The Health Care Improvement Foundation
2016 Delaware Valley Patient Safety and Quality Award
Entry Form

1. **Hospital Name**

   Main Line Health System

2. **Title Of Initiative**

   Reducing Medication Errors by Improving an Electronic Medical Record's Automatic Stop Medication Order Process

3. **Abstract (Please limit this description to 250 words)**

   This organization embarked on a deep dive analysis of its computerized physician order process after a serious safety event occurred. The health system's automatic stop order (ASO) policy allowed for the discontinuation of a routine medication within the electronic medical record platform without an explicit prescriber order. The analysis identified inefficient and ineffective processes involving the prescriber, the pharmacist and the nurse.

   A multi-disciplinary process improvement team created a patient safety action plan following Lean-Six Sigma methodology. Their work uncovered that the renewal process was poorly understood and minimally adhered to by clinicians. A safety net process of pharmacy calls to prescribers for clarification regarding expiring medications became the de facto first line of defense. With 5,000 phone calls made by pharmacists to prescribers monthly and a 65% renewal rate, there were more than 700 near misses for inadvertent discontinuation of medications each month.

   The team elected to overhaul the ASO policy. A unique and interactive email process was utilized to encourage rapid discussion and decision-making amongst more than 50 content experts regarding the default durations of more than 6,500 medications on the pharmacy master list. Information technology enhancements included more intuitive icons and a nurse "view only" capacity for expiring orders. Ongoing efforts aim to further simplify the renewal and discontinuation process.

   Over the nine months since the policy changes, pharmacy intervention calls decreased by 61% overall. There have been no additional safety events related to inadvertently discontinued medications in the ensuing 19 months since the index event.

4. **What were the goals of your initiative?**

   There were four goals associated with this initiative.
   1. The primary goal of this process improvement initiative was to prevent any further similar events of harm from occurring due to the inadvertent discontinuation of a medication. This goal aligned closely with the system's overarching goal of zero harm.

2. An additional objective was to reduce pharmacy phone calls made to prescribers regarding expiring medications by 50%. The team wished to redirect the pharmacists' time saved into other quality and safety efforts, such as bedside medication reconciliation provided by pharmacists for the health system's most medically complex patients.

3. The team endeavored to raise prescriber awareness of the pitfalls of the current system as well as to create a more intuitive, eye-catching system of electronic medical record (EMR) icons to call attention to the prescriber that a medication was approaching expiration.

4. The final goal of the project was to include nurses as partners in the process by allowing them to see which medications were approaching expiration on a daily basis.

5. **What were your initiative's baseline data and the results of your initiative?**

BASELINE:

In addition to a thorough literature review about the ASO process across the nation, a survey of 20 local hospital pharmacies was undertaken regarding their ASO policies. No single best practice was identified. This regional comparative evaluation highlighted that default durations for chronic medications ranged from 30 to 180 days, with wide variation in default duration for the high-risk categories of anti-coagulants, anti-infectives and narcotics. Most hospitals had neither a pharmacy nor a nursing peer check process in place. The EMR notification of a medication approaching expiration was accomplished via a variety of methods.

Once it was clear to the team that no single best practice for ASO management existed in the literature or the region, the team attempted to identify the level of prescriber understanding of the current automatic stop medication order process within this health system via a 15-question survey. Some questions focused on specific elements of the policy itself, such as default duration of certain medication groups, while others sought to garner an appreciation of the medical staff's perceptions about the efficiency and safety of that process. 27% of the staff was unaware that an ASO policy existed (see Appendix, Figure 1A). 34% of staff felt that a safety event may have occurred with one of their patients as a result of an automatically discontinued medication, while another 31% could not be sure (see Appendix, Figure 1B). 58% of the staff did not recognize the order approaching expiration (OAE) symbol (see Appendix, Figure 1C). Only 38% of the staff knew how to extend a medication's duration on the electronic medical record (EMR) and a resounding 87% of the medical staff felt the process could be made easier (see Appendix, Figures 1D and 1E).

Flow mapping of the current state identified that the medication renewal process was cumbersome, requiring 11 clicks in the EMR. An icon indicating that the medication was approaching expiration was black and white, placed far to the

right of an order line making it easy to miss, and used a symbol whose meaning was generally not understood (see Appendix, Figure 2A - BEFORE). Nurses did not have a view of an OAE list and thus relied on their memory to recall if a medication had fallen off the list from one shift to another. Realizing that prescribers were not responding to EMR notifications of medications approaching expiration, pharmacists had created a safety net process of calling prescribers to seek clarification regarding whether or not the medication should be renewed.

In order to establish a baseline, the team felt it was critical to identify how many pharmacy verification calls occurred each month. From January through March, 2015, pharmacy teams manually counted all intervention calls made to prescribers about orders approaching expiration. On average, calls were made on 1,097 orders per month (see Appendix, Table 1). Pharmacists estimated it took an average of 5 phone calls per order to identify the correct prescriber willing to take responsibility for the call. On average, 65% of the calls were renewed at the call (see Appendix, Table 1). This rate translates into an average of 700 near misses for inadvertent discontinuation of medications monthly.

RESULTS:

In the twenty-one months since the initial significant event occurred, there have been no safety events related to inadvertently discontinued medications across all hospitals within this health system. Preliminary results 2 months after implementing changes to the ASO policy the medication renewal rate decreased to 53% (see Appendix, Table 2). Nine months after implementing the changes to the ASO policy, the renewal rate has stabilized at 61% (see Appendix, Figure 3 and Table 3). The acute care hospitals have noted a 64% reduction in calls (see Appendix, Table 4), while the rehab facility call rate continues to decline and currently stands at a 49% reduction (see Appendix, Table 4).

The updated icons for orders approaching expiration have gone live for all of the 450,000 world-wide prescriber clients of this EMR vendor. Providers have indicated that the new icons are more intuitive and eye catching. The vendor's leadership participated in multiple meetings with the core team to review the literature, understand survey results from local pharmacies and particularly feedback from prescribers. Efforts to create a single-click renewal process have proved challenging, creating duplication of some orders. The health system process improvement team and the EMR vendor made a collaborative decision to continue to bring that process forward only after a safe application of the upgrade could be assured.

The group email blogging process to turn around complex decision making from a large group of stakeholders has been used in a variety of other process improvement projects across the health system. Also, the initial allocation of

resources for the pharmacy phone calls was approximately 2.4 FTE's of pharmacist time or a total of over $350,000 in expense to the health system annually. Reduction of those calls has created some additional availability of pharmacy resources within the system to pilot pharmacist oversight of medication reconciliation for complex patients admitted through our emergency departments at some of the busiest times of the day.

6. Appendices (i.e., tables and graphs)

DelVal Award Application Appendix.docx

7. Describe the interventions that were instrumental in achieving the results for your initiative.

After collecting baseline data about the automatic stop medication order process nationally, regionally and locally, the team identified that there were no true best practices and took it upon themselves to reinvent the process. By performing three Failure Mode and Effect Analyses regarding the pharmacy process, the prescriber process, and the nursing process, the team was able to prioritize the changes that needed to be made.

First, the core team reviewed the entire pharmacy master list dividing medications into one of eight categories. These included: critical care medications, anti-infectives, anti-coagulants, pain medications, package insert medications, chronic or maintenance medications, medications that were not felt to require pharmacy call under ASO, and a broad category of other medications. Each of these categories was assessed as to its current default duration and whether or not that duration could be extended. The most notable was a recommendation to increase the duration of chronic or maintenance medications from 30 to 90 days.

Second, the team sought input on the default list from each of the Chairs of the health system followed by an extensive group of content experts. With the initial feedback from the department Chairs, the proposed medication list revisions were brought to the Medicine Clinical Environment Workgroup (CEW), a team of dyads of nurse and physician leaders who provide clinical care in the medical units and intensive care units of each hospital in the system. The core process improvement team presented a summary of the problem and the findings to date and then asked for the support of the CEW in modifying the current default durations on the pharmacy master list. An innovative technique was undertaken to allow for rapid turnaround in the decision making process while allowing for stakeholder input. At an initial in-person presentation, the CEW members were encouraged to participate in an upcoming twice-weekly voting blog during which they would receive a summary of one of the eight categories of medications to be discussed. Each information email included a reminder of the current state, a recommendation for change and supporting documentation for the recommendation. Using "reply all" the CEW members added their thoughts during the weeklong discussion period. The process yielded nearly universal participation. The compiled data was then presented in person to the CEW members and, after brief discussion, the recommendations were accepted and

subsequently approved by the Pharmacy and Therapeutics Committee, Medical Executive Committee, the Quality and Patient Safety Council, and the Board. The interactive blog technique was felt to shorten the turnaround time on detailed decision making significantly.

Meanwhile, the core team coupled with system IT leadership and worked collaboratively with the EMR vendor to enhance the order renewal process. The black and white OAE icon was replaced with the highlighted explicit phrase "(approaching expiration)" with a color-coded OAE symbol immediately after the medication order sentence (see Appendix, Figure 2A). A new icon was created to indicate to the provider that these medications could not be renewed due to limitations within the EMR (see Appendix, Figure 2B). The vendor was able to create a "view only" OAE screen, which allowed nurses to better partner with prescribers as they could now see which medications were about to expire. This obviated the need for the nurse to rely on memory alone to identify which medications may have fallen off the administration list from one day to the next. Additionally, nurses were asked to collaborate with physicians regarding IV fluids approaching expiration on a daily basis, as these orders are not followed up with reminder phone calls by the pharmacy department. A highly collaborative effort was undertaken between the organization's IT team and the EMR vendor as multiple attempts were made to create a single click renewal process; however, many of these attempts resulted in coding errors or possible new safety concerns. As such, this enhancement has not been able to go live at this time but remains under vendor development. Fortunately, the new OAE icons and the "view only" OAE list for nurses were implemented for all of the vendor's clients worldwide. The adoption of these two new EMR elements has created a much larger footprint of safety related to EMR related medication management for patients than was initially imagined as a possibility by the organization's process improvement team.

Finally, once the medication duration list was updated and the EMR changes were ready to go live, the last step was communicate the changes. A multimedia educational blitz was undertaken including in person appearances at department meetings, leadership assemblies, medical operation committees, general medical staff meetings as well as weekly medical staff and nursing e-newsletters and emails.

8. How can this initiative be replicated through the region? (Please limit this description to 100 words.)

Several elements of this initiative are regionally replicable. Linking the work to real safety events creates accountability. Literature review, regional and local surveys provide useful baseline data; however, one on one time spent reviewing the data with clinical and administrative leaders is worth the effort to create a burning platform. The use of multidisciplinary content experts with the capacity to vote change up or down encourages solution-focused problem ownership. Serial email blogging on bite-sized portions of a complex problem promotes efficiency. Partnership with EMR vendors

provides increased technological support and social responsibility for patient safety on a broader scale.

9. **Explain how the initiative demonstrates innovation (Please limit this description to 100 words.)**

Three significant elements of innovation existed in this project. (1) Serial email blog voting associated with the drug master update created an opportunity to reduce a complex problem to manageable parts. An in-person explanation of the process at the kickoff accompanied by a live final vote provided an opportunity for discussion while keeping the process efficient and effective. (2) The nurse "view only" OAE list improved the focus on the prescriber-pharmacist-nurse partnership needed for safe medication management. (3) The enhanced EMR icons made the need for assessing orders approaching expiration more intuitive and were rolled out worldwide by this vendor.

10. **How does this initiative demonstrate collaboration with other providers within the continuum of care? (Please limit this description to 100 words.)**

This project's success depended upon multidisciplinary support among physicians, nurse and pharmacists, supported by administrative leadership with IT and process improvement expertise. Innovative email blogging allowed for a total drug master default duration update. This promoted standardization and reduced variation across all clinical units of the organization. The nurse "view only" lists encouraged caregiver partnership. A patient-care medication list, reviewed daily with the nurse, patient, and family, extended the continuum of care to further decrease the risk of medication errors. EMR vendor partnership led the use of new, safer, more intuitive medication ordering icons for its 450,000 clients worldwide.

11. **Explain ways in which senior leadership exhibited commitment to the initiative (Please limit this description to 100 words.)**

The success of this initiative depended on creating a burning platform for change supported by the highest leaders in the organization. The Chief Medical Officer, Chief Nursing Officer, Chief Medical Information Officer, Senior Vice-President of Quality and Safety, Chairs and hospital presidents supported the creation of a 40 member multidisciplinary, multi-hospital team to address this safety issue head on. At their request, multiple meetings included time on their agenda for discussion of this project, including conversations with the Board and the Medical Executive Committee. These behaviors are consistent with the organization's highest priority goal of reducing harm to zero.