

The High Definition Approach To Value-Based Care

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There is a huge gap in the capabilities of acute inpatient hospitals to systematically identify and employ best practices at the point-of-care which results in massive lost opportunities to reduce cost-of-care, decrease length-of-stay, improve patient outcomes and experience, and reduce readmissions. The DASH Analytics High-Definition Care Platform (HDCP) is designed by clinicians to bring a systematic approach to best practice at the point-of-care. HDCP is underpinned by a sophisticated machine learning engine and industry-leading curation of best practices. Our first module on the platform is designed to markedly reduce surgical site infections (SSI), a major expense for most acute care hospitals. This module, when implemented at the University of Iowa Hospitals and Clinics (UIHC), reduced SSI in the subject population by 74%. At scale, this impact would have saved UIHC over \$1 million annually solely in colon surgery and hysterectomy. The DASH platform is flexibly deployed and can be integrated into existing provider workflows in and EHR-agnostic fashion. Future modules will continue to focus on high-ROI opportunities including reducing deaths from sepsis, improving blood conservation, and early identification of delirium as examples. By delivering only actionable decision support at the right clinical moments, we ensure maximal impact and ROI without an interruptive workflow or "alarm fatigue." DASH Analytics HDCP brings to the table a complete solution to unlock the enormous value residing in hospitals' own real-time EHR data.

The move from Volume-Based to Value-Based healthcare is here and is driving an unprecedented pace and magnitude of changes in healthcare both outside and inside of hospitals. There are undeniably two interventions that hospitals need to execute to thrive in or even survive the transition:

1. Develop a business model that emphasizes value by creating a continuously learning environment for collecting, analyzing, and executing on patient outcomes.
2. Focus on optimizing care for specific patient conditions rather than generic approaches to high-cost care¹.

For most hospitals, both of these interventions require massive changes to workflows, culture, and information systems. Hospitals frequently lack the IT expertise, change management capabilities, and the engagement of expert clinicians to execute the necessary changes.

¹ Porter ME, Lee TH. From Volume to Value in Health Care: The Work Begins. *JAMA*. 2016; 316(10): 1047–1048.

DASH Analytics has created an ecosystem and platform that bridges these gaps (Fig. 1) and enables hospitals to execute the necessary changes.

High Definition Care Platform (HDCP)

DASH Analytics has combined the following components to create the High Definition Care Platform:

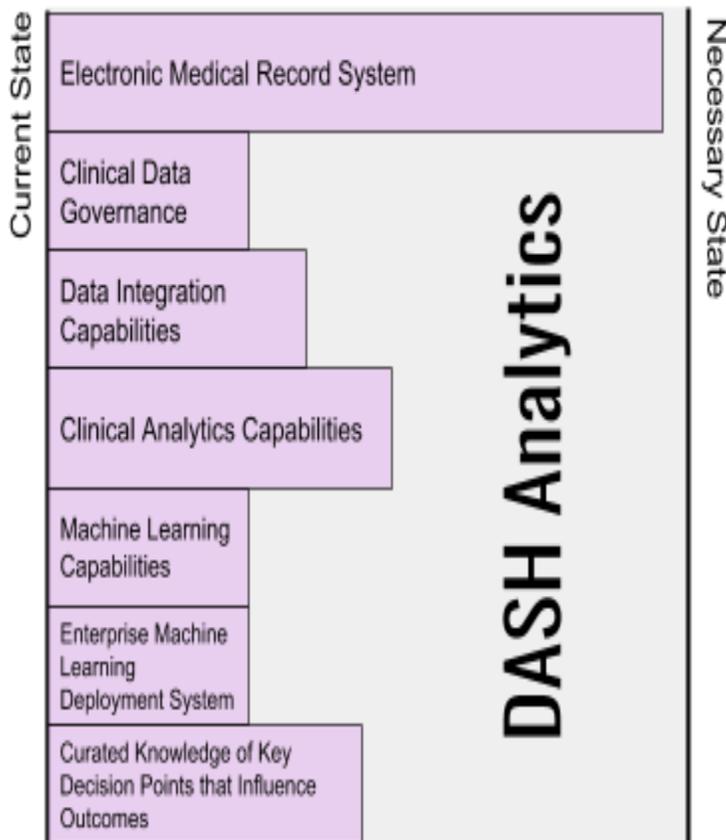


Figure 1. The High Definition Care Platform by DASH Analytics bridges the entire gap necessary for hospitals to leverage powerful machine learning solutions at the point-of-care

1. A secure technology stack that interfaces with the electronic health record and other enterprise information sources to constantly learn from enterprise data.

2. A decision support platform, underpinned by best-in-class machine learning models, that systematically identifies and targets high impact decision points at the point-of-care within the clinicians' normal workflows.

3. Curation of targeted interventions along with targeting parameters including the patient population, disease state, timing, and additional factors.

4. A strong clinician feedback system that reinforces choices that reflect high-value care. This evidence-based feedback is the key to cultural change.

Capturing Lost Opportunities

Targeted solutions to important clinical problems are being identified every day. When these targeted interventions are applied systematically to the right patient populations at the right time, they can have an effect more powerful than any pharmaceutical. However, clinicians have no

chance to put these solutions systematically into practice because they can't keep up (see inset next page).

Aside from increasing subspecialization, which causes more fragmentation and less coordination of care, there is no practical way for physicians to keep up with newly arising protocols and treatments that benefit patients, let alone systematically apply them at the point of care. This results in a **massive number of lost opportunities every day to improve patients' outcomes.**

DASH Analytics High Definition Care Platform acts as a prescriptive catalyst, empowering clinicians with knowledge to take action at specific points in the continuum of care, improving patient outcomes and the economics of patient care. By augmenting provider decision-making at the point-of-care, clinicians are able to realize previously lost opportunities. Importantly, the system provides ongoing, data-driven reinforcement of good clinical decisions through provider feedback of outcomes associated with their choices.

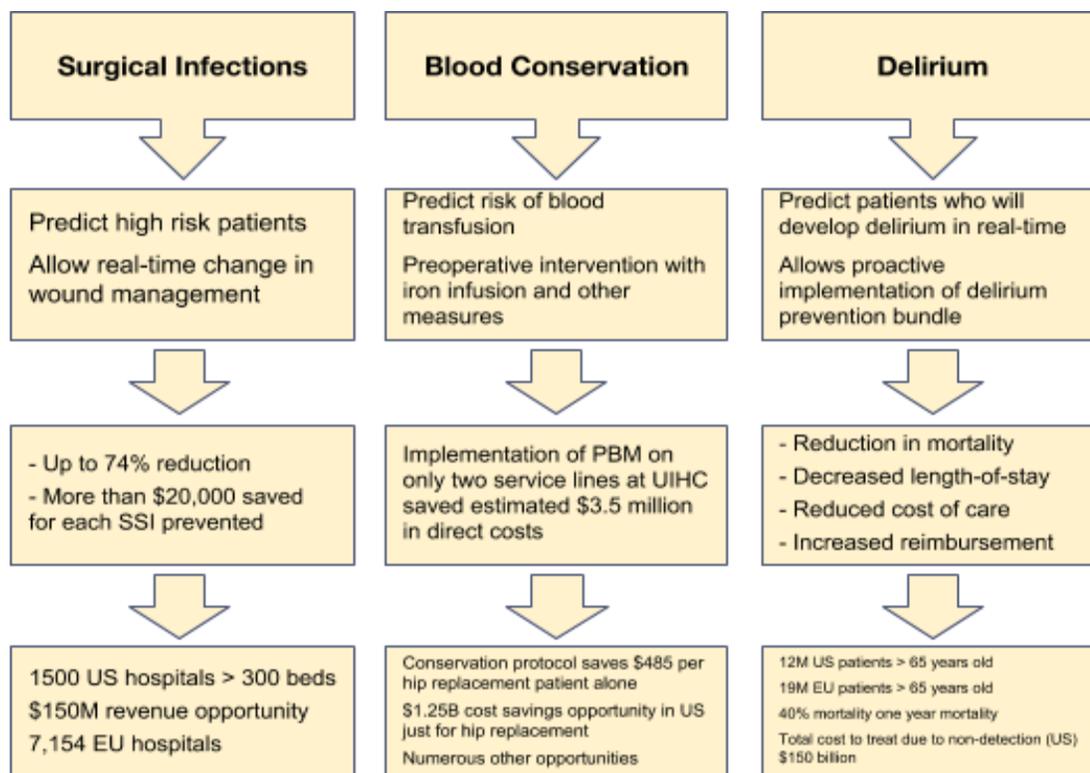
HDCP Modules

The HDCP consists of an ever growing number of modules that focus on both immediate high-ROI opportunities, as well as the foundation for sustainable, long-term high value care. The state-of-the-art machine learning technology that underpins these modules is crafted by nationally-recognized physicians and machine learning experts. Dual domain expertise in both medicine and machine learning enable our experts to create innumerable modules at the precise point of patient care to act as prescriptive catalysts; preventing downstream complications and costs as well increasing reimbursement in many cases.

Examples of current HDCP modules include:

...the doubling time of medical knowledge in 1950 was 50 years; in 1980, 7 years; and in 2010, 3.5 years. In 2020 it is projected to be 0.2 years—just 73 days. Students who began medical school in the autumn of 2010 will experience approximately three doublings in knowledge by the time they complete the minimum length of training (7 years) needed to practice medicine. Students who graduate in 2020 will experience four doublings in knowledge. What was learned in the first 3 years of medical school will be just 6% of what is known at the end of the decade from 2010 to 2020. Knowledge is expanding faster than our ability to assimilate and apply it effectively; and this is as true in education and patient care as it is in research. (Trans Am Clin Climatol Assoc. 2011; 122: 48–58.)

Example HDCP Modules



Prevention of Surgical Site Infections

Surgical site infections (SSI) are the leading and most expensive cause of hospital-acquired infections, increasing the cost of an encounter by more than \$20,000². High-definition care presents an opportunity to markedly reduce these costly infections. Our SSI module provides real-time decision support in the operating room providing objective risk-stratification for SSI based upon personalized data of the the patient on the operating room table. This allows surgeons to change the wound management strategy for high risk patients at closure.

Use of the HDCP SSI module at the University of Iowa Hospitals & Clinics reduced SSI in the target population by 58-74%³. This system is dynamic, constantly re-calibrating to changes in

² Ban, K.A., Minei, J.P., Laronga, C., Harbrecht, B.G., Jensen, E.H., Fry, D.E., Itani, K.M.F., Dellinger, E.P., Ko, C.Y., and Duane, T.M. (2017). American College of Surgeons and Surgical Infection Society: Surgical Site Infection Guidelines, 2016 Update. J Am Coll Surg 224, 59–74.

³ Wall Street Journal 2/11/2015:
<https://blogs.wsj.com/cio/2015/02/11/analytics-predict-which-patients-will-suffer-post-surgical-infections/>

patient populations, surgical selection criteria, the procedures being performed, and the hospital environment. Active use of the SSI module would be expected to drive down direct costs of care and readmissions while improving patient satisfaction. Downstream effects could include improved reimbursement through cost containment programs such as CMS Value-Based Purchasing.

Perioperative Blood Conservation

Blood management programs are well-documented to lower costs of healthcare delivery and improve outcomes. With the fully-loaded cost of a single unit blood transfusion in excess of \$1,000, most hospitals that implement blood management programs will reduce transfusion costs by 20-30%. In parallel, they will reduce transfusion-related complications such as transfusion reactions, lung dysfunction, infections, and kidney failure⁴. Perioperative blood transfusion is a common source of blood utilization and may be recognized and treated preoperatively, reducing the need for blood transfusion⁵. Such a program is highly data-driven and requires robust analytics and support at the point-of-care. Our Perioperative Blood Conservation module can be a high-impact, high-ROI method of introducing robust blood conservation at the point-of-care.

Delirium (Encephalopathy)

Thirteen million patients over 65 years of age are admitted to hospitals in the U.S. each year. Over 70% of elderly ICU patients and 20%-30% of general medicine patients have delirium⁶; yet, it goes undetected in over 70% of cases. This drives one year mortality rates to 22%-76%, increases complications and costs hospitals millions of dollars in care for which they are not receiving reimbursement. Non-detection of delirium costs the US healthcare system \$150 billion in additional health costs to care for subsequent comorbidities directly related to it.

Unfortunately, current screening tools consume human resources as they are manually administered by hospital staff and are subjective in nature. They have also demonstrated very low sensitivity in real-world conditions⁷. The lack of routine screening for delirium also prevents

⁴ Aryeh Shander (2014). Patient blood management improves outcomes, lowers costs. *Becker's Hospital Review*: <https://www.beckershospitalreview.com/quality/patient-blood-management-improves-outcomes-lowers-costs.html>

⁵ Muñoz, M., Gómez-Ramírez, S., Campos, A., Ruiz, J., and Liunbruno, G.M. (2015). Pre-operative anaemia: prevalence, consequences and approaches to management. *Blood Transfus* 13, 370–379.

⁶ Inouye SK. Delirium in older persons. *The New England Journal of Medicine*. 2006

⁷ van Eijk, M. M., et al. (2011). Routine use of the confusion assessment method for the intensive care unit: a multicenter study. *American Journal of Respiratory and Critical Care Medicine*, 184(3), 340–344.

hospitals from seeking reimbursement even though they are providing care for patients who have delirium. This non-coding can cost as much as \$8,000-\$10,000 per patient in lost reimbursement.

The DASH Delirium Module is an automated EHR-integrated approach to pinpoint patients who are at risk so that appropriate interventions can be implemented to alleviate the short and long-term effects of delirium, reducing morbidity and mortality for patients while improving reimbursement for hospitals.

High Definition Care Pipeline

The continuum of hospital care provides numerous point of care opportunities using machine learning from the EMR and other sources that can improve patient outcomes, reduce costs, and increase reimbursement. Future modules in the HDCP Pipeline include:

- Sepsis prediction and intervention
- Postoperative ICU utilization
- Management and prevention of deep venous thrombosis prophylaxis
- Pre-anesthesia risk assessment
- Other...What is your high ROI quality and safety target? DASH will customize a solution

Bring High Definition Care to Your Patients

To begin the journey of bringing the next generation of care to your patients, contact us at www.dashpredict.com.