MILLIMAN WHITE PAPER

Chronic disease management

Considerations for international adoption

Lalit Baveja, MSc, BSc
Mason Roberts, ASA, MAAA, MBA

Milliman

Background

Disease management is a system of coordinated healthcare interventions and communications for populations with conditions in which patient self-care efforts are significant.[1] Disease management strategies can include a range of activities with varying approaches and levels of intensity. Often these strategies are mixed with other care management approaches, which can complicate programme evaluation efforts. It is important to differentiate the disease management programme components, targets and interventions before evaluating return on investment (ROI) or cost and quality impact. There are three broad programme designs helpful to consider when discussing disease management.[2]

1. **Transitional care models:** Coordination of healthcare while moving from one healthcare setting to another or to home, either targeted to specific disease groups or generic to hospitalised patients. Typically, these programmes are focussed on specific members with disease profiles and aim at preventing emergency room (ER) visits and hospital admissions and readmissions.
2. **Telephone-based disease management:** "Keeping in touch" type programmes where telephone-based services are offered to prompt regular screening, drug adherence and physician review programmes with an educational component.
3. **Utilisation and case-based disease management programmes**: Monitor and coordinate care of a patient when in a hospital or other healthcare facility. These programmes have a structured approach to coordinating care, referrals and face-to-face interactions.

The table in Figure 1 highlights the differences between the more common transitional care programmes and disease management programmes. Here we have combined telephone and utilisation-based disease management programmes (i.e., design approaches 2 and 3 above).

FIGURE 1: COMPARISON OF CARE MANAGEMENT PROGRAMMES

	TRANSITIONAL CARE PROGRAMMES	DISEASE MANAGEMENT PROGRAMMES
EMPHASIS	SINGLE PATIENT	POPULATION WITH A SPECIFIED CHRONIC ILLNESS
TARGET	HIGH-COST PATIENTS OR DIAGNOSES EXPECTED TO HAVE HIGH COSTS	ALL PEOPLE WITH CHRONIC DISEASES IRRESPECTIVE OF DISEASE SEVERITY OR COMORBIDITY
FOCUS	ARRANGING CARE USING LESS RESTRICTIVE, CLINICALLY APPROPRIATE ALTERNATIVES	AVOIDING HOSPITALISATION AND MODIFYING RISK FACTORS THROUGH LIFESTYLE AND MEDICATION ADHERENCE
DURATION	60-90 DAYS	365 DAYS
PROGRAMME FACILITATOR	MULTIDISCIPLINARY	NURSE-LED
SITE OF INTERACTION	HOSPITAL, HOSPICE, SUBACUTE FACILITY OR HOME WITH FACE-TO-FACE INTERACTIONS	WORKPLACE, HOME, SCHOOL OR PHYSICIAN OFFICE WITH TELEPHONE OR MAIL CONTACT
OUTCOME METRICS	ADMIT LENGTH OF STAY, COST PER CASE, ER VISITS	ANNUAL COST PER DISEASED MEMBER AND FUNCTIONAL STATUS

[1] Care Continuum Alliance. Care Continuum Alliance (CCA) Definition of Disease Management. Retrieved 28 December 2017, from http://www.carecontinuum.org/dm_definition.asp.

[2] Kongstvedt, P. (2013). *Essentials of Managed Care*, 6th ed., chap. 8. p. 222.

The table in Figure 2 provides details about the types of services and interactions within a transitional care or disease management (DM) programme.[3] The three models described in Figure 2 are illustrative of a few of the many variations that are available. They highlight different target focus and intervention levels.

FIGURE 2: COMPARISON OF KEY PROGRAMME COMPONENTS IN ILLUSTRATIVE PROGRAMMES

KEY PROGRAMME COMPONENT	CARE COORDINATION	TRANSITIONAL CARE	DISEASE MANAGEMENT
TARGET POPULATION	Patients with a diagnosis of cardiovascular obstructive pulmonary disease (COPD), congestive heart failure (CHF) or diabetes mellitus.	All patients discharged from hospital for any diagnosis.	Patients with chronic conditions: COPD, diabetes, cardiovascular disease, asthma, depression, etc.
POPULATION IDENTIFICATION	Providers review hospital discharge data to identify patients with more than two admissions or emergency visits within six months or three or more chronic conditions. Providers would then recruit patients during face-to-face visits.	Care coordinators review hospital discharge summaries to identify patients with a high risk of readmission.	Nurses inform providers of patients with issues that might impair effective self-care.
KEY ELEMENTS OF CARE AND SERVICE DELIVERY	Initial: 30-minute introductory call with a care coordinator to review patient's conditions, goals and care plan. During: Care coordinator reviews progress by monitoring lab results, visiting patient and conducting weekly phone calls. Frequency increased to two to three times per week for those with more severe conditions. Discharge from programme: Patients discharged after meeting care plan goals, typically within six to 12 months.	Initial: Care coordinators visit patients in hospital to inform the patient of the programme, brochures are mailed to the patient's home and a follow-up call is made within 72 hours from care coordinator to assess transition needs and schedule follow-up appointments with providers. During: Care coordinator conducts weekly phone calls during 30 days post-discharge (frequency increased to two to three times per week for those with unstable conditions). Discharge from programme: All participants discharged after 30 days. Patients at high risk of readmission may be reenrolled.	Initial: Providers refer patients to the DM programme based on an assessment of ongoing support needs. During: Disease management nurses conduct brief weekly phone calls to identify concerns and any issues regarding self-care. Discharge from programme: Patients usually enrolled for a one-year term and then reevaluated the following year.

Return on Investment: key learnings from publications

Measuring rates of return for disease management programmes is controversial and challenging. There are significant costs associated with the disease management programme design, evaluation and maintenance. Programme outcomes are multifactorial due to the complexity of factors affecting a person's health. Additionally, while there may be a reduction in claims costs because of a reduction of admissions, there may not be net savings, which is due to programme costs. Alternatively, offering disease management services can create opportunities to attract new patients or insurance members, given that these services do not currently exist in many international markets. In markets where medical management had not yet been adopted, there is an opportunity for case management services to work in conjunction with disease management services to increase cost savings for patients with certain risk profiles.

Transitional care programmes have shown greater effectiveness, both in clinical outcomes and cost savings, than disease management programmes, likely due to the more focussed nature of their strategies. Transitional care programmes tend to include fewer patients and target those at greater risk for future hospitalisation, while using a more intensive multidisciplinary and relationship-driven care model. Timing of the intervention is also important. Transitional care programmes start when the patient is transitioning from hospital care to self-care at home, which can reduce the inconsistency of care received at home.

Broadly, commercial disease management models in the United States lack strong evidence of savings. Often this is due to difficulties in isolating the impact of the disease management programme. Studies sited in this paper include healthcare systems that had multiple care management programmes operating in tandem, which led to programme benefit attribution issues. For instance, a study of a

[3] Mathematica Policy Research (14 November 2014). First Annual Report: Evaluation of Health Care Innovation Awards (HCIA): Primary Care Redesign Programs. Retrieved 28 December 2017, from https://innovation.cms.gov/Files/reports/HCIA-PCRP-FirstEvalRpt.pdf.

programme focused on reducing unwarranted hospital admissions and ER visits found that the associated benefits were smaller than the programme expenses. In this case, there were multiple active care management programmes which reduced the impact of the disease management programme. However, disease management programmes do have evidence of having supported better clinical outcomes. The table in Figure 3 illustrates some examples of specific disease management programme focusses and their impacts on cost and clinical outcomes.

FIGURE 3: RESULTS OF DISEASE MANAGEMENT PROGRAMME

CONDITION	FOCUS OF INTERVENTION	COST SAVINGS?	PROGRAMME RESULTS
DIABETES	HB1AC CONTROL (<7%)	NO	Expenses of routine screening, examination and monitoring of blood test values were significant and outweighed the cost benefits. Clinical outcomes, however, were better post-intervention, even as measured 30 years later.
	LDL-C LEVEL <100	NO	
	BLOOD PRESSURE (BP) <130/80	NO	
	FEET EXAMINATION	NO	
	RETINAL SCREENING	NO	
	MICROALBUMINURIA SCREENING	NO	
CORONARY ARTERY DISEASE	LDL-C LEVEL <100 (ANTIHYPERLIPIDEMIC USE)	NO	Use of these medications does not generate short-term cost savings when costs of medications are considered. Statins' cost-effectiveness is emerging over time after the introduction of generic drugs has reduced the cost of medication. Lifestyle changes are difficult to assess for cost-effectiveness as the cost of lifestyle change is difficult to estimate (gym membership, dietary changes, etc.).[4]
	BETA BLOCKERS USE	NO	
	ACTIVITY/DIET/LIFESTYLE CHANGE	NO OR UNKNOWN	
ASTHMA	INHALED ANTI-INFLAMMATORY DRUGS	NO	While use of anti-inflammatory/controller medication is known to reduce ER visits and hospitalisations, it was not proven to be cost-effective due to the significantly increased drug costs. Education programmes involved significant in-person education, which is expensive. However, cost savings in selected high-cost, high-risk groups were found.
	SYMPTOM MONITORING/TRIGGER AVOIDANCE	UNKNOWN	
HEART FAILURE	ACE INHIBITOR USE	YES	ACE inhibitors, beta blockers and BP monitoring have shown to be cost-saving. Important note: the effective programmes have required structured monitoring and collaboration with physicians, which is not a standard offering of commercial disease management programmes.
	BETA BLOCKER USE	YES	
	WEIGHT/BP STRUCTURED MONITORING	YES	
	DAILY EXERCISE	NO OR UNKNOWN	

Source: Adapted from Table 2 in http://www.ajmc.com/journals/issue/2011/2011-1-vol17-n1/ajmc_11jan_motheral_webx_e10/P-2.

In summary, at the level of the individual programme activity, savings have not been shown for the treatment of these chronic conditions other than heart failure. A range of other potential cost savings in worker productivity, absenteeism and workers' disability compensation has been included in the disease management value proposition, but the results of these cost-saving efforts have yet to show up in the literature. Even though savings were not demonstrated in these programmes, there are other motivations to implementing disease management programmes. As mentioned above, improving community health and increasing competitive advantage between other health systems or insurance products can be accomplished with these programmes.

[4] Clark, A.M. et al. (November 2005). Meta-analysis: Secondary Prevention Programs for Patients with Coronary Artery Disease. National Center for Biotechnology Information. Retrieved 28 December 2017 from https://www.ncbi.nlm.nih.gov/pubmed/16263889.

Best Practices For implementation in global markets

Although demonstrating savings in disease management programmes has proven difficult, it is not impossible. It is important to thoughtfully design and continuously review the performance of the programme to ensure the best possible results. Below are distilled best practices taken from the available literature.

FOCUS THE PROGRAMME ON A SMALLER POPULATION

Better targeting of patients and treatment activities provides opportunities for savings. By focussing the programme on a smaller, more homogeneous group, the treatment activities are more likely to have effects that are more consistent across the population. For example, consider patients with paediatric asthma. A more global DM programme would provide anti-inflammatory inhalers for the entire population. In the United States, the inhalers have a cost of more than $100 per patient per year, and are known to reduce ER visits and hospitalisations. However, as seen in Figure 3 above, they have not been proven to be cost-effective. By comparison, consider a more focussed DM programme that targets patients using more than five beta agonists, a predictor of future hospitalisations. While only 5% of asthma patients would be admitted to this programme, there is a potential to save $500 per patient per year.[5]

EVALUATE PROGRAMME COMPONENTS AND IMPLEMENT A FEEDBACK LOOP

Programme components need to be evaluated carefully to understand their impacts. For example, a disease management programme focussing on shared decision making for selecting programme goals (avoidable admissions), education led by disease management nurses and phone support have demonstrated cost savings.[6] Detailed analysis revealed that savings were due to the avoidable admissions in the high-risk group rather than the disease management components of education, lab testing or pharmacy use. This feedback loop will be useful when designing new iterations of a programme. In addition, be aware of “regression to the mean” as a possible false indicator of programme success. Outliers, in this case high utilisers, have the tendency to show lower utilisation with additional measurement regardless of programme intervention.[7] Given that the appropriate data is available, you can control for this by estimating the effect of regression in your patient mix.

KEEP IT PERSONAL

Face-to-face intervention is significantly more effective than telephone-based programmes. Telephone-based disease management programme execution has two main challenges: ability to reach members on the telephone and ability to motivate behaviour change over the phone. Transitional care programmes’ impacts are mainly attributed to the face-to-face intervention and multidisciplinary teams, both of which are more expensive than disease management support, but create greater outcomes.

DESIGN AROUND THE PATIENT’S ACCESS TO HEALTHCARE

Disease management services designed around when a physician or healthcare provider was accessed proved to be a key feature of successful disease management programmes. In the United States, post-discharge coaching participation is much higher than enrolment in ongoing disease management. Reaching members while in the hospital (and therefore a captive audience) is likely the driver of better participation rates. The disease management programme can be set up as part of the discharge process. The patient’s phone number can be confirmed, an initial call be completed and a follow-up call can be scheduled.

DETERMINE DISEASE MANAGEMENT PROGRAMME GOALS

There are many potential goals to consider when designing the programme. It is imperative for the team that designs, implements and refines the programme to have aligned goals and incentives. This may require a culture shift in some aspects of the organisation. How to measure the goals should be considered while defining them. For instance, cost savings are dictated by who pays for the intervention and who the intervention is targeting, which will affect the measurement of the goals. It may also be appropriate to considered disease management as an expense for offering value to customers. Some interesting practice areas are shown in the table in Figure 4 on page 5.

[5] Paltiel, A.D. et al. (July 2001). Cost-Effectiveness of Inhaled Corticosteroids in Adults With Mild-to-Moderate Asthma: Results From the Asthma Policy Model. National Center for Biotechnology Information. Retrieved 28 December 2017 from https://www.ncbi.nlm.nih.gov/pubmed/11447380.

[6] Wennberg, D.E. et al. (23 September 2010). A randomized trial of a telephone care-management strategy. New England Journal of Medicine. Retrieved 28 December 2017 from http://www.nejm.org/doi/full/10.1056/NEJMsa0902321#t=article.

[7] Linden, A. (28 September 2013). Assessing regression to the mean effects in health care initiatives. BMC Medical Research Methodology. Retrieved 28 December 2017 from http://bmcmedresmethodol.biomedcentral.com/articles/10.1186/1471-2288-13-119.

FIGURE 4: INTERNATIONAL DISEASE MANAGEMENT EXAMPLES

LOCATION	DISEASE MANAGEMENT EXAMPLES
UNITED KINGDOM	Disease management programmes encourage the use of National Health Service (NHS) for care services by providing incentives in the form of a hospital cash benefit or other social care (transportation to hospital or babysitting services etc.). Because the services are free under NHS, insurers realise savings equal to the difference of paying for hospital services and the lower hospital cash or other financial incentive.
GERMANY	Insurers are able to negotiate big discounts on screening tests, physician evaluations and drug costs because of the volume of business generated. Additionally, direct reimbursements from pharmaceutical companies and discounts on blood tests from network labs make disease management attractive to insurers because much of the programme cost can be recouped.
MIDDLE EAST	Outpatient (OP) claims are paid by the insurer subject to a copayment. To encourage use of disease management services and preauthorisation, members are advised to use a disease management call centre. In return, the copayment is reduced or waived and they are routed to the preferred provider for services—pharmacy, labs or physician consults/follow-up (thereby reducing the insurer cost of claim).
INDIA AND SOUTHEAST ASIA	In cases where OP coverage is an out-of-pocket expense and not covered by the insurer, insurers or disease management services facilitate access to labs, pharmacies and network physicians for lower costs of tests, biometric devices, physician consults and drug costs. These providers offer large discounts to disease management members. It remains an expense for the insurer or disease management vendor, but the direct savings for the members result in improved loyalty and retention.
UNITED KINGDOM AND INDIA	In group medical coverage, some of the disease management or wellness services are offered as value-added services to employers. It has become an increasingly popular demand by employers to seek such services alongside the insurance coverage under the same premium. Insurers offer such services as an expense or customer engagement service. Cost savings, if any, are incidental and insurers consider the disease management service costs as a business acquisition/customer service expense.

Implications for other international markets

There are some unique nuances to many emerging healthcare markets, and it is important for disease management considerations to be interpreted in this context. In many markets in Southeast Asia, for example, the health insurance product is primarily an inpatient only product. Outpatient care is usually an out-of-pocket cost for the member, and therefore any disease management targeting outpatient savings will not benefit the insurer. Additionally, there is no formal primary or community care infrastructure. Members typically use private clinics, specialists and hospitals for primary care. This leads to a disjoint care continuum. The absence of formal referral mechanisms and primary care creates little opportunity for chronic disease management programmes. Not surprisingly, there are no formal medical management, utilisation management or case management programmes in these Southeast Asian markets.

However, there are opportunities for disease management services in many international markets. The need is evident as chronic respiratory diseases, cardiovascular diseases, diabetes and cancers are all very prevalent in the Asian region. Given the lack of care management infrastructure, it is important for an insurer or disease management provider to focus on what impact it wishes to target. Key savings may be feasible in hospitalisation costs (reduced readmission rates, reduced avoidable admissions or reduced ER visits). While designing the programme, it will be crucial to clearly determine the key drivers of admission and hospitalisations. Some items to consider include:

- Was the condition truly emergent or was the member admitted because that person did not have access to primary care? If primary care is the primary driver, then having access to a disease management coach would likely be a valued service if it were of minimal cost to the member.
- Has the member been prescribed medications and, if so, is that person adhering to the medication plan? If adherence is an issue, what are the barriers the member is facing? If cost is a common barrier, then having staff familiar with public benefits (e.g., social workers) may help, but it may also make sense for the insurer to subsidise the cost of prescriptions.

Summary of Recommendations

The literature shows that a disease management programme is not a guarantee of cost savings, but in addition to community health improvements and improved clinical outcomes, desired cost savings can be realised if the programme is designed correctly. Insurers or providers interested in creating a disease management programme must review the size of the target population, internal infrastructure requirements, external infrastructure and provider relations, any need for engagement from outpatient providers and pharmacies and methods for estimating and measuring savings. In some cases, focussing on specific populations within a condition can increase the sustainability of the programme. For instance, for CHF, it may be beneficial to focus on high-utilising members with multiple comorbidities. Analytical or other ways to identify such members then become crucial to success.

Effective disease management programmes often include key components of the transitional care model, such as an introductory call, weekly phone calls, monthly face-to-face monitoring, individualised action plans and coordination with physicians and providers. A timeframe should also be developed to link transitional care to the intervention. An example would be an active intervention for three to six months, with low intensity monitoring for stable patients for six months thereafter. Staffing considerations are important as well; additional nurse coordinators, social workers and administrative support are often needed for programme success.

It is also important to understand the current experience of the target population. If available, review the underwriting and claims data to identify the potential demand for the programme. Potential areas to analyse are the proportions of chronic disease, utilisation reviews and providers associated with the target cohort. If the utilisation in the cohort could be compared against benchmarks from other markets, then saving opportunities and triggers for intervention can be identified. For example, if the comparison highlights high ER use in asthma patients, high readmission rates in heart failure or OP visits in diabetics, then the populations utilising these services could be the target group for intervention. Setting a baseline against the benchmark creates an opportunity to monitor impact and ROI of any planned intervention.A pilot programme with a representative sample of patients and providers is critical to creating larger interventions. Group medical plans could allow such selective piloting as there may be a possibility of sharing the expense of a disease management pilot with a large employer group. The pilot will allow for the exploration of whether the third-party administrators have the required skill sets and infrastructure to provide transitional care and whether included providers are open to collaboration. As for cost savings in the form of pharmacy discounts or lab test discounts, it would help to explore whether some of these savings can be shared between member and insurer.

CONTACT
Lalit Baveja
lalit.baveja@milliman.com

Mason Roberts
mason.roberts@milliman.com