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BENEFITS TO OPENING A COMPREHENSIVE OUTPATIENT
MEDICAL NUTRITION THERAPY CENTER

BY

Veronica Serrano, MS, RD, LD/N, CDM

A doctoral project submitted to the faculty of the Medical University of South Carolina
in partial fulfillment of the requirements for the degree
Doctor of Health Administration
in the College of Health Professions

TITLE OF DISSERTATION

BY

Veronica Serrano, MS, RD, LD/N, CDM

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Abstract of Dissertation Presented to the
Medical University of South Carolina
In Partial Fulfillment of the Requirements for the
Degree of Doctor of Health Administration

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Chairperson: Dr. Abby Swanson Kazley
Committee: Dr. Dunc Williams
Melissa Santoro, RD

Medical Nutrition Therapy (MNT) can reduce costs related to medication, physician utilization, and hospital admissions in addition to improving patient clinical outcomes (Morris et al., 2017). MNT can be a cost-effective way to manage co-morbidities and prevent or delay the progression of chronic disease(s) (Morris et al., 2017). While registered dietitians have always played a vital role in the health of their patients, reimbursement for medical nutrition therapy services is limited. During a patient's hospital admission, dietitians prescribe nutrition interventions and implement a plan of care. After a patient is discharged, they often are not followed by a dietitian. Current healthcare systems lack the ability for patients to continue the reinforcement education needed to sustain nutritional improvements. The development of a comprehensive outpatient MNT center can provide patients with access to a dietitian post-discharge. Literature review consensus is favorable towards post-discharge nutrition interventions being effective at reducing unplanned readmissions, decreasing mortality rates and improving patient quality of life. Increasing patient access to MNT can not only yield profits from services rendered but, downstream the healthcare system can see positive impacts through the reduction of unplanned readmissions, costs of hospital services rendered, length of stay and Physician utilization (Briggs Early & Stanley, 2018; Toulson Davisson Correia et al., 2021).

Keywords: *DHA, Doctorate in Healthcare Administration, Medical Nutrition Therapy, Outpatient Medical Nutrition Therapy, MNT, Outpatient MNT*

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CHAPTER I INTRODUCTION

1.1 Background and Need

Medical Nutrition Therapy (MNT) can reduce costs related to medication, physician utilization, and hospital admissions in addition to improving clinical outcomes for patients (Morris et al., 2017). MNT is a cost-effective way to manage co-morbidities and prevent or delay the progression of chronic disease(s) (Morris et al., 2017). Overall, positive health outcomes and improvements in quality of life for patients were reported (Morris et al., 2017). Registered dietitian (RD) interventions can help reduce the number of visits made to physicians, the number of prescription drugs needed, the number of emergency room visits, hospital admissions, and re-admissions; along with costs associated with laboratory testing amongst obese patients (Sheils, Rubin, & Stapleton, 1999). According to the National Institute of Diabetes and Digestive and Kidney Disease (NIDDKD), obesity can lead to diabetes, which can cause renal dysfunction, possibly leading to dialysis treatment and other less favorable health outcomes such as cancer and heart disease (2018). Implementing MNT to help treat obesity and prevent/manage disease progression is a much better use of healthcare dollars and a reduction in downstream utilization (Sheils, Rubin, & Stapleton 1999; Morris et al., 2017).

While registered dietitians have always played a vital role in the health of their patients, reimbursement for medical nutrition therapy services is limited. Medicare Part B has strict criteria for covering MNT services and is specific to patients with a medical diagnosis of diabetes or kidney disease (Medicare, n.d.). Meanwhile, RDs generate income for with billing and reimbursement by using MNT to diagnose and treat malnutrition. As an example, facilities that trained clinical dietitians reported an increase in revenue of \$57.2 million reimbursement dollars in one year, related to malnutrition diagnoses, designation of severity, as a major

comorbidity or complication and treatment (JAND, 2017). However, being discharged from the hospital does not ensure that patients are able to function at home. According to a press release from the Journal of the Academy of Nutrition and Dietetics and Nutrition (JAND) about 20 to 50% of adult patients admitted to hospitals are at-risk for malnutrition and only about 7% have a diagnosis or documentation related to malnutrition (2017). According to the JAND press release, patients with malnutrition have a 54% higher chance of readmission, readmission costs are about 26-35% higher and those patients are five times more likely to pass away in the hospital (2017).

Quality improvement and practice improvement measures data showed that a significant percentage of patients diagnosed with malnutrition were being readmitted to the hospital (JAND, 2017). During an inpatient admission, dietitians prescribe nutrition interventions and implement a plan of care. However, after a patient is discharged, they often are not followed by a dietitian.

The current system lacks the ability for patients to continue to get reinforcement to sustain nutritional improvements. The development of an outpatient MNT center will provide a mechanism to allow patients to have access to a dietitian post discharge. Patients would receive MNT for various co-morbidities such as malnutrition, diabetes, cardiovascular disease, etcetera. MNT provided by a registered dietitian is a crucial component for preventing readmissions.

The Centers for Medicare & Medicaid Services (CMS) has a value-based program, The Hospital Readmissions Reduction Program (HRRP) aimed at improving care coordination by involving patients, their families and/or caregivers to reduce readmissions that are considered avoidable (n.d.). As of October 2012, CMS reduced payments for excess readmissions and delineated the following conditions or procedures as high risk for 30-day unplanned readmission: acute myocardial infarction (AMI), chronic obstructive pulmonary disease (COPD), heart failure (HF), pneumonia (PNA), coronary artery bypass graft (CABG) surgery and elective primary total

hip arthroplasty and/or total knee arthroplasty (THA/TKA) [CMS, n.d.]. A three-percent payment reduction is applied to the Medicare fee-for-service base rate for each diagnosis-related group (DRG) payment during the Medicare fiscal year, which runs from October 1 to September 30, of each year (CMS, n.d.).

Changes in payment regulations affecting MNT are of relevance for developing a sustained revenue stream for delivering outpatient MNT. As of January 2020, dietitians are able to participate in Merit-based Incentive Payment System (MIPS) for delivering MNT and the Medical Nutrition Therapy Act of 2021 was introduced to the House of Representatives on May 22, 2020 (CMS, n.d.). This new bill will expand reimbursement for additional co-morbidities. Further, there are various payment models which allow for dietitians to receive payment for services rendered. Medicare reimbursement is the very limited to only covering for MNT services if treating patients with diabetes and/or end stage renal disease or if the patient had a kidney transplant within the last 36 months (Morris et al., 2017). CMS allows for dietitians to receive payment from local carriers for MNT under Medicare Part B without requiring co-payments (CMS, n.d.). Medicare Advance Plans do require a co-pay and the dietitian must be enrolled as a provider, Managed Care is also another excellent way to receive reimbursement (CMS, n.d.). Table 1.1 illustrates the reimbursement models, gaps and available Current Procedural Terminology (CPT) codes for billing of MNT services. Figure 1.1 illustrates the distribution of payments to Medicaid Managed Care Organizations (MCOs) across the United States (Hinton et al., 2020). Lastly, private pay policies are expanding their clinical dietitian/outpatient nutrition services coverage, which will allow for the outpatient center to be financially successful. Thus, barriers to reimbursement and sustained funding for outpatient MNT have been lowered. However, the health system has yet to adjust and provide the needed

services. A few innovative programs exist, but the information and business plans needed to build sustainable outpatient MNT programs are not generally known.

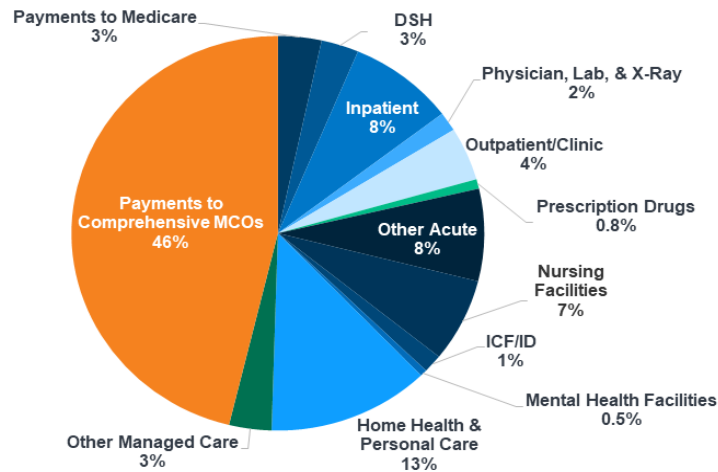
Table 1.1: Payment Models and Gaps^a

Level of Intervention	Examples of Service	Payment Models	Coverage/Payment Gaps
Level 1: Primary Prevention/Low Acuity)	Community Assessment & Program Development, Screening; Education/Monitoring; Community Resources ; MNT-prediabetes	Fee-for-Service; Fee-for-Service with Links to Quality; Population-Based Payments	Lack CPT Code(s) for Nutrition Screening; 97802, 03 (initial and re-assessment; 97804 (group); G0270, 71 (MNT tx for change dx, individual and group); G2061, 62, 63 online assessment and follow-up
Level 2: Secondary Prevention/Moderate Acuity	Nutrition, Knowledge/Skills Assessment; MNT, DSMT Goals Setting, Intervention & Monitoring; Care Coordination Case Management	Fee-for-Service with links to Quality; Episode or Condition-Based Payment; Population-Based Payments	Self-Management Training (98960-62) Team Conference (99441-43) Phone Codes (98966-69) Analysis Computer Transited Data (99091) inconsistently reimbursed; RDN payment for interpretation/report of CGM (99251);MNT for prediabetes; Metabolic Sx, home visit
Level 3: Tertiary Prevention (High Acuity)	Nutrition Reassessment, Functional Status Assessment; Goals Revision; Re-education; Care Coordination; Case Management; Referral as appropriate	Fee-for-Service &/or Episode- or Condition-Based; Population-Based Payments	As above, transitions of care, home visits inconsistently reimbursed
Level 4: Catastrophic Care	Adapt services to patient status/acuity level	Fee-for-Service with links to Quality; Episode- or Condition-Based Payment; Population-Based Payments	Reimbursement for RDN services across all acute and post-acute settings include Chronic Care (99487, 89) Transitional Care (99495-96)

Note. Adapted from “Patient centered nutrition services payment model: An approach to incentivizing the routine provision of high quality nutrition services” by Fleming, M., Gill, H., Knight, I., Ogata, B., Pratt, D., Sulik, B., White J.V., Kuppich, M., Tuma, P.A., and Schofield, M. (2016). Academy of Nutrition and Dietetics. Copyright 2016 by Academy of Nutrition and Dietetics.

Figure 1.1:

Distribution of Payments to Medicaid Comprehensive Managed Care Organizations



Note. Payments to comprehensive Managed Care Organizations account for almost half of total national Medicaid Spending. From “10 Things to Know about Medicaid Managed Care,” by E. Hinton., R. Rudowitz, L. Stoylar & N. Singer, 2020, *Keiser Family Foundation (KFF)*, (<https://www.kff.org/medicaid/issue-brief/10-things-to-know-about-medicaid-managed-care/>). Copyright 2020 by the Keiser Family Foundation.

1.2 Problem Statement

During a patient’s hospital admission, dietitians prescribe nutrition interventions and implement a plan of care. After a patient is discharged, they often are not followed by a dietitian, healthcare systems lack the ability for patients to continue the reinforcement education needed to sustain nutritional improvements. The development of a comprehensive outpatient MNT center can provide patients with access to a dietitian post-discharge. Patients would receive MNT for various co-morbidities such as, malnutrition, diabetes, cardiovascular disease, etc.

The purpose of this project is to demonstrate the need for post-discharge nutrition interventions and the benefits of a comprehensive medical nutrition outpatient center. A feasibility study will validate the potential income an MNT center can generate in addition to reducing hospital costs, reducing length of stay and decreasing unplanned readmissions.

1.3 Objective of the Study

There is an increased need to optimize patient outcomes and improve quality of life however; medical nutrition therapy is not consistently being provided within multidisciplinary

outpatient centers (Trujillo et al., 2019). Unfortunately, regulatory standards are also ambiguous regarding ambulatory nutritional care standards (Trujillo et al., 2019). The objective of this project is to evaluate nutrition services provided in post-discharge settings, reimbursement practices and evaluate the effectiveness of establishing a comprehensive outpatient medical nutrition therapy center.

1.4 Research Questions

Will the MNT center be a revenue source for the healthcare organization? What is the value to healthcare organizations when implementing an outpatient MNT center?

CHAPTER II SCOPING LITERATURE REVIEW

Multiple studies were reviewed on various comorbidities in both inpatient and outpatient settings, for the purposes of this literature review. Overall, the consensus of the studies has shown the lack of post-acute nutrition services which have an impact on patient outcomes, unplanned readmissions, and mortality. The purpose of the literature review was to better understand how post-acute nutrition interventions benefit patients and to identify any associated sources of revenue.

Dietitians play a key role in the management of various comorbidities. Early prevention of pre-diabetes or delay in the progression of type 2 diabetes is imperative to reduce any additional co-morbidities often associated with the disease (Briggs Early & Stanley, 2018). Studies show a positive rate of delaying disease progression when MNT has been provided by a registered dietitian when patients are diagnosed with pre-diabetes (Briggs Early & Stanley, 2018). Briggs Early & Stanley further report patients who have received MNT to have a higher rate of success with lifestyle changes compared to those patients managed solely managed with medications (2018). Briggs Early & Stanley (2018) discuss their literature review findings from a

21 arm study with 18 studies the reported how using Medical Nutrition Therapy interventions significantly lowered Hemoglobin A1C (HbA1c) levels by 0.3% in 3 months. Briggs Early & Stanley notes a decrease in HbA1C levels was sustained by participants for more than 12 months while the control group either remained unchanged or showed an increase in HbA1c of 0.2% (2018). In addition, Briggs Early & Stanley also reported that 12 study arms out of 11 achieved lowering the dosages of diabetes management medication for their patients (2018). A favorable outcome discussed by Briggs Early & Stanley is with improvement in overall quality of life for patients, improved self-perception, gained knowledge and motivation while reporting a decrease in emotional stress (2018).

While these findings are valid reasons for providing MNT, there is also a cost component associated with the treatment(s). Briggs Early & Stanley report cost reductions to healthcare insurance providers, when individuals attend a diabetes prevention program within a community or primary care setting (2018). Findings suggests that offering MNT services can reduce the risk of diabetes in pre-diabetic patients (Briggs Early & Stanley, 2018). Upon evaluating the 65 and older groups who received MNT, research shows highly cost-effective possible savings for health insurance payers such as Medicare (Briggs Early & Stanley, 2018). An economic analysis was conducted on 12,308 diabetic patients, it was determined that the use of MNT services in both outpatient and inpatient yielded a total of 9.5% cost reduction in hospital services and 23.5% reduction in physician services of Medicare enrollees, with diabetes (Briggs Early & Stanley, 2018). While the Briggs Early & Stanley findings do not separate the cost savings between outpatient versus inpatient MNT services, they noted that the reductions in hospital inpatient admission was correlated with dietitian visits, in the first quarter of the calendar year (2018). Briggs Early & Stanley further noted that the use of health services and costs were also

reduced, after implementation of medical nutrition therapy (2018). Briggs Early & Stanley analyzed CMS reports to find that lifestyle-based Diabetes Prevention Programs (DPP) were also highly cost-effective to both healthcare payers and providers (2018). It was determined that cost savings were attributed to dietitians providing MNT interventions in general, some of which included education on weight reduction, therapeutic-diet lifestyle changes, interventions for hypercholesterolemia; but the most significant of all, is that dietitians tailored dietary counseling and intervention to each patient (Briggs Early & Stanley, 2018). They also reported that hospital charges were substantially reduced when a patient received individualized care from a dietitian versus attending a group counseling session (Briggs Early & Stanley, 2018). Dietitians are able to utilize MNT interventions to prevent disease progression by providing nutrition education to the individual or a support group style program (Briggs Early & Stanley, 2018).

Toulson Davisson Correia et al. studied the adverse events associated with malnutrition in hospitalized patients such as an increase in length of stay (LOS), higher mortality rates, higher costs and increased rates of infection (2021). Toulson Davisson Correia conducted a systematic review of 67 studies and utilized a total patient sample size of 29,474 (2021). Toulson Davisson Correia et al. used a cost-effectiveness model to study said adverse effects over a one-year period utilizing early nutrition interventions as the variable (2021). As Toulson Davisson Correia points out, healthcare costs related to malnutrition are often multifactorial (2021). Toulson Davisson Correia noted that the average length of stay for a malnourished patient is between 16.7 and 24.5 days (2021). Extended LOS days negatively impacts healthcare costs and reduces bed availability (Toulson Davisson Correia, 2021). Toulson Davisson Correia, reports a reduction in LOS of 0.34 - 1.04 days, in patients who received early nutrition therapy interventions (2021). Thus, Toulson Davisson Correia conclude that providing patients who are malnourished or are

at-risk for malnutrition with early medical nutrition therapy represented a cost savings of \$92.24 per length of stay day that was reduced (2021). Furthermore, by reducing the length of stay, a cost savings of \$544.59 was noted, since the bed was now occupied by a different patient (Toulson Davisson Correia et al., 2021). Readmission rates were also decreased as a result of applying early nutrition interventions such as, oral nutritional supplements, enteral or parenteral nutrition support (Toulson Davisson Correia et al., 2021). Toulson Davisson Correia et al. noted that the reduction in readmission rates yielded an additional cost savings of \$1,848.12 and a decrease in mortality rates by about 12% was also observed (2021). Toulson Davisson Correia et al. excluded critically ill patients and oncology patients, the study was focused on nonsurgical hospitalized patients. Early use of nutrition interventions included the prescription oral nutritional supplements (ONS), enteral nutrition (EN) and/or parenteral nutrition (PN) [Toulson Davisson Correia et al., 2021]. The study found that early interventions using oral nutritional supplements, enteral nutrition and/or parenteral nutrition, avoided hospitalization days during the one-year period of 420,658 days with an estimated number of 71, 252 possible new admissions avoided plus 20,996 readmission were avoided and a total of 10,491 deaths were prevented yielding an increase in revenue of \$38,803,768.73 over the one-year period (Toulson Davisson Correia et al., 2021). When nutrition interventions were implemented after the sixth day of hospitalization, the effectiveness of MNT was drastically reduced and when nutrition therapy was initiated after 14 days of admission, the benefits were severely decreased and costs were significantly higher [see table 1] (Toulson Davisson Correia et al., 2021).

A cohort study by Morgensen et al. focused on the outcomes of intensive care unit (ICU) patients and their mortality rates 90-days post-discharge second to unplanned readmission 30-days post-discharge (2018). Morgensen et al. found that ICU patients had a higher mortality rate

with a 30-day readmission rate of 12% and a mortality rate of 15% within six months of discharge based on a sample size of 23,575 (2018). Compared to non-ICU patient discharges, ICU patients had higher odds of mortality 90-days post-discharge as follows: 1.4 times higher if the patient was at-risk for malnutrition, 2.4 times higher for non-specified malnutrition and 5.0 times higher for any type of protein-energy malnutrition (Morgensen et al., 2018). Morgensen et al. further concluded that intensive nutrition interventions post-discharge would be an effective strategy to reducing unplanned readmissions and increasing survival rates for ICU patients post-discharge (2018).

Trujillo et al. stress the importance of identifying malnutrition in patients as a key indicator of mortality, hospitalizations, readmissions, and cost especially in patients with a cancer diagnosis (2018). A project led by the Oncology Nutrition Dietetic Practice Group (ONDPG) of the Academy of Nutrition and Dietetics (AND) centered on addressing the nutrition gaps in oncology patients (Trujillo et al., 2018). To improve patient access to MNT from the time of diagnosis, during, and post-treatment (Trujillo et al., 2018). Solutions include detailing the benefits to insurance providers for bundled payments on MNT services or improved payment models for those carriers that already provided coverage (Trujillo et al., 2018). Trujillo et al. state that the idea is to use the framework to pave the way for additional reimbursement of nutrition therapy across a spectrum of comorbidities (2018).

According to Trujillo et al., 90% of oncology patients receive treatment at clinics or outpatient centers (2018). Outpatient settings do not offer nutritional screens, Trujillo et al. point out that approximately 80% of oncology patients exhibit signs of malnutrition; about 50% having indicators of being at-risk for malnutrition at some point during their cancer treatment (2018). As previously mentioned, suboptimal nutritional status affects mortality, morbidity, and overall

health costs. There is a notable disparity in the number of dietitians assigned to an outpatient oncology center (0.2 full-time equivalents) is significantly lowered compared to the inpatient oncology unit (0.5 full-time equivalents) [Trujillo et al., 2018]. About 64% of oncology dietitians report working in inpatient settings while, only 36% work in outpatient settings (Trujillo et al., 2018). Trujillo et al. also reviewed a survey conducted by the National Cancer Institute Comprehensive Cancer Centers who determined the average dietitian patient ratio for oncology is 1 RDN to 2,674 patients (2018). Lack of Medicare reimbursement for MNT referrals and high out-of-pocket expenses to the patient can all be barriers or contribute to poor patient outcomes (Trujillo et al., 2018).

Trujillo et al. (2018) remind that a limited number of cost-effective studies related to the efficacy of nutrition interventions. However, data supports that nutrition interventions with oncology patients increase the quality of life, reduce readmissions, length of stays, and overall costs (Trujillo et al., 2018). Currently, no screening standards for outpatient oncology patients are in place but, regulations on the inpatient side have screens to trigger a nutrition consult for a dietitian (Trujillo et al., 2018). Trujillo et al. stress the importance of assessing outpatient oncology patients for nutritional decline or possible nutritional risk (2018). Trujillo et al. recommend looking at clinical lab values such as those inflammatory markers, including measures of body composition, weight history, resting energy expenditure, and measure physical activity (2018). Trujillo et al. further recognize the lack of nutritional services in healthcare systems; many experts rely on primary care providers for nutrition education however, they are not nutrition experts (2018). While evaluating outpatient cancer centers, Trujillo et al. (2018) noted a significant amount of staffing shortages which may correlate to the disparity in reimbursement (2018).

A retrospective quality improvement study was conducted at The University of Arizona Medical Center (UAMC), a 487-bed academic teaching facility (Bristol et al., 2012). UAMC formalized outpatient nutrition services with centralized scheduling and insurance billing in November of 2009 (Bristol et al., 2012). The study reviewed 581 medical charts for patients who received outpatient nutrition services between November 2009 and October 2010 (Bristol et al., 2012). Bristol et al. noted a gross revenue increase of \$182,774.75 just by switching to formalized billing (2012). Bristol et al. also pointed out an increase in FTE from 0.2 to 1.1 FTE (2012).

A study conducted by Hand et al. reports that the average number of adult patients assessed by a dietitian approximately 9 patients/day. (2015). According to the U.S. Bureau of Labor Statistics, in May 2020 the median annual inpatient dietitian salary was approximately \$63,000 and the median wage for outpatient dietitians was \$69,660 annually (2021).

Ultimately, the literature shows the importance of medical nutrition interventions in treating or preventing the progression of the various comorbidities discussed. Briggs Early & Stanley highlight the importance of MNT reimbursement by third-party payers in order to effectively treat and prevent disease progression of diabetes (2018). Post-discharge nutrition care access is very limited and an increase in morbidity has been observed, especially with cancer patients (Trujillo et al., 2018). Trujillo et al. further challenges the standardization of nutrition care screening tools and outpatient referral pathways, in order to improve patient outcomes. Toulson Davisson Correia et al. highlights that malnutrition is multifactorial and requires more than just nutrition interventions, there is a socioeconomic imbalance amongst certain populations that require additional assistance (2021). However, Toulson Davisson Correia et al.'s study shows the significant financial impact that early MNT interventions can have during a patient's

hospitalization and downstream (2021). Morgensen et al. validates the importance of nutrition interventions post-discharge to reduce unplanned readmissions and decrease mortality rates among ICU patients (2018). The overarching limitations of the literature review is the lack of evidenced based information regarding the benefits of a comprehensive medical nutrition therapy center.

CHAPTER III METHODOLOGY

3.1 Research Design or Method

A systematic review of peer reviewed publications was performed to collect evidence the fits the eligibility criteria to support the benefits of a comprehensive MNT Center. According to the Cochrane Handbook for Systematic Reviews of Intervention, systematic reviews are considered the highest level of evidence (Ranganathan and Aggarwal, 2020). In this review, the population was patients with co-morbidities the comparator was either they were readmitted to the hospital within 30 days of their initial admission or required further outpatient services. The outcomes were studies that evaluated RD staffing patterns, provider to patient ratios and reimbursement practices. Besides the population, intervention, comparator and outcome (PICO) components, additional criteria were used. Further criteria included publication statues of full publishes papers and omitted unpublished, publication year was set to 2015.

To maintain a thorough systematic review to identify all relevant articles, multiple databases were used to perform the search. Databases included PubMed, Cochrane Library, National Library of Medicine (NIH), and MUSC Library database. Grey literature was also included to identify any relevant information that can further show the need of a comprehensive MNT Center. Once the strategy was defined, titles and abstracts of the studies were reviewed, and duplicates were discarded. After studies were selected, data was extracted to an Excel

spreadsheet that contained the name of the author, the year of publication, details of study designs, results and included any relevant data such as number of participants and additional outcome data. In the end a meta-analysis was used to create a pooled and more precise estimate of data. Table 3.1 shows the excel spreadsheet used in the systematic literature review.

The data from this systematic review will be used to propose and evaluate an outpatient MNT, which will be connected to a health care system. The model is further based upon the following assumptions:

Table 3.1: Systematic Literature Review Summary Spreadsheet

Question	Will the comprehensive MNT center be a self-sustaining ambulatory care department for the healthcare organization? What is the value to healthcare organizations when implementing an outpatient MNT center?
Date of Literature Review	<ul style="list-style-type: none"> • January 2015 – February 2022
Inclusion Criteria	<ul style="list-style-type: none"> • Trujillo et al., (2018), is the first national study that evaluated RD staffing patterns and reimbursement practices in outpatient cancer centers. Complete data were summarized for 215 cancer centers. The mean RDN full-time equivalent (FTE) for all centers was 1.7 ± 2.0. After stratifying by type of center, National Cancer Institute- Designated Cancer Centers (NCI CCs) employed a mean of 3.1 ± 3.0 RDN FTEs compared to 1.3 ± 1.4 amongst non-NCI CCs. The RDN- to-patient ratio, based on reported analytic cases, was 1: 2,308. Per day, RDNs evaluated and counseled an average of 7.4 ± 4.3 oncology patients. Approximately half (53.1%) of the centers screened for malnutrition, and 64.9% of these facilities used a validated malnutrition screening tool. The majority (76.8%) of centers do not bill for nutrition services. • Cohort study, performed in 1 academic medical center in Boston. Studied 23,575 patients, aged ≥ 18 years, who received critical care between 2004 and 2011 and survived hospitalization. Patients treated with critical care who survived hospitalization with a preexisting malnutrition, are found to have subsequent mortality and unplanned hospital readmission. • Position of the Academy of Nutrition and Dietetics that adults with prediabetes or type 2 diabetes, MNT be provided by RD. “Based on six cost-effectiveness analyses, lifestyle interventions for diabetes prevention were cost effective in terms of cost per quality-

	<p>adjusted life years gained compared to pharmacotherapy or no intervention.”</p> <ul style="list-style-type: none"> • Cohort study that assessed the potential cost-savings associated with decreased 30-day readmissions and hospital length of stay in malnourished inpatients through a nutrition-focused quality improvement program using web-based budget impact model. The study also aimed to demonstrate the clinical and fiscal value of the intervention. For comparison, the reduction of readmission rate and length of stay for 1269 patients enrolled in the program between 10/13/14 and 04/02/15 were compared to with a program baseline and validation cohorts (4611 patients vs 1319 patients respectively). Avoided hospital readmissions and reduced number of days in the hospital for the patients in the quality improvement program resulted in cost-savings of \$1,902,933 versus the pre-quality improvement program baseline cohort, and \$4,896,758 versus the pre-quality improvement program in the validation cohort. When costs were assessed across the entire population enrolled in the quality improvement program, per-patient net savings of \$1499 when using the baseline cohort as the comparator and savings per patient treated of \$3858 when using the validated cohort as the comparator were achieved. • Studied aimed to evaluate the cost-effectiveness of nutrition therapy, including oral supplements to at-risk or malnourished adult patients admitted to the Brazilian Public System hospitals. A one-year period cost effectiveness model that encompassed total costs, length of hospital stays, readmissions and mortality related to malnutrition were developed, having the provision of early nutrition therapy as the intervention variable. “Early nutrition therapy provided to all at-risk or malnourished patients would represent cost-effectiveness of US \$92.24, US \$544.59, US \$1848.12, and US \$3698.92, for each day of hospitalization avoided, for additional patients having access to hospitalization, for preventing readmission, and for prevented death, respectively” (Toulson Davisson Correia et al, 2021).
Exclusion Criteria	<ul style="list-style-type: none"> • Pediatric studies were excluded due nutrition assessment methods differ from adult nutrition assessments. • Normal nutritional status. • Duplicates. • Hospice/End of Life. • Psychiatric/Delirium patients with no ongoing medical care.
Search Terms Search Vocabulary	<ul style="list-style-type: none"> • Hospital readmission; malnutrition; mortality; outcomes • RD staffing; reimbursement practices in outpatient centers • malnutrition associated poor health outcomes, outpatient centers • budget impact model, cost-savings, malnourished patients, nutrition-focused interventions

Electronic Databases	<p>PubMed</p> <ul style="list-style-type: none"> • Search terms: Hospital readmission; malnutrition; mortality; outcomes -Hits: 118 • Search terms: RD staffing; reimbursement practices in outpatient centers -Hits: 0 • Search terms: Malnutrition associated poor health outcomes, outpatient centers -Hits: 25 • Search terms: Budget impact model, cost-savings, malnourished patients, nutrition-focused interventions -Hits: 2
	<p>Cochrane Library</p> <ul style="list-style-type: none"> • Search terms: Hospital readmission; malnutrition; mortality; outcomes -Hits: 30 • Search terms: RD staffing; reimbursement practices in outpatient centers -Hits: 3 • Search terms: Malnutrition associated poor health outcomes, outpatient centers -Hits: 78 • Search terms: Budget impact model, cost-savings, malnourished patients, nutrition-focused interventions -Hits: 0
	<p>National Library of Medicine (NIH)</p> <ul style="list-style-type: none"> • Search terms: Hospital readmission; malnutrition; mortality; outcomes -Hits: 90 • Search terms: RD staffing; reimbursement practices in outpatient centers -Hits: 156 • Search terms: Malnutrition associated poor health outcomes, outpatient centers -Hits: 186 • Search terms: Budget impact model, cost-savings, malnourished patients, nutrition-focused interventions -Hits: 0
	<p>MUSC Library</p> <ul style="list-style-type: none"> • Search terms: Hospital readmission; malnutrition; mortality; outcomes

	<p style="text-align: center;">-Hits: 5,540</p> <ul style="list-style-type: none"> • Search terms: RD staffing; reimbursement practices in outpatient centers -Hits: 408 • Search terms: Malnutrition associated poor health outcomes, outpatient centers -Hits: 5,338 • Search terms: Budget impact model, cost-savings, malnourished patients, nutrition-focused interventions -Hits: 12
<p>Inclusion List</p>	<p>Briggs Early, K., & Stanley, K. (2018). Position of the academy of nutrition and dietetics: The role of medical nutrition therapy and registered dietitian nutritionists in the prevention and treatment of prediabetes and type 2 diabetes. <i>Journal of the Academy of Nutrition and Dietetics; J Acad Nutr Diet, 118</i>(2), 343-353. doi:10.1016/j.jand.2017.11.021</p> <p>Bristol, S. E., Danielson, H., Fu, J., Griffin, C., & Sargeant, G. (2012). Financial benefits of medical nutrition therapy in the outpatient setting. <i>Journal of the Academy of Nutrition and Dietetics, 112</i>(9), A30-A30. doi:10.1016/j.jand.2012.06.110</p> <p>Mogensen, K. M., Horkan, C. M., Purtle, S. W., Moromizato, T., Rawn, J. D., Robinson, M. K., & Christopher, K. B. (2018). Malnutrition, critical illness survivors and post-discharge outcomes: A cohort study. <i>JPEN. Journal of Parenteral and Enteral Nutrition, 42</i>(3), 557-565. doi:10.1177/0148607117709766</p> <p>Sulo, S., Feldstein, J., Partride, J., Schwander, B., Sriram, K., & Summerfelt, T. (2017). Budget Impact of a Comprehensive Nutrition-Focused Quality Improvement Program for Malnourished Hospitalized Patients. https://www.ahdonline.com/issues/2017/july-2017-vol-10-no-5/2424-budget-impact-of-a-comprehensive-nutrition-focused-quality-improvement-program-for-malnourished-hospitalized-patients</p> <p>Toulson Davisson Correia, Maria Isabel, Castro, M., Oliveira Toledo, D., Farah, D., Sansone, D., Morais Andrade, T. R., . . . Fonseca, M. C. M. (2021). Nutrition therapy Cost-Effectiveness model indicating how nutrition may contribute to the efficiency and financial sustainability of the health systems. <i>JPEN. Journal of Parenteral and Enteral Nutrition; JPEN J Parenter Enteral Nutr, 45</i>(7), 1542-1550. doi:10.1002/jpen.2052</p> <p>Trujillo, E. B., Dixon, S. W., Claghorn, K., Levin, R. M., Mills, J. B., & Spees, C. K. (2018). Closing the gap in nutrition care at outpatient cancer centers: Ongoing initiatives of the oncology nutrition dietetic practice</p>

	group. <i>Journal of the Academy of Nutrition and Dietetics; J Acad Nutr Diet</i> , 118(4), 749-760. doi:10.1016/j.jand.2018.02.010	
List of Articles Included from Handsearch or Other Means	No other articles included.	
List of Excluded Articles with Reason	Excluded article	Reason for Exclusion
	Agarwal, E., Ferguson, M., Banks, M., Batterham, M., Bauer, J., Capra, S., & Isenring, E. (2013). Malnutrition and poor food intake are associated with prolonged hospital stay, frequent readmissions, and greater in-hospital mortality: Results from the Nutrition Care Day Survey 2010. <i>Clinical Nutrition</i> , 32(5), 737–745. https://doi.org/10.1016/j.clnu.2012.11.021	Lacking sufficient data for thorough analysis.
Summary of Articles Identified to Review	Reviewed Articles: 25 Articles reviewed but excluded: 4 Number of Articles considered: 21	

3.2 Sample Selection

Morgensen et al. concluded that ICU patients had a higher mortality rate with a 30-day readmission rate of 12% and a mortality rate of 15% within six months of discharge based on a sample size of 23,575 (2018). For the purposes of the feasibility study, patient volume that will be treated at the outpatient MNT center estimate is based on 10% of the discharged ICU patients in order to keep the feasibility study conservative. Thus, forecasted volume for the first year will be 2,357 patients.

Once the center is open, the patient volumes will be driven by the community needs. Patients with lower income, who typically are not able to receive post-discharge nutrition interventions, would have access. Additional patient volumes will also be generated through

marketing, referral of other inpatient admission. Dietitians can identify patients during an inpatient admission and using clinical judgement to determine which patients need additional nutrition guidance post-discharge. Collaborations with wound care nurses, social workers/case management, and physician assistants among other members of the interdisciplinary team will also drive patient volumes through referrals. However, this anticipated patient volume was not included in the feasibility study, in order to keep the forecasted volumes conservative.

3.3 Staffing Analysis

A staffing analysis was conducted to determine that the proposed MNT center will need 1.4 full-time equivalent (FTE) RDNs. The data from Morgensen et al. (2018) and Trujillo et al. (2018) was utilized to conduct the staffing analysis and summarized in Table 3.2, a cost model of a comprehensive outpatient MNT center. According to Trujillo et al. outpatient dietitians assess an average of 7.4 ± 4.3 patients, per day; for the purposes of this analysis an average of 7 patients per day will be utilized (2018).

3.4 Feasibility Study

During the systematic literature review, various theories and analysis were identified in nutrition interventions with loose connections to an outpatient MNT center, but no actual examples of cost analysis model was found. Therefore, an Excel spreadsheet, representing the cost model of a comprehensive outpatient MNT center was created (Table 3.2). A feasibility study is beneficial to determine if there are overall costs benefits associated with the provision of MNT services. Potential additional revenue sources can include patients that are referred to the outpatient MNT center from inpatient referrals, community referrals, primary care physician referrals, and marketing outreach campaigns.

Fixed costs are estimated and defined on the spreadsheet for purposes of the cost model.

Labor costs per year is based on the United States Bureau of Labor Statistics Employer Costs for Employee Compensation 2021 report. In addition, through the Federal Insurance Contributions Act (FICA) tax, the rate is statutorily set for employers at 7.65% (Miller, 2021). The total benefit costs are consistent with the United States Bureau of Labor Statistics major categories that include: paid leave, supplemental pay (overtime and shift differentials), insurance (health, short-term, life, and long-term disability), retirement and savings and legally required benefits (federal and state unemployment insurance), (2020b). All employees are included in the benefit cost estimates even if the employee does not have access to the plan or elects to not enroll (2020b).

Table 3.2: Cost Model of Comprehensive Outpatient MNT Center

Category	Item	Subtotal	Total Cost
Fixed Costs			
	(1) Full-Time Outpatient Registered Dietitians	\$ 70,650.00	
	(1) Part-Time Outpatient Registered Dietitians	\$ 28,260.00	
	Benefits Included: (FICA, Medicare, Social Security & Unemployment) ^b	\$ 17,803.00	\$ 135,000.36
	Retirement, Health, Dental, and Vision ^b	\$ 18,287.36	
Administrative Staff	Coding/Billing; Reimbursement analyst	\$ 24,000.00	\$ 24,000.00
Property Costs	Rent	\$ 33,600.00	
	Utilities inc.phone and internet service	\$ 1,800.00	\$ 36,360.00
	Repair/Maintenance	\$ 960.00	
Additional Professional Services	Advertising	\$ 7,500.00	\$ 7,500.00
Computer Hardware/Software	2 Computer Packages (inc. device w/ printer, scanner, EPIC Electronic Health Record, Windows programming, etc.)	\$ 2,800.00	\$ 2,800.00
Memberships/Affiliations	The Academy of Dietetics and Nutrition	\$ 300.00	
	Board Certified Licensure	\$ 70.00	
	Florida Medical Nutrition Therapy	\$ 150.00	\$ 920.00
	Florida Academy of Dietetics and Nutrition	\$ 250.00	
	Misc Affiliations required	\$ 150.00	
Training/Dues and Subscriptions	Continuing Education Requirments for (2) Licnesed Dietitians	\$ 400.00	
	Dues and Subscriptions to maintain licensure for part-time RD	\$ 370.00	\$ 770.00

TOTAL FIXED COST			\$ 207,350.36
Variable Costs			
Materials and Supplies	Renovation of office space (Lighting, Painting and installation of cubicles)	\$ 750.00	\$ 4,650.00
	Office Supplies (inc. binders, file folders, printer paper, toner, stapes, etc.)	\$ 1,800.00	
	Meeting Supplies	\$ 1,200.00	
	Postage/Printing	\$ 650.00	
	Food/Snacks (provided for meetings, demonstrations, participants, etc.)	\$ 250.00	
Education Materials	Creating/Printing Tracking Logbooks for participants	\$ 300.00	\$ 2,100.00
	Printing of Materials (flyers, registration forms, program announcements, handouts, etc.)	\$ 1,800.00	
MNT Education Programs	Educational Workshops	\$ 250.00	\$ 1,480.00
	Lunch and Learn Sessions	\$ 880.00	
	Food Demonstrations with National Foodbank	\$ 350.00	
TOTAL VARIABLE COST			\$ 8,230.00
Reimbursement			
	MNT Assessment [\$28.47, per unit] n=2,357; Average 4 units per initial assessment	\$ 268,415.16	\$ 325,760.20
	MNT Re-assessment [\$24.34, per unit] n=1178; Average 2 units per re-assessment	\$ 57,345.04	
TOTAL REIMBURSEMENT			\$ 325,760.20
REVENUE			
Gross Patient Service Revenue			\$ 325,760.20
Deductions from Gross Revenue			
TOTAL NET OPERATING REVENUE			\$ 325,760.20
EXPENSES			\$ 215,580.36
ANNUAL PROFIT			\$ 110,179.84

Sources: ^a Labor Statistics, 2021a; ^b Bureau Labor Statistics, 2021b; ^c Morgensen et al., 2018; ^d AND, 2021

For the purposes of the feasibility study, the administrative staff that will be utilized to support the financial aspects of coding and billing will be from the existing coding and billing department. The outpatient MNT center will prorate their salary based on the amount of time spent reviewing patient charts and coding for reimbursement. The salary portion will be cross-charged to the outpatient MNT department.

To complete the feasibility study, estimates were calculated based on the 2021 Medicare Fee Schedule for RDNs, an initial MNT assessment is \$28.47 per unit [1 unit=15 minutes] (AND, 2021). Feasibility study calculations are a conservative estimate based on the literature review findings, MNT Current Procedural Terminology (CPT) codes allow dietitians to bill for group counseling sessions \$17.61 for every 30-minute session, per patient (AND, 2021). The Medicare Fee Schedule for 2021 now includes reimbursement rates for telehealth services (AND, 2021). Fees vary by state and locality.

The expected profits are estimated at \$110,179.84 for the first fiscal year. The 2021 Medicare Fee Schedule for RDNs, an initial MNT assessment is \$28.47 per unit [1 unit=15 minutes] (AND, 2021). On average, an initial assessment takes about 60 minutes of face-to-face time, and every new patient will need an initial assessment, [$\$28.47 \times 4 \text{ units} \times \text{forecasted number of patients}$] (Siopis et al., 2020). Estimating that 50% of the forecasted patients return for a follow-up visit, the reassessment amount is \$24.34 per unit (AND, 2021). Typically, a reassessment takes about 30 minutes, which will add an additional gross revenue to the center [$(\text{Forecasted number of patients}/2) \times (24.34 \times 2 \text{ units})$] (Siopis et al., 2020; AND, 2021). Specific data regarding payer mix was not available thus, the feasibility study was compiled utilizing 100% Medicare reimbursement data to estimate potential profits.

3.5 Data Analysis

Systematic literature reviews were used to identify the benefits of offering comprehensive medical nutrition therapy post-discharge, which will be reviewed in the results section of this analysis. Studies have shown that a meta-analysis on the cost effectiveness of health benefits are not validated due to variability of results among study designs and methods (Shields & Elvidge, 2020). According to version 5.1 of the Cochrane handbook for Systematic

Reviews of Interventions, there is no agreed methods for pooling estimates for cost-effectiveness which would include actual benefits of providing MNT services (Shields & Elvidge, 2020). A systematic review of economic evaluations and the use of best-practice guidelines will dictate the feasibility of providing the services (Shields & Elvidge, 2020). The cost-benefit analysis shows a revenue profit of \$110,180 utilizing conservative figures. The financial profitability will be for the healthcare institutions with outpatient MNT service. The expansion of the service lines through the creation of an outpatient MNT center will reduce unplanned hospital readmission, length of stays and reduce costs (Toulson Davisson Correia et al., 2021).

Table 3.4 was comprised based on the economic model set up by Toulson Davisson Correia et al. for non-surgical, non-oncologic patients with malnutrition or at-risk for malnutrition who received medical nutrition therapy on day of one hospitalization (2021). Table 3.4 is reflective of the estimated patient volumes for the comprehensive outpatient MNT center.

It is estimated that 30% of hospitalized patients are affected by malnutrition (AHRQ, n.d.). The 2019 AHA Annual Survey reports admissions for all U.S hospitals was 36,241,815 and total expenses for all U.S. hospitals was \$1,161,032,419,000 (AHA, 2021). Based on this information approximately 10,872,544.5 of patients were malnourished (AHA, 2021). Utilizing the data from Table 3.4, if there is an average reduction in length of stay days by 0.35 days, then there is a cost-savings potential to the patients and insurance providers of approximately \$912.45 per day (Toulson Davisson Correia et al., 2021). In addition, if there is a reduction in the risk of readmission among patients with malnutrition or at-risk for malnutrition of 24.7% then there is an additional cost-savings potential to the patient and insurance provider of approximately, \$4,322.50 calculated using the average cost of readmission for malnourished patients.

Table 3.4: Average Costs of Hospitalizations for At-Risk or Malnourished Patients

Parameters	Minimum Value	Maximum Value	Average
At-risk for malnutrition (%) ^a	26.3%	48.2%	37.3%
Reduction in LOS (days) ^a	-1.04	0.34	-0.35
Days with MNT (%) ^a	70.0%	90.0%	80.0%
Days without MNT (%) ^a	10.0%	30.0%	20.0%
Enteral & Parenteral Nutrition Use (%) ^a	10.0%	30.0%	20.0%
Risk of Readmission in patients with malnutrition or at-risk (%) ^a	23.2%	39.4%	24.7%
Risk of readmission in well-nourished patients (%) ^a	14.8%	24.7%	19.7%
All US Hospital Admissions ^b	-	-	36,241,815
Estimated # of patients with malnutrition ^b	-	-	10,872,545
Average Cost of readmission, malnourished patients (\$) ^c	-	-	\$ 17,500
Average Cost of readmission, well-nourished patients (\$) ^c	-	-	\$ 14,300
Average cost of admission (\$) ^c	-	-	\$ 12,900
Average cost per day of hospital admission (\$) ^d			\$ 2,607

Sources: ^a Toulson Davisson et al., 2021; ^b AHA, 2021; ^c Barrett, Bailey & Owens, 2018; ^d Fay, 2021

CHAPTER IV RESULTS

4.1 Feasibility Study

Feasibility study results validate the potential income which can be generated through an outpatient MNT center. On average, an initial assessment takes about 60 minutes of face-to-face time and every new patient will need an initial assessment, the center will average a gross profit of \$268,415.16 for the first year [$\$28.47 \times 4 \text{ units} \times 2,357 \text{ patients}$] (Siopis et al., 2020).

Estimating that 50% of the forecasted patients return for a follow-up visit, the reassessment amount is \$24.34 per unit (AND, 2021). Typically a reassessment takes about 30 minutes, which

will add an additional gross revenue to the center of \$57,345.04 per year [$\$24.34 \times 2 \text{ units} \times 1178 \text{ patients}$] (Siopis et al., 2020; AND, 2021). The anticipated reimbursement for the first year is estimated at \$325,760.20 with a total annual profit of \$110,179.84 (Total Net Operating Revenue – [Total Fixed Cost + Total Variable Cost]). The calculated profitability margin is about 33% [Net Profit Margin = $(\text{Revenue} - \text{Cost} / \text{Revenue}) \times 100$] $\rightarrow [(\$325,760.20 - \$215,580.36) / \$325,760.20 \times 100]$, a high profit margin percent is normally not expected at startup. However, the combination of potential reimbursement profits in addition to keeping variable costs low, allows for a higher potential net profit yield. The full-time equivalents is calculated using the formula below: (Average number of patient assessment by RDN per day x number of days center will be open per week x 50 weeks). [1.0 FTE at 7pts/day x 5 days/week x 50 weeks = 1750 patients/year; 0.4FTE at 7pts/day x 2 days/week x 50 weeks = 700 pts/year] to cover a patient volume of 2,450. Total annual wages for 1.4FTE RDNs is \$135,000.36 with benefits. Table 4.1 summarizes the estimated cost model used to calculate the potential earnings for the first year.

Table 4.1: Summary of Estimated Cost Model

Category	Total Cost
Fixed Costs	
Total Labor Costs	\$ 159,000.36
Property Costs	\$ 36,360.00
Services/ Trainings and Subscriptions	\$ 9,190.00
Computer Hardware/Software	\$ 2,800.00
TOTAL FIXED COST	\$ 207,350.36
Variable Costs	
Materials and Education	\$ 8,230.00
TOTAL VARIABLE COST	\$ 8,230.00
TOTAL REIMBURSEMENT	\$ 325,760.20
TOTAL NET OPERATING REVENUE	\$ 325,760.20
EXPENSES	\$ 215,580.36
ANNUAL PROFIT	\$ 110,179.84

CHAPTER V Discussion

5.1 Discussion of Results/Findings

Currently, most patients have limited access to post-discharge nutrition care, which is correlated with an increased prevalence of unplanned hospital readmissions and patient mortality rates (Trujillo et al., 2018). Early MNT interventions during hospital admission in combination with post-discharge nutritional guidance and support improves patient outcomes and shows favorable results downstream. The most important findings from the feasibility study is learning that a comprehensive outpatient MNT center can provide patients with post-acute nutrition interventions while also being financially profitable.

From a practitioner standpoint, patient accessibility to nutrition recommendations and

interventions post-discharge is essential in preventing readmissions in addition to maximizing the probability of patients maintaining lifestyle changes. Practitioners can leverage community resources to help their patients overcome some of the financial barriers associated with negatively affecting outcomes. Hospitals often have charity care options available to patients who meet the criteria based on income. Local food banks, programs such as Meals on Wheels America, and local grocery stores sometimes partner with local religious institutions or other community partners to provide groceries at low or no-cost to participants. Most hospitals have a community outreach or population health department which can be useful in providing information on additional resources available. (For a sample of resources available, refer to exhibit G.) This is especially important for low income patient populations that may be experiencing food insecurity.

5.2 Limitations

There are few comprehensive outpatient MNT centers throughout the United States and publications evaluating the efficacy of their programs is severely limited. Feasibility and efficacy studies are specific to individual co-morbidities such as Diabetes, Oncology and other nutrition related diseases. Limited data related to measures of quality and quantifying preventable readmissions related to lack of post-discharge nutrition care forces researchers to piecemeal data from various sources of evidenced-based literature that are comorbidity specific to evaluate a comprehensive outpatient MNT program. In addition, payer mix data was not available and as such, the feasibility study was compiled utilizing 100% Medicare reimbursement data to estimate the potential profits.

A meta-analysis had to be conducted to answer the research question since individual research articles lacked pertinent information (Shields & Elvidge, 2020). Due to the

heterogeneity across study designs and methods, studies have shown that a meta-analysis often has gaps when analyzing cost-effectiveness (Shields & Elvidge, 2020).

5.3 Future Research

It is imperative that organizations and program coordinators report quality measures in addition to conducting and publishing research on how a comprehensive outpatient nutrition center can improve patient outcomes and quality of life. Anecdotally, patients sometimes have more than one nutritionally significant comorbidity, such as diabetes, renal disease or cardiovascular disease. It would be beneficial to see a cross-sectional study design that has various comorbidities addressed in their findings. A published cost analysis on the financial benefits for creating a comprehensive outpatient center would be beneficial to the field and could help other clinicians obtain administrative support for such a center.

5.4 Conclusion

Literature review consensus is favorable towards post-discharge nutrition interventions being effective at preventing unplanned readmissions, decreasing mortality rates and improving patient quality of life. A comprehensive outpatient center offering nutrition services 5 days per week has the potential to generate an estimated profit of \$110,179.84 during the first year. An outpatient MNT center can positively impact a healthcare system by generating profits, as noted in the research findings. The operating margin is estimated to be around 33% [Net Profit Margin = (Revenue - Cost/ Revenue) x 100]. Lower variable costs and calculations from potential reimbursement revenue shows a high profit-yield which is normally not expected at startup.

Profit margins are expected to increase as patient accessibility increases and awareness is created. Medicare reimbursement data was the only data value available to complete the estimated potential profits, since payor mix data was not available; it should be noted that normally private payors generate a higher revenue. Once a comprehensive outpatient MNT

center is fully operational, referrals from Primary Care Physicians, Managed Care Physician Offices, Inpatient Dietitians and Case Management/Social workers can increase patient volume and profits.

Increasing patient access to outpatient MNT services will not only yield profits from services rendered but, downstream the healthcare system can see positive impacts in the reduction of unplanned readmissions, costs of hospital services rendered, length of stay and Physician utilization (Briggs Early & Stanley, 2018; Toulson Davisson Correia et al., 2021). Patients may also be positively impacted by receiving nutrition interventions post-discharge, as patients have reported improvements in quality of life, gained knowledge, improved self-perception and a decrease in emotional stress (Briggs Early & Stanley, 2018). Healthcare insurance providers and payers may also be positively impacted when patients receive outpatient nutrition treatments due to a reduction in medication usage (Briggs Early & Stanley, 2018). In addition, disease prevention and progression usually declines which may lead to lower usage of healthcare costs and services (Briggs Early & Stanley, 2018).

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Appendices

Exhibit A: Creating an Outpatient Center

1.1. Setting Goals, Objectives, and Aim

The first consideration of the center will be if it should be a standalone center or if it will be part of an existing department such as the Food and Nutrition Services department in a hospital. Next, determine what services will be offered. Is the purpose of the department to generate income? In other words, will the department be offered as a best practice to enhance patient care thus, downstream utilization benefits will yield a reduction in readmission rates or will the department generate income utilizing reimbursement and/or self-pay payment models? Gather information regarding the number of readmissions over a specified period of time and categorize each patient by primary and secondary diagnosis that are nutritionally significant such as gastrointestinal diseases, renal failure, cardiovascular disease, diabetes, etcetera. Use the data to define the types of diseases/comorbidities that will be serviced at the outpatient center. Next, determine the reimbursement rates for dietitians based on the diagnoses and types of services that will be offered. Utilize this data to calculate the break-even point for the proposed MNT center.

1.2. Payor Mix

Define the payor mix for the hospital. How many patients have healthcare coverage, how many are self-pay and how many patients are provided with charity care? It is important to know the percentage of patients that have Medicare, Medicaid, and private insurance or self-pay, that come into the hospital. Definitive Healthcare highlights the importance of tracking and understanding what percentage of the hospital revenue comes from private insurance, government programs or self-pay (2019). Definitive Healthcare also reinforces that hospitals are able to obtain a higher reimbursement from self-paying patients or private insurances versus government programs and that hospitals with a high number of Medicare and Medicaid patients

can struggle to draw in patients with private insurance (2019).

1.3. Target Population and Forecasted Volume

Review discharge patient data to determine what diagnoses have the highest number of unplanned readmissions over a 30-day period. Streamline findings to those comorbidities that are nutritionally significant, for example end-stage renal disease, diabetes, gastrointestinal disorders, etc. Analyze the volume of number of consults and high risk patients assessed by the clinical dietitians and look for trends in that area. Is there an increase in the number of malnourished patients? Is there an increase in the number of education consults and what type of comorbidities are they being consulted to provide education for? Analyze assessments for length of stay patients to determine if there are any missed opportunities. Are nutritional consults consistently being placed for patients who are admitted with or develop a pressure injury? Is there a wound care center or outpatient services that could benefit from having a dietitian regularly meet with patients? The areas mentioned are often where dietitians can have a major impact on the patient's well-being. Use the data collected to determine what the forecasted outpatient volumes will be. Data for patient readmissions and tracking of various comorbidities, diseases, mortality and other pertinent information is most likely already being tracked by the quality department. A quality analyst will be able to provide information that will be useful in forecasting estimated volumes.

1.4. Location and Labor Costs

Where will services be offered? Is there already outpatient services being offered and nutritionally services can be incorporated? Is the current nutrition department setup to receive patients? It is important that you think about the ease of accessibility for your patients, when selecting the location where services will be offered. Refer to Exhibit B for a sample detailed location plan, which includes accessibility requirements, coding and other important elements

one must take into account for patient safety. Consider offering telehealth services to capture patients that are unable to take time off/miss work or that have transportation restrictions.

Review what options are available within the community or hospital to assist patients with transportation constraints.

Based on forecasted estimated volume, determine how many full-time equivalent (FTE) dietitians is needed to cover the services that will be offered and the associated labor costs.

Human resources can assist with providing a salary amount for the outpatient dietitians. Consider how many patients per day, each dietitian will be able to assess.

1.5. Reimbursement

Start by streamlining the services that will be provided. Define the demographics for your typical patient such as, average age, comorbidities, etc. Then, determine the reimbursement rates for each insurance include the in- and out-of-network reimbursements for the top insurance companies, based on the payor mix data. Establish how the dietitians will track MNT codes for billing purposes and what referral requirements are needed. What will be your physician referral process? Lastly, determine what clinical documentation requirements are necessary for reimbursement and regulatory compliance

1.6. Profitability

Conduct a market analysis and complete a community health assessment. Start the budget planning process. Take into consideration third party revenue and determine what the compassionate care options will be available. These items will help guide the estimated operating margins. Creating a separate cost center, just for the Outpatient MNT Department, would allow for expenses and revenue to be tracked correctly.

1.7. Provider and Physician Contracting/Billing

Is a contracted Physician required for billing? Most insurance companies only require a provider referral. A provider can be a Social Worker/Case Management, Physician Assistant, Advanced Nurse Practitioner, etc. Determine if the organization will have billing set up as a hospital-based outpatient nutrition services center which will allow for the RDNs to bill their services as part of the facility. It would be financially beneficial for the facility use their own national provider identification, which means that the dietitian will be able to bill as part of the hospital, without being credentialed with the individual insurance companies.

1.8. Information Technology

Information Technology (IT) will need to create the outpatient department within the electronic medical record system. They will also be able to create the patient scheduling system and telehealth portal. IT will also set up reports for tracking patient outcomes and billing. Some reports that would be beneficial are: submitted insurance claims, payment denials, patient no-shows, cost savings by tracking unplanned readmission rates, clinical outcomes data tracking and the user can also submit data to the Academy Health Informatics Infrastructure (ANDHII) for national benchmarking. The IT department will also be instrumental once the department is setup: to secure phone access, voice mail needed for clients software, electronic faxing

configurations and communication access for Physicians and providers (i.e secure chat.) IT will also be able to add forms to the EMR which are necessary for daily operations/billing such as: referrals, nutrition notes, doctor notes, superbills, and any other additional billing/claim submission forms.

1.9. Marketing

Meet with key providers for MNT referrals. Partner with medical practice managers to determine potential referrals. Partner with Primary Care Group to establish referral opportunities. Meet with other nutrition leaders within the organization and key RDNs, which will be providing their services within the department. Partner with pre-operative services, as they can assist with identifying patients that may be at risk for malnutrition related to surgery (i.e. GI surgery, Oncology, etc.) and they can also identify any patients that may be interested in or may benefit from weight loss education. Identify if there are any taskforce designed to prevent readmissions, if so, partner with taskforce leader. Partner with Pharmacy- residency students will be able to educate patients on drug-nutrient interactions and answer any questions related to medication (i.e. Insulin, Coumadin, etc.) Utilize the CNOs and DONs as champions. Partner with CM/SW for referrals—they tend to be strong advocates for Nutrition. Setup meetings with Director of Business Development to assist with creating marketing brochures, posters and media interview. Lastly, develop a plan for additional referral resources and outreach (i.e Physician Communications, Medical Executive Board, etc.)

Exhibit B: Functional Program Outline

Environment of Care:

1. Patient-Family Centered Care Model
2. The center will be located on the first level of the hospital. All entrances are compliance with accessibility guidelines. Waiting room and treatment room will have oversized chairs, benches and armless chairs that support up to 750lbs.
3. The waiting room area is spacious, allowing for patients to sit 6 feet apart.
4. Integrated electronic health record using Epic.
5. Waiting room and treatment areas are properly lit. Treatment rooms are private, equipped with visual food models and are cleaned and sanitized between patients.
6. Implementation will occur by mid-February.

Goal Statement:

- Provide comprehensive evidenced-based nutrition services to improve the health and quality of life for patients.
- Registered Dietitians (RDNs) will teach patients and their family's innovative ways to promote optimal nutrition, health and wellness.
- Nutrition education for disease prevention and nutrition counseling for chronic conditions are essential components of a comprehensive disease management and wellness program.
- The application of the information provided will improve a patient's overall well-being.

Level of Participation/Decision Making:

- Referring Physicians/Hospital Groups:
- Bariatric Surgeon Group
- Chief Medical Officer (CMO)
- Director of Physician Affairs
- CMO of the Wound Care Center
- Surgical Services
- Case Management/Social Work
- Bedside RN
- C-Suite: Primary involvement would be program approval and funding allocations
- Registered Dietitians
- Certified Diabetes Educators (Any allied health worker who is certified)
- Registered Nurse- Insulin administration

Design Consideration:

- Private Office for counseling
- Open area with ample seating for group classes

- Easily accessible electrical outlets and running water for when we host cooking classes/demos with patients and families.
- Registration front counter should be low enough to allow patients with disabilities to be able to use the space comfortable (sign-up, payment, scheduling of appointments, etc.)
- Visitor computer station should be adjustable or low enough to allow for all patients to easily utilize (i.e. wheelchair accessible)
- Television monitor (could display hospital news and events or with a local channel)
- Waiting room chairs positioned appropriately so that patients can view the TV monitor
- Play area for children (toy chest, coloring materials, etc.) [With COVID-19 guidelines, at this time the facility will not be able to accommodate this request. However, once we return to a level of “normal” we may evaluate this option especially, for those parents who are often accompanied by their children. One option would be disposable coloring materials such as a sheet of paper and small 2-pack of box crayons, similar to the options provided at a restaurant]

Major Equipment:

- Workstation for Dietitian
- Computer for Dietitian
- Computer for Visitor Computer Station (used to help patients sign up for telehealth, Epic MyChart, etc.)
- Waiting room chairs, coffee tables and decor

Detailed Space:

- Waiting room with a maximum capacity of 12 people, ~270 sq. ft.
- Small reception area with one employee ~108 sq. ft.
- 2 Small Offices (12 ft. x 10 ft.) ~162 sq. ft. each
- 1 Large Conference Room (15 ft. x 20 ft.) ~405 sq. ft.

Total space needed ~1,107 sq. ft.

NFPA 99-2012 Risk Assessment:

- Category 3- Failure of the utility systems or equipment would not likely result in injury to patients or caregivers but, could cause patient discomfort.
 - Example: Should the HVAC system fail, in the summer, the room would become very hot and uncomfortable. Patients would have to be re-scheduled in order to mitigate the impact on customer satisfaction.

Exhibit C: Case Study: Conceptualizing Health Promotion in Relation to Outpatient Healthcare

Building Design: A Scoping Review

Miedema, Lendahl & Elf (2019) really focused their project plan around creating a supporting environment, as such, they conducted a systematic literature review around health promotion, outpatient facilities and building design. Oddly enough they found that a clear descriptor of health promotion and building design did not exist (Miedema, Lendahl & Elf, 2019). Nevertheless, the recommendations are to consider the ‘end users’ and how the layout might be suitable based on the community and patient demographics (Miedema, Lendahl & Elf, 2019). This got me thinking about the location that I selected for my center; is it conveniently located to the main entrance of the building? How much time will it take patients to walk from their cars to the center? Is it easy to find? Miedema, Lendahl & Elf (2019) encourages the reader to evaluate how the design may contribute or inhibit participation, health education and participation. They also found that a more salutogenic approach to health would yield favorable results versus taking a pathogenic approach (Miedema, Lendahl & Elf, 2019).

Miedema, Lendahl & Elf (2019) further concluded that a strategic development with the buy in from stakeholders and an approach that addresses overall health promotion would be far more important than the building design. The hospital administrator has granted temporary access for the Outpatient Medical Nutrition Therapy (OP MNT) Department to be located within the current Hyperbaric and Wound Care Center at the facility. However, since I have been tasked with implementing the program while a dedicated space is created, this case study had me evaluating my approach. The space we will be temporarily using is hidden behind a long corridor of offices and it can be rather complicated to find. Patient Financial Services/Pre-Registration Director will collaborate with the OP MNT Department to have their staff register patients upon

arrival and escort them to the outpatient center. Miedema, Lendahl & Elf (2019) suggested that the center be suitable for the demographics. In my original program proposal, I discussed having oversized chairs with expanded weight capacities. However, I did not take into consideration other patients, such as those with wounds, amputations etc. There is a location that can be converted into an outpatient facility, if the offices are moved. Patients can valet their vehicles, free of charge and walk only a few steps to registration. From there they only ~200 feet from the center. I will be surveying this area using some of the questions from the case study, to determine if the area will meet Miedema, Lendahl & Elf's (2019) suggested design.

Miedema, E., Lindahl, G., Elf, M. (2019). Conceptualizing Health Promotion in Relation to Outpatient Healthcare Building Design: A Scoping Review. *HERD: Health Environments Research & Design Journal*. 12(1),69-86. doi:10.1177/1937586718796651

Exhibit D: Infection Prevention and Control Assessment Tool for Outpatient Settings

The following sections should be evaluated and completed:

- A) Section 1: Facility Demographics
- B) Section 2: Infection Control Program and Infrastructure
 - i. Infection Control Program and Infrastructure
 - a. It is important to have a guided structure that staff follows to ensure consistency with proper infection prevention is maintained.
 - b. Infection Control committee members will ensure that special precautions are taken during construction and commissioning to protect water and air quality. In addition, they will ensure that contamination is avoided, which could impact patient safety when these spaces become operational.
 - c. Ensure updated evidenced-based practices are in place
 - d. Infection Control Chairman will review policies, update the department regarding new guidelines, identify possible deficiencies, train new hires and complete annual refresher/in-service trainings.
 - ii. Infection Control Training and Competency
 - a. Perform audits, real-time reinforcement of education when deficiencies are observed.
 - b. Random audits in order to ensure that staff remains performing at a level of safety that is acceptable.
 - iii. Healthcare Personnel Safety
 - a. Exposures are reported to employee health nurse and administrative officer in addition to infection control chairman. This is increasingly important with COVID; the biggest risk to employees within this department is an exposure to a COVID positive patient.
 - b. Employee health and administrative officer to determine if situations/incidents/exposure require immediate ED visit.
 - c. Annual TB screening; prevent the spread of disease/infections and other pathogens.
 - iv. Surveillance and Disease Reporting
 - a. Annual e-learnings to ensure information is always refreshed, should any changes in practices occur.
 - v. V.a. Hand Hygiene
 - a. Proper training
 - b. Competency checklists and random audit checks
 - c. Readily available ABHR or soap and water, as needed
 - vi. VI.a Personal Protective Equipment
 - a. Part of the infection control training
 - b. Proper donning and doffing
 - c. Identification of Isolation signs and instructions regarding which PPE should be used and why.

- d. Perform audits, real-time reinforcement of education when deficiencies are observed.
- e. Annual competency
- vii. VIII a. Respiratory Hygiene/Cough Etiquette
 - a. Increasingly important during COVID
 - b. Ensure staff, patients and visitors have proper face masks
 - c. Offering sufficient special accommodations to promote social distancing
 - d. Proper signage should be used as reminders/education reinforcement
- viii. X.a. Environmental Cleaning
 - a. Initiated by the Director of EVS
 - b. Ensure areas are clean and sanitized
 - c. Employees working in this area to perform sanitation after each patient visit.
- ix. V.b. Hand Hygiene
- x. VI.b Personal Protective Equipment
- xi. VIII.b Respiratory Hygiene/Cough Etiquette
- xii. X.b. Environmental Cleaning

Exhibit E: Outpatient (OP) Medical Nutrition Therapy (MNT) Design Outcome Plan

Guiding Principles	Design Element	Process	Metric	Baseline	Target	Outcome
Outpatient Facility Provide medical nutrition therapy to manage diseases and to prevent re-admissions	Private Counseling rooms	Schedule one Dietitian per patient	Number of OP visits and co-morbidities	Both will vary per day	~6 patients per day	TBD
	Classrooms/Large meeting room for group classes	Adjust inpatient schedule and workflow to move one Dietitian to the OP center	<ul style="list-style-type: none"> • Outcome measures • Dietitian productivity 	<ul style="list-style-type: none"> • Changes (improvement) in lab values or wound healing • Clinician downtime tracking 	<ul style="list-style-type: none"> • Decrease in lab values showing improvement • 6.5 hours 	TBD
	Adequate space for waiting area, and a clinician office space	Leverage Physicians, Case Management/Social Work, CNOs and DONs to refer patients	Readmission rates	Decrease	-10%	TBD

Exhibit F: Outpatient MNT Code Enforcement Compliance Requirements

Outpatient Medical Nutrition Therapy Department

Located in Broward County

The State of Florida has codes and regulations that need to be followed in order for the facility to be approved for operations. In addition, Broward County has separate code enforcements for building codes and safety. Fire protection, physical plant codes and hospital standards seem to be the same for both the County and State. The State of Florida also has codes compliant with ICC:

2015 International Building Code:

- 2015 International Energy Conservation Code
- 2015 International Existing Building Code
- 2015 International Fuel Gas Code
- 2015 International Mechanical Code
- 2015 International Plumbing Code
- 2015 International Residential Code

The outpatient facility must be compliant with the American with Disabilities Act standards to ensure that patients with disabilities are not discriminated against. Ensuring that proper equipment, entrances, etc. are available to accommodate patients with special needs. The center must be compliant to ASHRAE, OSHA, NFPA, EPA and CMS guidelines and regulations in order to operate. These guidelines are in addition to the State or County; it is important to note that County and States regulations and guidelines tend to overlap with the regulations set forth by the larger agencies.

Exhibit G: Community Resources

Community Resources





Need a little extra help?



Broward County has services available for seniors, families, caregivers and people over the age of 18 years or older with severe or persistent mental illness.



For more information and to find out what programs you may qualify for, ask to speak with your Social Worker or Case Manager prior to discharge.

Meals on Wheels

- Home-delivered regular, kosher, and pureed frozen meals are delivered weekly.
- If you need to complete the application over the phone, please call (954) 714-6946 to speak with our social work department.
- Apply online: www.HandsOnBroward.org Look for Services then click on apply-for-meals

Complete Cuisine

- Complete Cuisine, in partnership with Red Chair Catering, is a gourmet paid home meal delivery service available in Broward and Miami-Dade counties for every age demographic.
- This service is offered by Meals on Wheels and orders can be placed on their website www.HandsOnBroward.org look for Programs and click on Complete Cuisine or by calling (954) 714-6941.

Resources for Seniors (60 years or older)

- Congregate dining sites for seniors over 60 y/o.
 - Over 30 locations in Broward to enjoy a hot meal, stimulating activities, and lots of friends to meet and socialize with.
 - To receive a complete list of dining sites with serving times and enrollment information, please email info@mowsoflo.org or call (954)714-6920.

- Returning home from the hospital and need immediate assistance?
 - Meals on Wheels South Florida has the ability to deliver a 14-day supply of emergency meals to seniors.
 - This is a one-time only service allowing seniors the chance to recover or make arrangements for continuing meal services. For more information, call (954) 714-6946 to speak to our social work department.
- Home Meal Delivery is available for home-bound seniors
 - Clients will be offered one of several meal service options including the Older Americans Act funded program, Complete Cuisine (private pay services), and Medicaid Waiver options.



NORTH BROWARD COUNTY SITES

All Saints Catholic Mission
[3350 Powerline Road](#)
 Oakland Park, FL 33309
 Tel: 954.396.3086
 Father Bob: 954.319.3514
 Soup Kitchen: Daily, 2 - 3:30 pm
 Food Pantry: Daily, 4:30 pm

Christ Church—Blessings Food Pantry
[201 NE 2nd Street](#)
 Pompano Beach, FL 33060
 Tel: 954.943.0404
 Food Pantry
 Call for Details

Cokesbury United Methodist Church
[1801 NW 65th Avenue](#)
 Margate, FL 33063
 Tel: 954.972.3424
 Food Pantry
 Margate Residents, Call for Details

Bethel Worship Center
[6060 Kimberly Blvd](#)
 North Lauderdale, FL 33068
 Tel: 954.972.3321
 Food Pantry
 Call for Details

Christian Love Fellowship Church
[801 SE 10th Street](#)
 Deerfield Beach, FL 33441
 Tel: 954.428.8980
 Food Pantry: Mon, Wed, Fri 10:30 am-2:00 pm

Gateway Community Outreach
[291 SE 1st Terrace](#)
 Deerfield Beach, FL 33441
 Tel: 954.725.8434
 FAX: 954.725.8436
 Homeless Prevention & Food Program
 Food Pantry—Must call before coming to Food Pantry location.

Haitian Evangelical Baptist Church
[153 NW 12th Street](#)
 Pompano Beach, FL 33060
 Tel: 954.479.7113
 Food Pantry
 Each Tues, 9 am - 2:00 pm

Our Father's House Soup Kitchen
[2380 Martin Luther Boulevard](#)
 Pompano Beach, FL 33061
 Tel: 954.968.7550
 Soup Kitchen & Food Pantry
 Lunch: Mon-Fri, 11:00 am - 1:30 pm

Pentecostal Gospel Temple Ministries
[900 S State Road 7](#)
 Margate, FL 33068
 Tel: 954.979.9999
 Food Pantry
 10:30 am - 4:00 pm (M-Th)

St. Laurence Chapel
[1698 Blount Road](#)
 Pompano Beach, FL 33069
 Tel: 954.972.2958
 FAX: 954.972.2448
 Soup Kitchen
 Breakfast: 8:30 am - 9:30 am
 Lunch: 12:30 pm

Hopewell Missionary Baptist Church
[890 NW 15th Street](#)
 Pompano Beach, FL 33069
 Tel: 954.989.8304
 Food Pantry
 Call for Details

Parkway United Methodist Church
[100 NE 44th Street](#)
 Pompano Beach, FL 33064
 Tel: 954.942.8310
 Food Pantry
 By Appointment Only

St. Ambrose Catholic Church
[380 S Federal Highway](#)
 Deerfield Beach, FL 33441
 Tel: 954.427.2225
 Food Pantry (Just Deerfield Beach)
 Call for appointment

Temple Beth Orr
[2151 Riverside Drive](#)
 Coral Springs, FL 33071
 (SW corner of Riverside Drive and Royal Palm Blvd on the north side of the building)
 Tel: 954.753.3232
 FAX: 954.753.2559
 Food Pantry
 Tue: 10 am - 12 pm