Impacting Claims Through Analytics

Mark Feuer, CEO – Beechwood
Mark Hoffman, Senior Manager – Ernst and Young
Brian Wegner, President and CEO – Fuzion and SHIP

Impacting Claims Through Analytics

- What Is “Analytics”
- Managing Risk with Analytics: A Workers Comp Example
  - Mark Feuer
- Analytics in the Long Term Care World
  - Brian Wegner
- Predictive Modeling in the Long Term Care Industry
  - Mark Hoffman

What Is “Analytics”

- **Analytics** is the discovery and communication of meaningful patterns in data. Data visualization helps communicate insights.

- **Data analytics** (DA) is the science of examining raw data with the purpose of drawing conclusions about that information

- **Business Intelligence** (BI) is a form of analytics involving the presentation of data in a format that enables the user to discern information from it.

What Is "Analytics"

- **Descriptive Analytics** is the presentation of data in a format that answers specific questions the user may have, such as "what is the policy form mix of all policies in State x". Terms such as profiling, segmentation, or clustering are used in Descriptive Analytics

- **Predictive analytics** encompasses a variety of statistical techniques from modeling, machine learning, and data mining that analyze current and historical facts to make predictions about future, or otherwise unknown, events

- **Optimization:** This type of analytics also requires a complex type of modeling, where "what if" questions are answered. "What if we would raise rates in State X on policy form Y – what would happen to claims in the next two years"

Mark Feuer, CEO, Beechwood

Managing Risk with Analytics:
A Workers Comp Example

Incident Reporting

- Incident Tracking of all incidents
  - Regardless of disposition

- Follow-up on witness statements for all incidents

Carrier "Point Person"

- "Point person" for follow-up, questions, ongoing interactions

- Coordination with attorneys, clients, and EEs for trial appearances

Injury / Medical Coordination

- "Quarterback" role to manage injury from diagnosis through completion, including all interactions
- Medical case management
- Surveillance coordination with clients, vendors, treating physicians, and IMEs

Modified Duty Management

- Customized light duty job assignments, with graduated assignments to get back to "full duty"

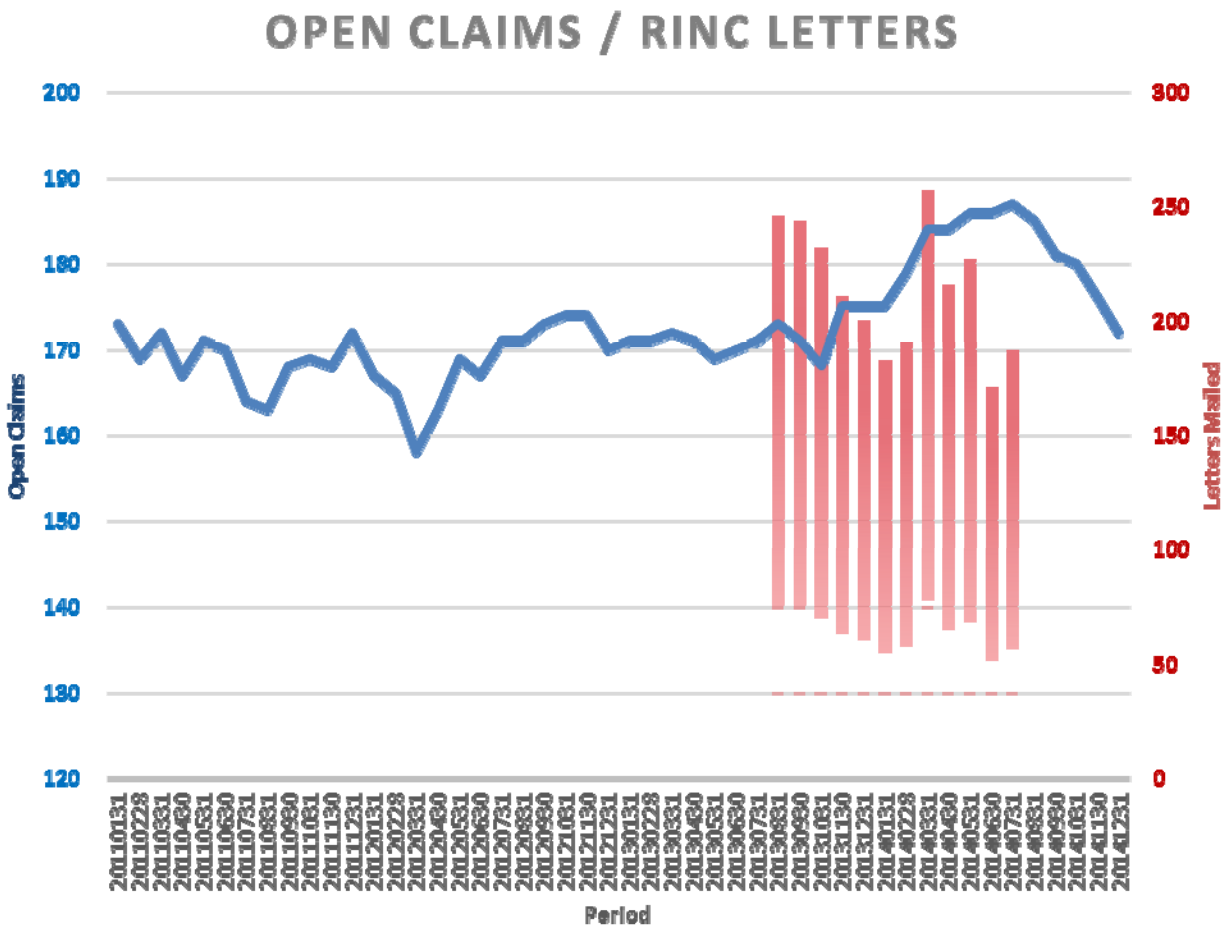
- Continuous review to assure appropriate progression is being made

Employee Communication / Coordination

- Claimant care, from availability of transportation to medical appointments to a "friendly shoulder"

- Follow-up phone calls, get well cards, flowers, etc.

Must Evaluate the PV of Rate Increases Against the Increase in Claims



- Rate increase letters drive an increase in open claims
- Over time open claims tend to return to the long term average
- Low rate increases often present a negative economic value where increased claims outweigh incremental premium over time

Brian Wegner, CEO, Fuzion and SHIP

Analytics in the Long Term Care World

Practical Uses of Analytics in the LTC Industry

- Fraud
- Claim Trends
- Claim Anomalies
- What-if Scenarios
- Individual Policy Actions
- Challenges
- Use of Analytics to Help Maintain Policyholder Independence

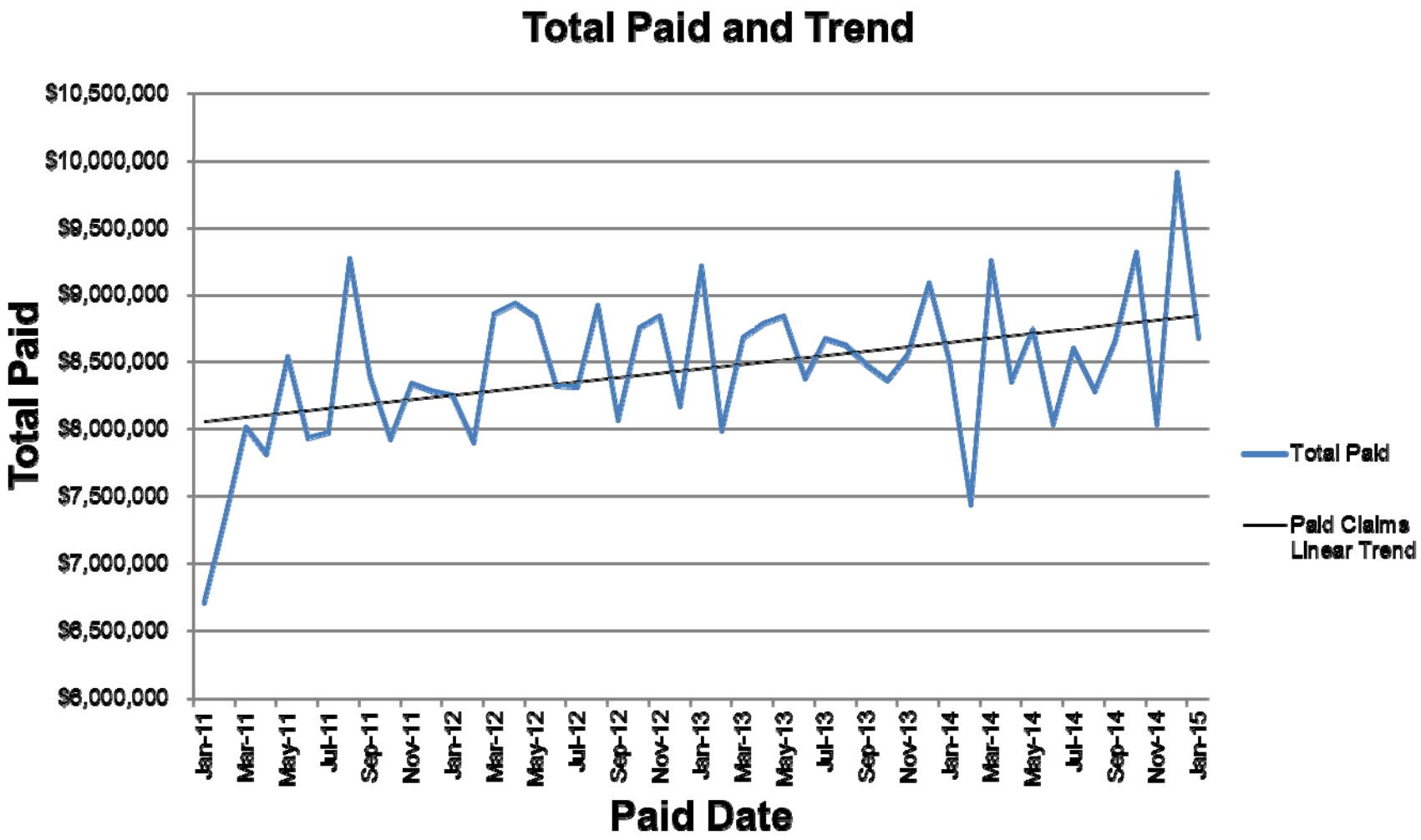
Fraud

- Identifying the propensity of a claim to be fraudulent
- Supervised model
  - Applying known rules such as:
    - One caregiver providing 24/7/365 care
    - Same caregiver providing care for two spouses
    - Unusual number of hours for reported condition
- Unsupervised Model
  - Pattern analysis using advanced analytic software
    - Identifies claims with attributes that are outside the norm
- All identified “suspects” require SIU follow-up

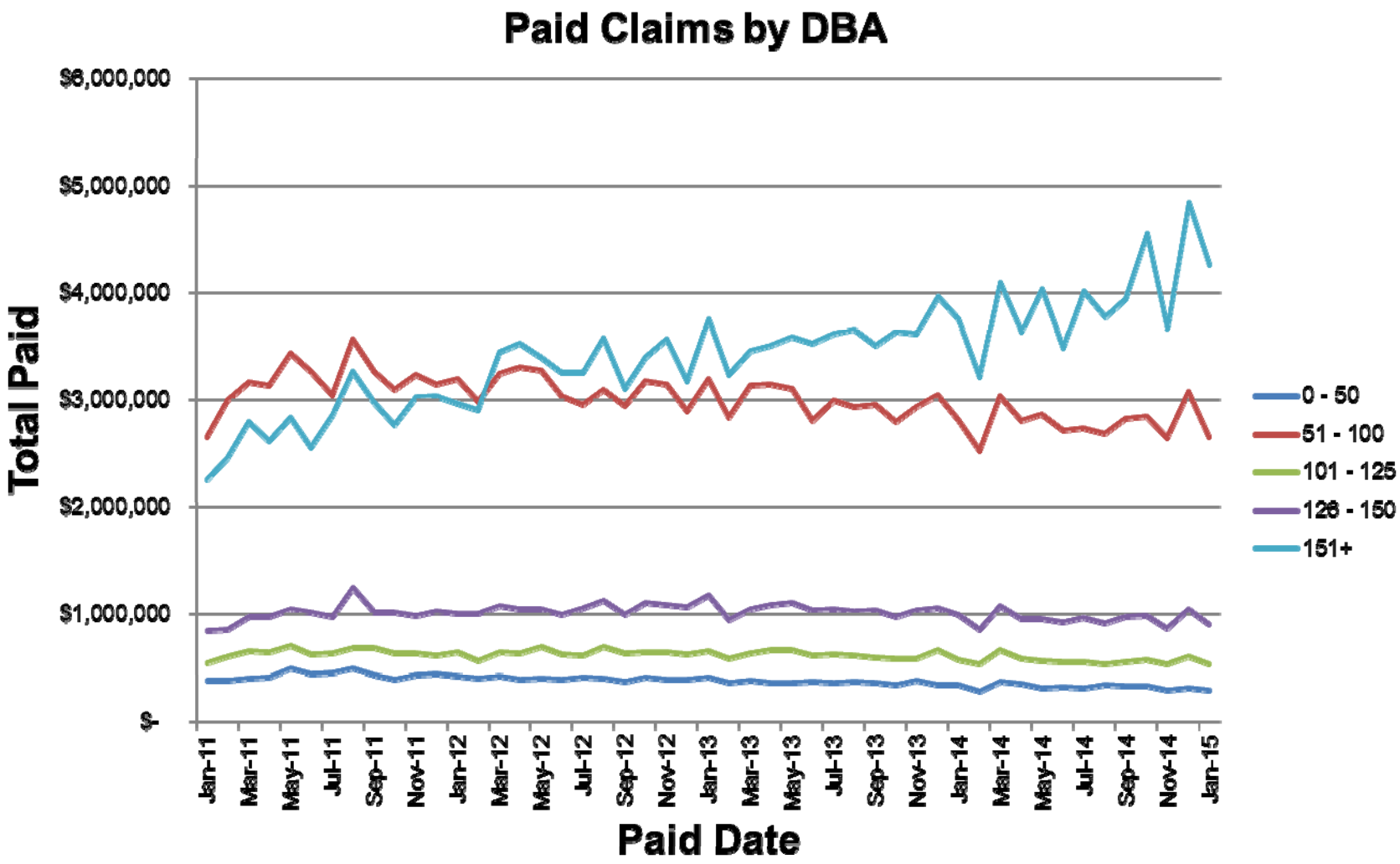
Claim Trends

- Identifying trends through drill-down capabilities
- Trends may look normal at a high level
  - Drilling into detail (ie: by state, product, demographic, etc.) may show a hidden trend
- Identifying unexpected trends may alert you to:
  - Operational or care management issues
  - Provider issues
  - Inaccurate reserves
  - Need for specific actions, such as rate increases

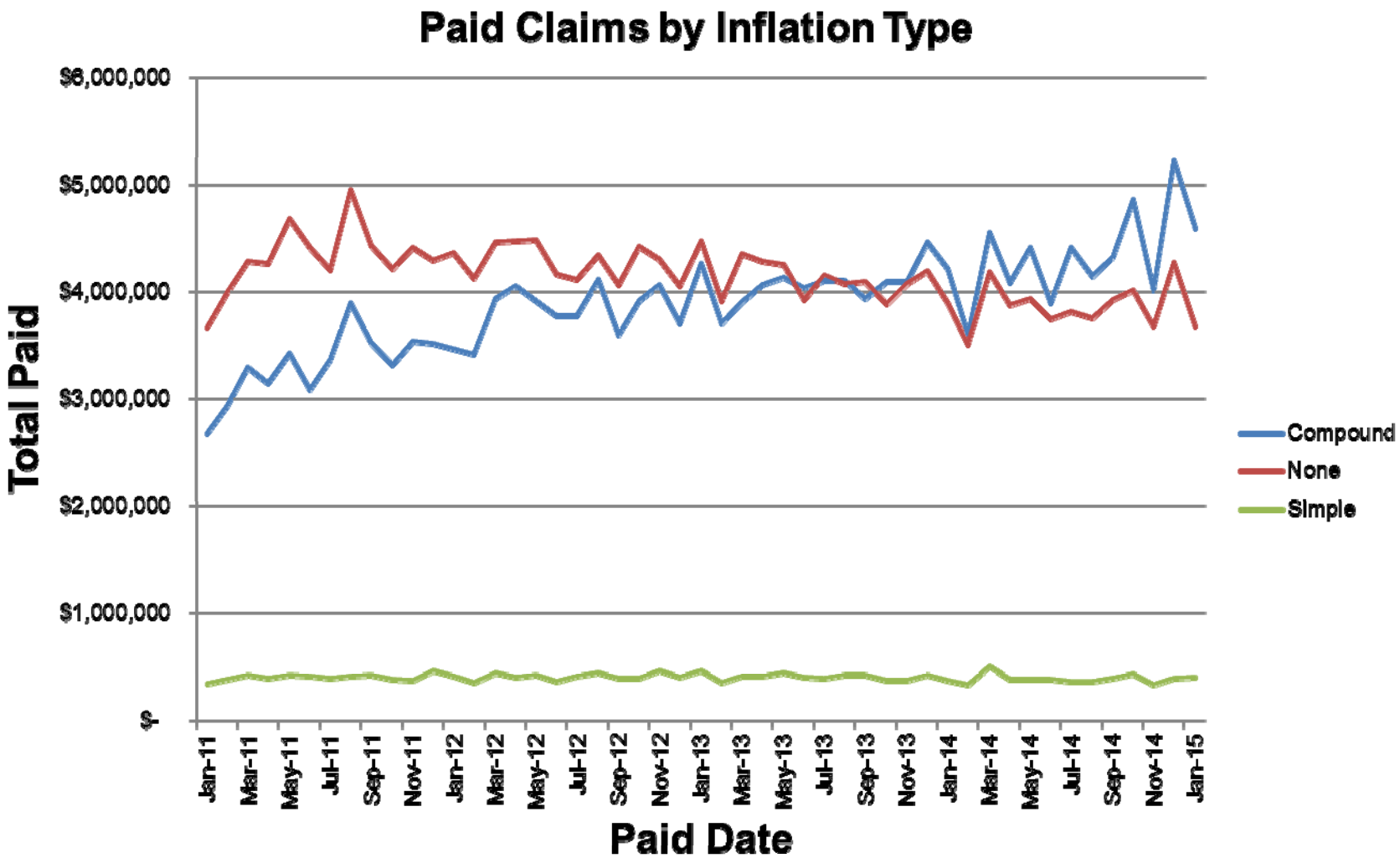
Summarized Data Shows Overall Trend



Drilling Down Reveals More Useful Data



Different Views Provide Even More Insight



Claim Anomalies

- Finding unusual patterns that might not be a trend, but still identifies an unexpected or erratic result
- May help identify fraudulent activity or reaction to an event (rate increase, regional issue)

What-if Scenarios

- Taking historical data and applying variables to carry it forward
  - What would happen to reserves and claims if we stopped spending money on assessments?
  - What if regulations would no longer allow the requirements of a 3-day hospital stays as a claim trigger?
  - What would happen to claims at different age bands if we implemented a 25% rate increase?
- Having information about the impact of business decisions on claims and reserves improves decision making

Use of Analytics for Individual Policy Action

- Use of analytics to identify abuses of policy benefits such as
  - Restoration of Benefits
  - Continually analyzing the meds used by a policyholder to determine if the reported condition matches with the condition the meds are used for
  - Applying analytics to determine the normal evolution of a claim by event
    - Which claims should improve over what duration by age?
    - Which co-morbidities tend to result in increases in care, or shift from HHC to Facility?
  - Identify claim pattern differences by provider or by the nurse conducting an assessment

Use of Analytics for Individual Policy Action

- Identify claim patterns under Med Necessity versus ADL deficiency triggers, or other variations to determine whether additional scrutiny may be needed

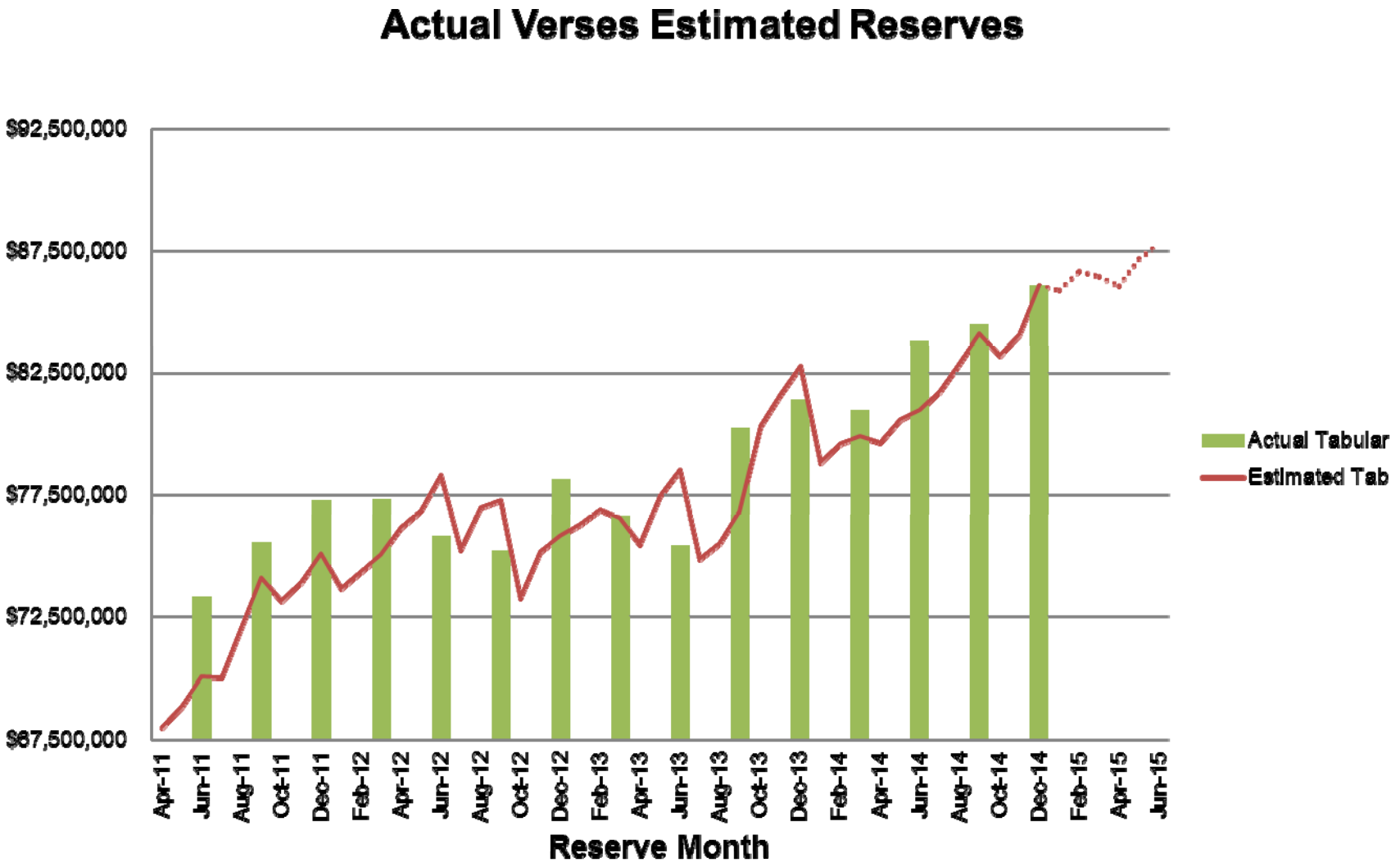
Challenges of Analytics in LTC

- Limited volume of historical claims and short history of product make long-term analysis less credible
- Systems haven't always captured the needed data (such as all ICD9 codes for co-morbidities and development of conditions over time)
- In most cases, unable to obtain health/Medicare data to supplement the data used in claim decisions
- Very limited number of proven fraud cases makes unsupervised fraud models difficult to achieve

Challenges of Analytics in LTC

- Most LTC blocks are too small to supply credible amount of data on their own
- Cost of analytics tools and specialized resources may make the investment difficult to justify
- Many LTC carriers just beginning to enter the higher level of claims for their overall block, not fully expecting what might develop

But, the Biggest Challenge in LTC is



Using Analytics to Maintain Policyholder Independence

- Historical (and most current) practices focus on paying benefits to insureds who trigger
- Identifying opportunities to (a) engage seniors prior to needing care or (b) engage seniors to return them to independence from a care setting is an opportunity to reduce claim costs and reserves
- Programs may be expensive (fall prevention, home modification, improving vitality)
  - Using analytics to identify those who would benefit the most holds down costs and improves ROI
  - Analytics also applied to determine effectiveness of programs by attribute
  - Selection of cases for pilots and measurement of results improve through use of analytics

The Bottom Line

- The smart application of well-designed analytics improves business results
- LTC is arguably the most challenged line of insurance in today's environment
- Gain any advantages that exist
- Carriers should work together to solve the challenges facing the industry (more data means we can better identify opportunities for improvement)

Predictive Modeling in the Long Term Care Industry

Disclaimer

- The views expressed by the presenter are not necessarily those of EY or its member firms.
- This material has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax or other professional advice. Please refer to your advisors for specific advice.

Today's Topics

- Unique challenges
- Predictive model applications
- Examples
  - Mortality relativities
  - Auto bodily injury claims
- LTC model approach example: slip and fall
  - Hypotheses
  - Data strategy
  - Model data base
  - Model output
- LTC analytics outlook 5-10 years – value chain

Long-term care policies — unique challenges for predictive model approaches

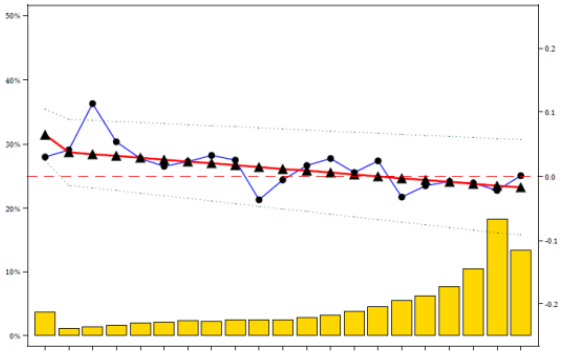
- Predictive model applications need to be aligned with coverage, it is not one size fits all
- LTC is in many respects very different from P&C and life coverage
  - Length of policy contract
  - Change in exposure as policyholder ages
  - Adverse selection based on genetic pre-deposition (e.g., Alzheimer's, arthritis) and/or pre-existing conditions
  - Limited data on exposure at the time of policy inception
  - Limited availability of updated data along the life of the policy
  - Duration and permanence of long-term care situations
  - Cost components (e.g., medical devices, drugs, housing, caretaker)
- LTC claims are in some cases similar to those resulting from auto or work place accidents

Predictive model applications

- **Claim severity**: Build a predictive model that estimates the relative or absolute severity of an injury that has already occurred based on information known about the injury early on and take measures to mitigate claim cost and/or avoid adverse claim development
- **Claim frequency**: Build a predictive model that estimates the likelihood of an individual policyholder to experience a certain claim type (such as an accidental fall) within one year
- **Underwriting**: Build a predictive model that estimates a measure of risk (typically relative to the core book) associated with a policy applicant
- **Pricing**: Build a predictive model that estimates the ultimate cost of a policy at inception

Example — mortality relativities

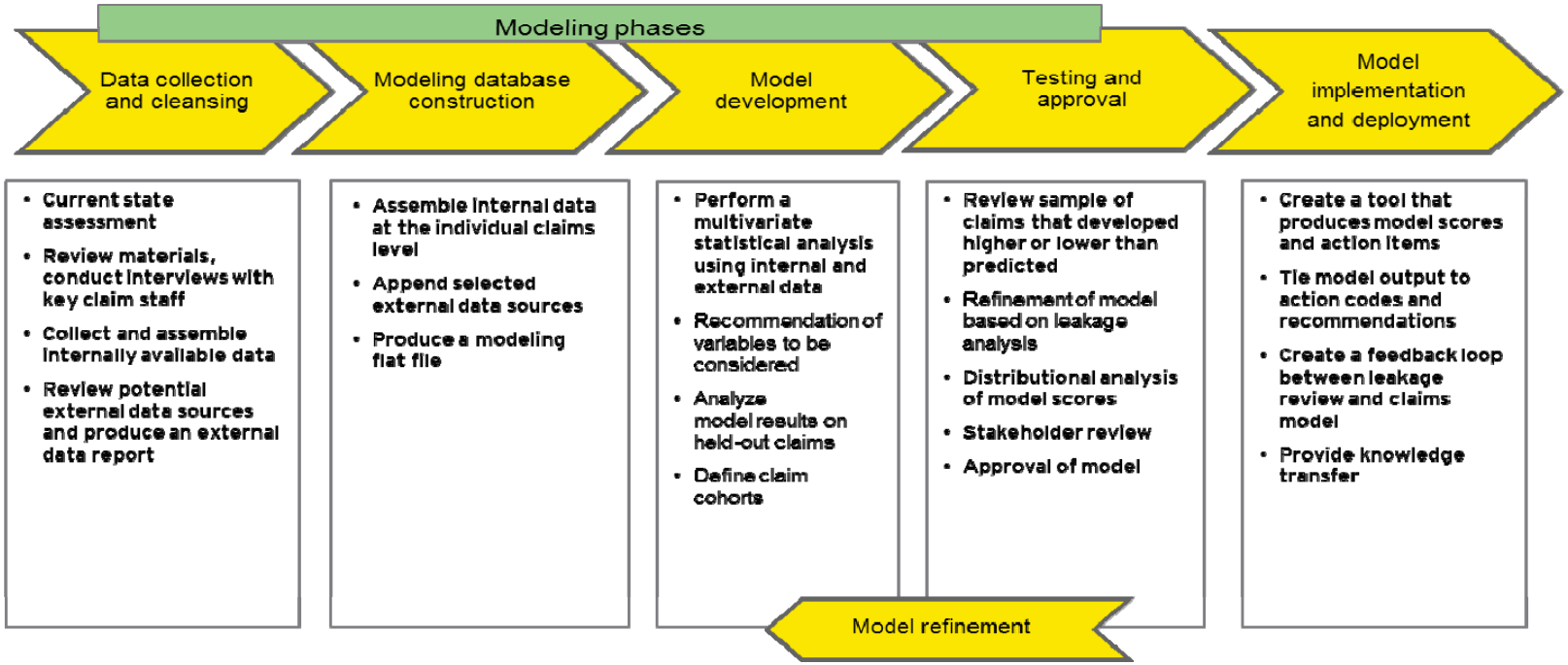
- Construct a multivariate framework that leverages individual health data and enhanced demographics to adjust mortality relativities
- Reflect traditional mortality factors such as age, gender, smoker as well as company and product specific factors such as Premium, Product Type, Underwriting Class
- Create an extended model that includes demographic and health related information to predict mortality while controlling for existing pricing factors
  - Individual health data
  - Enhanced demographics
    - Quality of health care
    - Wealth
    - Physical activities and hobbies
    - Family focus



- The new model approach can be fully adopted, or the existing mortality tables can be adjusted based on model insights

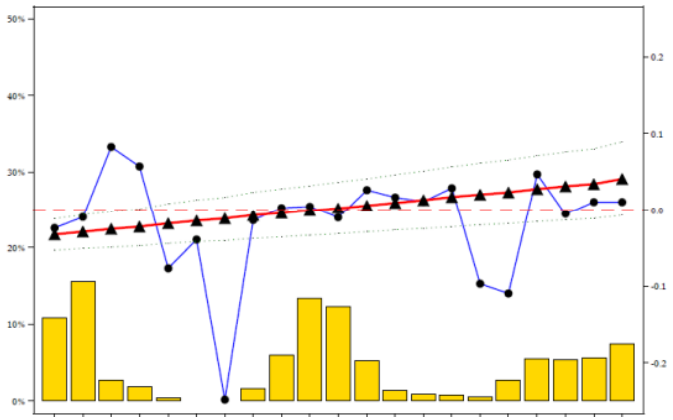
Example — auto bodily injury claims

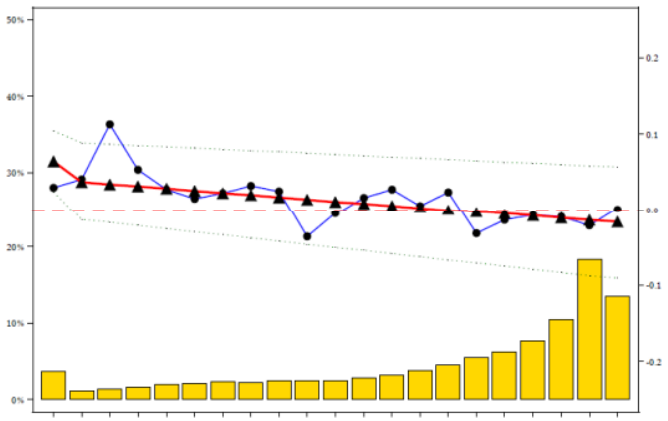
- Bodily injury claims are scored at first notice of loss if additional information becomes available.
- Claim score provides a basis for claim adjuster assignment and mitigation strategy.
- Leakage analysis guides the action plan recommended by the model.
- Automated reporting mechanism tracks adjuster and model performance.



LTC predictive model approach example
Goal

- Build a predictive model that estimates the likelihood of an individual to experience an **accidental slip or fall** within a one year
  - Define a set of hypotheses to be tested by actual slip and fall data
  - Collect slip and fall data to create a model flat file
  - Leverage internal and external data sources to design predictor candidates
  - Determine the likelihood of a slip and fall through multivariate model techniques
  - Create a relative risk score for LTC policyholders
  - Identify high risk policyholders and develop a mitigation strategy

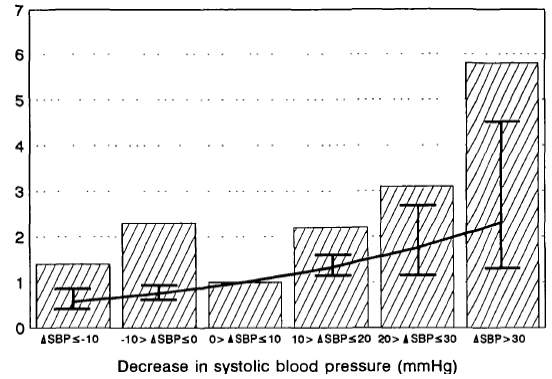




LTC predictive model approach example
Data assembly

- **LTC carrier data:** assemble model flat file from available policy and claims data
- **Primary research**: conduct a survey of a reference population, e.g., a nursing home facility or at home care network
- **Secondary research**: review publicly available data, research papers, and articles that quantify likelihood of falls based on measurable predictor variables

*



Variable	OR†	95% CI†
Falls‡		
Immobility	2.6	1.6–4.3
Dizziness upon standing	2.1	1.2–3.7
Recurrent falls§		
Immobility	5.0	2.2–11.4
History of stroke	3.4	1.5–7.9
Poor mental state	2.4	1.2–4.8
Dizziness upon standing	2.1	1.1–4.2
Orthostatic hypotension	2.0	1.0–4.2

Risk factor	Prevalence (%)	Falls (≥1 fall)†				Recurrent falls (≥2 falls)‡			
		I_1 (%)	I_0 (%)	OR§	95% CI§	I_1 (%)	I_0 (%)	OR	95% CI
Sociodemographic factors (n = 354)									
Age >83 years‖	51	40	32	1.4	0.9–2.2	20	13	1.6	0.9–2.8
Female sex¶	84	39	22	2.2	1.1–4.2	18	10	1.9	0.8–4.6
Residing in home for the elderly	49	42	30	1.5	0.9–2.4	21	12	1.6	0.8–3.1

**Falls in the Elderly: A Prospective Study of Risk Factors and Risk Profiles, American Journal of Epidemiology Vol. 143 No. 11 (1996)*

LTC predictive model approach example
Hypotheses

Do living conditions affect frequency of accidents?

Measured by e.g.,

- Floor, stairs
- Consortium
- Climate

Are policyholder attributes relevant?

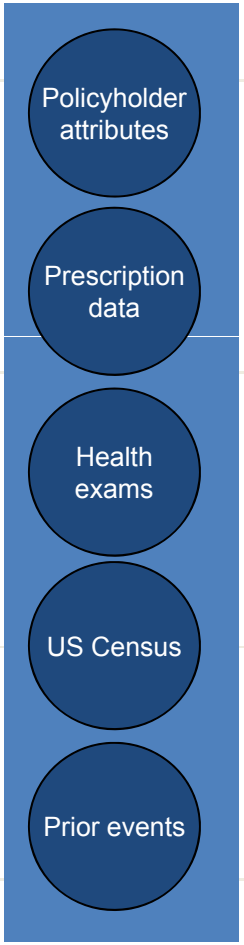
Measured by e.g.,

- Age
- Gender
- Income

Are geo-demographic characteristics significant?

Measured by e.g:,

- Demographic data
- Census data



Are prescription drugs affecting accident frequency?

Measured by e.g.:

- Number of drugs
- Category of drugs
- Affect of drugs, time medicated per day

What is the effect of policyholder health?

Measured by e.g.:

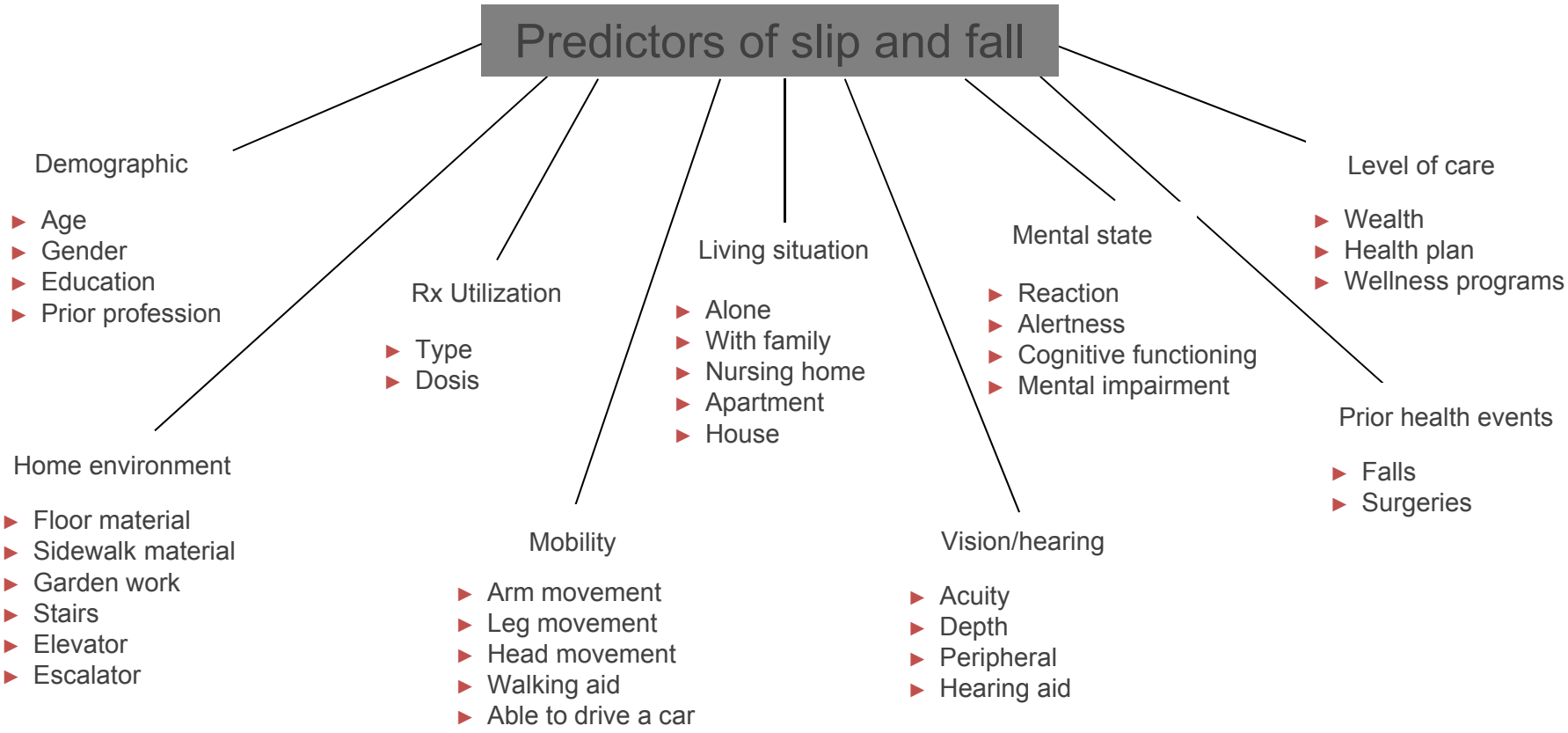
- Mobility
- Vision
- Mental abilities

Are prior slip and fall incidences predictive?

Measured by e.g.:

- Number and severity of prior falls
- Prior surgeries

LTC predictive model approach example
Data strategy



LTC predictive model approach example
Scoring

- Score each policyholder based on selected predictor variables
- Rank policyholders by risk score

Sample Model Algorithm - Score Card

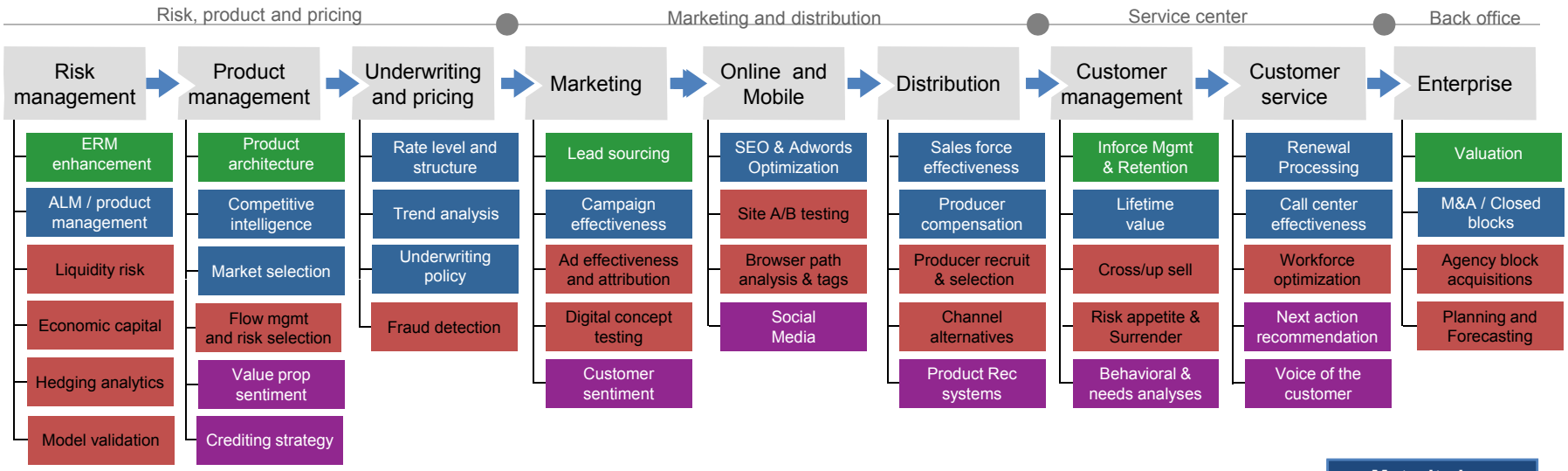
Predictor	Level	Risk score
[base risk]		50
Age	67	5
Gender	Male	4
Health care quality	4	-10
Vision	good	-5
Hearing	good	5
Motor	fair	15
Congitive	excellent	-32
Stairs	Yes	40
Consortium	Yes	-20
Prior falls	No	-8
Hip surgery	No	-2
Knee surgey	No	-5
Total		36

Rank	Policy #	Reason 1	Reason 2	Reason 3
1	1236	Two prior falls	Hip surgery	Age 85
2	8342	Cognitive	Vision	Consortium
3	6532	Age 92	Stairs	Motor
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.

LTC predictive model approach example
Model integration

- Design a tool that houses the data as well as the scoring algorithm
- Review policyholder risk score periodically
- Assign policyholders to cohorts with similar risk characteristics
- Derive action plans by cohort to mitigate claim exposure
- Produce automated reports to illustrate model findings and insights from action plan results

LTC analytics outlook 5-10 years
Life value chain adoption vs. LTC



Maturity key

- *Wide adoption*
- *Early adopters*
- *Leading edge*
- *Visionary*

- ► Increased data collection at policy inception and throughout the life of the policy
- ► Enhanced activity around creating modeling databases that mature in credibility as data is being collected
- ► Design of LTC specific predictive models which create risk scores for certain injuries and illnesses
  - ► Use of individual health data
  - ► Behavior-based segmentation
- ► Application of model driven prevention and claim mitigation strategies
- ► Broad use of predictive models to assist LTC underwriters and claim adjusters

Use of Analytics in Fraud Management

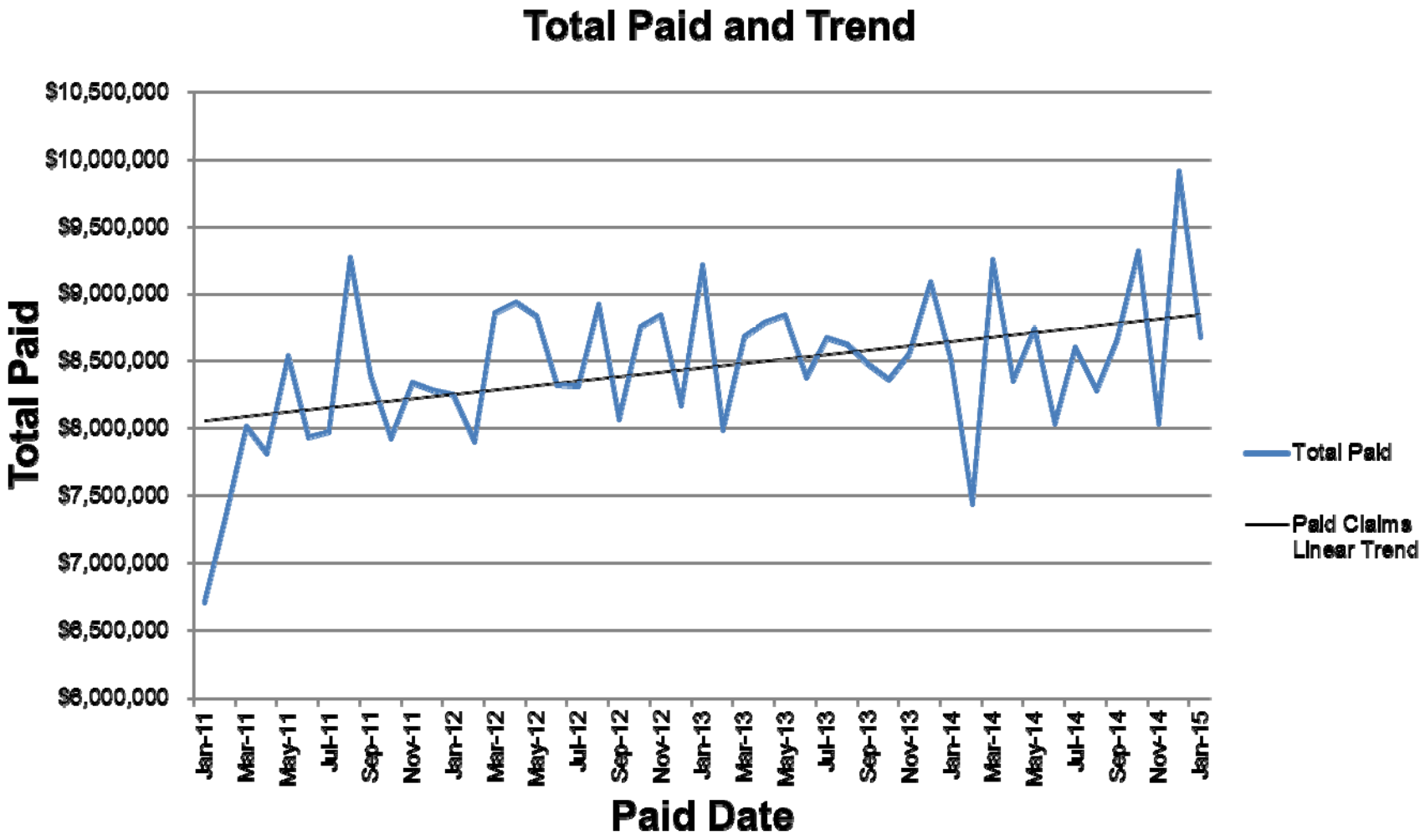
- Identifying the propensity of a claim to be an inappropriate claim
- Supervised model – Applying known rules such as:
  - One caregiver providing 24/7/365 care
  - Same caregiver providing care for two spouses
  - Unusual number of hours for reported condition
- Unsupervised Model – Let the system find it!
  - Pattern analysis using advanced analytic software
  - Identifies claims with attributes that are outside the norm
  - All identified “suspects” require SIU follow-up

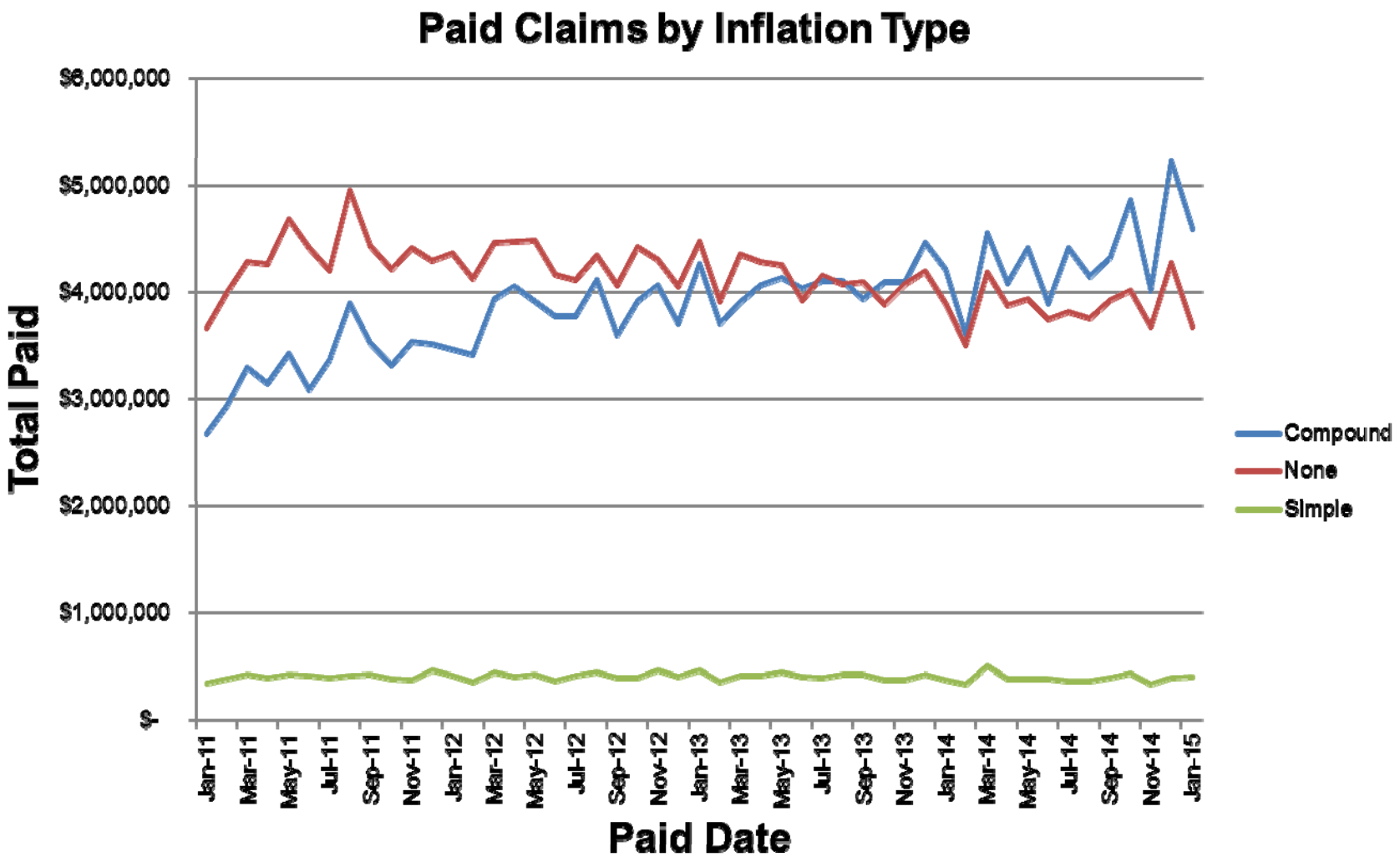
Claim Trends

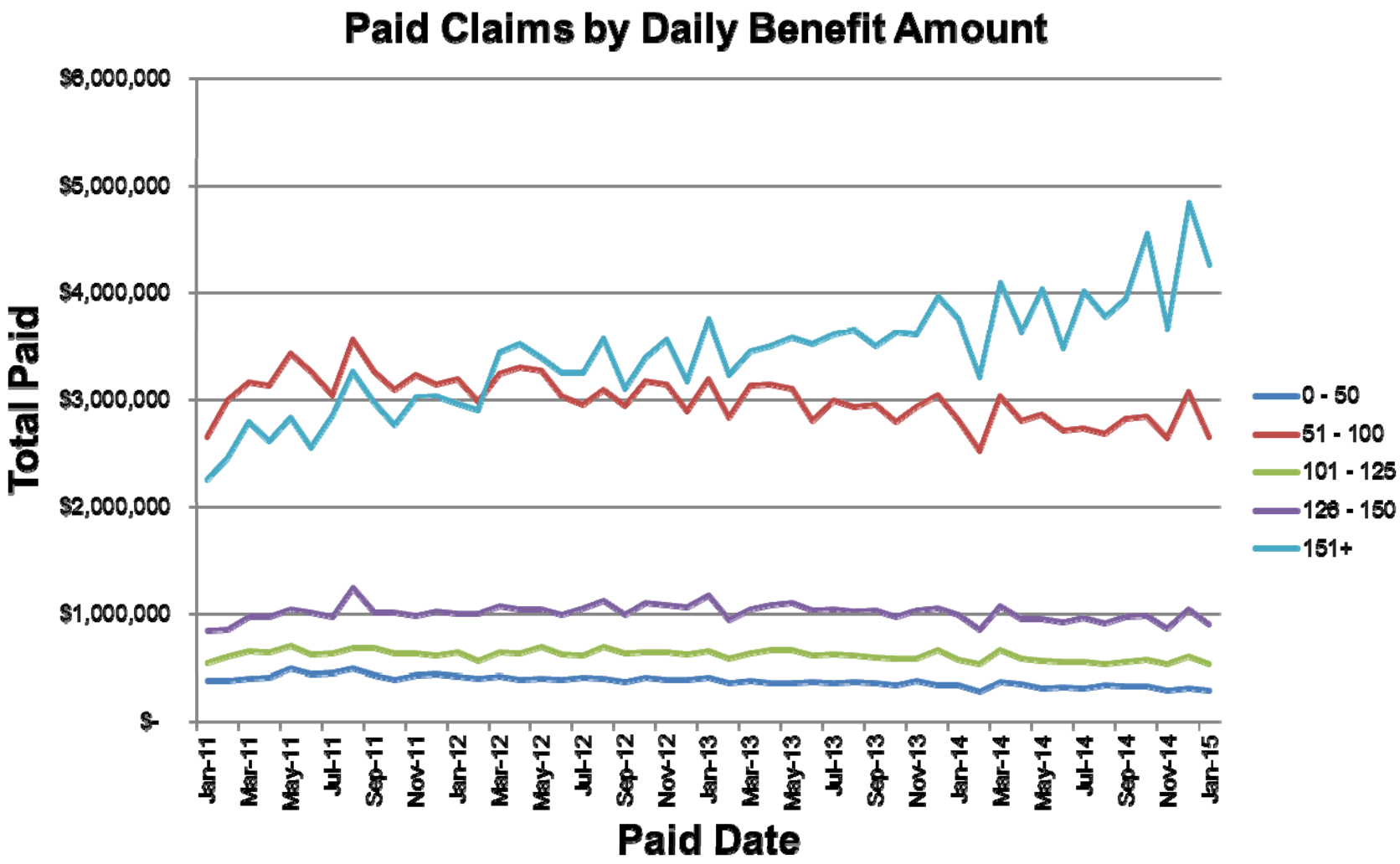
- Identify trends through drill-down capabilities
  - Trends may look normal at a high level
  - Drilling into detail (ie: by state, product, demographic, etc) may show an unexpected/unknown trend

- Identifying unexpected trends may alert you to:
  - Operational or care management issues
  - Provider issues
  - Inaccurate reserves
  - Need for specific actions, such as rate increases

Claims Paid - Total



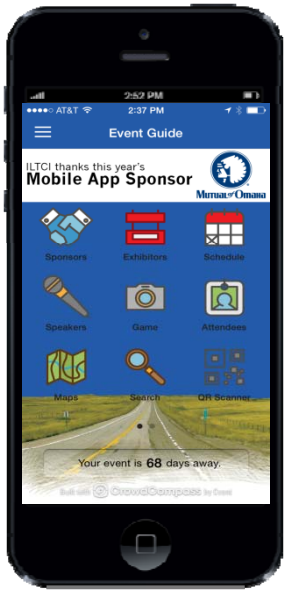

Paid Claims by Inflation Type
Total Paid
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$-
Jan-11
Mar-11
May-11
Jul-11
Sep-11
Nov-11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Jan-15
Paid Date
Compound
None
Simple


Paid Claims by Daily Benefit Amount
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$-
Total Paid
Jan-11
Mar-11
May-11
Jul-11
Sep-11
Nov-11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Jan-15
Paid Date
0 - 50
51 - 100
101 - 125
126 - 150
151+

Questions?

Thank You!!

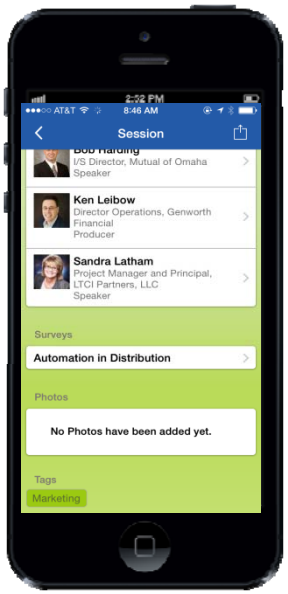
Don’t forget to fill out the survey



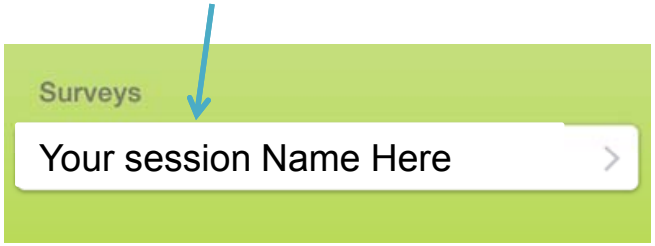
1st you must have download the ILTCI Mobile App
- Go to your app store; search ILTCI. It’s free.

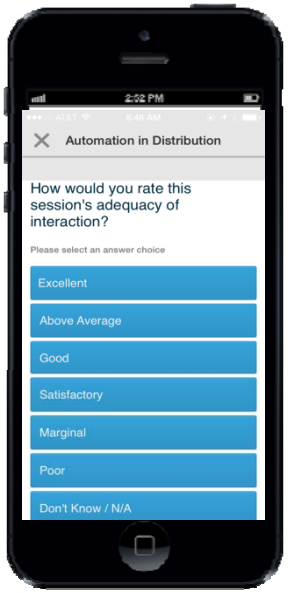
ANDROID APP ON Google play

Available on the App Store

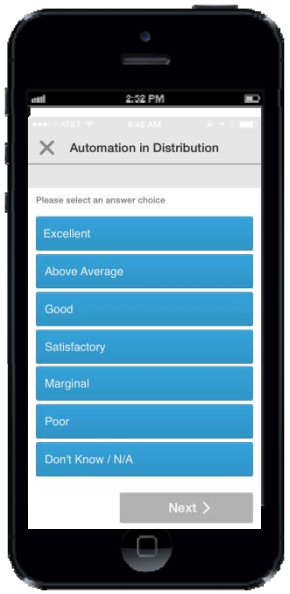


1. **Find the session**
2. **Scroll to the bottom**
3. **Tap on the session name below the survey**





Tap on the answer you wish to submit



Click Next

CrowdCompass by Cvent

ILTCI