

## Care Link in Action:

### **Information Technology-enhanced care management improves clinical outcomes and lowers costs in chronic disease and episodes of care**

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The burden of chronic disease in the United States has long been recognized. In 2012, among US adults, approximately half (49.8%, 117 million) had at least 1 of 10 of the following chronic conditions - hypertension, coronary heart disease, stroke, diabetes, cancer, arthritis, hepatitis, renal disease, asthma, or chronic obstructive pulmonary disease. Even more concerning, although 24.3% of adults had one chronic condition, 60 million adults had multiple conditions (13.8% had 2 conditions, and 11.7% had 3 or more conditions).<sup>1</sup>

In addition, in the past few years, we have been experiencing the expansion of value-based payment models in healthcare, in both the private and public payer markets. Medicare has progressively moved towards shifting larger portions of its overall payments through alternative models, setting a goal of at least 30% by the end of 2016. Further, Medicare has been linking value-oriented measures even to persisting fee-for-service payments.<sup>2</sup> Value-oriented contracts from private insurers continue to proliferate as well – for example, UnitedHealthcare shared its intention, by 2015, to add 250 Accountable Care Organizations to the 520 previously existing in its network.

Thus, although health systems have always attempted to improve the health of our populations, the simultaneous imperative to flex to succeed in the world of value-based payments provides even more of an urgent incentive to do so well. National healthcare expenditure in the United States in 2015 was \$3.2 trillion.<sup>3</sup> It has been shown in many populations that persons with chronic conditions are the most frequent utilizers of health care in the United States. 76% of physician visits, 91% of all prescriptions filled and 81% of all hospital admissions are for chronic disease,<sup>4</sup> and these inpatient stays contribute significantly to overall costs.<sup>4,5</sup> It comes as no surprise then, that as health systems tackle their transformation, they are appropriating a significant portion of their attention to helping their members manage and improve their chronic diseases.

As our community's leading care provider, Christiana Care Health System is deeply committed to addressing the health of our community in new and broader ways. We see the health challenges our neighbors face every day — in many cases, at rates higher than the rest of the nation. We see the increasing impact of complex chronic conditions, for example in the form of too many emergency department visits for acute conditions that we know could have been managed sooner — or better yet, prevented — at home or in the doctor's office. We also see community services that could be vitally helpful if only there were an effective way to connect patients to them. In response to these challenges, Christiana Care developed Care Link, a patient-centered and clinician-led information technology-enhanced care coordination service to get people the right care at the right time, in the right place and with the right community resources.

The technology innovations for Care Link were developed to overcome several challenges. Patients can receive care from multiple different health systems and clinical sites, and it has traditionally been very frustratingly difficult to remain fully informed about a patient's clinical

trajectory because data are not integrated across healthcare systems. Communication between providers across healthcare business entities is fractured.

The Information Technology [IT] innovations for Population Health Management by the Care Link team were significant and essential tools. An operational data store was developed, and receives data feeds from electronic health records of participating health systems, health information exchanges from two states [the Delaware Health Information Network (DHIN) and Maryland's Chesapeake Regional Information System for our Patients (CRISP)], and financial sources including claims data from payers. There is also a bi-directional data feed to and from this operational data store and a population health management electronic health record, a prediction engine and member portal.

This IT system allows the care coordination team to have a regional view of the clinical activity of patients, even if they traverse various health systems. The care coordination team receives real-time Admission and Discharge notifications on the patients in this project, from all the hospitals in Delaware and Maryland, through their feeds to these state health information networks. Thus, the care coordination team can proactively reach out to the hospitals or emergency departments to interact with the clinicians and care coordinators on the ground there, to provide clinical updates and collaborate in the management of our mutual patients' care. Also, the care coordination team receives real-time updates from all hospital and outpatient laboratory facilities in Delaware, thus alerting them to abnormal lab results (e.g. rising White Cell Counts which may indicate a brewing infection in patients recovering from knee or hip replacement surgery).

These triggers further allow care coordinators to pro-actively reach out to patients to assess them clinically, and direct them to appropriate clinical care as needed, thus allowing us to avoid unnecessary worsening of clinical problems or the escalation of the level of care. The use of a shared population health management electronic health record allow a geographically dispersed Care Link team to collaborate on the care of the patients and avoid redundancy of efforts. In addition, the novel real-time admission, discharge and laboratory results feeds from the state health information exchanges arm the whole team with tremendously valuable, actionable alerts that had never been available before.

A further IT enhancement has been the incorporation of a predictive engine that uses artificial intelligence and machine learning technology to enable the Care Link team to identify populations most at-risk. Historical data, including clinical information, utilization history, and demographic data are collected from internal and external sources. Predictive signal detection and analysis is applied in order to calculate a risk score predicting future utilization at the individual person level. This is of particular significance, because of the aforementioned high rate and costs of hospital admissions in patients with chronic disease. The risk scores are communicated via the population health management electronic health record to the care coordination team, so that the intensity of care coordination efforts can be customized to each patient's risk level.

In addition to these technological advances, emphasis was also placed on developing a care coordination team that actively builds relationships with patients, their families and their circles of care. The Care Link team has a much more rounded view of our patients' clinical progress and social and personal needs, and this in turn allows us to guide them to recovery or manage their chronic disease in a far more streamlined manner, while minimizing unnecessary, wasteful

clinical activity. Utilizing a hub-and-spoke model, Care Link leverages both virtual and embedded care management staff to drive patient engagement and coordination of care across a variety of care delivery locations, including primary care and subspecialty practices, hospitals and post-acute care facilities across the state of Delaware, Maryland, southeastern Pennsylvania and southern New Jersey.

The Care Link team is comprised of clinicians from multiple disciplines – Registered Nurses, Pharmacists, Social Workers, Respiratory Therapists and Medical Directors. This interprofessional team helps patients better adhere to treatment plans, guides them in self-management of chronic conditions, medication management and compliance with follow-up appointments, preventive care, testing and imaging. In addition, the Care Link team improves surgical outcomes with optimal perioperative care management of its patients.

As the back bone of the team, nurse care managers perform assessments and educate telephonically, face-to-face, through live video meetings, or printed materials. They review each patient in a holistic way to identify barriers, education gaps, any physical, social, and emotional needs, and work closely with patients and their providers of care to meet their current and future needs by promoting safe, quality care through appropriate use of resources.

Care Link pharmacists perform medication reconciliations when patients experience transitions of care, such as upon return home from a stay at a hospital or skilled nursing facility. They review medications for unsafe drug interactions and check to ensure that appropriate doses are being prescribed and dispensed. They communicate with prescribing physicians, pharmacies or home health care agencies whenever any medication-related needs arise. They provide medical-related education to patients by telephone, video consultation or printed material.

If patients are having trouble picking up their medications, they help to transfer prescriptions to conveniently located retail pharmacies or those that deliver to the home. Care Link pharmacists also contribute to the longitudinal care of chronic diseases and the perioperative support of patients in episodic care, such as bundled care for surgery, by reviewing their medications lists for high-risk medications, such as anticoagulants or narcotic pain medications.

Care Link social workers assist patients with a variety of financial challenges, such as arranging affordable transportation or medication. They also help them access local, regional or state agencies that provide social services. They help homeless patients to connect with state agencies or homeless shelters, link patients and families to the state's Division of Aging, when appropriate, administer depression screens and refer patients with positive findings to behavioral health care.

Care Link respiratory therapists focus on supporting patients with chronic pulmonary conditions with the goal of equipping them to successfully self-manage their health. They provide detailed education on conditions and treatment plans, and emphasize the importance of adherence to treatment plans. They review inhaler utilization techniques and communicate with physicians when patients need medication adjustments or refills. The therapists ensure that in-home medical equipment, is working appropriately, and connect with the durable medical equipment companies on their patient's behalf.

A consistent philosophy employed at Care Link is that of working to engage all members of the team – the patients, families, circles of care, as well as all their providers of healthcare. Much evidence exists that illustrates that patient activation makes a positive impact on health

outcomes, costs and patient experience.<sup>6</sup> The team is trained to apply motivational interviewing skills to activate patients, and to provide continuous customized support to help patients change their behaviors and gain confidence in self- management of their chronic medical conditions.

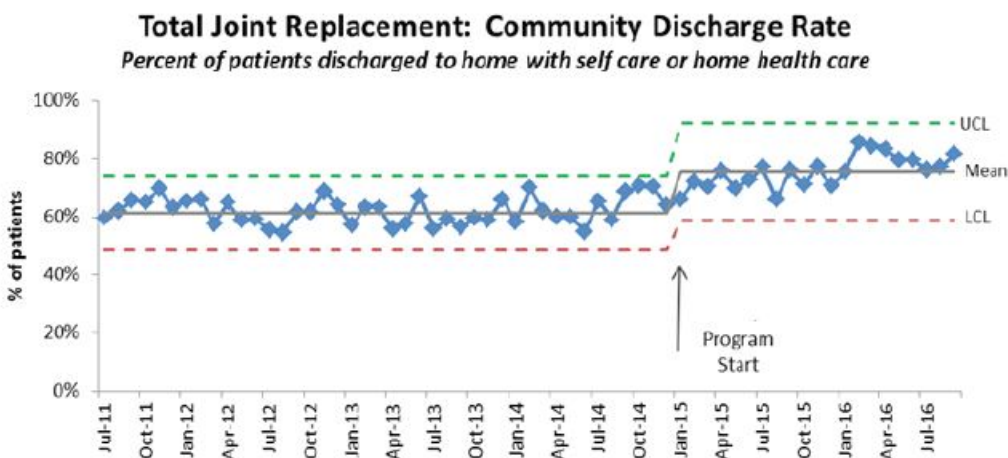
Let us take an in-depth look into a population that is served by the Care Link team. Beginning in January 2015, Christiana Care Health System voluntarily opted to participate in a bundled payment model with a major payer, taking responsibility for the financial and clinical outcomes of patients in episodes of care. In this agreement, the episode included the inpatient stay in the acute care hospital plus the post-acute care and all related services up to 90 days after hospital discharge. Several surgical and medical diagnoses, including total joint replacement surgery were included. The outcomes of the 2,432 patients underwent total joint replacement surgery in this program from January 2015 to September 2016 are reviewed here. Through the development of a clinical pathway and standardization of surgical and immediate post-operative procedures, the length of stay for total joint replacement patients was reduced by 4.0 days.

The Care Link team's interactions with patients undergoing elective total joint replacement surgery begins in the pre-operative period. The team converse with patients and their circles of care to identify clinical and psycho-social needs. They optimize patient and caregiver education, manage patient expectations and begin discharge planning before the patients arrive at the hospital.

Historically, total hip/knee joint replacements have accounted for nearly 10 percent of all discharges to post-acute care, among which 54.1 percent went to home health agencies, 37.3 percent went to SNFs, and 8.4 percent went to inpatient rehabilitation facilities.<sup>7</sup>

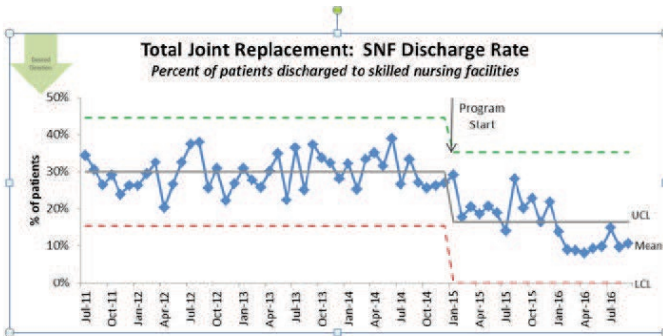
There exists a high likelihood that discharges to post-acute care, especially skilled nursing facilities are not often driven by clinical need and thus may not be cost-effective.<sup>8</sup> The Care Link team assesses all elective joint replacement patients pre-operatively using a validated tool to predict post-acute care needs. In doing so, we have been able to increase the number of patients being discharged to home with self-care or with home health care by 24% (Figure 1).

Figure 1: 24% increase in total joint replacement patients being discharged to home with self-care of home health care after initiation of care coordination by Care Link in a bundled payment model with a major payer.



Concurrently, we have been able to reduce the number of patients being transferred to skilled nursing facilities after total joint replacement surgery by 46% (Figure 2).

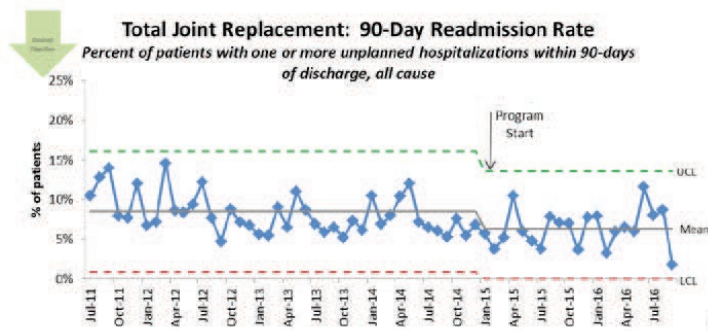
Figure 2: 46% decrease in total joint replacement patients being discharged to skilled nursing facilities [SNFs] after initiation of care coordination by Care Link in in a bundled payment model with a major payer.



The concern was raised that both shortening the hospital length of stay and sending more patients home after surgery instead of to skilled nursing facilities would lead to rising readmission rates.

However, the opposite was seen, as illustrated in Figure 3. There was a 25% reduction in readmissions after 30 days, and a 19% reduction in the 90-day readmission rate for joint replacement patients. This was achieved by technology-enhanced intensive care coordination of these patients. Within 24 hours of discharge from the hospital post-surgery, the Care Link team connects with the patient, by phone, face-to-face or video conference. Areas of focus include ensuring patient understanding of discharge instructions, ensuring that follow-up appointments are scheduled and kept, and that medication prescriptions are filled and treatment plans adhered to.

Figure 3: 25% reduction in readmissions after 30 days, and a 19% reduction in the 90-day readmission rate for joint replacement patients.

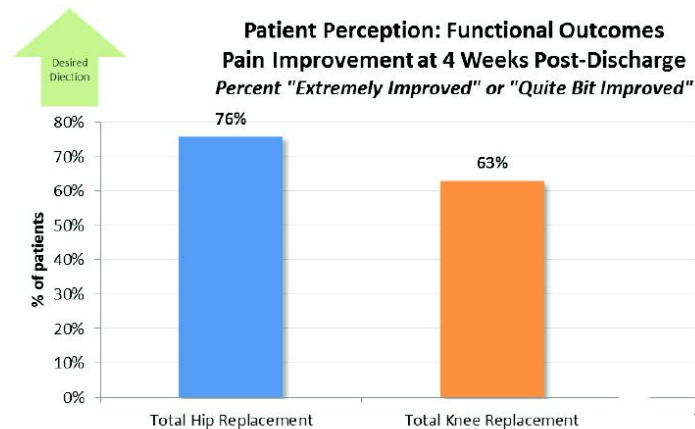


Much emphasis is placed on educating patients on the appropriate sites at which to access acute care, with emphasis on minimizing unnecessary use of the emergency department or hospital. The intensity of the outreach is further customized achieved by utilizing the predictive engine to identify patients at highest risk of utilization. In addition, the Care Link team receives near real-time admission alerts on its patients from all emergency departments and hospitals in the state of Delaware since they report to the DHIN. These triggers allow the Care Link team to interact with the hospital clinical and care management teams in real time, and to facilitate a smooth transition

to appropriate levels of care. We are often able to avoid unnecessary hospitalizations by providing the security of support to patients to ensure appropriate follow-up and follow-through on clinical plans.

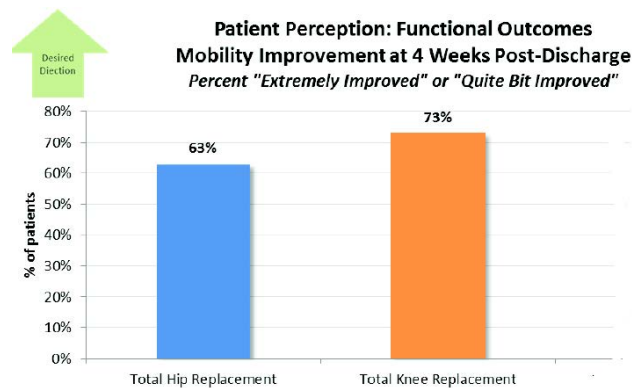
In addition, patients were surveyed about their perceptions of their levels of pain control and mobility four weeks after surgery. 76% of total hip & 63% of total knee patients had pain improvement at 4 weeks post discharge (“extremely” or “quite a bit” improved) as seen in Figure 4.

Figure 4: Improved levels of pain in total joint replacement patients 4 weeks after discharge



In addition, 76% of total hip and 63% of total knee patients had pain improvement at 4 weeks post discharge (“extremely” or “quite a bit” improved), as illustrated in Figure 5.

Figure 5: Improved mobility in total joint replacement patients 4 weeks after discharge



The IT-enhanced care coordination processes illustrated in the care of total joint replacement patients are also being applied to the support of patients with chronic diseases. The Care Link team supports 48,000 patients cared for by almost 300 primary care physicians in an Accountable Care Organization linked to a major payer in Delaware and Maryland. Care Link uses the complex and detailed data available on all its patients to identify areas of opportunity for clinical and care management improvements, and works collaboratively with clinicians to drive performance improvements throughout the care continuum.

Adapting to developments in one’s illness, understanding how to self-manage a chronic illness, coordinating appointments, sharing information between primary care and specialty providers

following up on details — from transportation to prescriptions to scheduling tests — can be a full-time job for someone with a chronic illness. The Care Link team is proving that by providing Information Technology-guided intensive care management support, populations of patients can achieve better clinical outcomes at lower cost.

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