

# Small Intervention, Big Impact:

## Health Care Cost Reductions Related to Medically Tailored Nutrition

June 2018



### Introduction

#### **"Your meals saved my life."**

For nearly three decades, we've heard these words from many grateful clients who believe the meals they received from Project Angel Heart were one of the reasons they were able to successfully manage their life-threatening diagnosis. Health care providers, too, have shared stories about patients whose blood work or symptoms improved once they began receiving deliveries of medically tailored meals.

These stories, coupled with favorable outcomes from clients, have long led us to believe that home-delivered, medically tailored meals lead to improved health and decreased health care costs for meal recipients. However, accessing data to demonstrate the actual impact of the meals on patients' health—and on their pocketbooks—has always been challenging.

In 2013, we partnered with the Center for Improving Value in Health Care (CIVHC), the administrator of the Colorado All Payer Claims Database (CO APCD), to conduct a retrospective analysis of clients' medical costs before, during, and after receiving meals. The CO APCD is a database that collects actual paid amounts from claims data submitted by Medicaid, Medicare, and commercial health insurance plans.

With health care policy in the U.S. rapidly evolving and health care costs on the rise, the timing was right for us to do such a study. Interest in social determinants of health—non-medical factors like food, housing, and transportation that can impact health and quality of life—was also increasing. Public officials and health care practitioners alike were anxious to find innovative, low-cost ways to improve patient outcomes, especially for people often referred to as "high utilizers."

High utilizers are generally people living with multiple chronic conditions and other social factors affecting either their health or their ability to manage their diagnoses. Nationally, the top five percent of individual high utilizers account for about 50 percent of overall health care expenditures.<sup>1</sup>

Project Angel Heart clients tend to be high utilizers. On average, clients are living with seven concurrent diagnoses, more than half report a behavioral health diagnosis, and more than 60 percent live in poverty, indicating that they are likely to have trouble accessing proper food and nutrition. The difficulties faced by people with chronic illness aren't specific to Colorado; nationally, one in three individuals living with a chronic illness has to choose between buying food or medication.<sup>2</sup> For clients, meals can serve a number of purposes, from improving overall health, to reducing stress, to helping them better adhere to their prescribed medical regimens.

With this study, we hoped to learn more about the impact medically tailored meals have specifically on clients' health care costs. Using claims data from the CO APCD, we sought to answer:

- 1) Does providing medically tailored meals impact health care costs for chronically ill individuals?
- 2) Do chronically ill individuals who receive medically tailored meals have lower health care costs than those who do not?



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## Background

### What is Project Angel Heart?

Project Angel Heart is a nonprofit organization located in Colorado that prepares and delivers medically tailored meals to individuals living with life-threatening illnesses. The organization was founded in 1991 and today provides meals to more than 3,000 Coloradans annually. The majority of Project Angel Heart clients are living with multiple co-occurring diagnoses, and their medical and nutritional needs are complex and often difficult to manage.



Project Angel Heart currently offers two programs. The core program is community-funded and provides medically tailored meals at no charge to qualifying individuals referred by a health care provider. The other program, Meals for Care Transitions, is funded by health care organizations and/or insurance providers and provides meals at no charge to patients or members with an aim of reducing hospital readmissions and/or supporting individuals after an acute medical episode.

Our meals are prepared by hand using fresh ingredients, frozen, and then delivered weekly to the homes of clients. Meal bags include entrées, soups, a small dessert, bread, fruit, and milk. Clients who are severely underweight or malnourished also receive a breakfast bag containing items such as breakfast cereal, hard-boiled eggs, yogurt, peanut butter, and milk.

Survey data from clients participating in our core program is collected after four months of service and annually thereafter. Survey results indicate that a majority of clients believe that medically tailored meals contribute to improved or greatly improved physical, emotional, and financial health, as well as improved quality of life.

### Of clients surveyed in 2018:



82% report less stress



72% report improved ability to afford basic needs



60% report improved energy



70% report our meals allow them to live at home



63% report improved health



72% report improved quality of life



69% report improved adherence to their health care plan

## What other research tells us about food as medicine and its potential financial impacts

According to a study published in 2017, the U.S. spends more on health care—\$9,237 per person, per year—than any other country<sup>3</sup>. Why so much? There are many factors, but the cost of treating chronic diseases is largely to blame. In fact, two-thirds of total U.S. health care expenses can be attributed to adults with chronic conditions.<sup>4</sup>

So what can be done to reduce the economic impact of chronic disease? There is evidence that addressing the social determinants of health—providing medically tailored nutrition, for example—can be an effective way to reduce health care costs, especially for individuals with chronic illness. Studies completed by organizations similar to Project Angel Heart have shown a correlation between the delivery of social services and improved health outcomes:

- A study by MANNA, an organization that provides medically tailored meals and nutritional counseling to people with serious illnesses in Philadelphia, PA, used medical claims data to explore the health care costs of 65 MANNA clients over time. The study revealed that clients' health care costs decreased by \$10,764 per month in the first three months of receiving medically tailored meals.<sup>5</sup>
- Project Open Hand, an organization that provides nutritious meals to critically ill individuals in San Francisco, CA, partnered with the University of California San Francisco on a study involving more than 50 clients living with diabetes, HIV/AIDS, or both. The study showed increases in the number of people with diabetes who achieved optimal blood sugar control, and decreases in hospitalizations or emergency department visits. Additionally, HIV-positive clients who received healthy food and snacks from Project Open Hand for six months were more likely to adhere to their medication regimens, and they, along with clients with type 2 diabetes, were less depressed, and less likely to make trade-offs between food and health care.<sup>6</sup>
- In a study conducted by Community Servings (a Boston-based nonprofit organization), Massachusetts General Hospital, and Commonwealth Care Alliance, researchers compared a group of 133 people receiving Community Servings' medically tailored meals and 624 people receiving non-medically tailored meals to a control group. Researchers found that participants receiving home deliveries of both medically tailored and non-medically tailored meals experienced fewer emergency department visits and emergency transportation services than those in the control group. Individuals who received medically tailored meals from Community Servings also had fewer inpatient admissions than the control group, resulting in a 16 percent net reduction in health care costs.<sup>7</sup>

Inspired initially by MANNA's study—and later by research being conducted by other organizations providing medically tailored meals—we sought to complete a similar analysis, utilizing a larger study population. A larger study population made it possible for us to segment data and impact by clients' primary diagnosis, insurance provider, and line of service. Our aim was to add to the body of research on this topic and demonstrate a return on investment for funders and policy makers interested in this unique approach to health care.

## What are medically tailored meals?



Medically tailored meals are meals approved by a registered dietitian nutritionist that use evidence-based guidelines to ensure positive health outcomes.

At Project Angel Heart, clients and/or their health care providers may select a diet based on the clients' nutritional needs: standard healthy diet, renal-friendly (lower in sodium, potassium, and phosphorous), heart-healthy (no added sodium or sugar, lower in saturated fat), vegetarian (no meat or fish), allergy-friendly (limits a number of common allergens), and naked/bland (no sauces or seasonings). Texture modifications and additional dietary requests to accommodate allergies, side effects, and religious beliefs—such as gluten-free, no pork, low-vitamin K, pureed or small-diced, and/or nut-free—can be combined with any of the diets listed above.

## Methods

This retrospective data analysis used health insurance claims data from the CO APCD to calculate per-member-per-month health care costs for Project Angel Heart clients for the six months prior to receiving medically tailored meals. These costs were compared to costs incurred while receiving meals. Costs were then broken out by where they were incurred (inpatient, outpatient, professional, pharmacy, emergency department, or total), and segmented by primary disease diagnosis and the insurance provider of meal recipients.

The individuals included in this study were Project Angel Heart clients age 18 or older who:

- Participated in Project Angel Heart's core program
- Received medically tailored meals (five to ten meals per week, delivered free of charge) for any given month(s) from January 2010-June 2013
- Were diagnosed with at least one of the following diseases: cancer, congestive heart failure, chronic obstructive pulmonary disease, diabetes, end-stage renal disease, HIV/AIDS, or multiple sclerosis

- Were not on hospice and/or did not pass away while receiving meals

Using this criteria, more than 1,800 Project Angel Heart clients were identified and 708 were able to be matched with sufficient claims records for analysis. These individuals made up the intervention group.

We also compared the per-member-per-month health care expenditures of the intervention group (meal recipients) to expenditures, over 12 months, of a matched control group. The control group was created using a propensity score matched to the intervention group. Weighted regression helped isolate the effect of medically tailored meals on Project Angel Heart clients as compared to the control group.

Please note that study results include only individuals covered by Medicaid or Medicare, or those who were dual-eligible. Project Angel Heart clients covered by commercial insurance were eliminated from the study as there were too few to provide accurate study results.



### Case study: Latonia, congestive heart failure

For Latonia, 37, the path to her congestive heart failure diagnosis started with dental work. Following treatment for a gum abscess and related dental cleaning, she was admitted to the hospital with a fever of 106 degrees. She was diagnosed with endocarditis, an infection where bacteria from another part of the body, like the mouth, spreads through the bloodstream and attacks heart tissue. She ended up having open heart surgery.

Twelve years have passed and Latonia, a former correctional officer, now has a 5-year-old son. She's had two additional heart surgeries, uses a cane, and has dealt with other health complications stemming from her heart condition or her medications. She also now has a pacemaker.

"It's difficult for me to stand for long periods of time," said Latonia. "It's easy to get short of breath or fatigued." And due to fluctuations in her blood pressure, she often gets light-headed or dizzy. Seeing she was struggling with meal preparation, Latonia's home health nurse suggested medically tailored meals from Project Angel Heart.

"Before getting the meals," said Latonia, "I was having to go see my doctor once or twice a month. Now I don't have to go more than once every three or fourth months." Her doctor says her heart is doing well, something Latonia attributes to eating the right foods and feeling less stress, which eases strain on her heart. "Eating the low-sodium meals and the vegetables and fruit provided make me feel like I have a little more energy," said Latonia.

"Before I started getting the meals, there were days where I was very, very fatigued. I have fewer days like that now."

# Results

Reductions in total monthly health care expenses during the intervention period (the timeframe during which clients received meals) were observed for the majority of Project Angel Heart clients, though positive results were not seen with all diagnoses, and not all results reached statistical significance. Key findings are described below.

## Medically tailored meals lead to a decrease in hospital readmissions

Thirty-day, all-cause hospital readmissions across diseases and insurance providers dropped by 13 percent during the time that Project Angel Heart clients received meals. See Figure 1. With the cost of an average hospital readmission in the U.S at \$13,430, this reduction in preventable readmissions has the potential to result in significant savings for individuals and health care insurance providers.<sup>8</sup>

## Significant cost reductions for people with CHF, COPD, and diabetes

Clients with a primary diagnosis of congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), or diabetes saw the greatest reductions in total medical costs while receiving meals, with statistically significant reductions in cost ranging from \$416/month to \$736/month. On average, total medical costs for people in this group were reduced by 24 percent during the time that they received meals. See Figure 2.

Figure 1: Readmissions, All Payers / All Diagnoses

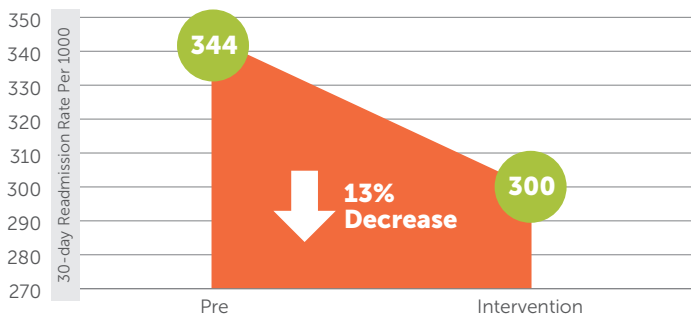
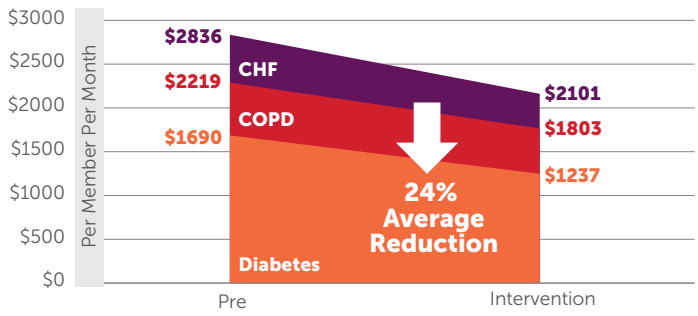


Figure 2: Total Medical Costs, All Payers/CHF, COPD, Diabetes



| Diagnosis | Pre/Intervention PMPM reductions |
|-----------|----------------------------------|
| CHF       | \$736; p≤0.001                   |
| COPD      | \$416; p=0.004                   |
| Diabetes  | \$453; p=0.002                   |



**\$4.2 Million  
in Annual Cost  
Reductions**

## Home-Delivered Meals Lead to Cost Reductions in Preventable Health Care Costs

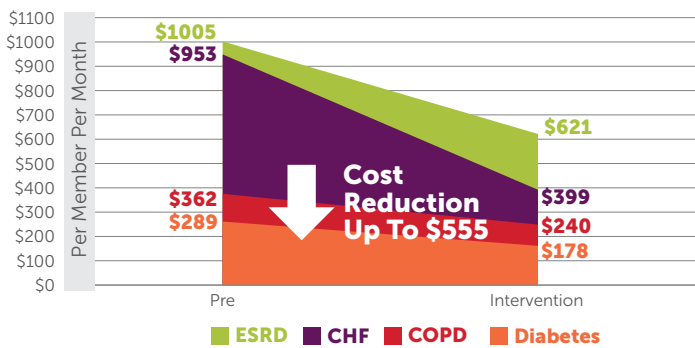
Let’s do the math. If we applied the average monthly reductions in total medical costs **just** to the clients Project Angel Heart plans to serve this year with CHF, COPD, and diabetes (an estimated 1,740 people out of 3,000 to be served in 2018) and then factored in clients’ average length of service, the projected total reduction in preventable health care costs in 2018 would be \$4.2 million!\*

\*Costs are not adjusted for inflation and do not include the cost of meals. Additionally, clients with multiple conditions may have been double-counted in this calculation.

Inpatient cost reductions ranging from \$111 to \$555 per month

We have long theorized that the delivery of medically tailored meals helps keep people out of the hospital, and that appears to be true, at least for a segment of the Project Angel Heart client population. Average inpatient cost reductions ranging from \$111 to \$555 per-member-per-month were observed for clients living with CHF, COPD, diabetes, and end-stage renal disease (ESRD), of which reductions for CHF and ESRD were statistically significant. See Figure 3.

Figure 3: Inpatient Costs for Clients Living With CHF, COPD, Diabetes & ESRD



| Diagnosis | Pre to Intervention PMPM reductions |
|-----------|-------------------------------------|
| CHF       | \$555; p≤0.001                      |
| COPD      | \$122; p= .1260                     |
| Diabetes  | \$111; p= .1180                     |
| ESRD      | \$384; p=.0047                      |

Discussion

How do the results for Project Angel Heart clients compare to those of people with similar health issues who did not receive medically tailored meals?

To attempt to answer this question, we compared Project Angel Heart clients to a propensity score matched control group. The control group comparison also showed strong trends toward decreased medical costs for those who received meals, though savings varied by disease and insurance provider, and not all cost savings were statistically significant. Similar to what we learned by analyzing Project Angel Heart clients’ medical costs before and while receiving meals, the most consistent cost reductions were for clients living with CHF, COPD, and diabetes.

Creating a control group with claims data that matched Project Angel Heart clients was challenging as our clients had varying spending patterns, forcing us to base the control group on only the interquartile range (the middle 50 percent) of clients. This means that clients with both the highest (high utilizers) and lowest medical expenses were eliminated from the intervention group.

As a result, the impact of meals on clients, as compared to the control group, is likely understated. Given this limitation, we believe that further research is warranted.

What about the cost of the meals?

These savings do not include the cost of the home-delivered, medically tailored meals. During the time that clients included

in the study received meals, we estimate the monthly average cost of the meals provided (which included 5-10 meals per week, depending on specific clients’ nutritional needs, and includes overhead costs) to be \$199.54.

What happened when these clients stopped receiving meals?

Total monthly medical costs increased when meal deliveries stopped, although in most cases participants’ post-service total medical costs were still less than their pre-service costs. The rate of hospital readmissions returned to pre-service levels when clients stopped receiving meals.

Seven diseases were analyzed in the study. What did the data reveal about people living with one of the other primary diagnoses (cancer, end-stage renal disease, HIV/AIDS, multiple sclerosis)?

Cancer: Unfortunately, we were unable to control for the type, stage, and severity of cancer in the medical claims data; therefore, study results were inconclusive. Overall, however, Medicare and dual-eligible (eligible for both Medicaid and Medicare) populations did see a reduction in per-member-per-month total medical costs during the time that they received meals.

End-stage renal disease (ESRD): The study revealed statistically significant reductions in total medical costs for individuals on Medicaid (reduction of \$3,038 per-

member-per-month,  $p=.0115$ ) who received meals, compared to the six months prior. However, there were less than 10 participants in this category, making it hard to apply the cost reductions to a larger population. The finding indicates an area that could benefit from further research. Across all insurance providers, Project Angel Heart clients with ESRD experienced significant per-member-per-month reductions in inpatient costs when receiving meals (reduction of \$384,  $p=.0047$ ).

**HIV/AIDS:** Surprisingly, costs *increased* for Project Angel Heart clients living with HIV/AIDS when meal deliveries started. Given the trajectory of the disease, we can assume that these individuals were experiencing complications and/or their disease had progressed, which led to an increase in medical expenses as well as a referral for Project Angel Heart's service. Notably, however, as compared to the control group, Project Angel Heart clients living with HIV/AIDS had significantly lower per-member-per-month inpatient costs if they were on Medicaid (\$110 lower,  $p\leq .05$ ), outpatient costs if they were on Medicare (\$92 lower,  $p\leq .01$ ), and pharmacy costs if they were dually eligible (\$1,161 lower,  $p\leq .01$ ).

**Multiple sclerosis (MS):** Given the trajectory of the disease, Project Angel Heart often serves individuals living with relapse-remitting MS, which is when symptoms flare up

between periods of recovery or remissions. As such, meal service is often provided to individuals when symptoms are flaring, which is often accompanied by increased medical costs due to the symptoms. Data from this study supports this narrative, as meal recipients had *increased* medical costs across all insurance providers and most lines of service.

#### **Were there differences in results based on the insurance provider of participants?**

The most significant cost reductions were observed for clients covered by Medicare as well as for dually eligible clients across different diseases and lines of service. We were particularly encouraged by a statistically significant reduction of 14 percent in total medical costs for Medicare populations when they received meals, as compared to the six months prior ( $p=.002$ ). Though expected, we observed few areas of significant cost reductions for clients covered by Medicaid.

#### **Where can I get additional information about this study?**

A more technical write-up, including detailed methodology, results, and additional information on limitations, is available. To request this information, please call 303.830.0202 or email [info@projectangelheart.org](mailto:info@projectangelheart.org).



## More good news about medically tailored meals and hospital readmissions

The positive impact of medically tailored meals on hospital readmissions has been even greater for people participating in Meals For Care Transitions, a Project Angel Heart program where health care providers and/or insurance providers reimburse for medically tailored meals for patients—often upon release from a hospital or other care facility. In a pilot program, more than 100 patients from HealthONE hospitals—most with either CHF or COPD—received 30 days' worth of medically tailored meals upon release from the hospital. Participants who received meals had a self-reported readmission rate of only 15 percent, compared to national average readmission rates of 23 percent for people with a COPD diagnosis and 25 percent for those with a CHF diagnosis.

## Conclusion and Recommendations

Overall, study results demonstrate cost reductions attributable to medically tailored meals across various diagnoses, insurance providers, and lines of service, although not all results reached statistical significance and several of the data sets had limitations due to sample size. These results suggest that medically tailored meals can be an effective intervention for reducing overall health care costs, as well as reducing the frequency of, and costs associated with, hospital readmissions for individuals living with chronic disease. As health care organizations work to contain costs while solving complex care issues, this study suggests meals should be considered an innovative approach to the future of medicine and chronic disease treatment.

Additionally, we believe the results of this study, in conjunction with results from other similar studies, indicate the need to incorporate medically tailored meals into the continuum of care for chronically ill individuals. As such, we recommend the following:

1) **Integrate medically tailored, home-delivered meals into health care delivery and payment models**

Medically tailored meals work. Providing these meals is a simple, low-cost intervention that can lead to improved health and reduced health care expenses for people living with chronic disease. We believe that it's time for medically tailored meals to be considered a key component of disease treatment and, therefore, a reimbursable benefit included in public and private health plans. Let's explore public-private partnerships and policy changes that lead to this outcome.

2) **Continue to evaluate the impact of medically tailored meals on health outcomes and costs of chronically ill individuals**

Creating a control group using medical claims data was complex and challenging, but led to valuable insights. We recommend future research that integrates clinical markers, demographics, and quality of life indicators—none of which are possible in an analysis of claims data—to help us better understand the impact of medically tailored meals on chronically ill populations.

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