



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Clinical Decision Support Tools

Massive Transfusion Protocol App: Clinical Trial

Massive Transfusion Protocols (MTPs), as part of a damage control resuscitation paradigm, have been shown in multiple military and civilian series to improve patient outcomes (*Dente et al. 2010, Hodgman et al. 2012, Mina, Winkler, and Dente 2013, Shaz et al. 2010*). The coordination of a MTP is a complex and multi-disciplinary effort that requires both significant oversight as well as the use of a large amount of human and blood bank resources. In FY14, the Surgical Critical Care Initiative (SC2i) supported the development and deployment of a smartphone application to prospectively evaluate accuracy in predicting the need for massive transfusion in critically injured patients.

Researchers at the Uniformed Services University of the Health Sciences (Bethesda, Maryland), WRNMMC (Bethesda, Maryland), Naval Medical Research Center (Silver Spring, Maryland), Emory University (Atlanta, Georgia), Grady Memorial Hospital (Atlanta, Georgia), Duke University (Durham, North Carolina), Henry M. Jackson Foundation for the Advancement of Military Medicine (Bethesda, Maryland), and Decision Q Corporation (Arlington, Virginia), conducted a study to prospectively assesses the accuracy of a previously published MTP prediction tool that embeds a complex predictive algorithm within a convenient smartphone application. Prospective patient recruitment was performed at Grady Memorial Hospital (Atlanta, Georgia), an urban, Level I trauma center, from October 2014 to November 2016, with a total of 363 patients enrolled to power the study. For level I activations (the highest level of severity), the application recorded the surgeon's initial opinion for massive transfusion (≥ 10 Units of Packed Red Blood Cells /24 hours) protocol activation, then prompted inputs for the predictive model (gender, admission heart rate and systolic pressure, base deficit, mechanism). The application provided a probability for MTP activation and recorded the surgeon's final decision on MTP activation.

The application has been successfully deployed in the Cerner Electronic Health Record at Emory University; the SC2i is now working with the Defense Health Agency to insert the MTP CDST into the Military Health System (MHS) Genesis, the new electronic health record for the MHS.

In conclusion, this protocol could prospectively evaluate accuracy in predicting the need for massive transfusion in critically injured patients, thereby reducing both the risk of over-transfusions and the need for blood products (i.e., logistical savings) (*Chang, Dente, and Elster 2017*; Figure 1).

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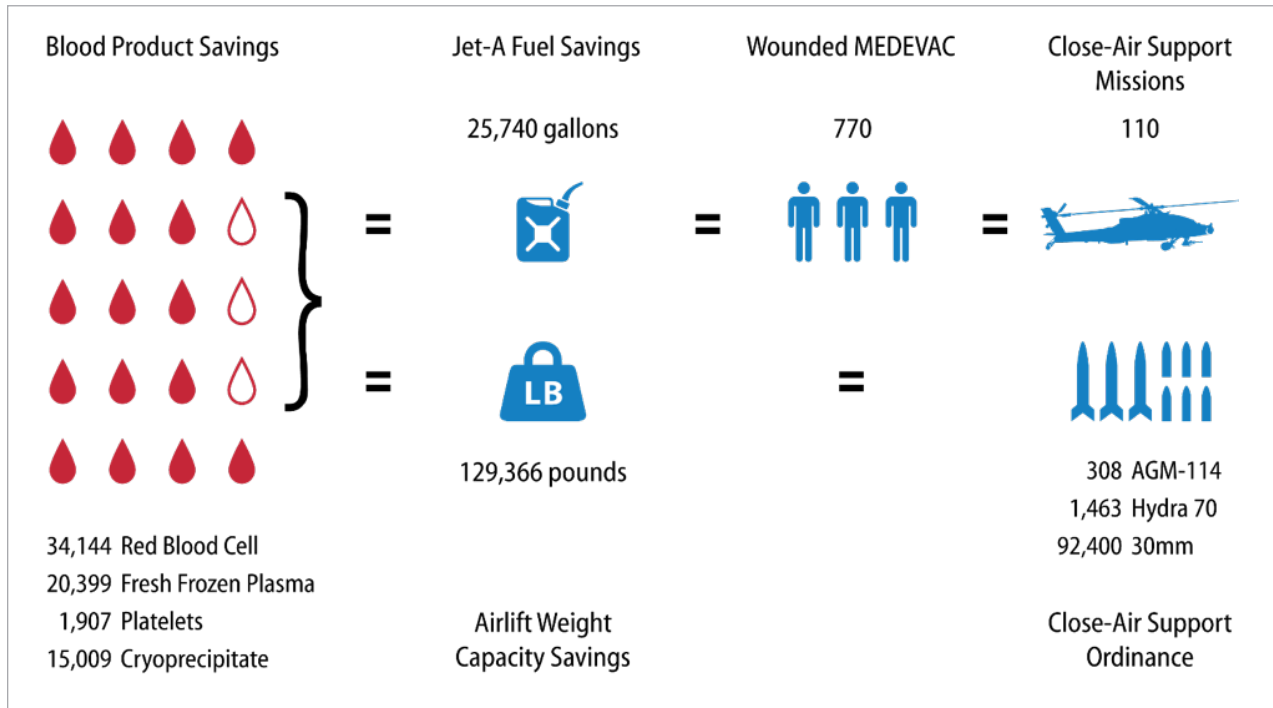


FIGURE 1: Summary of clinical and logistical benefits from SC21's MTP CDS Tools. (Figure from Dente et al. (2010) used with permission from the authors)

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