

## Chapter 5.3

# Informatics Application Challenges for Managed Care Organizations: The Three Faces of Population Segmentation and a Proposed Classification System

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### ABSTRACT

Organizations across industry sectors continue to develop data resources and utilize analytic techniques to enhance efficiencies in their operations. One example of this is evident as Managed Care Organizations (MCOs) enhance their care and disease management initiatives through the utilization of population segmentation techniques. This article proposes a classification system for population segmentation techniques for care and disease management and provides an evaluation

process for each. The three proposed operational areas for Managed Care Organizations are: 1) Risk Status: early identification of high-risk patients, 2) Treatment Status: compliance with treatment protocols, and 3) Health Status: severity of illness or episodes of care groupings, all of which require particular analytic methodologies to leverage data resources. By applying this classification system an MCO can improve its ability to clarify internal goals for population segmentation, more accurately apply existing analytic methodologies, and produce more appropriate solutions.

## **INTRODUCTION**

Population segmentation is the term broadly applied to technologies used to correctly identify and target the right patients for care and disease management program interventions. Many MCOs are using these technologies, including those containing predictive modeling techniques and quantitative applications, to enhance patient care and optimize available resources. With the rapidly growing use of population segmentation and predictive modeling today, it is essential to understand the relative strengths and weaknesses of different types of population segmentation techniques, including those employing predictive methods. The purpose of this article is to propose a classification system for the different types of population segmentation techniques and their usefulness in addressing the independent and interactive roles of risk status, treatment status, and health status in patient evaluation initiatives.

Organizations across industry sectors have intensified their initiatives to increase operational efficiency through effective resource allocation, and the health care sector is no exception. Given the increased level of competition in today's digital, information economy, organizations are faced with the task of increasing productivity by more efficiently allocating available resources in producing goods and services to meet the demands of their customers. One of the greatest issues facing the health care industry today is managing patients who suffer from chronic illnesses. Currently, approximately 100 million Americans have at least one chronic condition and this is expected to rise to over 150 million Americans in the next 20 to 30 years (Faughy, 1999; Institute of Medicine, 2001). Furthermore, chronic conditions are the leading cause of death, disability, and illness in the United States, accounting for over 75% of direct medical expenditures (Landro, 2002).

The health care industry has been faced with a number of additional factors that have increased

the complexity of managing available resources. Some of these include an increase in the aging population, costs for defensive medicines, optimizing existing health care facility usage (e.g., staffing doctors and nurses along with designated bed utilization rates) and the introduction of new organizations such as HMOs and PPOs (Smith-Daniels, Schweikhart, & Smith-Daniels, 1988). One way Managed Care Organizations are attempting to improve their efficiencies in treating illnesses is through the development and management of robust data resources and the utilization of analytic techniques to identify patterns and trends in patient populations. With this information, efficiency can be enhanced by more accurately identifying the sources of resource demand of specific customer segments and initiating strategic health care management policies and better allocating available resources to meet those demands (Heskett, 1983; McLoughlin, Yan, & Van Deirndonck, 1995).

## **Analytic Methods for Health Care Management**

The utilization of analytic techniques in strategic management is increasing (Shook, 2000). More formal analytic techniques such as stochastic trees have been utilized to help increase operational efficiencies by enhancing the decision making process in medical treatment procedures (Hazen, 1992, 2000). Other analytic methodologies involving data mining techniques enable decision makers to identify patterns in clinical-, claims- and activity-based historical data, to better understand explanatory relationships in data and create models to more accurately predict future resource demand (Xiaohua, 2005). Artificial neural networks are computer algorithms that identify relationships in historical data that can be used for classification and prediction (Bishop, 1995; Swingler, 1996). Reducing the uncertainties in process resource requirements through enhanced predictive capabilities is seen to increase efficiency across industry sectors (Kudyba & Hoptroff, 2001).

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