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# Employer Adoption & Promotion of Predictive Modeling

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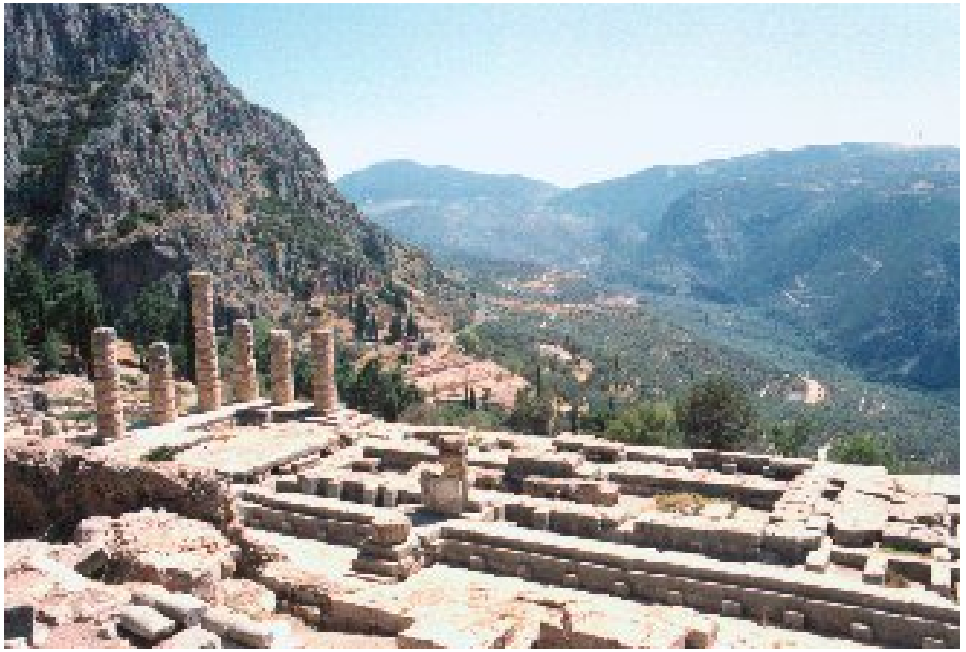
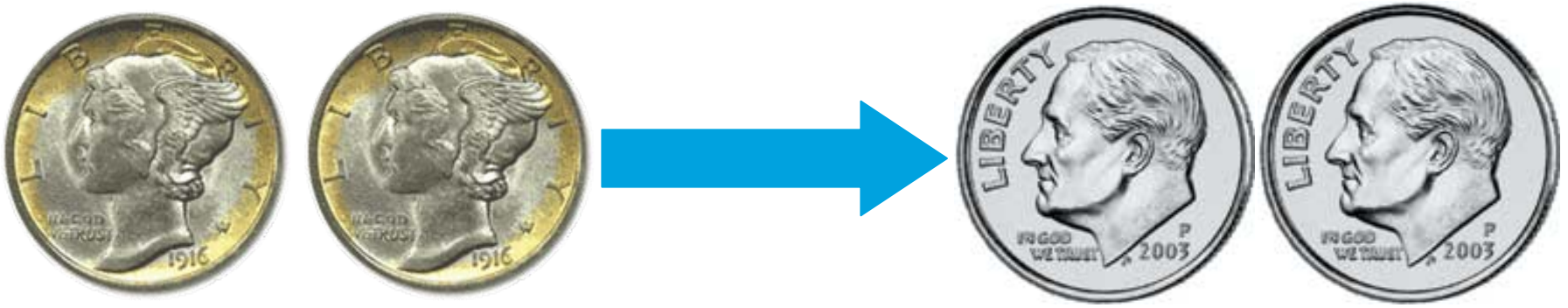
# Predictive Models: Are We Getting Better?



- Employers have been trying to predict the future based on current knowledge for thousands of years.
- Increased desire to identify healthy population who may be at risk
- Need to understand data to make changes in future benefit designs and offerings
- Use of predictive models to understand effectiveness of vendors

# Agenda

- What employers are currently facing
- How employers perceive predictive models
- Uses of predictive models to change marketplace



# Current State

## The Headlines

- ***Costs are still rising,*** even with managed care and cost shifting
- The ***workforce is aging,*** adding 2.5% -3.0% higher medical costs and higher disability incidence for each year over 40 years of age
- ***Business competition is getting tougher*** with increased pressures to control cost and enhance productivity
- ***Piecemeal solutions generally just shift costs*** and promote narrow expense control

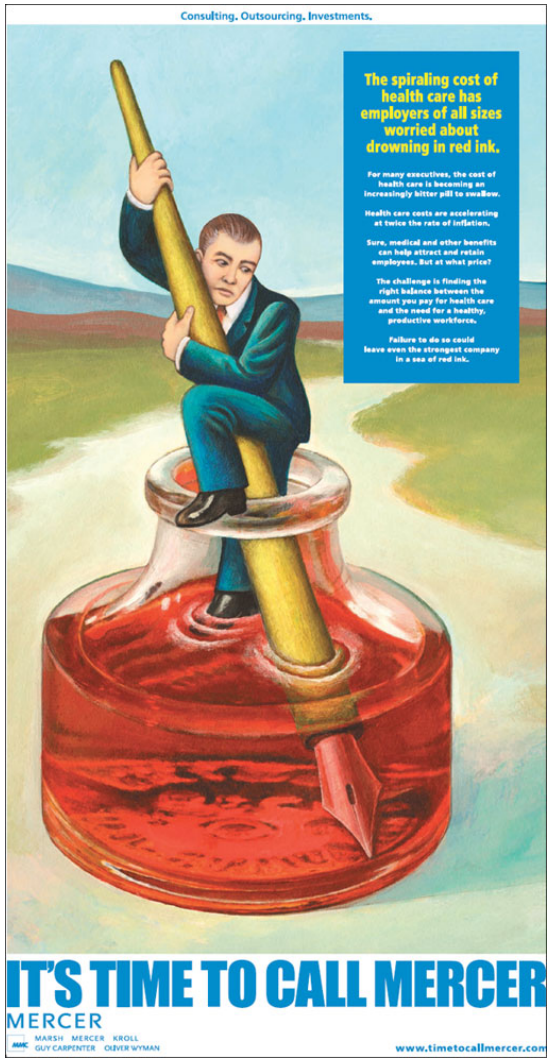
## The Drivers

- People with ***chronic diseases*** often drive 50% of costs – 70 million people have a chronic disease
- ***20% of the members incur 80%*** of the healthcare costs
- Those with ***lifestyle risk factors*** can cost 10% to 70% more than those not at risk

To make matters worse…..

- ***1 of 2 people*** with a chronic disease ***don't comply*** with their treatment plan resulting in:
  - Disease progression and increased use of healthcare resources
  - Costs between $100 billion and $150 billion annually in the U.S.

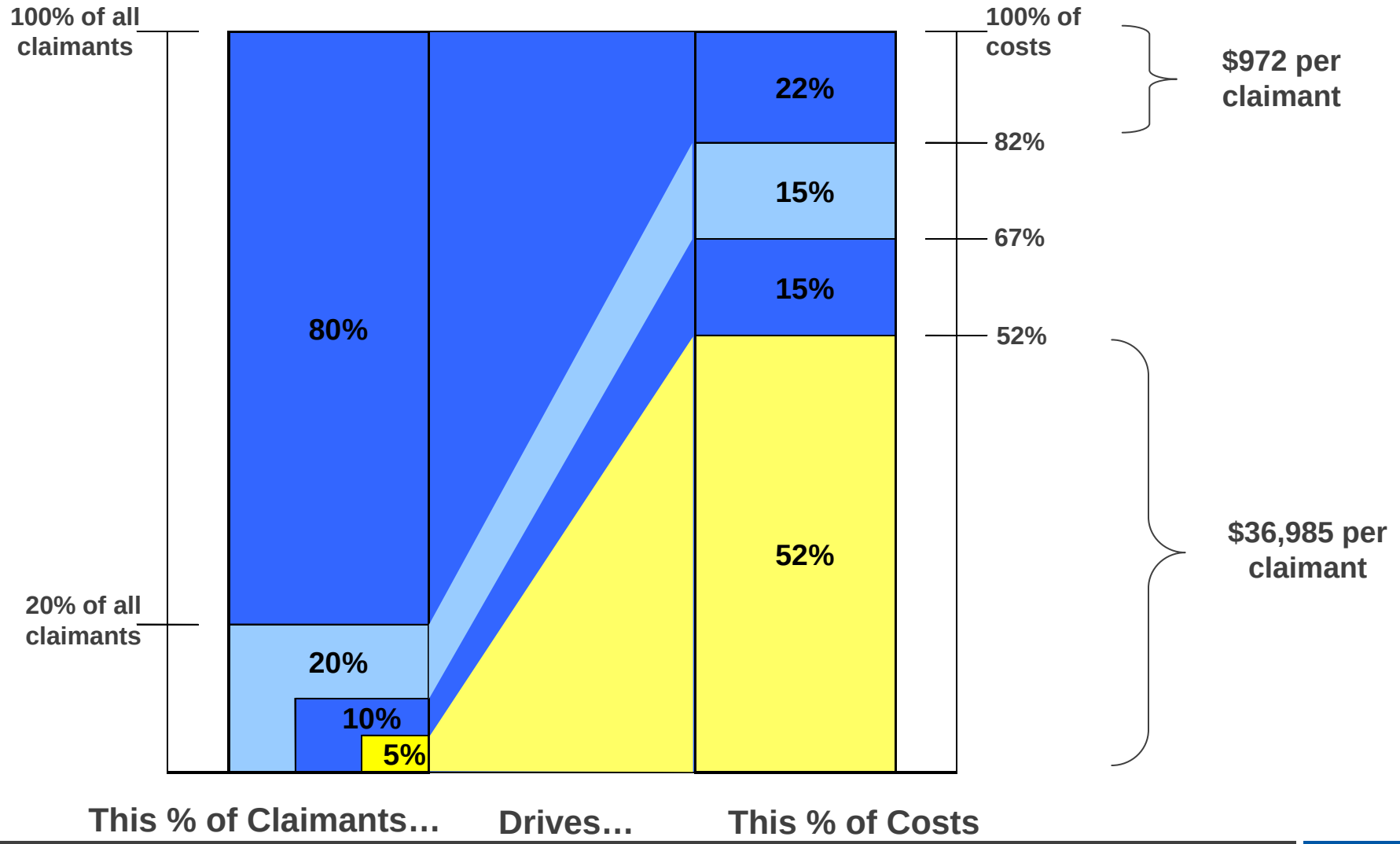
# What Employers Expect from a Healthcare Predictive Model




- The ability to understand the current workforce and trends in order to make business decisions on future healthcare costs
- Desire to provide the right information and programs to the employees to keep them motivated, productive, and healthy

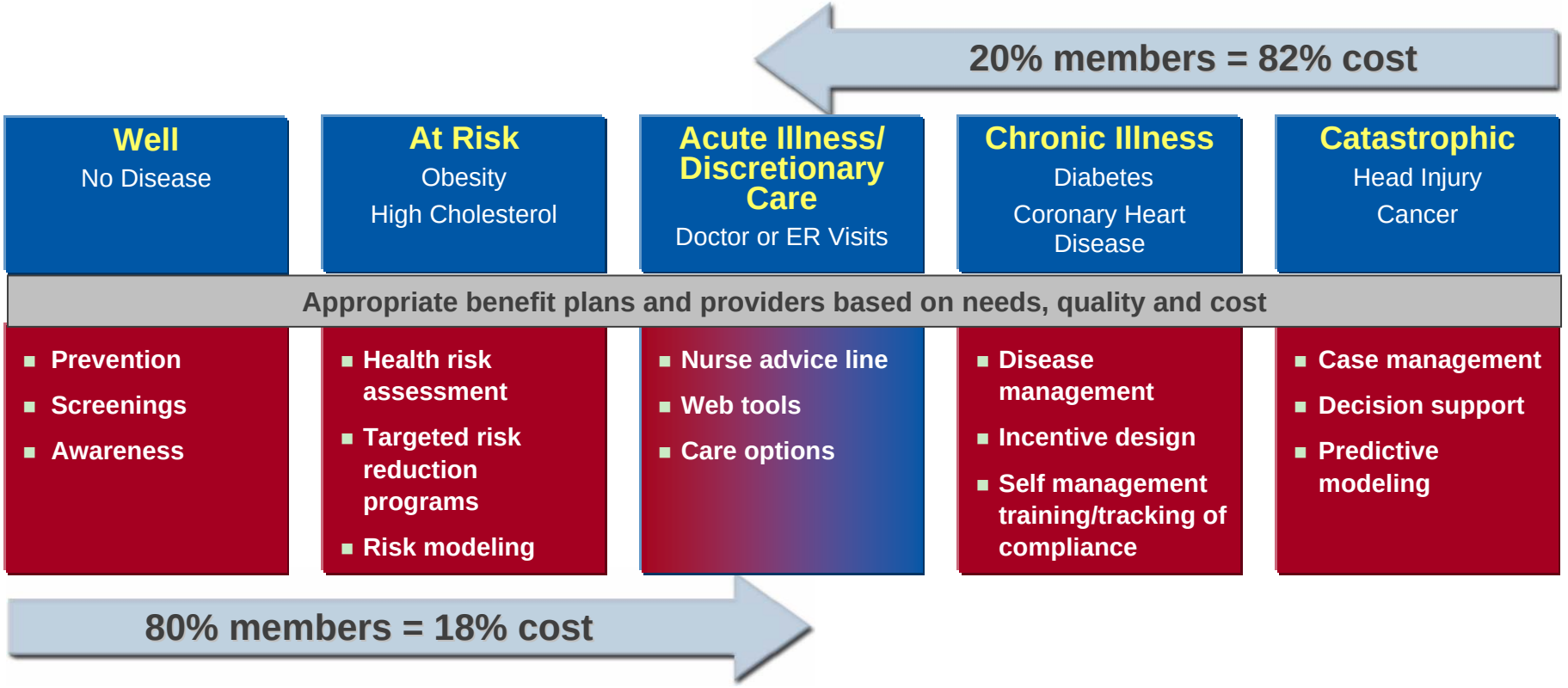
# Employers Are Interested in Using Their Data

- 20% of your claimants drives 82% of total costs



# Employees are Heterogeneous Population

- Target programs to address needs of each segment of the population
  - Member engagement and behavior change will drive ROI
- Goal: Move population “down” the health care continuum

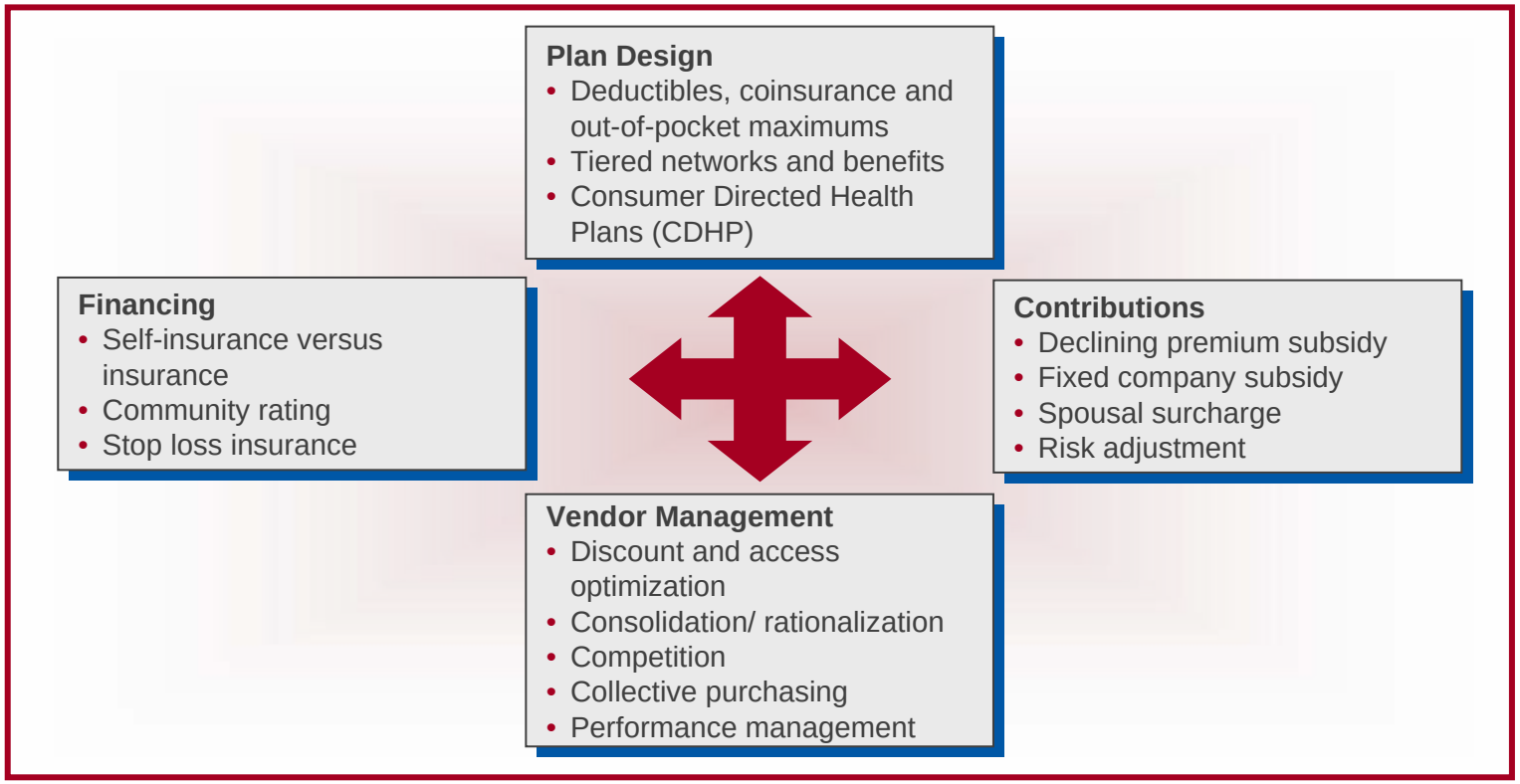


# Employer Expectations from Predictive Models

- Recognition that companies are unique
- Willingness to use benchmark and normative data for comparison
- Need to stratify employees into different cohorts based on risk
- Create programs based on their data to improve work environment
- Desire to use appropriate tools
- Understanding that traditional models need to change

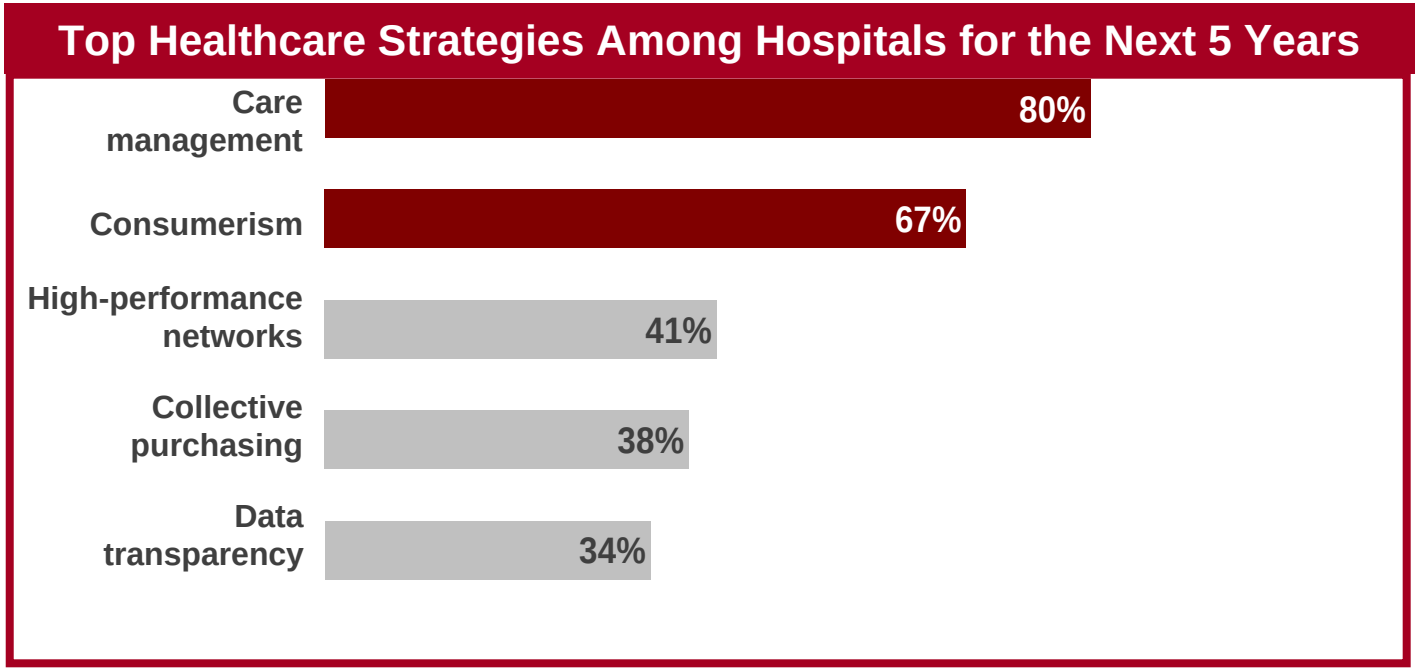
# Looking Back
## *Traditional Initiatives*

- Since the early 1990's employers have aggressively implemented traditional initiatives to manage their employee healthcare programs



# New Opportunities

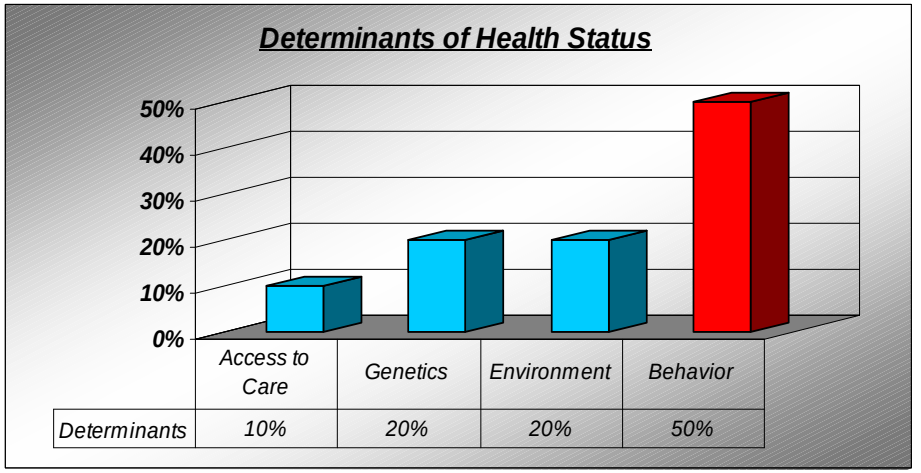
- Although employers will continue their use of traditional initiatives, many are considering alternative strategies
- Areas of most interest focus on member engagement and population health risk management

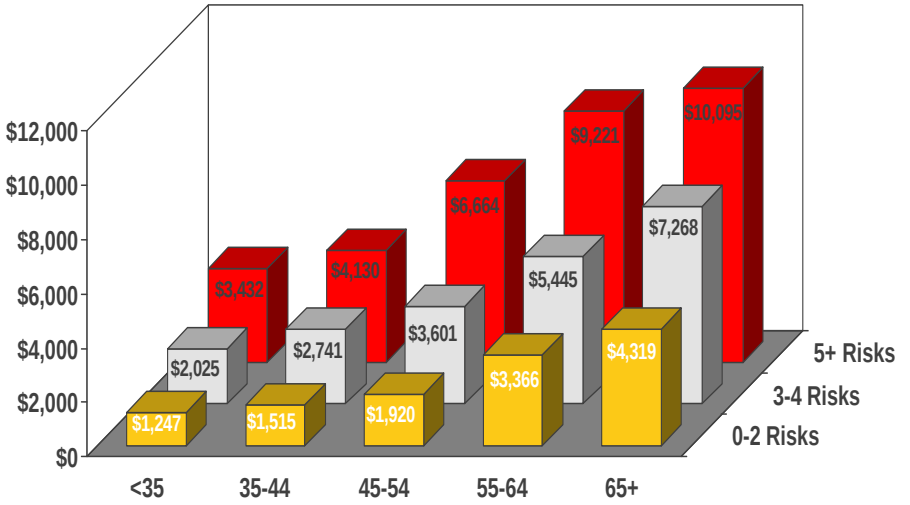



Source: Mercer National Survey of Employer-Sponsored Health Plans, 2006

# Managing Health Risks to Mitigate Onset of Future Illnesses

- Health behavior accounts for 50% of medical costs[1]
- Across all ages, higher risk individuals generate higher healthcare costs[2]
- For this population, a 10% reduction in risk would result in 2% lower costs[3]




[1] IFTF, Center for Disease Control and Prevention
[2] Staywell data analyzed by University of Michigan (N=43,687); 1997-1999 annual paid amounts
[3] Assumes 70% population have 0-2 risks, 20% 3-4 risks and 10% 5+ risks; also, assumes distribution across age ranges from <35 through 65+ of 24%, 27%, 26%, 17% and 7%, respectively

# Total Health Management
## *Key Principles*

***"It is not about health benefits, but rather it is about creating and maintaining a healthy and productive workforce."***

- Focus on total **population health management** and address the entire healthcare continuum
- Emphasize long-term **behavior change** and **risk modification**
  - Use **health risk questionnaires** (HRQs) with **lifestyle coaching** as the starting point for risk modification programs
- Support health **plan designs**, strong **communication** and **incentives**
- Create **data-driven programs** tailored to individual risk, health status and learning style
- **Measure and evaluate** both health and productivity measures to document program impact and return on investment (**ROI**)

# Predictive Modeling Tools to Help Employers

I. Health Risk Questionnaires

II. Changes in Benefit Design

III. Evaluating Disease Management Companies

IV. Biometric Screenings & Monitoring

V. Educating Employees

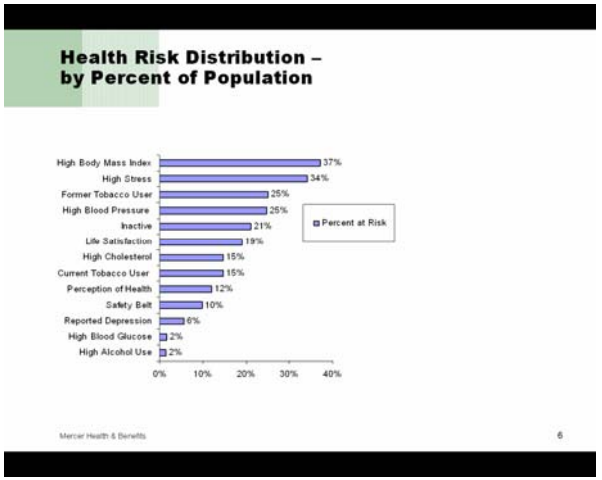
VI. High Performance Networks

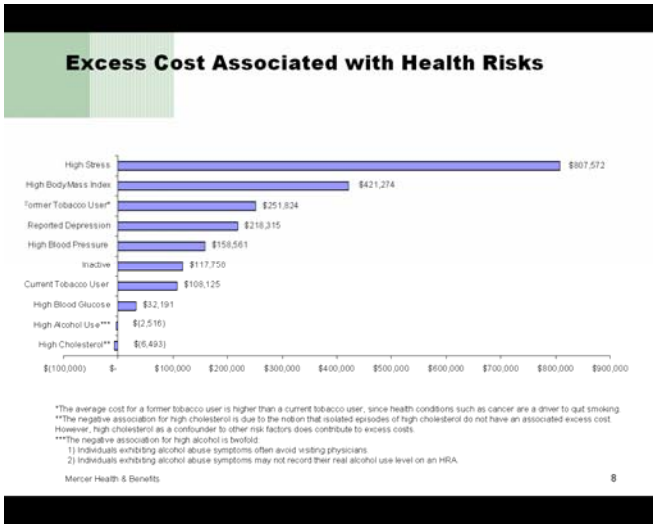
VII. Combinations

# I. Health Risk Questionnaires: Predictive Models Before the Claims

# Early Identification of At Risk Employees

- Health risk questionnaire (HRQ) is the gateway to determining health risk status of a covered population



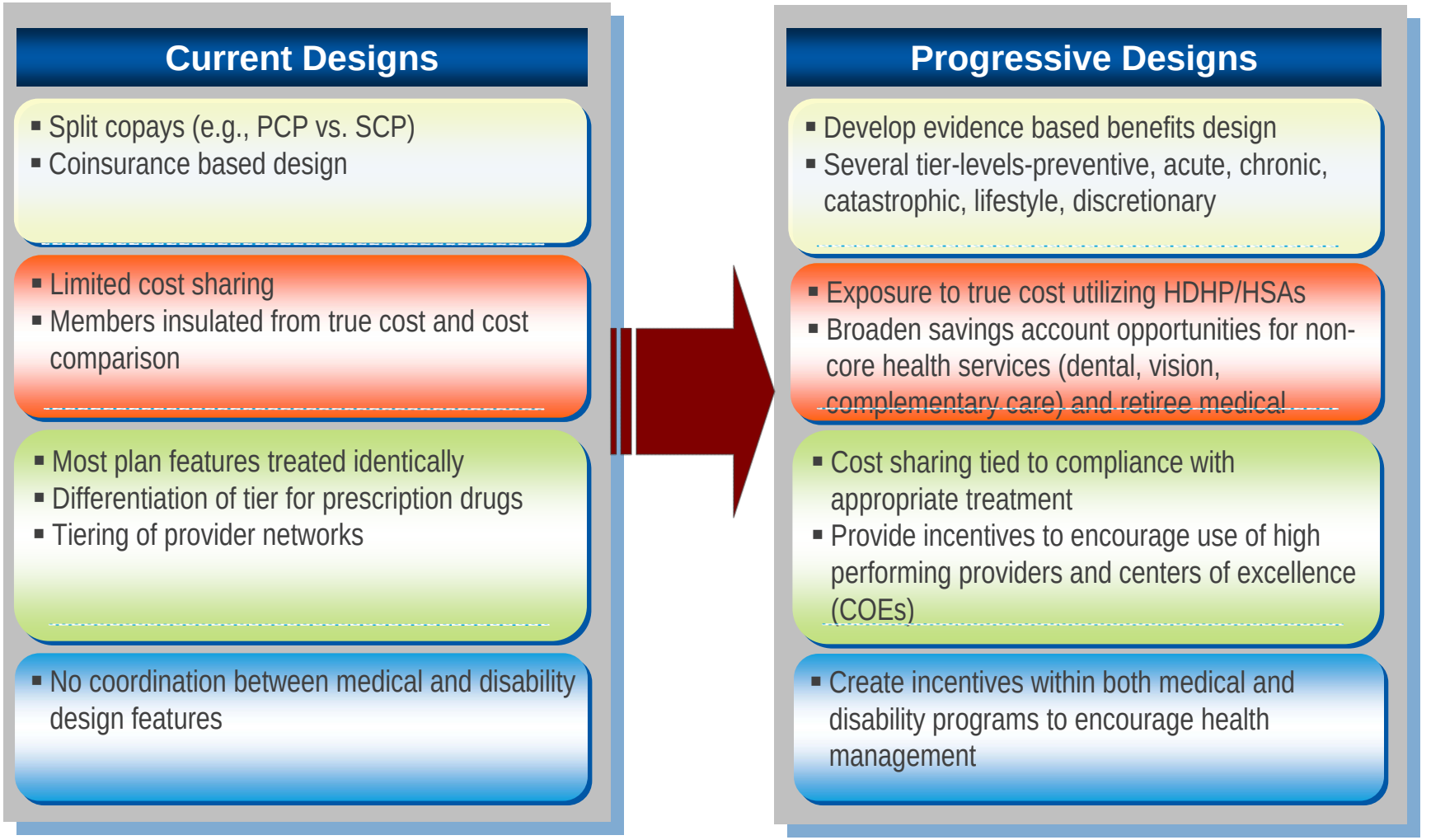




- Health coaching for the 20% - 30% of the population with high risks is a critical component to modifying risk
- HRQ sheds light on potential issues before claims

Source: Mercer Predictive Risk Analysis diagnostic results; determined in conjunction with University of Michigan database and Health Enhancement Research Organization (HERO)

# II. Plan Design Changes: Using Predictive Models to Modify Benefits

# Plan Designs Continue to Evolve



# Employers are Using Data to Create Changes in Plan Design

- Benefits should be supported by scientific evidence
  - Most benefit designs are not based in supportive “science”
- Benefits need to be aligned with health management strategy
  - Realigning benefits to drive behavior change reduces immediate and long-term trend
- Utilizes evidence-based medical findings and standards to design benefits

  - Examples: preventive services coverage; medication/medical supply coverage for certain chronic conditions; DxRx pairing

***Evidence-based design concepts are consistent with a strategic focus on maintaining a healthy workforce and engaging employees in behavior change***

# Combining Predictive Models with Evidence Based Plan Design

- Employers are using their data to understand risk of employees and dependents
  - Disease Management
  - High Cost Claimants
- Employers are beginning to adopt new benefit models based on clinical evidence
  - Simple across the board changes
  - Complex models requiring integration with multiple sources

# Evidence-Based Design a New Offering Based on Predictive Models

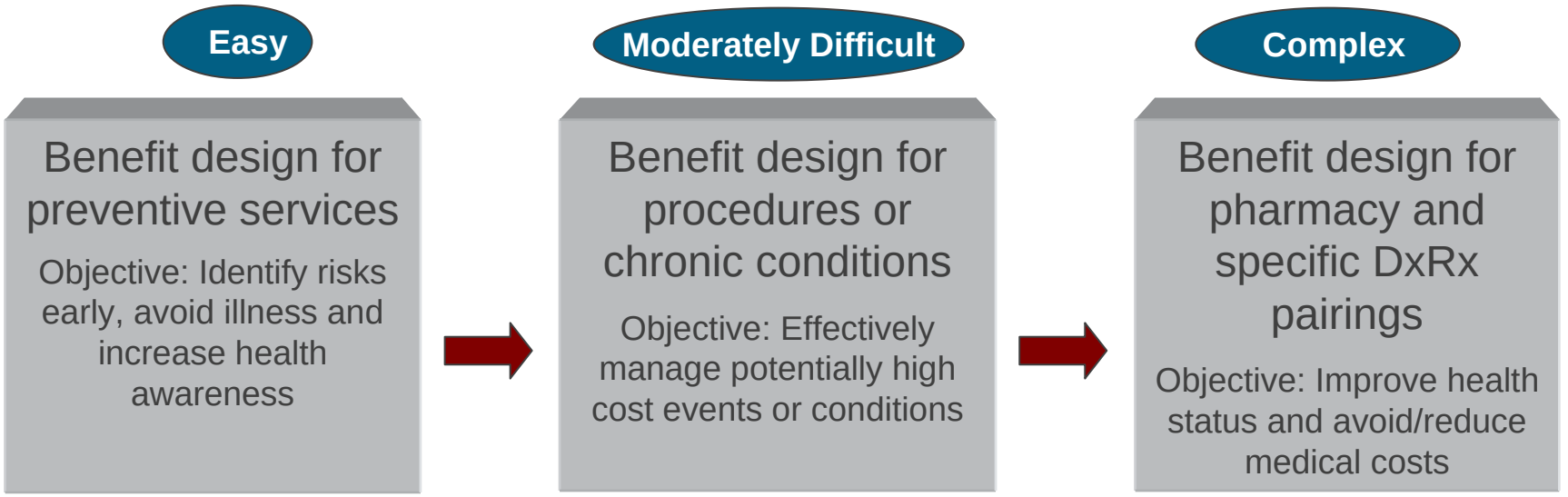
- Mercer's EBD recommendations fall into three value categories
  - Highest EBD Value
    - Lower net direct medical spend (net of added benefit costs), and
    - Either improve or not affect clinical outcome

      *Example: Diabetes and ACEI/ARB medication*
  - Intermediate EBD Value
    - Improve clinical outcome, and
    - Not increase net direct medical spend

      *Example: Immunizations and preventive screenings*
  - Lower EBD Value
    - Improve clinical outcome
    - Increase net direct medical spend, but
    - Increase will be offset by reduction in indirect spending

      *Example: Procedure – Bariatric surgery*

# Implementation of EBD




***The over-riding goal of EBD is to eliminate barriers to service, increase compliance with evidence-based medicine, improve health status and reduce net health-related costs (both direct medical and indirect costs)***

# Why Employers are Using Pharmacy Benefits and Predictive Models

- While this is the most complicated to administer, it can lead to the best outcomes
  - Higher risk population takes prescribed medications
    - Improved quality of care
    - Less absenteeism
    - Greater productivity
- Employers will see an increase in pharmacy spend and need to be aware of this cost

# High Costs of Medications Lead to Low Rx Compliance

- Recent studies show high drug prices have caused patients to cut back on their medications, which can be very costly for patients and employers in the long run.
- Only 50% of patients typically take their medicines as prescribed.
- Poor prescription adherence costs $1.77 billion annually in direct and indirect health care costs.
- 31% had not filled a prescription they were given.
- 24% had taken less than the recommended dosage.
- In addition, in the past year:
  - 20% of adults had not filled at least one prescription.
  - 16% of adults said they had taken a medicine less frequently than prescribed.
  - 14% of adults admitted taking a smaller dose than prescribed.
  - Among those with health insurance, 10% of individuals under age 65 and 33% of those over age 65 do not have prescription drug coverage.

Source: National Council on Patient Information and Education, 2007.

# How Employers are Reacting

- By decreasing barriers to obtaining medications through plan design changes, employers are beginning to change the health care market
- By using predictive models, employers are adopting programs that will offer greatest benefit to both employee and employer
- By recognizing that certain medications are beneficial for some diseases, co-pay structure is being lowered for those individuals only

# Case Study: Employer Creates a New Pharmacy Model

- Looked at data regarding employees illness and predicted costs
- Waived copays on generics and halved copays on brands treating diabetes, asthma and heart disease
- Result: First-year savings from reduced non-pharmacy medical cost were equal to cost of copay reduction

# Case Study: University Eliminates Copays Based on Employee Demographics

- Initiate new program with holistic approach to diabetes care
- Modeling showed that nearly half of certain diabetic populations do not follow pharmacy treatment regimen
- Recognition of data suggesting diabetics at risk to become more severe if non compliant
- Pilot program eliminated copay for any medication treating diabetes, including ACE inhibitors, antidepressants and blood-sugar control drugs
- Program also includes educational material and focused outreach to improve their health
- Ongoing measurement of results of healthcare risk, costs, absenteeism

# III: Using Predictive Models to Assess Disease Management Program

# Evaluating Vendor Efficacy

- Employers are paying high costs for DM services and want to know if the vendors are finding and engaging the right employees
- List of all employees in DM programs provided
- Comparison made based on:
  - A member is grouped into one or multiple condition buckets depending upon their Episode Treatment Group (ETG) assignments
  - The member's severity is based upon their ETG assignment for that specific condition
  - Episode Risk Group (ERG) scores applied at member level
- Matching done to see if DM vendor identified same individual that predictive model did

# Methodology to Identify Members

- We received vendor data, with a unique identifier and diagnosis/program for each member that was identified to be part of a vendor program
- Mercer used ETG software to assign each member to condition categories
- We targeted 22 conditions (a combination of the conditions that are being managed by the vendors)

# Methodology to Match Claims

- Broad Technique-
  - SSN,
  - DOB
  - Gender alone
- Narrow Technique
  - Broad Technique
  - Plus a match on the identified condition

# Using Predictive Models for Disease Management Assessment

| | | All | | More Severe | | Less Severe | |
|---|---|---|---|---|---|---|---|
| Company | Combined Vendor | Members | Avg Risk | Members | Avg Risk | Members | Avg Risk |
| A | 1763 | 7840 | 1.34 | 1237 | 2.02 | 6603 | 1.20 |
| B | 3551 | 13364 | 1.22 | 1779 | 2.06 | 11585 | 1.09 |
| C | 23195 | 33640 | 1.52 | 4611 | 2.73 | 29029 | 1.32 |
| D | 53 | 1908 | 1.67 | 289 | 3.24 | 1619 | 1.37 |
| E | 6285 | 28865 | 1.33 | 3952 | 2.33 | 24913 | 1.15 |
| F | 9452 | 18323 | 1.53 | 2357 | 2.82 | 15966 | 1.33 |
| G | 22280 | 54255 | 1.75 | 8161 | 3.14 | 46094 | 1.49 |
| H | 11861 | 26375 | 1.67 | 4013 | 2.95 | 22362 | 1.43 |
| I | 5835 | 2318 | 1.34 | 204 | 3.19 | 2114 | 1.16 |
| J | 1650 | 2563 | 1.58 | 344 | 2.31 | 2219 | 1.46 |
| K | 9165 | 17750 | 1.58 | 2538 | 2.60 | 15212 | 1.41 |
| L | 22 | 2193 | 1.63 | 200 | 2.95 | 1993 | 1.49 |
| M | 9715 | 15366 | 1.54 | 2116 | 2.73 | 13250 | 1.34 |
| **TOTAL** | **104,827** | **224,760** | **1.51** | **31,801** | **2.70** | **192,959** | **1.33** |

# Medical Management Review Identification by Condition

| | HDMS | | | | | |
|---|---|---|---|---|---|---|
| | All | | More Severe | | Less Severe | |
| | Members | Average Risk [1] | Members | Average Risk [1] | Members | Average Risk [1] |
| **Transplant** | 18 | 15.23 | 18 | 15.23 | N/A | N/A |
| **ESRD** | 411 | 13.00 | 411 | 13.00 | N/A | N/A |
| **Lung Cancer** | 582 | 10.93 | 139 | 11.02 | 443 | 10.89 |
| **Lymphoma/Leukemia** | 1,418 | 5.72 | 1,418 | 5.72 | N/A | N/A |
| **CHF** | 2,216 | 5.46 | 653 | 7.11 | 1,563 | 4.75 |
| **Breast Cancer** | 2,271 | 4.43 | N/A | N/A | 2,271 | 4.43 |
| **Colorectal Cancer** | 1,207 | 4.42 | 391 | 6.60 | 816 | 3.40 |
| **Lupus** | 682 | 4.28 | N/A | N/A | 682 | 4.28 |
| **CAD** | 5,327 | 3.84 | 819 | 3.93 | 4,508 | 3.82 |
| **COPD** | 720 | 3.83 | 152 | 5.28 | 568 | 3.46 |
| **Rheumatoid Arthritis** | 2,260 | 3.44 | N/A | N/A | 2,260 | 3.44 |
| **Prostate Cancer** | 1,091 | 3.32 | N/A | N/A | 1,091 | 3.32 |
| **MS** | 2,203 | 3.11 | 101 | 3.69 | 2,102 | 3.08 |
| **Crohns Disease** | 3,299 | 3.02 | 412 | 3.66 | 2,887 | 2.93 |
| **Cystic Fibrosis** | 5,791 | 2.97 | 5,791 | 2.97 | N/A | N/A |
| **Diabetes** | 23,114 | 2.93 | 9,199 | 3.48 | 13,915 | 2.52 |
| **Sickle Cell** | 12,027 | 2.43 | 2,336 | 3.74 | 9,691 | 2.13 |
| **Hypertension** | 60,689 | 2.11 | 9,813 | 3.61 | 50,876 | 1.81 |
| **OsteoArthritis** | 12,423 | 1.94 | N/A | N/A | 12,423 | 1.94 |
| **Asthma** | 23,932 | 1.47 | 7,172 | 1.70 | 16,760 | 1.36 |
| **Low Back Pain** | 138,424 | 1.42 | N/A | N/A | 138,424 | 1.42 |
| **NICU** | 5,333 | 0.85 | 4,024 | 0.87 | 1,309 | 0.77 |
| **Total Records (Conditions)** | **305,438** | | **42,849** | | **262,589** | |

[1] Average Risk Score only reflected for 174,676 members that have risk scores- 149,034 less severe and 25,642 more severe

# Diabetics Matching to Any Program

- This represents members that were grouped (by ETGs) into one or multiple condition categories AND were found on the combined vendor file as being identified by any program
- Members are being matched by a unique identifier alone
- Comparison done to see what % were being managed by vendor

# Diabetics Identified

| | Total | | More Severe | | Less Severe | |
|---|---|---|---|---|---|---|
| Company | Members | Avg Risk | Members | Avg Risk | Members | Avg Risk |
| **A** | 624 | 2.82 | 212 | 3.62 | 412 | 2.34 |
| **B** | 1028 | 2.68 | 320 | 3.33 | 708 | 2.31 |
| **C** | 2830 | 3.15 | 1244 | 3.70 | 1586 | 2.69 |
| **D** | N/A | N/A | N/A | N/A | N/A | N/A |
| **E** | 2652 | 2.56 | 1008 | 3.05 | 1644 | 2.18 |
| **F** | 1722 | 3.03 | 687 | 3.53 | 1035 | 2.75 |
| **G** | 7195 | 2.96 | 2900 | 3.45 | 4295 | 2.54 |
| **H** | 3662 | 2.81 | 1535 | 3.24 | 2127 | 2.47 |
| **I** | 197 | 2.79 | 36 | 5.21 | 161 | 2.26 |
| **J** | 99 | 3.54 | 36 | 4.14 | 63 | 3.18 |
| **K** | 1335 | 3.24 | 528 | 4.15 | 807 | 2.62 |
| **L** | 216 | 2.72 | 47 | 3.63 | 169 | 2.47 |
| **M** | 1323 | 2.94 | 537 | 3.48 | 786 | 2.53 |
| Total | 22883 | 2.94 | 9090 | 3.71 | 13793 | 2.53 |

# Diabetics Managed–Broad Technique

| | Total | | | More Severe | | | Less Severe | | |
|---|---|---|---|---|---|---|---|---|---|
| Company | Members | Avg Risk | % | Members | Avg Risk | % | Members | Avg Risk | % |
| A | 438 | 2.99 | 70% | 167 | 3.64 | 79% | 271 | 2.56 | 66% |
| B | 723 | 2.84 | 70% | 260 | 3.50 | 81% | 463 | 2.39 | 65% |
| C | 2680 | 3.21 | 95% | 1206 | 3.74 | 97% | 1474 | 2.75 | 93% |
| D | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| E | 1491 | 2.75 | 56% | 677 | 6.16 | 67% | 814 | 2.36 | 50% |
| F | 1485 | 3.19 | 86% | 624 | 3.66 | 91% | 861 | 2.82 | 83% |
| G | 5148 | 3.17 | 72% | 2376 | 3.61 | 82% | 2772 | 2.76 | 65% |
| H | 3114 | 2.84 | 85% | 1367 | 3.24 | 89% | 1747 | 2.51 | 1% |
| I | 188 | 2.78 | 95% | 34 | 5.05 | 94% | 154 | 2.28 | 96% |
| J | 93 | 3.54 | 94% | 34 | 4.10 | 94% | 59 | 3.21 | 94% |
| K | 877 | 3.32 | 66% | 366 | 4.16 | 69% | 511 | 2.71 | 63% |
| L | 1 | 3.26 | 0% | 0 | N/A | N/A | 1 | 3.26 | 100% |
| M | 1238 | 2.96 | 94% | 517 | 3.48 | 96% | 721 | 2.55 | 92% |
| Total | 17476 | 3.07 | 74% | 7628 | 3.55 | 84% | 9848 | 2.64 | 71% |

# Diabetics Managed– Narrow Technique

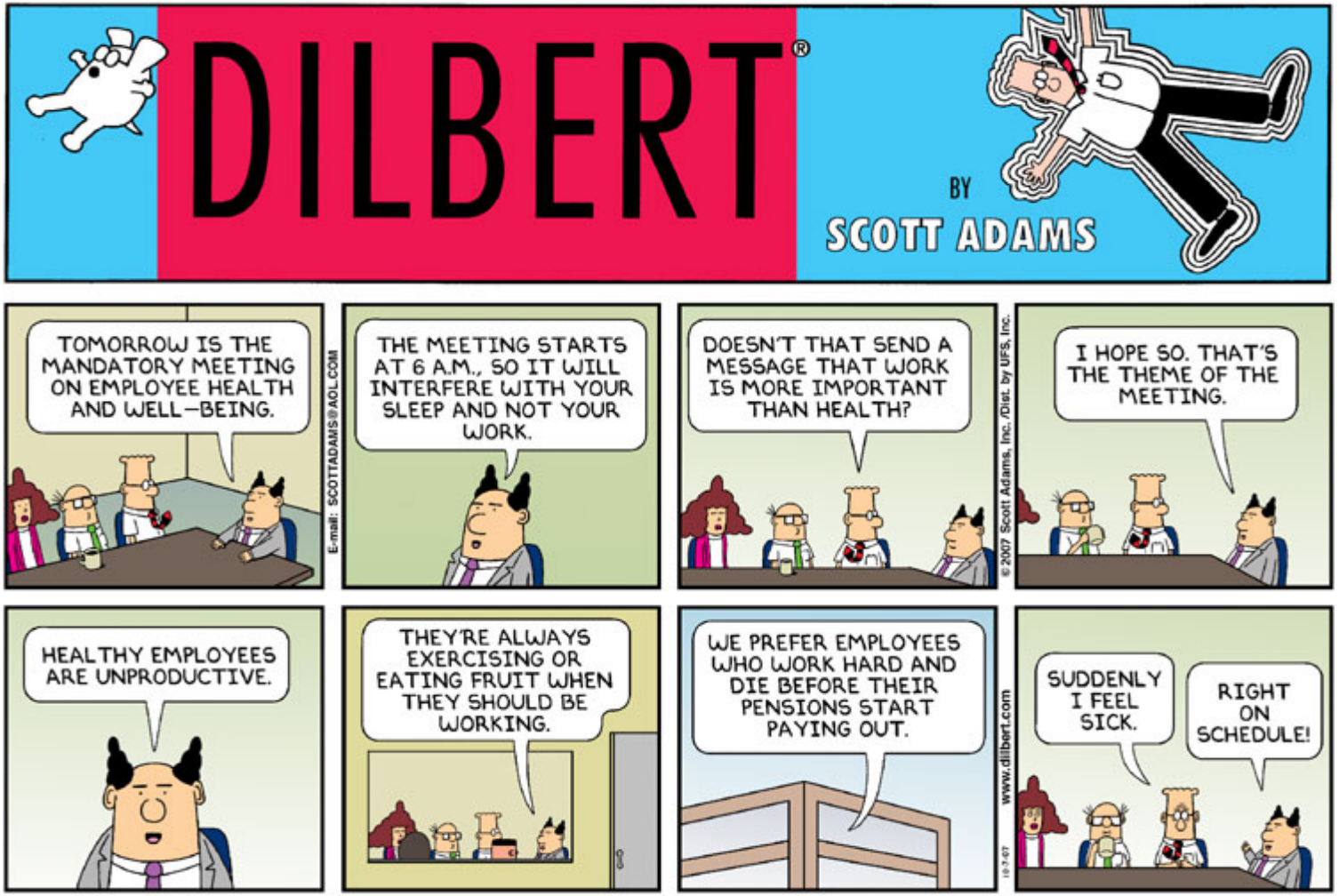
| | Total | | | More Severe | | | Less Severe | | |
|---|---|---|---|---|---|---|---|---|---|
| Company | Members | Avg Risk | % | Members | Avg Risk | % | Members | Avg Risk | % |
| A | 373 | 2.98 | 60% | 122 | 3.92 | 58% | 251 | 2.50 | 61% |
| B | 620 | 2.79 | 60% | 197 | 3.67 | 62% | 423 | 2.32 | 60% |
| C | 2492 | 3.10 | 88% | 1116 | 3.63 | 90% | 1376 | 2.64 | 87% |
| D | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| E | 1263 | 2.74 | 48% | 532 | 3.21 | 53% | 731 | 2.35 | 44% |
| F | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| G | 4413 | 3.14 | 61% | 1936 | 3.66 | 67% | 2477 | 2.70 | 58% |
| H | 2925 | 2.76 | 80% | 1265 | 3.14 | 82% | 1660 | 2.46 | 78% |
| I | 177 | 3.50 | 90% | 30 | 2.92 | 88% | 147 | 2.21 | 91% |
| J | 81 | 3.50 | 82% | 28 | 4.16 | 78% | 53 | 3.15 | 84% |
| K | 722 | 3.25 | 54% | 268 | 4.28 | 51% | 454 | 2.64 | 56% |
| L | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| M | 1161 | 2.86 | 88% | 483 | 3.40 | 90% | 678 | 2.44 | 86% |
| Total | 14227 | 2.98 | 62% | 5977 | 3.53 | 66% | 8250 | 2.55 | 60% |

# Pilot Study Results

- Employees in more severe ETGs or with higher risk scores were more likely to be targeted independently by DM companies
- Employers satisfied that money is being spent wisely
- Longitudinal outcomes studies need to be completed to assess programs on ongoing basis

# Where the Market is Heading

- Most employers are interested in using predictive models to understand employee health care costs and diseases
- Some have begun to implement new benefits based on these models
- More will need to become educated in order to make bold changes
- Market will evolve more quickly as demands on health care system and costs increase
- Employer's use of data and predictive models will continue to increase



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