

Supplemental Information

ADDITIONAL QI METHODS BEFORE BUNDLE LAUNCH

During the planning phase, we developed an asthma registry within the health system's EHR and stratified the population to identify the highest risk patients with potentially modifiable use. We developed a driver diagram to depict a theory of change believed to reduce acute care visits. Team leads and QI experts built defined process and outcome measures into an asthma dashboard.

DETAILED DESCRIPTION OF PROCESS METRIC-RELATED TESTS OF CHANGE

Tailored Bedside Education

Inpatient asthma screening and tailored education began in May 2016 with a staff of 2 registered nurses and 1 respiratory therapist with expertise in asthma management. Asthma educators identified eligible patients from an existing inpatient asthma pathway list during the first iteration of the intervention. The asthma educators, team lead, and QI advisor met every other week to assess performance. The primary barriers to improvement were the time required for manual chart review to determine eligibility of patients for bundle enrollment and short length of stay for most asthma admissions. Clinical informatics experts built a best practice alert (BPA) in the EHR on the basis of the asthma registry logic to identify eligible patients with asthma and created an in-basket work queue that was accessible to the 2 nurses, respiratory therapist, and physician lead. The BPA and in-basket work

queue were tested and implemented in January 2017. Additional tests of change included revising the BPA logic in March 2017 to include patients seen in the ED observation unit and converting the high-risk inpatient asthma assessment from a paper survey to an EHR flowsheet (April 2017 to June 2017).

Referral to the CAPP

Immediately before the launch of the bundle, an EHR-based referral order to the CAPP was created and added to inpatient preference list in June 2016. This referral order was received in a common EHR in-basket and CHW workflows were adjusted to review the in-basket daily. The CHWs were instructed to prioritize referrals for high-using children above other provider referrals, which included trying to schedule bundle-eligible patients with a primary care provider visit within 7 days of discharge and a home visit within a month. The medical director of the CHW program was a coleader of the overall initiative (T.B.S.) who reviewed dashboards on a monthly basis with the asthma population health team and as needed at weekly CAPP meetings to identify barriers to improvement of the CAPP metrics. The biggest barrier for the CHWs was contacting certain participants with vulnerable social situations and scheduling clinic and home visits given the competing priorities of busy families.

Facilitated Discharge Medication Filling

Inpatient providers received e-mail notification and in-person orientation to the preferred discharge medication process in May 2016. Asthma clinical nursing champions on each inpatient unit were instructed to frame the on-site outpatient pharmacy as the default pharmacy, for which families could opt out. The inpatient team reviewed performance twice monthly and discussed barriers. These included inconsistent adoption of new default practices by both physicians and nurses on the 5 individual units where asthma patients receive care and, less often, caregivers' preferences to stick with their home pharmacies. Asthma educators initiated real-time reminders to prescribing providers during the second test of change in January 2017. Systems-level tests of change were explored thereafter, such as piloting a "meds-to-beds" program, but were abandoned because of logistic issues related to contracting between the outpatient retail pharmacy and the hospital, resource requirements, and estimated time to scale.

Expedited Follow-up With Specialists

Specialists on the team provided specific guidance to inpatient providers on when to refer eligible patients to an allergist and/or pulmonologist for ambulatory consultation at initial implementation of the bundle. The multidisciplinary team reviewed performance monthly and explored operational challenges

in both the inpatient and ambulatory settings. One specific challenge was long wait lists for outpatient specialty follow-up and no easy way to identify “High Utilizer” referrals. With the creation of the previously mentioned BPA in January 2017, inpatient referrals to the allergy and pulmonary clinics for children with 3 asthma hospitalizations in the last year were revised to include an “expedited” status that flagged the referral as “High Utilizer” for ease of identification by clinic coordinators. Coordinators in the allergy and pulmonary clinics were recruited as dedicated points of contact to review lists of consultations to their division and schedule patient visits within 30 days of previous discharge during the third test of change.

competing family priorities in the month after hospitalization, and other reasons for high no-show rates) that we considered beyond the immediate scope of the first year of bundle implementation. Subsequent efforts of our team have focused more on these hard to solve problems.

RATIONALE FOR DISCHARGE MEDICATION AND SPECIALTY FOLLOW-UP PROCESS METRIC SELECTION

E-Prescription of Discharge Medications

During the intervention, we did not have access to prescription fill data because the on-site outpatient pharmacy was under the management of a third party. Without access to filling data, e-prescription to this specific pharmacy was the best proxy data we were able to monitor with our run charts.

Scheduling of Specialty Appointments

As noted above, all of the tests of change for expedited specialty follow-up were created to increase the scheduling of appointments. To track our team’s performance, we measured the proportion of referred patients who were scheduled for an appointment within 30 days of discharge. Completion of a follow-up visit within 30 and 90 days were additional metrics that we tracked, but we determined that completion of follow-up has additional drivers (lack of adequate transportation,