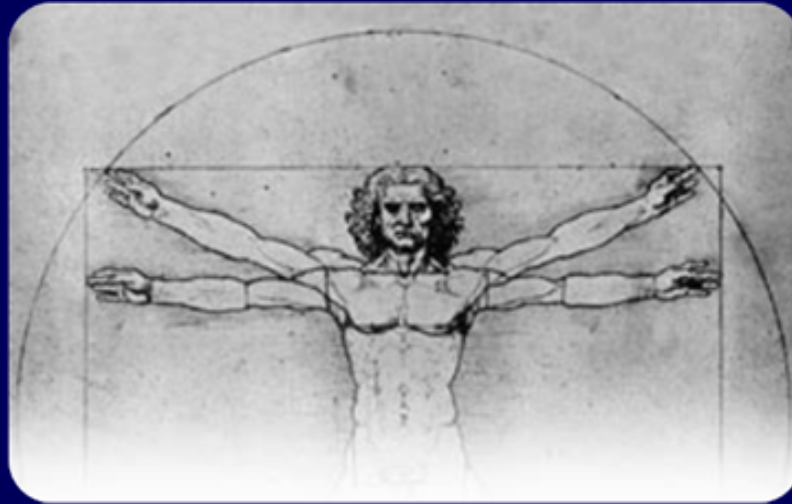# End-to-End Health Plan Segmentation Using Predictive Analytics

Monday, September 22, 2008
4:00 p.m.

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Mo Masud

Susan Novak

Deloitte Consulting, LLP

Discussions Topics

Traditional Segmentation Through Predictive Analytics

Market Drivers for a New Approach to Segmentation

An Innovative Approach to Health Plan Segmentation

Business Applications

Benefits to Health Plans

Questions and Answers

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Traditional Segmentation Through Predictive Analytics

Traditional Segmentation Through Predictive Analytics

Overview of Traditional Segmentation Approach

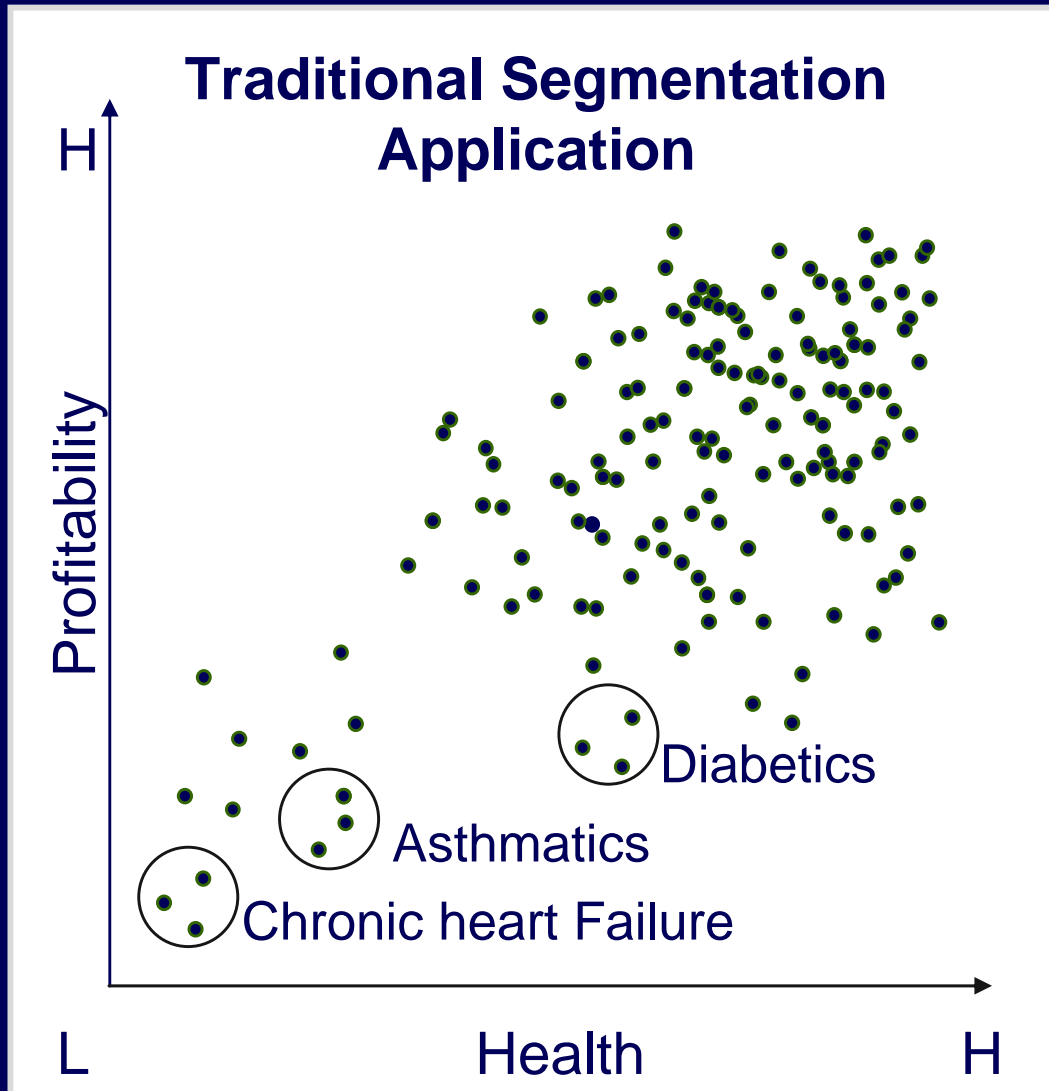Illustration of Traditional Segmentation Approach

Lessons Learned

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Traditional Segmentation through Predictive Analytics

Overview of traditional segmentation approach

- Predictive modeling in healthcare began to solve a widely known problem:

    - Small percentage of members account for a disproportionately large percentage of healthcare costs

- Cost triggers used to identify candidates for medical management

- Most predictive models heavily dependent on claims and authorization data

- Initial applications were disease specific but evolved to support patient centric approach

- Lack of utilization data made models ineffective

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Traditional Segmentation through Predictive Analytics

Illustration of traditional segmentation approach

Traditional Segmentation Application

(scatter plot with axes: Profitability [L to H] vertical, Health [L to H] horizontal; labeled clusters: Diabetics, Asthmatics, Chronic heart Failure)

Limitations:

- Neglects 80% of members

- Leverages internal data only

- No insight into drivers of consumer behavior

- Not a holistic approach to assessing individual's risk

- Does not engage members earlier in the lifecycle

- Driven primarily on reducing MLR

Traditional Segmentation through Predictive Analytics

Lessons learned

- Initial models heavily dependent on adjudicated claims and authorization data

  - Not all claims are created equal

  - Incomplete data, up-coding, claims submission lag, false positives – *Need more data*

- Identified high risk members did not consistently have high likelihood to engage in care

- High risk should not be measured on PMPM alone

- Claims and authorization data ignore behavioral, demographic, and geographic aspects, and their impact on overall risk

- Cost triggers identified members exceeding cost threshold; but low cost does not equal low risk

- Lack of utilization data makes identifying high risk members difficult

- PM had limited applications for underwriting, new market penetration, target marketing, member retention, and engagement

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Market Drivers for a New Approach to Segmentation

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Market Drivers for a New Approach to Segmentation

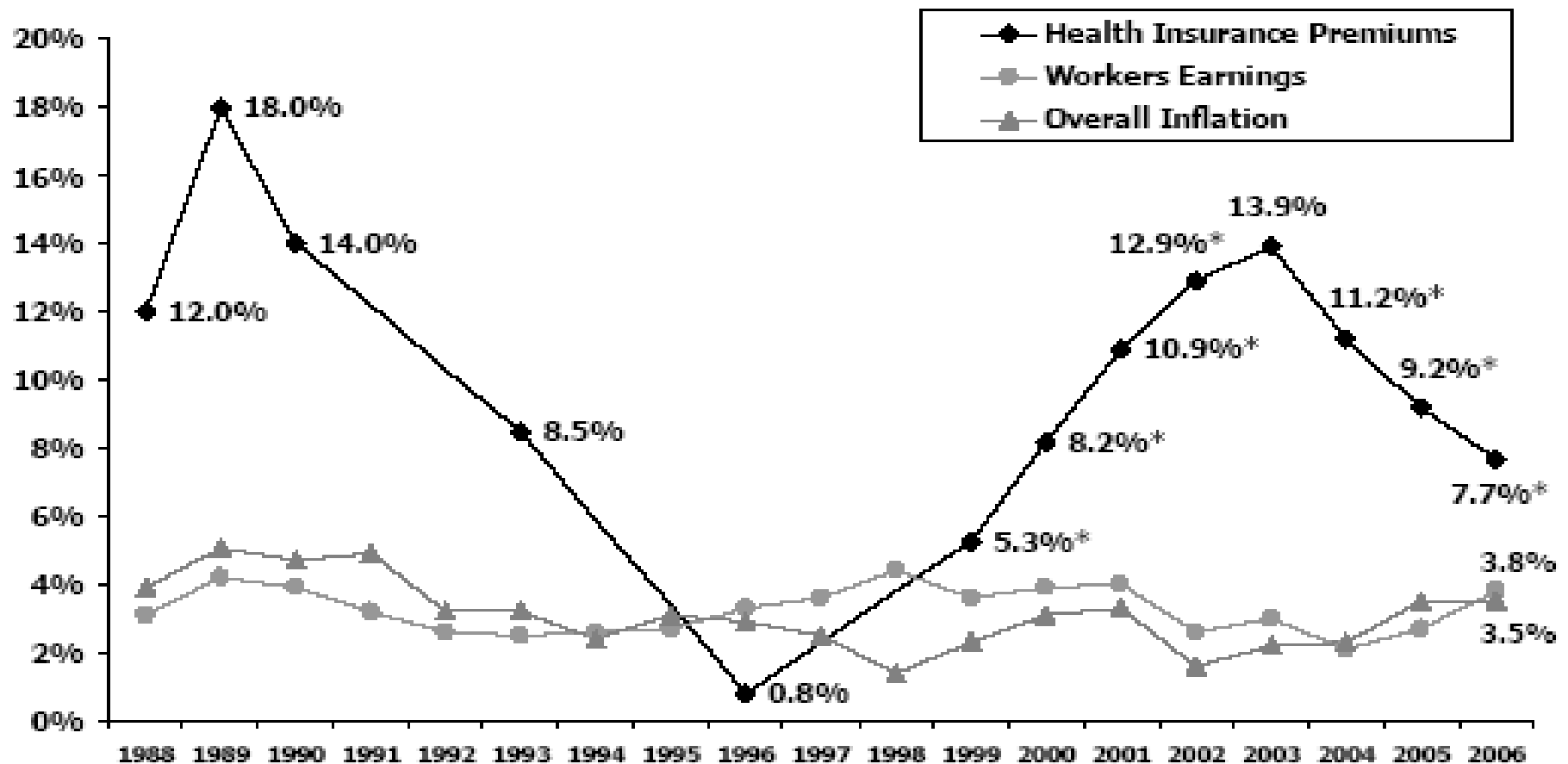The State of the Healthcare Industry

The Shift Towards Consumerism

Key Issues and Market Needs

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The State of the Healthcare Industry

Overall premium growth is declining, challenging health plan revenues and profitability

Increases in Health Insurance Premiums Compared to Other Indicators, 1988-2006

Legend:
- Health Insurance Premiums
- Workers Earnings
- Overall Inflation

Health Insurance Premiums data points: 12.0% (1988), 18.0% (1989), 14.0% (1990), 8.5% (1993), 0.8% (1996), 5.3%* (1999), 8.2%* (2000), 10.9%* (2001), 12.9%* (2002), 13.9% (2003), 11.2%* (2004), 9.2%* (2005), 7.7%* (2006)

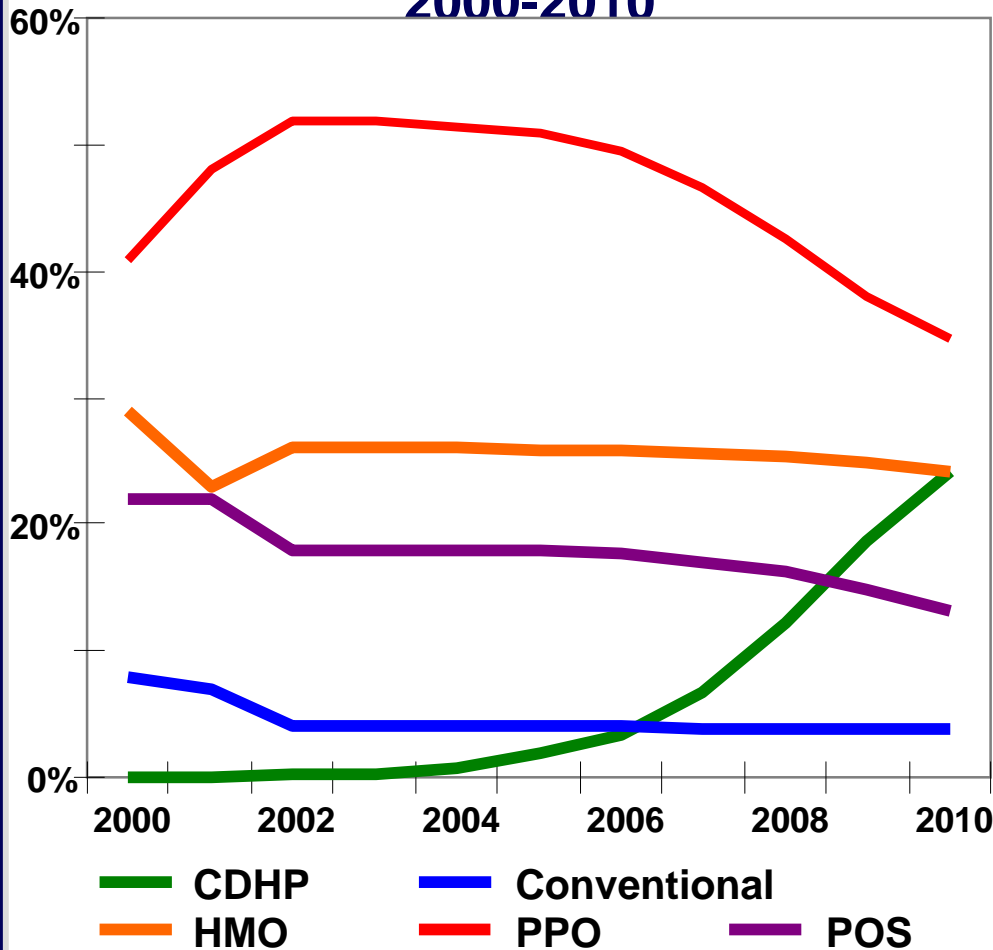Other values shown: 3.8%, 3.5%

Source: Kaiser Foundation

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The State of the Health Insurance Industry

Forecasted product shifting to more affordable, consumer-driven products will result in lower revenues and threaten margins
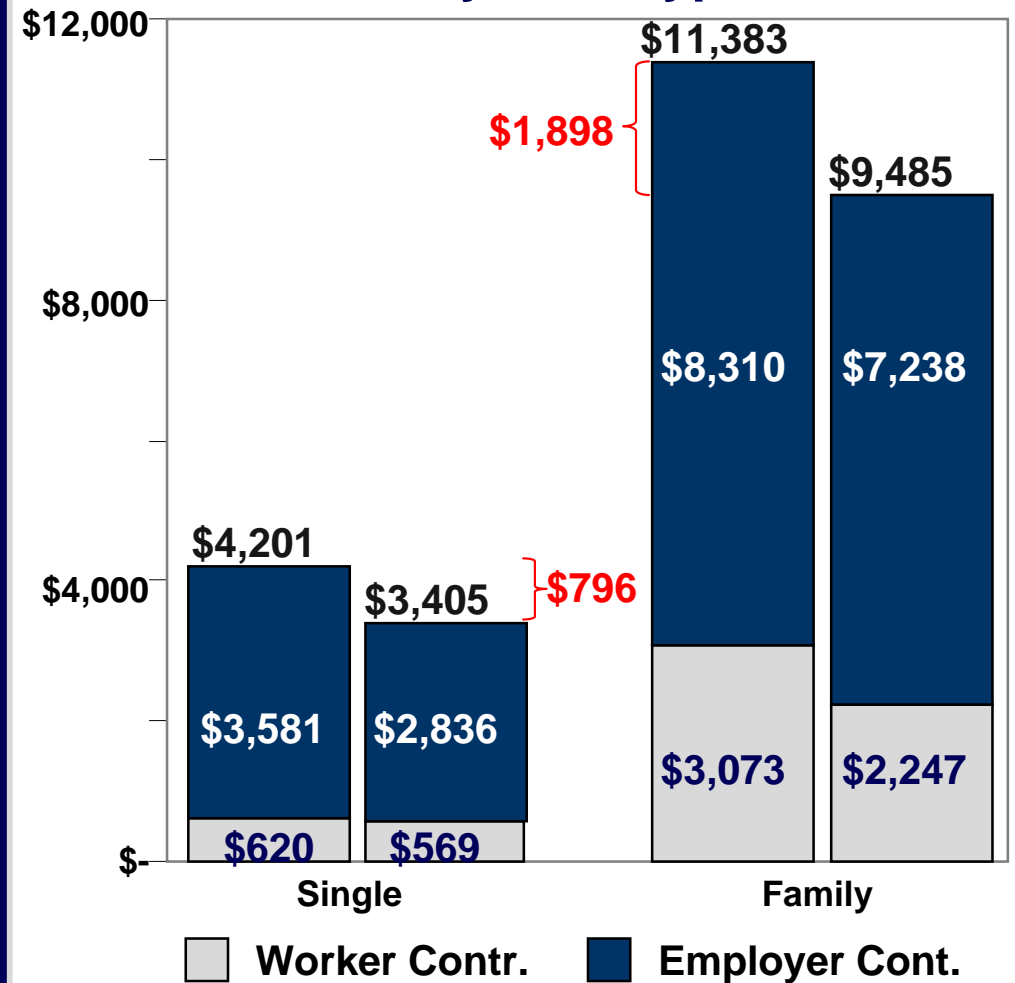

Projected Relative Market Share Among Health Plans, by Plan Type, 2000-2010

Legend:
- CDHP
- Conventional
- HMO
- PPO
- POS

Average Annual Premiums for Covered Workers, by Plan Type, 2006

Single:
- $4,201 (Employer Cont. $3,581, Worker Contr. $620)
- $3,405 (Employer Cont. $2,836, Worker Contr. $569)
- $796

Family:
- $11,383 (Employer Cont. $8,310, Worker Contr. $3,073)
- $9,485 (Employer Cont. $7,238, Worker Contr. $2,247)
- $1,898

Legend:
- Worker Contr.
- Employer Cont.

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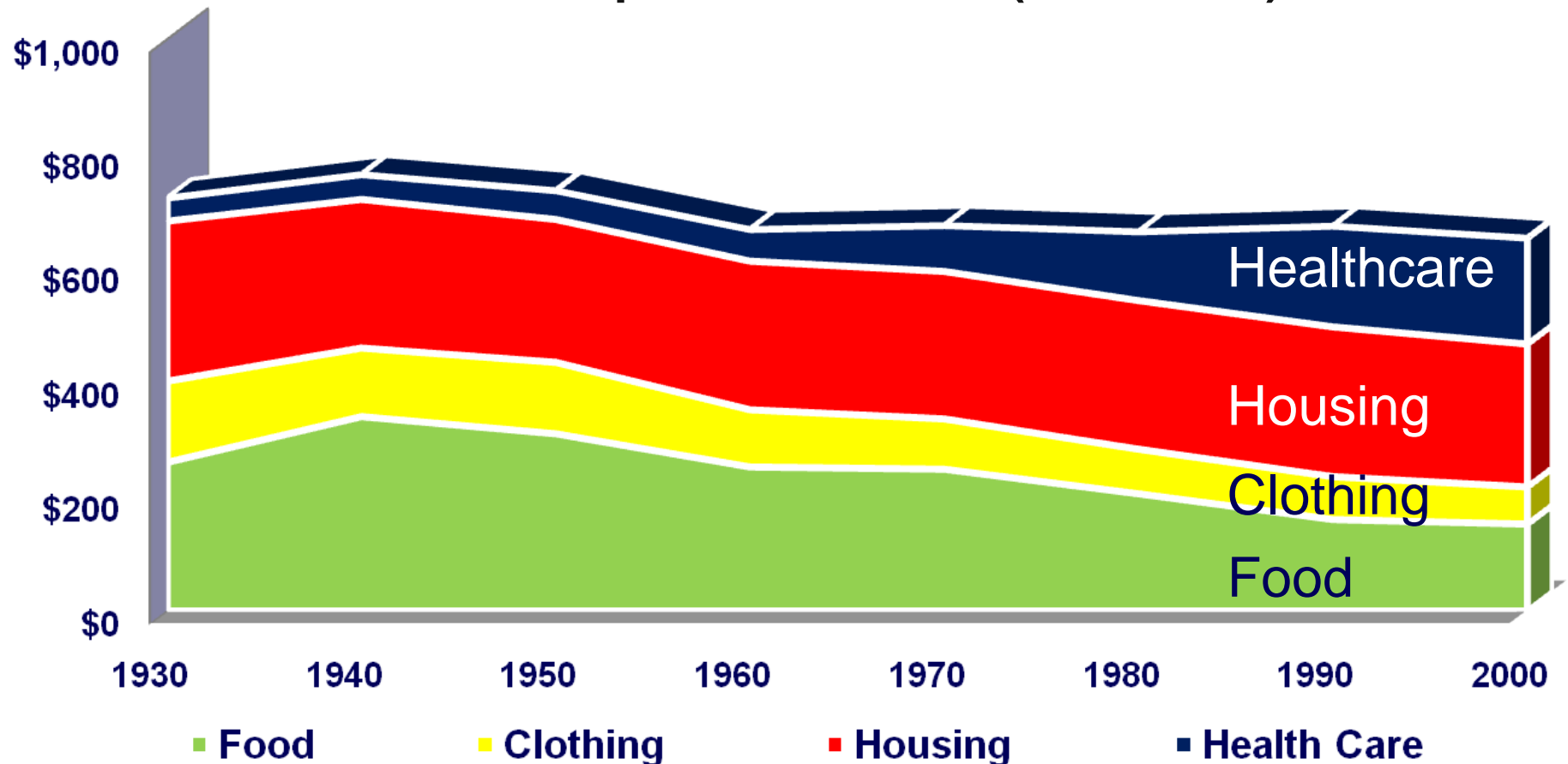
The State of the Healthcare Industry

Historically, decreases in spending on housing, clothing and food subsidized rising healthcare costs; however healthcare costs will soon eclipse disposable income causing individual consumers to more closely evaluate their tradeoffs

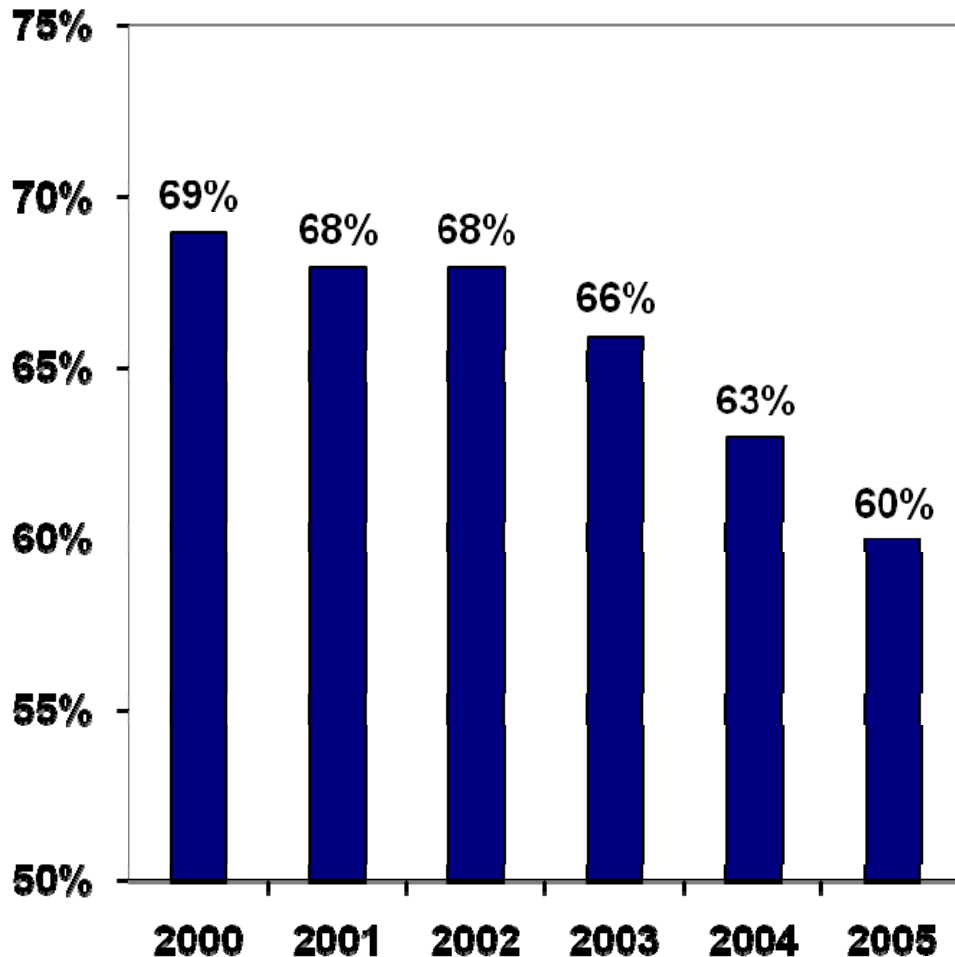**Uses of Disposable Income (1930-2000)**

Legend: Food | Clothing | Housing | Health Care

Labels on chart: Healthcare, Housing, Clothing, Food

Y-axis: $0, $200, $400, $600, $800, $1,000
X-axis: 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000

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The State of the Healthcare Industry

Employers – the industry's traditional "customer" – are not only reducing benefits, but are opting out of offering coverage all together

Percentage of Firms Offering Health Benefits, 1996-2005

- 2000: 69%
- 2001: 68%
- 2002: 68%
- 2003: 66%
- 2004: 63%
- 2005: 60%

Percentage Point Change Among Non-elderly Adults 19-64 by Coverage Type, 2000-2004

- Uninsured: 2.7%
- Medicaid: 1.5%
- Individual Insurance: 0.2%
- Employer-Sponsored Insurance: -4.8%

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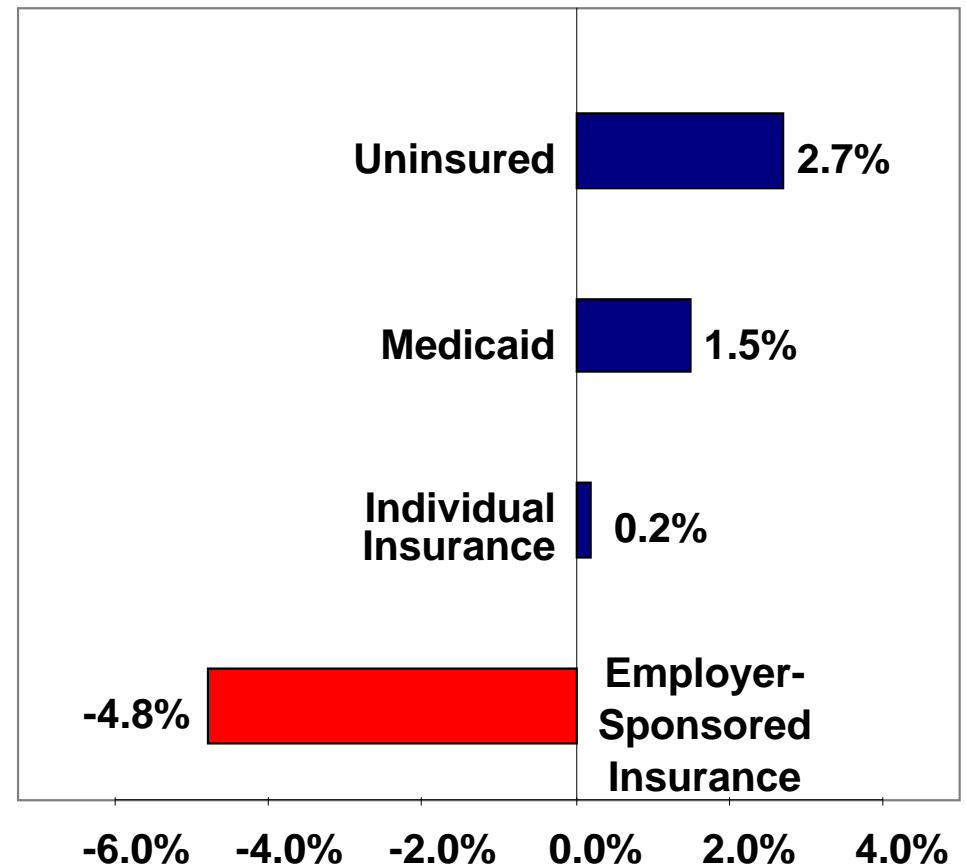
The Shift Towards Consumerism

With the employer role reduced, health plans face new competition that is "filling the void" by developing relationships with the end consumers

Infomediaries
Building brand as trusted advisors and owning consumer data
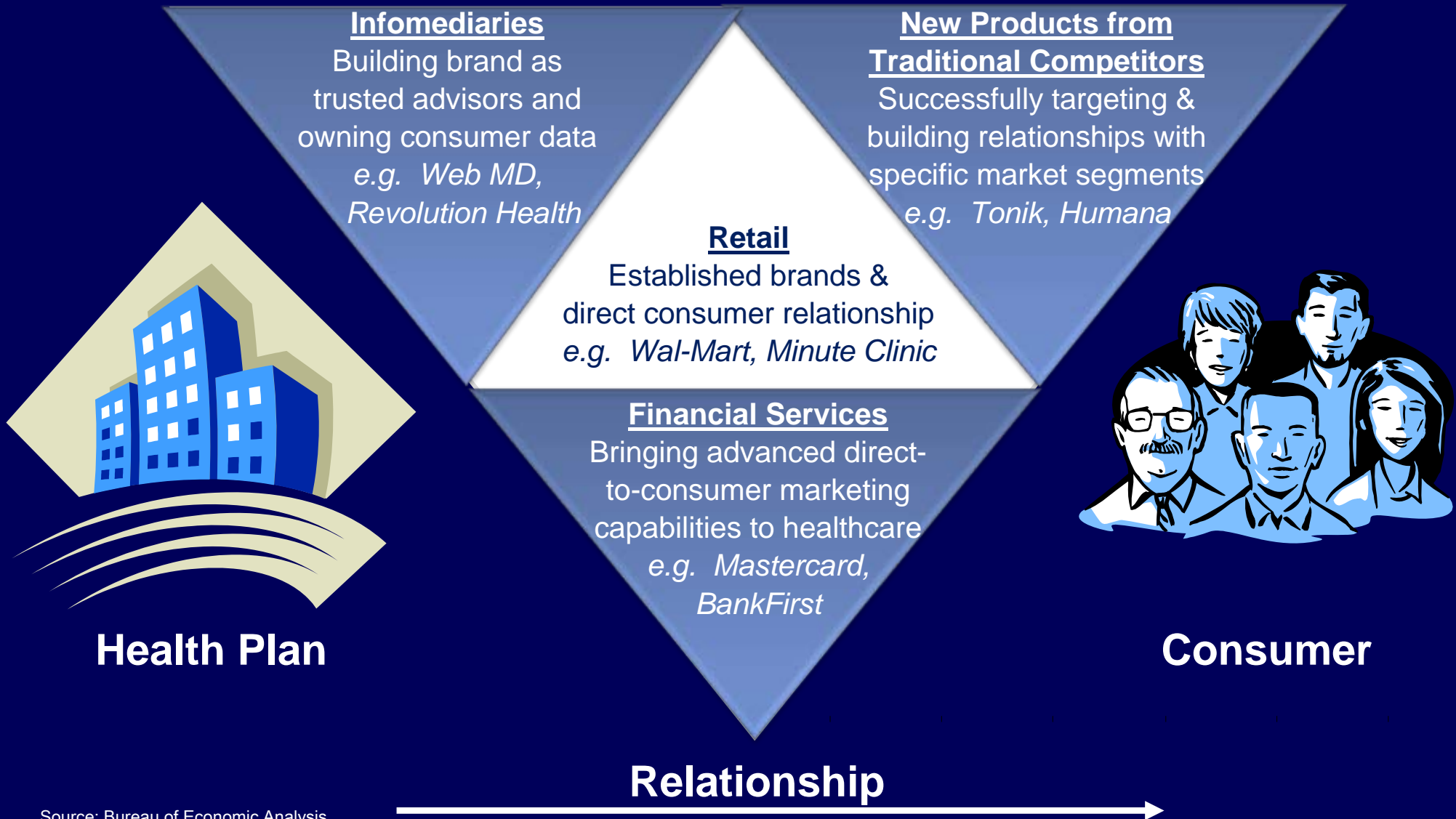*e.g. Web MD, Revolution Health*

New Products from Traditional Competitors
Successfully targeting & building relationships with specific market segments
e.g. Tonik, Humana

Retail
Established brands & direct consumer relationship
e.g. Wal-Mart, Minute Clinic

Financial Services
Bringing advanced direct-to-consumer marketing capabilities to healthcare
e.g. Mastercard, BankFirst

Health Plan

Consumer

Relationship

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The Shift Towards Consumerism

New entrants and traditional competitors are improving their understanding of individual consumers and applying this understanding to marketing, distribution, products and services

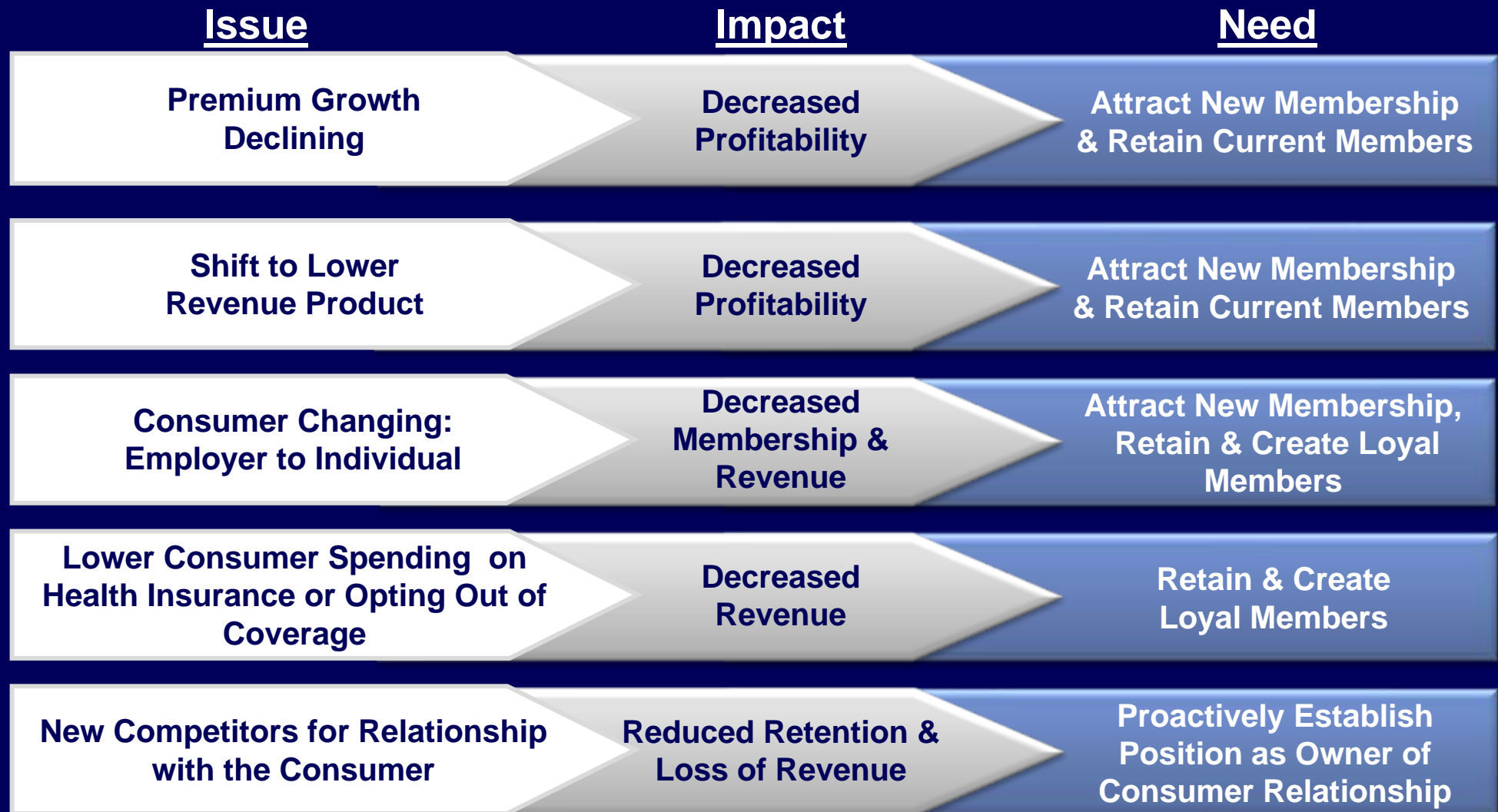| Threat	Capability
Disease Management Vendors	▪ Utilizes advanced predictive modeling to identify ROI and readiness to change ▪ Allocates resources to address biggest impact cases
Financial Services Companies	▪ Applies sophisticated consumer segmentation and profitability analysis ▪ Practices direct-to-consumer and targeted marketing campaigns
Data / Informatics Vendors	▪ Positions to "own" consumer data and relationship ▪ Leverages technology to provide highly personalized services
Traditional Competitors	▪ Invests in advanced data analytics to understand behavior ▪ Designs and marketing products specifically for young & healthy ▪ Attracts specific segments through creative, targeted campaigns ▪ Rewards health and "good health consumers" through incentives

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Key Issues and Market Needs

Winning health plans will develop a superior understanding of the individual consumer and use it to attract and retain the most desirable customers.

Issue	Impact	Need
Premium Growth Declining	**Decreased Profitability**	**Attract New Membership & Retain Current Members**
Shift to Lower Revenue Product	**Decreased Profitability**	**Attract New Membership & Retain Current Members**
Consumer Changing: Employer to Individual	**Decreased Membership & Revenue**	**Attract New Membership, Retain & Create Loyal Members**
Lower Consumer Spending on Health Insurance or Opting Out of Coverage	**Decreased Revenue**	**Retain & Create Loyal Members**
New Competitors for Relationship with the Consumer	**Reduced Retention & Loss of Revenue**	**Proactively Establish Position as Owner of Consumer Relationship**

Source: Bureau of Economic Analysis

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An Innovative Approach to Health Plan Segmentation

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An Innovative Approach to Health Plan Segmentation

Overview

Deloitte Consulting's Predictive Analytics Framework

It's All About Data

Turning Analytical Insight into Action

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An Innovative Approach to Health Plan Segmentation

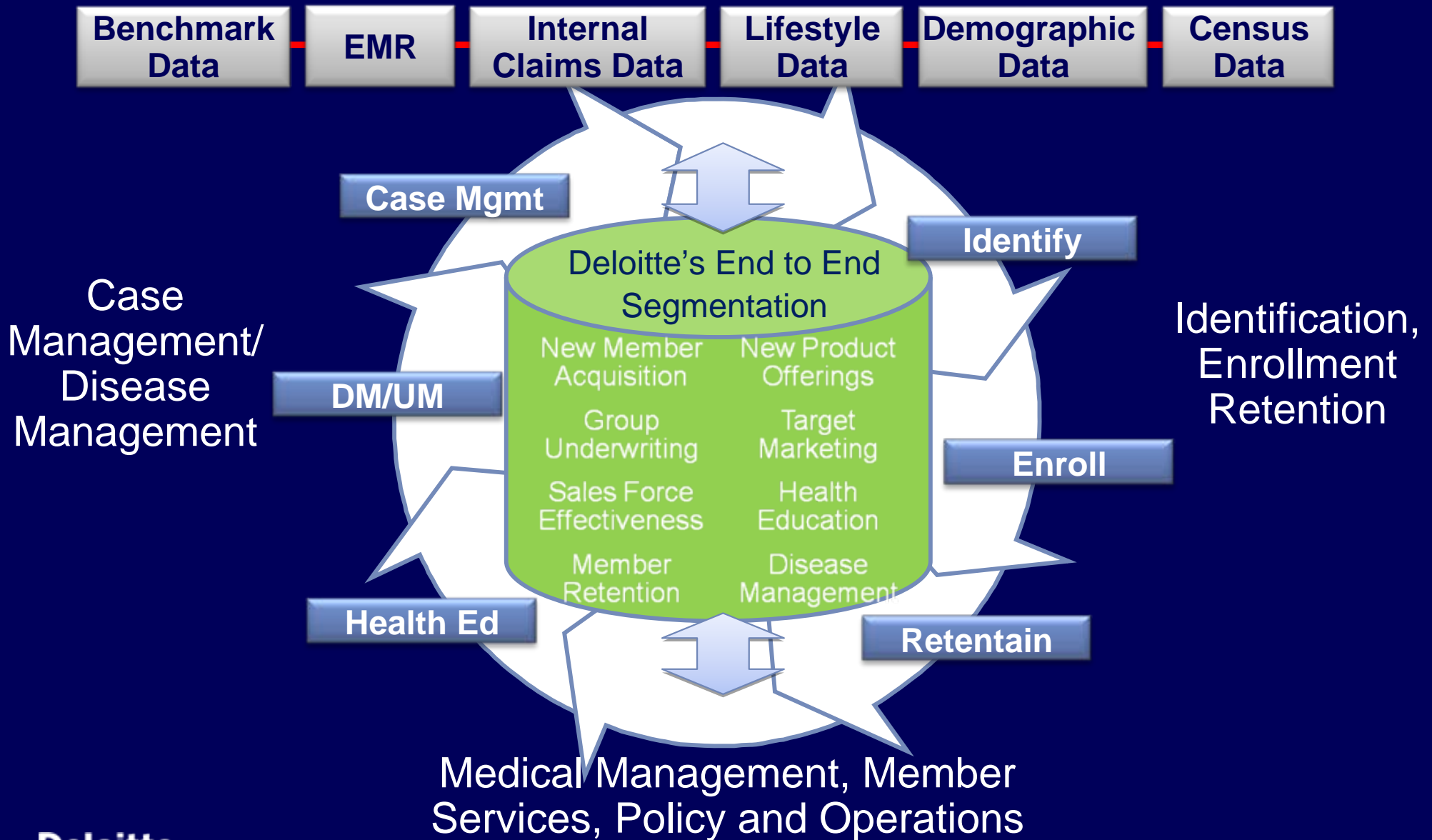**End-to-end Segmentation through Predictive Analytics allows health plans to:**

- Proactively identify and improve business outcomes from acquisition of new customers to retention and loyalty of profitable members
- Improve engagement and clinical outcomes for high risk and high cost customers

Through improved segmentation across the entire plan's population, health plans can:

- Take a life-cycle view of managing risk
- Implement appropriate business process improvements to efficiently improve clinical and non-clinical outcomes across multiple member touch points
- Emerge as a customer-centric leader in today's Zero Sum Game industry

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An Innovative Approach to Health Plan Segmentation

Deloitte Consulting's Predictive Analytics Framework can offer health plans the opportunity to take a lifecycle view of managing risk

Benchmark Data — EMR — Internal Claims Data — Lifestyle Data — Demographic Data — Census Data

Case Mgmt

Identify

Case Management/ Disease Management

DM/UM

Deloitte's End to End Segmentation

New Member Acquisition | New Product Offerings
Group Underwriting | Target Marketing
Sales Force Effectiveness | Health Education
Member Retention | Disease Management

Identification, Enrollment Retention

Enroll

Health Ed

Retentain

Medical Management, Member Services, Policy and Operations

Deloitte's Predictive Analytics Framework

Approach supplements internal plan data with external consumer data; uses advanced statistical analysis to define members desires and needs; gains insight into profitable members with limited claims experience

Innovative Data Sources

Customized Segmentation Analysis

Business Implementation

Non-traditional external zip code or household level data sources

Traditional internal data sources

- Consumer Data
- EASI Census
- Benchmark Data
- Electronic Medical Records
- Claims Data
- Customer Service Data
- Demographic Data
- Pharmacy Data

Segmentation Analytics

Data Aggregation & Cleansing

↓

Evaluate and Create Variables

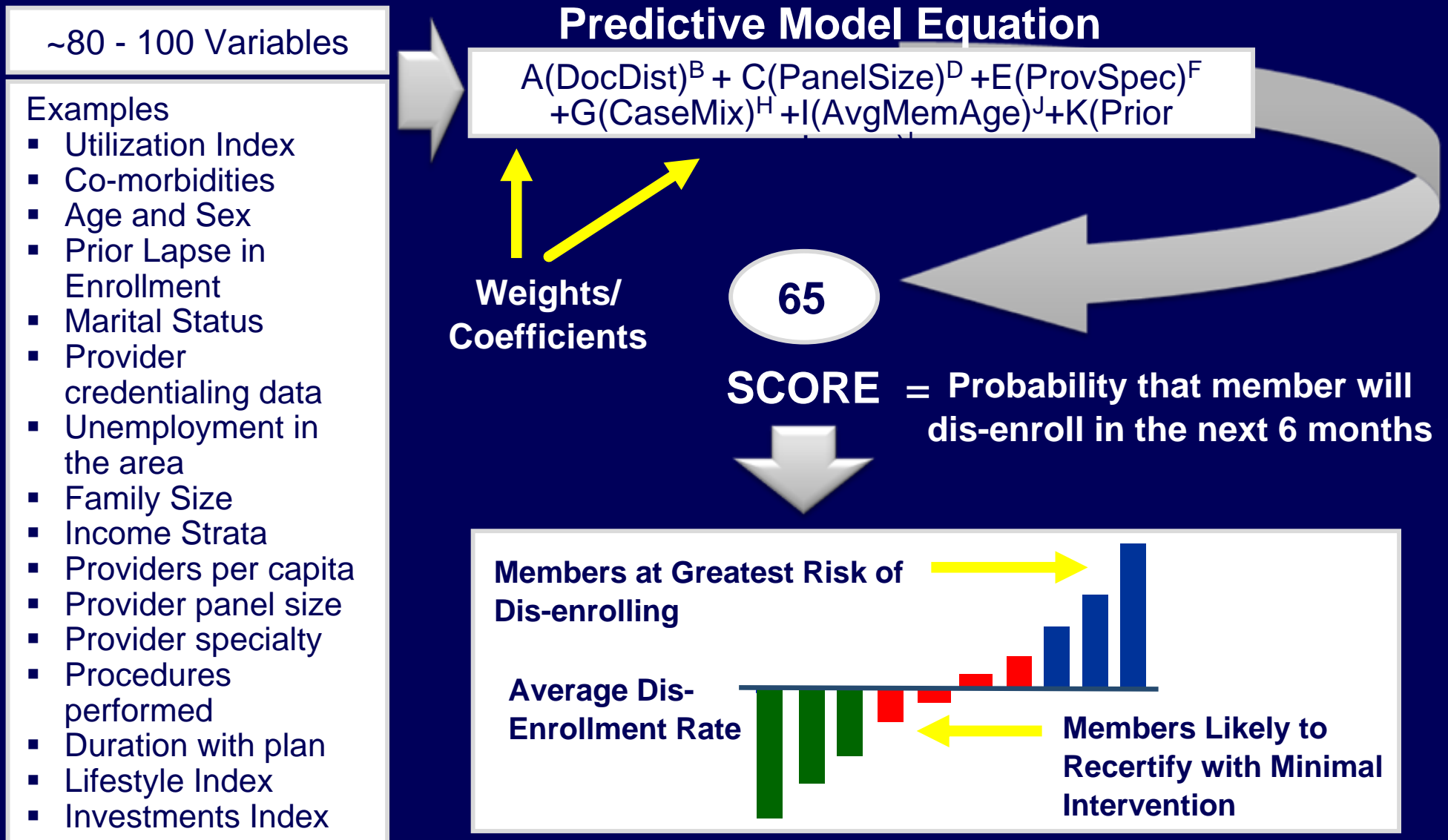↓

Develop Segmentation Model

↓

Develop Segmentation Profiles

Resulting Programs:

- Targeted Outreach
- Incentives / Rewards Programs
- Product Design / Rationalization
- DM Program Compliance Programs
- Personalized Customer Service
- Sales Channel Alignment
- Improved Disease and Case Management

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Deloitte's Predictive Analytics Framework

Model produces a score of 1 – 100 indicating the likelihood that a health plan member will dis-enroll in the next 12 months

~80 - 100 Variables

Examples
- Utilization Index
- Co-morbidities
- Age and Sex
- Prior Lapse in Enrollment
- Marital Status
- Provider credentialing data
- Unemployment in the area
- Family Size
- Income Strata
- Providers per capita
- Provider panel size
- Provider specialty
- Procedures performed
- Duration with plan
- Lifestyle Index
- Investments Index

Predictive Model Equation

$$A(DocDist)^B + C(PanelSize)^D + E(ProvSpec)^F + G(CaseMix)^H + I(AvgMemAge)^J + K(Prior$$

Weights/ Coefficients

65

SCORE = **Probability that member will dis-enroll in the next 6 months**

Members at Greatest Risk of Dis-enrolling

Average Dis-Enrollment Rate

Members Likely to Recertify with Minimal Intervention

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It's All About Data

Innovative data sources, unique variables derived from traditional data sources are key to developing robust analytic solutions that help health plans segment their population across the full spectrum of risk

Traditional Claims Data Sources
- Concentration of cardiologists within a five mile radius
- Distance from the member's home to their primary care physician
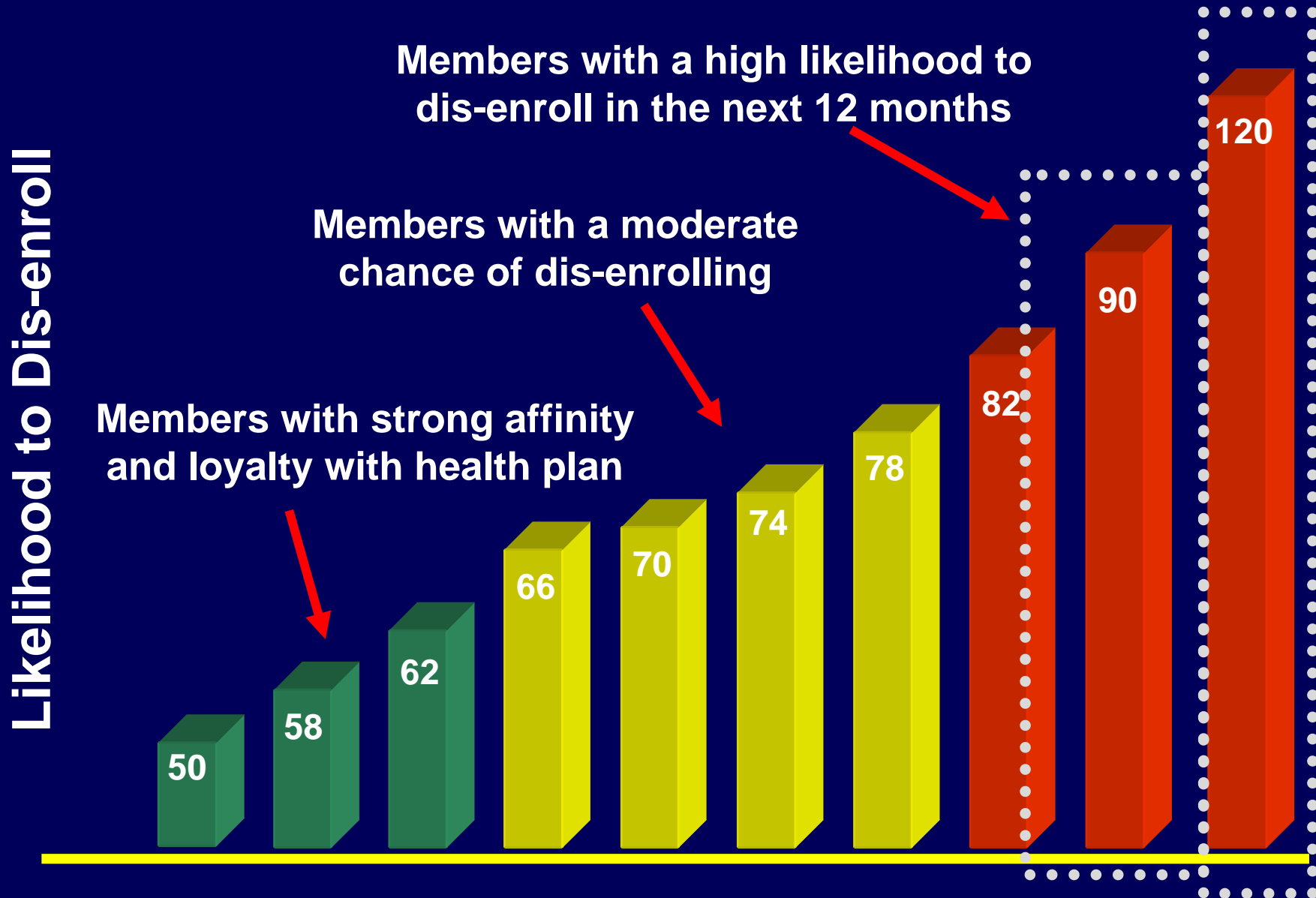- Average days lapse between filled scripts

Lifestyle Data
- Exercise equipment purchase within the past twelve months
- Active gym membership
- Body Mass Index and Family Disease History (EMR derived data)

Demographic Data
- Household Size and Income
- Graduate School Degree
- Number of Cars in Household
- Third Party Demographic Group Assignment (Claritas, Equifax)

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Turning Analytical Insight into Action

A model to measure a member's likelihood to dis-enroll

Likelihood to Dis-enroll

Members with a high likelihood to dis-enroll in the next 12 months

Members with a moderate chance of dis-enrolling

Members with strong affinity and loyalty with health plan

50 58 62 66 70 74 78 82 90 120

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Business Applications

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Business Applications

Why segment your customers?

Segmentation applications across the health plan

Three applications

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Business Applications

A well-developed segmentation model forms the starting point for a variety of improvement opportunities across the health plan

To understand **how to reach** the consumer

To understand **what products & services** the consumer is looking for

Why Segment Consumers?

To understand the consumer's **support needs**

To understand the **value** of the consumer

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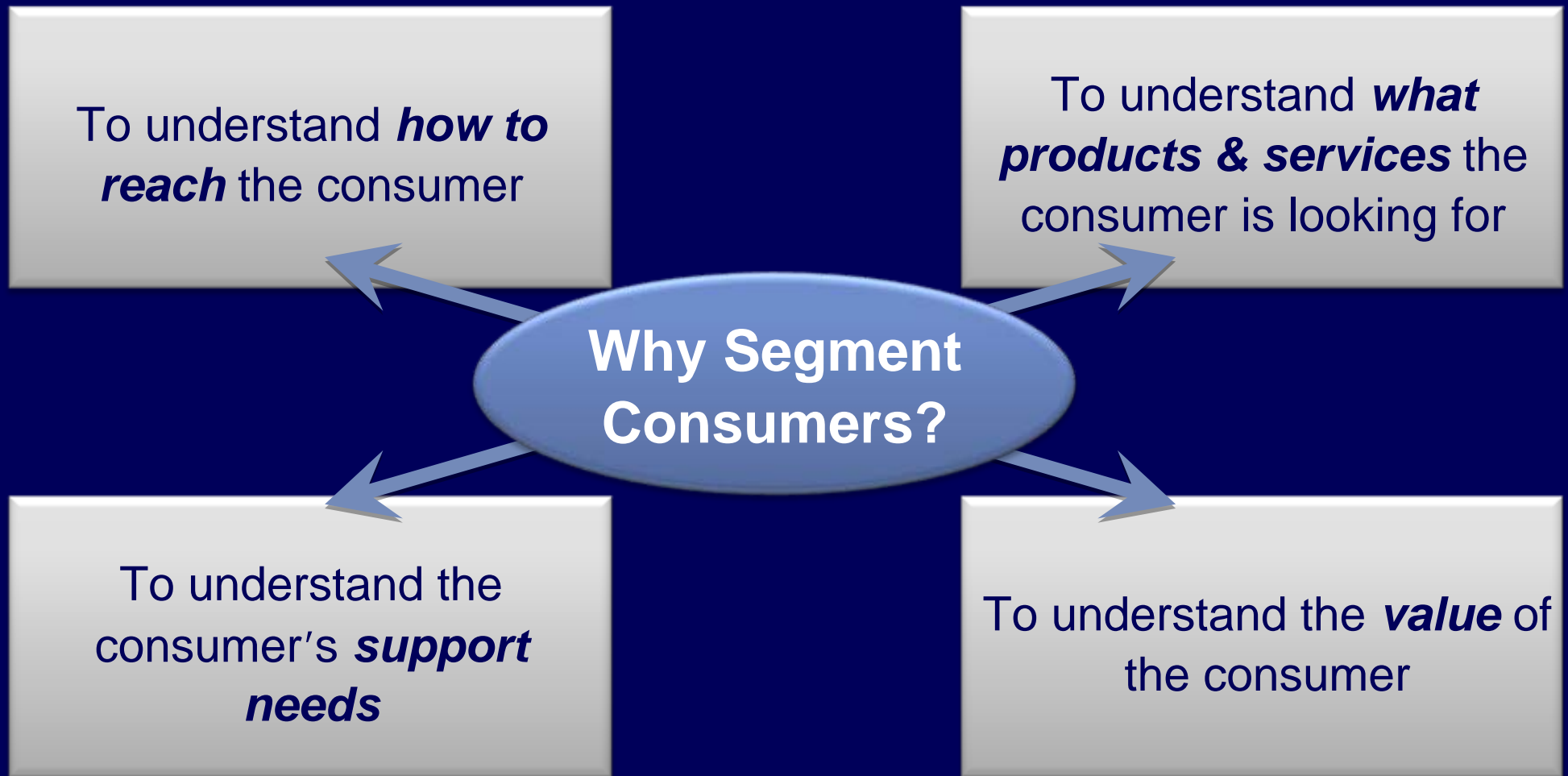
Business Applications

Improved customer understanding can be applied across the health plan organization to improve products and services

Functional Area	Applications
Sales & Marketing	▪ Align sales channels to reach target customers ▪ Develop more targeted marketing campaigns ▪ Design incentive programs to attract and retain profitable members
Products & Pricing	▪ Custom design products to meet specific segment needs - Products reflect clear value proposition to a unique customer segment ▪ Inform product pricing
Customer Service	▪ Direct customers to preferred service channels ▪ Anticipate customer needs to prevent costly, frustrating interactions ▪ Develop "Personalized" web / self-service tool design
Medical Management	▪ Identify "readiness/propensity to change" ▪ Improve engagement and compliance by aligning incentives / rewards
Provider Relations	▪ Improve provider relationship with providers by sharing consumer insight ▪ Improve quality of outcomes

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Business Applications

Three examples of how improves predictive analytics and segmentation can improve health plan performance:

- Loyalty and Rewards Program Design

- Improved Medical Management

- Improved Lead Generation

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Business Applications: Member Rewards Programs

Segmentation is critical to maximize effectiveness of member rewards and loyalty programs

Example Segmentation Results
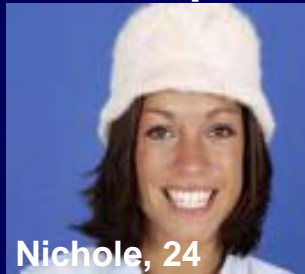
"Recent Graduate"

Health Status: Health, Active Lifestyle, Low Risk

Characteristics: Highly educated, environmentally conscious

Nichole, 24

"Kids & Cul-de-Sacs"

Health Status: Varies, but overall Health Conscious

Characteristics: Child-centered products and services

The Johnsons

"Mover & Shakers"

Health Status: High Cholesterol, High Stress, Insomnia

Characteristics: Business bent, has a home office, travels extensively

David, 38
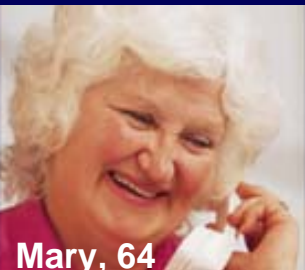
"Golden Years"

Health Status: Overweight, diabetic, low physical activity

Characteristics: Community ties / involvement, Values family, Pursues hobbies

Mary, 64

Loyalty Track

Show low cost members the value of the health plan to increase loyalty

Health Response Track

Engage high cost / high risk members in prevention and condition management activities

Example Member Loyalty Actions

Targeted Marketing

Fitness Club Memberships and Discounts

Child Health Education Programs

Outdoors Clubs

Targeted Marketing

Lifestyle Management Programs

Personal Health Records

Disease Management Programs

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Business Applications: Right Medical Management

An end to end approach to segmentation can help address many of the challenges of medical management program participation

Evaluate Challenges

- Few programs evaluate specific costs for those who declined
- Few programs track why members did not engage

Identify Challenges

- Data is sometimes 9–12 months old
- Identify more members than DM can manage
- Reliant on claims data only
- Few referrals from other departments

Intervene Challenges

- Nurse has little insight into member lifestyle or values to use in engaging member in a discussion of benefits

Enroll Challenges

- Members difficult to contact live
- Member lacks interest in program
- Little customer insight to plan assessment call

Optimal Lifecycle of Care

Evaluate — Identify — Enroll — Intervene

Health Plan · Hospitals · Employers · Physicians

Member

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Business Applications: Right Lead Generation

More sophisticated use of segmentation and predictive modeling can be used to improve lead generation resulting in higher close rates

Our Approach

- Build a predictive modeling application based on external business, census and commercial credit data
- Use application to
  - Qualify leads upstream
  - Prioritize leads
  - Develop different value propositions for different groups

Business Value

- Improved sales force effectiveness
- Reduced sales cycle for "high close" probability groups
- Improved market position and communication of value proposition
- Reduce marketing and sales spend

Steps to Realize Opportunity

- Analyze historical lead and sales data
- Build predictive modeling application using external data sources and apply to historical sales data to identify characteristics that signal a greater likelihood of sale
- Integrate predictive model within sales/CRM systems to score leads and prioritize sales efforts based on predictive model scores

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Benefits to Health Plans

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Segmentation Can Unlock Significant Business Value

Customer segmentation can decrease costs while developing more innovative products

Improved Acquisition, Engagement and Retention

- Sophisticated targeting and campaigning
- Increased engagement in and compliance with medical management programs
- Improved retention of profitable members

Shift the medical cost curve

More Efficient Allocation of Resources

- Acquisition, retention and outreach effectiveness
- Clinical intervention and health education effectiveness
- Customer service personalization and tiering

Lower administrative expenses

Opportunities for Innovation

- New product development and launch
- Provider collaboration to improve outcomes
- Community partnerships to improve public health

Develop consumer-focused innovations

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Questions & Answers

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About Us

Mo Masud, Hartford, CT

A Senior Manager in Deloitte's Advanced Quantitative Services Practice, with over 13 years of health insurance, technology and predictive modeling experience. Areas of expertise include: healthcare predictive modeling for private and public sector insurance, healthcare regulatory reporting, clinical expert systems and technical implementation and integration of predictive modeling applications. Mo has led numerous engagements of implementation of large scale predictive modeling and custom technical applications for public and private integrated healthcare delivery networks and insurers that helped improve quality and continuity of care. Prior to his tenure in the consulting field, he held several data analysis positions with Empire Blue Cross Blue Shield in New York City including the management of Empire's corporate wide Health Data Analysis and Reporting Group.

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Susan Novak, Philadelphia, PA

A Senior Manager in Deloitte's Strategy and Operations Practice with over 8 years of Health Plan consulting experience specializing in corporate strategy, customer market strategy and sales and marketing effectiveness. Clients include national health plans as well as multi-state and regional Blues plans. Her accomplishments include guiding executive teams in developing long term strategic plans, crafting distribution channel strategies, long term sales and marketing strategies and working with sales teams to identify commission management tactics. In addition to her strategy work, Susan is skilled in leading teams through the design and implementation of new core operations departments, build and launch of integrated health plan systems, and root cause analyses to increase efficiency. Susan is the author of or a key contributor to several industry whitepapers on the growth in the retail marketplace, the uninsured crisis, consumer segmentation and member incentives programs.

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