



Predictive Analytics and Enterprise Profitability

Fireman's Fund
Insurance Company
a company
of the **Allianz Group**

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Customer Research and Strategies
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Note -- The views contained herein are those of the speaker
and not necessarily those of The Fireman's Fund Insurance Companies^(R).



Overview

- **What is Fireman's Fund ^(R) ?**
- **What are some challenges facing the Business?**
- **Where does data mining fit in?**
- **How can analytics improve things?**
- **Some examples to do at home**
- **Lessons learned**
- **What's next?**



Fireman's Fund Insurance Company (FFIC)

A "Top 20" multi-line Property&Casualty Insurer

- Personal Lines
 - Homeowners Multi-Peril, Auto, Fire, Inland Marine, other
- Commercial Lines
 - Multi-Peril, Workers Compensation, Auto, Property, other
- Marine
- AgriBusiness
- Professional Liability



Business Environment

Competition, now more than ever, means that we must be customer focused.

The Market

- Electronic connectivity is expected
- Touch point knowledge is anticipated
- Personalized service is assumed
- Ease of doing business is desired
- The word Premium becomes an adjective
- Low tolerance for not learning

Each Company

- Define, attract, retain, and grow “good” customers
- Match offering to customer
- Improve ‘customer facing processes’
- Reduce expenses



Customer Focus started it all

There are many entry points for beneficially using information across the Enterprise.

Strategy

- Organizational vision
- Customer segmentation and strategy development
- Brand development and positioning
- Etc.

Analytics

- Marketing analytics
- Risk scoring
- Fraud detection
- Etc.

**Focus
of Today's
Talk**

Operations

- Information technology
- Call centers/customer service
- Sales force/agency management
- Etc.



“Data Mining” Functions Within FFIC

Three years ago, we combined three existing functions within FFIC to leverage resources.

	<u>Commercial</u>	<u>Personal</u>	<u>Claims Data Mining</u>
Areas of Commonality	<ul style="list-style-type: none">•Data warehousing	<ul style="list-style-type: none">•Data warehousing	<ul style="list-style-type: none">•Data Warehousing
	<ul style="list-style-type: none">•Data mining for risk selection•Data mining for marketing•Primary customer research•Market research•Direct marketing campaigns for customer acquisition and cross-sell	<ul style="list-style-type: none">•Data mining for risk selection•Data mining for marketing•Primary customer research•Market research•Direct marketing campaigns for customer acquisition and cross-sell	<ul style="list-style-type: none">•Data mining for operational improvement<ul style="list-style-type: none">•fraud detection•subrogation ID•Reserving Trends•Severity Analysis•Feedback to Underwriting



Key Questions

Tactics: Actively turn data into actionable information to reduce costs and to grow profits.

What can broad application of analytics do?

Implement and Execute on your Strategies. You can better understand your markets, your customers, and the things that drive the organization's profitability, and then act on good information in a timely manner.

Why spend effort analyzing Operational Processes?

Cash-flow in and Cash-flow out. The better you can analyze and take action on your company's cash-flow information, the better you can accelerate collections and control the largest expenses to the Company.

How will this help continuous improvement?

Leaders will gain access to information they never had before. This will stretch their thinking to new types of information that will allow them to make even better and faster business decisions.



The “Operations Research” Mission

Mission :

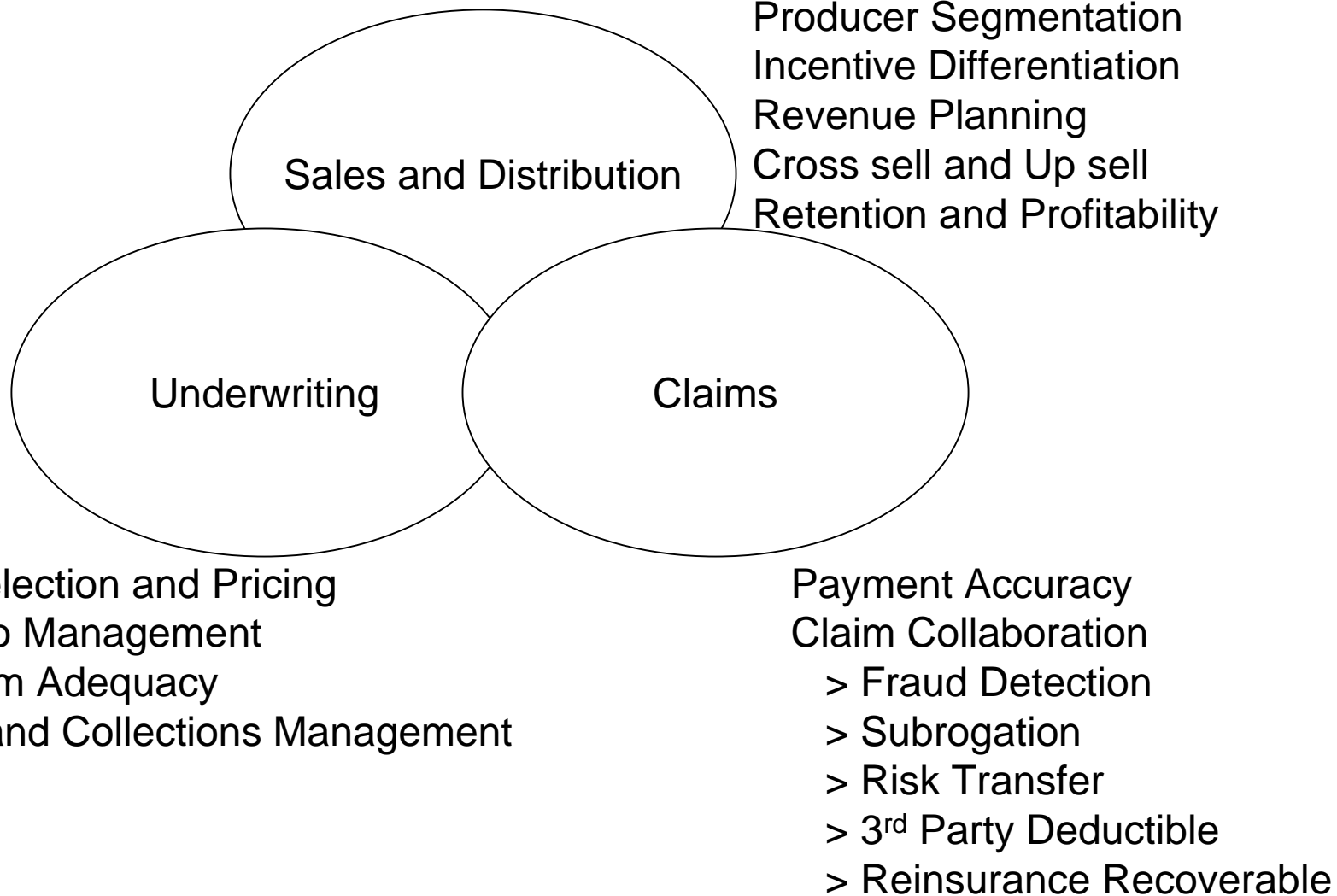
Implement and execute on our strategy by enhancing the quality, efficiency, and profitability of decisions made through the use of sophisticated analytics and detailed information.

**“ Be smarter in the Marketplace,
and react quicker to change.”**



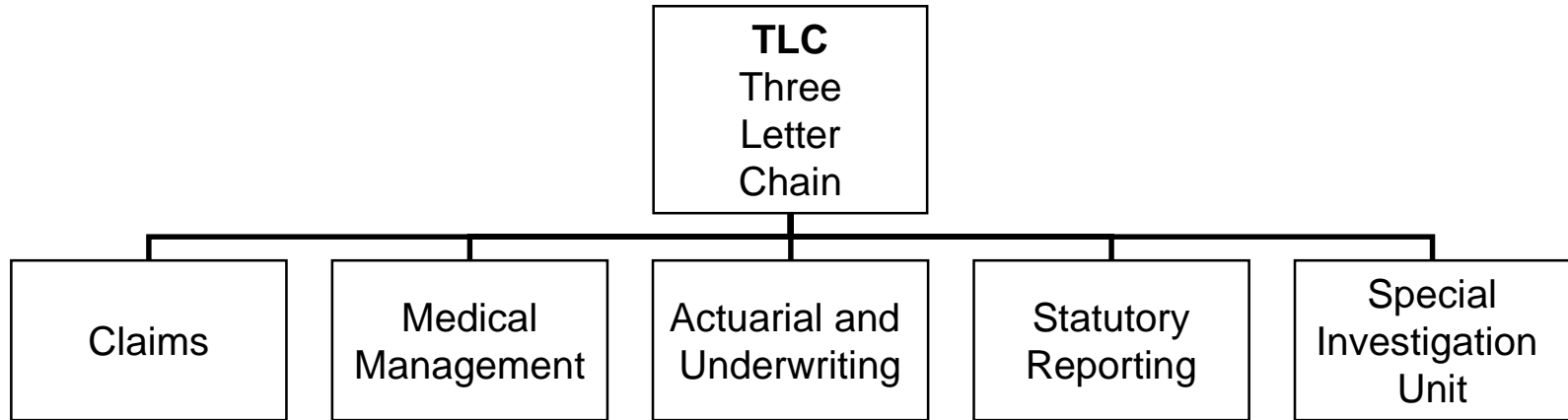
General Organizational Overview

An information business focused on risk taking.





Where are the data and what does it look like?
The data have complex structures and are separated in different systems and sources.



IT

claims

medical

policy

unit stat

fraud status

Plus : Many Potential External Sources



Insurance Company System Dynamics

Identify the processes and actions that drive profitability and highlight interactions.

Profitability

Expense

Claims

Cost of Revenue

Claim Rates

Inflation

Claim Severity

Complexity

Revenue

Underwriting

Sales & Marketing

Pricing

Policy Holders

Risk Selection

Agents

Risks

Uncertainty Litigation

Regulations Catastrophe

Competition Stock/Bond Market

Incremental improvements to many areas will be needed.



Next Opportunities: Profit-minded Processes

There are many ways to improve profitability, but some have clearer near-term results than others.

Loss Control

- Fraud Prevention
- Property Inspections
- Assess Work sites
- Re-underwriting

Cost Avoidance

- Automate Manual Work
- Appetite Qualification
- Underwriting Guides
- Redundant Processes
- Vendor Sourcing
- Spend Analysis

Cash-flow Opportunity

- Subrogation
- Credit to Loss
- Third Party Deductible
- Premium Audit (Comm)
 - Account Identification
 - Audit Ordering
- Insured to Value (PI)
- Reinsurance Recoverable

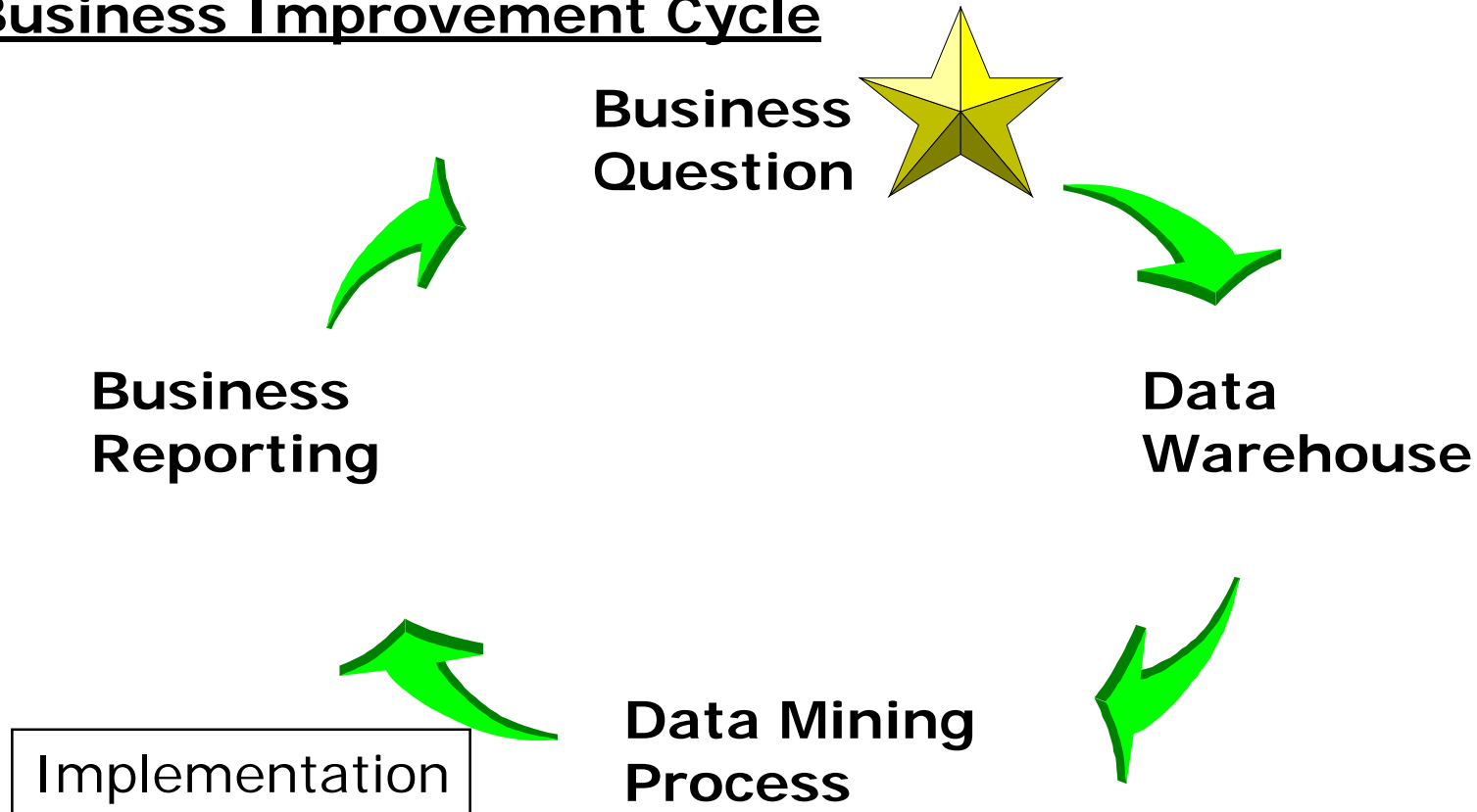
Better Decision Making

- Risk Selection
 - Renewal (Attrition)
 - New (Acquisition)
- Cross-sell & Up-sell
- Portfolio Management
- Broker/Agent Profiles
- Medical Management
- Litigation Management
- Large Loss Reserving
- Improved Collaboration



How can Analytics help
Learn from the Data. Then, use what you learn.

Business Improvement Cycle



Virtuous Learning Cycle -> Do Better Each Time Through



Internal Consulting

Focus on business priorities. Look for 'wins' in the near- to mid-term, to balance strategy projects. Never allow the perception of redundancy.

- **Getting a clear understanding of what makes us profitable**
- **Improving customer and agent service**
- **Boosting worker productivity**
- **Simplifying or optimizing business processes**
- **Organizing and using customer data**
- **Gaining better return on analytic services capital investments**



Analytic Value Efforts

Reporting = "Having the data"
Timeliness and accuracy
Reports and Tables
Surfacing data

Descriptive Analyses = "Seeing the data"
Scorecards / Measurements
Profiles and Exceptions
Segmentation

Analytic Modeling = "Knowing the data"
Understand Trends
Evaluate Business Practices
Choice Models and "What ifs"

Predictive Analytics = "Acting on the data"
Informed decision-making
Actionable Information Engines



Business Analysis Process

Prepare for each segment of the problem domain.

Fine grained problems, need fine grained solutions.

	Plan	Likely	Ideal
➤ Define the Problem	5%	10%	50%
➤ Data Collection and Enhancement	60%	75%	10%
➤ Select Modeling Strategy(ies)	5%	2%	10%
➤ Build and test Models	10%	5%	10%
➤ Analyze Results	10%	5%	5%
➤ Model Iteration	10%	3%	5%
➤ Implement Results	10%

Ideally, once the data is available, you can dynamically **re-purpose it** and spend more time asking new questions and incrementally implementing new findings.



Combining “What and How” with “Why”
Claim coding was not invented for Data Mining,
so look into structured and “free form” data to
build powerful classification models.

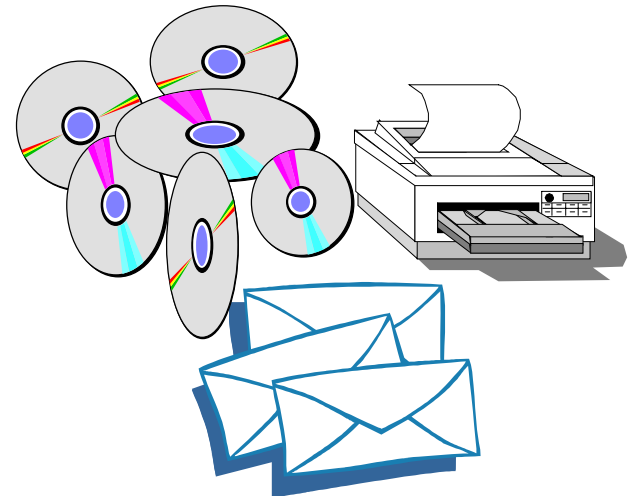
Structured Data

- Line of Business
- Coverage
- Cause of Loss
-



Unstructured Data

- Loss Description
- Progress Notes
-





Short Case Studies

- Database Marketing
- Risk Scoring
- Understanding Loss Trends
- Fraud Detection
- Identifying Subrogation Opportunities





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Customer Insight

Focus your attention on your best customers to increase your 'wallet share' with them.

Best Customers:

- **Have the most growth potential**
- **Strongest financial ratings and payment histories**
- **Easiest (lowest cost) to service**
- **Will benefit most from cross-sell and up-sell**

Results:

- **Better understand communication needed to influence the target audiences**
- **More efficient than growing new business**
- **Higher Return on Investment**
- **Stop "leaving money on the table"**
- **Building on successful relationship investments already made is a small gamble**



Case Study: Cross-sell / Up-sell
Make more happen with the top x% of your Book.
For instance...

Business Segment

- **Personal lines: \$800 Million**
- **Homeowners, fire, and auto policies**
- **Distributed through independent agents**

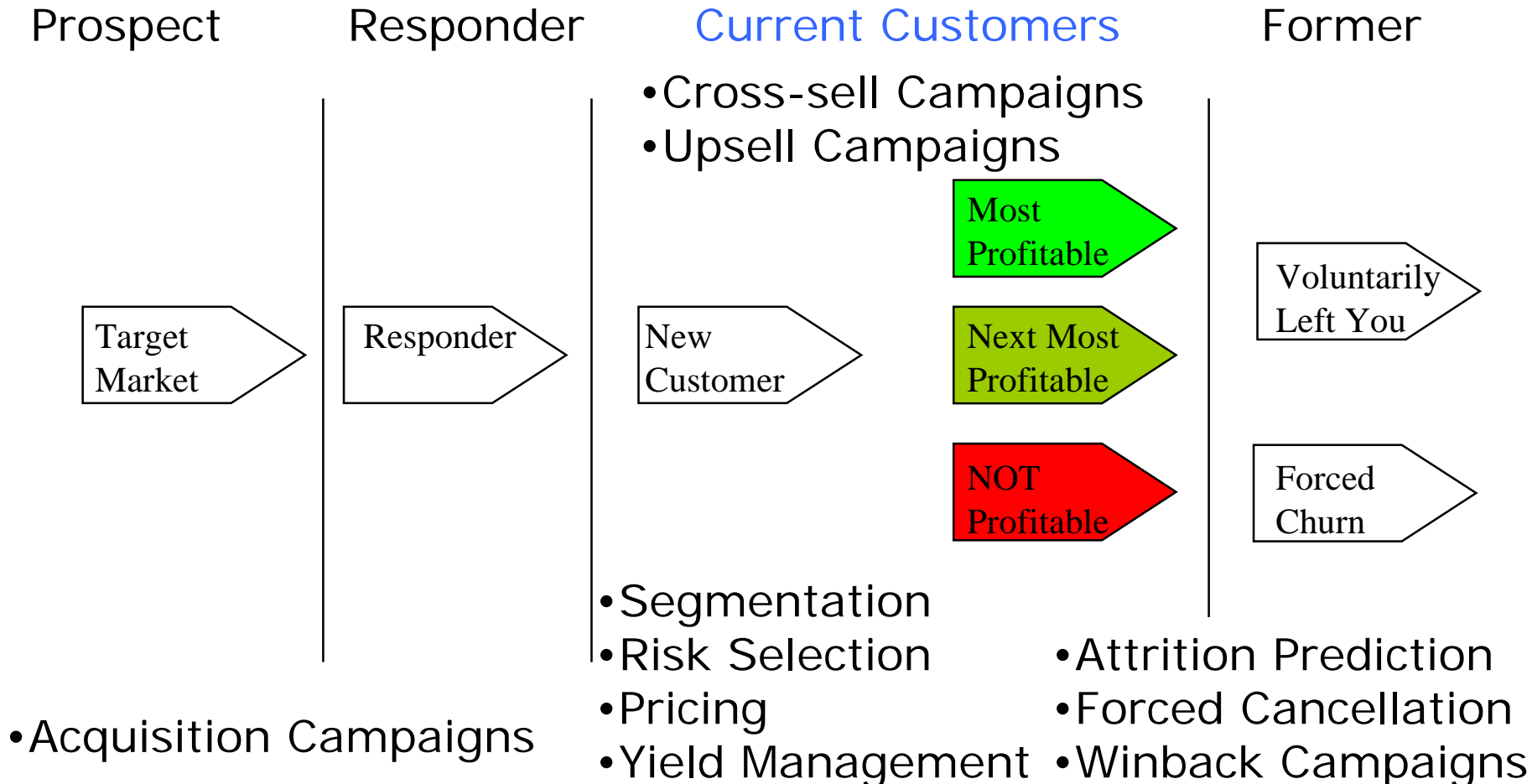
The Product: Blanket Inland Marine

- **Jewelry and silverware**
- **Optional coverage**
- **Sold as an endorsement to a homeowners policy**



Customer Life Cycle Management

Best Practice use of CLTV is to incorporate it into all stages during a customer's lifecycle





Case Study: Database Marketing Implementation Approach

SERVICE DIFFERENTIATION BASED ON “PORTFOLIO POSITION”

**Most
Profitable**

Retention Programs

Cross-sell / Up-sell

**Next Most
Profitable**

Loss Control Services

Agency Contact

Re-underwriting

Cross-sell / Up-sell

**NOT
Profitable**

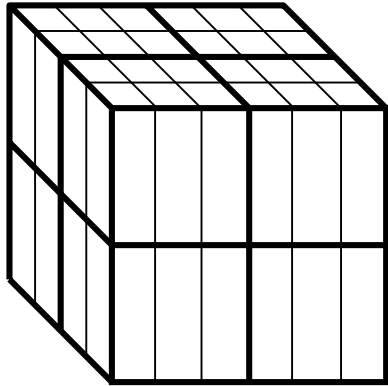
Forced Churn (where legally appropriate)

Price to Risk



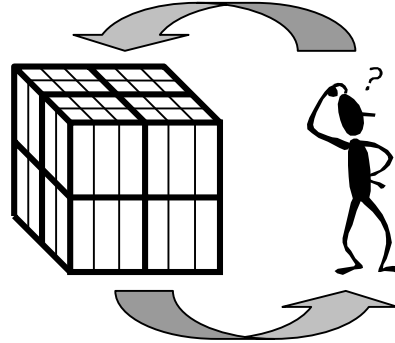
Case Study: Database Marketing Test and Learn process

Phase 1: “Test”



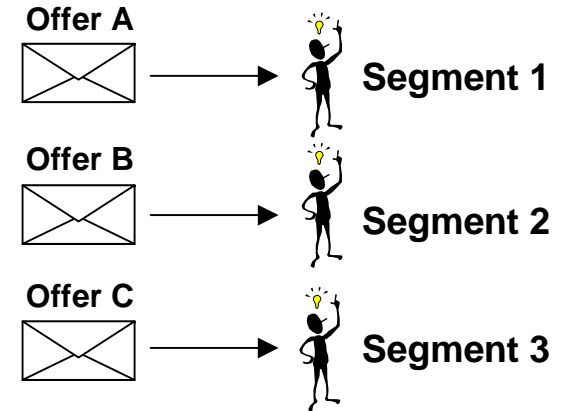
- Complex test cell design
- Small, random sample (32,000)
- 48 different combinations

Phase 2: “Learn”



Match offer combinations to customer preferences through statistical modeling

Phase 3: “Rollout”



Send the best offer combination to each customer to maximize ROI



Case Study: Database Marketing

Lessons learned:

- Individual tastes vary widely - use it to your advantage
- It pays to invest in developing knowledge first
- Strong hypotheses matter
- Tight integration is necessary



Short Case Studies

- ▶ Database Marketing
- ▶ Risk Scoring
- ▶ Understanding Loss Trends
- ▶ Fraud Detection
- ▶ Identifying Subrogation Opportunities



Case Study: Risk Scoring

Improve management of a Book of Business based on a portfolio view of risk quality. For instance...

Business Segment

- Personal Insurance: \$800 Million
- Homeowners, fire, and auto policies
- Distributed through independent agents

Situation

- Homeowners Insurance
- Decline in profitability



Key Questions

Do you know who will file your next loss?

Your next loss will most likely be with a group of risks that tend to make more claims than any other group.

How do you find them?

Your current process looks backward to re-underwrite customers with losses, or to lower the bar for the pool of larger risks that should always be re-written.

Your improved process should look forward, at the estimated 80% of renewals that pass under the existing process. You need a predictive model solution.

What then?

Only good underwriting judgment should 'make the call' on a risk. An actionable, forward-looking approach to renewal underwriting would continuously score your Book of up-coming renewals for their likelihood to file a claim, and add the most likely of those to the existing process for review.

What is the benefit of changing?

Odds are, that as time goes by, you will avoid more claims by managing the poorest risks off your Book. Automated execution of this new addition to your current process will give you greater control than ever to profitably manage your risk portfolio with a more disciplined underwriting perspective.



Environment

Most personal lines carriers are utilizing risk scoring within their underwriting functions.

Most utilize scoring for risk selection (i.e. new business) and/or as a portfolio management tool for influencing renewal decisions.

Both commercially available and proprietary risk models are being utilized.

Credit-based risk scores are actively used within states that permit their use.

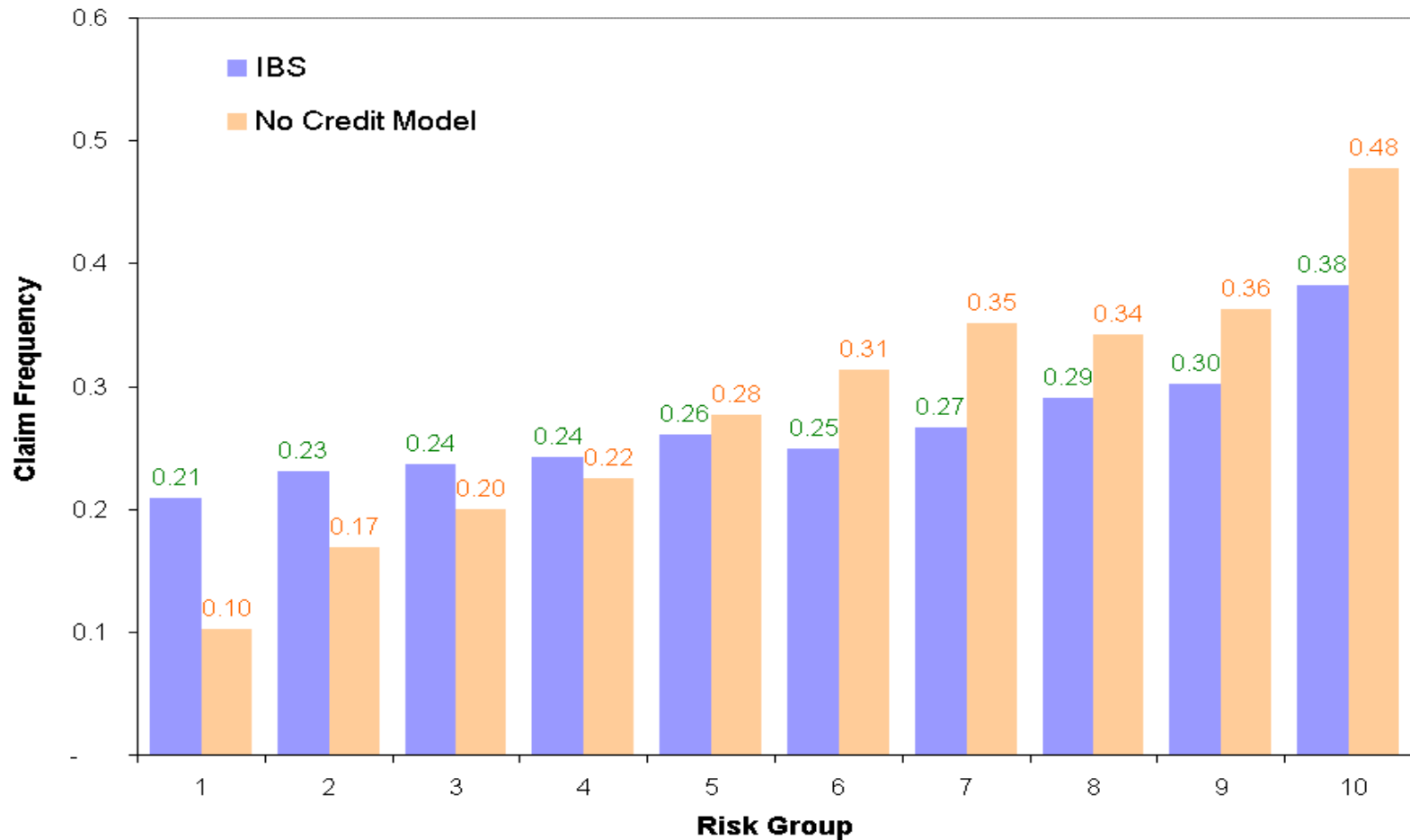
The use of credit scores for the selection, pricing and management of customers is a topic of high debate with consumer advocacy groups, the insurance industry and regulatory agencies.

HO: Better Model and more flexible response to changing regulatory conditions



Case Study: Risk Scoring

A company can do better in scoring renewal business than simply looking at commercially available insurance scores.





Case Study: Risk Scoring Estimated Benefits

- Efficient identification of risks currently unseen by the existing re-underwriting criteria
- A flexible risk scoring methodology that can be applied to specific regulatory environments
- A portfolio management process that, through automation, will enable consistency of execution against underwriting objectives.
- Ability to monitor portfolio performance at the market, agent and underwriter level.
- Sustainable competitive advantage for risk/portfolio management.
- Relatively low incremental cost for implementation



Case Study: Risk Scoring

Lessons learned:

- Involve the business user early in the project
- Focus on actionable & incremental improvement
- Data management is critical
- Communication and training are important

Short Case Studies



➤ Database Marketing

➤ Risk Scoring

➤ Understanding Loss Trends

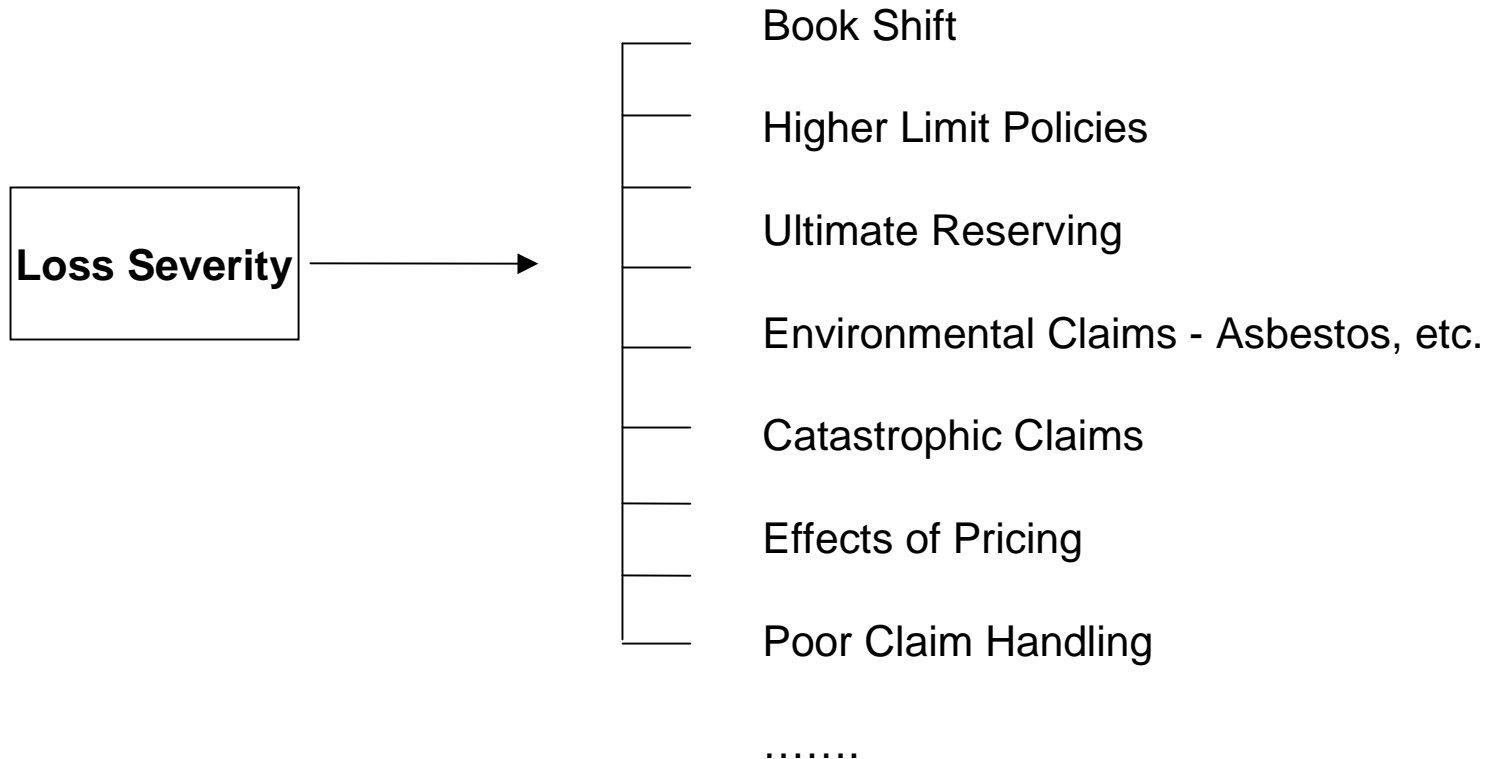
➤ Fraud Detection

➤ Identifying Subrogation Opportunities



CA Work Comp: WHY big Inflation in late '90s?

Initial hypotheses surfaced after discussions with the business, actuaries, Claims personnel, and Commercial Underwriters.

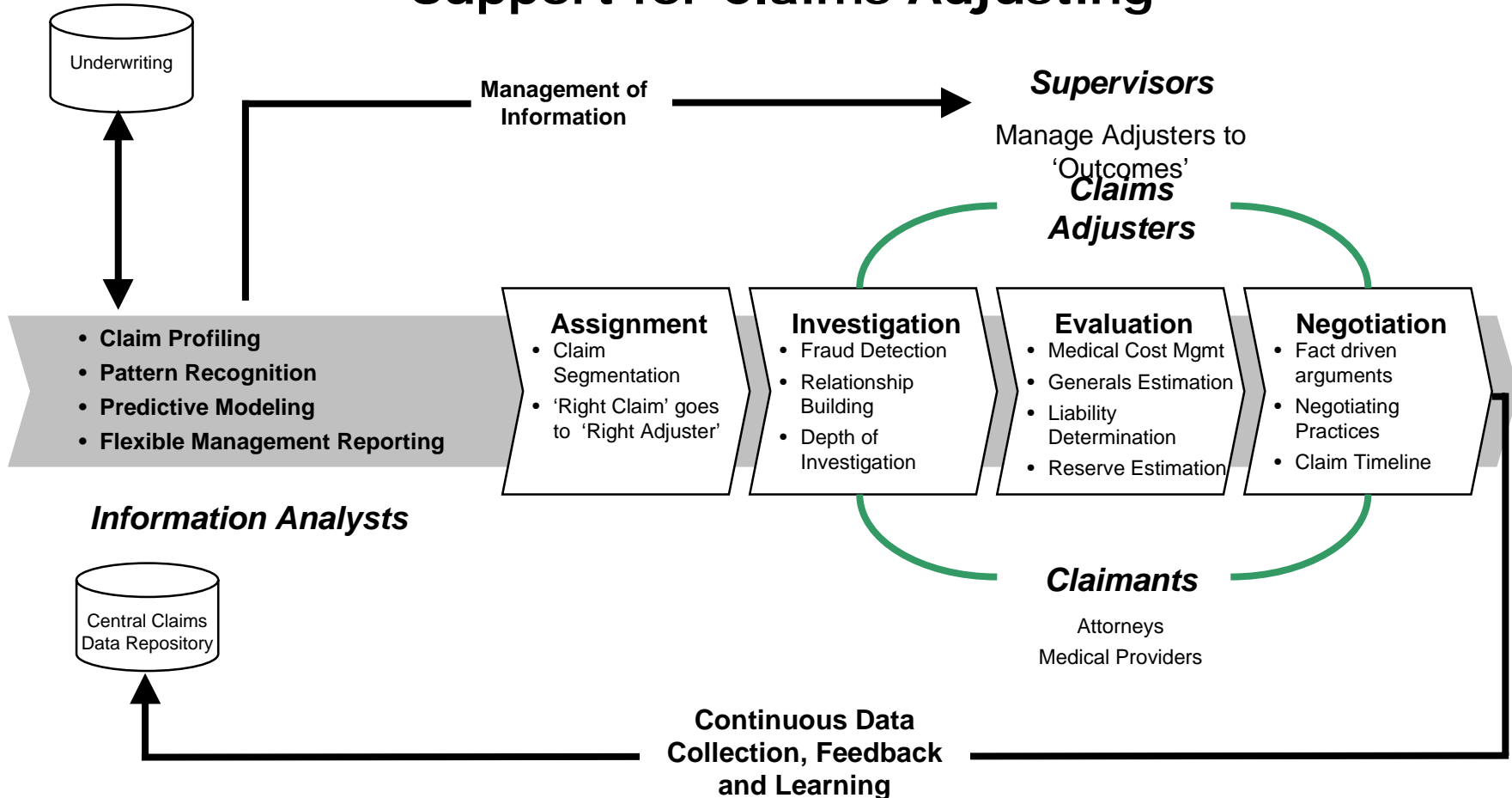




The Claims Vision

The efficient use of information to support core claim activities.

Information-Based Decision Support for Claims Adjusting





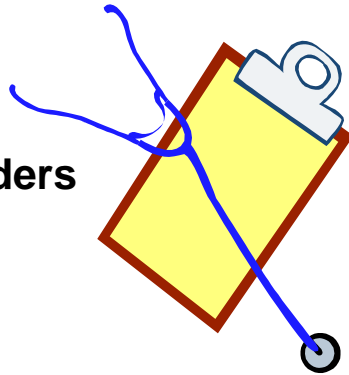
"Checkbook" Evaluation

If a company can get a clear understanding of its costs, it can ask questions about which ones it can try to control versus which it can only price.

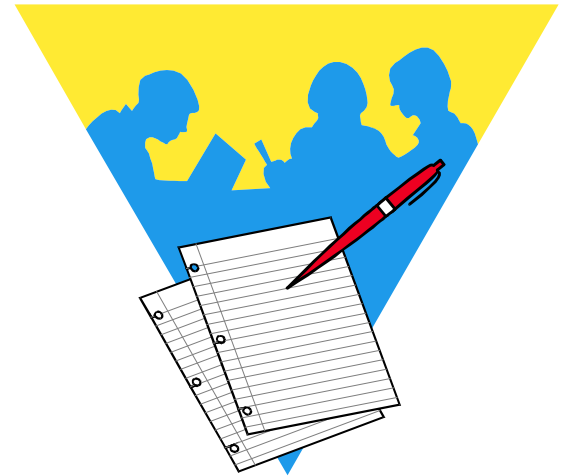
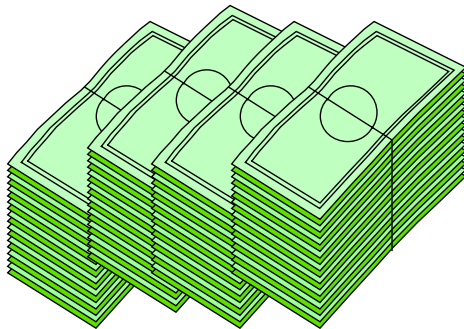
A lot of small payments



to medical providers



can really add up

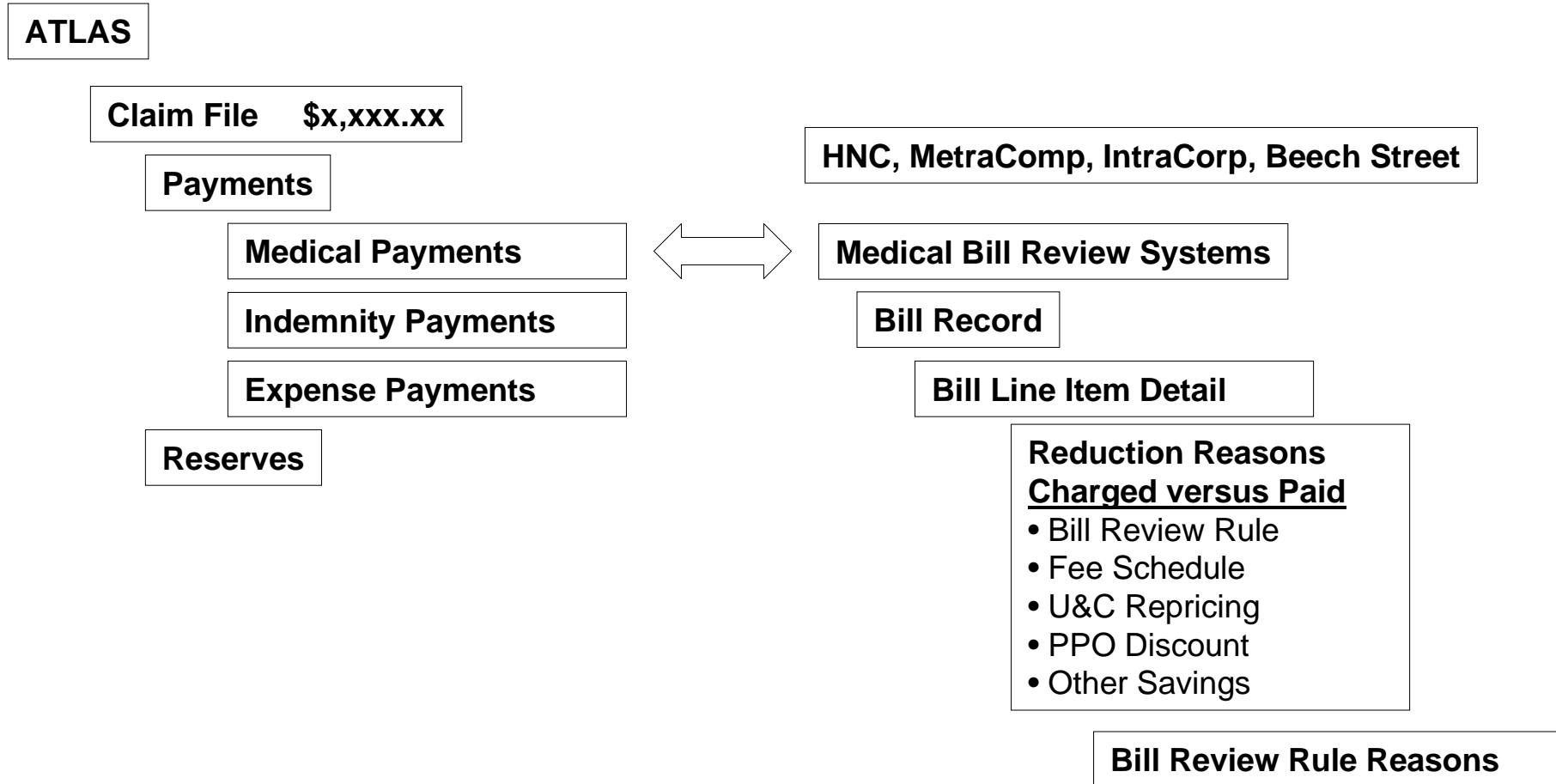


Track
each and every
medical payment.



The Claims "Checkbook"

By integrating claims data with medical bill review vendors' data, a company can see where its money is going.





Transactional Data Preparation

Leverage investments in data handling methods that can bring every claim element into a 'like aged' data set.

Key Technologies

Ability to handle medical bill detail data

- Provider groups

- Diagnosis groups

- Service groups

Capability to generate common valuation "cohort" groups

- 3, 6, 12, 18, 24, 30, 36, etc. months

- Can also generate 'leading indicator metrics'

Direct Link to Excel Tables for easy replication

- Multiple time periods

- Easy to add states

- Can directly add other lines of business

A solid red rectangular bar.



Level of Analysis

The “apples to apples” approach requires stringent rules for data handling and analysis.

➤ Groups for Analysis

→ Class Codes

→ Injury Groups

→ Geographic (All CA, Los Angeles, SFBay, East Bay)

→ Accident Years (1995 through 2000)

→ Valuation Periods (Avg. Maturity 6, 18, 30 months)

➤ Limiting factor will be volume of claims

→ Geographically

→ Like aged maturity for the development pattern of the particular injury groups



Case Study Findings

Regulatory changes can impact results.

The change in ability to manage medical utilization (1997) is a prime factor related to higher WC medical costs in recent years.

Consumption of services for some types of claims tripled, while the State Fee Schedule kept unit costs flat.



Case Study: Understanding Loss Trends

Lessons learned:

- “Follow the Money” when you want to see what is driving inflation in your checkbook
- Comparing claims requires “like maturity” processing
- Unseen exogenous factors can leave internal staff pointing at each other for worsening profitability
- Sophisticated data handling techniques can give you much more insight than higher-level statistics



Short Case Studies

➤ Database Marketing

➤ Risk Scoring

➤ Understanding Loss Trends

➤ Fraud Detection

➤ Identifying Subrogation Opportunities



Case Example: Auto 3rd Party Bodily Injury

Business Objective

Reduce Unnecessary Losses Paid

Increase Productivity of SIU Resources

- Sharpen recognition of potentially suspicious claims
- Shorten the time it takes to get an SIU resource involved
- Reduce time spent by SIU staff on training adjusters

LIKELY ACTION STEPS

- Interdiction of 'Build-up' during treatment
- Negotiate 'Build-Up'
- Litigate 'Hard Fraud'



Claim Operations: Identifying Suspicion

There is an entire spectrum of "targets".

Look for signs of potential Fraud in the "Life of a Claim"

Presumed Legitimate

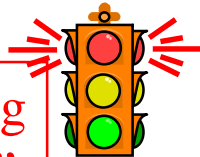
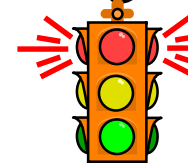
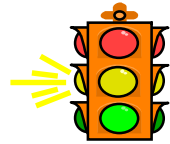
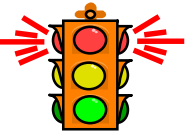


Investigate

Evaluate

Negotiate

Settle



Inflammatory Red Flag
Being on "Watch List"
False Identity
Stolen goods
Faked the Loss
Caused the Accident

Multiple Red Flags
Collusion, Conspiracy,
Extensive Claims History

Claimant "Build-up"
Padded Estimates
Exaggerated Lost Earnings

False/exaggerated Disability
Large Data base Link Analysis
Connected to a Crime Ring



Example: Leveraging Unstructured data

DATE OF LOSS 11/07/99

Automobile Accident
'Rear Ender'

PROGRESS NOTE

"felt set up"
" suddenly stopped"

ProcID	Name	Date
409F123	Ima Phile-Hanler	11/11/99

Repped in less than 4 Days

Insured said that they felt set up, this was a mild impact in heavy traffic that happened when the claimant suddenly stopped while other traffic kept moving. Claimant is represented.

DESCRIPTION OF LOSS

" Minor RE in Heavy Traffic"

RESERVES ABI \$7500

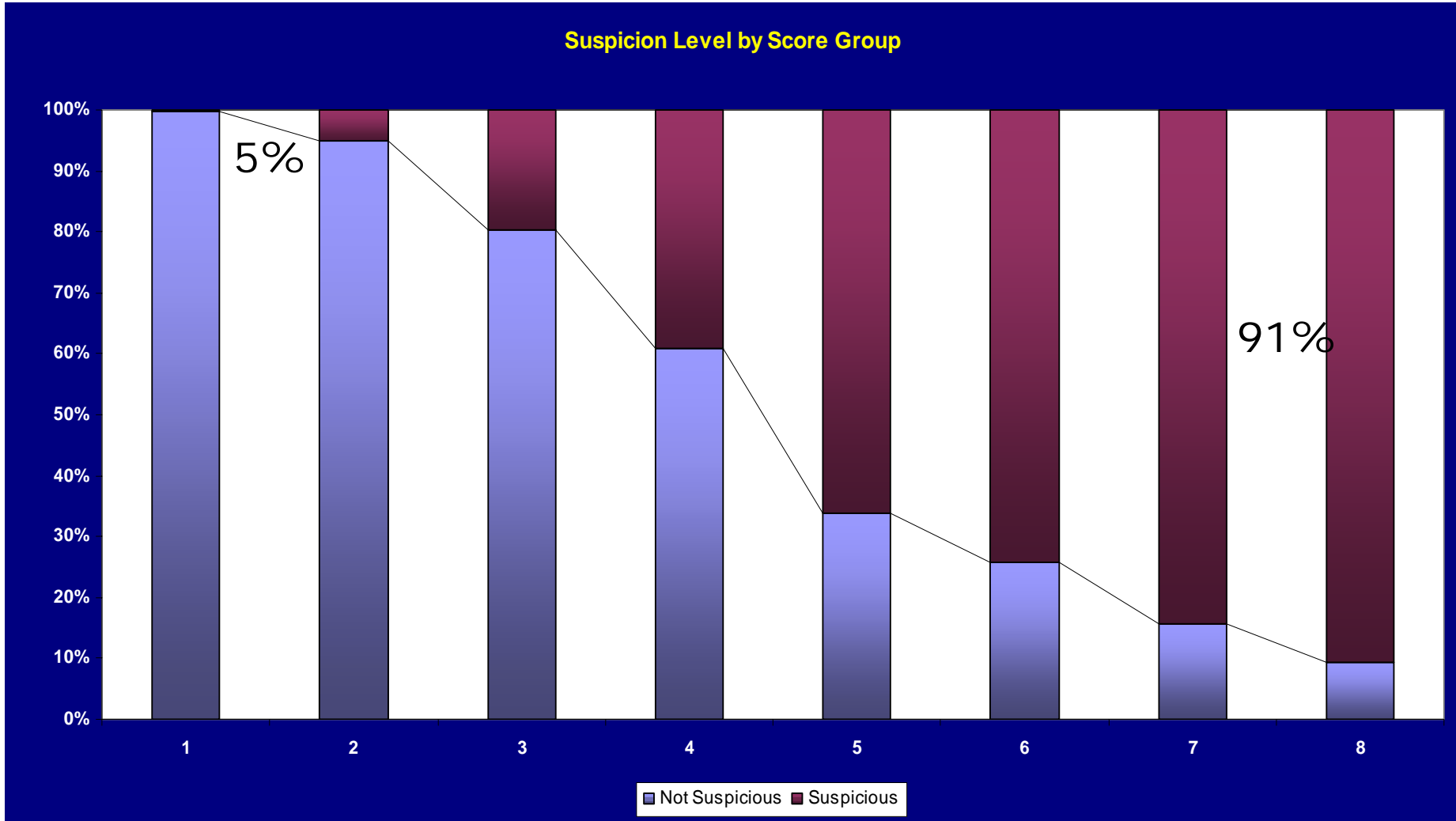
Inconsistency
Minor Impact v.
Severe Injury

Higher potential for sending for SIU review



Current Capability: Auto 3rd Party BI

Strong rank ordering of cases for the SIU to review
76% of the 'Bad Guys' in the bottom 15% of ranked cases





A model-based solution

The SIU gets good files fast and can fill slack time reviewing next best scoring files. Electronic data is available for advanced investigation techniques.

Solution:

- Predictive models based on historical data
- Every claim is scored continuously
- High scoring claims are automatically referred
- Systematically implement additional models to cover the spectrum of the problem-space

Results:

- Highly actionable referral method
- Many 'full' investigations are solely model driven
- Referral relevancy tuned to trained adjuster
- Files are referred faster for review
- Additional files are available for review



Case Study: Fraud Detection

Lessons learned:

- When mining opportunistic data, go where the opportunity leads
- Incumbent business experts can show you the way
- Text cues can be made into very useful features
- Focus on actionable & incremental improvement



Short Case Studies

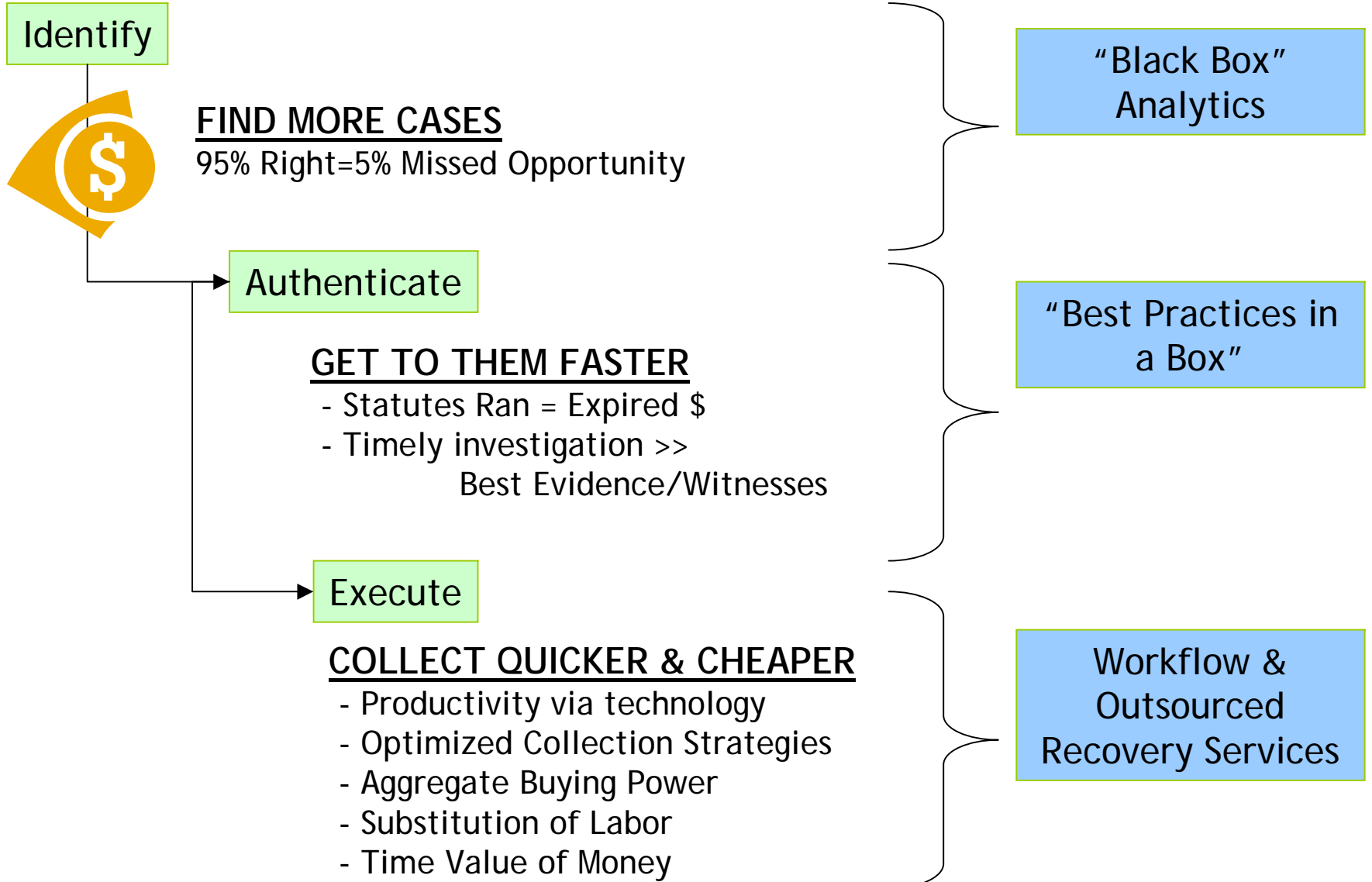
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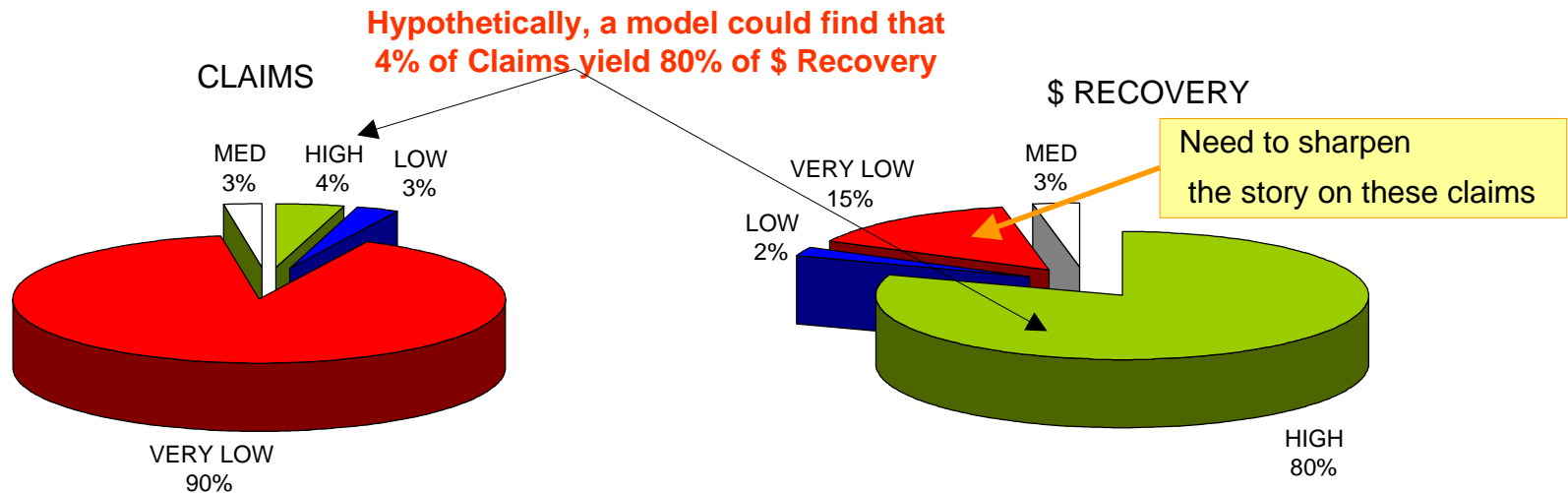
KEY LEVERS, SOLUTIONS

This is money we paid, but that others owe.





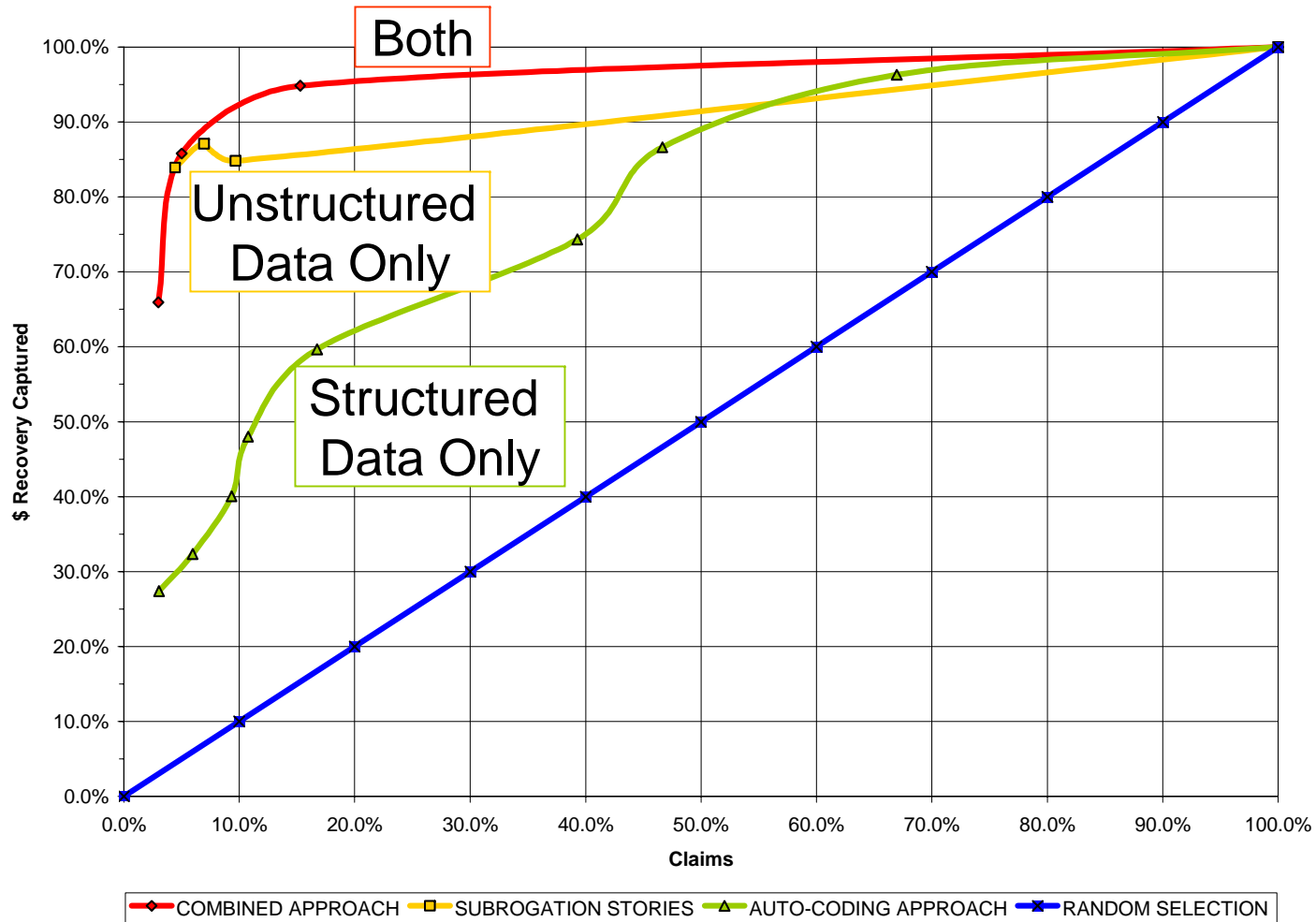
Subrogation "Stories" are Very Actionable
Recursively segmented "Stories" are predictive.
Similar results are achieved in all first party claims.





Lift Chart: Efficient Recovery Identification

Leveraging the unstructured data can deliver significant gains in proper identification.





Case Study: Identify Subrogation Opportunities

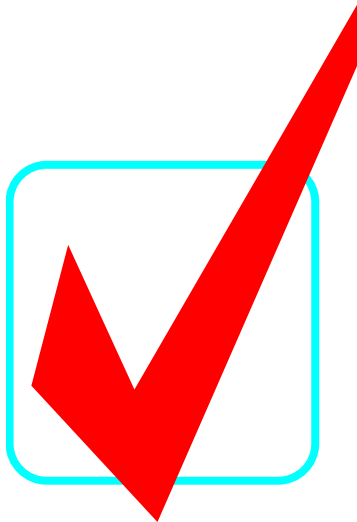
Lessons learned:

- Use of a “covering” approach for directing research is very efficient
- Focus on actionable & incremental improvement
- Don't be afraid of text data
- Rapid iteration with business experts helps drive convergence quickly
- Projects where you can ‘count the money’ are easy to get sponsored



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Company Level Design Issues

It's about People, Process, Technology, and Philosophy. Company capabilities vary widely.

- Leadership Focus and Strategy
- Type and Volume of Business
- Structure/presence of specialized services
- Information Architecture
 - Data Warehousing
 - Analytic & Business Intelligence
- Specialized Technologies
 - Data Handling
 - Analysis and modeling
 - Investigative tools
- Trained Professionals
 - In-house Out-source
- Available budget and resource allocation



The Future: Real Time Enterprise

It's not just having the data, it's what you do with it.
Analytic procedures encapsulate the best practices of a business function to apply intelligence.

Embedded Analytics:

- Actionable events proactively identified
- Transaction triggered analysis and alerts
- Targeted to specific departments and roles
- The power of teamwork via collaboration routing

Expected Results:

- **Value Proposition** = "Close the loop"
link operations with analytics
- Leverages existing resources; increases efficiency
- Adaptable, robust, and affordable
- Allows cross-enterprise process automation
- Run the business processes "by the numbers"
- Cost effective alternative to expensive and time-consuming training



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