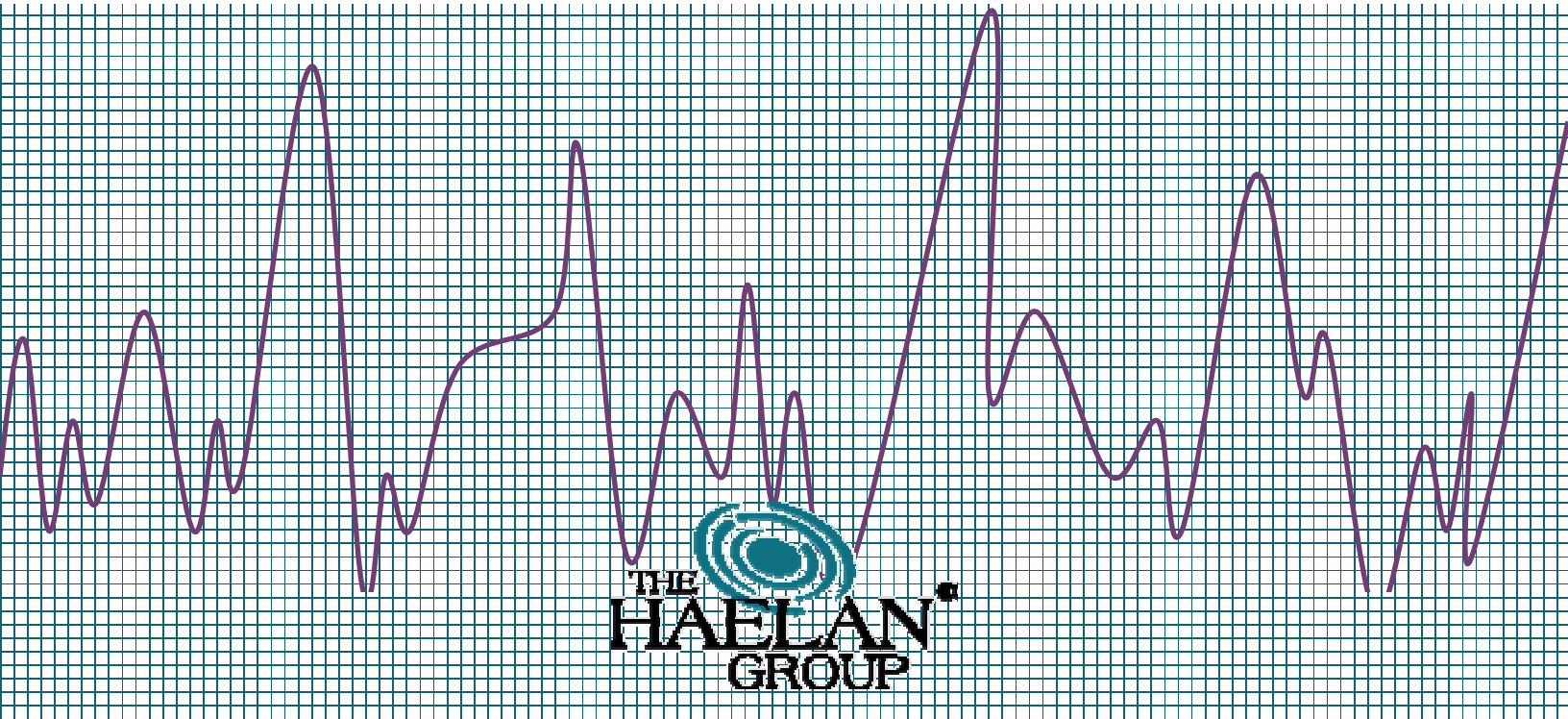
White Paper

Predictive Modeling
And
Finding and Intervening with
The High-Cost Healthcare Consumer



Executive Summary

It's no secret that the healthcare industry is facing a worsening crisis. Healthcare costs are rising at an alarming rate. Premium increases between 10 to 30 percent per year are not uncommon. And while managed care slowed down the crisis for a while, the practice of putting constraints on physicians and limiting consumer choice did not solve the problem and in fact, has worsened the situation.

Admittedly, the industry has tried a variety of approaches to contain costs from health risk assessments and wellness programs to disease management efforts that focus care on member groups that share a similar disease condition.

The inherent problem with each of these attempts is that too much effort is expended on too many people that don't need or want care management. Much like targeted marketing or advertising, one's message and solution will best reach and impact people if they fall into the right demographic profile—otherwise money and effort are wasted.

This same principle must now be applied to the healthcare industry. Healthcare consumers are motivated by a variety of factors— not just disease conditions— to seek healthcare. Understanding what motivates someone to seek care is the first, most critical step towards finding and treating the right people.

That's why predictive modeling is so valuable to the healthcare industry. By using a combination of science and technology, health plans and employers can now find specific people that most need and want intervention. Since we know that a fraction of consumers account for 60-80 percent of healthcare costs, predictive modeling is key in finding that costly percent.

As a result, healthcare delivery can become more targeted and beneficial for health plans, employers, providers and consumers. The result will have a positive economic impact on today's health plans and employers, and the economy as a whole.

Attempts to Contain Costs

For over a decade, health plans and employers have promoted wellness and prevention programs as a way to keep people healthy. Some of the more familiar programs are brown bag lunches on health topics, fitness centers at work, mailings, and now, Web content directed at healthcare consumers.

While wellness has been a successful, "feel-good" type of program, it has done very little to affect real, demonstrated change in containing costs or dramatically improving the rate of successful outcomes.

First, wellness is only effective if and when a consumer decides to attend a wellness program or seek help. Current care management processes are reactive, not proactive. And, by singling people out by disease condition only (diabetic or history of heart disease, for example), many high-risk people are overlooked. In order for care management to be a true prevention effort, health plans and employers need to take the lead and find sick members before an acute crisis occurs.

Trying to find and intervene with high-risk consumers is, of course, not new. Health Risk Assessments (HRAs) have been sent out to consumers for some time as a way to change behavior and determine risk for morbidity/mortality over a lifetime. But, HRAs have proven ineffective at identifying those at high-risk for costly, near-term care use and have very little impact on behavior change for the following reasons:

- The focus is on clinical risk factors and disease conditions
- Risk scores are largely quantifying how much longer someone could live if they stop smoking or lose weight, for example
- Delivers a weak educational component without highly-tailored coaching interventions

Encouraging positive health behavior and educating consumers is not without merit—some people have been helped. Unfortunately, the result is often a lot of wasted time, effort and money on people that don't need or want help, leading to further budgetary crises for those who are footing the healthcare bills.

Many organizations would admit that wellness and HRA type programs are more window-dressing than attempts at bottom-line improvements. More dramatic cost savings has been left to managed care strategies and disease management.

Disease Management—Good Try, But Not Enough

Managed care squeezed administrative waste out of the healthcare system, but the goal of bringing healthcare costs under control has not come to fruition. Quite the contrary, costs continue to rise with no end in sight.

After years of trying to manage utilization through primary care physicians, referrals and restricted access to care, the emphasis is shifting to the demand side of the equation. Controlling cost is now focused on finding the costliest members and trying to steer them away from a crisis situation.

One steadfast rule in healthcare is that a small percentage of the population (for example 10 percent of adult commercial populations; 20 percent in Medicare populations) is responsible for 60-80 percent or more of direct healthcare costs. This rule is one of the basic principles that led to disease management and the attempt to manage that targeted percentage of the population more effectively.

Introduced in the mid 90s, disease management is now a mainstay with many health plans and is focused on controlling demand and trying to intervene and help members before their conditions worsen.

At the core of disease management is the attempt to find members in a population that meet a certain disease criteria and encourage as many of them as possible to enter the appropriate disease management program. So, members with diabetes, asthma, coronary artery disease, or low back pain would be prime targets for a disease management program.

Finding and treating these members has been relatively easy. By using claims and pharmacy data, health plans and employers can come up with a list of members that have a diagnosable disease and encourage participation in the appropriate disease management program.

But, after nearly 10 years, disease management has not been able to bring costs under control and the return on investment has been less than compelling. The 10-20 percent of members are still costing health plans a lot of money and have not been found proactively enough.

Why did disease management go the way of other failed programs? Simply put, the premise of disease management is limited in two major ways.

First, you simply can't find enough of the costly 10-20 percent of the population on the basis of diagnosed disease conditions from claims or pharmacy data. This error has led many plans and employers to miss the costliest members. The cold, hard truth is that managing people based strictly on their disease condition does not result in lowered cost and has not substantially improved return on investment (ROI).

Further, a study by The Institute for Health & Productivity demonstrated that two thirds of patients and three fourths of healthcare costs are not explained by the top 10 most costly conditions. And, Status One recently published an article stating that it takes the 20 most costly diseases to account for 45 percent of the costs in the population they studied.

So, how can we gain control over 60-80 percent of near-term healthcare dollars if we continue to focus on the top three to five medical conditions? The answer is simple: ***predicting those at risk for high near-term care use requires more than determining if they have a medical condition.***

Birth of Predictive Modeling

In the mid 90s, two new movements were also underway that began to shift attention from diseases back to people and refined how we find the costly 10-20 percent of the population.

First, a new discipline, named population health management, offered the industry a new way of interacting with members and managing care. Population health management provides a system of coordinated healthcare interventions and coaching techniques for populations with a ***combination*** of factors—not just disease conditions that contribute to poor health. The emphasis here is on patient self-care and participation, patient empowerment and prevention.

Second, predictive modeling began to exert its power in the market. New approaches not only made predictive modeling more accurate, but by using newer technologies and the latest Web-based tools, it became affordable.

Predictive modeling uses a set of tools that takes information about a given population and stratifies people according to their risk for seeking higher than expected levels of healthcare in the next 6-12 months. As a result, a percentage of the population is identified that needs intervention before an acute crisis or the development of further complications results in increased medical costs.

While some health plans use predictive modeling for provider/physician profiling or predicting premium costs, these are not the overriding purposes of predictive modeling. ***Predictive modeling identifies members of a population needing proactive care management.***

By honing in on people that comprise the near-term cost pool (those that will seek high-cost care within 6-12 months), predictive modeling greatly increases the chances of producing successful outcomes and significant cost-savings.

Self-Reported Data More Direct

Until recently, the primary way to find high-risk individuals was through the analysis of claims information. After a member is seen and diagnosed, a claim form is submitted in order for providers to get reimbursed and health plan members to get covered. Payors, such as health plans, look for certain "indicators" and codes on claims forms to find the "sickest" patients. For example, an ICD 230 code indicates diabetes with complications. A health plan nurse would attempt to call each member with this ICD code and try to enroll him or her in the plan's disease management program for diabetes.

However, claims forms continue to be an unreliable and incomplete way to find and treat the costliest and sickest members for the following reasons:

- Long lag time between claims submissions and their analysis
- Data is often incomplete (new enrollees), unreliable, or of poor quality for accurate predictive modeling
- Doesn't provide any information about a member's readiness to change and improve behavior
- Lowered ability to identify high-risk, high-cost members (typically identifying only 1-3 percent of the population, meaning only 10-15 percent of the near-term cost has been brought under proactive care management)

Type	Method	Advantage/Disadvantage
Rules-Based	Used by most health plans, this approach singles out members that meet certain diagnostic criteria or reach certain utilization thresholds. For example, someone diagnosed with diabetes, over 65 and with a recent ER visit is placed on a call list to enroll in a diabetes management program.	Reactive approach. Identifies people who have already entered the healthcare system. Data lag times don't allow for timely follow-up with high-risk members.
Statistical Regression	A computer-generated model selects the factors that are most relevant to predicting care use and gives each factor a beta weight.	Highly effective at predicting which members are more likely to incur high costs or seek higher levels of near-term care.
Neural Network	Similar to regression, this weighs factors related to care use and looks for relationships between what you want to predict and factors that are most predictive.	Requires vast amounts of data, which is time-consuming to collect/process.

Currently, there are three primary statistical techniques used to develop predictive modeling.

More and more health plans and employers are taking a more direct and holistic approach to find the sickest members— self-reported surveys based on Health Perception Science.

By directly surveying members, using the latest risk stratification algorithms and processing, and delivering results with advanced technology, insurers can now find 8-12 percent of high-risk members who represent 40-60 percent or more of the near-term cost pool.

Health perception surveys elicit answers that reveal psychosocial factors that impact a member's well-being and likelihood to seek near term care use. In other words, what leads one to seek near-term care use other than a disease condition?

In its most-basic form, health perception science gauges a person's perception of how they are feeling or doing. For most people, there are a variety of factors that contribute to their sense of feeling well, in addition to specific medical conditions: stress emotions, levels of functioning, compliance with treatments and personal beliefs can greatly impact a person's perception of their health. That's why one person with diabetes who is managing their disease well is not high-risk, but another diabetic that is under immense stress, not taking medication regularly and not exercising is nearing a crisis.

A Closer Look at Health Perception Science

The traditional view of health looks for the presence or absence of a disease to predict care-seeking behavior. A new view of health based on the Health Perception Science defines health very differently and has been developed into a Perceived Health Model.

The Perceived Health Model, developed at Indiana University by Dr. Brenda Lyon, takes other contributing factors into account, such as emotions and health beliefs, and defines health as a person's total evaluation of how he/she is feeling or doing. In other words, a person can feel well, regardless of whether they have a disease.

For example, a 20-year study at Kaiser-Permanente concluded that physicians could not find a diagnosable disorder during 60 percent of all medical visits. So, what is responsible for these visits?

According to the Perceived Health Model, people are seeking care when their sense of feeling or doing is below their perceived threshold of tolerance. It is this gap between how a person feels and how they *perceive* they should feel that accounts for near-term care seeking behavior.

By looking at psychosocial factors and measuring someone's perceived state of health, the Perceived Health Model is able to predict with a higher degree of accuracy those that will consume the highest percentage of non-beneficial or avoidable care. This approach is consistent with a holistic approach to medicine.

There are four key reasons why health perception surveys boost predictive accuracy and ensure an intervention program has a successful impact on members.

1. Surveys reveal not only those needing intervention but also which members are willing to make changes.
2. Information gathered comes directly from members, which leads to more stable and reliable data.
3. Results and reporting are immediate, and populations can be profiled across demographic, geographic location, age, gender, etc. so that additional programs and services can be developed.
4. High engagement rates are achieved, because the right people are being targeted.

Your Medical Conditions and How You Care About Yourself						
Question: How adequately do you feel you are currently managing your long-term medications? (Managing your long-term medications means that you understand how to take your medicine(s) and you report how you're doing to your doctor.) Choose only one	• I am not currently on any long-term medications so this question doesn't apply to me					
	• More than adequately					
	• Adequately					
	• Somewhat adequately					
	• Not at all adequately					
Your Emotions						
Question: DURING THE PAST MONTH, how much have you felt each of the following? Please mark *every* emotion.	• Happy	Not felt	Slightly	Somewhat	Quite a bit	Greatly
	• Calm	Not felt	Slightly	Somewhat	Quite a bit	Greatly
	• Afraid	Not felt	Slightly	Somewhat	Quite a bit	Greatly
	• Angry	Not felt	Slightly	Somewhat	Quite a bit	Greatly
	• Depressed	Not felt	Slightly	Somewhat	Quite a bit	Greatly
	• Frustrated	Not felt	Slightly	Somewhat	Quite a bit	Greatly
	• Guilty	Not felt	Slightly	Somewhat	Quite a bit	Greatly
	• Sad	Not felt	Slightly	Somewhat	Quite a bit	Greatly

Sample Questions from the Health Perception Science Survey.

The Promise of Survey-based Predictive Modeling

Survey-based predictive modeling combines the spirit of wellness with a more scientific approach to finding high-cost, high-risk users. As a result, spending money and time on keeping consumers healthy is not only morally justified, but is also a strategic imperative with economic payoffs for today's health plans and employers.

Conservatively speaking, recent programs using survey-based predictive models show that 8-12 percent of high-risk members who represent 40-60 percent of the near-term cost pool can be brought under proactive care management. This represents an immense opportunity for reduction in a population's utilization of healthcare and overall costs.

Case Study – Medicare Risk Group

In one Medicare risk population, a survey-based predictive model—One Care Street™—gathered data on 79.4 percent of Medicare risk members. After the surveys were received and stratified, 92.5 percent of cases costing more than $25,000 were found. Through subsequent intervention with high-risk members, medical management effectiveness increased by 38 percent and claims costs went from $445 per member per month down to $221 per member per month.

Case Study – Employer Setting

- Survey-based predictive model sent to 10,000 employees
- Can expect 30 percent participation
- 7 percent targeted as high-risk
- Health coaches intervened with high-risk employees over a 6-12 month timeframe
- Can expect 1-3 percent reduction in healthcare costs
- Program fosters employee well-being and overall job satisfaction

Companies such as Blue Cross & Blue Shield of Rhode Island, Evercare (a division of United Healthcare), MVP Healthcare, Procter & Gamble, Eli Lilly and Company, and the State of Arkansas are turning to survey-based predictive modeling to tackle mounting healthcare costs. And, even medium and small sized businesses with less than 500 employees can realize substantial cost savings and achieve ROI.

However, finding healthcare consumers at risk must be coupled with an effective intervention approach. Traditional case management trained nurses to focus on treating illnesses and managing diseases instead of people. New healthcare professionals, called health advocates and trained in behavioral health and intervention strategies, are now critical to working with high-risk members.

Using structured Web enabled software, health advocates work one-on-one with members to change health and lifestyle behaviors. When advocates contact members, the goals are to: establish a relationship, identify the major concerns of the member and to identify one of four pathways indicated by their survey results that puts them at highest risk and requires their attention. This type of personalized contact leads to an overall improved health functioning and a decreased utilization of healthcare resources.

Summary

As we learn more about what motivates someone to seek near-term care (or why they do not utilize the healthcare system to keep from getting ill), we can begin to stem the tide of spiraling healthcare costs.

While claims information can tell us the medical conditions that have been diagnosed for certain members, it is proving to be a very unreliable predictor of the majority of high-risk members that are headed for costly, near-term care.

Health plans and employers alike are turning to self-reported surveys combined with predictive modeling to hone in on the members that require the focus of the industry's time, money and care management.

By looking at members from a more holistic approach—physical and psychosocial factors—, we can begin to find and treat patients proactively that need the most help. And, as a result, the industry can deliver quality patient care, but also realize a return on investment that keeps costs from ending up on the shoulders of the healthcare consumer.

About The Haelan® Group

Founded in June, 1995 as a healthcare consulting company, The Haelan Group is based in Indianapolis, Indiana. Privately held, The Haelan Group has developed a revolutionary population health management product called One Care Street that prospectively finds individuals at greatest risk of accessing the healthcare system in the next 6-12 months and then links them to highly tailored coaching interventions. One Care Street is unique because it uses participant self-reported information instead of claims or pharmacy data to predict care use.

Target markets include health plans, self-funded employers, professional employment organizations, third-party administrators and senior retirement communities. Clientele includes Eli Lilly, Blue Cross and Blue Shield of Rhode Island, Procter & Gamble, MVP Healthcare, Episcopal Retirement Homes and the State of Arkansas.

For more information call 317-278-9700 and visit www.haelan.net.

Glossary of Terms

Care Management (or Case Management)

Case management is a collaborative process that assesses, plans, implements, coordinates, monitors, and evaluates the options and services required to meet an individual's health needs, using communication and available resources to promote quality, cost effective outcomes. Source: Case Management Society of America

A key difference between case management and health advocacy is that case management typically begins with an acute episode and continues through the resolution of that episode. Conversely, health advocacy begins with case identification from a predictive model and continues until the person's expected outcomes towards feeling better are met. The goal of case management is effective management of that acute episode, while the goal of health advocacy is to help individuals attain or maintain wellness in the presence or absence of a disease.

Disease Management

Disease Management is a system of coordinated healthcare interventions and communications for populations with conditions in which patient self-care efforts are significant. Disease management supports the physician or practitioner/patient relationship and plan of care; emphasizes prevention of exacerbations and complications utilizing evidence-based practice guidelines and patient empowerment strategies; and evaluates clinical, humanistic, and economic outcomes on an ongoing basis with the goal of improving overall health. (Source: DMAA)

Health Advocate (or Health Coach)

This is a new type of healthcare professional who is trained in behavioral health and intervention strategies. Unlike case managers that focus on care coordination and disease conditions, health advocates work with members on a more holistic, personal, one-on-one basis to affect change in a range of health and lifestyle behaviors for overall improved health functioning and decreased non-beneficial utilization of healthcare resources.

Health Perception Science (or the Perceived Health Model)

A conceptual model that is very powerful in predicting near-term care seeking behavior. According to this model, people are said to be "well" when their sense of feeling and functioning is at or near their expected capability level and are said to be "ill" when their sense of feeling/functioning falls below their expectation, thereby creating a gap that is uncomfortable/unpleasant. It is this gap that is measured by health perception science and that is most closely connected to care seeking behavior.

Payors

An entity which holds the risk for payment of a population's health claims costs. Employers, health plans, managed care companies, or insurance carriers are examples of payors.

Providers

This refers to a hospital or doctor or other care provider who “provides” treatment directly to patients.

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