

# ***Predictive Risk Modeling in the Healthcare Industry***

## **The Needs-awareness Gap Among Healthcare Payers**

*The first in a series  
of peer-group reports*



A white paper based on independent research with senior managers  
at major healthcare payer organizations

**1st Quarter 2003**



## Executive Summary

This report discusses the results from a study jointly commissioned by ViPS<sup>SM</sup>, Inc. and Integrated Healthcare Information Services, Inc. (IHICIS) to map the interest in and knowledge of Predictive Risk Modeling (PRM) among senior management at industry-leading healthcare payer organizations.

In January and February 2003, researchers interviewed chief medical officers, physicians and care managers at 50 major healthcare payer organizations across the United States. All of these organizations had at least 150,000 covered lives.

The research found that managers at these major healthcare payer organizations believe PRM can greatly enhance current and future efforts for improving disease management, patient care/safety and cost management. But many of these managers are uncertain or have limited knowledge about the various techniques and solutions that PRM encompasses.

The study found considerable interest in PRM – fully 80 percent of top healthcare organization (HCO) managers believe PRM can help solve their care and disease management needs.

Respondents indicated even greater interest in PRM's specific care and operational capabilities:

- 96 percent said their organizations were interested in communicating directly with providers and members
- 82 percent said they were interested in reallocating case management resources to increase return on investment (ROI)
- 88 percent said they were interested in identifying high-cost, high-disease patients in order to implement actionable intervention strategies.

Despite their interest, many respondents reported only some or limited familiarity with PRM:

- 61 percent reported being only “somewhat familiar” or “not very familiar” with the concept of predictive risk modeling
- 55 percent reported being only “somewhat familiar” or “not very familiar” with the concept of risk adjustment.

When asked about specific predictive risk-modeling methodologies, an even greater percentage of respondents reported only partial awareness:

- 65 percent said they were only “somewhat familiar” or “not very familiar” with risk-group-based models
- 69 percent reported similar low familiarity with rules-based models
- 84 percent reported that they were “somewhat familiar” or “not very familiar” with neural network-based models.

# Predictive Modeling Technology in Healthcare

## The Needs-awareness Gap Among Healthcare Payers

### Introduction

This report analyzes findings from a survey research study commissioned by ViPS<sup>SM</sup> and Integrated Healthcare Information Services, Inc. (IHCIS) to map the needs and awareness of Predictive Risk Modeling (PRM) among senior managers at industry-leading healthcare payer organizations.

ViPS/IHCIS commissioned Porter Research, a specialist in market research on healthcare information technology, to survey a sample of large healthcare payer organizations about their needs and knowledge regarding PRM.

Porter Research interviewed chief medical officers, physicians and care managers at 50 major healthcare payer organizations across the United States. All of these organizations have at least a total membership population of 150,000 covered lives. The research was conducted during January and February 2003.

A summary of responses reveals that a gap exists between the PRM needs of healthcare payers and their awareness of PRM solutions.

Such results are not uncommon in the field of healthcare information technology, where technology complexity and continuous development often leave healthcare organizations (HCOs) a step behind other industries.

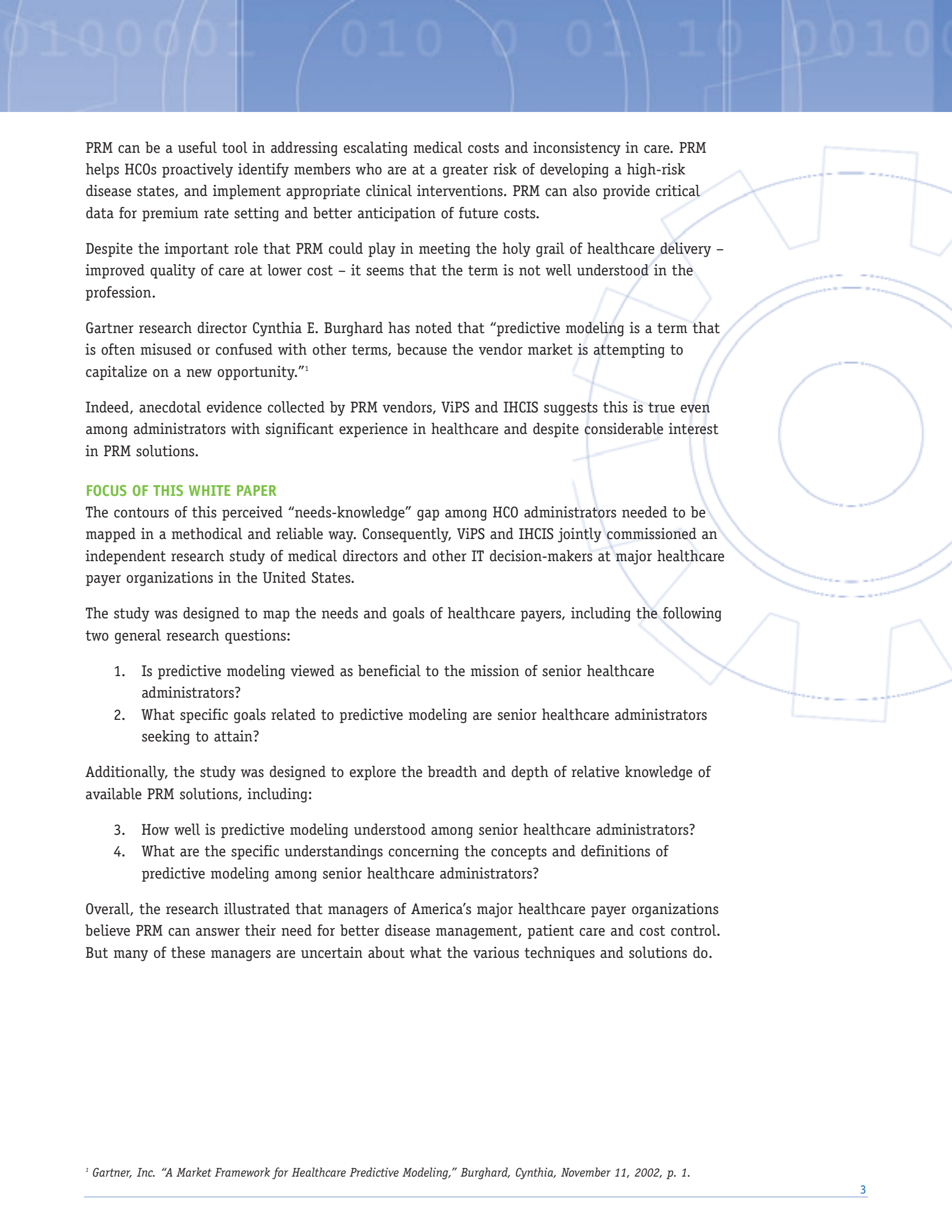
Nevertheless, these results should be heard as a clear signal to PRM vendors that constant, vigorous efforts are required to educate the market on this still emerging technology.

### BACKGROUND TO THE STUDY

HCOs are currently facing operational challenges as a direct result of increasing costs of care and demands for patient safety and care quality. There are indications of a growing interest in PRM from different areas of leadership within the industry. For the purposes of this report, we define PRM as an “umbrella” term for statistical methodologies and supporting technology using historical data to predict future behavior.

PRM can be a critical tool in managing future resource consumption on the part of patients and covered individuals. Two broad areas of use for predictive modeling in healthcare include:

1. Calculating insurance premium amounts and establishing provider reimbursements based on predicted future medical expenses by group and/or individual
2. Identifying individuals whose future medical expenses could be significant (individuals who currently have at least one chronic condition, or have multiple risk factors indicating the development of a future chronic condition) and recommending a program of medical intervention that will improve the quality of care while lowering overall treatment costs.



PRM can be a useful tool in addressing escalating medical costs and inconsistency in care. PRM helps HCOs proactively identify members who are at a greater risk of developing a high-risk disease states, and implement appropriate clinical interventions. PRM can also provide critical data for premium rate setting and better anticipation of future costs.

Despite the important role that PRM could play in meeting the holy grail of healthcare delivery – improved quality of care at lower cost – it seems that the term is not well understood in the profession.

Gartner research director Cynthia E. Burghard has noted that “predictive modeling is a term that is often misused or confused with other terms, because the vendor market is attempting to capitalize on a new opportunity.”<sup>1</sup>

Indeed, anecdotal evidence collected by PRM vendors, ViPS and IHCIS suggests this is true even among administrators with significant experience in healthcare and despite considerable interest in PRM solutions.

#### **FOCUS OF THIS WHITE PAPER**

The contours of this perceived “needs-knowledge” gap among HCO administrators needed to be mapped in a methodical and reliable way. Consequently, ViPS and IHCIS jointly commissioned an independent research study of medical directors and other IT decision-makers at major healthcare payer organizations in the United States.

The study was designed to map the needs and goals of healthcare payers, including the following two general research questions:

1. Is predictive modeling viewed as beneficial to the mission of senior healthcare administrators?
2. What specific goals related to predictive modeling are senior healthcare administrators seeking to attain?

Additionally, the study was designed to explore the breadth and depth of relative knowledge of available PRM solutions, including:

3. How well is predictive modeling understood among senior healthcare administrators?
4. What are the specific understandings concerning the concepts and definitions of predictive modeling among senior healthcare administrators?

Overall, the research illustrated that managers of America’s major healthcare payer organizations believe PRM can answer their need for better disease management, patient care and cost control. But many of these managers are uncertain about what the various techniques and solutions do.

<sup>1</sup> Gartner, Inc. “A Market Framework for Healthcare Predictive Modeling,” Burghard, Cynthia, November 11, 2002, p. 1.

## The Context for Predictive Risk Modeling in Healthcare

Healthcare has been pulled in opposite directions for the past decade as it continues to struggle to contain costs while improving the effectiveness and overall quality of care.

The spread of the managed care model for healthcare delivery in the mid-1990s achieved notable reductions in the growth rate of healthcare costs. During this time period, managed care networks effectively decreased many administrative cost areas and improved access to preventative services. However, a consumer and political backlash against network restrictions and pre-authorization requirements caused payers to retreat from such cost-containment strategies.

### QUALITY OF CARE

At the same time, the industry has come under closer scrutiny and often sharp criticism for dropping any commitment to continuous improvement in the quality of care. At the end of the decade, the Institute of Medicine (IOM) published two major reports on quality issues in healthcare that challenged the industry to fundamentally reassess how care is delivered.

First, in 1999 the IOM published, *To Err is Human: Building a Safer Health System* focusing on a single, quality concern, patient safety.<sup>2</sup>

This prompted other researchers to closely examine the nature and extent of procedure and treatment errors. While it can be argued that some of this research was motivated by commercial interest, it nevertheless highlighted quality-of-care issues that required immediate attention.

The next year, the IOM published, *Crossing the Quality Chasm: A New Healthcare System for the 21st Century*.<sup>3</sup> In this report, the IOM laid out a broadly conceived agenda for fundamentally reorienting the nation's healthcare system toward speed, agility and anticipation of patient needs in the delivery of healthcare services.

The work's authors, members of the Committee on the Quality of Health Care in America, stated that "fundamental reform of health care is needed to ensure that all Americans receive care that is safe, effective, patient centered, timely, efficient, and equitable" (p. xi).

### NURSING CRISIS

Also in 2000, the U.S. Health Resources and Services Administration published, *National Sample Survey of Registered Nurses, Preliminary Findings*, which documented what has come to be recognized as an unfolding nursing crisis in the U.S. healthcare system.

This report explained that during the 1990s, many nurses experienced stagnation in the levels of compensation, and suggested that significant numbers of nurses left the profession or reduced their hours by switching to part-time status. Notably, the report showed an unsustainable upward trend in the average age of nurses in the U.S. No doubt, these trends reflect workplace pressures to maintain quality amid ever tighter resources.<sup>4</sup>

<sup>2</sup> Committee on Quality of Health Care in America, Institute of Medicine. *To Err is Human: Building a Safer Health System*. Washington, DC: National Academy Press, 1999.

<sup>3</sup> Committee on Quality of Health Care in America, Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academy Press, 2000.

<sup>4</sup> Health Resources and Services Administration. "National Sample Survey of Registered Nurses, Preliminary Findings." March 2000.

## Needs and Challenges of Healthcare Payer Organizations

To understand the needs and challenges of healthcare payer organizations, respondents were asked to identify objectives, issues and interests on three levels:

1. Their own business objectives over the next three years
2. The key issues of their employer groups, providers and members
3. Their own specific operational interests as they relate to PRM.

### BUSINESS OBJECTIVES AND KEY ISSUES

To begin assessing the perceived needs of healthcare payer organizations, respondents were asked to identify their key business objectives for the next few years.

What are the key business objectives you are trying to meet in the next few years?	
Reduce overall costs	16%
Increase profits	14%
Better identification of high-risk members	12%
Develop quality disease management program	12%
Manage growth of membership and company overall	12%
Develop predictive modeling program	10%
Improve claims processing	8%
Other unique responses	16%

The two most common responses to this open-ended question were related to overall profitability, to which PRM can make significant improvements. Some 16 percent of respondents identified reducing costs as their key business objective for the next few years.

Another 14 percent – for a total of 30 percent of respondents concerned with overall profitability – directly mentioned increasing profits.

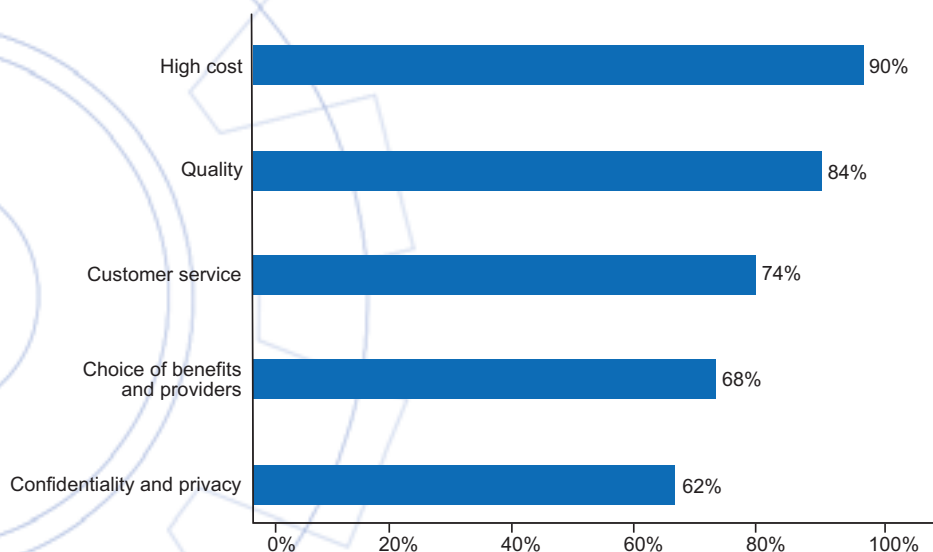
Key business objectives related to PRM	
Better identification of high-risk members	12%
Develop a quality disease management program	12%
Develop a predictive modeling program	10%
<b>Total</b>	<b>34%</b>

Notably, 34 percent of respondents identified goals related to specific PRM functionalities as their key business objectives (see the above table).

One might add to this 34 percent of respondents the additional 12 percent who identified “managing growth of membership and company overall” as their key business objective for the next few years. This is because PRM can be used to establish premium rates for new members and groups and to predict future care-related costs.

Next, respondents were asked to identify from a constrained list of possible responses the most important issues confronted by their employer groups, providers and members.

**Which of the following do you consider to be the most important issues to your employer groups, providers and members? (select all that apply)**





Selecting all that applied, respondents overwhelmingly identified high costs (90 percent) as the most important issue. This was followed closely by quality concerns (84 percent).

Reducing cost and improving quality have been the two most significant and critical industry challenges for more than two decades. After more than a decade of intense struggle, the industry overall seems to have reached an impasse, with costs growing at accelerated rates while realizing few gains in measurable quality improvement.

This impasse could provide an opportunity for PRM solutions, which are designed for managing long-term costs and improving the quality of care.

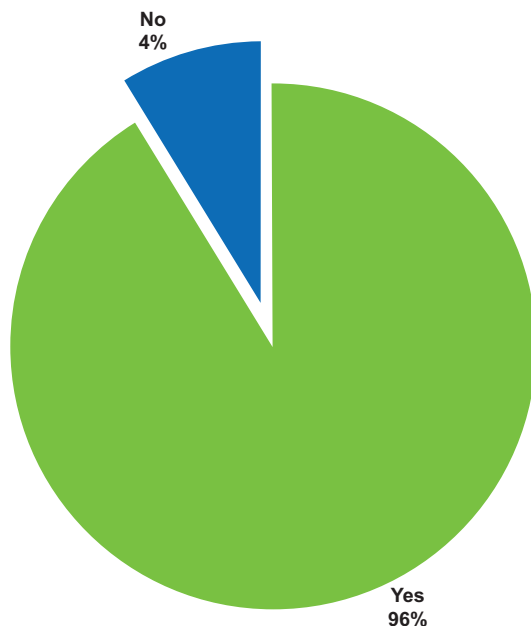
### SPECIFIC OPERATIONAL INTERESTS

The general objectives and challenges of healthcare payer organizations indicate potentially strong receptiveness to PRM solutions. Drilling down into payers' specific operational interests as they relate to PRM reinforces these findings.

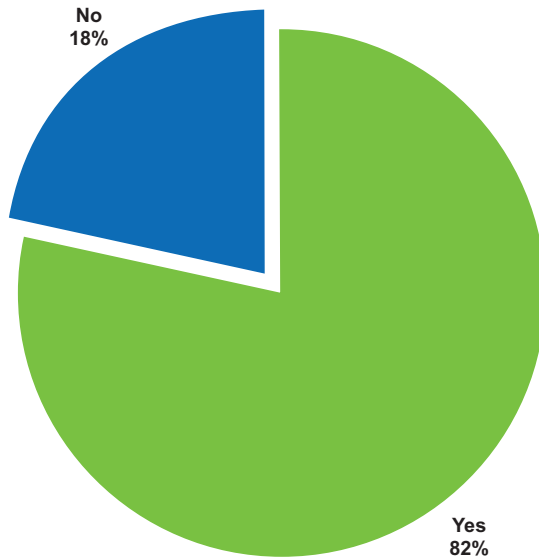
Respondents were asked a series of questions related to their interest in the following three functional areas:

1. Identifying high-cost, high-disease patients for actionable intervention strategies
2. Reallocating case management resources to increase ROI
3. Communicating directly with providers and members.

**Is your organization interested in communicating directly with providers and members?**



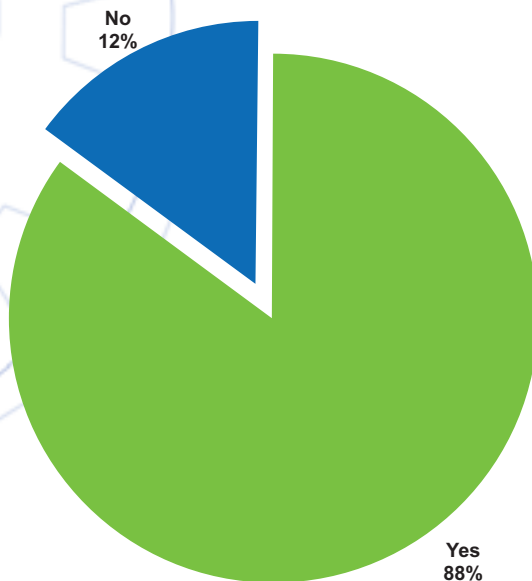
**Is your organization interested in being able to reallocate case management resources to increase ROI?**



The results indicate a significant perception of unfilled needs that could be satisfied by a robust PRM program:

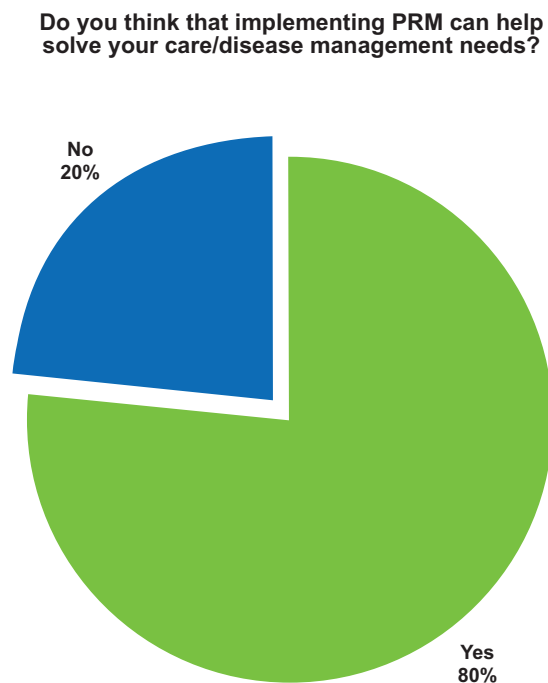
- 96 percent said their organizations were interested in communicating directly with providers and members
- 82 percent said they were interested in reallocating case management resources to increase return on investment (ROI)
- 88 percent said they were interested in identifying high-cost, high-disease patients in order to implement actionable intervention strategies.

**Is your organization interested in identifying high-cost, high-disease patients and stratifying these populations so that actionable intervention strategies can be implemented?**



This widespread interest in the potential capabilities that PRM solutions can provide indicates continued effort by healthcare payers to manage cost increases while simultaneously improving the overall quality of care.

When asked if they thought that implementing PRM could help solve their care/disease management needs, 80 percent said yes.



## Uncertainty Regarding PRM Solutions

The broad interest in PRM-type capabilities and in PRM itself, indicates that HCOs can benefit from vendor-provided consulting and solutions that exist. Nevertheless, vendors must overcome a fair degree of market uncertainty over exactly what PRM is and what it does.

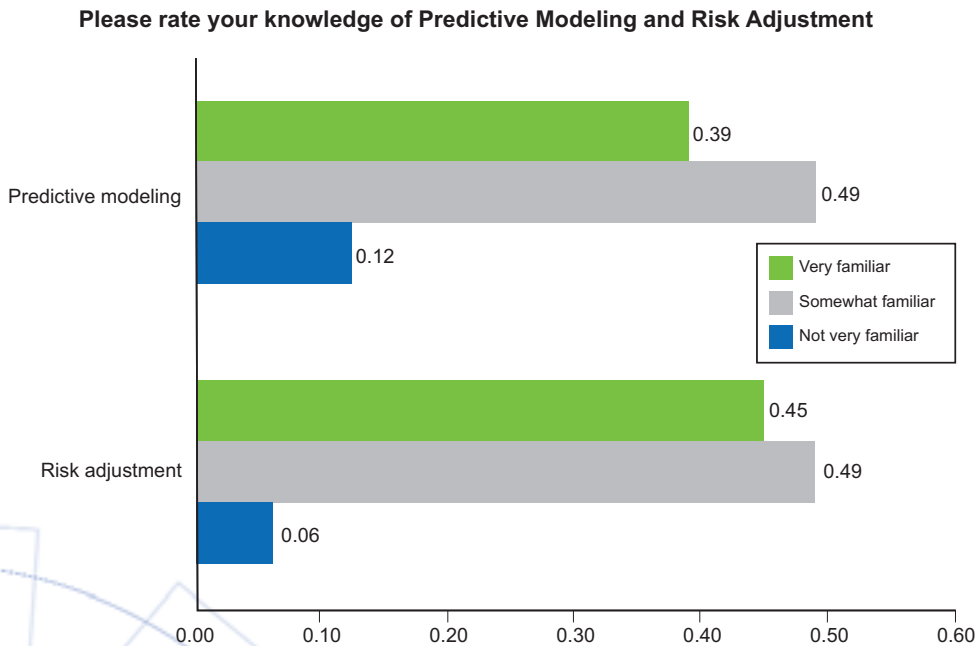
### SOURCES OF UNCERTAINTY

Several factors have contributed to confusion and uncertainty over the meaning and application of predictive risk modeling in healthcare.

- Vendors offering predictive risk-modeling solutions to the healthcare industry have only recently begun to complete successful solution implementations at a few organizations
- There are a variety of tools and techniques that can be used for predictive modeling, including rule-based modeling, risk-grouper analysis and neural network analysis
- Predictive modeling can be used in two broad areas: establishing premium rates and recommending programs of healthcare intervention
- The evaluative criteria used in predictive modeling systems can vary depending on the specific goals identified by the healthcare organization
- Predictive modeling can produce actionable results, but the mechanisms and processes for acting on those results must also be created or already in place.

## General familiarity and knowledge of specific methodologies

Respondents were asked to rate their knowledge of PRM on a general level first. Then they were asked to rate their knowledge about specific PRM methodologies.



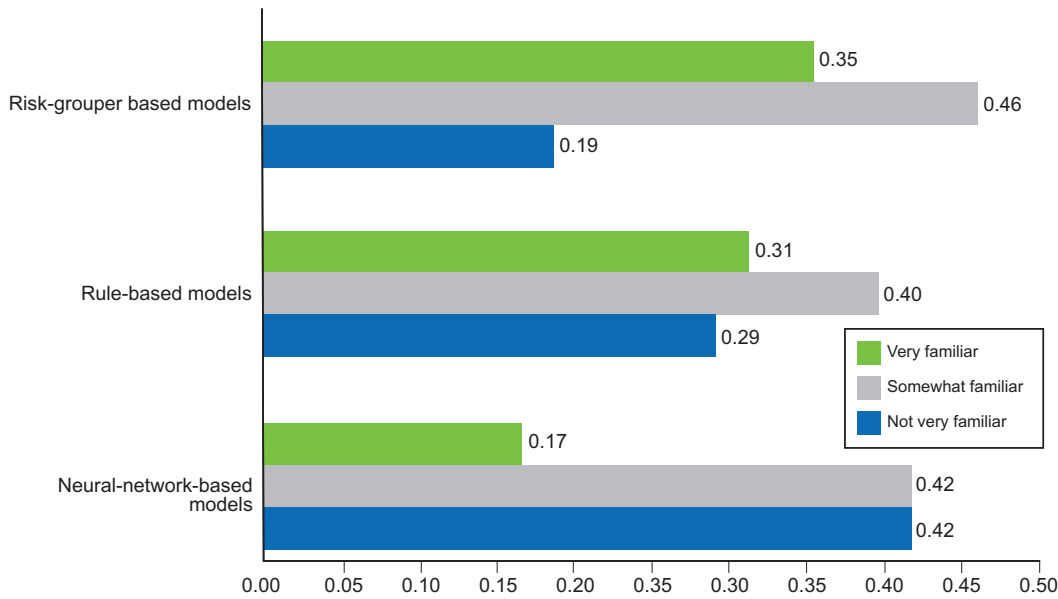
The responses indicate a fair amount of uncertainty, even at a higher management level, about PRM and risk adjustment. Some 61 percent of management at the nation's largest payer organizations reported being only "somewhat familiar" or "not very familiar" with PRM.

Reported knowledge of risk adjustment is only slightly more encouraging: some 61 percent said they were only "somewhat familiar" or "not very familiar" with risk adjustment.

When asked about specific risk-modeling methodologies, reported familiarity drops considerably.

- 65 percent said they were only "somewhat familiar" or "not very familiar" with risk-group-based models
- 69 percent reported similar low familiarity with rules-based models
- 84 percent reported that they were "somewhat familiar" or "not very familiar" with neural-network-based models.

**Please rate your knowledge of predictive risk modeling methodologies**



The overall patterns in the reported levels of knowledge are to be expected. Survey samples will quite naturally report lower levels of knowledge as the degree of detail gets more specific.

Still, it is notable that only 35 percent (slightly more than one in three) reported being very familiar with one of the PRM methodologies mentioned – in this case, risk-grouper-based models. On the lower end of the scale, only about one in six reported being very familiar with neural network-based models.

None of this would be particularly notable were it not for the very high levels of interest in PRM-type capabilities, and the considerable concern with issues that could be attenuated using PRM solutions.

## Conclusion

Clearly there is a PRM needs-knowledge gap among medical managers at America's healthcare payer organizations.

In their identification of key business objectives and most important issues, and their reported operational interests, respondents indicated considerable interest in solutions and capabilities that could be provided by PRM solutions.

- 16 percent of respondents identified "reducing costs" as their key business objective for the next few years
- 14 percent identified "increasing profits" as their key business objective
- 34 percent of respondents identified key business objectives that related to specific PRM functionalities, including identifying high-risk members and developing disease management-related programs and using PRM tools.

Additionally, strong majorities of the respondents reported being interested in developing capabilities that are core PRM functionalities, including:

- communicating directly with providers and members
- reallocating case management resources to increase ROI
- identifying high-cost, high-disease patients so that intervention strategies can be implemented.

These high levels of interest and concern are not matched by similar levels of knowledge in PRM solutions. This often happens in the healthcare IT industry. Solutions are often quite complex, with terminology and definitions constantly evolving as the technology matures.

The challenge going forward for PRM vendors is to commit themselves to educating the market. They cannot take for granted even a basic foundation of knowledge in the market. Instead, solution vendors must be ready to provide strategic guidance throughout the sales and implementation process.

## About the Researchers

### PORTER RESEARCH

Since 1989, Porter Research has provided innovative model-based market research services to more than 400 companies in the global IT industry with special emphasis on Healthcare IT. Porter also integrates the *knowledge value* chain by creating tools for the systematic collection of data through surveys like: customer satisfaction and CRM, sales win-loss analysis, market needs analysis, employee satisfaction and brand awareness. The company has published two IT business books on customer retention and sales improvement and recently released a new national study on Healthcare IT entitled, *Data Storage in Healthcare IT: Industry Trends*.

## About the Sponsors

### ViPS<sup>SM</sup>

ViPS delivers innovative solutions that simplify the business of healthcare. Headquartered in the Baltimore-Washington, DC metro area, ViPS offers advanced anti-fraud, care management, claims management and risk management solutions. The company also delivers exceptional value with its outsourcing applications service provider (ASP) services, Web-enabled software and consulting expertise. In operation for more than two decades, ViPS serves a diverse mix of commercial and government customers nationwide, from large health plans and major managed care organizations to leading federal agencies and contractors.

### IHCIS

Waltham, Massachusetts-based IHCIS is a leading provider of innovative information solutions for national managed care organizations, care management providers, employers, pharmaceutical and medical device manufacturers. IHCIS offers solutions that enable its customers to improve healthcare through more informed decision-making. IHCIS' products and services provide healthcare organizations with the ability to measure clinical and financial performance, predict future medical costs, and implement targeted proactive medical management initiatives by leveraging a variety of administrative and clinical healthcare data.

