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Kadir GÜRSOY*

ABSTRACT

Rising healthcare costs in nearly all nations, particularly in the United States, has been posing major challenges to stakeholders in healthcare industry. Each actor has been developing new strategies to mitigate costs. Care coordination is one of the methods many healthcare providers have been applying to remedy this problem. Cambridge Health Alliance - a public, safety net health care system serving the Greater Boston area- has been piloting a care coordination program for one of its population cohorts since November 2011. This paper evaluates the possible impact of the program on healthcare costs, analyzes cost structure for different sub-populations to understand which groups contribute most to cost reductions, and offer suggestions to achieve the highest saving. The analyses conclude there is room for curbing the cost growth when the program targets the highest cost patient and the program succeeds in changing the cost concentration of healthcare spending. Nevertheless, the analyses need to be developed further, using bigger population and a longer intervention period. Finally, it is important to support the program with other policies such as a gate keeping system, preventive care, and new alternative payment systems to sustain an impact on costs in the long-run.

Keywords: Care coordination, rising healthcare costs, cost containment, project evaluation

ÖZ

Amerika'da artan sağlık giderleri, sağlık sektöründeki paydaşlar için büyük bir sorun oluşturmaktadır. Bu yüzden her paydaş, maliyetleri kısma adına yeni stratejiler geliştirmektedirler. Kişiye özel sağlık hizmetlerinin koordinasyonu, bu sorunu çözme adına sağlık hizmeti sunucuları tarafından geliştirilen yöntemlerden bir tanesidir. Cambridge Health Alliance – büyük Boston sınırları içinde hizmet veren kamu güvenlik ağı sağlık sistemi sunucusu – Kasım 2011'den bu yana örnek bir grup için koordinasyon programının pilot uygulamasını yapmaktadır. Bu makale, bu programın sağlık maliyetleri üzerine etkisini ölçmekte, örmek grup içindeki farklı alt grupların hangisinin maliyetleri daha çok aşağıya çektiğini anlamak için maliyet yapısını analiz etmekte ve en büyük tasarrufu sağlamak için önerilerde bulunmaktadır. Analizler, programın maliyet dağılımını değiştirmede başarılı olduğu ve programın en maliyetli hastaları kapsaması durumunda maliyet artış hızında azalma sağladığı sonuçlarına ulaşmaktadır. Ama, analizlerin daha büyük bir örneklemi ve daha uzun süreli kontrol dönemini içerecek şekilde geliştirilmeye ihtiyacı vardır. Son olarak, programın; koruyucu sağlık, uzun dönemde maliyetleri sürdürülebilir hale getirecek yeni ödeme sistemleri, aile hekimi sistemi gibi başka politikalarla desteklenmesi önem arz etmektedir.

Anahtar Sözcükler: Sağlık hizmetlerinin koordinasyonu, artan sağlık giderleri, maliyet kontrolü, proje değerlendirmesi

* *Sosyal Güvenlik Uzmanı, Sosyal Güvenlik Kurumu, kgursoy@sgk.gov.tr*

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INTRODUCTION

Healthcare accounts for a remarkably large slice of the United States (US) economic pie. Aggregate spending in 2013 was $2.9 trillion, translating to $9,255 per person or 17.4% of the nation's Gross Domestic Product (GDP) (Centers for Medicare & Medicaid Services, 2014). Healthcare costs are rising steadily and outpacing the growth in overall GDP. Chronic diseases put great burden on healthcare spending. Together with the passage of healthcare reform in Massachusetts in 2006 and the Affordable Care Act in 2010, the US has embarked on major changes in the healthcare system. New models to address cost containment and quality, such as patient centered medical homes (PCMHs) and accountable care organizations (ACOs) are emerging, but challenges still remain in launching these models (Conway and Terrell, 2010).

Cambridge Health Alliance (CHA), an integrated healthcare system operating in Massachusetts, has been adapting to this transformation in the healthcare environment by developing a high-performing ACO which is striving to improve the patient experience with higher satisfaction, improved access, achieve outcomes for all patients as improved quality, and controlling the costs of healthcare (Hacker et al, 2014(1); Hacker et al, 2014(2)).

One of the elements of the transformation has been focusing on "*bending the cost curve*" by introducing a coordination of care –a system in which all of a patient's needs are coordinated with the assistance of a primary point of contact in order to ensure coordination among different line of treatment and specialization. It most importantly covers chronic-ill patients having the largest share in health spending and tries to achieve providing safer and more efficient care, as well as reducing cost by eliminating unnecessary services and improving transition of care impatient to outpatient setting (Hacker et al, 2014(1), Hacker et al, 2014(2)). CHA launched a pilot care coordination program for one of its population cohorts, consisting of patients enrolled in Medicaid managed care and the states Commonwealth Care[1], in November 2011. This paper figures out potential impact of the care coordination program on healthcare costs, and recommends some enhancements to the program to increase savings.

1 Commonwealth care is a free or a subsidized healthcare coverage program for eligible Massachusetts residents.

The paper first provides a background about CHA, describes what care coordination is, and summarizes the major outcomes of past studies on care coordination. It then details the methodology used for the analyses, underlines the main findings of the analyses. The final section brings recommendations for next steps, and draws the conclusion.

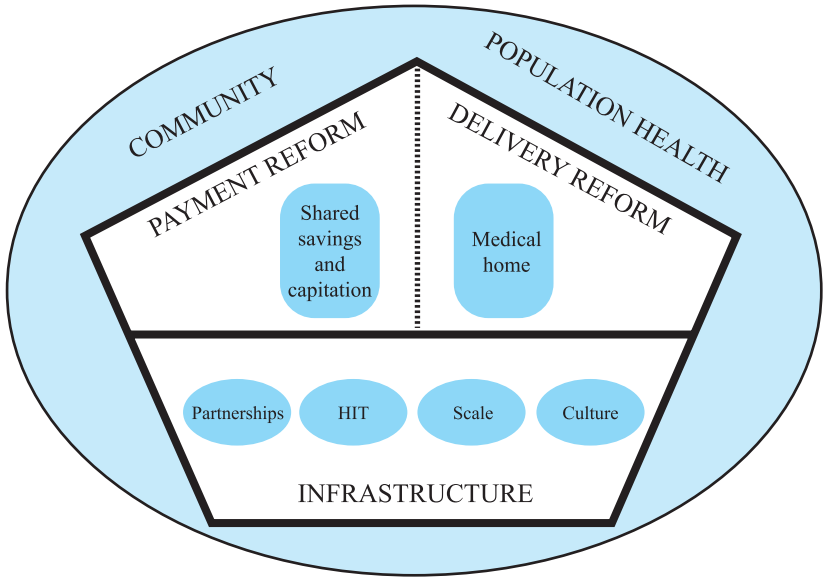
I- BACKGROUND ABOUT THE ORGANIZATION AND CONTEXT

CHA is a public, integrated healthcare system working on achieving its community health mission, serving a population of 380 thousand residents in tis primary service area (Hacker et al, 2014(1)). CHA has a critical mass of primary care providers and includes two inpatient hospital campuses, three emergency departments, a wide range of specialists, and one of the largest psychiatric departments in Massachusetts. It provides a large selection of clinical services with a special focus on primary care, community wellness, and prevention.

As a public institution, CHA provides services to a largely publicly insured or uninsured population and remains dependent on public funding. Its primary care patient population is racially and ethnically diverse and largely disadvantaged with over 40% speaking a language other than English. Approximately 15% of patients are uninsured but with state coverage, 60% have publicly funded insurance, and 25% have private insurance coverage.

Since after the healthcare reform law in Massachusetts enacted in 2006 aiming to ensure near-universal health insurance coverage, 2008 and 2010 reforms laying a foundation for cost-control (Raymond, 2011; Leighton et al, 2011), and 2012 reform for promoting the development of PCMHs and ACOs with the new payment reform in Medicaid (Gosline and Rodman, 2012), CHA has been currently transforming its system to ensure excellent patient experiences and control healthcare costs by developing a "*high-performing*" ACO - a group of healthcare providers (primary care teams, specialists, and hospitals) working together to give patients all the services they need while striving to meet certain goals (Figure 1).

Figure 1. *CHA's ACO-PCMH Transformation Model*



Source: CHA ACO-PCMH advisory work group

CHA is also participating in the Medicare Shared Savings Program, a national effort that aims to provide more coordinated, higher quality healthcare and reduce the growth of Medicare spending. The system is building new financial models that shift from fee-for-service to global payment methods relying on risk sharing agreements with private health insurance companies. For example, CHA implemented a global payment[2] initiative with Medicaid Managed Care Organization (MCO) for Medicaid managed care and Commonwealth Care members in 2010.

In order to produce higher savings in this agreement with the MCO, CHA introduced a care coordination program in November 2011 for its nearly 20,000 MCO members. The program aims at helping sickest patients, namely high-risk patients, navigate the health care system, and coordinate all the care they need and then finally mitigate healthcare costs. The

2 Global payment refers to an involvement in an arrangement with a payer in which the provider receives per member per month for each enrolled patient and savings or deficits accrued as a result of this arrangement were to be shared by CHA and MCO equally.

selection criterion of the patients to the program was based on the current prospective risk score[3] and current cost generated by the patients (the highest top 3% in spending).

In the first stage, CHA hired three centralized case managers responsible for establishing, implementing, monitoring, and evaluating cost effective care plans for high risk MCO patients[4] across the organization; one more person was added to the group in November 2012. From the launch of the program till end of March 2013, care managers have contacted a total of 150 patients and helped them receive the highest quality service.

The major focus of the team is to connect patients to primary care and community resources like area agencies on aging, supportive housing, and other social services (Hacker et al, 2014(2)). CHA is also building a program of embedded complex care management teams including a registered nurse and a social worker in each primary care clinic (Hacker et al, 2014(2)).

Based on the outcomes of this program, CHA is planning to expand it to other population groups. The outcome measures will rely on triple aims: to enhance patient experience of care with better access and satisfaction, improve outcomes for all patients with better quality, and bring down the costs of healthcare (Berwick et al, 2008). However, this paper only concentrates on evaluating the cost containment impact of the program.

II- CARE COORDINATION

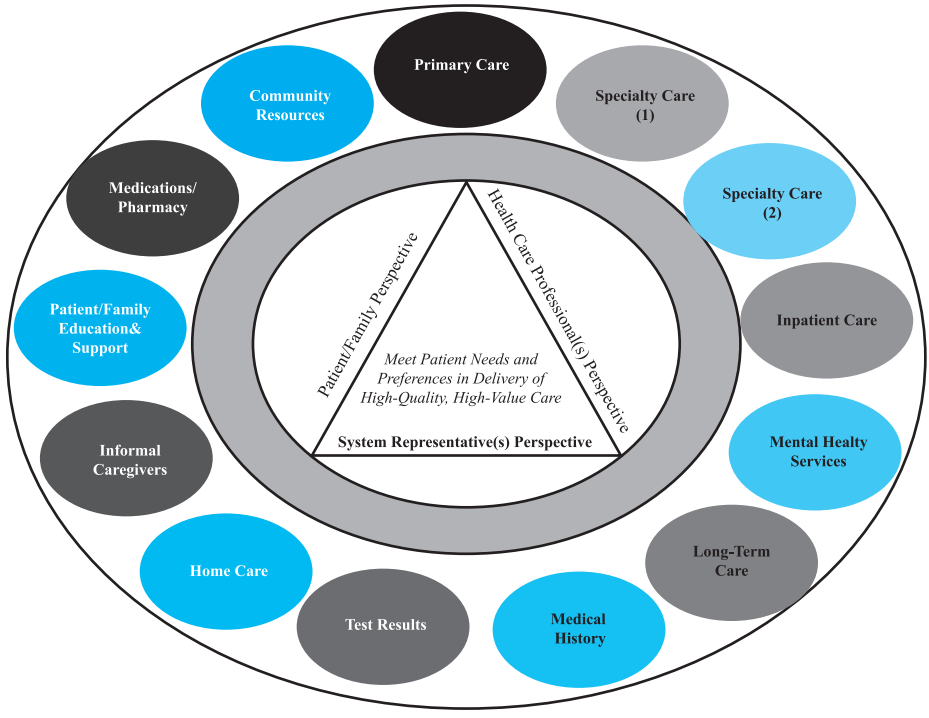
Healthcare in the US is fragmented. Clinical services are frequently organized around small groups of providers functioning autonomously and specializing in specific symptoms or organ systems. Therefore, many patients receive attention only for individual health conditions rather than receiving coordinated care for their overall health. For example, the typical Medicare beneficiary sees two primary care providers and five specialists each year (Bodenheimer, 2008). Communication of important information among providers and between providers and patients may result in delays or inaccuracies or even fail to occur at all.

3 A risk score is a numeric representation of the health status of a patient based on factors developed by the Centers for Medicare and Medicaid Services.

4 High risk patients denote the patients having multiple health and social needs that offer the greatest opportunity for cost savings in the health care system.

Care coordination, as promoted by Agency for Healthcare Research and Quality (AHQR) and adopted by CHA, is an attempt in which all of patient's needs are coordinated with the assistance of a primary point of contact; usually a care coordinator, nurse, or case manager. The CHA model places the patient's primary care practice at the center of all relevant health activity. Utilizing a patient centered approach, the primary point of contact works directly with patients, caregivers, physicians, and health care teams in both acute and ambulatory settings to better coordinate and manage patient care. Its central goal is to ensure that patients' needs and preferences are met and that care is timely, appropriate, cost-efficient and of high quality (Figure 2).

Figure 2. *Care Coordination Ring*



Source: AHRQ, 2010

AHQR states that care coordination involves deliberately organizing patient care activities and sharing all patient information among all of the participants concerned with a patient's care to provide safer and more effective care. This means that the patient's needs and preferences are

known ahead of time and communicated at the right time to the right people, and that this information is used to guide the delivery of safe, appropriate, and effective care to the patient.

Generally speaking there are two ways of achieving good care of coordination: Using broad approaches and specific care coordination activities. Broad approaches that are commonly used to improve health care delivery are the most important part for designing well-established care coordination. Teamwork, care management, medication management, health information technology, and patient-centered medical home are good examples of broad care coordination activities.

As a secondary approach, using specific care coordination activities are crucial and they include establishing accountability and agreeing on responsibility, communicating and sharing knowledge, helping with transitions of care, assessing patient needs and goals, creating a proactive care plan, monitoring and follow-up, including responding to changes in patients' needs, supporting patients' self-management goals, linking to community resources, and working to align resources with patient and population needs[5].

Care coordination has been accepted as an important step for healthcare providers to manage healthcare costs and provide high-quality services and been adopted by many healthcare providers during the last decade. There are several studies conducted to assess the impact of care coordination experiences on quality, cost, hospital admissions, and patient satisfaction. However, those studies have conflicting results; therefore we can say that there is no general consensus among the academicians and healthcare professionals whether care coordination can contain costs or not.

Nearly all those studies conducted randomized clinical trials but each focused on programs consisting of members having different demographic structure and each program had distinct settlement (Boult et al, 2011; Peikes et al, 2009; Peikes et al, 2007, Coleman et al, 2006; Engelhardt, 2006). For example, the number of patients assigned for each care coordinator differed significantly in some programs. While in some programs registered nurses took responsibility of the patients, in others

5 Care Coordination Measures Atlas, AHQR, 2011

case managers interacted with patients. In some programs intervened patients received trainings, whereas others offered no training. As a result of all those differences in the studies, it is difficult to draw a common conclusion from the literature.

The Sutter Care Coordination Program[6], adopted in 1994 and the disease management components were added between 2001 and 2005, combines chronic care and disease management to address the medical and psychosocial needs of individuals with multiple chronic conditions. As the population of individuals with one or more chronic illnesses is expanding rapidly, and the ability of the fragmented, fee-for-service health care system to meet the complex needs of these patients is limited, they adopted a care coordination program consisting of two main elements.

The primary element here is a team of registered nurses, medical social workers, and general health care coordinators who work with patients and their families or caregivers to keep those with multiple chronic conditions as healthy as possible through coordination of care; patient education; referral to appropriate medical, psychosocial, and community services; and ongoing monitoring and troubleshooting as needed. The team is supplemented, when appropriate, by specific disease management programs for those patients with heart disease, diabetes, or asthma, as well as for those in need of anticoagulation management.

As a result, the care coordination program has decreased inappropriate use of health care resources, reduced costs, and improved patient and caregiver understanding of disease process and symptom management. When compared the experience of Sutter patients who received care coordination services against Sutter patients who also had multiple chronic conditions but did not receive coordinated care services, patients receiving care coordination had:

- 24 percent fewer visits to specialists,
- 13 percent fewer emergency department (ED) visits,
- 39 percent fewer hospitalizations for acute care,

6 Sutter Health Sacramento-Sierra Region, Chronic Care and Disease Management Improves Health, Reduces Costs for Patients With Multiple Chronic Conditions in an Integrated Health System.

- 33 percent fewer outpatient visits at hospitals,
- 38 percent fewer home health care visits,
- 15 percent fewer primary care physician visits.

Furthermore, an evaluation of Sutter's care coordination program by The California HealthCare Foundation concluded that the program saved money by reducing inpatient admissions, including intensive care unit stays, for Medicare fee-for-service patients (Coleman et al, 2004). Sutter's internal studies have also shown meaningful cost savings and return on investment from the heart failure and anticoagulation disease management programs due to reductions in physician visits, ED visits, and hospital admissions, which more than offset the increased home health care and skilled nursing facility costs. Since 42% of the patients enrolled in the care coordination program have traditional fee-for-service insurance, reductions in unnecessary services for these patients can have a negative impact on Sutter's revenue stream.

Another patient-centered care coordination program, launched by Blue Shield of California, designed to improve healthcare quality and reduce medical expenses for those with complex or clinically advanced illnesses resulted in a 38% decrease in hospital admissions, reduced costs by more than $18,000 per patient, and garnered high satisfaction rates among 92% of the patients (Sweeney et al, 2007).

This study is one of the first studies to quantify actual cost reductions that result from participation in this type of expanded case management program. The 18-month study followed 756 Blue Shield of California members who were diagnosed with late-stage illness, most frequently an oncologic condition. All had access to the same benefits. Approximately half of the participants were blindly assigned to a group that received usual case management, which included traditional coordination of services, approval processes, and utilization management practices. Those designated for the program received all usual case management with additional support that included access to a registered nurse, care manager, registered nurse team manager and physician in active clinical practice. Care management registered nurse interaction included home visits and an average of two weekly member calls.

Overall, the study found that the program effectively reduced overall costs by 26 percent. The savings were realized in patients having fewer costly hospital days and emergency room visits, with care shifting to less costly home care and hospice settings when appropriate:

- hospital admissions reduced by 38 percent,
- hospital days reduced by 36 percent,
- emergency room visits reduced by 30 percent,
- home care increased by 22 percent,
- hospice use increased by 62 percent.

Finally, the average combined utilization cost of the program cohort was $49,742 per patient for the 18-month study duration, compared with $68,341 in the usual care management cohort, which average savings of about $18,599 per patient.

The main lessons that can be taken from those studies in terms of achieving the desired outcomes can be summarized as follows (Peikes et al, 2009; Boult et al, 2011; Peikes et al, 2007; Social Work Leadership Institute, 2008; Nelson, 2012; Musich S. and Paralkar S., 2007) :

- Care coordinators have an important role. They do not just simply contact patients through telephone but should interact with patients in person. They must get to know each patient, establish a personal, trusting relationship, and connect to motivators that are important to the patient.
- They need to collaborate closely with the patients' physicians.
- The benefits are highest when services are aimed at patients with the most complex conditions.

A degree of integration has great importance for the success of care coordination since highly integrated systems such as Intermountain Healthcare[7] in Utah and the Mayo Clinic system[8] have significantly achieved to control costs. The Dartmouth Atlas estimates that practicing

7 http://intermountainhealthcare.org
8 http://mayoresearch.mayo.edu/mayo/research/science-of-health-care-delivery/value-analysis-program.cfm

medicine as Intermountain would lower the costs of healthcare in the U.S. by 40% (Dartmouth Atlas of Health Care, 2008).

III- METHODOLOGY

There are many methods that can be used as a tool to evaluate the saving impact of the care coordination program on healthcare costs. The soundest approach is to run a randomized-clinical trial (RCT). On the one hand, it has many pros such as producing more reliable results and reducing spurious causality and bias. On the other hand, the conduction of a RCT takes several years to follow up the patients and is very expensive. Because of these two reasons, RCT approach was not feasible at CHA.

Another approach is to divide the time period into pre-intervention and post-intervention periods for each patient participating in the program. Then we could compute and compare the average monthly cost before and after the intervention per patient. Finally, by subtracting the average cost before intervention from after intervention we could get the monthly saving per each patient and then by adding up all savings for the participants we end up total saving figure.

Yet, with this approach the estimated saving is not good at explaining whether the saving is solely due to the care coordination. There can be other factors leading to cost reduction such as recovery after the treatment in the post intervention period, no regular appointments after the intervention. For example, assuming a patient having higher costs before the intervention now recovers from the disease and does not need to visit the healthcare provider during post intervention. Can we say that calculated savings with this approach for this patient is the real saving occurring due to care coordination? This approach will likely yield misleading results since it does not reflect the actual saving as a result of implementing the program; hence I did not prefer to use this method.

The approach I adopted was to divide the population into two groups: intervention group and non-intervention group. The intervention group consisted of patients who were assigned to the program whereas non-intervention group members were the patients who were not included in the program. Then we could calculate the annual growth rates on per member per month healthcare costs for each group. If the growth rate for

the non-intervention group were higher than that of intervention group, we could conclude that the program is successful at slowing down the growth rate in the healthcare costs. I think this approach will end up computing more accurate results compared to the previous approach since the figures will regress to the mean and reflect the impact of the program on cost containment. However, we need to admit that this analysis does not turn out as accurate outcomes as scientific studies since it only analyzes 38 intervened patients and intervention period is short, an average of 5 months. It needs to be developed with longer intervention period and bigger size of intervention group.

IV- ANALYSES

For the analyses, I pulled the monthly claim and member month[9] data from the MCO system for each patient in the population cohort between July 2009 and December 2012, but only used July 2009 to June 2012 data (The oldest cost data dates back to July 2009). In the analyses, a fiscal year of 2012 refers the timeframe between July 2011 and June 2012. In 2012 fiscal year, the population cohort consisted of nearly 19 thousand patients receiving healthcare services and only 76 patients were involved in the program.

Since I assumed that three months of tracking period would be sufficient enough to observe the saving impact for the program, I excluded patients who were in the intervention group for less than three months in the fiscal year 2012 and only picked the ones who have been assigned to case managers for at least 3 months. This decision was because case managers need time to set up the relation with the patient and other providers, and provide the cost-efficient and high-quality services for the patient to meet his/her needs. Furthermore, it is difficult to persuade the patient to cancel appointments that were scheduled prior to enrollment in the care coordination program even when the care manager believes that it is unnecessary. This resulted in the exclusion of 35 patients, the number of intervened patients in the intervention group dropped to 41. I also excluded 3 patients whose yearly costs were either so low or so large since I thought that adding those patients would affect the significance

9 Member month is the number of months that each patient stays in that population group in a fiscal year.

of my analysis and produce misleading results (Two of the patients had nearly no cost in year 2011 and one had huge costs in year 2012). In fact, I analyzed the impact including those 3 patients, and the results were misleading. Finally, I ended up only 38 intervened patients.

After dividing population into intervention and non-intervention group, I followed the steps explained in the previous paragraph. Since the program did not start at the beginning of the fiscal year 2012 and each patient had different intervention months, the calculated total saving figure does not yield annual amount. Therefore, I converted the intervened period-saving into annual saving by just multiplying monthly saving by 12 and dividing average intervention month assuming other factors stays the same throughout the year and saving pattern is linear.

V- FINDINGS AND RESULTS

A- Findings on Overall Population

In my analyses, I first computed summary statistics covering all population cohort for fiscal years 2010, 2011, and 2012 in terms of total number of members and non-cost members, total costs, yearly per member cost, average cost per member per month (CPMPM), and average member month enrolled in the MCO (Table 1). Throughout fiscal year 2012, nearly 19 thousands patients took part in that population. It is clear that the turnover ratio for this population cohort, the share of patients leaving and entering the system, was quite high. Average member month increased from 7.8 to 8.6 out of 12 months in 2012, meaning a reduction in turnover ratio.

Another interesting statistics is the share of non-cost members, the figure declined from 20% to 16% in 2012 highlighting that fewer patients record no spending in the year 2012. Annual per member cost rose by more than 20% in two years. This rise stems from two factors: increase in average member months and rise in CPMPM.

Looking at per member cost figures can be misleading since member months also play important role on the costs. Therefore, best measure to analyze the trend is to compare CPMPM and it went up by 11% in two years, reaching to $397 in 2012. *Consequently, I came to a conclusion*

that people stayed in the population cohort longer compared to previous years, the proportion of population incurring some medical expense was climbing, and healthcare costs were still on the rise on a per person basis.

Table 1. *Comparative Statistics – Whole Population (2010-2011-2012)*

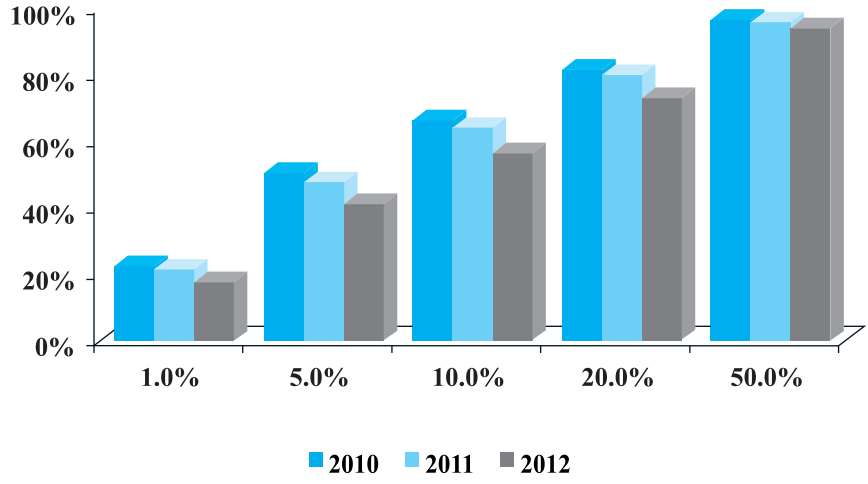
	2010	2011	2012
Number of members	20,108	18,315	18,968
Non-cost members	4,081	3,037	3,097
Share of non-cost members	20.3%	16.6%	16.3%
Total costs (in thousands)	$56,070	$55,823	$64,498
Per member cost (year)	$2,788	$3,048	$3,400
Total member months	156,293	151,598	162,546
Average # months in a group	7.8	8.3	8.6
Cost per member per month	$358.75	$368.23	$396.80

Secondly, I compared how the cost concentration of spending evolved between 2010 and 2012 for the whole population cohort to show a clearer picture how this population cohort's healthcare dollars were allocated. The concentration of healthcare spending has important implications for health policy, particularly as we think about how to control overall spending.

Healthcare spending in the US is highly concentrated among a small portion of people with high cost. According to National Institute for Healthcare Management Foundation data brief[10], 5% of the US population accounted for nearly half of the overall spending; 15% did not get any healthcare services. Based on my analysis, as seen in Figure 3, for all different population groups, each group's share of overall costs was the lowest in fiscal year 2012 relative to 2010 and 2011. For example, the sickest 5% of the population cohort consumed 51%, 48%, and 41% of the total healthcare costs in fiscal year 2010, 2011, and 2012 respectively. In addition, half of the population with the lowest spending was responsible for only 3% of total spending in 2010, and it increased to 6% in 2012. At the other end of the spectrum, only 62% of the population accounted for 99% of the total cost in 2010, whereas it rises to 70% in 2012.

10 http://www.nihcm.org/component/content/article/679

Figure 3. *Concentration of Costs (2010-11-12)*

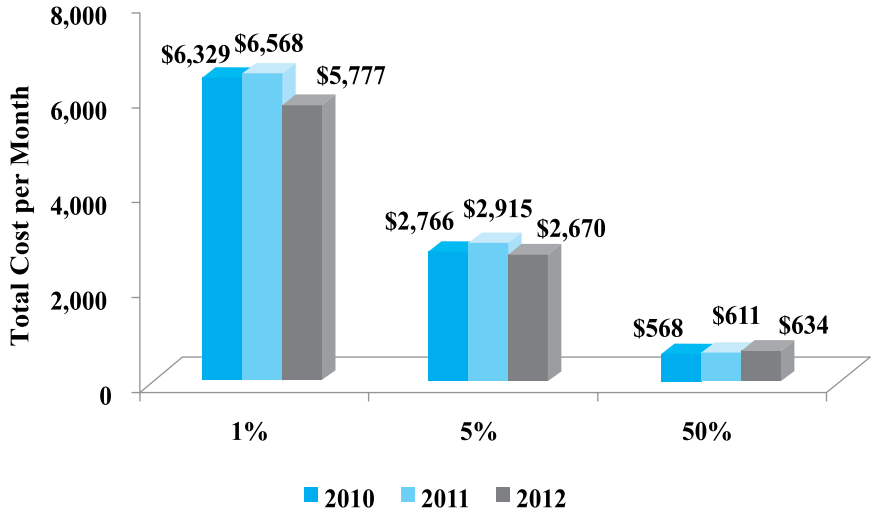


In dollar terms, CPMPM with the most health expenses in the 1 percent and 5 percent diminished in 2012 compared to those of 2010 and 2011 although CPMPM in 2012 rose by 10% relative to 2010. In 2010, monthly spending of people in the highest 1% in terms of healthcare costs averaged $6,329 person, whereas it declined by nearly 10%, reaching to $5,777 (Figure 4). Those in the top 5 percent of most expensive patients each accounted for $2,766, 2,915, and 2,670 per person in 2010, 2011, and 2012 respectively.

However, when it came to the top 50% of most expensive patients, the situation was quite different. The highest figure belonged to 2012 with $634 per person. *In the light of these statistics, it is clear that per-person spending among the highest users is substantial and represents a natural starting point when thinking about how to curb health care spending. Accordingly, we can conclude that the care coordination program works well to smooth costs for highest-cost patients even though the intervention group covered limited number of patients*.

In 2012, top 1% highest cost patients only accounted for 18% of total healthcare costs, reducing by 4 percentage points compared to 2011. Additionally, although CPMPM in 2012 increased by 7% annually, it dropped by 12% for the sickest 1% patients ($6,568 versus %5,777).

Figure 4. *CPMPM for 1%, 5%, and 50% Sickest Patients (2010-11-12)*

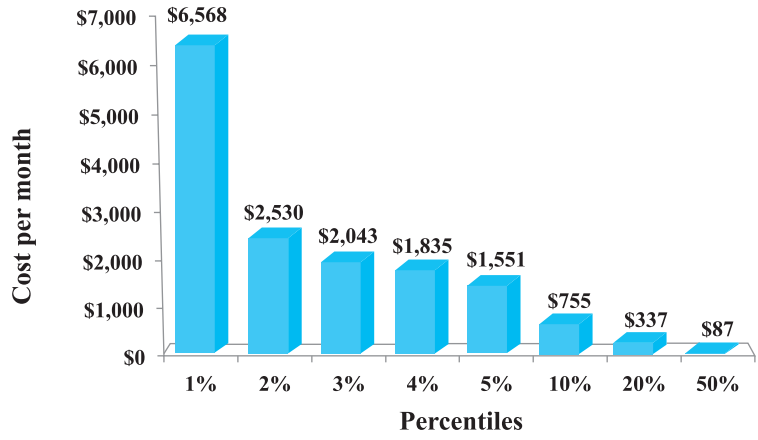


My other analysis proposed that there was huge variation among different sub-populations in terms of CPMPM (Figure 5). For example, the sickest 1% of the population spent more than two times on healthcare than the second sickest 1% group ($6,568 versus $2,530). The reduction in CPMPM slowed down as we shifted from the highest cost patients to lowest cost ones. In the 10th percentile, CPMPM only halved relative to the 5th percentile. For instance, 10% savings for 1st percentile corresponded to $660 monthly, whilst 10% savings for the 5th percentile equaled only $150. Furthermore, fully cutting down cost in the 50th percentile only generated $87 per month. *Eventually, based on those analyses, it is best to coordinate care with the highest cost patients in order to maximize savings since there is huge room for saving for those patients*.

1- Findings on Intervention and Non-intervention Groups

Most importantly, I evaluated whether the program generated any savings for the year 2012 by contrasting the growth rate in CPMPM for among intervention and non-intervention groups. CPMPM for the non-intervention group rose by 7% and reached $383 in 2012, whereas

Figure 5. *CPMPM For Different Cost Percentiles (2011)*

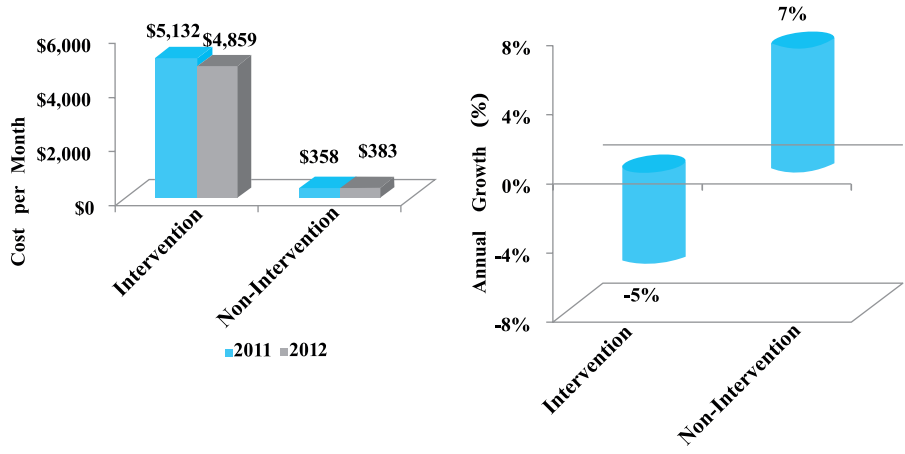


CPMPM for the intervention group dropped by 5% and aggregates to $4,859 in 2012 (Figure 6) –5% drop originated from only average of 5-month implementation of the program and if it was extended to 12 months, the reduction would most probably be much higher.

Figure 6 illustrates how each group's cost change from 2011 to 2012. The cost figures for intervention group were quite high since we know that intervention group largely included high cost patients. This comparison clearly states that care coordination program functioned well in terms of slowing down the growth rate in costs. Estimated saving per person was $16,219 annually, and total saving for 38 patients equaled nearly $650 thousands provided that the program started in July 2011 and has a full-year impact.

In order to understand which sub-group under the intervention group contributed greatly to the estimated savings, I analyzed high-cost and low-cost patients' performance. High-cost patient refers the patient who ranked in the first 100 patients in terms of total costs and remaining patients represent the low-cost ones. Among top 100 highest-cost patients, 17 patients belonged to the intervention group and 83 were not assigned to the program (non-intervention). Only 38 patients were included in the program, 17 were high-cost patients and 21 were low-cost patients (Table 2). CPMPM for the intervention group in 2011 was $7,677 and increased

Figure 6. *Cost Per Month and Annual Growth (Overall)*



to $9,635 in 2012, whereas non-intervention group consumed $5,232 per month per member on average and CPMPM rose to $7,335 (Figure 7). When it came to the annual growth rate, CPMPM for intervention and non-intervention group improved by 25% and 40% respectively, *showing that program achieves to bend the cost curve.*

Table 2. *Patient Size for Intervention and Non-Intervention Groups*

Patient Group	Intervention	Non-intervention	Total
High-cost	17	83	100
Low-cost	21	29,905	29,926
Total	38	29,988	30,026

Among low-cost patients, only 21 patients out of nearly 30,000 patients were included in the program. While intervention group spent $1,185 per month per member on average in 2011, reducing to $1,018 in 2012; 2011 figure was $339 and it increased to $348 in 2012 (Figure 8). It is obvious that intervention group generated three times higher costs than that of non-intervention since intervention group did not cover no-cost patients representing nearly 20% of the population cohort, which pulled down the average figure on the non-intervention side. In 2012 CPMPM dropped drastically by 13% and went up slightly, only 3%, for intervention and non-intervention groups respectively.

Figure 7. *Cost Per Month and Annual Growth (High-Cost Patients)*

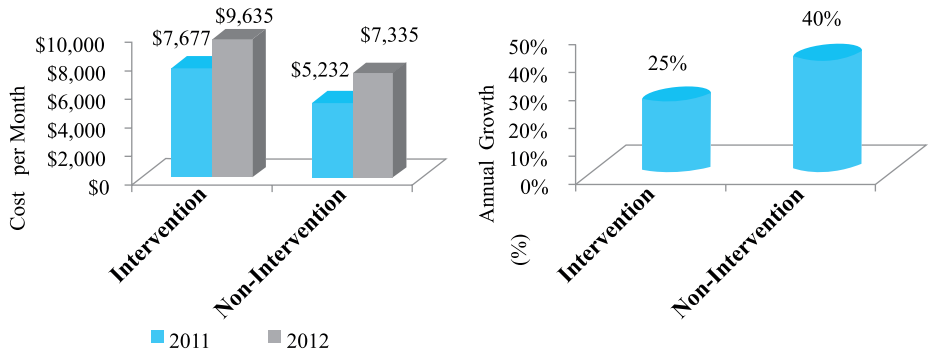


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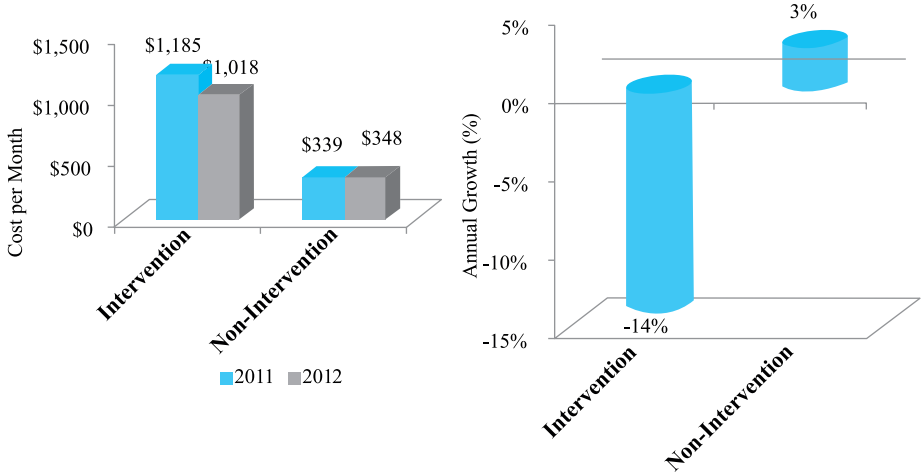
Figure 8. *Cost Per Month and Annual Growth (Low-Cost Patients)*



Interestingly, when we looked at annual savings (Figure 9), high-cost group produced nearly nine times higher savings per person compared to the low-cost group ($36,819 versus $4,209) and more than two times higher than that of overall average. *This result once again supports the idea that we need to follow the money, concentrate on high-cost patients to boost cost savings. In addition, we can conclude that care coordination will rapidly diminish savings in populations that do not generate the highest cost.*

Figure 9. *Annual Savings Per Person Comparison*

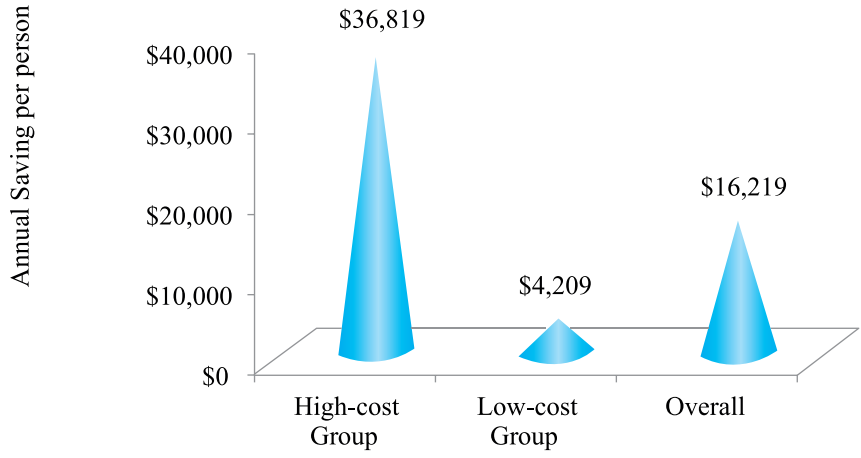
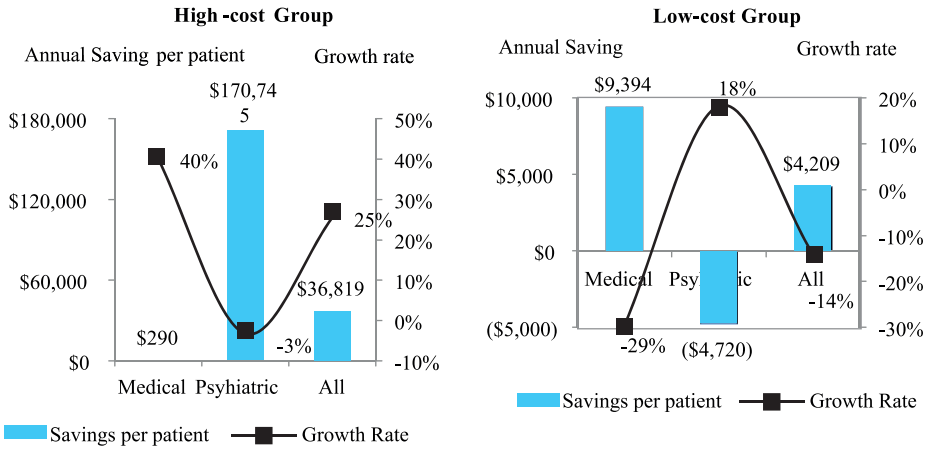


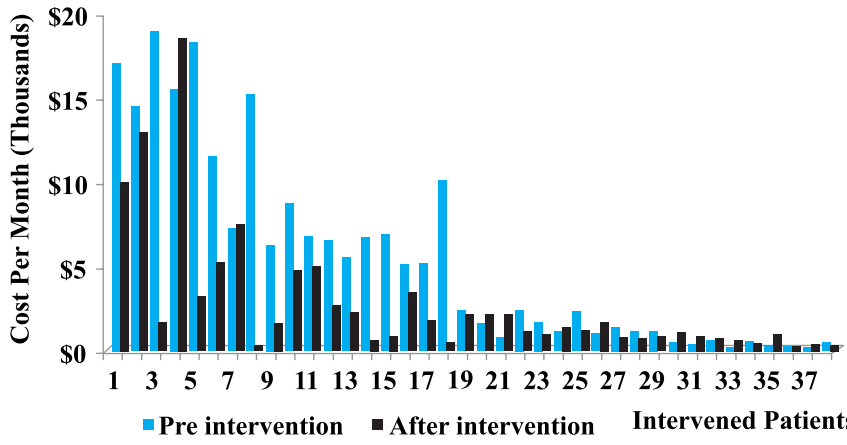
Figure 10 displays another interesting result that among high-cost patients adding psychiatric patients to the program helped bring about higher savings. Four psychiatric patients out of 17 intervened patients nearly generated all the annual savings ($170,745 per patient) in that group, whereas medical patients only had minor contribution ($290 per patient). On the other side, among low-cost patients each medical patient (total of 13 patients) lowered cost by $9,394 per member annually, whereas no savings came from the 8 psychiatric patients. In fact their CPMPM rose more quickly than that of non-intervention low-cost group, hence ran losses. *As a result, it makes sense to more concentrate on high-cost patients with psychiatric problems to mitigate healthcare costs. Consequently, reductions in spending for the patients with behavioral health conditions accounted for most of the savings in the intervention group.*

Figure 10. *Annual Savings and Growth Rates for Different Patient Types*



In order to show whether the program reduces the healthcare costs for each intervened patients, I just computed and compared pre and after intervention average monthly costs (Figure 11). For example, for patient #3, the monthly cost was $18,779 and it reduced dramatically to $1,460 after the intervention, generating $200 thousands annual savings. However, for some patients the program could not contain costs. Overall, the program saved nearly $1.3 million annually, reaching the same conclusion as in the previous analyses. *All in all, I can propose that the program achieved its aim because all those findings cannot be explained by chance; slowing down the growth rate in the costs, reduction in the costs for the sickest patients.*

Figure 11. *Pre and After Intervention Monthly Cost Comparison*



Apart from those analyses, I also planned to analyze the cost pattern using risk scores of the patients, but unfortunately could not get historical data for each patient because the MCO does not store previous risk scores of the patients in their warehouse. Instead, they only hold recent risk scores of the patients and use those scores for their analysis. Risk scores are calculated based on prospective analysis, taking into account the estimated future cost of the patients and disease structure, and each month the score can fluctuate depending on the severity of health condition of the patient. Therefore, it is really important to add risk scores as a criterion when deciding which patients to include in the program. Patient cost levels are retrospective and combining cost levels and risk scores analyses will correctly point at the patients whose costs can be contained.

Apart from my analyses, based on a case study conducted by CHA early data for 73 patients found that primary care visits doubled and hospitalization, emergency department visits and total spending declined in the first six months the patients were enrolled in the care coordination program compared to prior six months (Hacker et al, 2014)1)).

VI- NEXT STEPS

My analyses definitely draw a conclusion that care coordination program at the organization slows down the growth rate in healthcare costs under certain conditions and it states to follow the money. Yet, as told in the previous section, as a first step CHA needs to expand my analyses with bigger patient size and longer intervention period. Secondly, CHA needs to estimate the approximate size of the intervention group generating the highest savings. Then, they need to conduct cost-benefit analysis of the program and calculate net investment return. Moreover, due to limited data the risk score analysis is also missing in my analyses. Therefore CHA should store risk scores of each patient for each month and then compute whether risk score indicates the patients who have the potential for cost containment.

In the light of all those analyses, CHA will decide whether to expand this program for other population groups, then determine what percent of the total population needs be included to care coordination program and under what criteria to select the intervention group members. In addition, they will also decide how many case managers to hire to coordinate care for their intervened patient group. As a final remark, I also want to add that

adopting only care coordination to the problem will not lead to long-run cost containment; hence it is essential to support care coordination system by applying other strategies such as PCMH (Milstein and Gilbertson, 2009), gate keeping system (Ferris et al, 2001), preventive care (Cohen et al, 2008), and new payment systems incentivizing physicians for quality improvement and cost containment (Bradford and Kirkman, 1990) while offering healthcare services.

CONCLUSION

Health expenditures in US neared $2.9 trillion in 2013, nearly twelve times the $256 billion spent in 1980 (CMS, 2014). Addressing this growing burden continues to be a major policy priority and new models have been applied to improve quality and reduce costs. CHA piloted care coordination program for one its population group to lower healthcare costs after introducing risk sharing global payment with the MCO. Based on an analysis on limited data, the program proves to be a good investment strategy. It succeeds in bending the cost curve, changing the cost distribution, and finally generating savings on cost containment. For example, while CPMPM rose by 40% for the non-intervention group, it only increased by 25% for the intervention. Additionally, CPMPM in 2012 increased by 7% annually, whereas it dropped by 12% for the sickest 1% patients ($6,568 versus %5,777). Additionally, even though I did not know the exact cost figure of the program, the estimated annual saving of the program would well cover the costs, generating a positive net return.

The prerequisites for a positive net return indicate to follow the money and focus on the highest cost patients, and limit the member size of the program. Otherwise, lack of savings and even losses as in low cost psychiatric patients from low-cost patients balance out the savings generated from high-cost patients.

I believe that this paper shows a clear pathway on the program evaluation. However, it has some shortcomings that the evaluation period is less than a year so it is difficult to estimate the most probable saving amount and most importantly the analysis only covers 38 patients even though the result regresses to the mean. Then it is better for CHA to update and even develop the analyses further by next year with bigger member size and longer intervention months.

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