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Decreasing Unnecessary Daily Labs by Choosing Wisely

Olugbenga Arole[1]* (MD); Kavitha Rajan[2] (MD) Sana Khan[2] (MD); Saif Ullah[2] (MD); Valentine Y. Njike[3] (MD, MPH)

[1.] Frank H. Netter MD School of Medicine Quinnipiac University, North Haven, CT.
[2.] Griffin Hospital - Derby, CT.
[3.] Yale Griffin Prevention Research Center- Derby, CT.

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ABSTRACT

Introduction: The utilization of laboratory services has increased across various healthcare settings. We assessed the impact of the implementation of a Quality Improvement project aimed at reducing Complete Blood Count (CBC) and Basic Electrolyte Panel (BEP) ordered by house staff physicians.

Materials and Methods: This study with a pre-post design was conducted in a community hospital in Connecticut, USA. The study was performed between January 2014 and December 2016. At initiation of the project, a taskforce consisting of attending doctors and house staff physicians was created. The taskforce reviewed and determined the current practices of ordering CBC and BEP. The taskforce members analyzed every step of the process and unveiled circumstances where unnecessary CBC and BEPs were ordered. Based on the results of the analysis, a multi-level intervention of one-year duration was then developed to address the ordering of unnecessary CBC and BEPs. The intervention consisted of daily decision making about labs during rounds, incorporating lab documentations planned for the next day into daily progress notes, including the rationale for these labs, audit and reporting of ordering practices to each medical team, and providing direct feedback to each house staff not providing appropriate documentation of lab rationale. The average numbers of CBC and BEP orders per patient days were used to assess the impact of our intervention.

Results: After implementing this Quality Improvement program, the average number of CBC and BEPs per patient days ordered by the house staff physicians decreased (i.e., from 1.20 to 1.09; P<0.01, and from 0.88 to 0.80; P<0.01, respectively). This corresponds to a reduction of 9% in both CBC and BEP orderings per patient days. There were no unintended adverse consequences from the interventions.

Conclusion: Our Quality Improvement initiative resulted in a reduction in CBC and BEP orderings per patient days by the house staff without adversely affecting our patients' length of stay or mortality.

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Introduction

The national healthcare expenditures in the United States have substantially increased compared to the previous years (1). According to the National Center for Health Statistics, in 2014, the total national health expenditures in the United States was estimated to be $3.0 trillion, which corresponds to 17.5% of the national gross domestic product (1). The national health expenditures were estimated to be 37.9% for hospital care, 23.5% for physician and clinical services, 11.6% for prescription drugs, and 6.1% for nursing care facilities and continuing care retirement communities (1). In 2015, the out-of-pocket costs rose 3.0% to an average of $813 per capita (2). Prices for outpatient, inpatient, and professional services, as well as prescription drugs increased by 3.5-9.0% (2).

In the United States and other developed countries, overutilization of medical services such as laboratory tests, prescription drugs, and procedures by physicians with little or no benefit to patients is one of the factors contributing to rising costs of health care (3). To

***Corresponding Author:** Olugbenga Arole, Frank H. Netter MD School of Medicine Quinnipiac University. Email: oarole@griffinhealth.org

reduce the unnecessary utilization of medical services, the American Board of Internal Medicine (ABIM) foundation developed a Choosing Wisely campaign (3, 4). The Choosing Wisely initiative taskforce encourages physicians and patients to engage in conversations to reduce the overuse of laboratory tests, prescription drugs, and procedures in order for the physicians to support the patients' clinical needs in their efforts to make smart and effective care choices (3). One of the recommendations of the Choosing Wisely initiative was to avoid performing repetitive laboratory tests such as Complete Blood Count (CBC) and Basic Electrolyte Panel (BEP) in the context of clinical and laboratory stability (3, 4).

To assess the effectiveness of the Choosing Wisely initiative, we designed a Quality Improvement project targeting house staff physicians aimed at reducing their unnecessary orderings of CBC and BEP in a general medical floor in a community hospital. Our goal was first to uncover circumstances where unnecessary CBC and BEPs were ordered by house staff physicians.

Then, we tailored an intervention based on the pitfalls, to reduce or eliminate unnecessary CBC and BEP orders.

Materials and Methods

Design

This study with a pre-post design compared the baseline CBC and BEP orderings by house staff physicians to CBC and BEP orderings by house staff physicians after the implementation of our tailored intervention. This study was a Quality Improvement project aimed at reducing or eliminating the unnecessary orderings of CBC and BEP conducted in a small community hospital in Derby, CT. This project had two phases. Phase I consisted of establishing a taskforce to unveil pitfalls of ordering unnecessary CBC and BEPs in the general medicine floor, while phase II consisted of designing a tailored intervention based on the feedback from phase I.

Phase I: Under the supervision of the Cost Conscious Care committee, a taskforce was created. The taskforce consisted of two hospitalists, two house staff physicians, and a physician preparing to get into training. The house staff were included in the taskforce in order to gain their perspective and help drive the interventions. The taskforce reviewed the current practice for ordering blood work among house staff.

They then analyzed each step of the process to establish pitfalls that led to the ordering of unnecessary CBC or BEPs. Each failure point was explored with a focus on failure points that were more likely to occur commonly. Table 1 provides a summary of the key shortcomings uncovered from the systematic review by the taskforce of the house staff physicians for ordering unnecessary labs.

Phase II: The taskforce then developed an intervention of one-year duration with a multi-faceted approach to address the ordering of unnecessary labs. The intervention included:

- Requiring daily decision making about labs during rounds

– The medical teams were required to include discussion about labs needed for the next day in their morning rounds. During follow up rounds in the afternoon, the teams would discuss again the need for labs for each patient.

- Incorporating lab documentations planned for the next day into daily progress notes, including the rationale for these labs.

– The house staff were required to provide documentation in the progress notes, the labs required for the following day, and why the labs were needed. This allowed the nursing staff and call teams to know that patients with no labs ordered were not "missed" by the team, but intentionally did not have labs ordered.

- Audit and reporting of ordering practices to each medical team

– The team received feedback weekly on the number of labs ordered per patient days and how they compared to other medical teams.

- Providing direct feedback to each house staff not providing appropriate lab documentation rationale.

– Program leadership provided feedback directly to residents whose documentation about rationale for ordered labs was not considered appropriate.

In addition to these interventions:

- House staff participated in lecture series on high-value care as part of their curriculum.

Informational flyers were sent out with reminders for decision making prior to ordering labs.

Outcome measure: With the help of our Information Technology department, we developed a method of collecting data regarding ordering of CBC and BEP by house staff physicians to track performance of the intervention provided. To assess the impact of our intervention, the average numbers of CBC and BEP orders per patient days were calculated. The data regarding a five-month period in 2014 were used as baseline for comparisons. The number of tests avoided was calculated as test per patient days (i.e., from 2014 to 2016) multiplied by the number of patients in 2016. Cost saving was calculated as cost per test (i.e., $11.54 for BEP, $10.61 for CBC) multiplied by the number of tests avoided. While the volume of blood not drawn was calculated as volume per test (i.e., 4 cc) multiplied by the number of tests avoided.

Table1: Pitfalls unveiled by taskforce

Before ordering the labs	● The physician was unaware of the previous labs. ● No decision was made prior to ordering the labs.
At the time of ordering the labs	● Prior lab results were unknown. ● No rationale required to order labs. ● Labs repeated on a daily basis. ● Nursing or call team assumes that patients with no labs were missed by the primary team.

Results

The average number of CBCs per patient days at baseline was 1.12, while the average BEPs per patient days for that same period was 0.818. After the implementation of the Quality Improvement initiative, the average number of CBCs per patient days was 0.99 and the average number of BEPs per patient days was 0.74. This represents a 9% reduction in daily CBC orderings per patient per day and 9% reduction in BEP orderings per patient per day, which was significant in both cases (P<0.01). There were no unintended adverse consequences from the interventions. In addition, this intervention did not affect the length of hospital stay or mortality rate in our patients. Details of our data are provided in Table 2 and figures 1 and 2.

Table2: Laboratory costs, the number of tests avoided, the volume of blood not drawn, and length of stay over time

Variable	January	February	March	April
Basic chemistry (*BEP)*				
Number of tests avoided	1,189.6	49.8	114.5	183.3
Cost saving ($11.54/test)	13,727.5	574.7	1,321.5	2,114.8
Volume of blood not drawn (4 cc/test)	4,594.2	199.2	458.0	732
Length of stay 2014	4.9	5.6	4.7	4.7
Length of stay 2016	4.5	4.3	4.6	4.4
(CBC)				
Number of tests avoided	230.6	28.3	399.8	113.4
Cost savings ($10.61/test)	2,446.5	300.3	4,242.1	1,203.4
Volume of Blood not Drawn (4cc/test)	922.3	113.2	1,599.3	453.7
Length of stay 2014	4.9	5.6	4.7	4.7
Length of stay 2016	4.5	4.3	4.6	4.4

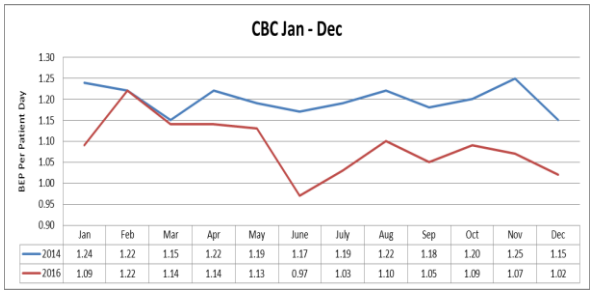

Figure1: Order of complete blood count over time

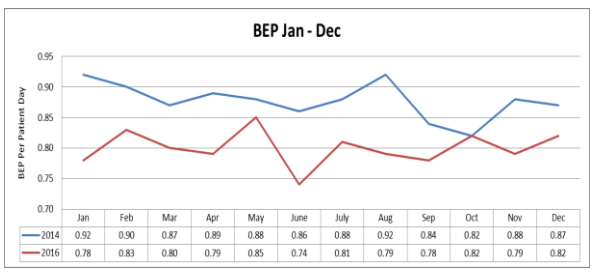

Figure2: Order of basic chemistry over time

Discussion

Our data suggest the implementation of the Quality Improvement project led to a decline in the ordering of CBC and BEP by the house staff.

The length of hospital stay and mortality rate of our patients were not affected by the reduction in CBC and BEP ordering. Additionally, no unintended consequences were observed in our patients during their care while in the hospital because of the implementation of our Quality Improvement curriculum.

Our findings were consistent with the results of other studies that implemented somewhat similar interventions. In a previous study by Iams (5), the implementation a house staff-led intervention utilizing education and data feedback with goal setting and peer comparison reduced the daily orderings of CBC and BEP by the house staff physicians in inpatient general medicine and surgical services. In another study by Corson (6), the implementation of a multifaceted Quality Improvement program in a large community hospitalist group was associated with a decrease in the lab tests ordered and hospital costs without affecting the length of hospital stay, mortality rate, or readmission. Similarly, Neilson (7) demonstrated that the implementation of peer management through a resource utilization committee to favorably modify test ordering behavior in a large academic medical center led to a reduction in the ordering of laboratory tests without affecting readmission, the transfer of patients to intensive care units, hospital length of stay, and mortality rate in an academic medical center. In a coronary care unit setting, Wang (8) also demonstrated that the implementation of a management intervention was associated with a significant decrease in test ordering without a remarkable change in clinical outcomes.

Conversely, a recently published study by MVillanueva (9) revealed that education in the form of cost reminders did not significantly diminish the overall ordering of the most common daily laboratory tests in an academic medical center. Interestingly, Sommers (10) demonstrated that a brief intervention featuring a discussion of hospital bills by residents led to a reduction in laboratory costs for a subset of patients, but it was associated with elevated readmission rates.

Limitations

This study has several limitations. First, it was conducted in a small community hospital with about 160 beds.

This limits our ability to extrapolate our findings to much broader medical center settings. Second, there was no true comparison group. We assessed the impact of our intervention by comparing our post-intervention data to a historical baseline data before the implementation of our Quality Improvement program. It is likely that some changes may have occurred over

time that may have introduced potential confounders into our study. Third, differential or non-differential misclassification may have occurred during data entry and assessment. However, all steps were taken to verify the data during the data entry and assessment processes to ensure no such errors were introduced.

Conclusion

Our data suggest that the implementation of our Quality Improvement program led to a reduction in CBC and BEP orderings by the house staff physicians in the general medical floor in a small community hospital. This reduction in daily laboratory orderings did not affect our patients' length of stay in the hospital and mortality rate. A large multicenter randomized controlled study is warranted to elucidate these findings. In addition, a more vigorous cost-benefit analysis needs to be conducted to quantify the amount of dollars saved because of the implementation of such a program in a hospital setting.

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