Title: How the Preventable Admission Care Team (PACT) used IT to Expand Program

EXECUTIVE SUMMARY
The ability to prevent avoidable readmissions by patients with certain chronic conditions within 30 days of discharge is a primary success factor for hospitals to be able to adhere to forthcoming changes in the reimbursement model used by Medicare. The Mount Sinai Medical Center (MSMC) set out to establish an electronic health record (EHR) based process whereby patients at risk of being readmitted into the hospital are efficiently and accurately identified and managed.

Once identified, these patients are enrolled into MSMC’s Preventable Admissions Care Team (PACT) program, where psychosocial drivers of readmission are assessed and addressed through a 35 day social work-lead intervention that begins upon discharge. By incorporating the identification process into the design and implementation of the Epic EHR, MSMC has effectively been able to hard wire key workflow processes required to reduce readmissions, improve care, and lower the costs of care.

The program has been very successful. A 56 percent reduction in 30 day readmission rates has been observed, and these gains have been sustained at 60 and 90 days of discharge. Ninety-one percent of patients enrolled in PACT (n= 615) made follow up appointment within seven to 10 days, with 84 percent of patients keeping their appointment. Finally, MSMC and its partners have received generous grant funding to continue to evolve this ground breaking program. Further, the PACT program is expected to be a centerpiece of MSMC’s emerging Accountable Care Organization (ACO) program.
1. BACKGROUND KNOWLEDGE
The Mount Sinai Medical Center encompasses both The Mount Sinai Hospital and the Mount Sinai School of Medicine. The Mount Sinai Hospital, founded in 1852, is a 1,171-bed tertiary and quaternary care teaching facility and one of the nation’s oldest, largest, and most respected voluntary hospitals. In 2012, U.S. News & World Report ranked The Mount Sinai Hospital 14th on its elite Honor Roll of the nation’s top hospitals based on reputation, safety, and other patient-care factors. Nearly 60,000 people were treated at Mount Sinai as inpatients in 2011, and approximately one million outpatient visits took place. Due to Mount Sinai’s location in the Upper East Side area of New York, New York; the hospital is located at an intersection of the wealthiest and poorest zip codes in the United States and has the responsibility of meeting the unique medical needs both of those from affluent backgrounds and of patients requiring indigent care.

2. LOCAL PROBLEM BEING ADDRESSED AND INTENDED IMPROVEMENT
The PACT Program at MSMC had been using admission history data for nearly the past two years to identify and target for intervention of patients at high risk of a 30 day readmission to the inpatient setting. Without an integrated EHR, this identification process was very labor intensive and required a concentrated review of manual paper documents. In addition, it did not allow for the identification of those patients who are at high risk for a 30 day readmission, but do not have a history of admissions.

In an effort to refine the identification process and enable the PACT workers to target additional patients who might benefit from the intervention, MSMC’s Department of Health Evidence and Policy developed a risk prediction model for readmission within 30 days using logistic regression that did not rely upon admission data: the higher the score, the higher the risk of readmission. The analysis was performed on the 2010 Medicare Fee For Service (FFS) beneficiaries and their associated readmissions rates. The score utilizes co-morbidities and demographics that are readily available and can be used in “real time.” Integrating this risk prediction “score” into Epic not only makes it possible to easily and quickly identify patients at high risk for readmission, it also improves the awareness of services being provided to the patients. By tailoring the electronic admissions history form in the Epic EHR to electronically capture responses to discrete questions (such as whether the patient has been seen at MSMC or anywhere else in the past twelve months and/or the past six months), as well as integrating the risk prediction score into Epic, the enrollment process into the PACT program would be streamlined. Once the patient has been identified and enrolled into the PACT program, their profile in the EHR would be flagged and shared longitudinally, alerting other clinicians of the patient’s higher risk of readmission. The alert would signal the need for the PACT team to become immediately involved with the care of those patients to avoid readmissions. Figure 1, Appendix A illustrates the overall process for the PACT program.

For those at-risk patients who are targeted for the PACT intervention, a comprehensive bedside assessment is completed. The PACT assessment covers 15 areas of psychosocial strain that MSMC has deemed primary contributors towards the likelihood of being readmitted. The areas covered by the PACT Assessment are identified in Figure 2 below.

![Figure 2: Areas of Psychosocial Strain](image)

The program also addresses those factors that place the patient at high risk for readmission. By addressing clinically relevant topics such as ethnicity, past medical history, and similar universally recognized risk factors; it is possible to assign risk scores to patients and also group them accordingly. Figures 3 and 4 show both the risk factors assessed and how these are scored along with historical readmission rates for these groups.
The PACT assessment is documented using Epic and then facilitates communication amongst providers to enhance the understanding of the unique issues driving readmissions for a particular patient. The clinical staff sees a “flag” in the header area of the electronic chart as visual cue to the relative readmission risk that follows the patient wherever care is provided at MSMC.

3. DESIGN AND IMPLEMENTATION
The development of workflow processes prior to the implementation of the Epic EHR was key to the success of the PACT program being able to effectively utilize Epic’s capabilities. During the design and implementation of the Epic EHR, the established pre-admission assessment workflow, the high-risk questionnaire, the PACT Assessment, and a rounding list were built into the Epic software. MSMC estimated upwards of 25 percent of high risk patients were being missed by a manually intensive process that depended on history of admission data versus the more accurate scoring model now used. The need for this scoring model also recognized that while the patient might not have a documented history of admissions to MSMC, there was still a high statistical risk for a readmission to occur at some point.

The move from a paper process to one highly facilitated by an EHR was an evolutionary one occurring from 2010 to present day with these key milestones:

- Excel spreadsheets, extracted from the legacy EHR, that included all patients with a prior MSMC hospitalization, were emailed throughout the hospital to manually identify high-risk patients.
• A logistic regression model was developed by the MSMC Health Evidence and Policy Department which used a sophisticated statistical tool and added both past medical admissions and comorbidities into the model.
  o The model still required some manual additions by the caregivers to get to the final risk score.
  o The model was validated in actual clinical practice.
• The PACT model was fully implemented in Epic
  o Medicare data was used so the model could incorporate any prior admissions in New York, not just those occurring at Mount Sinai.
  o Social workers now document the psychosocial assessment and scoring using Epic automation.
  o The flag symbol is now displayed on various screens for clinicians across the continuum of care.

Specific enhancements recently made to the Epic system include:

• Building the admissions history form in Epic to ask discrete questions such as:
  o Has the patient seen his or her primary care physician in the past 12 months?
  o Has the patient been seen in an ED in the past six months?
• Having the patient profile in Epic noticeably indicate via a “red flag” that the patient is a high-risk for readmissions generating a daily rounding report out of Epic (based on diagnosis) with all identified patients so the PACT team can conduct intervening rounding where the patient is actively engaged to assist with the aforementioned 15 areas of psychosocial strain

Figure 5, Appendix A provides a timeline of the PACT program evolution.

4. HOW HEALTH IT WAS UTILIZED
Without automation, it would have been impossible for the program to be scalable with rising patient volume. In the first year of the program, 488 patients were enrolled, while 4,800 are expected for 2012. The algorithms (such as the scoring model) embedded in the EHR allows more patients at high-risk for readmissions both to be quickly identified and also to be more accurately identified than with manual processes. The scoring process utilizes coding data that is readily available through our EHR, while other scoring methods utilize administrative data that is not available in real time to hospitals. Finally, the EHR provides real-time communication (such as a red flag that displays with the patient information) to all care settings as soon as a high-risk patient is identified. This too would not be possible using a manual system.

The Epic EHR plays a central role in the PACT program, given its longitudinal view of the patient and the user’s ability to customize the system. Enhancements included:

• A flexible assessment form that MSMC has tailored to include questions specific to identifying high-risk patients for readmission
• Production of a daily report that identifies all patients enrolled in PACT, which in turn, enables PACT associates to round to PACT patients
• The ability to aggregate information from the psychosocial assessment to trend readmission contributors and facilitate the development of community-based resources
• A far-reaching electronic patient profile that is central to the patient electronic record, regardless of the area in which the patient presents in the medical center. This central record provides an automatic signal, alerting caregivers of a high-risk patient.

Without automation, it would have been impossible for the program to grow in patient volume.

5. VALUE DERIVED OUTCOMES
In summer 2011, the predictive model was applied to patients enrolled in the PACT program to determine how many were at high risk for 30-day readmission. "Ninety-five percent of PACT enrollees had a risk score greater than three, meaning their readmission rate was between 20 percent and 39 percent," said Jill Kalman, MD, Director of the Cardiomyopathy Program, Associate Professor of Medicine (Mount Sinai’s Cardiovascular Institute), and Medical Director of PACT. Dr. Kalman further states, "If these results can be substantiated through further study, we believe this could have national implications for identifying high-risk patients in real-time.”¹

MSMC reported a 56 percent reduction in 30 day readmission rates (baseline 39 percent to 17 percent) in 2011. While MSMC is only held to reducing 30 day readmissions, these gains were sustained at both the 60 and 90 day mark. MSMC also measured overall utilization. On a subset of 111 patients, using each patient as their own control, MSMC measured hospitalization and ED visits for six months prior to the PACT intervention and for six months after the PACT intervention. MSMC had a 43 percent reduction in hospitalizations and a 54 percent reduction in ED visits (for the 6 month period). Ninety-one percent of patients enrolled in PACT (n= 615) had seven to 10 day follow up appointments made and 84 percent of patients kept their appointment.

This reduction is directly attributed to the EHR-enabled processes of identifying high-risk patients and aggressively managing factors that contribute to readmission within thirty days post-discharge. PACT patients are provided with phone numbers for the PACT program, collaboration with MSMC’s homecare partner, Visiting Nurse Service of New York (VNSNY), and open access to the PACT clinic staffed by nurse practitioners and clinical social workers.

The PACT program’s value to the community was highlighted by a National Public Radio (NPR) segment that outlined how the program at MSMC is playing a major role in reducing readmissions. Focusing on a case study of one patient as an example, the reporter showed how the PACT program saved taxpayers $86,000 annually for the patient by reducing emergency and overnight visits from 20 to only seven occurrences over the course of one year.

Other related areas of MSMC were integrated into this program so all could benefit from the PACT risk assessment. MSMC’s Medicare population was focused on as they were the largest group served by the program. Because we regard healthcare as a continuum, the synergy that would result from recognizing the PACT risk assessment would have a tangible, far reaching impact. Figure 6 summarizes both the services and scope of services related to the program.

**Figure 6: Services Related to PACT program**

6. **LESSONS LEARNED**

From a patient identification perspective, there are challenges with identifying the moderate-risk patients at risk to be readmitted. Industry-standard assessment forms typically identify the high-risk patients based on diagnosis, family history, functional deficits, and comorbidities. In order to be more precise in identifying patients with a moderate-risk of being readmitted, the assessment process needed to be refined to include questions specific to the past medical encounter history. Members of PACT believe that during the Epic go-live, the value of fine-tuning the risk assessment tools would have been facilitated if they had the ability to gather patient data sooner. Specifically, the team believes IT professionals should have

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been brought into the process sooner. Not only would there be a better understanding of population needs, but also the ability to plan for and address future needs such as clinical and community partnerships.

A key lesson learned was the importance of effectively and consistently utilizing the EHR’s patient problem list. A more regimented use of the electronic problem list keeps chronic disease registries accurately updated and allows further tightening of the patient identification process.

Other lessons learned included:

- Point-of-care (POC) integration was desired and proved to be one of the keys to the success of PACT. Without a visual cue for providers in various care settings at the POC, providers would not be able to intervene in real-time as needed for patients at risk.
- Integration went beyond simply identifying high risk patients and required links and IT development for external calculations, reporting, modifier settings, and flagging.
- Flagging high-risk patients was important for reporting (rounding, etc.), but more importantly turned out to be a key visual identifier on the patient’s electronic record, so all providers accessing the record are apprised of the patient’s condition.
- The integration required for the PACT program has had many positive effects on care coordination beyond the original intent of the program. The increased care coordination has advanced the MSMC accountable care organization, the Geriatric Emergency Department Innovations in Care Program (GEDI WISE), and the Home Health program, to name a few as seen in Figure 6.
- The process and IT developments created for PACT have been, and continue to be, incremental. The PACT team anticipates continual improvement within the PACT toolset for the foreseeable future.

7. FINANCIAL CONSIDERATIONS
The PACT program has been funded through the hospital and was recently awarded a multi-million dollar five-year award from the CMS Center for Medicare and Medicaid Innovation for Community-based Care Transitions Program (CCTP) in partnership with the Institute for Family Health. If the award money is taken into account, the program is breaking even financially. It is believed that hard ROI will quickly become apparent as MSMC moves from an FFS to an ACO model of reimbursement.

From a cost perspective, in the pilot phase, the cost per patient per year was $627 per patient for an annualized cost of $376,000. IT costs were modest at $14,500 per year. PACT was also able to draw from the wide talents of MSMC staff with participation from the Health Policy team and physicians who provided their skills, talents, and knowledge at no charge to the program.

The ability to facilitate shared savings in MSMC’s emerging ACO is expected to be significant. The combined reductions in hospitalizations and ED visits over a six-month period post PACT saved an estimated $1.6 million in Medicare spending. Using individual patients as their own controls, the number of hospitalizations and ED visits were compared for pre- and post-PACT enrollment for a six-month period. An average reimbursement of $9,000 was used for each hospitalization and $450 per ED visit was used to estimate overall savings to Medicare.
APPENDIX A

Figure 1: Overall Process of the PACT Program

- Patient admitted for inpatient treatment with CHF condition
- Nurse documents past treatments in Epic (admissions)
- IT and case management run daily report
- Health IT Intervention
  - MedPAR
  - Epic
  - HealthX
- Report identifies candidate patients for PACT
- Social worker meets with patient about PACT program
- Patient is enrolled and flagged in Epic
- Patient is monitored by PACT team for 35 days
- If patient goes to ED within 30 day period, ED nurse/physician contacts PACT team who responds to help evaluate if hospitalization is necessary

Figure 5: Timeline of the PACT Program Evolution

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>First use of “low-tech” report identifying high risk patients</td>
<td>January 2010</td>
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<tr>
<td>Launch of PACT program</td>
<td>September 2010</td>
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<tr>
<td>Admission history first entered in Epic EHR</td>
<td>May 16 2012</td>
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<tr>
<td>Rounding report first developed and used</td>
<td>May 17 2012</td>
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<tr>
<td>HCC scoring process embedded in Epic EHR</td>
<td>September 2012</td>
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<tr>
<td>Improved use of Epic patient problem list to assist with identifying high risk patients</td>
<td>October 2012</td>
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