



2019 HEALTH
MEETING

JUNE 24-26 | PHOENIX, AZ



Session 39, Innovation in Health Insurance Underwriting

[SOA Antitrust Disclaimer](#)

[SOA Presentation Disclaimer](#)

2019 Health Meeting

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MODERATOR: BLAKE HILL

039 - Innovation in Health Insurance Underwriting
June 24, 2019



SOCIETY OF ACTUARIES

Antitrust Compliance Guidelines

Active participation in the Society of Actuaries is an important aspect of membership. While the positive contributions of professional societies and associations are well-recognized and encouraged, association activities are vulnerable to close antitrust scrutiny. By their very nature, associations bring together industry competitors and other market participants.

The United States antitrust laws aim to protect consumers by preserving the free economy and prohibiting anti-competitive business practices; they promote competition. There are both state and federal antitrust laws, although state antitrust laws closely follow federal law. The Sherman Act, is the primary U.S. antitrust law pertaining to association activities. The Sherman Act prohibits every contract, combination or conspiracy that places an unreasonable restraint on trade. There are, however, some activities that are illegal under all circumstances, such as price fixing, market allocation and collusive bidding.

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While participating in all SOA in person meetings, webinars, teleconferences or side discussions, you should avoid discussing competitively sensitive information with competitors and follow these guidelines:

- **Do not** discuss prices for services or products or anything else that might affect prices
- **Do not** discuss what you or other entities plan to do in a particular geographic or product markets or with particular customers.
- **Do not** speak on behalf of the SOA or any of its committees unless specifically authorized to do so.
- **Do** leave a meeting where any anticompetitive pricing or market allocation discussion occurs.
- **Do** alert SOA staff and/or legal counsel to any concerning discussions
- **Do** consult with legal counsel before raising any matter or making a statement that may involve competitively sensitive information.

Adherence to these guidelines involves not only avoidance of antitrust violations, but avoidance of behavior which might be so construed. These guidelines only provide an overview of prohibited activities. SOA legal counsel reviews meeting agenda and materials as deemed appropriate and any discussion that departs from the formal agenda should be scrutinized carefully. Antitrust compliance is everyone's responsibility; however, please seek legal counsel if you have any questions or concerns.

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Session Overview

Underwriting is one of several areas in the insurance industry being impacted by insurtech.

In this session, we will hear from experienced experts in underwriting transformation. Digitization, machine learning and other approaches are among topics to be discussed.

The three core themes to reviewed are:

- New data and data analytics used, and rating process
- Considerations for Individual, Group, and Supplemental markets
- Considerations of Product design, retention efforts, etc. that aid in post issue risk and profit management that can be considered a form of U/W.

Speakers



Joan Barrett Axene Health Partners



Chris Stehno Deloitte



Khris Dai Aon

Blake Hill dacadoo



The view from the Actuary at the InsureTech

- Technology is moving much faster than most appreciate
 - CRISPER, Nano Technology, AI, 5G
- Innovations are happening fast, regulations struggle to keep up, and companies trying to navigate alone tend to believe they will be safe
- Asia is leading the way

Trends – Meeker Report 2019

Healthcare Innovation = Apple... Hardware + App Store Leveraging Research For Consumers

Apple = Democratization of Healthcare

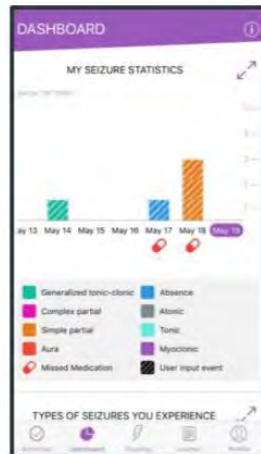
If you zoom out into the future & you look back, & you ask the question, 'What was Apple's greatest contribution to mankind,' it will be about health.

Because our business has always been about enriching people's lives. We've gotten into healthcare more & more through the Watch, other features created with ResearchKit & CareKit & including medical records on the iPhone. This a huge deal.

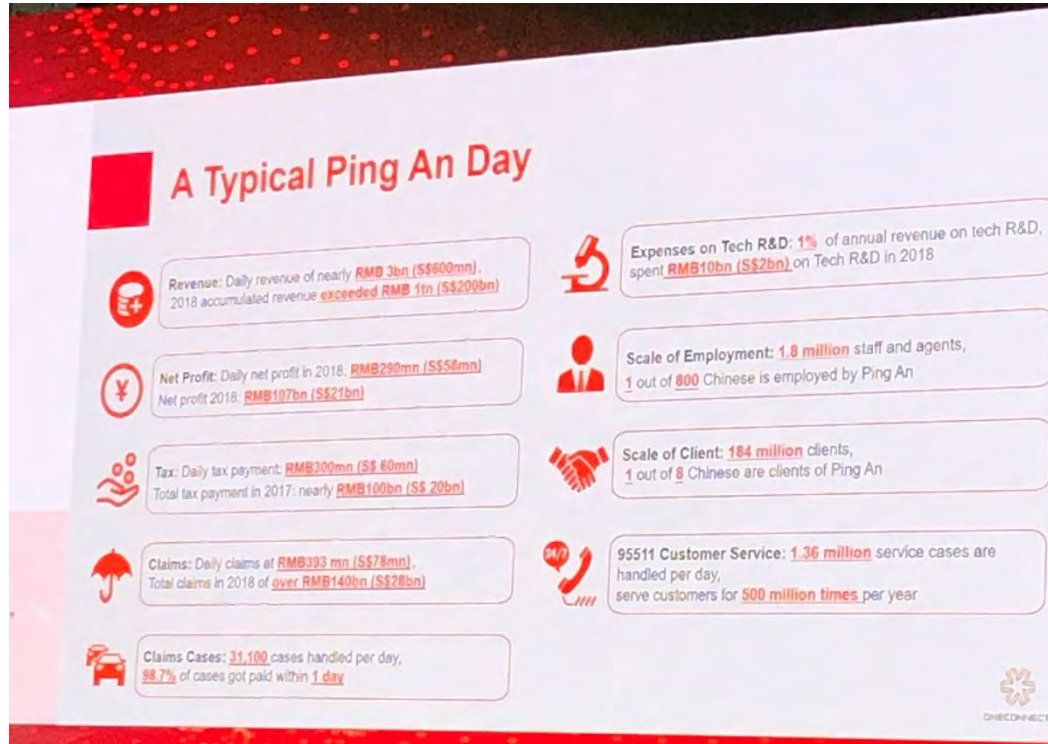
[Healthcare] is very important for people. We are democratizing it. We are taking what has been with the institution & empowering the individual to manage their health. We're just at the front end of this.

Tim Cook – CEO, Apple, 1/19

Apple ResearchKit = Medical Research Technology for Consumers



Are you prepared for the future?



Daily:

\$600M Revenue,
\$58M Profit,
\$78M Claims,

31,100 Claims cases,
98.7% Claims paid in
a day
1.36M Calls a day

1.8M Staff & Agents
184M Clients

Yearly:

\$200B Revenue,
\$21B profit,
\$28B Claims,

500M Calls per year

\$2B spent on R&D in
2018

InsureTechs to the rescue dacadoo ecosystem as an example



Offering in engagement and health risk quantification





axene health partners
HEALTH ACTUARIES & CONSULTANTS

A large, semi-transparent blue banner with a diagonal orientation. It contains a white line graph on the left and a black compass rose on the right. The compass rose shows cardinal and ordinal directions (N, NE, E, SE, S, SW, W, NW) and degree markings (300, 320, 340, 360).

National Accounts Underwriting

Joan C. Barrett, FSA, MAAA

Today's Topics

- **The Current State, Innovations, NextGen**
- **Beyond the Shiny Object**



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HEALTH ACTUARIES & CONSULTANTS

The Current State, Innovation and NextGen

The Employer's Perspective

- **What does an employer want from a health plan?**
 - A trusted advisor: Overall guidance and performance about how to manage their benefit
 - Price point and predictability
 - Employee satisfaction/Employee responsibility
- **What does an employer want to avoid?**
 - Employee complaints
 - Missed budgets/large increases
 - Oversold solutions
 - Excuses for lack of performance

Financial Risk

- **Efficient operations**
- **Stop-loss**
- **Guarantees/Fees at risk**
 - Trends
 - Discounts
 - Operations

Team Example

- **The underwriter/The account team**

- Direct contact with assigned clients
- Reviews client's experience, including benefits and care management suite
- Negotiates financials, including premiums, administrative fees and guarantees
- Operational issues

- **The actuary**

- Underlying models for underwriters
- One-off pricing requests
- Direct employer assistance in complex or new situations
- Strategy/Consulting

Plan Design

Deductibles,
Coinsurance
and Copays

CDH and
value-based

On-demand
insurance

Challenges:

- Selection/Migration
- Risk pool analysis
- Variable cost share

Networks

Fee-for-Service

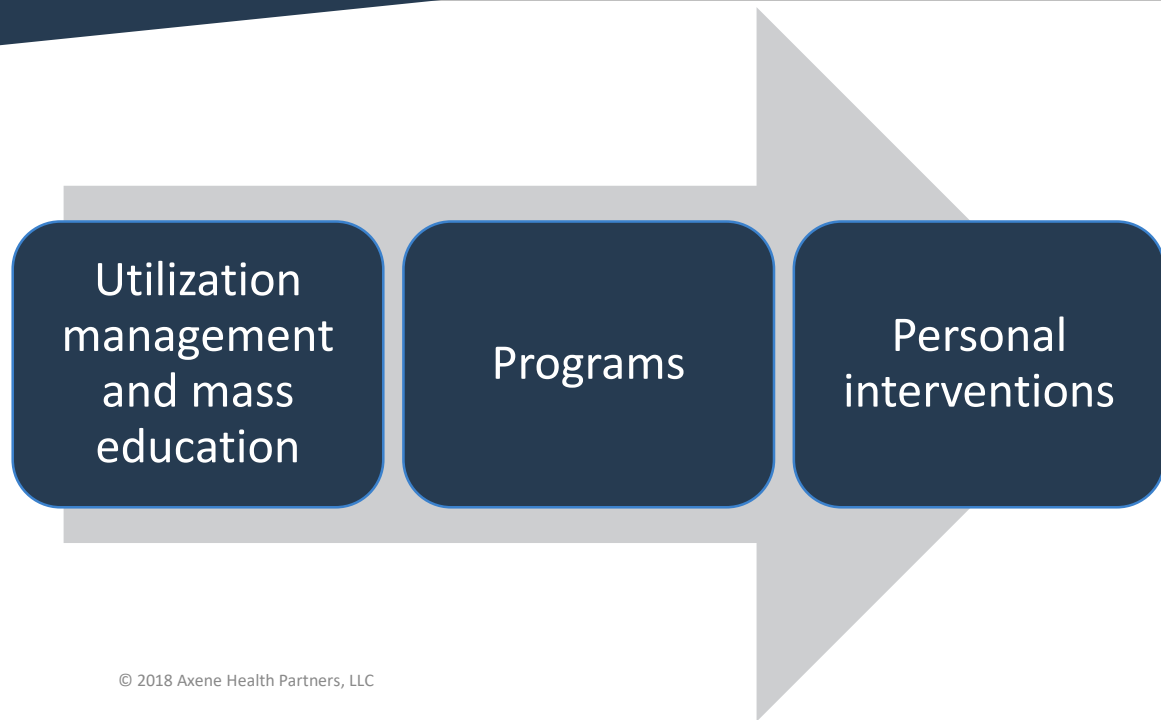
Narrow and
specialty
networks

Value-based
Reimbursement,
reverse reference
pricing

Challenges

- The health care identity
- Cultural change
- Measuring risk
- Cost-effectiveness measurement

Care Management and Wellness



Challenges

- Record-keeping
- Duplication of effort
- Cost-effectiveness measurement



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HEALTH ACTUARIES & CONSULTANTS

Beyond the Shiny Object

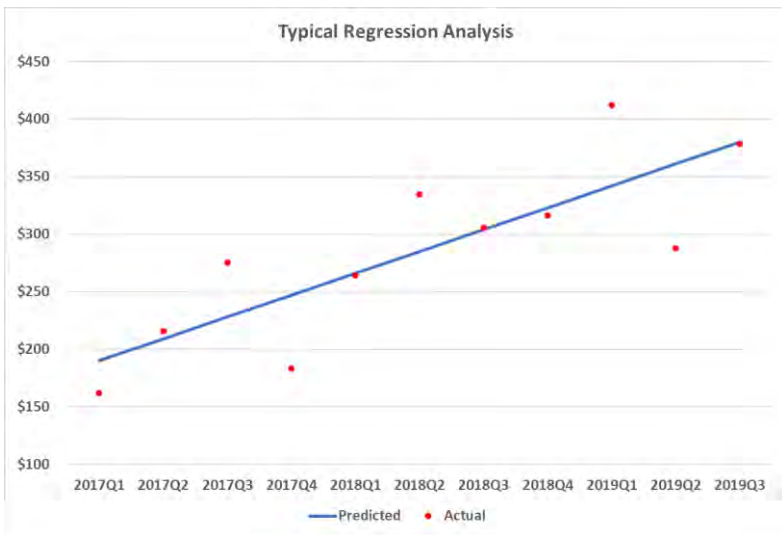
Actuarial Analytical Techniques

Non-
statistical
methods

Predictive
analytics

Risk, cost-
effectiveness
and people

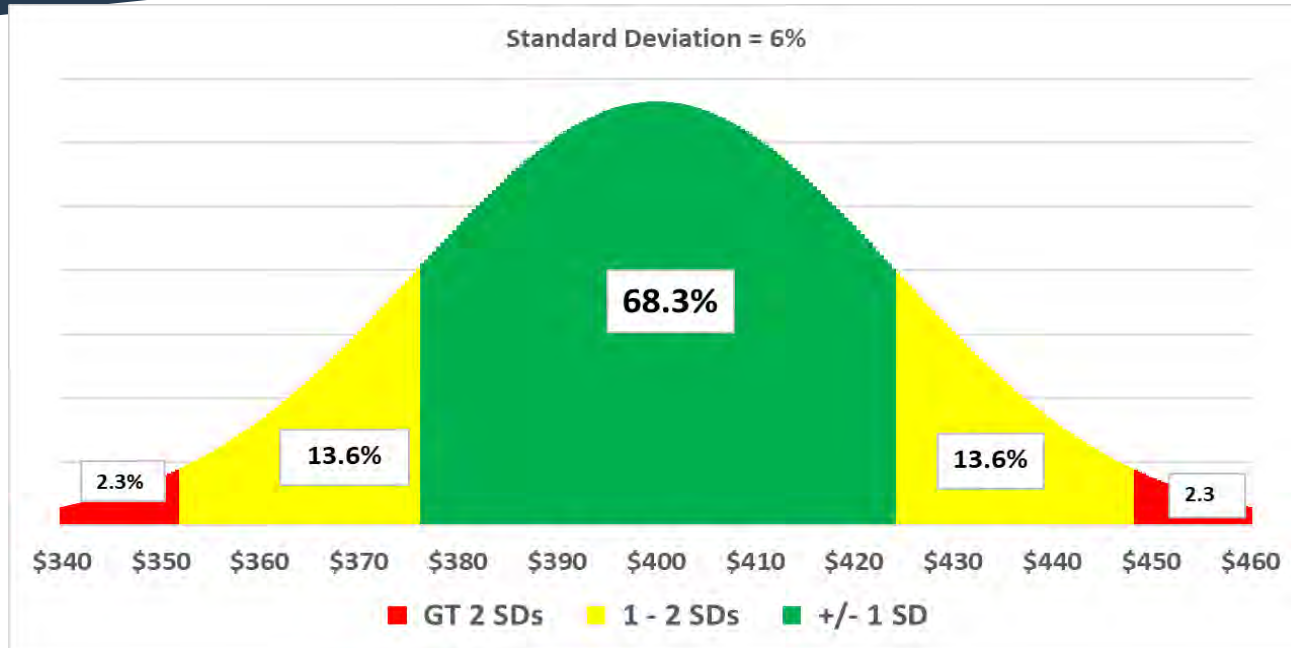
Risk



Total risk

- Pricing risk +
- Process/random variation risk

The Central Limit Theorem

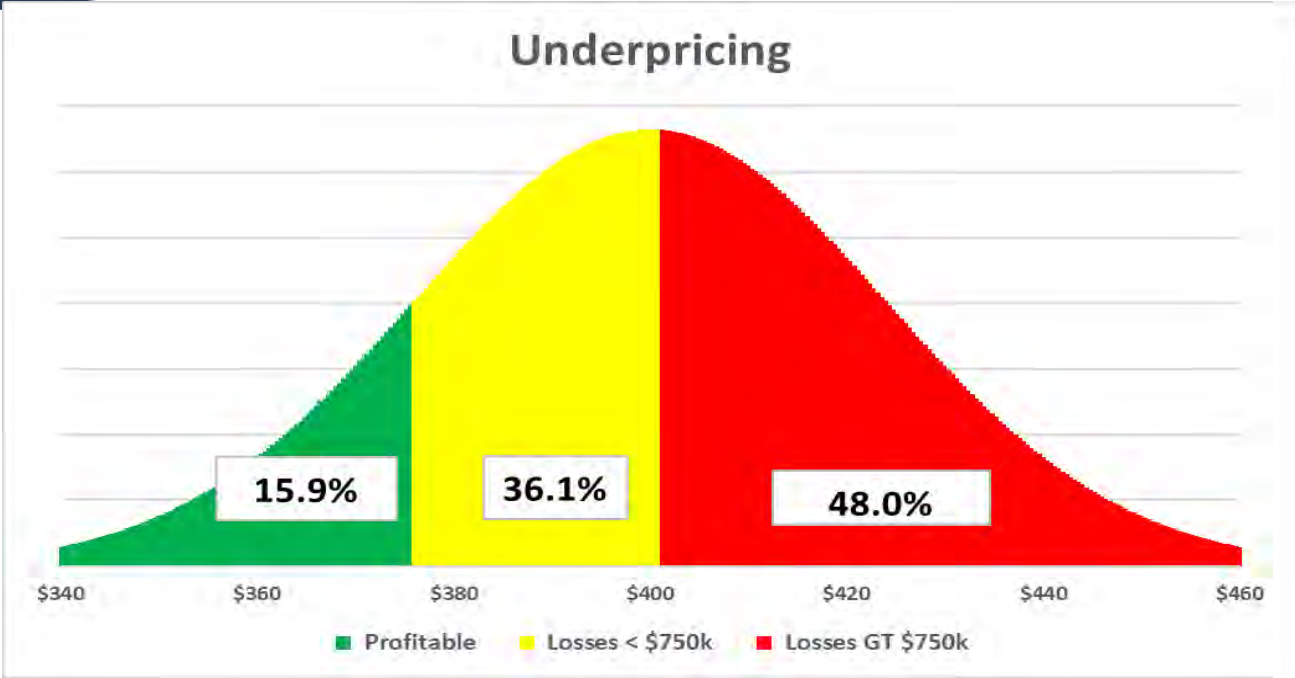


Assuming Best Estimate



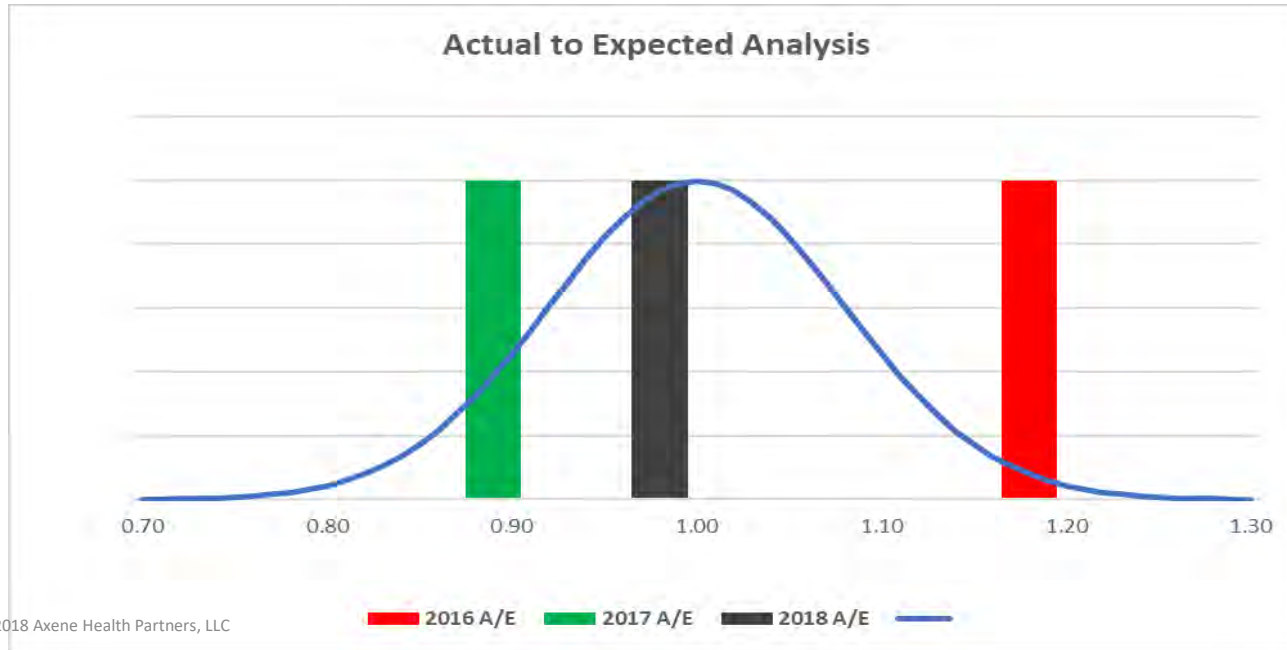
Assumes margin is 1 standard deviation from best estimate.

Pricing Miss

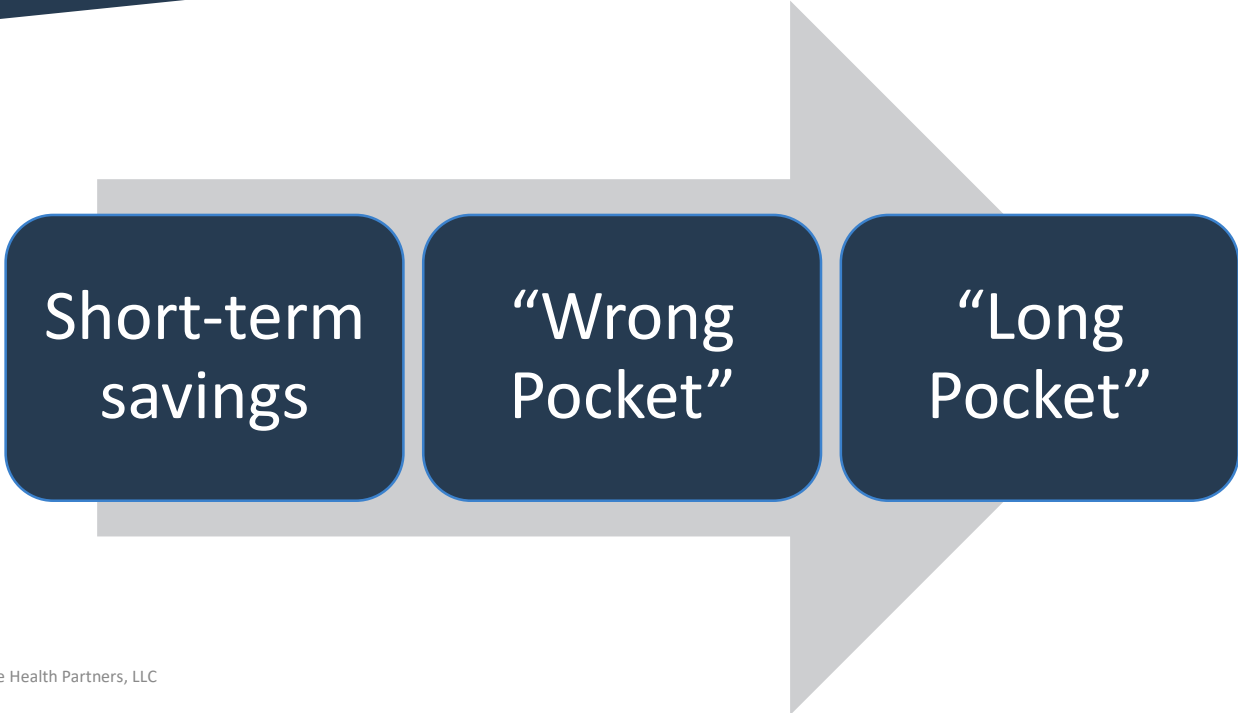


Assumes price is off by 1 standard deviation

Actual to Expected Analysis



Cost-Effectiveness Analysis



Short Term Cost-Effectiveness Analysis

- **Source of savings**

- Reduced admissions, ER visits, etc.

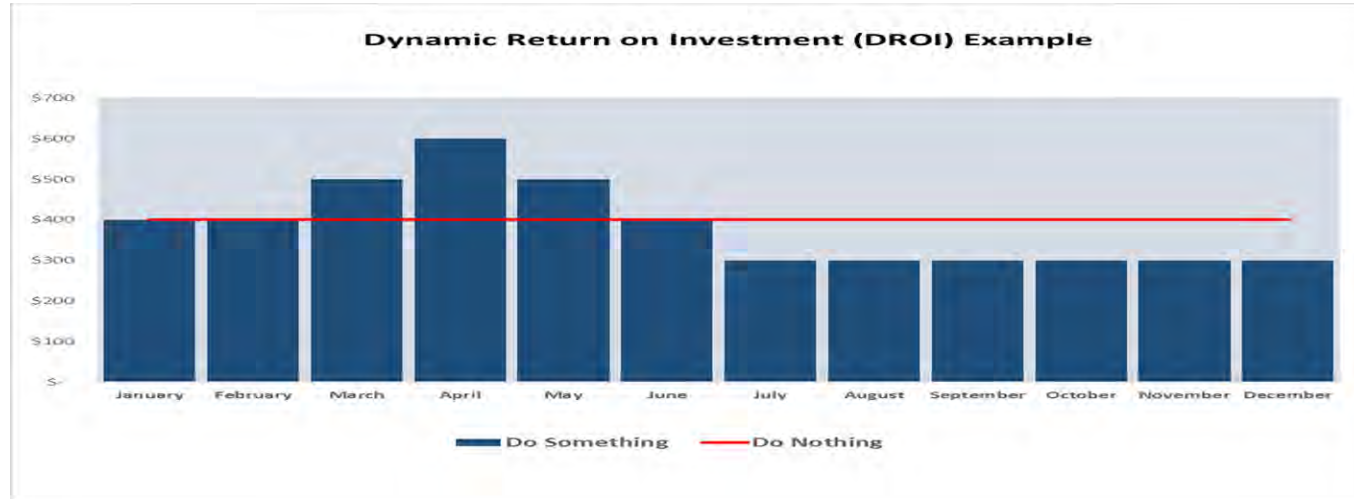
- **Measures**

- Total savings over time (usually 1 to 2 years after change)
- Return on investment

- **Techniques**

- Pre/Post population analysis
- Participant/non-participant analysis
- Value-drivers

Wrong Pocket/Dynamic Return on Investment Analysis



What happens if a person leaves the group before the payback period?

Long-Term Savings

- **Sources of savings**

- Fewer large claims
- Slow or delay disease progression

- **Methods**

- Longitudinal studies (expensive, quickly out-dated)
- Actuarial projections – similar to life and annuities, but with markers

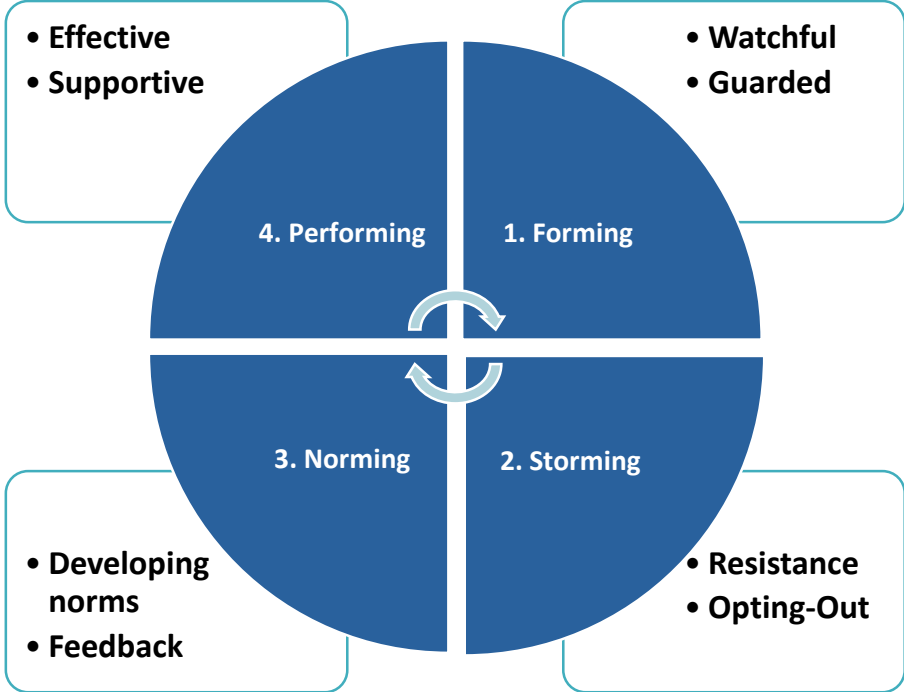
- **Challenges**

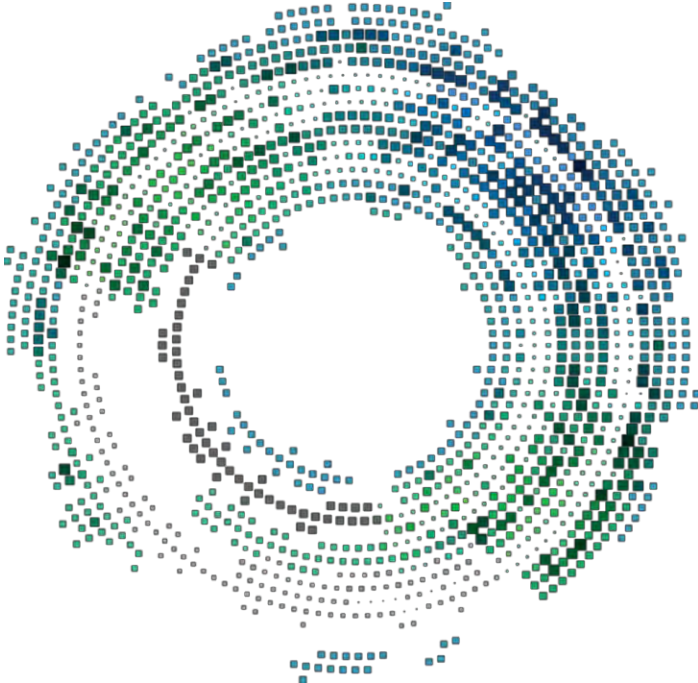
- How to tie savings to reimbursement?

Cultural Change Management

Letter	Stage	Outcome/Goal	Implementation Phase
A	Awareness	<ul style="list-style-type: none">• Early outcomes of communications• Similar to name recognition	Business need
D	Desire	<ul style="list-style-type: none">• Why participate in the process?	Concept and design
K	Knowledge	<ul style="list-style-type: none">• What do you need to do to change?	Implementation
A	Ability	<ul style="list-style-type: none">• How do you translate knowledge into action?	Implementation
R	Reinforcement	<ul style="list-style-type: none">• Same as actuarial control cycle• improve, lessons learned, etc.	Post-Implementation

Team Change Management





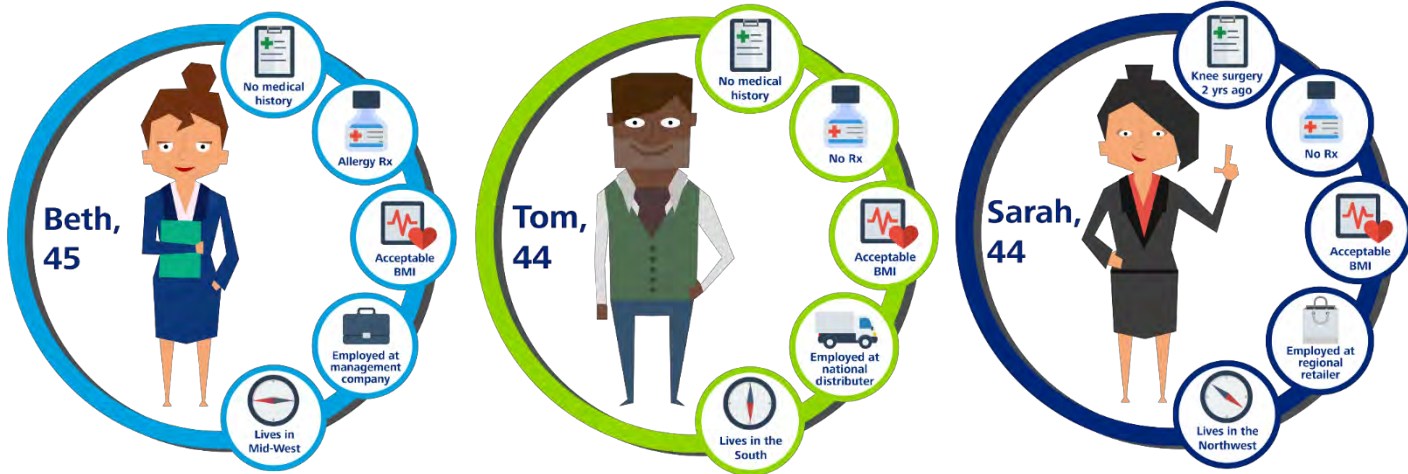
Data and Underwriting

June 2019

70% of Diseases are Lifestyle Related

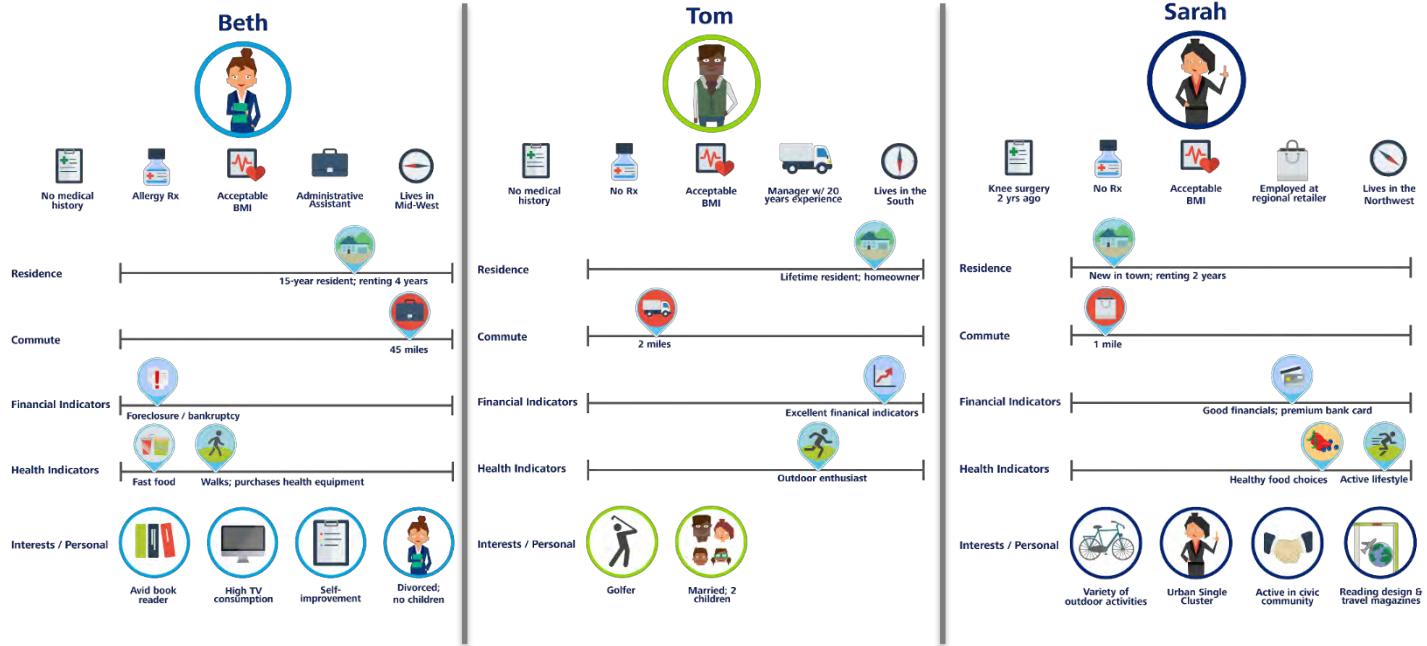
Uncovering Health Risks through Lifestyle

Evaluating the Population



Who will generate the highest medical claim costs?

“Lifestyle-based” Analytics



“Lifestyle-based” Analytics



The pool of candidates who score similar to Beth are 3 times as likely to have a Depression claim and will have **increased medical claims of 18%**.

- Long commute
- Poor financial indicators
- Purchases tied to obesity indicators
- Lack of exercise



Tom falls into the pool of candidates that are **near expectations** on morbidity assumptions.

- Strong personal ties to community/location
- Avid outdoor enthusiast
- Avid golfer
- Average commute









The pool of candidates who score similar to Sarah are 2.5 times less likely to have diabetes and will have **reduced medical claims of 15%**.

- High activity indicators
- Good financial indicators
- Healthy food choices
- Little television consumption
- Foreign traveler



Quick PredictRisk™ Facts

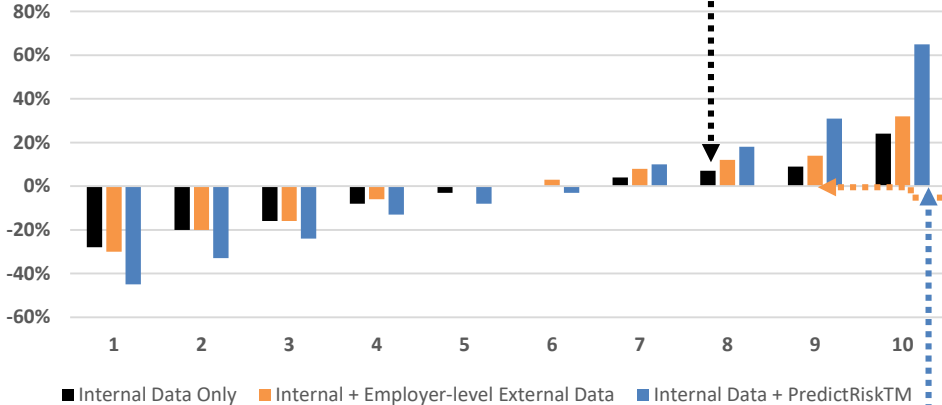
There are multiple dataset in the marketplace that evaluate risks

 <p>230M+ U.S. Adults Scored</p>	 <p>Data updated every 1 Month</p>	<p>Contains over 1,500+ variables on a person's lifestyle and other metrics</p>	 <p>150+ Advanced predictive algorithms</p>
<p>400+</p>  <p>Variables used in the mortality predictive algorithm</p>	 <p>Provides 360° view of a person</p>	 <p>Algorithms rebuilt every 2 years</p>	 <p>40+ Insurers served</p>

Underwriting for New and Renewal Business Quotes

Business case

Illustrative Group Insurance Life Curves



Incurred claim data is highly predictive —therefore renewal models are stronger than new business models

Group-level data external to the organization can supplement the level of insight



Individual-level data, when available, can produce the deepest level of insight



Lift Curve based on...

Internal Data Only

Internal Data + Employer-level External Data

Internal Predict Risk™

Decile	1	2	3	4	5	6	7	8	9	10
Internal Data Only	-28%	-20%	-16%	-8%	-3%	0%	4%	7%	9%	24%
Internal Data + Employer-level External Data	-30%	-20%	-16%	-6%	0%	3%	8%	12%	14%	32%
Internal Predict Risk™	-45%	-33%	-24%	-13%	-8%	-3%	10%	18%	31%	65%

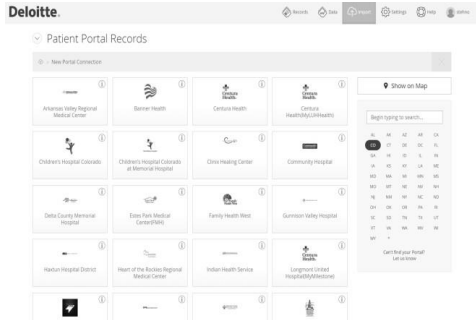
Electronic Health Records Health Analytics Best Friend

On-Demand EHR Solutions

EHR solution utilizes patient portal technology which allows the consumer to control the entire process using existing online portal functionality

On-Demand EHR Solution

Deloitte's EHR Solution cuts weeks off of initial decision timelines, reduces manual data entry and enables analytics



Collect

Collect the data post acknowledgment and agreement by the customers



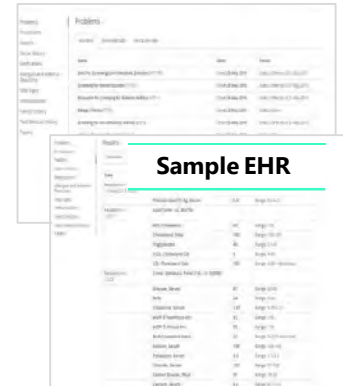
Parse

Parse the data into machine readable format



Analyze

Analyze the robust dataset including: Medical encounters and issues, lab and diagnostic results, medications, past medical history, vital signs, medical procedures, family medical history, etc.












On-Demand EHR Solutions

Deloitte.

Records Data **Import** Settings Help

Import

<p>Patient Portal Records</p> <p>Schedule automatic periodic collection of health records from your patient portals</p> 	<p>Health Plan Portal Records</p> <p>Collect health records from your Health Plan portals</p> 	<p>Medicare Records</p> <p>Schedule automatic periodic collection of clinical data in your Medicare claims records from MyMedicare.gov</p> 
<p>VA Health Records</p> <p>Schedule automatic periodic collection of your VA health records from My HealtheVet</p> 	<p>DIRECT Inbox</p> <p>Receive summaries sent directly from your providers' EHRs and communicate securely with your doctors</p> 	<p>Personal Device Records</p> <p>Schedule automatic periodic collection of data from your personal health/fitness monitoring devices</p> 
<p>Upload Files</p> <p>E-mail or upload any electronic records you have in any format</p> 	<p>Upload DICOM Study</p> <p>Upload imaging studies such as x-rays or MRIs provided to you on CD</p> 	<p>23andMe Records</p> <p>Retrieve your genomic data and analyzed health reports from your 23andMe account</p> 

Sample EHR

Medical Encounters and Issues

Problems
Procedures
Results
Social History
Medications
Allergies and Adverse Reactions
Vital Signs
Immunization
Family History
Past Medical History
Payers

Problems

Narrative Structured Data Structured View

Name	Dates	Details
Visit For: Screening Exam Metabolic Disorders (V77.99)	Onset:20-May-2016	Status: Other as of 21-May-2013
Screening for thyroid disorder (V77.0)	Onset:20-May-2016	Status: Other as of 21-May-2013
Encounter for screening for diabetes mellitus (V77.1)	Onset:20-May-2016	Status: Other as of 21-May-2013
Allergic rhinitis (477.9)	Onset:20-May-2016	Status: Active
Screening for iron deficiency anemia (V78.0)	Onset:20-May-2016	Status: Other as of 21-May-2013
History of contact dermatitis (V13.3)	Onset:20-May-2016	Status: Other
Esophageal stricture (530.3)	Onset:20-May-2016	Status: Active
Blood tests for routine general physical examination (V72.62)	Onset:20-May-2016	Status: Other as of 21-May-2013
Encounter for screening for lipid disorders (V77.91)	Onset:20-May-2016	Status: Other as of 21-May-2013
Encounter for general health examination (V70.0)	Onset:20-May-2016	Status: Active
Encounter for screening for malignant neoplasm of prostate (V76.44)	Onset:20-May-2016	Status: Other as of 21-May-2013
Laceration of hand, right (882.0)	Onset:20-May-2016	Status: Active

Sample EHR

Lab and Diagnostic Results

- Problems
- Procedures
- Results
- Social History
- Medications
- Allergies and Adverse Reactions
- Vital Signs
- Immunization
- Family History
- Past Medical History
- Payers

Results

Narrative Structured Data Structured View			
Date	Description	Value	Details
Resulted on: 21-May-2013 12:23	Prostate-Specific Ag, Serum - LC 010322		
	Prostate-Specific Ag, Serum	0.6	Range: 0.0-4.0
Resulted on: 12:23	Lipid Panel - LC 303756		
	HDL Cholesterol	60	Range: >30
	Cholesterol, Total	169	Range: 100-199
	Triglycerides	46	Range: 0-149
	VLDL Cholesterol Cal	9	Range: 5-40
	LDL Cholesterol Calc	100	Range: 0-99 = Abnormal
Resulted on: 12:23	Comp. Metabolic Panel (14) - LC 322000		
	Glucose, Serum	87	Range: 65-99
	BUN	24	Range: 6-24
	Creatinine, Serum	1.07	Range: 0.76-1.27
	eGFR If NonAfrican AM	82	Range: >59
	eGFR If African Am	95	Range: >59
	BUN/Creatinine Ratio	22	Range: 9-20 = Abnormal
	Sodium, Serum	139	Range: 134-144
	Potassium, Serum	4.4	Range: 3.5-5.2
	Chloride, Serum	103	Range: 97-108
	Carbon Dioxide, Total	21	Range: 20-32
	Calcium, Serum	9.2	Range: 8.7-10.2
	Protein, Total, Serum	6.8	Range: 5.0-8.5
	Albumin, Serum	4.2	Range: 3.5-5.5
	Globulin, Total	2.6	Range: 1.5-4.5
	A/G Ratio	1.6	Range: 1.1-2.5
	Bilirubin, Total	0.6	Range: 0.0-1.2
	Alkaline Phosphatase, S	60	Range: 25-150
	AST (SGOT)	21	Range: 0-40
	ALT (SGPT)	26	Range: 0-44

Resulted on: 12:23	CBC With Differential/Platelet - LC 005009		
	WBC	4.8	Range: 4.0-10.5
	RBC	5.50	Range: 4.14-5.80
	Hemoglobin	16.3	Range: 12.6-17.7
	Hematocrit	47.5	Range: 37.5-51.0
	MCV	86	Range: 79-97
	MCH	29.6	Range: 26.6-33.0
	MCHC	34.3	Range: 31.5-35.7
	RDW	13.9	Range: 12.3-15.4
	Platelets	221	Range: 140-415
	Neutrophils	66	Range: 40-74
	Lymphs	19	Range: 14-46
	Monocytes	11	Range: 4-13
	Eos	3	Range: 0-7
	Basos	1	Range: 0-3
	Neutrophils (Absolute)	3.2	Range: 1.8-7.8
	Lymphs (Absolute)	0.9	Range: 0.7-4.5
	Monocytes(Absolute)	0.5	Range: 0.1-1.0
	Eos (Absolute)	0.1	Range: 0.0-0.4
	Baso (Absolute)	0.0	Range: 0.0-0.2
	Immature Granulocytes	0	Range: 0-2
	Immature Grans (Abs)	0.0	Range: 0.0-0.1
Resulted on: 15-Jan-2011 16:10	Tsh, 3rd Generation - LC 004259		
	TSH	1.210	Range: 0.450-4.500

Sample EHR

Vital Signs

- Problems
- Procedures
- Results
- Social History
- Medications
- Allergies and Adverse Reactions
- Vital Signs
- Immunization
- Family History
- Past Medical History
- Payers

Vital Signs

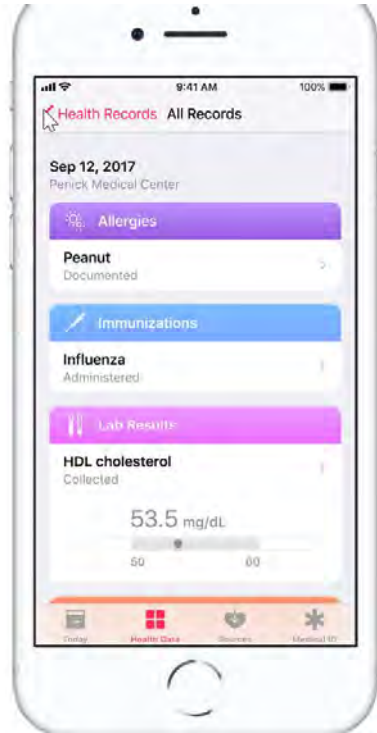
Narrative Structured Data Structured View

Date	Test	Result	Details
12-Nov-2010 23:38	BP Diastolic	90 mm[Hg]	Status:
23-May-2013 20:09	BP Diastolic	84 mm[Hg]	Status:
17-Jan-2011 22:24	BP Diastolic	86 mm[Hg]	Status:
14-Mar-2016 14:40	BP Diastolic	88 mm[Hg]	Status:
12-Nov-2010 23:38	Heart Rate	66 /min	Status:
23-May-2013 20:09	Heart Rate	66 /min	Status:
17-Jan-2011 22:24	Heart Rate	64 /min	Status:
14-Mar-2016 14:40	Heart Rate	66 /min	Status:
23-May-2013 20:09	Height	187 cm	Status:
17-Jan-2011 22:24	Height	190 cm	Status:
14-Mar-2016 14:40	Height	187 cm	Status:
23-May-2013 20:09	O2 SAT	95	Status:
14-Mar-2016 14:40	O2 SAT	96	Status:
12-Nov-2010 23:38	Respiration Rate	14	Status:
23-May-2013 20:09	Respiration Rate	16	Status:
17-Jan-2011 22:24	Respiration Rate	16	Status:
14-Mar-2016 14:40	Respiration Rate	16	Status:

23-May-2013 20:09	Body Surface Area Calculated	2.23	Status:
17-Jan-2011 22:24	Body Surface Area Calculated	2.29	Status:
14-Mar-2016 14:40	Body Surface Area Calculated	2.33	Status:
23-May-2013 20:09	Body Mass Index Calculated	27.21 kg/m2	Status:
17-Jan-2011 22:24	Body Mass Index Calculated	27.62 kg/m2	Status:
14-Mar-2016 14:40	Body Mass Index Calculated	30.3 kg/m2	Status:
12-Nov-2010 23:38	BP Systolic	130 mm[Hg]	Status:
17-Jan-2011 22:24	BP Systolic	124 mm[Hg]	Status:
23-May-2013 20:09	BP Systolic	122 mm[Hg]	Status:
14-Mar-2016 14:40	BP Systolic	124 mm[Hg]	Status:
12-Nov-2010 23:38	Temperature	98.2 f	Status:
23-May-2013 20:09	Temperature	97.1 f	Status:
14-Mar-2016 14:40	Temperature	97.2 f	Status:
12-Nov-2010 23:38	Weight	226 lb	Status:
17-Jan-2011 22:24	Weight	221 lb	Status:
23-May-2013 20:09	Weight	212 lb	Status:
14-Mar-2016 14:40	Weight	236 lb	Status:

Apple takes a shot at Health Records

Apple Health Records started in March 2018 and already has surpassed initial estimates with millions of EHRs already downloaded. Deloitte is set up to use Apple Health, Google Medical and other major platforms for EHR collection as they reach critical scale



Track other important data, too.

Health makes it easy to keep tabs on a wide array of data that matters to you — from measurements of your blood pressure and blood glucose to records for your weight and reproductive health.



Heart



Body Measurements



Reproductive Health



Results



Vitals

The Mobile Revolution

Tracking, Recording, Nudging,
24/7/365 Coverage

The Mobile Revolution

90% of the data in the world today was created in the last 2 years. The majority of that data was collected on mobile devices.



The Times are a Changing

Usage based insurance is rapidly changing the marketplace

<https://www.insurancejournal.com/news/national/2018/09/19/501747.htm>

John Hancock Will Only Sell Interactive Life Insurance with Fitness Data Tracking

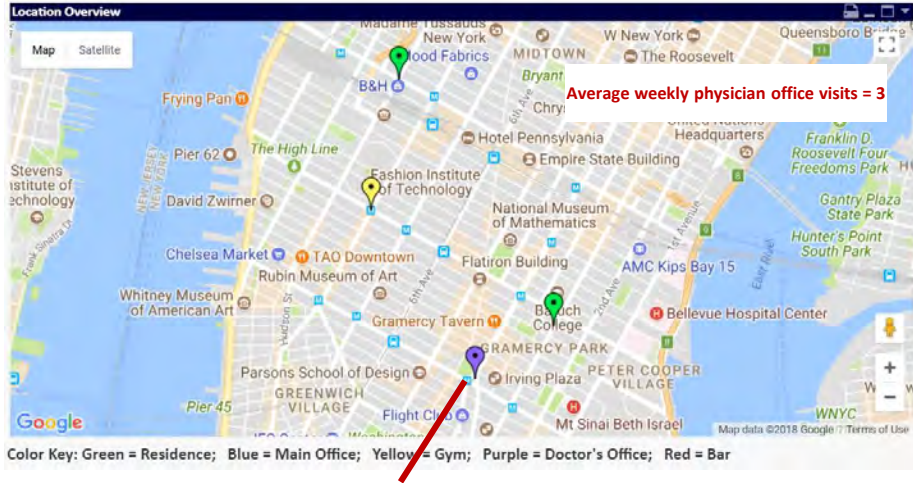
September 19, 2018 by Suzanne Barlyn

John Hancock, one of the oldest and largest North American life insurers, will stop underwriting traditional life insurance and instead sell only interactive policies that track fitness and health data through wearable devices and smartphones, the company said on Wednesday.

Use Case – Identifying Fraud in Disability Insurance

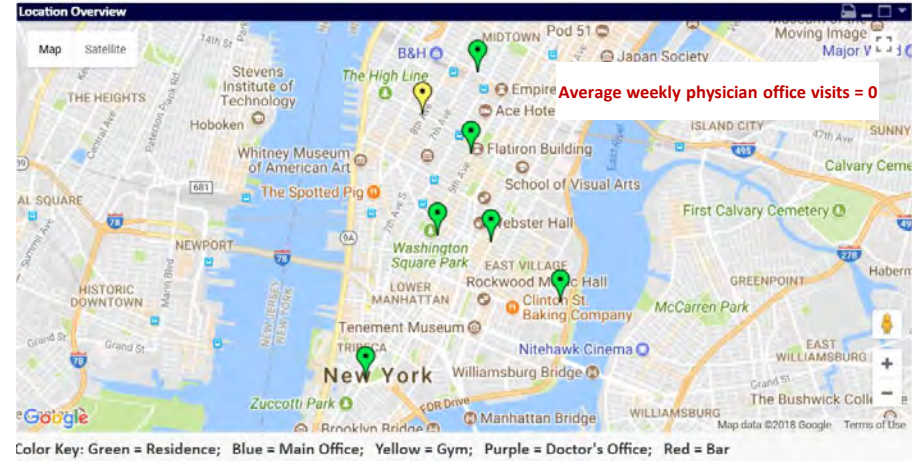
Location insights can be leveraged to infer potential fraud in disability claims.

Submitted Claims – Locations of “claimed” physician services



Claims submitted for physician visits

Potentially Fraudulent Claims – Actual location of household parties over same time period show that no physical visits took place



Actual digital device visits from claimant's household = 0

Location snapshot of claimant cohort aggregated over the claim period helps insurers triage suspect claims early in the claims cycle to **mitigate costs and prevent fraud**

[Link to dashboard](#)

Human Body Based Sensors

We are not far of from the Human Body itself generating its own feedback loop.





Innovation in Health Insurance Underwriting

One Employer Example

Plan Name	PPO A	PPO B	PPO C	PPO D
Member Coinsurance	20%	20%	20%	20%
Individual Deductible	\$250	\$500	\$1,000	\$2,000
Individual OOP Maximum	\$1,750	\$2,500	\$3,500	\$4,000
Actuarial Value	90%	87%	84%	84%*
Annual Premium (EE Only)	\$9,348	\$8,304	\$7,704	\$7,320
Annual Member Contribution (EE Only)	\$3,564	\$2,520	\$1,920	\$1,188
Enrollment (EE Only)	512	1,224	527	994
Enrollment Distribution (EE Only)	16%	38%	16%	30%

* Including HRA funding of \$500

Health Insurance Comprehension Study

- Actual and self-perceived comprehension of insurance concepts

	% who think they understand concept	% of those who think they understand who correctly answered question testing understanding of concept	% of total sample who correctly answer question testing understanding of concept
Deductible	97%	81%	78%
Copay	100%	72%	72%
Coinsurance	57%	59%	34%
Maximum Out-of-Pocket	93%	59%	55%

G. Loewenstein et al. / Consumers' misunderstanding of health insurance / Journal of Health Economics

Health Insurance Comprehension Study

Ability to compute insurance costs: % answering questions correctly	% Correct
Multiple choice cost-estimate questions	58%
In-network primary care (after deductible)	77%
In-network primary care visit	73%
Out-of-network office primary care	59%
Out-of-network office primary care (after MOOP)	35%
In-network primary care (after MOOP)	58%
In-network MRI (after deductible)	57%
In-network MRI	41%
ER charges (with admission)	40%
Open ended cost question: cost of 4-day stay in hospital	11%
In this plan, is preventive covered 100% if you have not met your deductible? (Y/N)	76%
In the plan, if you spend money out-of-pocket on in-network providers, does this count toward the deductible for out-of-network providers (Y/N)	34%

G. Loewenstein et al. / Consumers' misunderstanding of health insurance / Journal of Health Economics

Choice

One Employer Example

Plan Name		PPO B	PPO C	PPO D
Member Coinsurance		20%	20%	20%
Individual Deductible		\$500	\$1,000	\$2,000
Individual OOP Maximum		\$2,500	\$3,500	\$4,000
Actuarial Value		87%	84%	84%*
Annual Premium (EE Only)		\$8,304	\$7,704	\$7,320
Annual Member Contribution (EE Only)		\$2,520	\$1,920	\$1,188
Enrollment (EE Only)	512 ?	1,224	527	994
Enrollment Distribution (EE Only)	16% ?	38%	16%	30%

* Including HRA funding of \$500

One Employer Example

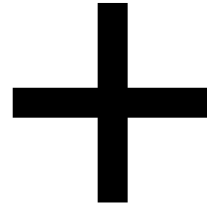
Plan Name	HSA	PPO B	PPO C	PPO D
Member Coinsurance	20%	20%	20%	20%
Individual Deductible	\$2,000	\$500	\$1,000	\$2,000
Individual OOP Maximum	\$6,500	\$2,500	\$3,500	\$4,000
Actuarial Value	82%*	87%	84%	84%*
Annual Premium (EE Only)	???	???	???	???
Annual Member Contribution (EE Only)	???	???	???	???
Enrollment (EE Only)	???	???	???	???
Enrollment Distribution (EE Only)	???	???	???	???

* Including HSA/HRA funding of \$500

Migration Prediction



Actuarial Judgment



Machine Learning

Migration Prediction

- Factors impacting migration amongst a choice of plans
 - Change in employee contributions
 - Plan design / change in plan design
 - Employee information
 - age/gender/location
 - marital status
 - health status/risk
 - income
- Other considerations
 - Enrollment platform
 - Active vs. passive enrollment
 - Employer communication
 - Carrier information
 - brand recognition
 - network strength
 - Rx formulary

One Employer Example

- Migration from PPO A to the other plans

	HSA	PPO B	PPO C	PPO D*
Actuarial Judgment	5%	50%	45%	0%
Machine Learning Algorithm		100%		
Actual	3%	92%	5%	0%

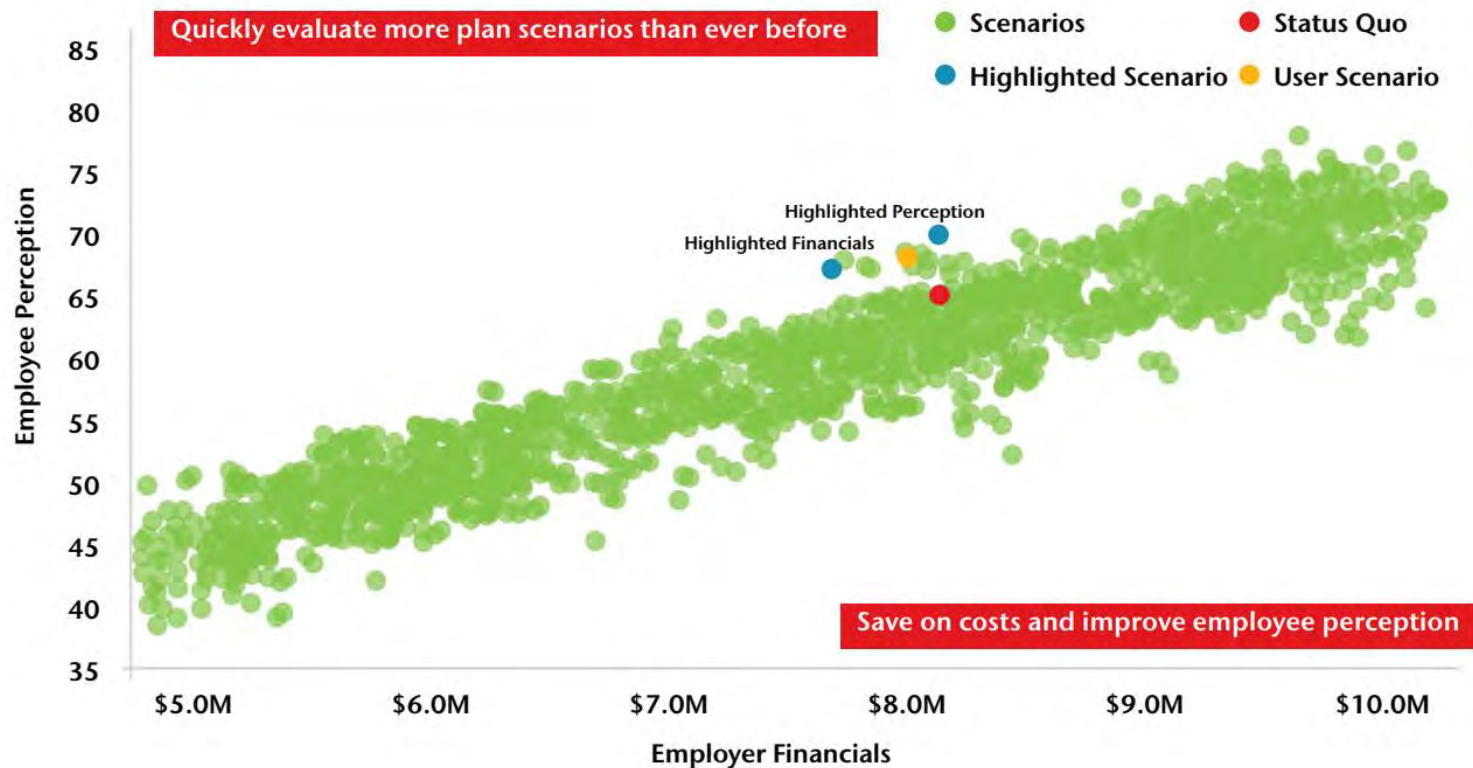
- Migration from the other plans to the new HSA (expressed as a % of total enrollment from each plan)

	PPO A	PPO B	PPO C	PPO D*	Waived
Actuarial Judgment		2%	2%	40%	
Machine Learning Algorithm		1%	1%	44%	1%
Actual	3%	4%	7%	18%	3%

*PPO D became a closed plan when the new HSA plan was introduced

Perception

Measuring Beyond Cost



Employee Perception – Conjoint Analysis

Q4. Which plan would you be most likely to purchase?

Q3. Which plan would you be most likely to purchase?

Q2. Which plan would you be most likely to purchase?

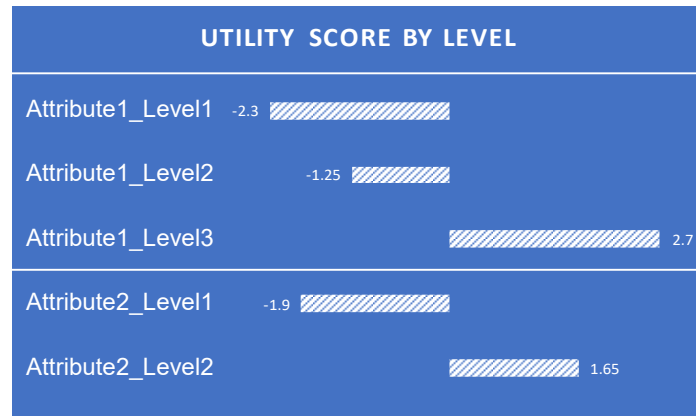
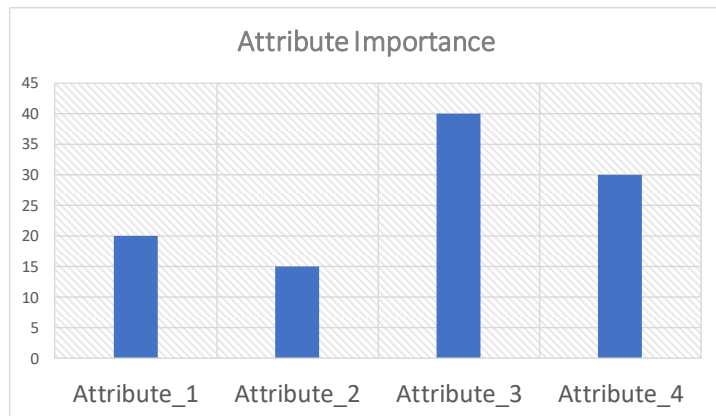
Q1. Which plan would you be most likely to purchase?

Annual Contribution	\$4,000	\$1,000
Deductible	\$5,000	\$4,000
Out-of-Pocket Maximum	\$5,000	\$4,000
Coinsurance	30%	10%
General Services Copay	\$20	\$80
Prescription Drug Copay	\$80	\$20
	Choose	Choose

Exhibits are illustrative

Employee Perception – Conjoint Analysis

- Useful outputs from a conjoint analysis
 - Importance scores of attributes
 - Utility scores for each level
 - Segmentation of consumers



Exhibits are illustrative

Employee Perception – Conjoint Analysis

- Highlights from the conjoint analysis



Thank You & Questions

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