

Simply Delivered Meals: A Tale of Collaboration

Sarah L. Martin, PhD; Nancy Connelly, MBA; Cassandra Parsons, PharmD; and Katlyn Blackstone, MS, LSW

Western medicine is beginning to recognize what social scientists have known for years: There are social determinants of health. For too long, we have focused on treatment of disease, instead of prevention, and not comprehensively enough to reduce the disease burden. Social determinants are consistently and prominently noted by the World Health Organization and, more recently, by our nation's health protection agency, the CDC, along with several other agencies, as summarized in a recent scan of large-scale initiatives.¹ Maslow's hierarchy of needs² is hardly unknown, yet today, in much of the world and in pockets of this country, people's physiological and safety needs are not being met. The United States dedicates far fewer dollars per person on social services than does almost every other nation within the Organisation for Economic Co-operation and Development.³ The Economist Intelligence Unit released a white paper on the healthcare systems of 166 nations that ranked the United States highest in healthcare spending and 33rd in quality outcomes, making it a "poor-value" healthcare system.⁴ As our healthcare system is striving toward the Triple Aim of improving population health, improving the patient experience of care, and reducing per capita cost,^{5,6} it is time to embrace a new paradigm to achieve these aims.

A recent study found that states with a higher ratio of social spending to health spending had significantly better health outcomes for 7 measures: adult obesity, asthma, mentally unhealthy days, days with activity limitations, and mortality rates for lung cancer, acute myocardial infarction, and type 2 diabetes.⁷ In countries where collaborations happen across sectors, successful programs exist, such as the Integrated Care Pathways for Airway Diseases.⁸ The Affordable Care Act has a new requirement for nonprofit hospitals: conducting a community health needs assessment every 3 years and using the results to launch an implementation strategy.⁹ This affords the opportunity to expand collaborations with social services agencies. Evidence already exists to support these collaborations in terms of the positive health outcomes and reduced healthcare spending they generate.⁷ Cost savings are

ABSTRACT

Western medicine is undergoing a transition toward transparency of quality and costs, and healthcare systems are striving to achieve the Triple Aim, a framework for improving the patient experience of care, improving the health of populations, and reducing the per capita cost of healthcare. Meanwhile, there is growing recognition of the impact of social determinants of health and a new federal requirement for nonprofit hospitals to implement prevention strategies. A specialized meal delivery program called Simply Delivered for ME (SDM) was formed in an effort to improve care and reduce 30-day hospital readmission rates.

The Maine Medical Center (MMC) partnered with the Southern Maine Agency on Aging to offer SDM on a voluntary basis to high-risk Medicare patients already enrolled in the Community-based Care Transition Program (CCTP) at MMC. We report the results of the 2-year intervention in terms of 30-day hospital readmission rates and cost measures (ie, return on investment and cost savings).

Of the 622 MMC patients who received SDM during the 24 months, the 30-day readmission rate was 10.3% (compared with the 16.6% 30-day rate of hospital readmission at baseline [ie, before the adoption of CCTP]) for all-cause readmissions. The cost savings for reduced readmissions were \$212,160. The return on investment was 387%, or a benefit-cost ratio of \$3.87 for every \$1.00 spent on meals. Programs such as SDM may reduce the rate of hospital readmission among high-risk older adults and, thereby, yield lower healthcare costs.

Am J Manag Care. 2018;24(6):301-304

TAKEAWAY POINTS

- ▶ Social determinants of health matter across the age spectrum, from birth to old age, and across disease progression, from prevention to tertiary treatment.
- ▶ We examined the impact of a care transition intervention with or without the addition of a meal delivery program titled Simply Delivered for ME (SDM) upon hospital discharge and its effect on 30-day readmission rates. More than 600 high-risk elderly patients received SDM over a 24-month period, which was associated with a 38% decreased rate of 30-day readmissions (10.3% vs 16.6% at baseline).
- ▶ The associated cost savings for these lower readmissions were estimated to be \$212,160, or a benefit-cost ratio of \$3.87 for every \$1.00 spent on meals.

often realized by decreased rates of readmission, especially in the geriatric population.^{10,11}

Simply Delivered for ME (SDM) was a collaboration between a hospital and a social service agency: The Maine Medical Center (MMC) partnered with the Southern Maine Agency on Aging (SMAA) to offer a Community-based Care Transition Program (CCTP) with an optional add-on program, SDM. SDM offered specialized meals (eg, vegetarian, pureed) to patients after they were discharged from the hospital; caregivers were also allowed to participate. Up to a 7-day meal supply was delivered weekly to participants' doorsteps. The purpose of this report is to examine the potential impact of the CCTP on the readmission rates of high-risk Medicare patients and the potentially additive effect of delivering meals to these individuals post transition from the hospital to the home or an alternative setting, such as long-term care.

METHODS

The study population of patients from MMC were on Medicare and designated as at high risk of readmission according to CMS (ie, CMS Hierarchical Condition Category [HCC] score >1.6). We used a time-series design with rolling enrollment over a 2-year period (July 2013–July 2015).

In 2012, SMAA was selected by CMS for participation in the CCTP. SMAA used as the basis for their program the Coleman Model of Care Transition Intervention (CTI), a 4-week process that focused on patient engagement post discharge by coaching individuals to take more active roles in their healthcare. Patients enrolled in CTI received specific tools and skills training reinforced by a transition coach (ie, a nurse or social worker) who received extensive training in motivational interviewing and teach-back methods. The transition coaches were responsible for reinforcing the following components: medication reconciliation and self-management, use of a patient-centered health record to help guide patients through the care process, primary care provider and specialist follow-up, and patient understanding of red-flag indicators of worsening condition and appropriate next steps. Within the post-hospital discharge setting, the goals of the CCTP were to improve quality of care, reduce readmissions for high-risk beneficiaries, and document

measurable savings to the Medicare program. During the 4 weeks of the transition process, referrals were made to other social service agencies as deemed appropriate by the visiting coach. To enhance the care transition process, SMAA introduced meals post discharge, the SDM program, which was offered on a voluntary basis. SDM is similar to Meals on Wheels, but distinguishable by the following: (1) it was marketed to patients as part of the CCTP at no cost, (2) it was titled Simply Delivered for ME and delivered in a labeled shopping bag, (3) it consisted of a weekly delivery of frozen meals, (4) it included a 7-meal supply delivered within 4 days of discharge, and (5) no milk or bread was provided.

The patients were in either the CCTP-only group or the CCTP-plus-SDM group; the 30-day hospital readmission rate was calculated by group status. A hospital staff member calculated that rate, by group, and compared those rates with the baseline rate (the year prior to adoption of CCTP for patients with HCC >1.6). Statistical significance was determined by nonoverlapping 95% CIs. Cost savings and return on investment were calculated based on the cost of providing the meals and on the 30-day readmission rate, assuming an average cost per readmission of \$16,320 per high-risk patient, as established at baseline. Although the baseline costs may seem high, they are the true costs experienced by MMC for the year preceding the adoption of CCTP and were the impetus for adoption of the new project.

RESULTS

The project served 1745 people, 1177 patients and 568 caregivers, in southern Maine between July 2013 and June 2015. Data from MMC included 622 patients (data from settings other than MMC are not available) whose characteristics are displayed in the [Table](#). The mean age was 71.7 years, and 56.6% were female. Among the 622 MMC discharges who received SDM during the 24 months, the 30-day readmission rate was 10.3% (95% CI, 8.1%–12.9%; n = 64 readmissions). This is 16.3% lower than MMC's CCTP 30-day readmission rate of 12.3% (95% CI, 10.0%–15.2%; n = 77 readmissions) since the beginning of the CCTP in 2012, and a 38.0% improvement over MMC's baseline (pre-CCTP) 30-day all-cause readmission rate of 16.6% (95% CI, 13.8%–19.7%; n = 103 readmissions). The cost savings for the 13 fewer readmissions with the addition of SDM to CCTP were \$212,160. The cost of providing 7 days of meals to the 622 discharges was \$43,540. Thus, the return on investment was 387%, or a benefit-cost ratio of \$3.87 for every \$1.00 spent.

DISCUSSION

Based on a literature review (2004–2014), Taylor and colleagues⁷ summarized the impact of social service investments on health

outcomes and healthcare costs. More than 80% of these studies reported positive effects on either health outcomes (62.5%) or costs (15.6%) or both (22.0%). The authors stress that additional research addressing both health and cost outcomes and evidence of cost savings will be essential for more widespread endorsement. We were able to examine a proxy for health status (30-day hospital readmissions) and to calculate costs, providing further evidence for both.

In our analyses, the 30-day readmission rate for those receiving coordinated care transition and SDM was 38% lower than baseline, although the difference was not statistically significant. Being enrolled only in CCTP (vs CCTP plus SDM) was also associated with a reduction in the readmission rate. Indeed, we need comprehensive approaches for mitigating “posthospital syndrome,” a condition described by Krumholz,¹² which suggests that these approaches need to target stressors that contribute to the high baseline rate of readmissions. Having a resource, such as a CCTP transition coach or delivered meals, can alleviate many of the likely stressors that patients face once they return home.

A synthesis of 9 studies of coordinated care found that 4 of the coordinated care interventions showed decreased healthcare costs and 2 others had positive health outcomes. The 2 that included outreach (eg, home-delivered meals) showed both lower costs and improved outcomes.⁷ The authors also synthesized 11 nutritional support studies and found that 7 showed improved health outcomes, but none showed decreased healthcare costs. In contrast, our analyses showed an association with both cost savings and positive health outcomes.

SDM is similar to Meals on Wheels, which has demonstrated a wide array of beneficial effects.¹³ Zhu and An¹⁴ reviewed 8 studies on home delivery of meals to older adults and found that the majority reported significant improvement in diet quality and nutrient intake, reduced food insecurity and nutritional risk, and other benefits, such as increased socialization and higher quality of life. The authors concluded that home-delivered meals help older adults maintain independence and remain in their homes.

The coordinated care transition intervention in our report can be compared with the Bridge Model,¹⁵ which combines care coordination, case management, and patient engagement. The model, like the CCTP, is designed to provide a seamless transition and improve the overall quality of transitional care for older adults. The authors of the Bridge Model study believe that the emphasis on value and quality support further development and expansion of transitional care strategies, which offer promising avenues to fulfill the Triple Aim while also impacting population health and controlling per capita costs.¹⁵ Gottlieb and colleagues¹⁶ noted barriers to widespread adoption of these collaborations across disciplines (eg, there are no medical codes to bill for social services and collaborations are challenged by various care delivery models, organizational structures, and financial contracting systems). Indeed, in the present report, external grant funding was an essential element, without which the SDM program ceased.

TABLE. Characteristics of Patients Receiving Simply Delivered Meals

Characteristic	N = 622
Gender, %	
Female	56.6
Male	43.4
Age, years, mean (SD)	71.7 (13.1)
Body mass index category, ^a %	
Underweight	3.5
Normal weight	22.0
Overweight	30.7
Obese	37.0
Discharge disposition, %	
Home or self-care	35.9
Home healthcare	56.3
Skilled nursing	4.3
Rehabilitation	2.3
Other health setting	1.2
Top 10 admitting diagnoses (ICD-10-CM code), n (%)	
Chest pain/respiratory/cough (786)	108 (17.4)
Altered mental status/dizziness/fever (780)	39 (6.3)
Heart failure (428)	34 (5.5)
Atrial fibrillation/dysrhythmias (427)	29 (4.7)
Osteoarthritis (715)	23 (3.7)
Acute myocardial infarction (410)	21 (3.4)
Abdominal pain (789)	21 (3.4)
Pneumonia (486)	20 (3.2)
Bronchitis (491)	16 (2.4)
Nausea/vomiting/diarrhea (787)	14 (2.3)
Top 10 principal diagnoses (ICD-10-CM code), n (%)	
Heart failure (428)	67 (10.8)
Atrial fibrillation/dysrhythmias (427)	41 (6.6)
Septicemia (038)	31 (5.0)
Acute myocardial infarction (410)	30 (4.8)
Coronary atherosclerosis (414)	26 (4.2)
Complication/infection due to implant/device (996)	22 (3.5)
Bronchitis (491)	22 (3.5)
Osteoarthritis (715)	19 (3.1)
Pneumonia (486)	15 (2.4)
Kidney failure (584)	14 (2.3)

ICD-10-CM indicates *International Classification of Diseases, Tenth Revision, Clinical Modification*.

^aThere were 48 patients with height and weight data missing.

Practice Recommendations

Our recommendations are to: (1) establish a plan for patients discharged to skilled nursing facilities before returning home; (2) ensure that dietary restrictions are identified by the transition coach and confirmed by site staff before the meals are delivered (eg, food allergies or need for pureed, vegetarian, or renal-sensitive meals); (3) brand SDM, to distinguish the program from Meals on Wheels, which some perceived negatively as a program for a frail and low-income population; and (4) consider the effects of home-delivered meals on caregivers.

Limitations

One limitation of our report was that the analyses were limited to just 1 hospital with 622 patients, although there were more than 1000 participants. Although we cannot reliably generalize our findings to other hospitals, we believe that the sample size and 2-year duration are sufficient to suggest potentially beneficial effects. We do not have access to the data for further analyses to explore the potential bias of our sample that volunteered for SDM. Our cost estimates are valid for this hospital but, again, perhaps not generalizable, as baseline costs for the high-risk patients were quite high (\$16,320 per patient).

CONCLUSIONS

Despite these limitations, we observed an association with positive outcomes for adopting coordinated care at transition, and even more so when accompanied by home-delivered meals. Our findings also suggest that it can be cost-saving to the healthcare system involved. We hope that, moving forward, barriers to collaboration will be overcome and that social determinants of health can be addressed as common practice. ■

Acknowledgments

The authors would like to acknowledge Rocket Wong, formerly of MMC (Portland, Maine), for the original analyses of these data and for the abstraction of the deidentified MMC data. They would also like to acknowledge Dan Knox of SMAA for his reanalysis of the data for this manuscript.

Author Affiliations: Husson University School of Pharmacy (SLM, CP), Bangor, ME; Southern Maine Agency on Aging (NC, KB), Scarborough, ME.

Source of Funding: None.

Author Disclosures: The authors report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

Authorship Information: Concept and design (NC, KB); acquisition of data (NC); analysis and interpretation of data (SLM); drafting of the manuscript (SLM, CP); critical revision of the manuscript for important intellectual content (SLM, NC, CP, KB); administrative, technical, or logistic support (NC, CP); and supervision (KB).

Address Correspondence to: Nancy Connelly, MBA, Southern Maine Agency on Aging, 136 US Rte 1, Scarborough, ME 04074. Email: nconnelly@smaaa.org.

REFERENCES

- Koo D, O'Carroll PW, Harris A, DeSalvo KB. An environmental scan of recent initiatives incorporating social determinants in public health. *Prev Chronic Dis*. 2016;13:E86. doi: 10.5888/pcd13.160248.
- Maslow AH. *Motivation and Personality*. Oxford, UK: Harpers; 1954.
- Bradley EH, Elkins BR, Herrin J, Elbel B. Health and social services expenditures: associations with health outcomes. *BMJ Qual Saf*. 2011;20(10):826-831. doi: 10.1136/bmjqs.2010.048363.
- Health outcomes and cost: a 166-country comparison. The Economist Intelligence Unit website. eiu.com/public/topical_report.aspx?campaignid=Healthoutcome2014. Published 2014. Accessed September 21, 2016.
- Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)*. 2008;27(3):759-769. doi: 10.1377/hlthaff.27.3.759.
- Stiefel M, Nolan K. *A Guide to Measuring the Triple Aim: Population Health, Experience of Care, and Per Capita Cost*. Cambridge, MA: Institute for Health Care Improvement; 2012.
- Taylor LA, Tan AX, Coyle CE, et al. Leveraging the social determinants of health: what works? *PLoS One*. 2016;11(8):e0160217. doi: 10.1371/journal.pone.0160217.
- Bousquest J, Addis A, Adcock I, et al; European Innovation Partnership on Active and Healthy Ageing, Action Plan B3; Mechanisms of the Development of Allergy, WP 10; Global Alliance against Chronic Respiratory Diseases. Integrated care pathways for airway diseases (AIRWAYS-ICPs). *Eur Respir J*. 2014;44(2):304-323. doi: 10.1183/09031936.00014614.
- New requirement for 501(c)(3) hospitals under the Affordable Care Act. Internal Revenue Service website. irs.gov/charities-non-profits/charitable-organizations/new-requirements-for-501c3-hospitals-under-the-affordable-care-act. Updated August 27, 2017. Accessed September 16, 2016.
- Deschodt M, Devriendt E, Sabbe M, et al. Characteristics of older adults admitted to the emergency department (ED) and their risk factors for ED readmission based on comprehensive geriatric assessment: a prospective cohort study. *BMC Geriatr*. 2015;15:54. doi: 10.1186/s12877-015-0055-7.
- Leppin AL, Gionfriddo MR, Kessler M, et al. Preventing 30-day hospital readmissions: a systematic review and meta-analysis of randomized trials. *JAMA Intern Med*. 2014;174(7):1095-1107. doi: 10.1001/jamainternmed.2014.1608.
- Krumholz HM. Post-hospital syndrome—an acquired, transient condition of generalized risk. *N Engl J Med*. 2013;368(2):100-102. doi: 10.1056/NEJMp1212324.
- Campbell AD, Godfryd A, Buys DR, Locher JL. Does participation in home-delivered meals programs improve outcomes for older adults? results of a systematic review. *J Nutr Gerontol Geriatr*. 2015;34(2):124-167. doi: 10.1080/21551197.2015.1038463.
- Zhu H, An R. Impact of home-delivered meal programs on diet and nutrition among older adults: a review. *Nutr Health*. 2013;22(2):89-103. doi: 10.1177/0260106014537146.
- Alvarez R, Ginsburg J, Grabowski J, Post S, Rosenberg W. The social work role in reducing 30-day readmissions: the effectiveness of the Bridge Model of transitional care. *J Gerontol Soc Work*. 2016;59(3):222-227. doi: 10.1080/01634372.2016.1195781.
- Gottlieb LM, Garcia K, Wing H, Manchanda R. Clinical interventions addressing nonmedical health determinants in Medicaid managed care. *Am J Manag Care*. 2016;22(5):370-376. doi: 10.1007/s40471-014-0031-3.

Full text and PDF at www.ajmc.com