A Cost-Benefit Analysis of Case Management Activities for Diabetes

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A Quasi-Experimental Study from One Medicare Advantage Plan's Perspective

Felix J. Bradbury

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Boca Raton

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Boca Raton, Florida
USA • 2010

ISBN-10: 1-59942-317-0
ISBN-13: 978-1-59942 317-3

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ACKNOWLEDGMENTS

Anyone who has undertaken a doctoral education knows all too well that it is truly a love-hate relationship that requires an incredible amount of diligence and sacrifice from the student as well as family and friends. When I started this project, I had no idea of the true costs to either my family or friends. As such, I owe them a debt of gratitude for their love, support, and patience that will take my lifetime to repay.

This project could not have been completed without the support of some very special people, several of whom have the rare distinction of being family, as well as friends and mentors:

- Alma V. Pallas
- April K. Rollins
- Bobby Rizwan, MBA, MPH
- Brian Pallas
- Claudia Campbell, PhD
- Eileen P. Bradbury
- Erin Downey, MPH, ScD
- Felix Vincent Pallas
- Gloria Hernandez Amaro
- Hugh W. Long, JD, PhD
- Janet Rice, PhD
- Karen Bryant, RN
- Kimberly Tamietti
- Penny Louviere
- Rachel K. Reininger
- Richard Sabbara, MBA
- Richard "Rick" Henault, FACHE
- Stephen J. Leierer, PhD

Warmest Regards,

Felix

For my two very very special ladies -

Sara Patricia and Isabella Bradbury Amaro
Te quiero con todo mi corazon siempre

CHAPTER I

ABSTRACT

The economic and humanistic costs of diabetes in the U.S. population places an enormous burden on the U.S. healthcare system as well as employer groups, diabetic individuals, and their families. This is well substantiated by current statistics that indicate the prevalence of diabetes is increasing: In 2007, approximately 23.6 million persons in the U.S. were diagnosed diabetics, compared with approximately 20.8 million in 2005. In addition, the elderly are disproportionately affected by diabetes: in 2007, 23.1% of people 60 years of age or older were diagnosed diabetics, compared with 20.9% in 2005.

Payers have responded to the enormous burden by implementing diabetes case management programs (DCMPs) to contain costs, ensure continuity of care, and improve the outcomes for their diabetic members. These programs are proactive, seeking to identify people at an actionable stage of disease progression and introduce effective interventional programs engineered to prevent disease exacerbation, the development of comorbid conditions, improve health outcomes, reduce unnecessary utilization, and attenuate healthcare costs. These interventional programs typically consist of nurse-patient, nurse-physician, and physician-patient telephonic interactions. The goals of the programs include improved compliance with treatment, healthy lifestyle choices, behavior change, and improvements to prescribing practices.

DCMPs are proliferating through many major carriers and through specialized disease management companies but their effectiveness in improving health outcomes and mitigating healthcare spending has been difficult to measure; furthermore, the ROI of these programs has not been well demonstrated. The purpose of this retrospective longitudinal study was to determine whether the nurse-based DCMP interventions employed by one Medicare Advantage health plan affect health services utilization, and healthcare costs differently than a no-touch or "status quo" level of intervention.

This research takes the perspective of a large Medicare Advantage payer and addresses the following four fundamental business questions:

1. Does the DCMP reduce the total health care costs within the diabetes population?
2. If there are cost savings attributable to DCMP, do these cost savings offset the total administrative costs of the program?
3. Does the DCMP result in decreased acute inpatient admissions for those admissions related to diabetes?
4. Do the DCMPs result in decreased ER utilization for those admissions related to diabetes?

The setting for this study was HHS Texas Management, LP, (HHSTM), a Medicare Advantage health plan. This health plan is headquartered in Houston, Texas, with a Medicare population of approximately 19,610 total covered lives - including subscribers, spouses, and dependents - as of January 1, 2005.

The administrative dataset used in this study includes demographic data as well as medical claims and professional claims. The dataset consists of strictly de-identified member-level information containing 24 months of paid claims from January 1, 2005, through December 31, 2006, with an additional 3-month claims run-out to allow for claims payment through March 31, 2007.

To facilitate comparison of members across time, members in the study sample were aligned according to the month of first intervention, or touch, so that, regardless of when the member entered the DCMP, all members had a time zero month of initial intervention. This alignment resulted in 12 discrete cohorts of diabetic members that were analyzed; one cohort for each of the 12 months between July 2005 and June 2006, and labeled 'cohorts 1' through 'cohorts 12', consecutively. Using a quasi-experimental one group interrupted time-series study design and a cross sectional time series statistical analysis approach, the total healthcare costs, program loaded costs, inpatient utilization, and ER utilization in the pre-touch period were compared to the healthcare costs, program loaded costs, and inpatient and ER utilization in the post-touch period.

To answer the four fundamental business questions, four groups of cross-sectional time series regression analysis models were developed: The first model evaluates differences in total costs pre-post the t0 first touch point. The second model evaluates cost-savings relative

to program costs by adding program costs to the first model. These models use total allowed dollars as a continuous outcome variable and are based on an ordinary least squares panel data model. The second and third models look at inpatient utilization and ER utilization respectively and are based on cross-sectional time series Poisson regression models.

The results of the research indicated that when program participants in the post-touch period were compared to program participants in the pre-touch period, the post-touch participants in three of the 12 cohorts had average higher costs, and greater likelihood of both acute inpatient utilization, and ER utilization. The remaining nine cohorts did not show any statistically significant changes when the pre-touch and post-touch periods were compared. However, these findings do not necessarily imply that the DCMP was ineffective. The results are complicated by data losses stemming from two natural disasters – Hurricanes Katrina, and Rita - that devastated the Gulf Cost and Texas in August/September, of 2005 – about 1/3 of the way through the study. The net effect of these disasters was changes in utilization and lost or unrecoverable claims data. Pharmacy claims – which typically account for approximately 16% of total healthcare claims expense - was excluded from the analysis because it was either incomplete or unavailable. Part of the explanation for the increase in costs may be attributed to individuals transitioning from a less compliant state to a more compliant state. Costs for these individuals are typically expected to increase because the health care system that was not previously being utilized is now being utilized. However, the utilization data for outpatient claims does not clearly support this notion. The explanation for the increase in ER and acute inpatient utilization is even less clear.

Lastly, in identifying members for management, the DCMP used a retrospective and not a proactive or predictive model-based approach. This reactive approach is limited in its effectiveness because by the time the plan is aware of a significant health-related event - such as an ER visit or an acute inpatient admission – 90 to 120 days have already passed. As a result of the factors outlined above, this study needs to be conducted over a longer time horizon to effectively measure the long-term impact of the DCMP on costs, utilization, and the underlying health-related behaviors.

CHAPTER II

BACKGROUND AND SIGNIFICANCE

This chapter provides a background to the study, including a brief review of literature related to the management of diabetic patients in the U.S. In addition, the chapter contains a discussion of the significance of this research and outlines the research problems to be addressed.

Background to the Study

The prevalence of diabetes in the U.S. population, and its economic and human costs, place an enormous burden on the U.S. healthcare system, as well as on employer groups, diabetic individuals, and their families (American Diabetes Association, 2003). Both commercial and Medicare-based payers have responded to this burden by implementing diabetes case management programs (DCMPs) designed to help contain costs, ensure continuity of care, reduce unnecessary or inappropriate health services utilization, and improve health outcomes for their diabetic members. DCMP programs represent an aggressive, proactive approach to patient management which involves educating diabetic members about their condition and encouraging them to get necessary care in order to improve medication and treatment compliance. Yet, despite the ubiquitous nature of these programs (virtually every health plan offers a DCMP to its members), research on the economic and health impacts of DCMPs has been both sparse and inconclusive. Moreover, most of the limited amount of available research has been conducted by commercial payers and concerns their members; far less research has focused on the effectiveness of DCMPs within the Medicare and Medicaid populations. This paucity of research may reflect an unwillingness to disclose outcomes results or a lack of resources or motivation to investigate DCMPs, which often are implemented primarily in response to market forces. Whatever the reason, a lack of empirical study has contributed to the absence of established processes for

tracking the financial and health outcomes of diabetes case management programs by sponsoring health plans. This study seeks to address this deficit by investigating the outcomes of one DCMP designed for members of a Medicare Advantage HMO in Texas.

The CareContact DCMP Model

Regardless of the specific chronic condition or conditions being managed, most disease management programs follow one of two distinct business models: an opt-in model or an opt-out model (very rarely do companies offer both opt-in and opt-out models). Many commercial and Medicare DCMPs follow the opt-in model for program participation, that is, they enroll only those targeted members who, when contacted, expressly agree to participate in the program. The CareContact DCMP model is based on an opt-out approach, however, one designed to ensure that at least a nominal level of intervention is applied to all diabetic patients regardless of whether or not a member wishes to participate in more intensive levels of intervention and interaction with a nurse counselor. Thus, the CareContact DCMP enrolls all targeted members and excludes them only if the member specifically requests to be disenrolled during an initial interview with a nurse counselor.

Disease Management Program Interventions

Both opt-in and opt-out disease management programs require some form of consistent timely interaction with the member in order to achieve improved compliance and other desired changes in member behavior, as well as subsequent changes in utilization and costs. Such interactions, which are considered interventional processes, may take a variety of forms, including: simple postcards to remind members to get a screening exam, for example; health education materials that give members detailed information about their condition and tips for how to best manage their own care; telephone calls from nurses who act as health guidance counselors (this interaction is generally referred to as telephonic nurse counseling); reminder information that is sent to the member's primary care provider (PCP) to encourage the physician to contact the member with a reminder of the need for a screening exam or follow-up care; and any combination of the above.

In this study, any instance of an interaction between a patient and a registered nurse (RN) engaged by a DCMP, such as those described above, is referred to as a *touch*. If a diabetic member meets

one or more of the clinical criteria that trigger DCMP enrollment, for example, an acute inpatient admission, the member is considered high-risk and is targeted to receive DCMP interventions, or touches. Such high-risk members receive the same member education mailings and annual reminders as low-risk members; however, they also receive calls from nurses with specialized training in the management of diabetes.

The interaction of registered nurses with high-risk members is a key factor differentiating low-risk and high-risk members. These specially-trained nurses provide education, counseling, guidance, and assistance that help to make the member's interaction with the health system relatively seamless. The nurses work with high-risk members as well as proactively interact with the member's physicians to communicate gaps in care and notify the physician of potential compliance issues.

The DCMP model under study is based on an established clinical algorithm – a predefined set of triggers based on a combination of medical and pharmacy utilization that is used to identify members for nurse-based program participation. (The specific algorithm used in the model is discussed in detail in a later section.) This clinical algorithm determines whether or not the member should be touched by a nurse; it does not, however, dictate the amount of touch necessary to change behavior, improve outcomes, or reduce costs. The frequency of touch is dictated by the member's level of interest in participation as well as by the discretion of the nurse, who reviews the member's health claims data, looks at the member's medical records for gaps in care or evidence of non-compliance, and evaluates the member's responses on a health risk assessment.

Program Costs for 2004-2006

The DCMP studied employs 16 clinical teams, each comprised of an RN and a technical assistant who are responsible not only for diabetes, but for three other chronic conditions including coronary artery disease (CAD), congestive heart failure (CHF), and chronic obstructive pulmonary disease (COPD) as well. Based on internal documents and private discussions, the total costs of the DCMP studied, across all conditions and including initial $60,000 start-up costs for the time period January 1, 2004, through December 31, 2006, were approximately $6,425,829. The total program costs less the initial one-time start-up costs were approximately $6,365,829. Costs for the management of only diabetic members were calculated based on