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Predictive Modeling - P&C's Evolution Points to Healthcare's Revolution

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Overview

- The Evolution of P&C Predictive Modeling

- Predictive Modeling Across Insurance

- Healthcare Predictive Modeling Today

- The Future of Healthcare Predictive Modeling

The Evolution of P&C Predictive Modeling

Why was Predictive Modeling not extensively used in the past?

Processing power and storage was either not available or to expensive to support large scale predictive modeling

Year	1980	1985	1990	1995	2000	2004
Storage Cost per Megabyte	$190	$ 70	$ 10	$0.90	$0.05	$0.001
Microprocessor Speed, MHz	5-8	16	33	75	200	400

Also robust external data and easy accessible internal transaction level data did not exist

Progressive Insurance and Credit Score Case Study

- 1980's – Progressive began experimenting with alternative underwriting variables
- 1990's – Progressive became the first company to extensively use credit scores
- 2000's – Progressive uses over 200 data elements in its scoring process

Progressive vs Industry
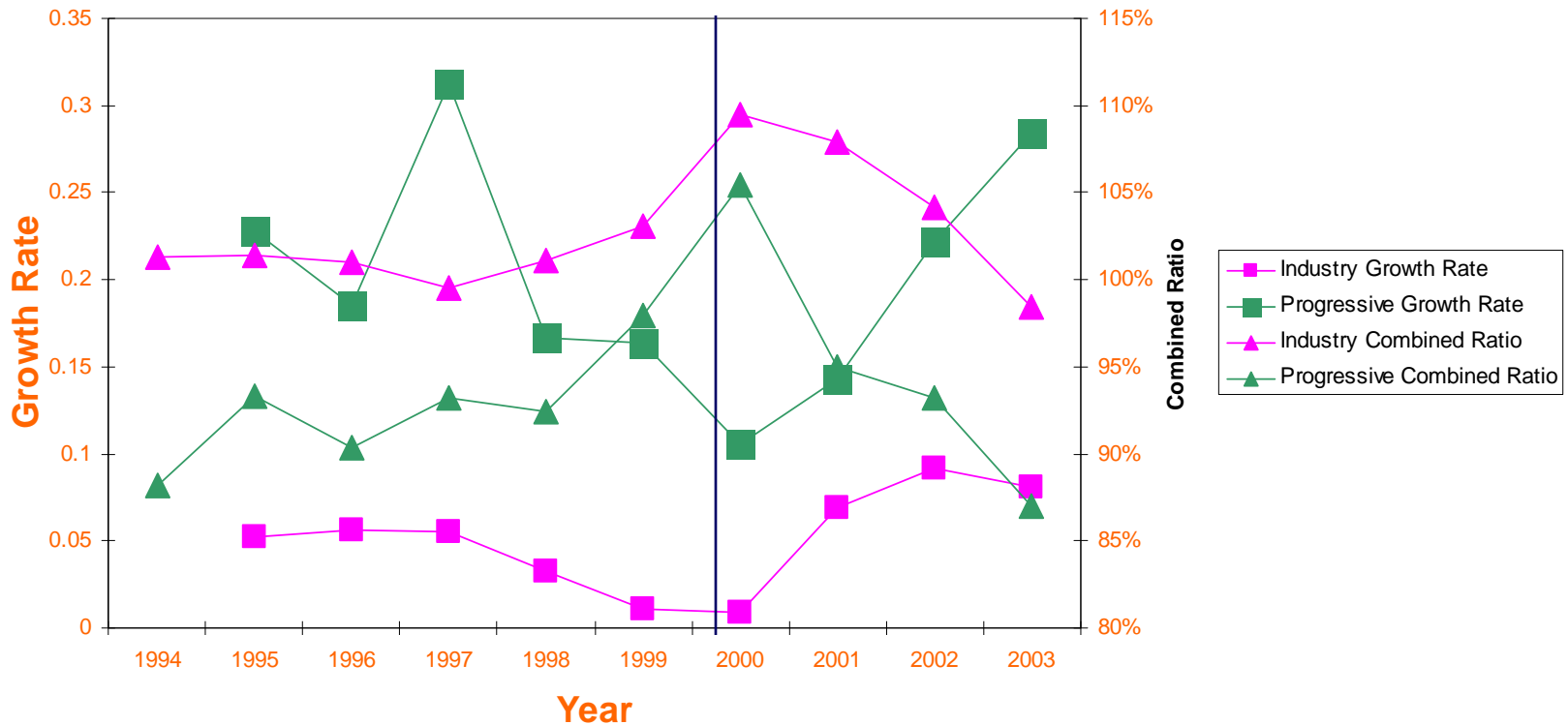
The Evolution of P&C Predictive Modeling

Evolution of P&C Predictive Modeling

- **Credit Scoring for Personal Auto**

- **Credit Scoring for Homeowners**

- **Small Commercial**

  - Business Owners Policies

  - Commercial Auto

  - Property and General Liability

  - Workers' Compensation

- **Non-Credit Scoring for Personal Auto and Homeowners**

- **Mid-Size and Large Commercial**

- **Workers' Compensation Claim Models**

- **Specialty Lines**

P&C Underwriting Today

- Predictive Modeling is Table Stakes
- Used in:
  - New business underwriting
  - Renewal underwriting
  - Customer service
  - Claims
  - Customer Retention
  - Agency Management
- Data Sources and Predictive Variables
  - Moved from solely credit score to 1,000s of variables
  - Looking at the present, the historical, and the changes over time
  - Internal elements
  - External elements
    - D&B, credit reporters, marketing datasets, geo-coding, synthetic variable development
- Key to realizing business benefits is implementation

Predictive Modeling Across Insurance

Predictive Modeling In The Insurance Industry Landscape

Predictive Model Applications in Insurance

Product	Life Stage of Predictive Modeling 15 Yrs+………………………………Today…...Future		Market Penetration	Sophistication

• Personal Lines *Underwriting*
  – Credit Modeling
  – Non-Credit Modeling				

• Commercial Lines *Underwriting*
  – BOP/CMP
  – Commercial Auto
  – Workers Compensation				

• Healthcare
  – Claims and Medical Management
  – Underwriting				

• Personal Lines *Claims* – Auto Bodily Injury				
• Commercial Lines *Claims* – Workers Compensation				

• Disability Income
  – LTD
  – STD				

• Specialty Lines *Underwriting & Claims* – E&O, D&O, EPL, etc.				

Healthcare Predictive Modeling Today

Consumer Segmentation

Consumer Segmentation is a method of better understanding and meeting the needs of individual consumers by dividing current and potential members into subgroups with distinct attributes, buying behaviors and health risk characteristics.

Traditionally, insurance companies have applied predictive analytics to identify high risk members either for upfront underwriting analysis or for post sale block of business analysis. However, insurance companies have often ignored the significant portion of the population that were either low cost and low risk or unknown.

We believe a broader, end-to-end segmentation approach utilizing Predictive Analytics should be used to deepen the understanding of the entire consumer population. An insurance company can then utilize this information to positively impact acquisition of new customers, develop programs to retain profitable members and improve risk analysis identification and assumptions for high risk high cost customers.
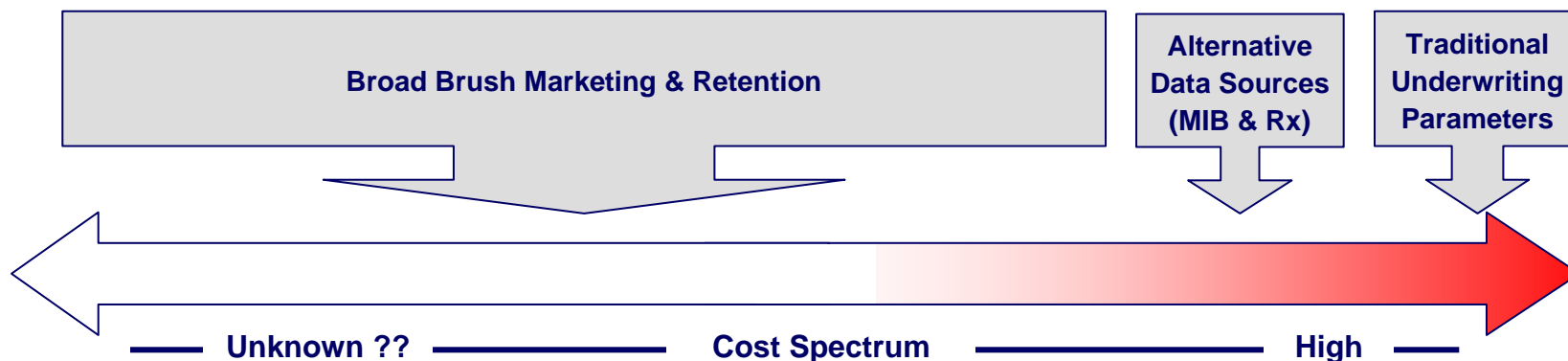
Traditional Approach to Health Risk Segmentation

Predictive modeling was originally used to identify the 20% of the population that have significant medical histories. However, this population will only account for 30% of next years claims.

The approach offered a strong understanding of historical health characteristics for targeting purposes; however it had the following pitfalls

- Limited understanding of the unhealthy population subject only to historical medical information

- Limited to no understanding of the characteristics of prospects and profitable members thereby limiting marketing and retention efforts for the healthiest individuals

- Model was heavily dependant on historical medical history. Alternative sources such as MIB and Rx only add additional medical information to the equation

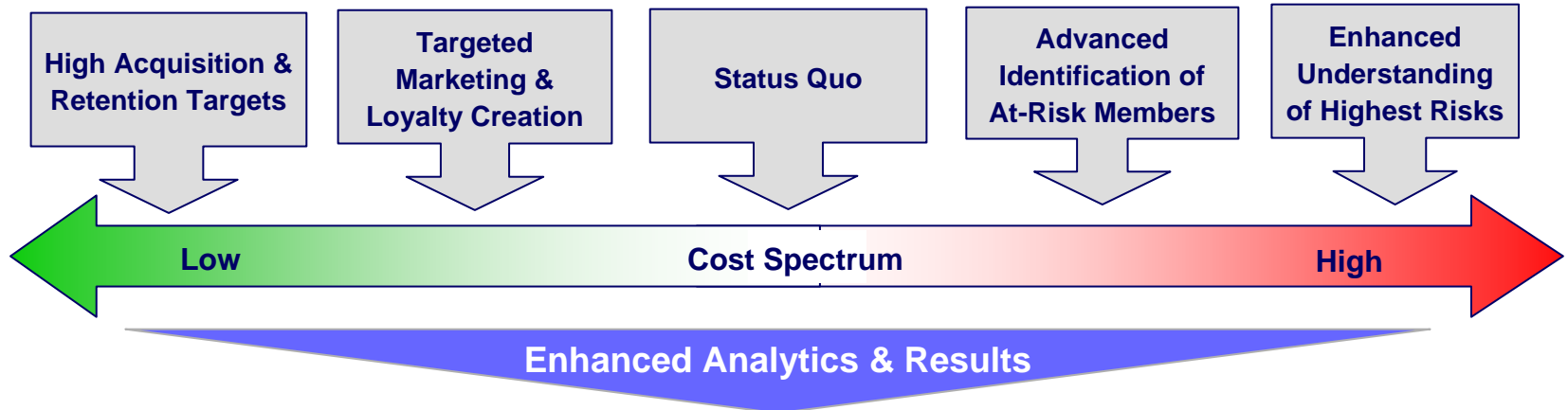### Traditional Health Risk Segmentation and Resulting Solutions

| Broad Brush Marketing & Retention | Alternative Data Sources (MIB & Rx) | Traditional Underwriting Parameters |

Unknown ?? — Cost Spectrum — High

The Future of Healthcare Predictive Modeling

Proposed Solution to Health Risk Segmentation

New Health Risk Segmentation and Resulting Solutions

| High Acquisition & Retention Targets | Targeted Marketing & Loyalty Creation | Status Quo | Advanced Identification of At-Risk Members | Enhanced Understanding of Highest Risks |

Low ⟵ Cost Spectrum ⟶ **High**

Enhanced Analytics & Results

New Business

Tools:
- Lifestyle-Based Analytics
- Household level data
- Census
- Geographic Data

Solutions
- Sales-force Effectiveness
- Improved Underwriting Especially for Year 2 and Beyond
- New Market Penetration
- Improved Marketing Efforts
- Underwriting Efficiencies

Member Retention

Tools:
- Member Retention Analytics
- Household Level Data
- Non-HEDIS Based Clinical Compliancy Measures

Solutions
- Outreach Router
- New Product Offerings
- Loyalty Rewards Program
- Enhanced Customer Experience
- Improved Efficiency

Disease Management/Wellness

Tools:
- Comprehensive Clinical Models Incorporating Multiple Risk Characteristics
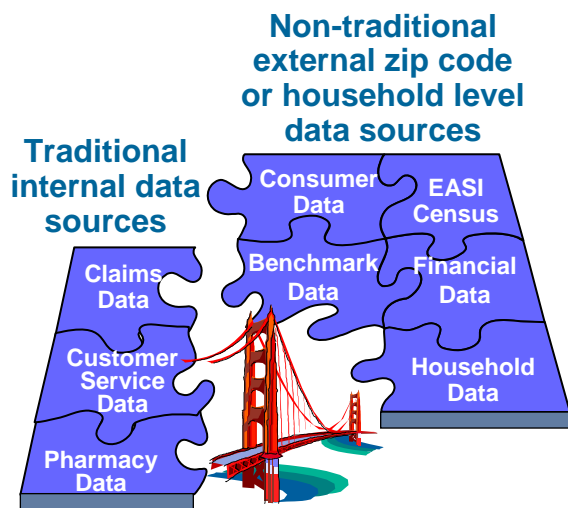- Lifestyle Indicators of At-Risk Individuals

Solutions
- Improved Risk Analysis Capabilities
- Earlier Identification of High Risk Members
- Increased Agent Education of Non-Traditional Member Risk Characteristics

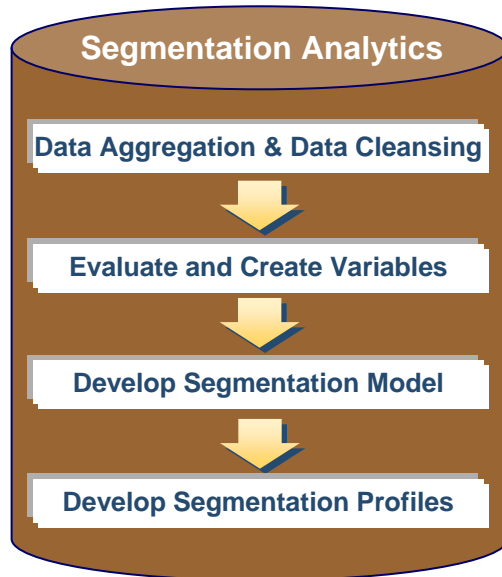# An Innovative Approach to Consumer Segmentation for Insurance Risk

Emerging approach supplements internal plan data with external consumer data and uses advanced statistical analysis to better define members desires and needs and gain insight into the health risks of members with limited claims experience

Innovative Data Sources

Non-traditional external zip code or household level data sources

Traditional internal data sources

- Consumer Data
- EASI Census
- Benchmark Data
- Financial Data
- Claims Data
- Customer Service Data
- Household Data
- Pharmacy Data

Non-traditional data sources unleash new insights into a plan's population

Customized Segmentation Analysis

Segmentation Analytics

- Data Aggregation & Data Cleansing
- Evaluate and Create Variables
- Develop Segmentation Model
- Develop Segmentation Profiles

Consumer Segmentation models are custom built to fit our client's needs

Business Implementation

Resulting Programs:

- Targeted Marketing
- Advanced Underwriting
- Incentives / Rewards Programs
- Product Design / Rationalization
- Personalized Customer Service
- Sales Channel Alignment
- Early Risk Identification
- Block of Business Analytics

Segmentation results are used to align marketing, distribution channels, products and services with prioritized consumer segments to improve acquisition, engagement and retention

Predictive Modeling

Predictive Modeling applies mathematical and statistical techniques to predict the future profitability of a book of business at the individual policy level basis.

Predictive Modeling

|	
An Objective Approach to Analyze Risk	• Limits subjective reasoning from the underwriting process • Leverages internal and external data to predict individual risk profitability at the policy level • Utilizes historical data to develop the model and enhance predictive power
A Tool to Allow Increased Efficiency	• Can allow for increased amount of "low touch" policies/claims • Provides objective guidance for more efficient and consistent pricing • Improves underwriting workflow allocation efficiency for appropriate assignment of resources
A Means to an End	• The predictive model itself delivers the relative profitability indication for each policy • The business value to be obtained from the predictive model comes from careful implementation of model results into underwriting process, pricing, and systems

Sample Lift Curve
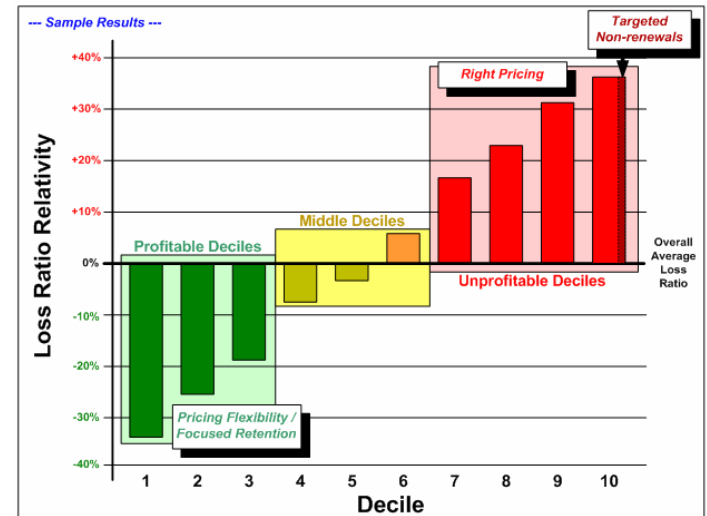
The model supports key business decisions and yields increased profitability and growth.

Predictive Modeling Overview – What can You Do with the Models?
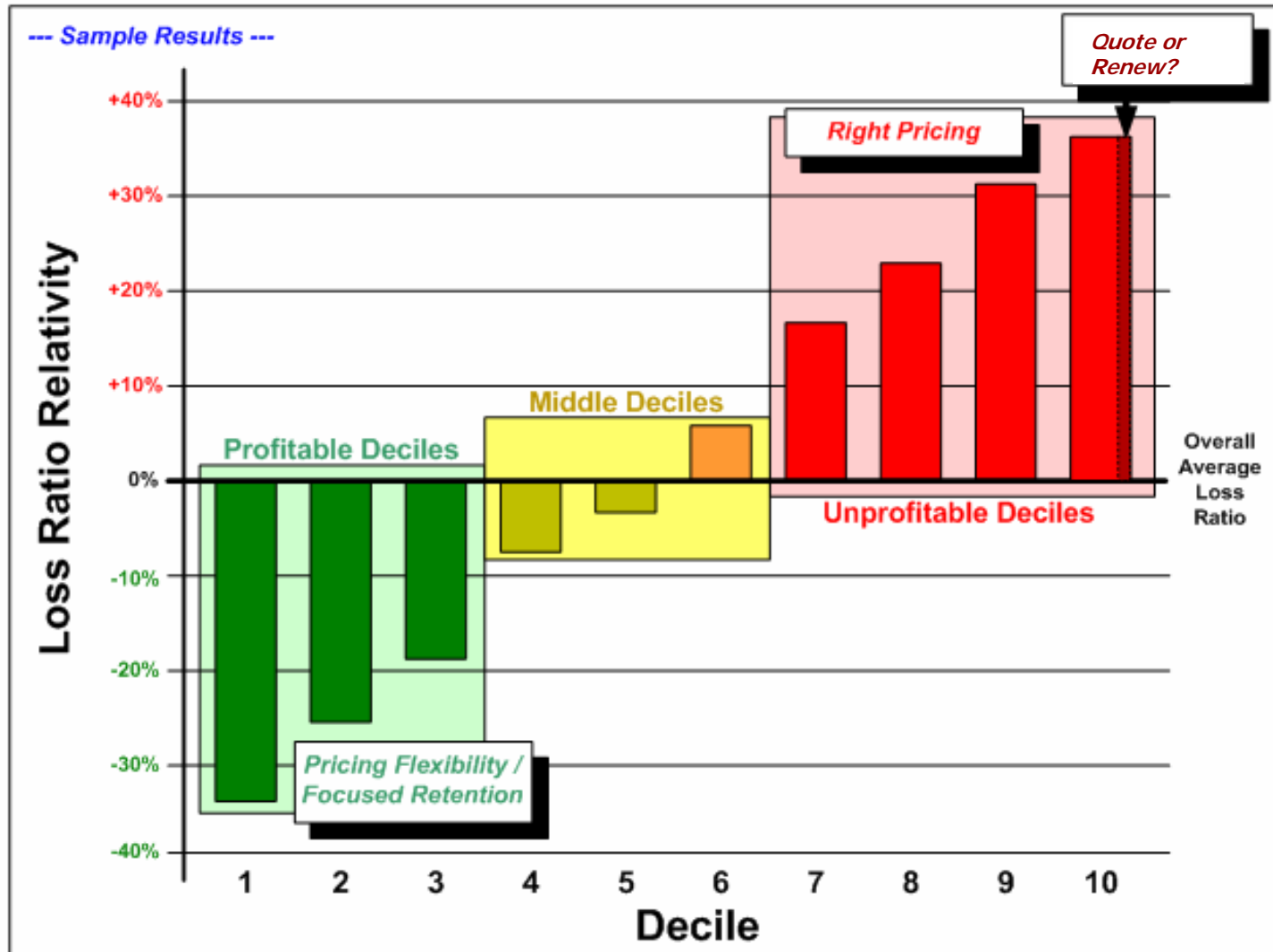
Business Value of Improved Insurance Risk Consumer Segmentation

Applying improved customer insight across the organization can unlock significant business value

Benefits of Improved Segmentation

Improved Engagement and Retention

- Improved identification of the healthiest population
- Improved retention of profitable members
- Increased engagement and marketing to the best morbidity risk populations
- Improved ability to provide value to entire member population

Contributing to a shift in the claims cost curve

More Efficient Allocation of Resources

- Increased efficiency of acquisition, retention and outreach activities
- Increased effectiveness of underwriting as healthiest applicants are passed through efficiently and questionable applicants can be looked at closer
- Efficiency of customer service interactions

Contributing to a lower administrative expenses

Opportunities for Innovation

- Consumer insight for new product development and marketing activities
- Potential for sharing customer insight with agents to improve quality
- Potential for sharing customer insight with affinity groups or other populations to develop new partnerships
- Pre-cursor to personalized insurance product development

Contributing to consumer-focused innovations

Lifestyle-Based Analytics (LBA)

- Roots are in predictive modeling

- Maps lifestyle behaviors to health risks

- Focuses on strong correlations that exist between lifestyles and many disease states

  – Diabetes

  – Hypertension

  – Cardiovascular

  – Stroke

  – COPD/Respiratory

  – Back Pain

  – Maternity

  – Most cancers

  – Some mental health: Depression, Alzheimer's, etc.

  – Others: Osteoporosis, Arthritis, etc.

LBA Example

Diabetes Profiling Example			
Data Element	**Employee A**	**Employee B**	**Diabetes Ratio A to B**
Age	40	40	1 to 1
Vehicle Type	MiniVan	MiniVan	1 to 1
# of Children	3	0	1 to 10
Outdoor Rec	4 plus	No	1 to 25
Fast Food	Rarely	Frequent	1 to 40
Lifestyle Ind	MI7	RE3	1 to 60
Hobbies	Active Outdoor	Reading	1 to 80
…..	…..	…..	…..
…..	…..	…..	…..
Online Purchasing	Sporting Goods	Clothes	1 to 110

Implementation is the Key to Success

The failure of predictive models in the past has not been due to the strength of the model itself but due to the lack of implementation planning

Plan on spending at least twice as much time on implementation as on model development

Before any data is ever analyzed, a successful model must begin with three things:

- determination of the business objectives
- definition of key model success parameters
- development of a detailed work plan for implementation

What is the Future?

- Watch as earlier adopters in the world of underwriting automation gain significant competitive advantages by picking off the best risks, eliminating the worst risks, or even both

- To date, successful early adopters have had a strong entrepreneurial corporate nature leading this next generation of predictive modeling

- As managed care continues to move towards managed health, the importance of predictive models will increase and thus the need for advances in predictive modeling will expand
  - In disease management the need to assess those who are next at risk, not just those who are currently diagnosed
  - In marketing and sales, the paradigm is shifting to marketing to the healthiest populations or the most profitable populations

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