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Improving Value (Low cost, Optimal Clinical Outcome, Patient Satisfaction) in a Skilled Nursing Facility: A Quality Improvement (QI) Project

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Abstract

Improving the value of care with reduced cost without compromising the quality is utmost important in the modern era of medical practice. An attempt was made in the nursing facility to observe an outcome with a plan to implement in much larger scale in the larger facility in future. In the 7-month period of this ambi- directional study, the focus was on minimizing unnecessary daily laboratory orders and to observe the reduction in the cost without adverse effect on length of stay in the nursing facility and hospitalization from the nursing facility.

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Conflict of Interest Statement

no conflict of interest

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Introduction

Reducing inappropriate laboratory testing is one of the validated methods to achieve high-value care. Laboratory tests are conducted for diagnostic and management purposes, monitoring disease status, and response to treatment. This leads to not only increased cost of care but if ordered inappropriately, also a potential for increased harm and dissatisfaction to the patient. There has been no supporting data in the literature that obtaining daily laboratory tests reduces mortality or morbidity. Often, the patient gets several lab tests drawn due to lack of awareness, providers' fears of missing a diagnosis, or as a part of a medical panel.

Smoller, *et al.* found that an average of 3.4 blood draws per day and a total of 762.2 ml of blood is drawn during the entire hospitalization for Intensive Care Unit (ICU) patients.¹ Increased lab testing may subsequently lead to a need for a blood transfusion or even hospitalization.¹ Kumwilaisak, *et al.* and Dhanani, *et al* found that guidelines to decrease unnecessary laboratory testing reduces the frequency of laboratory tests, decreases health care costs, and reduces the risk of complications such as anemia, without changing patient outcomes or mortality.^{2,3} To date, there is little data regarding laboratory testing in skilled nursing facilities. The goal of this study was to institute a process improvement to reduce the frequency of inappropriate laboratory tests in Skilled Nursing Facility patients.

Methods

Study Population

Patients admitted to the skilled nursing facility from (April 2019 to October 2019) who were not on comfort care/hospice care.

Study Design

This project was an ambi-directional study conducted in a skilled nursing facility from April, 2019 to October 2019, involving patients admitted to the subacute unit within the facility during that time frame. An educational intervention for nurses, advanced practice providers and physicians in evidence-based practice of laboratory testing was initiated in the month of July 2019 with full implementation at the beginning of August. In addition, every provider was required to have a 'time out' regarding any order. The provider was required to document a clinical indication (per history and physical examination) for the bloodwork. The admitting team was required to obtain laboratory records from the referring facility (hospital or outpatient facility) to avoid duplication of tests and unnecessary tests.

Weekly reminders were sent to providers, and repeated education on appropriate ordering of laboratory testing was emphasized. Providers were encouraged to document the appropriateness of the laboratory testing. The months of April, May, and June were classified as the pre-intervention period. The months of August, September and October were classified as post-intervention periods. July was excluded from the analysis due to rolling out the intervention during this month. Outcomes measures for the project were defined as:

- Cost of laboratory testing
- Length of stay
- Readmission to hospital or ED

Analysis

Length of stay and admissions to the hospital was analyzed using a Poisson regression model. Laboratory costs were analyzed assuming a gamma distribution. All models included an intervention period indicator coded as 0 (pre-intervention) and 1 (post-intervention) to permit estimating the pre-post intervention change. Each month, the total number of admitted patients to the skilled nursing facility was obtained. The total laboratory cost was calculated each month.

Results

Laboratory Costs

Cost was estimated as the total cost per 100 patient days in a month. In the pre-intervention period, the monthly average cost per 100 patient days was \$682.02 (95% CI: 516.00 - 901.54).

Post-intervention cost per 100 patient-days was \$348.20 (95% CI: 263.41 - 460.27) resulting in a significant reduction in costs of 49% (95% CI: 24% - 66%, $p = 0.0008$).

April 2019 appeared to be an outlier with a total cost (\$9804.22) as the number of admissions to the sub-acute unit was larger than any other month. Therefore, a sensitivity analysis was performed that excluded April. After this exclusion, there was still a significant reduction in laboratory costs of 35% (95% CI: 15% - 51%, $p = 0.0020$).

Length of Stay (LOS)

In the Medicare population, the pre-intervention monthly average LOS per 100 patient-days was 12.1 (95% CI: 9.5 - 15.5). Post-intervention was 12.0 (95% CI: 9.4 - 15.3) resulting in a non-significant 1% reduction in LOS (95% CI: -139% - 30%, $p = 0.9521$).

In the Other Insurance population, the pre-intervention monthly average LOS per 100 Patient-days were 11.1 (95% CI: 8.6% - 14.3%). Post-intervention was 10.2 (95% CI: 7.9 - 13.3) resulting in a non-significant 8% reduction in LOS (95% CI: -132%, 36%, $p=0.6456$).

Hospitalization

The hospitalization rate was standardized to the average monthly census. The pre-intervention period had an estimated hospitalization rate of 7.0% (95% CI: 5.1% - 9.6%) and the post-intervention period was 5.3% (95% CI: 3.7% - 7.6%). The estimated reduction was 26% (95% CI: -1.23% - 53%). The reduction in hospitalization rate was not statistically significant ($p = 0.2582$).

Discussion

Getting the right test at the right time is particularly important to achieve high-value care. Similar to the findings of Mehari and Havill, simple educational interventions and repeated reminders to prevent extinction of the learning provided achieved the goals of the quality improvement

process to minimize inappropriate laboratory testing in a skilled nursing facility without compromising quality of care metrics.⁴ The low sample size could potentially have led to the statistically insignificant finding with hospitalizations. Repeating a project like this in a larger system or network of systems could provide more insight to its scalability. Inserting the “time out” process into clinical decision support in a facility electronic health record would provide more robust metrics in the setting of a large system and represents an important next step.

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