



FUSION



IMPROVE PATIENT & HOSPITAL OUTCOMES WITH ANALYTICS

# BLOOD UTILIZATION

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HEALTHCARE CUSTOMER USE CASE



*Improving Patient Care Through Analytics*

# BLOOD UTILIZATION

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The use of advanced electronic health record (EHR) systems has grown rapidly in the United States. This has created an abundance of data previously unavailable for analysis. Many Health organizations have advanced and now have reporting systems for operational key performance indicators (KPIs), regulatory metrics and data warehouse systems for analytics. However, using this information as meaningful knowledge to increase and target those areas of concerns regarding quality of care still remains a challenge.

In this use case, we explain how Fusion Consulting helped our client successfully turn data analytics for Clinical Quality – Blood Utilization into a strategic asset through the identification of targeted clinical programs and clinical events that affect quality care delivery. We demonstrated our expertise by utilizing an enterprise data warehouse and business intelligence tools to improve clinical outcomes for those most vulnerable patients who are at high risk of developing an infection due to blood transfusions.

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The Future Of  
**HEALTHCARE**



## AFFECTED JOB CAPACITIES

- Chief Medical Officer (CMO)
- Chief Nursing Officer
- VP of Patient Care
- Director of Clinical Quality
- Inpatient Clinical Services Director

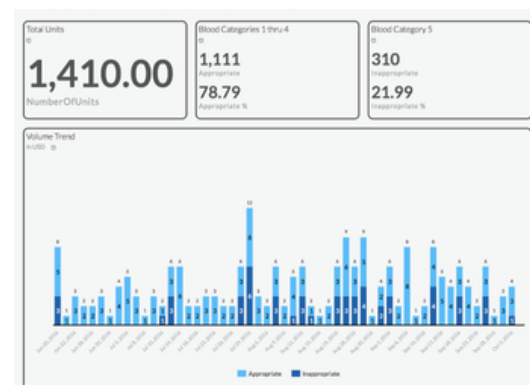
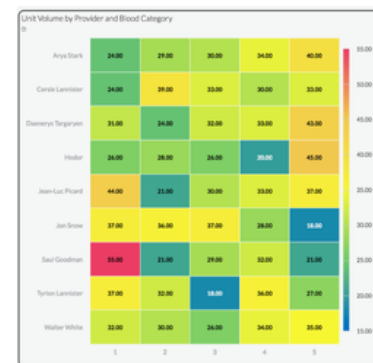
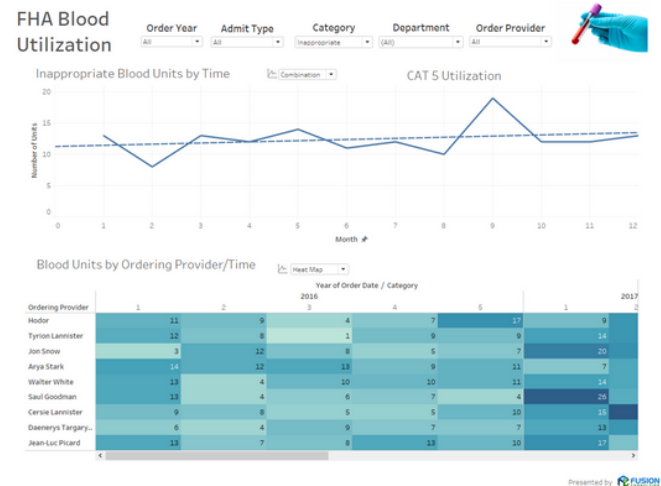
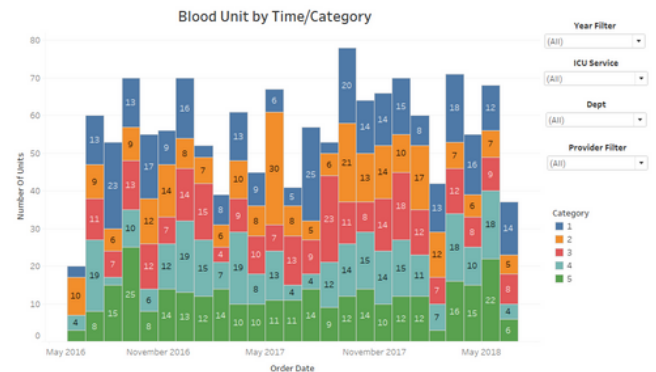
## USE CASE EXAMPLE

Our client (an Academic University Hospital System) maintains all medical records using their EHR system. Fusion implemented the EHR's data warehouse solution and extended it to become a true enterprise data warehouse including detailed clinical and operational information for each hospital visit.

Blood utilization is only used to monitor potential ordering abuse and wastage. It provides an organization with the information to make corrective clinical decision to help reduce unnecessary administrations of blood products. It is up to each organization to establish clinical guidelines for blood unit ordering and administration.

This use case explores our process for defining and creating KPIs and business intelligence tools to analyze clinical outcomes. The goal was to use this analysis to identify our client's clinical areas with the greatest opportunity for improvement and risk reduction specifically around blood utilization.

Together we developed work groups where quality clinicians worked with the business intelligence team to develop analytics for each targeted clinical program.

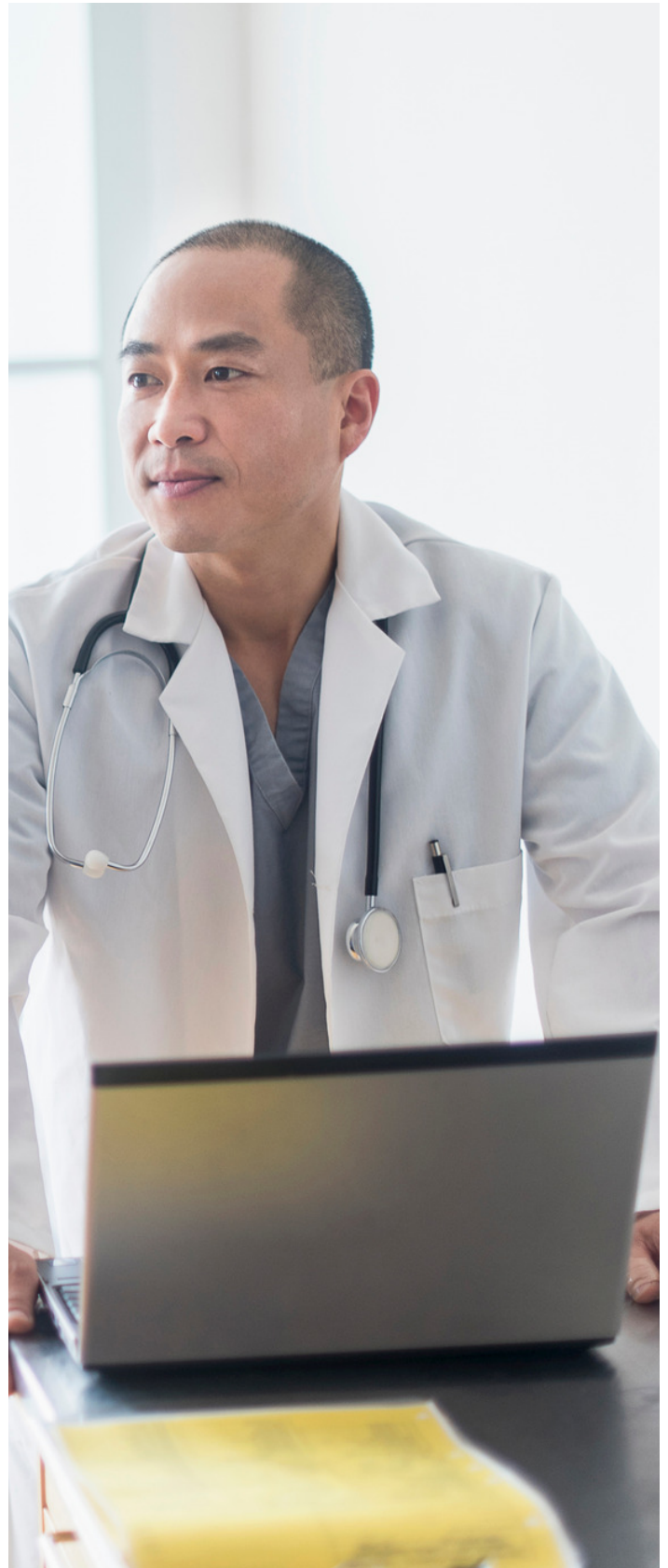


For blood utilization analysis, we limited the scope to red blood cells and addressed blood transfusions by analyzing the clinical events preceding the order to determine the necessity of the transfusion.

Blood transfusions negatively affect the patient's immune system and increase the risk of acquiring an infection. We evaluated each blood transfusion as clinically appropriate or not based on blood utilization categories. The key metrics to categorize clinical necessity are hemoglobin, systolic blood pressure, blood loss, lactate, base deficit, venous oxygen saturation, and the presence of acute myocardial infarction. There were five blood utilization categories applied to each unit of blood administered. Categories 1 through 4 represent a unit of blood that deemed clinically appropriate. If the blood unit administered is a Category 5 then the it is seen as having no applicable reason for administration.

Next, we built custom reporting tables or views for each of our programs. This enabled simpler reporting and better performance. We faced several challenges in this.

For blood utilization we needed to determine the exact number of units administered. Several of our early attempts, including looking at clinical documentation and order status, failed to give us an accurate account due to workflow and documentation inconsistencies. Each unit of blood requires a label. We were finally able to get accurate information by directly mining the label printing actions. Discarded units were being properly documented and were rare so we were able to take that into account. Another challenge with blood utilization is that we need to not just look at lab results but look at the delta in lab results over specific periods of time. We built an auxiliary table which monitored delta ranges for lab results. This allowed this information to be updated with standard incremental load and easily accessed.





## RESULTS

Our self-reporting initiative has had significant early success. Users have created their own reports and developed programs not mentioned here, including cirrhosis, childhood immunizations, and critical care daily goals. These were developed not by the IT analytics team but by the business users and quality department.

We have evaluated progress of the analytics in improving clinician behavior and patient outcomes with the following results vs patient encounters prior to the analytics rollout:



- 21% reduction in total blood units administered monthly
- 34% reduction in blood units administered without clinical necessity
- 7.4% reduction in the percentage of units which are not clinically justified

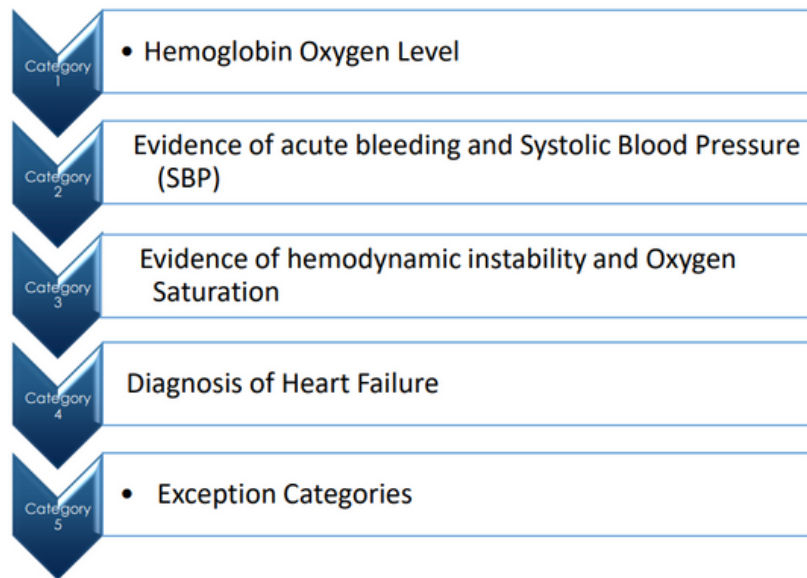
## REUSE OPPORTUNITY OF USE CASES

Blood utilization is only used to monitor potential ordering abuse and wastage. It provides an organization with the information to make corrective clinical decision to help reduce unnecessary administrations of blood products. It is up to each organization to establish clinical guidelines for blood unit ordering and administration. These established clinical guidelines will be represented as blood utilization categories in future use cases.

## ALTERNATE WORKFLOW

Blood utilization is only used to monitor potential ordering abuse and wastage. It provides an organization with the information to make corrective clinical decision to help reduce unnecessary administrations of blood products. It is up to each organization to establish clinical guidelines for blood unit ordering and administration. These established clinical guidelines will be represented as blood utilization categories in future use cases.

## BLOOD PRODUCT ADMINISTRATION CATEGORIES (CUSTOMER SPECIFIC)



HAVE QUESTIONS? WANT TO DISCUSS YOUR  
CURRENT PROJECTS...

✉ info@fusionconsultinginc.com

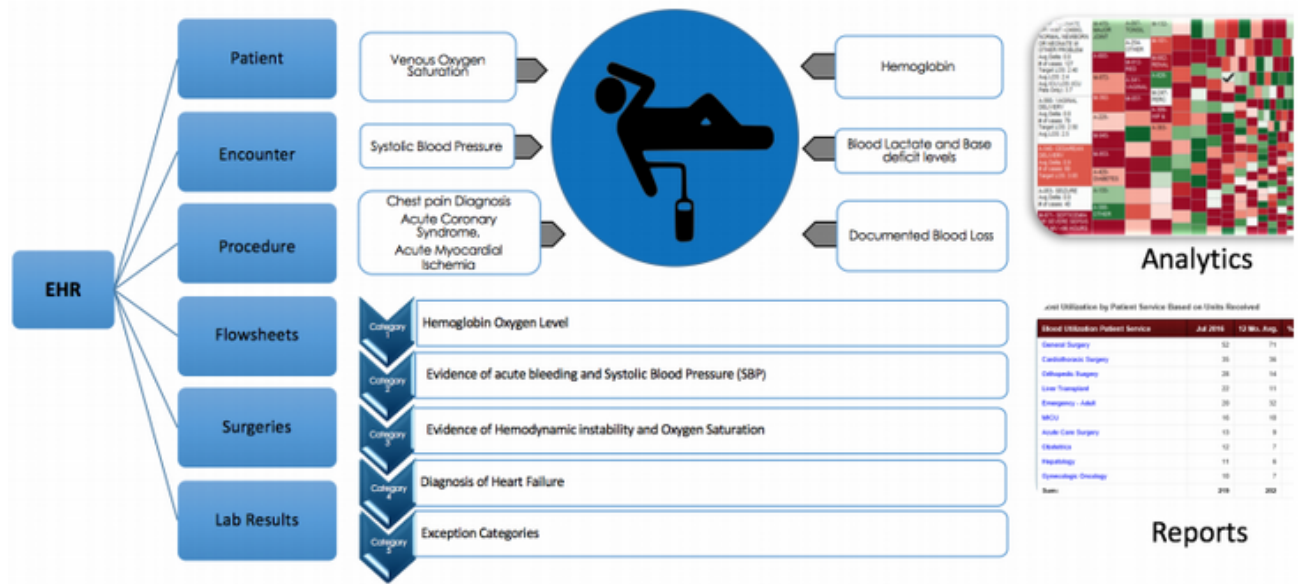
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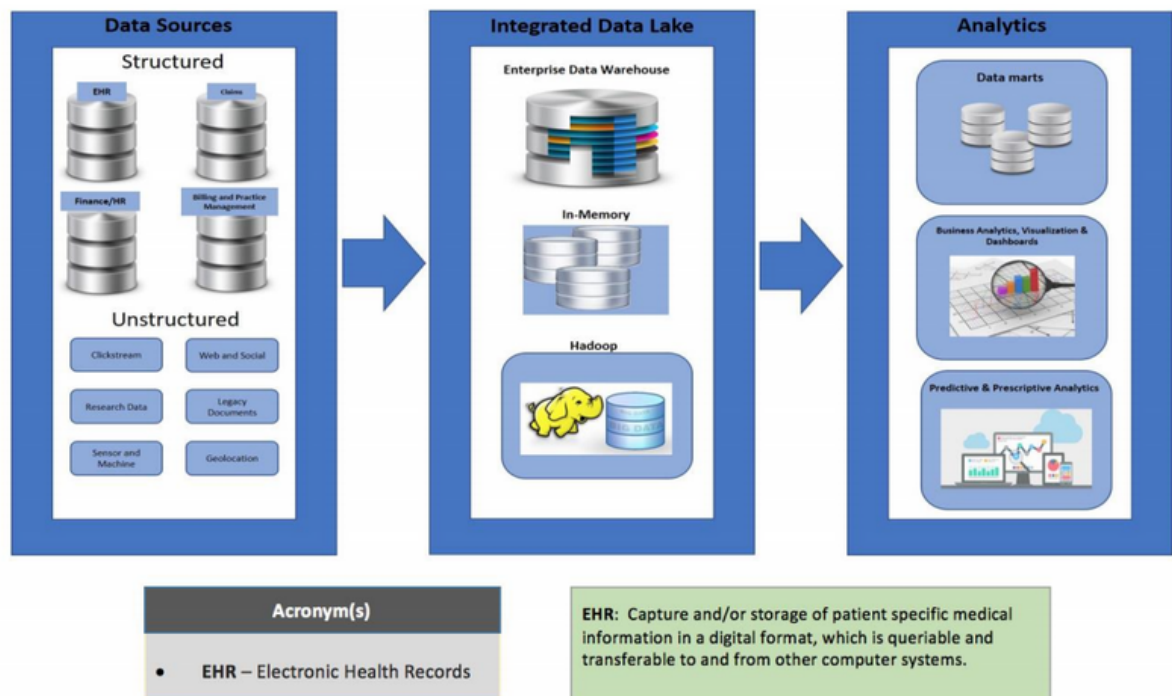
## Our Healthcare SOLUTIONS

Fusion's solutions help healthcare customers unlock data, from their EHRs and other data sources, to provide a vendor agnostic approach to achieving clinical outcomes. As part of this approach, Fusion provides a measurable ROI to help evaluate key areas for improvement and a framework to align clinical quality, efficiency, utilization, productivity and financial objectives.

## USE CASE FLOW DIAGRAM



## TECHNOLOGY ARCHITECTURE



## REFERENCES

"Improving Patient Care Through Analytics" – Paper Publication Conference Paper· September 2016 DOI: 10.1109/ISCBI.2016.7743265 Conference: 2016 4th International Symposium on Computational and Business Intelligence (ISCBI)

[https://www.researchgate.net/publication/310500110\\_Improving\\_patient\\_care\\_through\\_h\\_analytics](https://www.researchgate.net/publication/310500110_Improving_patient_care_through_h_analytics)  
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