Telephone-Based Disease Management: Why It Does Not Save Money

Brenda R. Motheral, PhD

Objectives: To understand why the current telephone-based model of disease management (DM) does not provide cost savings and how DM can be retooled based on the best available evidence to deliver better value.

Study Design: Literature review.

Methods: The published peer-reviewed evaluations of DM and transitional care models from 1990 to 2010 were reviewed. Also examined was the cost-effectiveness literature on the treatment of chronic conditions that are commonly included in DM programs, including heart failure, diabetes mellitus, coronary artery disease, and asthma.

Results: First, transitional care models, which have historically been confused with commercial DM programs, can provide credible savings over a short period, rendering them low-hanging fruit for plan sponsors who desire real savings. Second, cost-effectiveness research has shown that the individual activities that constitute contemporary DM programs are not cost saving except for heart failure. Targeting of specific patients and activity combinations based on risk, actionability, treatment and program effectiveness, and costs will be necessary to deliver a cost-saving DM program, combined with an outreach model that brings vendors closer to the patient and physician. Barriers to this evidence-driven approach include resources required, marketability, and business model disruption.

Conclusions: After a decade of market experimentation with limited success, new thinking is called for in the design of DM programs. A program design that is based on a cost-effectiveness approach, combined with greater program efficacy, will allow for the development of DM programs that are cost saving.

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Disease management (DM) emerged in the mid-1990s as a solution that offered better quality and lower costs. Enthusiasm for the concept was widespread given its intuitive appeal and positive results from recent studies[1-4] of patients with heart failure. However, more recent research has not found savings from telephone-based nurse-led DM models,[5-8] and the market is uncertain as to why these programs are not generating the savings that were much anticipated at their inception. Review of the literature in DM and other disciplines provides guidance for future design. The objectives of this article are to discuss those insights, to suggest strategies for retooling the DM model to deliver greater value, and to highlight lessons learned from the commercial DM experience.

TRANSITIONAL CARE MODELS VERSUS DM

The early studies[9,10] that helped stimulate interest in DM found that better management of patients with heart failure improved quality, reduced rehospitalizations, and sometimes saved money. Although these studies were generally well-constructed randomized controlled trials and showed promise for care management, they actually used care models that look quite different from today's commercial DM (Table 1).[11] They were typically conducted in academic research hospitals, targeted patients hospitalized for heart failure, and focused on inpatient and postdischarge follow-up. Patients usually lived in the same geographic region as the multidisciplinary team, allowing for face-to-face interaction after discharge. This approach, often referred to as a transitional care (TC) model, is in stark contrast to the commercial DM model that exists in the marketplace today, which typically includes not just patients with heart failure but also those with diabetes mellitus, asthma, chronic obstructive pulmonary disease, and coronary artery disease (CAD). To be eligible, patients can have prior inpatient visits or just outpatient visits. Intervention begins several months after identification because of the lag in medical claims reporting. Interventions are conducted primarily via telephone by a nurse who rarely has an established relationship with the patient or physician.

In contrasting the 2 models, it is easy to infer why the TC model has shown greater effectiveness.[9,10,12] Transitional care targets fewer patients with greater risk for future hospitalization, uses a more intensive multidisciplinary and

relationship-driven care model, and intervenes at a time of actionability. Although this distinction was noted by the Congressional Budget Office[13] in its 2004 review of the DM literature, the important differences between the models generally have been overlooked. Even the Medicare Coordinated Care Demonstration did not incorporate the relevant features of the TC model but rather implemented a model that more closely mirrored the commercial DM vendors. Researchers questioned whether the Medicare Coordinated Care Demonstration would show cost savings given the notable differences, a concern that ultimately materialized.[11] Although some contracts require DM vendors to embed TC in their offering,[14] the key elements of TC effectiveness (ie, established relationship, intervention at or before discharge, some face-to-face contact, multidisciplinary team) are typically not a component of the commercial DM models.[15]

Take-Away Points

Plan sponsors continue to search for new disease management (DM) models that can deliver real cost savings. Accordingly, it is of utmost importance to understand why the current commercial telephone-based DM model does not provide savings and how DM can be retooled based on the best available evidence.

- Research shows that transitional care models represent low-hanging fruit for plan sponsors who desire short-term cost savings.
- Evidence also shows that cost-effectiveness–based DM design that considers risk, actionability, treatment and program effectiveness, and all relevant costs can identify the patient and treatment combinations that have real potential for shorter-term cost savings.

Despite evidence of cost savings, the TC model ironically has not met with the same commercial success as DM. Within the United States, 13 of 15 original TC programs for heart failure were discontinued primarily because of financial constraints, as many had received federal grant funding.[11] Broader uptake has been limited primarily by the lack of financial incentives. Until health reform, hospitals have not had an incentive to reduce readmissions, and employers perhaps have believed that their DM or health plan vendor was successfully addressing this gap. Experts have recognized the value of TC,[16] and as plan sponsors become more aware of the value, it will be important that they look for programs that possess the critical elements for real savings such as the partnership programs established by researchers at the University of Pennsylvania, Philadelphia, who have led multiple successful randomized controlled trials of TC.[17] It remains to be seen whether commercial DM companies can also develop the necessary multidisciplinary networks, rapid response processes, and more intensive care models.

THE COST-EFFECTIVENESS OF DM

While mistaken identity with the TC model at least partially explains the enthusiasm of the marketplace for DM, it does not explain why the current commercial DM model lacks strong evidence of savings. The answer to this question lies partly in the myriad of cost-effectiveness assessments that have been conducted on chronic disease treatment over the last 30 years. In a review of the literature, Cohen et al[18] reported that less than 20% of preventive measures or treatments for chronic conditions are cost saving, even for a 30-year time horizon. Kahn et al[19] found that aggressive implementation of nationally recommended medical activities would increase costs over a 30-year period for all activities except smoking cessation.

Looking more specifically at the individual components of DM programs, the evidence is equally compelling. Diabetes programs typically identify blood glucose control, medication use and adherence, and regular foot, eye, and microalbuminuria examinations as key goals. On an individual basis, none of these activities are cost saving, even over a 30-year period (**Table 2**).[19-32] Disease management for CAD typically has the following 4 primary aims: diet modification, increased exercise, use of β-blockers, and use of cholesterol-lowering medications. Research has shown that use of these medications does not generate shorter-term cost savings when the medication costs are included.[19,23] However, the cost-effectiveness profile of statins is moving closer to a net savings as more patients take advantage of the $4 generic programs offered by many retail pharmacies. Improved diet and exercise for patients with CAD have been shown to reduce recurrent myocardial infarctions, but the few formal cost-effectiveness analyses have not found cost savings.[24,25] It is important to keep in mind that lifestyle changes for CAD are difficult to globally assess for cost-effectiveness because the program costs are driven by how much the lifestyle change costs (eg, food changes, gym membership) and by who is paying the bill. However, program fees alone are likely to exceed current commercial DM program fees because effective lifestyle programs are necessarily intensive.

Three hallmarks of asthma DM are improved use of controller medications, symptom monitoring, and reduction of triggers. Use of anti-inflammatory or controller medications reduces emergency department visits and hospitalizations but is not cost saving because of the significantly increased drug cost.[26] The cost-saving potential is unclear for asthma education about triggers and symptom monitoring for a commercial DM program, as most investigations have been conducted among low-income pediatric populations, involved significant in-person education, and have not included the full range of

Table 1. Comparison of the Transitional Care and Disease Management Models

Feature	Transitional Care	Disease Management
Population	Primarily heart failure	Heart failure, diabetes mellitus, coronary artery disease, asthma, chronic obstructive pulmonary disease
Severity	Hospitalized	Nonhospitalized and hospitalized
Timing	Discharge	3-6 mo following identification
Patient relationship	Established	None
Location	Some face to face	Telephone, mail
Team	Multidisciplinary	Nurse

Table 2. Cost-Effectiveness of Common Disease Management Activities and Goals

Treatment or Service	Cost Savings
Diabetes mellitus	
Glycosylated hemoglobin level <7%	No[19]
LDL-C level <100 mg/dL	No[19]
Blood pressure <130/80 mm Hg	No[19]
Feet examination	No[20]
Retinal screening	No[21]
Microalbuminuria screening	No[22]
Coronary artery disease	
Antihyperlipidemic agent use (LDL-C level <100 mg/dL)	No[19]
β-Blocker use	No[23]
Lifestyle changes	No or unknown[24,25]
Asthma	
Inhaled anti-inflammatory agent use	No[26]
Asthma education on symptom monitoring or trigger avoidance	Unknown[27,28]
Heart failure	
Angiotensin-converting enzyme inhibitor use	Yes[29]
β-Blocker use	Yes[30]
Structured remote monitoring (weight, blood pressure, etc)	Yes[31]
Daily exercise	No or unknown[32]

LDL-C indicates low-density lipoprotein cholesterol.
SI conversion factor: To convert LDL-C level to millimoles per liter, multiply by 0.0259.

program costs (eg, peak flow meters).[27,28] The only chronic condition for which research has demonstrated a clear opportunity for shorter-term savings is heart failure. Use of angiotensin-converting enzyme inhibitors and β-blockers is cost saving,[29,30] and daily weight and blood pressure monitoring have been shown to be cost saving.[31] However, the effective programs have provided structured monitoring rather than "as needed" monitoring and have collaborated with patients' physicians to effectively respond to notifications, 2 key distinctions from many commercial DM programs. In fact, a recent evaluation of an electronic home-monitoring system did not show clinical effect or savings.[33] The authors acknowledged that participating physicians may have lacked the necessary resources and work flow changes to handle patient information provided by the monitoring system. Finally, a cost-effectiveness analysis of moderate exercise training for heart failure has been conducted, but the program was not cost saving once exercise program costs and lost wages were included.[32] However, similar to CAD, the cost savings depend on the cost of the exercise program and who is paying. The potential for savings exists, as moderate exercise can reduce the risk of hospitalization for heart failure by two-thirds.[32]

In summary, at the level of the individual program activity, savings have not been shown for the treatment of these chronic conditions other than heart failure. Accordingly, one should not necessarily expect to see cost savings for the program as a whole unless one believes that DM can independently improve the outcomes of patients with chronic disease without affecting the key clinical goals that have been outlined previously. Therefore, it is important to keep in mind that for pharmaceuticals in particular cost-effectiveness is likely to improve over time as more patients use generic alternatives and as generic prices continue to fall. Because of difficulty in demonstrating savings, some vendors have expanded the range of potential cost savings to include disability, workers' compensation, ab-

Table 3. Potential Medical Cost Savings Per Year From a Targeted Asthma Program

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Inhaled β-Agonist Use	Hospitalization Cost Savings	Emergency Department Visit Cost Savings	Medical Cost Savings	Drug Cost Increase	Medical Cost Savings Per Patient
Overall	148	46	**194**	300	**–106**
0	211	60	**271**	300	**–29**
1-5	15	9	**24**	300	**–276**
>5	637	191	**828**	300	**528**

senteeism, and worker productivity in an effort to generate a better savings value proposition. The success of these efforts remains to be seen. While another alternative would be to withdraw the expectation for savings from DM and to measure its success primarily through quality improvement, this seems an unlikely outcome in today's economic climate.

LESSONS LEARNED IN DM

Health reform certainly affords opportunity for wellness and chronic care management initiatives in commercial, Medicare, and Medicaid populations given its emphasis on prevention and incentives to promote chronic care management in multiple settings and populations. However, this and other research points to 4 important lessons that have been learned from the commercial DM market experience, which have implications not only for future DM programs but also for other population health management programs. These insights are discussed in the subsections that follow.

Targeting Patients and Treatments Provides a Pathway for Savings

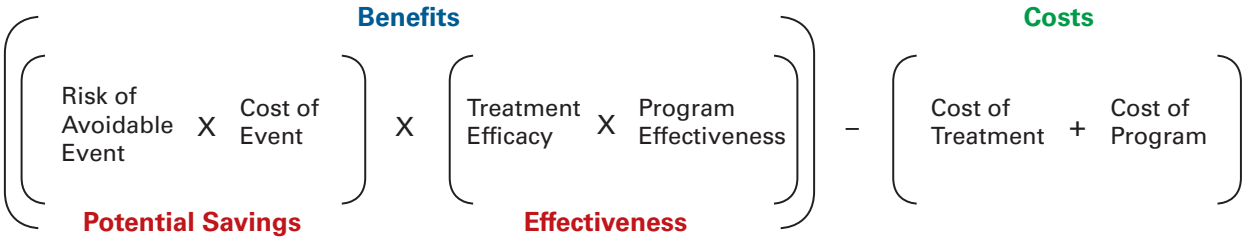
Although the cost-effectiveness literature does not bode well for the future of DM as now designed, research suggests that better targeting of patients and treatment activities may provide opportunity for cost savings.[34] In the case of pediatric asthma, increased use of anti-inflammatory inhalers among all pediatric patients with asthma is estimated to cost an additional $106 per patient per year (Table 3). By targeting patients using 5 or more β-agonists (a predictor of future hospitalizations), there is the potential for a medical savings of more than $500 per patient per year.[35] However, program effectiveness and costs must also be considered, as shown in the cost-effectiveness formulas in Figure 1 and Figure 2. Assuming a program effectiveness of 35%, increased medication costs of $105 per patient, and a program fee of $100, the estimated annual net savings per targeted patient is $85. In addition to making key cost drivers explicit, the cost-effectiveness approach allows for rapid assessment of varying assumptions to understand the sensitivity of the program to these variables. Furthermore, it allows for the establishment of performance metrics that are critical to achieving savings (eg, 30% of patients reached and demonstrate behavior change). Note that the cost-effectiveness formula is similar to a budget impact analysis, with an important difference being that program effectiveness is an explicit input and does not rely on the vendor's claims.

The concept of targeting is not new; using predictive models, commercial DM vendors now "target" high-risk patients. However, the targeting is based on predicted future medical expense rather than avoidable expense, and no targeting of interventions occurs based on effectiveness or cost-effectiveness of the treatment. In addition, targeted patients are those for whom DM vendors offer more intensive interventions rather than less intensive interventions. Accordingly, a truly targeted approach is not a revenue-optimizing model for DM vendors. In the asthma example, only 5% of patients with asthma used 5 or more β-agonists and lacked an anti-inflammatory agent. Another barrier to adoption is the marketability of a more realistic return on investment. An employer's willingness to select a vendor claiming a 1.85 return on investment over a vendor with an inflated return on investment (that also includes a much larger group of patients) is questionable. Finally, DM vendors must acquire the expertise to conduct detailed reviews of the relevant cost-effectiveness literature and be able to apply the findings appropriately without bias, a known challenge with models designed for commercial purposes.[36]

Not All Care Management Programs Are Created Equal

As highlighted earlier, much of the misperception about DM effectiveness has resulted from imprecise nomenclature. The term *disease management* has been used to describe a broad range of activities aimed at the chronically ill, with varying approaches and levels of effectiveness. Without better

Figure 1. Cost-Effectiveness Formula for Disease Management

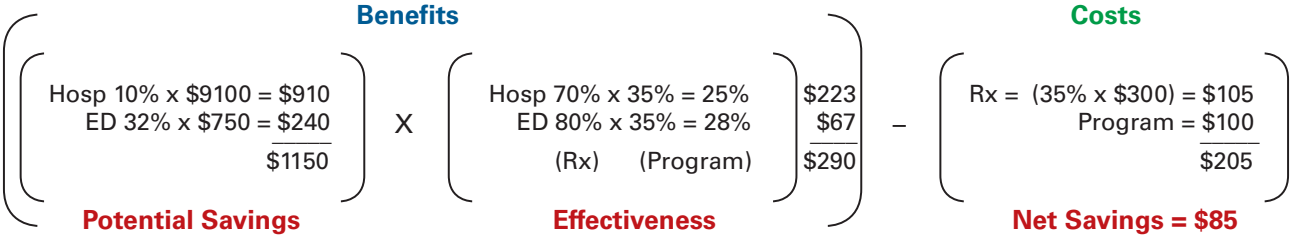


demarcation of program components based on features that drive effectiveness, confusion is likely to continue. Consider a recently published study[37] that had some elements of DM but also included shared decision making aimed at reducing preference-sensitive admissions. The study was a randomized trial that compared lower levels of care with enhanced care support. The program offered traditional coaching services to patients with chronic conditions (9.7% of the sample) but also included patients at high risk of hospitalization for preference-sensitive conditions and patients with other high-risk conditions. After 1 year, the hospital admission rate was 10.1% lower for the enhanced-support group than for the usual-support group, a difference that was almost entirely accounted for by a reduction in admissions for preference-sensitive and high-variation medical conditions. Notably, the cohort of patients with chronic conditions and gaps in care (ie, a typical DM patient) experienced an increase in hospital admissions and medical expenditures (reported in a supplemental appendix), and no difference was found between the enhanced-support and usual-support groups in laboratory testing or pharmaceutical use. Accordingly, the model seems to be generating much of its savings not through a DM model of improving common quality-of-care measures but through other mechanisms that are likely related to its unique program feature of shared decision making for preference-sensitive conditions. Although this program provided more rigorous evidence of savings than traditional DM, citing this study as evidence of DM effectiveness is at best confusing to plan sponsors. Fortunately, the authors were careful not to describe the program as DM.

Execution and Cost-Effectiveness Matter

Much of the current emphasis in retooling DM is placed on the ability of vendors to motivate patients over the telephone rather than on fundamental economics. This is because research has shown that execution is an ongoing challenge for the industry on 2 levels, the ability to reach individuals via telephone and subsequently to motivate individuals to change behavior. For example, less than 5% of enrollees in Medicare Health Support were reached on a monthly basis.[38] Once reached via telephone, the ability to motivate individuals for behavior change has met with limited success, as evidenced by the weak and inconsistent clinical impact of the programs.[38,39] These findings are not particularly surprising, as even the successful investigations of TC have usually found that some element of face-to-face interaction is necessary after discharge.[15] A meta-analysis[40] of TC found that use of multidisciplinary teams and face-to-face intervention was significantly more effective than single-provider types or telephone-based programs. Accordingly, much of the current industry emphasis on identifying the best motivational or behavioral techniques may be in vain if the program is lacking a meaningful face-to-face component and use of multidisciplinary collaborations, which are gaps that the medical home is intended to address. Therefore, cost-effectiveness research shows that, even if

Figure 2. Net Savings From Improved Use of Inhaled Anti-Inflammatory Agents Among Pediatric Patients With Asthma Having High β-Agonist Use



ED indicates emergency department visits; Hosp, hospitalizations; Rx, prescription.

DM vendors were 100% effective in execution, their programs as currently designed would likely not generate cost savings outside of heart failure. Accordingly, plan sponsors would be prudent to require cost-effectiveness plausibility and proven outreach models simultaneously.

Enthusiasm Often Trumps Evidence

As a final note, the cost-effectiveness challenge outlined herein applies not only to DM but also to the medical home, wellness programs, and other population health programs, as experts have indicated.[18] Although well known, this fact is largely ignored in the marketplace, as enthusiasm tends to trump evidence in the ongoing desire to find solutions to rising healthcare costs, in part because poor-quality studies can be found to support almost any position. Accordingly, more timely and rigorous research is needed for population health programs. Had Medicare not conducted randomized controlled trials of DM, the market might still be debating the fundamental question of DM effectiveness in the commercial population given the numerous low-quality studies in the marketplace. Improved evaluations will require the active support of commercial plan sponsors, as the federal government will likely evaluate only a small portion of the new models that will materialize under health reform. Given the current active experimentation with new models, it is a particularly important and appropriate time for comparative evaluations. In the early years of a program when early adopters are purchasing, there are more than sufficient comparison groups available in the marketplace. Finally, in addition to producing more rigorous research, greater scrutiny needs to be placed on study quality after publication to help decision makers demarcate high-quality versus poor-quality evaluations. Independently funded groups and organizations, rather than commercial vendors or their advocacy organizations, should set methodologic and transparency standards and use those standards to provide timely critical reviews of published DM and wellness studies.

Greater scrutiny and new thinking are called for in the design of DM programs, as the value for DM purchasers is significant, moving from intuition and a promise of savings to a priori evidence of the plausibility of program savings. For organizations searching for real savings from their population health programs, short-term opportunities exist. Well-designed and well-executed TC programs can provide credible short-term savings, rendering them low-hanging fruit. Targeting of specific patients and activity combinations based on risk, actionability, and treatment and program effectiveness has the potential to deliver a cost-saving DM program if combined with an outreach model that brings the care manager much closer to the patient and physician.

Author Affiliations: From CareScientific, Brentwood, TN; and the Department of Pharmacy Practice and Science, University of Kentucky, Lexington, KY.

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Address correspondence to: Brenda R. Motheral, PhD, CareScientific, 5115 Maryland Way, Brentwood, TN 37027. E-mail: bmotheral@carescientific.com.

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