelmed & Reluctant Reactors (Healthy)	2%	"I'd rather not."	Activity on Web: Medium Inbound Calls: Low Preventive Visits: Medium
Overwhelmed & Reluctant Reactors (Chronic Illness)	1%	"I'm losing the battle."	Activity on Web: High Inbound Calls: Medium Preventive Visits: Low
Support-seeking Participants (Chronic Illness)	3%	"I need support."	Activity on Web: Low Inbound Calls: High Preventive Visits: Medium
Healthy Self-sustainers	5%	"I like it on my terms."	Activity on Web: Medium Inbound Calls: Low Preventive Visits: Low

Exhibit 6: Enterprise Dashboard for Management Evaluations, 2014

Goal	Success Criteria
Bold Goal	Every community served by Humana will be healthier in the future because we make it easy for people to achieve their best health
Financial	Return on invested capital (ROIC) above target and above weighted average cost of capital (WACC) over a trailing twelve month period. Earnings per share (EPS) above guidance for the quarter and the fiscal year.
Consumer	Monthly consumer health participation higher than year ago. Monthly consumer experience Net Promoter Score (NPS) greater than year ago.
Talent	Annual modifiable health risks per Humana employee lower than year ago. Annual Humana employee engagement index higher than year ago.

Note: ROIC refers to Return on Invested Capital. EPS refers to Earnings per Share. NPS refers to the Net Promoter Score. CE refers to Consumer Experience. CHP refers to Consumer Health Participation. Associate refers to Humana's employees.

Source: Company documents.

Exhibit 8: Bold Goal Community Partnership Strategy

Bold Goal Team: catalysts for change.



We bring together leaders and co-create solutions that result in better health.

Then we share what we learn.

Humana

400,110), and St. Tammany Parish (2014 population of 240,000) represents 60% of population of metropolitan New Orleans, 1,251,962 in 2014)

	New Orleans	Jefferson	St Tammany	Best in US	US Overall
Health and Quality of Life Variables					
Length of Life Rank*	49	17	3		
Years of potential life lost before age 75, per 100,000 (age adjusted)	10,585	8,600	7,200	5,200	6,600
Quality of Life Rank*	47	11	1		
% adults reporting fair or poor health (age adjusted)	23%	20%	15%	12%	16%
Poor physical health days	4.5	3.9	3.4	2.9	3.8
Poor mental health days	4.2	3.7	3.6	2.8	3.7
Health Behaviors Rank*	20	5	1		
% Adult Smokers	23%	19%	19%	14%	17%
% Obese Adults	32%	32%	28%	25%	27%
Food Environment Index (0 = worst, 10 = best)	5.1	7.7	8.3	8.3	7.2
% Physically Inactive Adults	26%	31%	25%	20%	23%
% with access to locations for physical activity	95%	97%	82%	91%	84%
% Adults Reporting Excessive Drinking	20%	19%	20%	12%	17%
Sexually Transmitted (chlamydia) infection per 100k	1101	582.5	258.5	134.1	446.6
Teen births per 1,000 females 15 – 19	44	43	28	19	35
Clinical Care Rank*	10	12	3		
% Uninsured <65	20%	21%	17%	11%	17%
Population/Primary Care physician	1127:1	1140:1	1290:1	1040:1	1320:1
Population/Dentists	1531:1	1230:1	1310:1	1340:1	1540:1
Population/Mental Health Provider	411:1	660:1	650:1	370:1	490:1
% Diabetes in Medicare receiving HbA1c	78%	83%	85%	90%	85%
% Medicare women 67-69 receiving Mammography Screening	60%	61%	65%	71%	63%
Social and Economic Determinants Rank*					
% ninth graders graduating HS in 4 yrs	74%	69%	79%	93%	82%
% adults 25 – 44 with some college	67.3%	58%	67%	72%	64%
% Population >16 unemployed but seeking work	7%	6%	5.75%	3.6%	6.2%
% Children under 18 in Poverty	43%	26%	15%	13%	22%
Ratio of 60 th to 20 th percentile of Income	7.3	5.0	4.5	3.7	4.7
% Children in Single-Parent Household	61%	44%	30%	21%	34%
Violent Crime Rate per 100,000	789	478	197	59	352
Sexual Assault Rate per 100,000	66	72	99	24	26

Physical Environment Rank*	25	60	53		
Avg Daily Density of fine particulate matter, micrograms per cubic meter	12.1	12	11.8	9.5	11.4
Drinking Water violations	No	Yes	Yes		
% Housing with severe problems	29%	18%	15%	9%	19%
% workforce driving alone to work					
	70%	82%	82%	71%	76%
% Long commute	27%	31%	47%	15%	31%
Demographic Variables					
Population 2014	384,320	435,716	245,829		
Median Household Income	\$35,468	\$47,024	\$63,441		
% Non-Hispanic White	31.2%	54.1%	79.5%		
% African American	58.8%	26.2%	11.8%		

*Rank refers to the county ranking among the 63 counties in Louisiana

Bold Goal creates value for Humana's business, consumers, & associates



Business

Membership in Bold Goal Communities^{1,3} **↑5%**



Consumers

San Antonio Brand Commitment⁴ **↑78%**

Humana Pharmacy Mail Order Rate (MAPD)² **↑42%**

HOS Simulation Analysis (Mental Health)² **↑17%**

HOS Simulation Analysis (Physical Health)² **↑7%**

Diabetes Best Practice - Diabetes Med Adherence² **↑7%**

Diabetes Best Practice - Diabetes Statin Therapy² **↑3%**

Diabetes Best Practice - Diabetes Eye Screening² **↑5%**

CHF Best Practice - CHF Minimal Therapy² **↑5%**

Humana At Home HCCP Engagement² **↑2%**



Associates

Associate Engagement in San Antonio² **↑6%**

Associate Engagement in Bold Goal Communities^{1,3} **↑2%**

Exhibit 11: Examples of Other Measures Considered for Measuring Population Health

Source	Types of Data Used	Website
AmeriLINK	Consumer marketing information, including demographics, lifestyle, attitudes, values, and motivations.	http://www.kbmg.com/products/ameriLink/
Community Health Status Indicators	Profiles health outcomes of every county in the US; measures of health care access and quality, health behaviors, social, environmental factors.	http://www.cdc.gov/communityhealth
Medicaid External Quality Review	Aggregated information on quality, timeliness, and access to the health care services furnished by Medicaid managed care organizations.	https://www.medicare.gov/medicaid/quality-of-care/medicaid-managed-care/external-quality-review/index.html
National Health and Nutritional Examination Survey (NHANES)	Assesses the health and nutritional status of adults and children in the United States through interviews and physical examinations.	http://www.cdc.gov/nchs/nhanes/
Institute for Health Metrics and Evaluation	All Global Burden of Disease causes, risks, etiologies, impairments.	http://www.healthdata.org/
Short Form 36	Self-reported quality-of-life measures utilized by managed care organizations for routine monitoring and assessment of care outcomes in adult patients.	http://www.rand.org/health/surveys_tools/mos/36-item-short-form.html
American Human Development Index	A composite index of health, education, and income indicators by community district.	http://www.measureofamerica.org/
Community Needs Index	Measures each community (zip code) in terms of barriers to health, including income, housing, education, insurance, and cultural barriers to health.	http://cni.chw-interactive.org/
County Health Rankings	Ranks all counties in US on variety of factors known to influence health (health behavior, social and environmental factors, clinical care) as well as health outcomes (length and quality of life).	http://www.countyhealthrankings.org/
Health Equity Index	Scores seven social determinants of health and thirteen health outcomes, the correlations between them, and GIS maps that illustrate community-specific scores.	http://www.cdh.org/health-equity/health-equity-index.html

eValue8	Annual survey to gather benchmarks on health plans such as prevention and health promotion, adoption of health information technology, member and provider support, disease management, provider performance measurement and rewards, patient safety, pharmaceutical management and behavioral health.	http://www.nbch.org/Evalue8-for-Health-Plans
Well-Being Index (Gallup-Healthways)	Measures overall life evaluation, daily affect (positive and negative experiences and emotions), basic access to food, shelter, healthcare, safety, physical health, economics (perception of standard of living); and work (satisfaction and a quality workplace).	http://www.well-beingIndex.com/about

Patient-reported health related quality of life is strongly correlated to an objective index of comorbidity: Results from a study of elderly U.S. patients

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Background

The Healthy Day Count Module is a validated four question tool to reflect quality of life and the primary measure developed for the Center for the Assessment and Prevention of CCI that was used by the study. It was validated in a study of elderly U.S. patients. The study also used the Geriatric Depression Scale (GDS) for objective of comorbidity. The study also used the Geriatric Depression Scale (GDS) for objective of comorbidity. The study also used the Geriatric Depression Scale (GDS) for objective of comorbidity.

Objective

To examine the relationship between self-reported health related quality of life (HRQL) and objective comorbidity (CCI) scores.

Methods

The study was a cross-sectional study of 1,000 elderly U.S. patients (65-85 years old) who were hospitalized in a tertiary care hospital. The study was a cross-sectional study of 1,000 elderly U.S. patients (65-85 years old) who were hospitalized in a tertiary care hospital. The study was a cross-sectional study of 1,000 elderly U.S. patients (65-85 years old) who were hospitalized in a tertiary care hospital.

CCI score: The CCI score was calculated as the sum of the number of CCI conditions present in the patient's medical record. The CCI score was calculated as the sum of the number of CCI conditions present in the patient's medical record.

HRQL score: The HRQL score was calculated as the sum of the number of healthy days in the patient's medical record. The HRQL score was calculated as the sum of the number of healthy days in the patient's medical record.

Statistical analysis: The relationship between CCI score and HRQL score was examined using Pearson's correlation coefficient. The relationship between CCI score and HRQL score was examined using Pearson's correlation coefficient.

Results: The study included 1,000 elderly U.S. patients (65-85 years old) who were hospitalized in a tertiary care hospital. The study included 1,000 elderly U.S. patients (65-85 years old) who were hospitalized in a tertiary care hospital.

Conclusion: The study found a strong positive correlation between CCI score and HRQL score. The study found a strong positive correlation between CCI score and HRQL score.

CCI Score	Mean HRQL Score	SD
0	10.0	1.0
1	11.5	1.5
2	13.0	2.0
3	14.5	2.5
4	16.0	3.0
5	17.5	3.5
6	19.0	4.0
7	20.5	4.5
8	22.0	5.0
9	23.5	5.5
10	25.0	6.0

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Results: Medicare Advantage, Age > 65 Years

Figure 1. Regression-adjusted Mean Unhealthy Days by CCI Score Age > 65 Years



Results: Medicare Advantage, Age ≤ 65 Years

Figure 2. Regression-adjusted Mean Unhealthy Days by CCI Score Age ≤ 65 Years

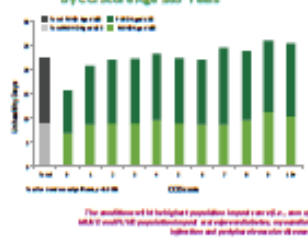


Table 2. Prevalence and Impact by CCI Condition

CCI Condition	Weighted Prevalence	Impact on HRQL			
		HRQL score in PLE	HRQL score in PLE	Impact on HRQL score in PLE	Impact on HRQL score in PLE
Arthritis	15%	10	15	5	10
Chronic Pain	12%	8	12	4	8
Depression	10%	7	10	3	7
Diabetes	8%	6	8	2	6
Heart Disease	7%	5	7	2	5
Hypertension	6%	4	6	2	4
Stroke	5%	3	5	2	3
Other	4%	2	4	2	2

Table 3. Prevalence and Impact by CCI Condition

CCI Condition	Weighted Prevalence	Impact on HRQL			
		HRQL score in PLE	HRQL score in PLE	Impact on HRQL score in PLE	Impact on HRQL score in PLE
Arthritis	15%	10	15	5	10
Chronic Pain	12%	8	12	4	8
Depression	10%	7	10	3	7
Diabetes	8%	6	8	2	6
Heart Disease	7%	5	7	2	5
Hypertension	6%	4	6	2	4
Stroke	5%	3	5	2	3
Other	4%	2	4	2	2

Conclusions

- This study demonstrates a strong positive correlation between self-reported health related quality of life and objective comorbidity scores.
- The study also found that higher CCI scores correspond to higher mean unhealthy days.
- The study also found that higher CCI scores correspond to higher mean unhealthy days.

Implications

- The study findings suggest that self-reported health related quality of life is a valid measure of comorbidity.
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Limitations

- The study was a cross-sectional study and cannot establish causality.
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References

1. Carmon J, Corlier T, Skibniewski L, Haugh G, Gresham R, Gopal V, Rende A. Patient-reported health related quality of life is strongly correlated to an objective index of comorbidity: Results from a study of elderly U.S. patients. *J Gen Intern Med.* 2016;31(10):1155-1161.
2. ...
3. ...

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