



2019 HEALTH
MEETING

JUNE 24-26 | PHOENIX, AZ



Session 12, Large Claims, Large Problems?

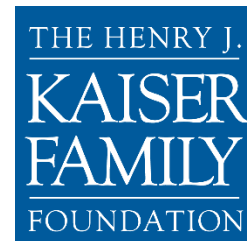
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Session 12: Large Claims, Large Problems

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The Story of Initiative 18|11

- **A little history**
- **Goals**
 - Create something actionable
 - Bring together various domains of health care community
 - Emphasis on cost and quality
 - Access and finance will be addressed in the ACA@10 Initiative
- **Phases**
 - Phase 1: Inaugural event (Conference Report)
 - Phase 2: Actionable research, strategic initiatives
 - Managed Care 3.0
 - Pharmacy Pricing
 - 5/50 Research project
 - Phase 3: TBD
- www.soa.org/Initiative1811

Our Partners

- **The SOA Team**

- Brian Pauley, Chair
- Joan Barrett
- Joe Wurzburger, Staff Fellow

- **Kaiser Family Foundation**

- A health information organization that analyzes policy issues, tracks public opinion through polling, and informs the public through journalism
- Not part of Kaiser Foundation
- Key websites
 - www.kff.org (in-depth articles)
 - www.khn.org (Kaiser Health News: Current events)
 - www.healthsystemtracker.org (Peterson-Kaiser joint venture, data repository)

- **Healthcare Finance Management Association**

- a membership organization that brings together executives and financial managers from provider organizations, physician practices, and health plan markets to collaborate and address the many financial challenges the US healthcare system faces today.
- www.hfma.org

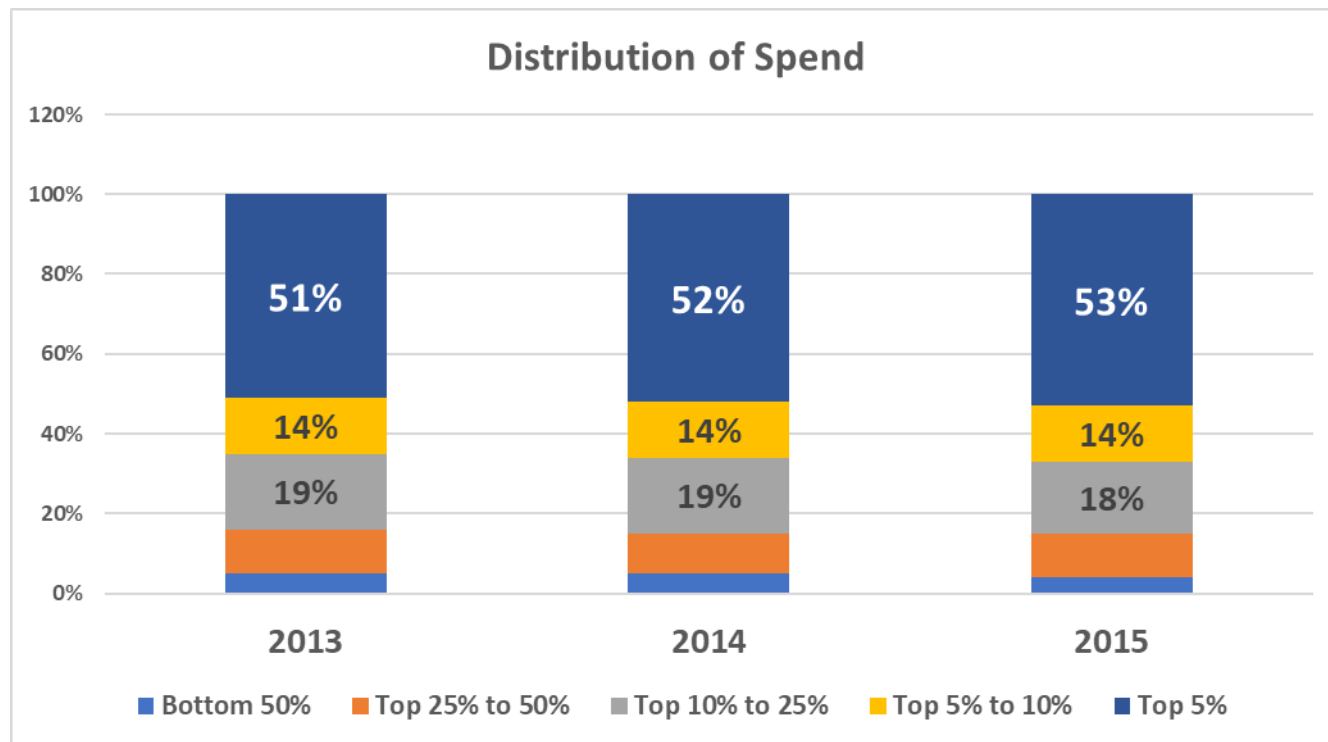
Today's Agenda

- The 5/50 Premise
- The Health Plan Environment
- The Stop-loss Environment

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The 5/50 Premise

The 5/50 Premise

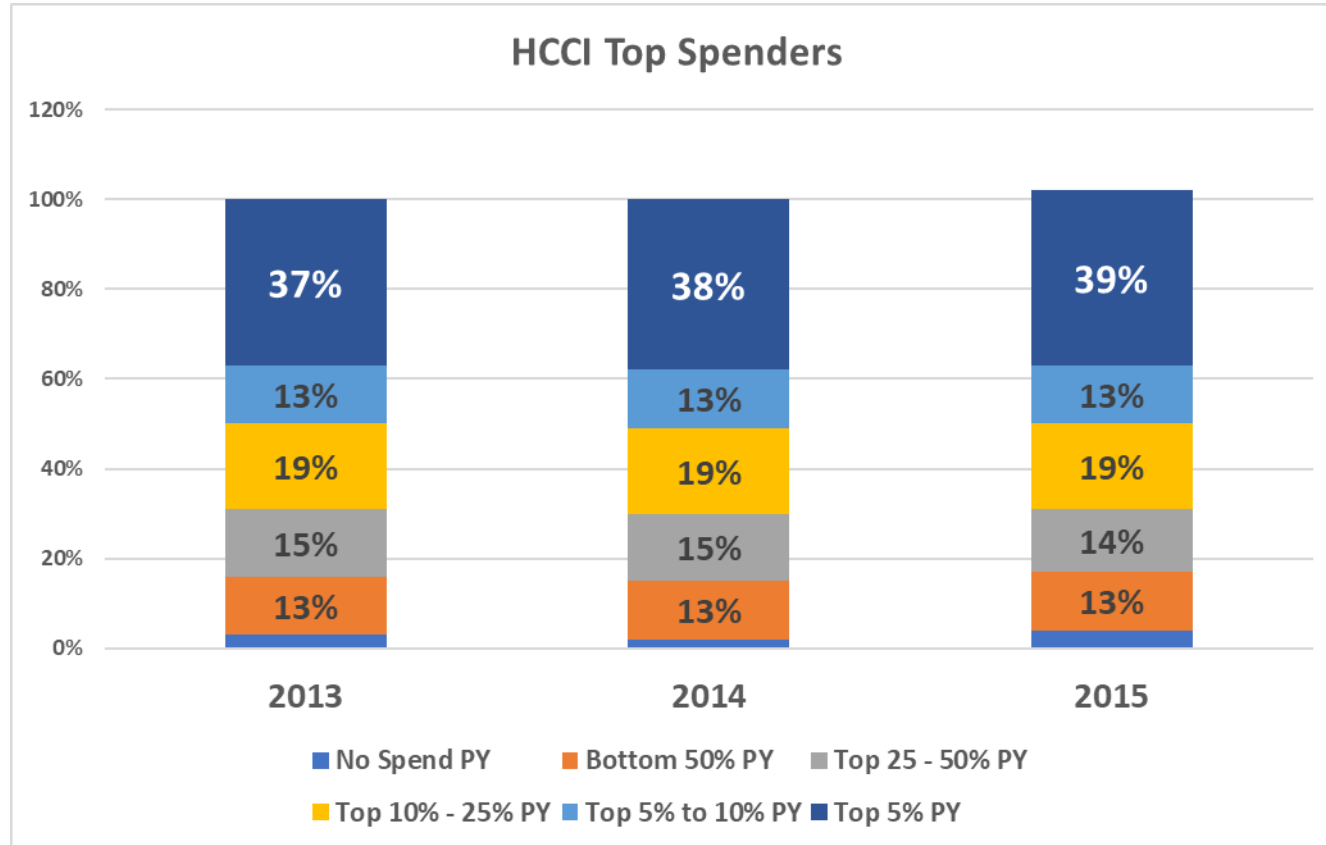


- Premise: 5% of the population accounts for 50% of total health care costs, across all, or at least most, populations
- This premise needs to be challenged and findings need to be converted to actionable items
- Relying on HCCI data

About HCCI

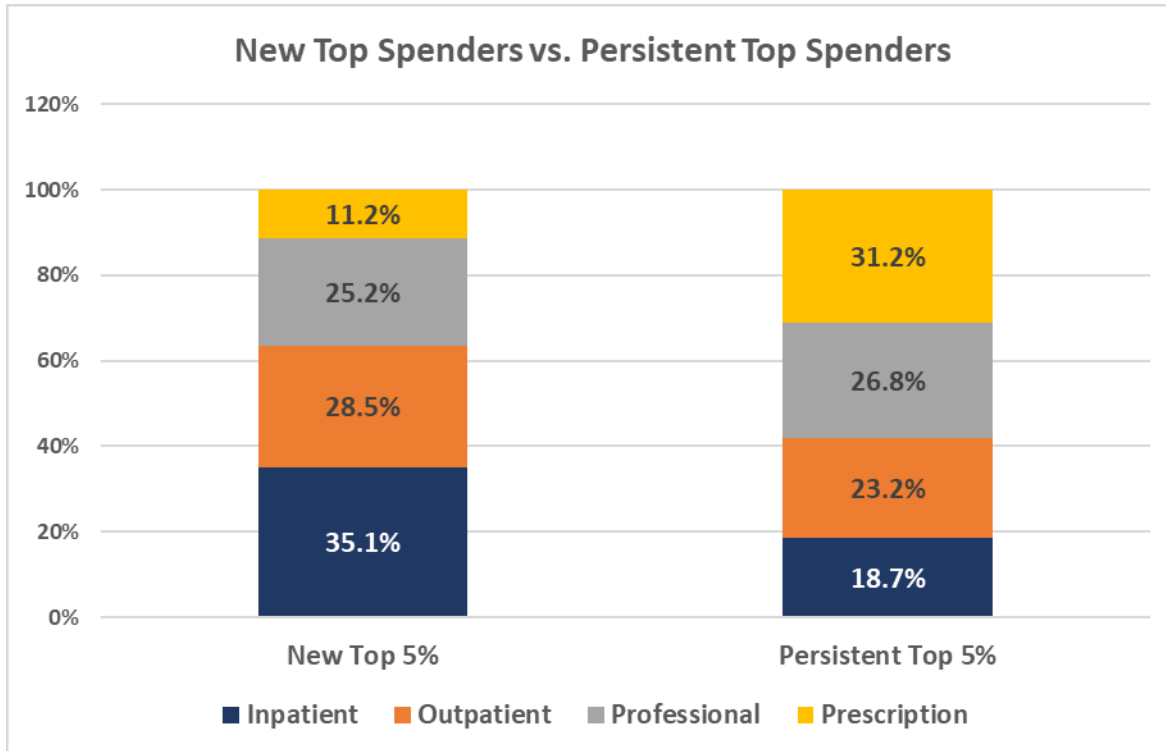
- **The Health Care Cost Institute** (<https://www.healthcostinstitute.org>)
- **Data**
 - Commercial: Individual, ESI, Medicare advantage
 - Longitudinal, starting in 2009
 - 50 million lives
 - Multi-carrier
 - Medicare: CMS-approved qualified entity (QE)
 - 100% samples
- **Research**
 - Annual Cost and Utilization Reports
 - Specific topics, like Top Spenders report

New Top Spenders vs. Persistent Top Spenders



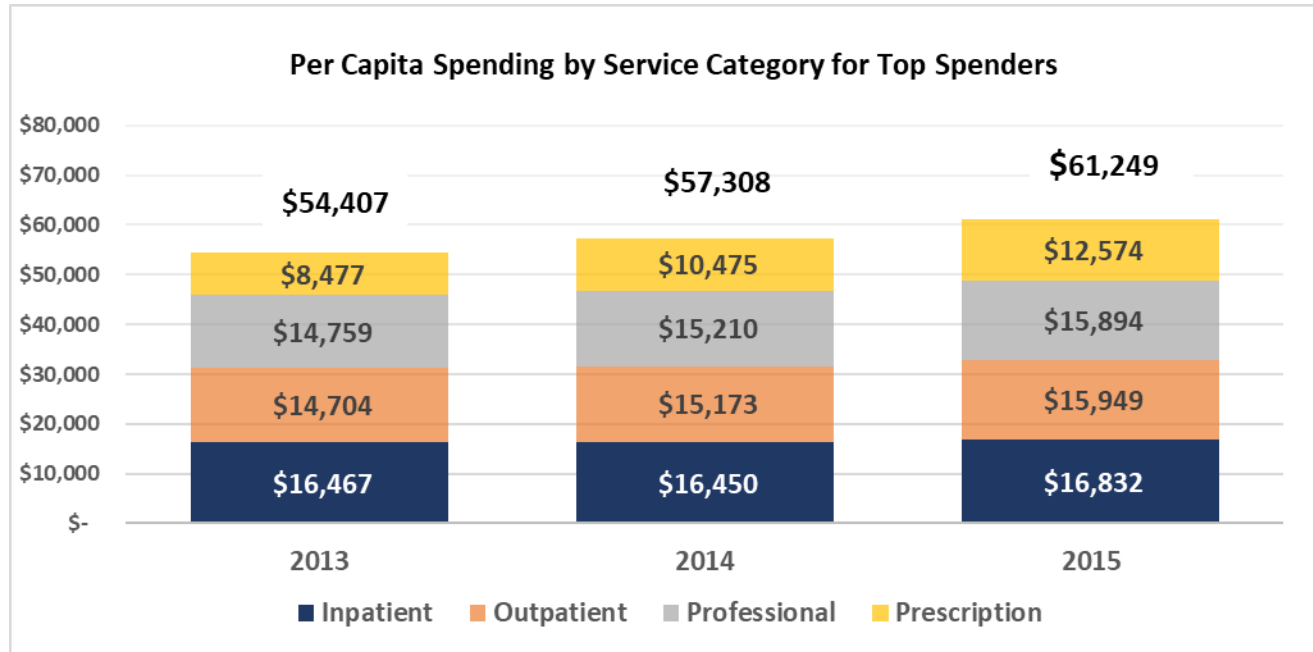
- Less than 40% of the top spenders in any given year were top spenders in the previous year

Top Spenders by Type of Service



- New top spenders spend more on inpatient hospital than on other services
- Persistent top spenders spend more on prescription Rx

Trends



- Top spenders have been trending about 6% on average
- 60% of the increase has been driven by prescription Rx

About the 5/50 Research Project

- **Target audience/Goals**

- Actuaries

- Do we have the analytical techniques and baseline information we need to do our day-to-day jobs?
 - Two perspectives: Health plans and stop-loss

- Health researchers

- Do they have techniques and understand the consequences of adjusting for large claims in doing research?

- The public/media

- Key highlights for media impressions
 - Policymaker take-aways

- **The team/Project Oversight Group**

- **Process**

- To be done in phases

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The Health Plan Environment

The Health Plan Environment

Function	Key Questions
Pricing/Underwriting	<ul style="list-style-type: none">• How can I measure risk?• How much margin do I need?• How can I tell if my original projection was correct?• How can I tell if a group's experience is better or worse than the book?• How can I adjust my trend projections for large claims?
Building care management programs	<ul style="list-style-type: none">• What types of programs do I need?
Predicting individual large claims	<ul style="list-style-type: none">• What data do I need?• What techniques are available?• How do I know if the technique is accurate?

Today's goal: How can we approach quantifying the answers to these questions?

Risk Approaches

	Current Practice	Emerging
Basic Premise	<ul style="list-style-type: none"> • Most risk is the result of large claims 	<ul style="list-style-type: none"> • Need to measure <ul style="list-style-type: none"> • PMPM variance • Pricing risk and process/random variation risks
Stop-loss Analogy	<ul style="list-style-type: none"> • Specific stop-loss 	<ul style="list-style-type: none"> • Aggregate stop-loss
Advantages	<ul style="list-style-type: none"> • Existing infrastructure • Easy to apply • Widely-accepted 	<ul style="list-style-type: none"> • More complete picture of risk • Better analytics
Disadvantages	<ul style="list-style-type: none"> • Limited analytics 	<ul style="list-style-type: none"> • New infrastructure • Learning curve

Types of Risk

- **Process Risk**

- Risk associated with random variation even if a projection is 100% accurate
- Mostly large claims

- **Pricing Risk**

- The additional risk associated with inaccurate projections
- Mostly trend

- **Total Risk**

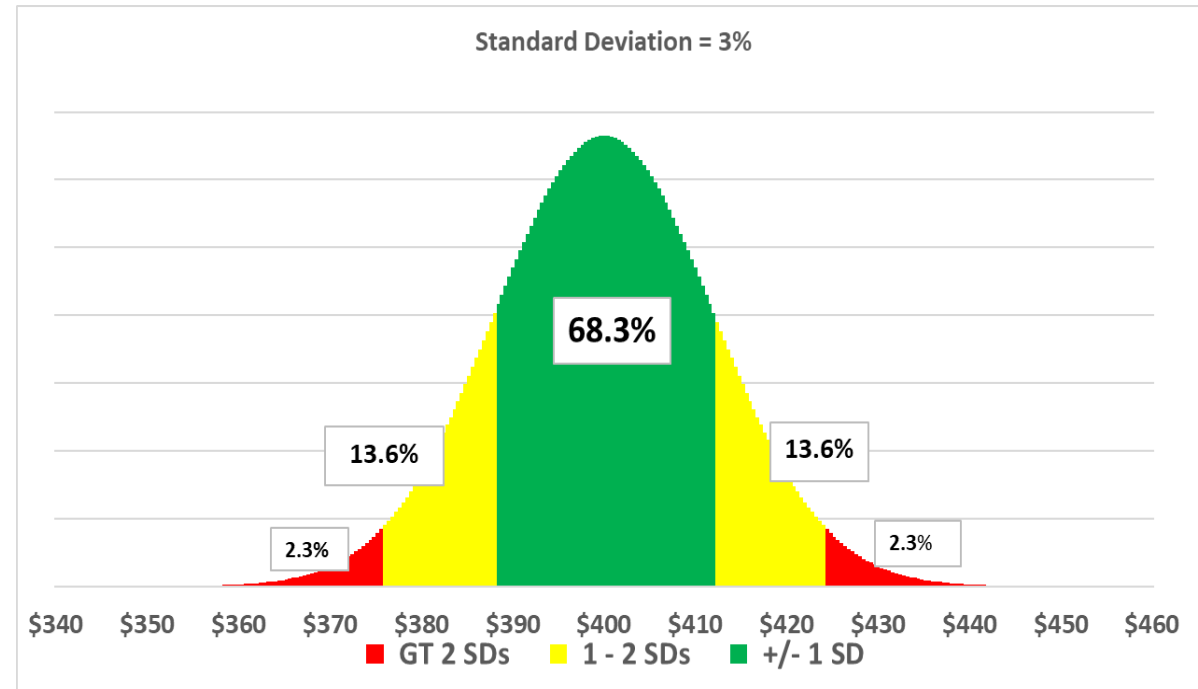
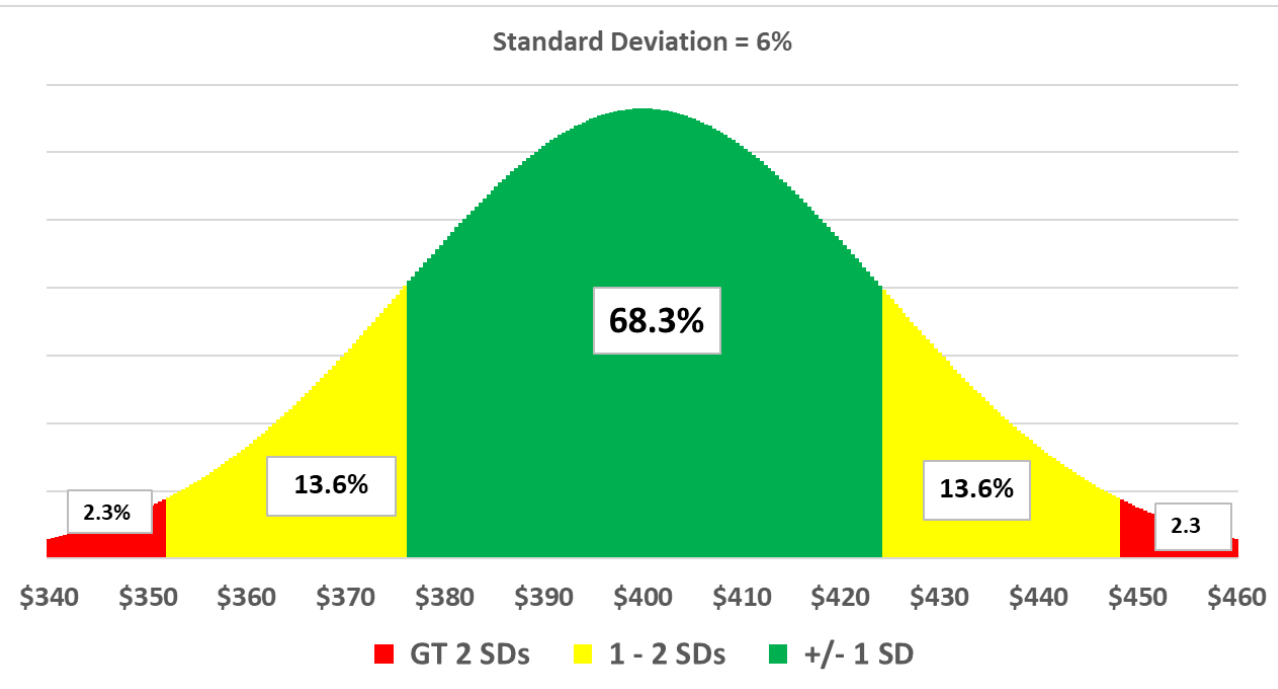
- Combined process risk and pricing risk
- Multiple ways to divide risk into process risk and pricing risk
- Theoretically, total risk should consider all combinations of variables, but weighting scenarios may be acceptable

Building a Claims Probability Table

	Weights	Average Size		
		Claim	PMPY	PMPM
No Claims	9.7%	\$ -	\$ -	\$ -
\$1 - \$2000	40.3%	\$ 500	\$ 201	\$ 17
\$2,001 - \$5,000	25.0%	\$ 2,105	\$ 526	\$ 44
\$5,001 - \$10,000	15.0%	\$ 5,800	\$ 870	\$ 73
\$10,001 - \$20,000	4.0%	\$ 10,900	\$ 436	\$ 36
\$20,001 - \$25,000	1.0%	\$ 24,000	\$ 240	\$ 20
\$25,001 - \$50,000	3.5%	\$ 32,500	\$ 1,138	\$ 95
\$50,001 - \$100,000	1.0%	\$ 63,500	\$ 635	\$ 53
Above \$100,000	0.5%	\$ 151,000	\$ 755	\$ 63
Combined	100.0%		\$ 4,801	\$ 400
Claims Below \$25,000	95.0%	\$ 2,394	\$ 2,274	\$ 189
Claims Above \$25,000	5.0%	\$ 50,550	\$ 2,528	\$ 211
Combined	100.0%		\$ 4,801	\$ 400

- **Weights based on purpose of table**
 - Actuaries use member months to be consistent with pricing methodology
 - Health economists look at the impact on individuals (out-of-pocket expenses, large claims, etc.)
- **Cut-off techniques**
 - Entire experience for individual
 - Amount over the cut-off

The Central Limit Theorem



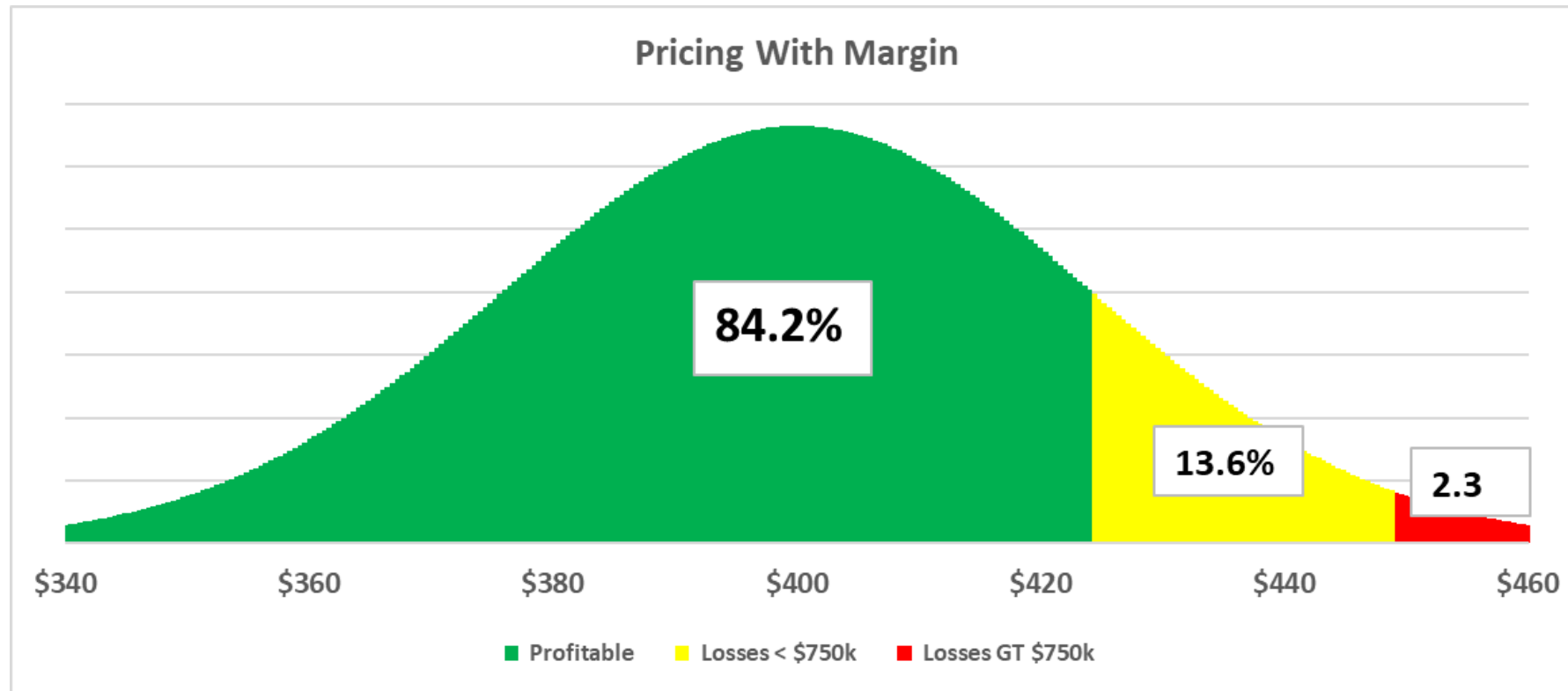
- The set of all samples from a distribution are normal, regardless of the underlying distribution
 - The mean is the same as the population mean μ
 - The variance is the population variance divided by the number in the sample σ^2/n

Estimating Variance

Method	Description	Comments
First Principles	Apply definition to claims probability table	
Sample Variance	Use variance from sample as proxy for population variance	<ul style="list-style-type: none"> Assumes sample is not skewed Divide by $n - 1$, not n
Monte Carlo and/or Bootstrapping	Variance of sample means using random number generator to create samples	<ul style="list-style-type: none"> Work intensive Mostly process risk
Experience	Based on means of actual groups in book	<ul style="list-style-type: none"> May not be enough groups of a similar size to be credible Provides a strong reasonableness check

- Adjustments for factors like age-sex, area and large claims should be consistent with how the results will be used

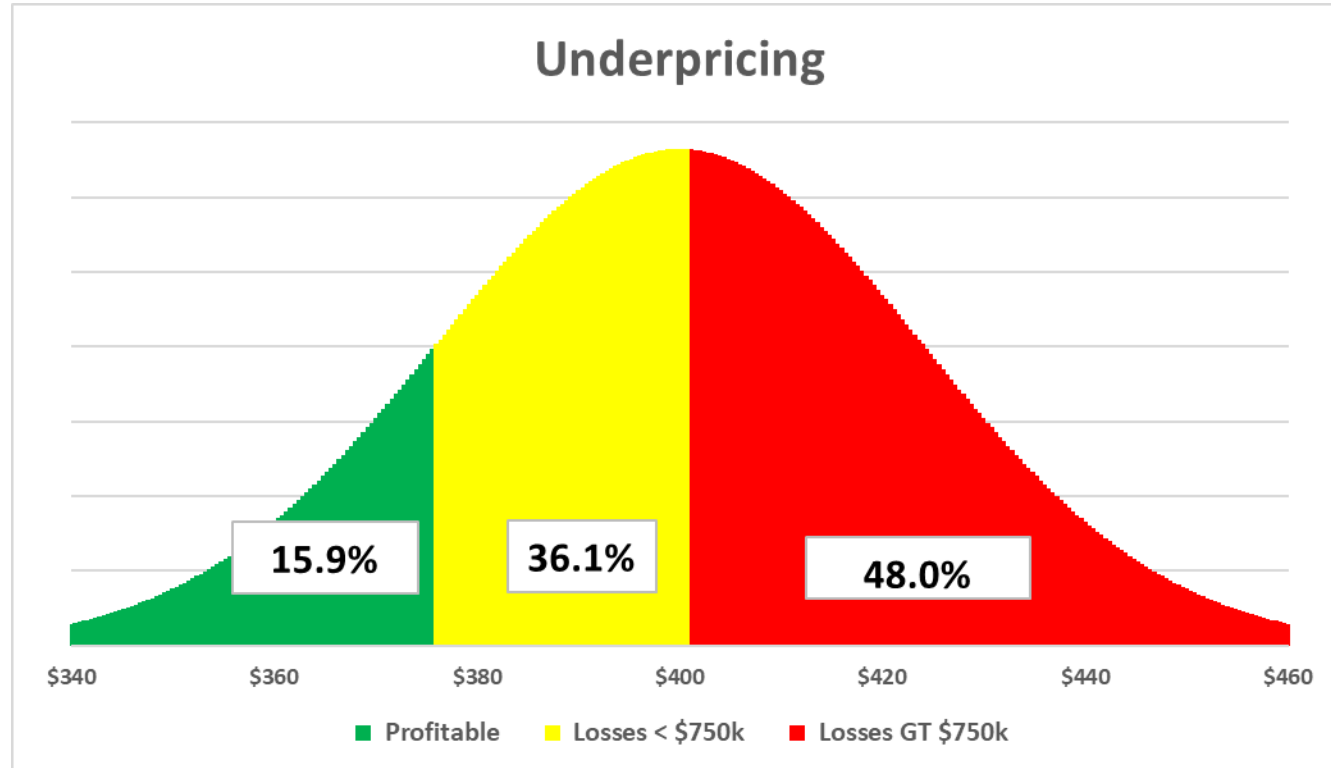
Case Study: Rates With Margin



Standard Deviation: 6%

Margin: 6%

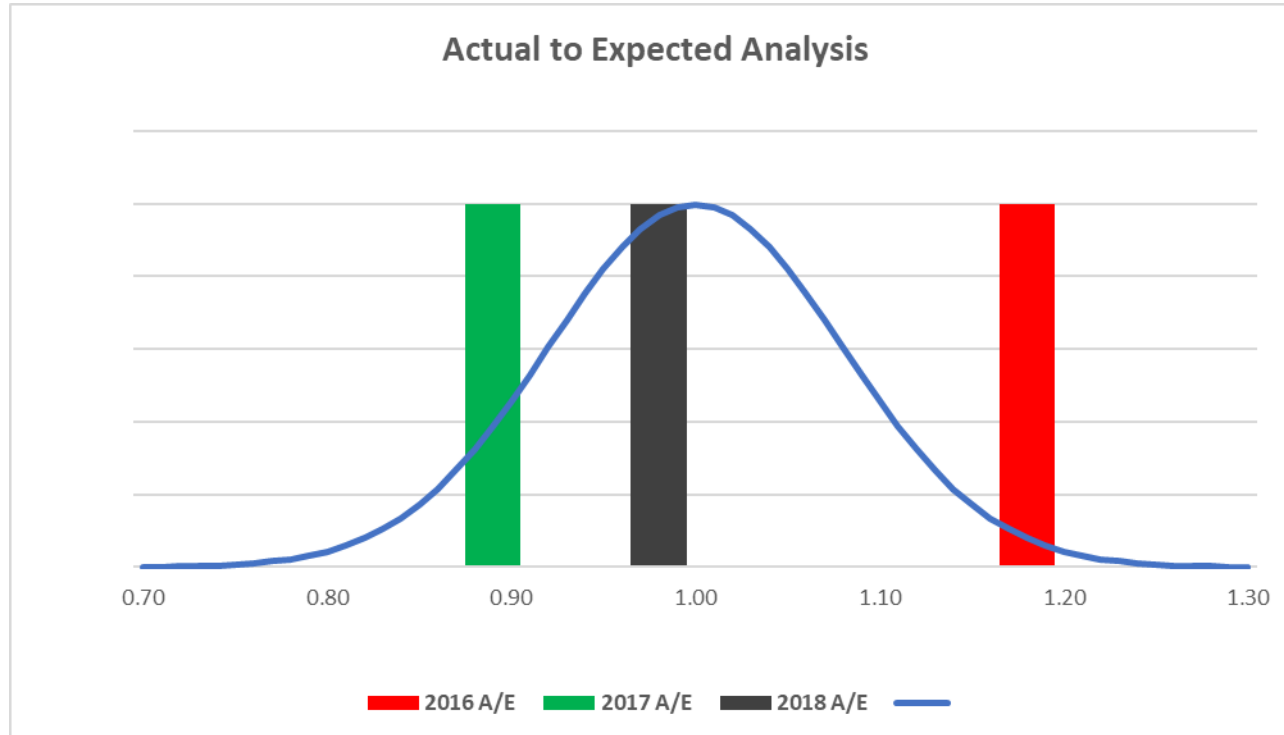
Case Study: Underpricing



Standard Deviation: 6%

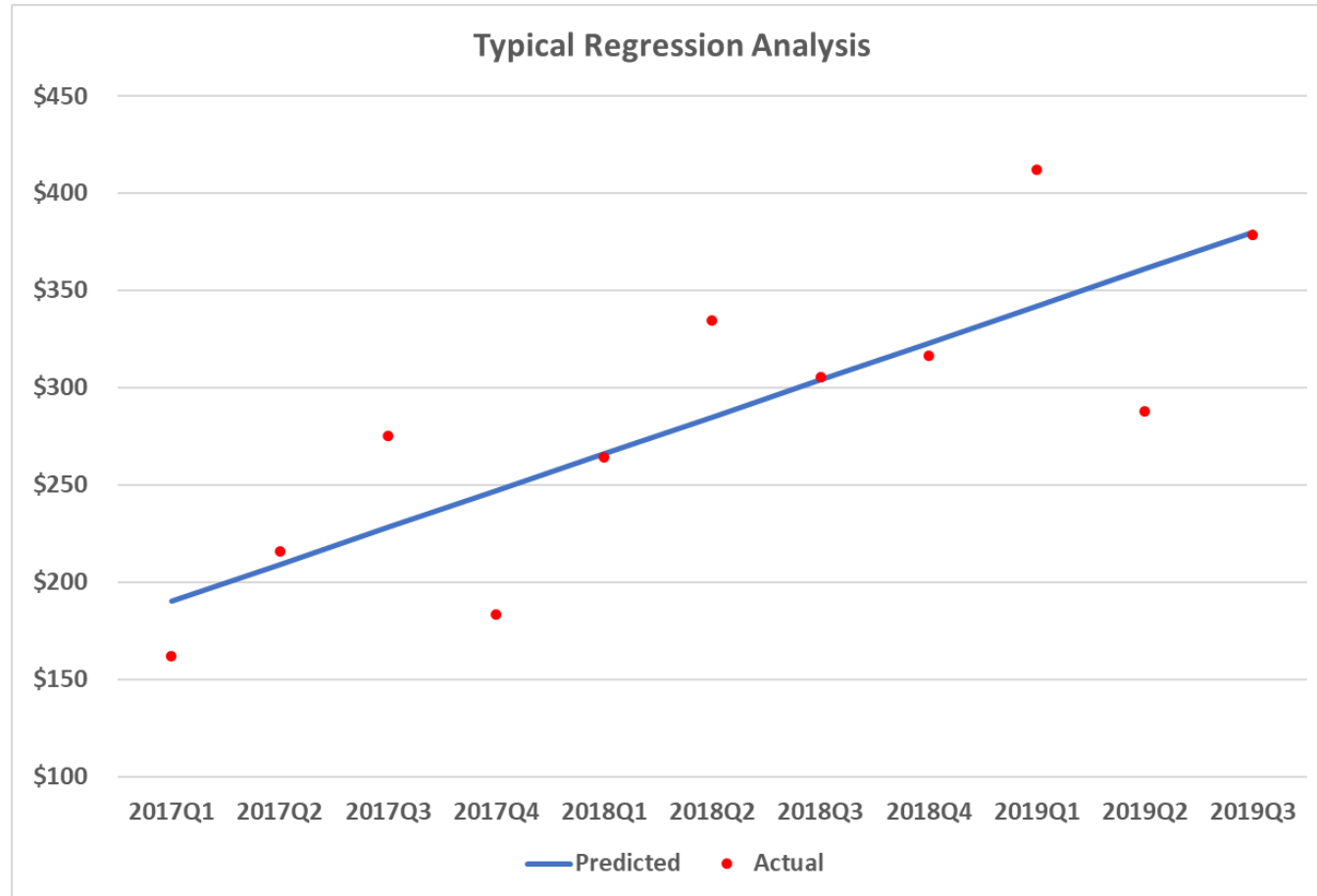
Margin: -6%

Actual to Expected Analysis



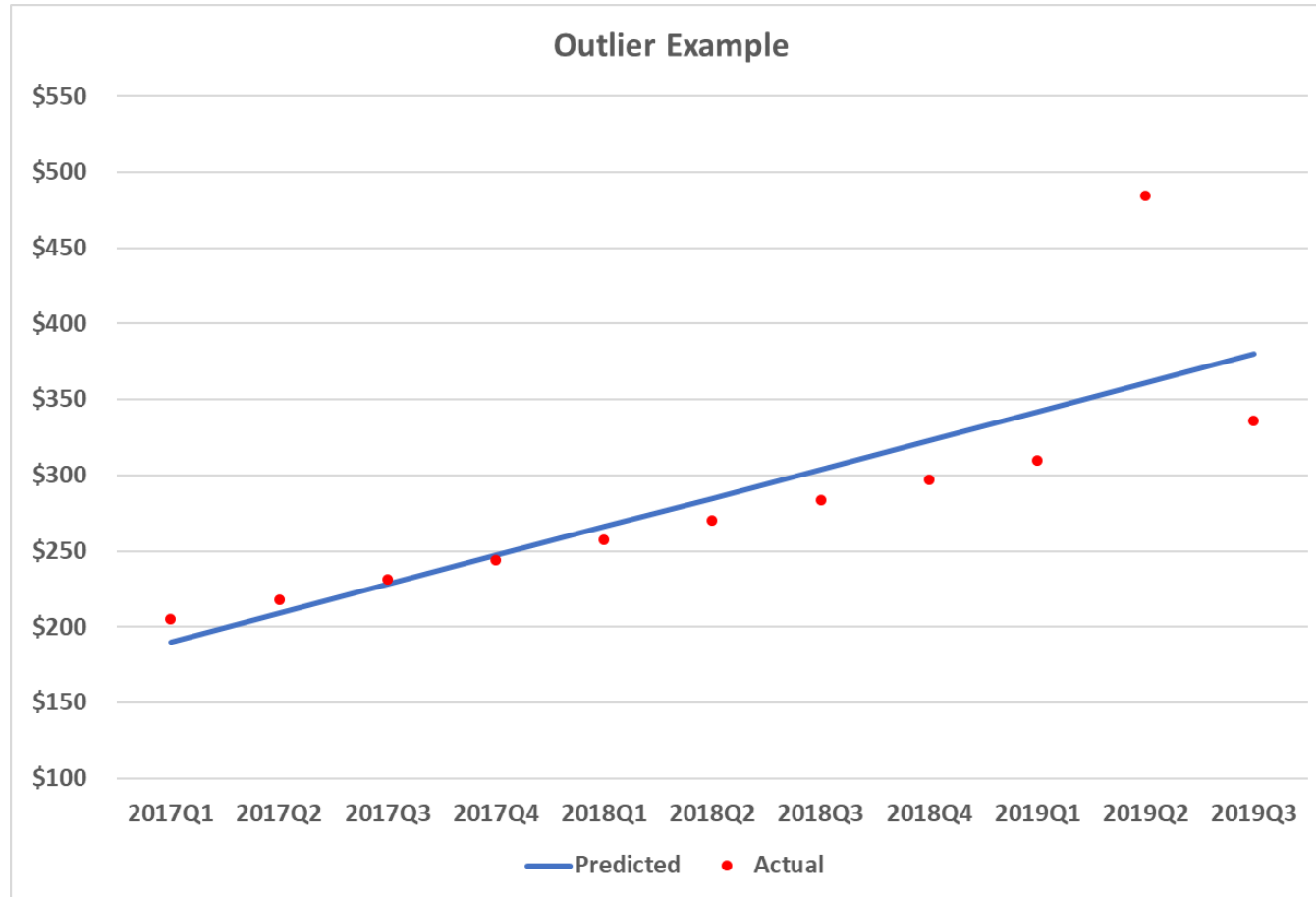
- Expected analysis is based on book experience
- There is roughly a 50/50 chance that a group's experience will exceed expected in any given year and a 50/50 chance that the group's experience will be less than expected in any given year
- An actual to expected curve provides a way to quantify how likely it is that a specific group's expected is not the same as the book

Linear Regression Overview



Statistic	Value
Average Value	\$285
Intercept	\$192
Slope	\$19
R ²	66.7%
Predicted Value	\$400

Outlier Example



Statistic	No Adj.	Remove Outlier	Adj for Outlier
Average Value	\$285	\$265	\$267
Intercept	\$192	\$204	\$207
Slope	\$19	\$13	\$12
R ²	66.7%	99.9%	95.0%
Predicted Value	\$400	\$345	\$339

Program Design

- **Benefit and network design**
 - Value-based plan design
 - Pre-authorization
 - Centers of Excellence
- **Prevention and early detection**
 - Biometric screenings
 - House calls
 - On-line resources
 - Reminders
- **Disease management/care coordination**
 - Provides education and guidance specific to the individual's situation
 - Coordinates care, especially post-discharge care

Costs and Savings

- **Costs**

- Administrative expenses associated with intervention
 - Analytics
 - Postage/phone calls
 - Incentives
- Medical expenses
 - Labs, other tests
 - Maintenance drugs

- **Savings/Avoided costs**

- Large claims/admissions
- Progression to a more serious disease

Key Metrics

- **High level**
 - Distribution of spend by condition/type of episode
 - Incidence rates
 - Prevalence rates
- **Specific condition/type of episode**
 - Progression/timing
 - Natural history of disease
 - Episode progression
 - Aggregate predictability
 - Cost/savings potential
 - Break-even/Needed to treat
- **Financial measures**
 - ROI
 - Cost/savings by time period

Predicting Individual Claims

- **Techniques**

- Regression analysis/generalized linear models
- Cluster analysis
- Artificial intelligence
- Decision trees

- **Data**

- Risk scores
- Claims history, especially Rx
- Test results, other electronic health record data
- Interviews
- Demographics – age, gender, income, education, geographic location, etc.
- Search history

Choosing the Right Program

- **Data**
 - Specific disease or treatment expected
 - Reliability of prediction
- **Cost-effectiveness**
 - Is a program cost-effective?
 - Is it more or less cost-effective than similar programs?
 - Which program is the priority for an individual?
- **Behavioral Finance**
 - Which type of incentive works best in a given situation?
 - For cash incentives, what amount gives the optimal result?

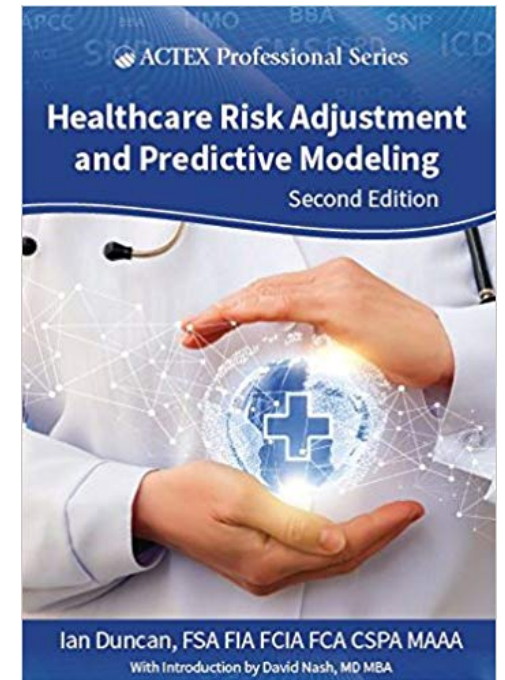
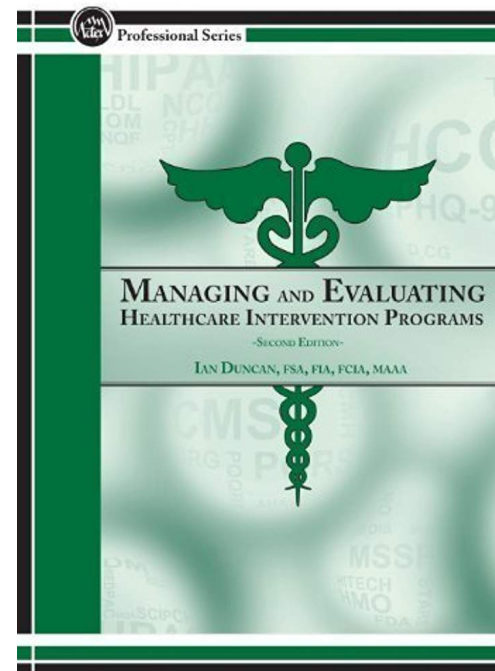
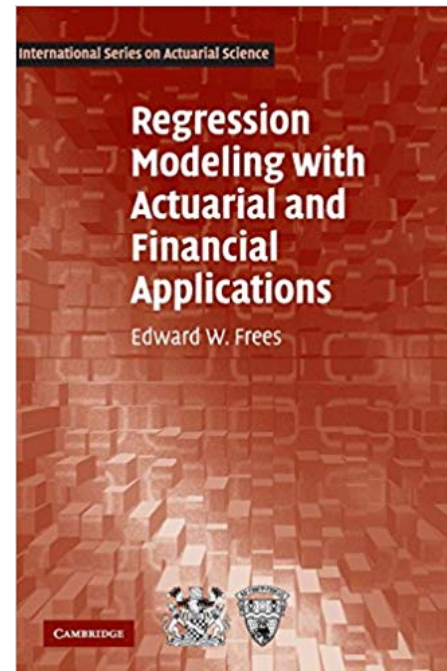
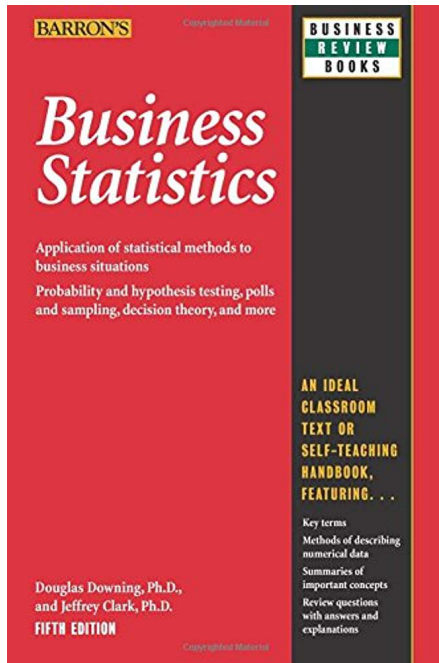
Testing Results

	Actual Results		
Predicted	Large claim	Not a large claim	Combined
Large claim	True positive (TP) 50	False positive (FP) 10	60
Not a large claim	False negative (FN) 50	True negative (TN) 890	940
Combined	100	910	1,000

Sensitivity: % of true large claims identified = $TP / (TP + FN) = 50 / 100 = 50\%$

Positive Accuracy Rate: % identified as large claims that were actually large claims = $TP / (TP + FP) = 50 / 60 = 83\%$

Recommended Readings



SOA Resources

- On-line and in-person events <https://www.soa.org/pdopportunities>
- Health Section resources <https://www.soa.org/sections/health>
 - Research
 - Podcasts
 - *HealthWatch*
 - Sub-groups

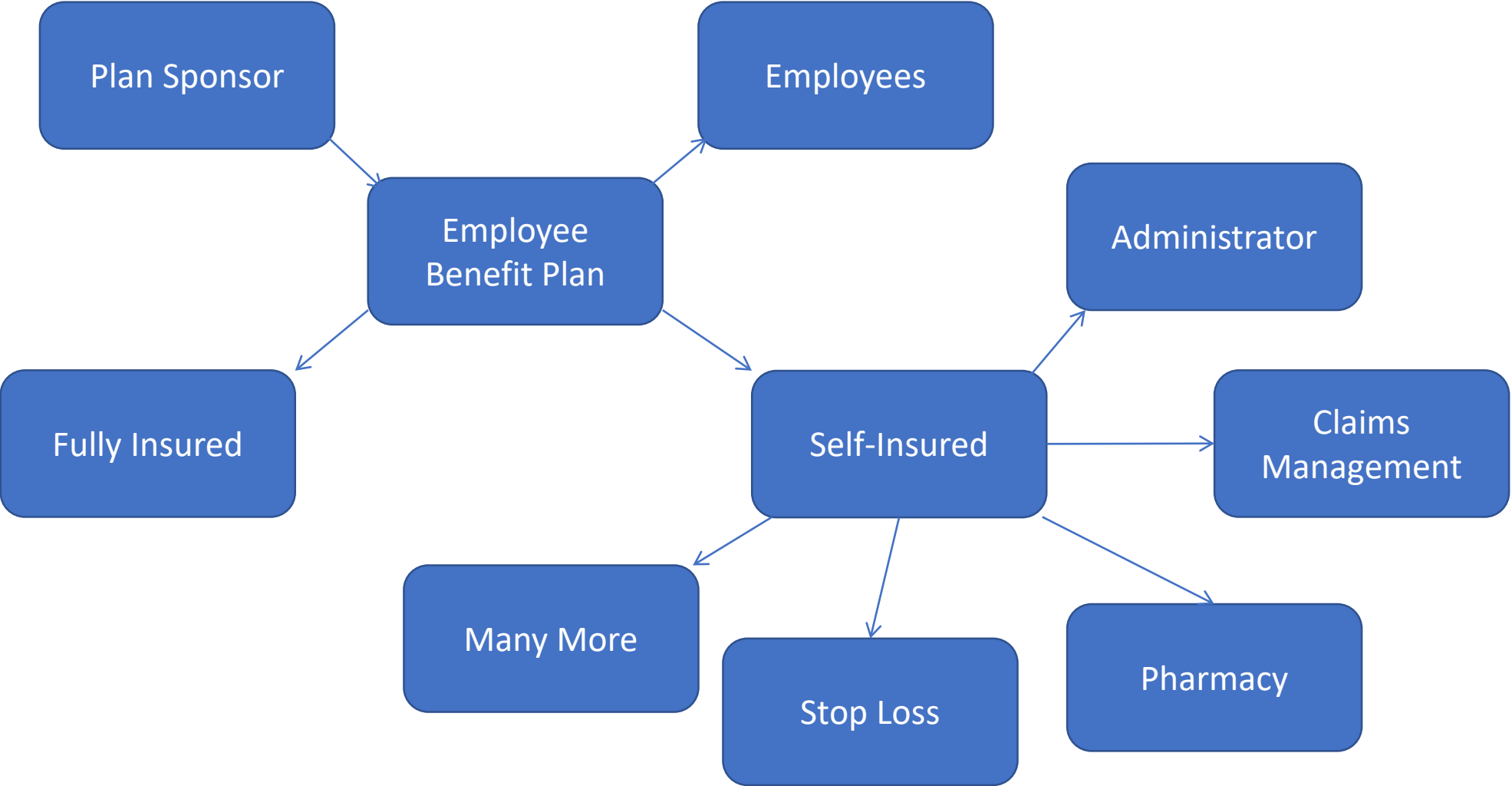
Final Thoughts

- **Test**
- **Test**
- **Test**

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Stop Loss Environment

To Insure or Not Insure, That is the Question



Prevalence and Average Attachment Points of Stop Loss Insurance, by Firm Size, 2018

	Percentage of Covered Workers In a Partially or Completely Self-Funded Plan	Percentage Enrolled In a Self-Funded Plan With Stoploss Insurance	Percentage Enrolled In a Self-Funded Plan With Stoploss Insurance With a Per-Enrollee Spending Limit	Average Attachment Point
FIRM SIZE				
50-199 Workers	20%*	89%*	84%	\$110,000*
200-999 Workers	50*	91*	89	230,000*
1,000-4,999 Workers	87*	91*	92	290,000*
5,000 or More Workers	91*	39*	93	550,000*
All Small Firms (3-199 Workers)	13%*	72%	79%*	\$110,000*
All Large Firms (200 or More Workers)	81%*	59%	92%*	\$390,000*
All Self-Funded Firms	61%	60%	90%	\$360,000

* Estimate is statistically different from estimate for all other firms not in the indicated size or region category ($p < .05$).

SOURCE: KFF Employer Health Benefits Survey, 2018

Stop Loss Legal Framework

- Protects plan, not plan's beneficiaries
 - => Beneficiaries have no recourse to stop loss carrier
- What it pays (or does not pay) has no bearing on plan's obligations
- Not health insurance
 - => Stop Loss Carrier is not a plan fiduciary

Stop Loss Product Structure

Description	Amount
(1) Expected Claims Eligible for ASL	\$1,800,000
(2) ASL Deductible [=125% of (1)]	\$2,250,000
(3) 100% Actual Claims	\$2,400,000
(4) Specific Stop Loss Reimbursements	\$250,000
(5) Actual Claims Eligible for ASL [= (3) – (4)]	\$2,150,000
(6) ASL Reimbursement [=max(0, (5) – (2))]	\$0

- Two Coverages
 - Specific Stop Loss (SSL)
 - Aggregate Stop Loss (ASL)
- SSL inures to the benefit of ASL

Claim Volatility Transferred To Stop Loss Carrier

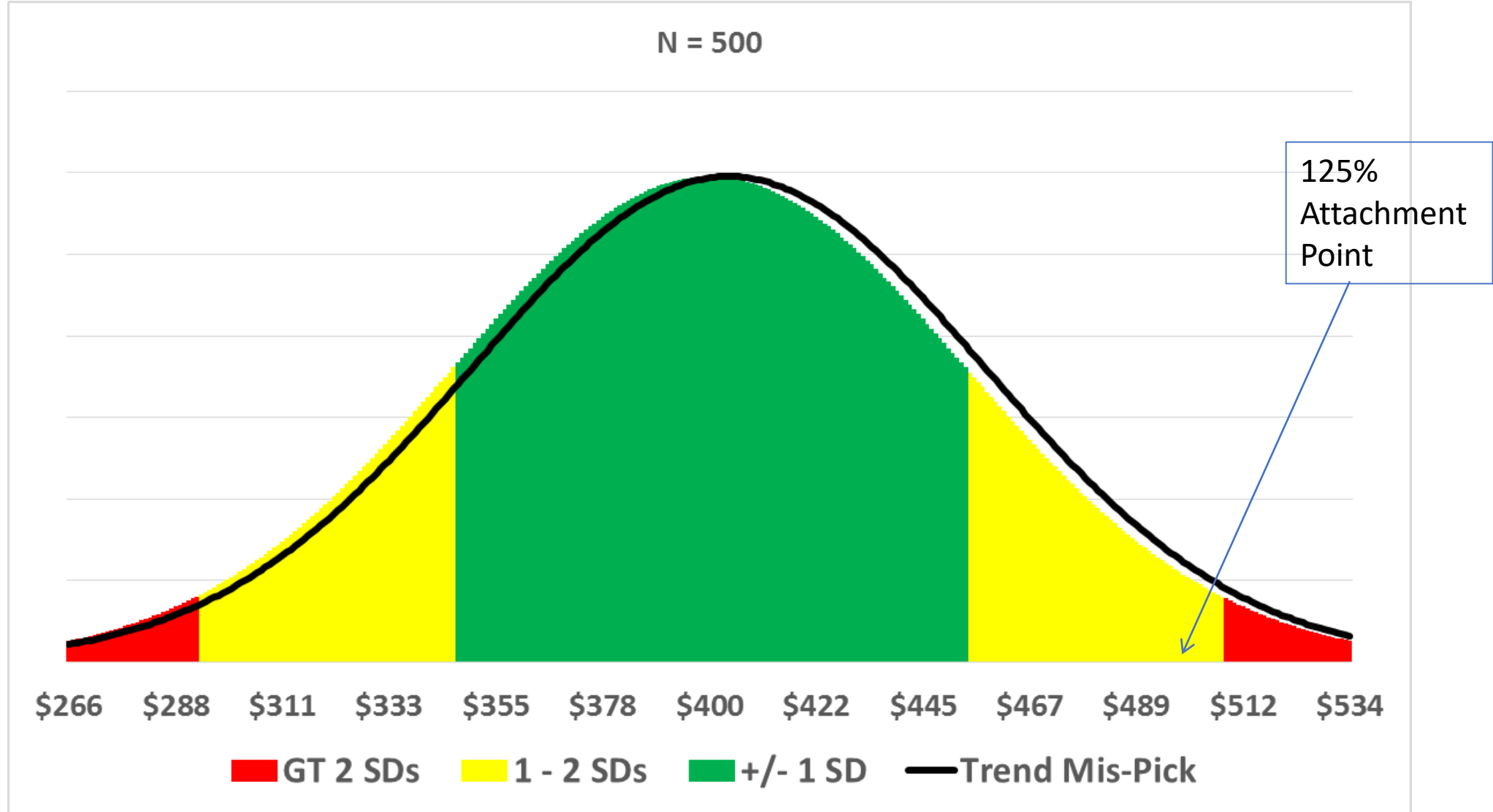
Severity

- Specific (or Individual) Stop Loss
- Per Person
- Cash Flow Feature: Specific Advance

Frequency & Trend Mis-Pick

- Aggregate Stop Loss
- Per Group
- Cash Flow Feature: Monthly Accommodation

Trend Mis-Pick Illustration



Risks of Stop Loss Compared to Fully Insured

- Different risk profile by age and sex
- Less able to exert control over claims management
- Impact of expensive new technologies
- Leveraging
 - Trend
 - Area
 - Network

Trend Leveraging

	2018				2019			
	Weights	Avg Size Claim	PMPM	Trend	Weights	Avg Size Claim	PMPM	
No Claims	9.7%	\$ -	\$ -	10.0%	9.7%	\$ -	\$ -	
\$1 - \$2,000	40.3%	\$ 500	\$ 201	10.0%	40.3%	\$ 550	\$ 18.45	
\$2,001 - \$5,000	25.0%	\$ 2,105	\$ 526	10.0%	25.0%	\$ 2,316	\$ 48.24	
\$5,001 - \$10,000	15.0%	\$ 5,800	\$ 870	10.0%	15.0%	\$ 6,380	\$ 79.75	
\$10,001 - \$20,000	4.0%	\$ 10,900	\$ 436	10.0%	4.0%	\$ 11,990	\$ 39.97	
\$20,001 - \$25,000	1.0%	\$ 24,000	\$ 240	10.0%	1.0%	\$ 26,400	\$ 22.00	
\$25,001 - \$50,000	3.5%	\$ 32,500	\$ 1,138	10.0%	3.5%	\$ 35,750	\$ 104.27	
\$50,001 - \$100,000	1.0%	\$ 63,500	\$ 635	10.0%	1.0%	\$ 69,850	\$ 58.21	
Above \$100,000	0.5%	\$ 151,000	\$ 755	10.0%	0.5%	\$ 166,100	\$ 69.21	
Combined	100.0%	\$ 4,801	\$ 400			\$ 5,281	\$ 440	
Claims Up to \$25,000	95.0%	\$ 3,524	\$ 294	6.0%	94.3%	\$ 3,735	\$ 311	
Claims Excess \$25,000	5.0%	\$ 25,550	\$ 106	21.0%	5.7%	\$ 27,223	\$ 129	
Combined	100.0%	\$ 4,801	\$ 400	10.0%	100.0%	\$ 5,281	\$ 440	

Area Leveraging

	Average Cost Area			Area Factor	Higher Cost Area		
	Weights	Avg Size Claim	PMPM		Weights	Avg Size Claim	PMPM
No Claims	9.7%	\$ -	\$ -	1.10	9.7%	\$ -	\$ -
\$1 - \$2,000	40.3%	\$ 500	\$ 201	1.10	40.3%	\$ 550	\$ 18.45
\$2,001 - \$5,000	25.0%	\$ 2,105	\$ 526	1.10	25.0%	\$ 2,316	\$ 48.24
\$5,001 - \$10,000	15.0%	\$ 5,800	\$ 870	1.10	15.0%	\$ 6,380	\$ 79.75
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\$20,001 - \$25,000	1.0%	\$ 24,000	\$ 240	1.10	1.0%	\$ 26,400	\$ 22.00
\$25,001 - \$50,000	3.5%	\$ 32,500	\$ 1,138	1.10	3.5%	\$ 35,750	\$ 104.27
\$50,001 - \$100,000	1.0%	\$ 63,500	\$ 635	1.10	1.0%	\$ 69,850	\$ 58.21
Above \$100,000	0.5%	\$ 151,000	\$ 755	1.10	0.5%	\$ 166,100	\$ 69.21
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Combined	100.0%	\$ 4,801	\$ 400	1.10	100.0%	\$ 5,281	\$ 440

Network Leveraging

	No Network			Network Discount				
	Weights	Avg Size Claim	PMPM	Discount	Weights	Avg Size Claim	PMPM	
No Claims	9.7%	\$ -	\$ -	10.0%	9.7%	\$ -	\$ -	
\$1 - \$2,000	40.3%	\$ 500	\$ 201	10.0%	40.3%	\$ 450	\$ 15.09	
\$2,001 - \$5,000	25.0%	\$ 2,105	\$ 526	10.0%	25.0%	\$ 1,895	\$ 39.47	
\$5,001 - \$10,000	15.0%	\$ 5,800	\$ 870	10.0%	15.0%	\$ 5,220	\$ 65.25	
\$10,001 - \$20,000	4.0%	\$ 10,900	\$ 436	10.0%	4.0%	\$ 9,810	\$ 32.70	
\$20,001 - \$25,000	1.0%	\$ 24,000	\$ 240	10.0%	1.0%	\$ 21,600	\$ 18.00	
\$25,001 - \$50,000	3.5%	\$ 32,500	\$ 1,138	10.0%	3.5%	\$ 29,250	\$ 85.31	
\$50,001 - \$100,000	1.0%	\$ 63,500	\$ 635	10.0%	1.0%	\$ 57,150	\$ 47.63	
Above \$100,000	0.5%	\$ 151,000	\$ 755	10.0%	0.5%	\$ 135,900	\$ 56.63	
Combined	100.0%	\$ 4,801	\$ 400			\$ 4,321	\$ 360	
Claims Up to \$25,000	95.0%	\$ 3,524	\$ 294	-6.7%	95.3%	\$ 3,289	\$ 274	
Claims Excess \$25,000	5.0%	\$ 25,550	\$ 106	-19.2%	4.6%	\$ 22,319	\$ 86	
Combined	100.0%	\$ 4,801	\$ 400	10.0%	100.0%	\$ 4,321	\$ 360	

Stop Loss Carrier Risk Management

Cash Management

- Contract Basis
- Terminal Liability
- Level Funding

Pre-Existing Conditions (Lasers)

- Conventional
- Conditional
- Laser Pooling
- Aggregating Specific
- No Laser Guarantees

Stop Loss Environment

- Self-Insured Operating Environment
- Highly leveraged claims risks
- Risk management opportunities