HEALTHLEVEL
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Subject Matter Brief

Improving productivity and outcomes through actionable analytics

Clinical Surveillance and Audits

OVERVIEW

Anesthesiologists, clinical staff and administration have to continually monitor appropriateness and outcomes of medication dose for clinical safety audits, routine surveillance, education, as well as long term aggregated data analysis for continuous quality improvement. Examples include medication and dose appropriateness with procedure durations, patient condition and vital sign correlation, use of reversal agents, patient recovery and complications.

Few tools are available to satisfy these needs effectively, and unfortunately in many cases double data entry or paper based data capture is the established practice. Staff efficiency is reduced, opportunity for human error is prevalent and consequently there can be a negative impact on patient care and business performance.

FRAMING THE PROBLEM

Data is captured in multiple medical device and anesthesia record keeping systems (ARK), however those systems are not intended to provide a user friendly method to uncover meaningful relationships. For example, GE MacLab provides a hemodynamic monitoring solution for Cardiac Cath & EP Lab procedures, collecting a rich set of data for vital signs, procedures log, medications, inventory, staff and more. Another set of data is included from post-acute care systems that are not logically part of the procedure log. These disjointed data sets are created for the same episode of care, some part pre-procedure and in-procedure and other part post-procedure. A similar situation exists with Picis for OR workflow and management with an EMR or other system being used for post-acute data capture.

SOLUTION

Foundations™ provides tools and methodology to collect and correlate information from ICS/ARK and other

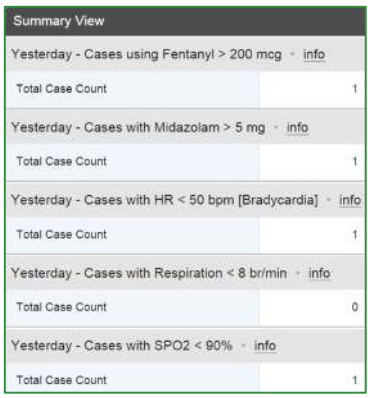

Figure 1:
The summary view in this picture demonstrates an effective surveillance method where an authorized user can monitor outliers at a glance. However, an outlying case by standards does not imply inappropriate procedures, context is key. The chart example associates case duration to medication dose. Similarly, correlations can be built with a variety of meaningful criteria, such as case types, BMI, age,vital signs, contrast and radiation parameters, conditions such as creatinine and sodium levels, smoker/non-smokers, etc.

clinical systems so that physicians and administrators are able to meet the surveillance and auditing requirements with near real-time data, along with the ability to use historical data for education and continuous quality improvement. Physicians, managers and clinical staff are able to set new targets, provide specific educational programs and ensure quality work is recognized. This is achievable with a rich set of raw data that can then be utilized for analytics and reporting.

INPUT—DATA PLANNING

The primary and most important data sources needed are the Clinical Information System (CIS) and ARK system, used to document all case and workflow details for each patient. Generally, CIS/ARK systems communicate through standard and well-defined HL7 messages (e.g. GE MacLab/Philips-Witt/Siemens-Sensis for cardiac cathlab and PICIS for surgical procedures). If historical data is available from archived data sources, this data can be extracted in a structure data out manner and consumed by Foundations. Some sample data sources are illustrated below (customers have a vast array of options and tools for data interfaces and connectivity):

Identifiers	Attribute Name	Attribute Value	Recorded On Timestamp	StaffName	Example Source
PatientId, EncounterID, CaseID	BP	170/90	2015-01-01 10:30:21		Hemo system
"	SpO2	98%	2015-01-01 10:30:21		
"	RR	35	2015-01-01 10:30:21		
"	Level of Consciousness	0,1,2	2015-01-01 10:30:21	Nurse, John, RN	Hemo or Other
"	Level of Sedation	0,1,2,4	2015-01-01 10:30:21	Nurse, John, RN	Hemo or Other
"	Midazolam	.5	2015-01-01 10:31:56	Nurse, John, RN	Hemo or Other
"	Fentanyl	12	2015-01-01 10:35:00	Nurse, Betty, RN	

Figure 2:
These attributes and values are an illustrative example of data captured as part of procedures. Other data items such as room number, staff associated with procedure and procedure logs, are also available from the monitoring systems. In some cases, the EMR can provide patient conditions, medications and clinical values, whereas the resource and staffing information is extracted from other ancillary applications.

OUTPUT—MEASURES PLANNING

Foundations™ offers these measures and filters/organizations out of the box, with all interactive discovery attributes available.

1. Medication dose tracking—by case type, case time, administering personnel, anesthesiologist
2. Medication ratios—dose over case duration, number of doses, and duration between doses
3. Case level details—mix of case type by MD, room, diagnosis, case time
4. Case complications—by case type, MD, type of procedure, ratio of complications per case type
5. Case complications vs. PACU length of stay (LOS)
6. Room idle, room turn over time, procedure duration

CONCLUSION

While auditing and surveillance is possible with many systems, Foundations™ offers the ability to have a consistent analytical model without being burdened with the impact of short term vs. long term data set volumes. Therefore, users can answer questions such as what is the comparative performance of certain medications over time, or are there correlations between BMI and dose required for certain procedures?

Foundations™ provides a powerful tool and methodology, and demonstrated experience with anesthesia surveillance and analytics for near-real-time and historical data sets.

Related Information: Technical Brief–Room Utilization & Operations Planning. Request this resource by emailing info@healthlevel.com

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About HealthLevel, Inc.

Founded in 2010, HealthLevel, Inc. is a privately held company, headquartered in Mountain View, California. Foundations from HealthLevel, Inc. is the industry's first integrated real-time and multi-year correlation platform for clinical, operational and financial data. Foundations provides an intuitive, configurable, analytics solution allowing all hospital personnel to readily monitor and improve their own business practices.