Healthcare 3 (2015) 67–73

Contents lists available at ScienceDirect

Healthcare

journal homepage: www.elsevier.com/locate/hjdsi

Into Practice

Multifaceted approach to reducing unnecessary red blood cell utilization

Sarah K. Abbett [a,*], Richard M. Kaufman [b,1], Michael Gustafson [c,2], Jeffrey O. Greenberg [d,3]

[a] Saint Francis Hospital and Medical Center, Department of Obstetrics & Gynecology, 114 Woodland Street, Hartford, CT 06105, United States
[b] Brigham and Women's Hospital, 75 Francis Street, Amory Lab Building, AL-2, Boston, MA 02115, United States
[c] Brigham and Women's Faulkner Hospital, 1153 Centre Street, Jamaica Plain, MA 02130, United States
[d] Brigham and Women's Hospital, 75 Francis Street, Peter Bent Brigham Building, 6th floor, Room 615, Boston, MA 02115, United States

ARTICLE INFO

Article history:
Received 20 January 2014
Received in revised form
30 May 2014
Accepted 15 July 2014
Available online 5 September 2014

Keywords:
Performance improvement
Value
Decision support
Transfusions
Appropriateness

ABSTRACT

- Strong organizational leadership, experienced project leaders, and the engagement of front-line stakeholders are critical elements for performance improvement efforts.
- A holistic approach, including incentives, feedback, a collaborative interdisciplinary process, decision support, and education may be necessary to change clinician behavior.
- A multifaceted performance improvement effort can lead to dramatic improvement in value for patients and society.

1. Background

Excessive use of blood products is harmful on many levels. Individual patients face risks of transfusion reactions, infection, volume overload, iron overload[1–4] and even death.[5] Since blood is a limited resource, other patients in need of transfusions may suffer if shortages occur as a result of inappropriate utilization. Recently, our own institution has faced severe shortages following the Boston Marathon bombings, when demand was especially high.[6] Finally, excessive transfusions can drive up health care costs. In 2010, our institution spent one million dollars in procuring red blood cell (RBC) units for transfusions outside of its own guidelines, and other institutions have also documented the high financial cost of clinically inappropriate transfusions.[7] To address these challenges, we sought to reduce the number of clinically inappropriate RBC transfusions at our institution.

2. Organizational context

Brigham and Women's Hospital is a 793-bed academic medical center located in Boston, MA.[8] The hospital is a founding member of a large integrated healthcare delivery system and is a leader in both clinical care and medical research. Hospital operations are complex, as the hospital is both a referral center for tertiary and quaternary care as well as a provider of primary care. The hospital has 63 operating rooms at the hospital's main campus and 160 affiliated ambulatory medical and surgical practices. Additionally, the hospital is a hub of graduate medical education, with 44 ACGME accredited residency programs and 51 fellowship programs. Each year, 700 residents care for patients across the hospital's clinical services.

The hospital has long been an innovator in healthcare information technology, having developed and rolled out its own clinical information system (CIS) in 1989.[9] In 1993 and 1994, physician order entry (POE) was added to CIS and rolled out across the inpatient setting. Over time, the institution has broadened and refined the extensive real-time decision support that CIS provides to ordering clinicians.

One area in which CIS offers robust decision support is inpatient transfusion POE.[10] The hospital's transfusion guidelines were developed in 2003 and incorporated into POE decision support at that time. The transfusion POE system presents the most recent hematocrit from the past 7 days. If there is no hematocrit information from the past 7 days, the ordering clinician must enter the hematocrit value. The ordering clinician then selects an indication (from a list of 17 different indications) that is most consistent with the clinical scenario. The POE decision support provides guidance based on the hematocrit and indication selected (Fig. 1).

The system does not have a 'hard stop' – it allows clinicians to order transfusions in excess of hospital guidelines. However, it

* Corresponding author. Tel.: +1 617 525 8363.
E-mail address: sabbett@stfranciscare.org (S.K. Abbett).
[1] Tel.: +1 617 732 5232.
[2] Tel.: +1 617 983 7400.
[3] Tel.: +1 617 525 9521.

http://dx.doi.org/10.1016/j.hjdsi.2014.07.003
2213-0764/

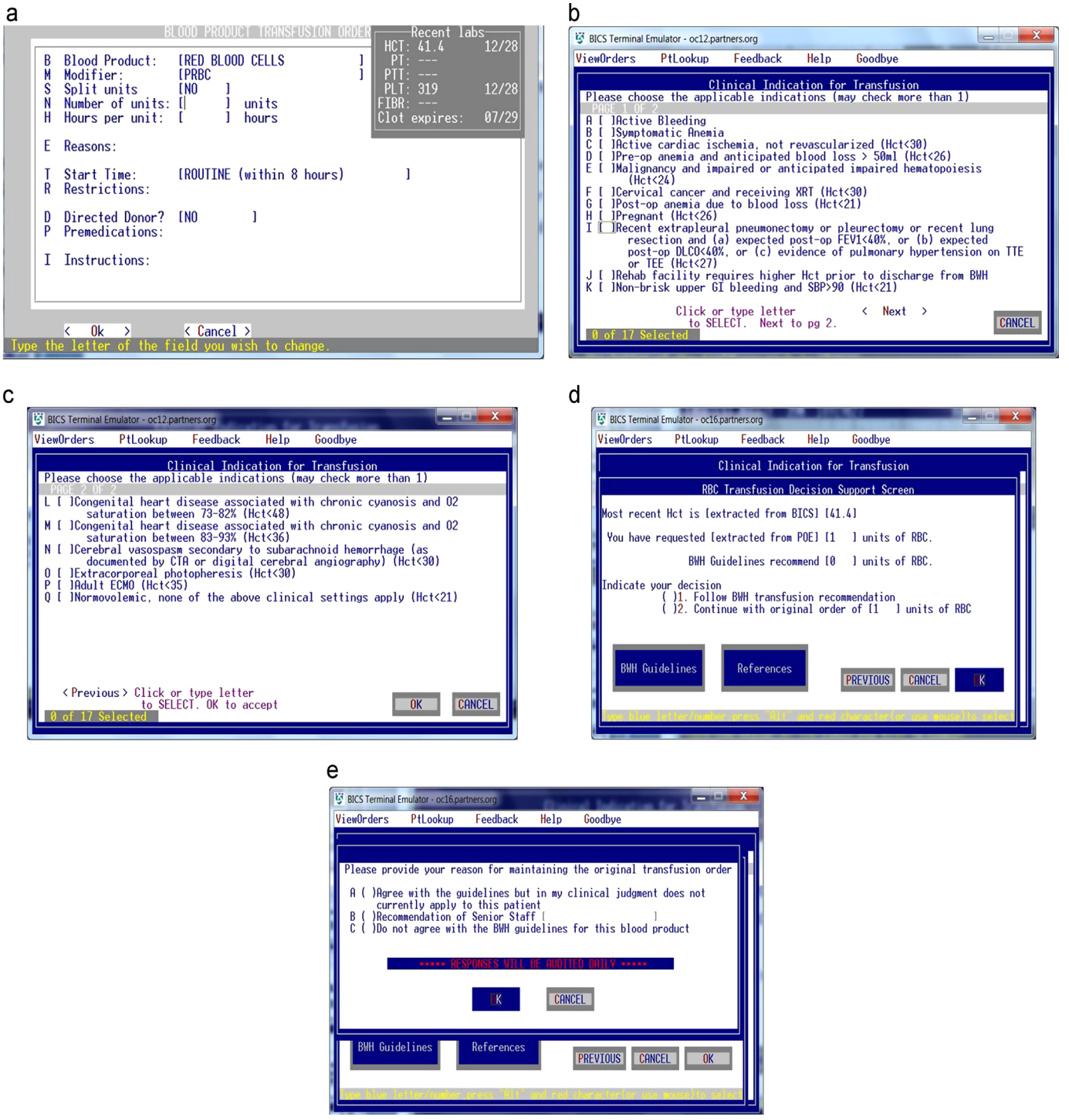

Fig. 1. Screen shots of the hospital's clinical information system provider order entry module for red blood cell (RBC) transfusions. (a) Screen shot showing the most recent hematocrit with its date of collection. The ordering clinician enters the number of units to transfuse and the number of hours over which each unit should be transfused. (b) Screen shot showing the first page of clinical indications for RBC transfusion from which the ordering clinician can select. These indications were revised in May 2013. (c) Screen shot showing the second page of clinical indications for RBC transfusion from which the ordering clinician can select. These indications were revised in May 2013. (d) Screen shot showing the decision support that the ordering clinician receives based on the most recent hematocrit result and indication(s) selected. The clinician can select to follow the transfusion recommended by the decision support or continue with the original order. (e) Screen shot showing the options that the ordering clinician sees when he or she selects to continue with an order outside of the decision support guidelines. The ordering clinician can select one of three choices for continuing the order. If the clinician selects option B, he or she can enter the name of a physician working at the hospital.

tracks all orders and stores them in a data warehouse. This data warehouse can be queried at any time, enabling provider- and clinical service-level feedback and thereby facilitating performance improvement.

The existing health policy climate in Massachusetts is unique and uncertain. Massachusetts mandated universal coverage for all legal residents in 2006, well before the Affordable Care Act was enacted at the federal level. Since 2006, the Commonwealth's non-elderly uninsured population has fallen from 10.9% to 6.3% (compared to the national average of 17.1% and 18.4%, respectively).[11] Unfortunately, costs of health care remain high, and over $800 million of public funding were spent on health care in