2014 Sautter Award Proposal

Project Title: Nursing Performance Improvement Business Intelligence Solution

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Project Description

UCSF Medical Center’s Nursing Performance Improvement (NPI) department implemented a Nursing Business Intelligence solution that included technological tools for gathering and displaying data for quality metrics with the ultimate goal of improving patient care and preventing harm to patients. Other benefits of a Nursing Business Intelligence solution are in reducing Registered Nurse (RN) time and streamlining processes for efficiency.

NPI was faced with the need to collect data for ever-increasing metrics required for internal performance improvement programs, regulatory and other purposes. Survey data is needed to demonstrate compliance with nursing policies and procedures based on observation of the patient or observation of a nurse providing care to a patient. This compliance data is reviewed internally at many levels within UCSF Medical Center but also frequently requested by external groups such as The Joint Commission (TJC) or Centers for Medicare & Medicaid Services (CMS). For example, The Federal Drug Administration (FDA) monitors blood and blood product administration and grants UCSF Medical Center the permission to administer it onsite. NPI provides data to the FDA to demonstrate policies and
procedures are in place and complied with in order to keep patients safe to secure this permission. Also increasing is the demand for reductions in nursing time for cost saving and efficiency and for a rapid turnaround of results for real-time actionable data at the unit level. Unit staff can make immediate adjustments, provide on the spot training or feedback all to prevent potential harm to patients if able to receive real-time data at the unit level.

NPI implemented a Nursing Business Intelligence solution to meet the growing needs for data collection while using fewer resources, especially with nursing time. The three elements of the solution are Data Capture, Store and Display. A key piece of the solution that was monumental in improving efficiencies was the Data Capture element. The Data Capture process in the past for NPI meant collecting data on paper, manually entering the data from the paper into an excel spreadsheet then using the excel spreadsheet to generate reports and graphs. To replace this laborious and inefficient process, a data collection tool called Survey Tool was developed using a Salesforce platform. It was implemented throughout the UCSF Medical Center and could be accessed on unit computers or on mobile devices (iPad). This allowed for paperless data collection from anywhere at the medical center and also increased data integrity with built-in data validations. An ADT data feed from the electronic medical record (EHR) unit patient census is displayed to eliminate manual data entry of patient identifiers and allows the nurse to select the right patient.

For Data Store, a Nursing Data Mart was created where data such as EHR nursing documentation and staffing data could come together and reported on. For Data Display, a dashboard tool was linked to the Nursing Data Mart to show data from multiple sources in one place and allowed actionable data made available immediately at the nurse or unit level.

There were major gains in implementing Survey Tool within the Nursing Business Intelligence solution. For a quarterly HAPU Prevalence Studies, significant reductions in RN time averaging 50% savings as time dropped from 4 to 2 hours. On average, a nurse may earn from $65 to $70 per hour (based on the average nurse with experience of 4-5 years). This means up to an average $140 per nurse participating in the study. A data resource to enter paper forms eliminated 40 hours. Reductions are for each study, each quarter, with 4 quarters per calendar year. Other improvements were for example increased Data Transparency at the unit level, reductions in NPI staff to manage processes and near elimination of data entry errors.

Key implications were on reducing RN time in data collection and improving patient outcomes. In making the processes more efficient means less time collecting and analyzing data, units and nurses can spend more time acting on data and more time taking care of their patients at the bedside.

This tool was featured in the Higher Education track at the Salesforce Dreamforce 2013 convention in a video of UCSF achievements using Salesforce.

**Technology**

There are multiple components that make up the technological infrastructure of the Nursing Business Intelligence solution: Force.com (Salesforce), Mule Enterprise Service Bus (ESB), Epic integration, Ruby on Rails, OmniView, and SQL Server.

1. **Salesforce**
   - Data is stored in the cloud, which means it is accessible anytime and from any location.
• Dynamic data model to republish and change data
• Allows a non-developer to easily create and publish a survey
• Administrative functions:
  o Manage Invitations
  o Manage Surveys
  o One survey can have many invitations assigned to them, any nurse can pick up any survey and assess any patient
  o Run Extract, Transform and Load (ETL) batch processes from Salesforce to data warehouse (OmniView)

2. Survey Builder Tool
• Built Ruby on Rails and web services to interact with Salesforce
• Multiple question types – text, numeric, date, mult-select, radio button, grid
• Supports pictures, icons and text
• Supports conditional logic, branch logic, required questions
• Re-usable questions in a question bank, drag-and-drop building functionality

3. Survey Client Tool
• Built using Ruby on Rails, Jquery, and web services to interact with Salesforce
• Collaboration features allow one nurse to complete any survey started but not finished by another nurse
  o Provides visual look at incomplete, in progress, and completed surveys
• Integration with Epic (electronic medical record system) data, patients can be searched on MRN and CSN and other patient data fields are pre-populated
  o A patient census list from Epic is in the survey client tool so that a nurse can see a list of all the patients available to be surveyed
• ADT integration feed – from Epic to Cloverleaf to Mule to Salesforce -- is real-time integration

4. OmniView reporting and QlikView dashboard
• Export time-selected survey data from Salesforce to OmniView using an on-demand ETL batch process and Mule
• OmniView is the Medical Center data warehouse which produces reports for the state and federal government oversight
• Quarterly and Monthly depending on the survey. During times of regulatory scrutiny, weekly audits were performed.
• Survey data is needed to demonstrate compliance with nursing policies and procedures based on observation of the patient and/or patient’s room or a nurse providing nursing care to a patient. This compliance data is provided internally (i.e. Medical Center leadership, Nursing leadership, nursing unit management, unit staff) and externally to regulatory agencies (i.e. FDA, CMS, TJC).
• This process allows for a rapid turnaround of results for real-time actionable data at the unit level. Unit staff can make immediate adjustments, provide on the spot training or feedback all to prevent potential harm to patients if able to receive real-time data at the unit level.
• Sample agencies NPI reports to:
  o FDA – Our blood and blood products administration is mandated by the federal drug admin.
CMS (Centers for Medicare & Medicaid Services) and the TJC (The Joint Commission) – both dictate whether or not UCSF can operate as a hospital or not and reimbursements. Several past UCSF audits reflect the need to show improvement for action plans that were developed based on TJC survey where UCSF was cited for deficiencies.

System Architecture

Screenshots

Survey Tool
**QlikView Qual Dash**
Implementation Timeframe

- Phase 1, 2011 – 2012
  - Survey Builder, ETL to OmniView, Survey Client, Survey Administration in Salesforce
- Phase 2, 2013-2014
  - ADT integration, Collaboration features, general enhancements and bug fixes

Measurable Outcomes

- 50% reduction in nursing time spent participating in Prevalence studies — went from 4 hour study to 2 hour study overall. This is a savings of up to an average $140 per nurse participating in the study, each quarter (4 studies per calendar year).
- Timing of getting study data into OmniView data went from one month to immediate eliminating the need for approximately 40 hours of data entry and immeasureable report generation time using Excel spreadsheets.

Objective Customer Satisfaction Data

Comments from some of the UCSF Nurses involved in the first pilot:

- I was thrilled to use a tablet for the survey last time. It was very easy to use and will save time in the future. I am also impressed by how much information was extracted out of APEX, because that was the most time consuming thing, now we can focus more on the patients. Olga Sukhenko, RN, Adult Orthopaedics, Spine and Plastic Surgery unit
• The APEX and iPad tool makes the collection of patient information really fast and easy. For the PICU this means we no longer have to look in 3 places for data (paper, UCare, old charts). Our survey time is more efficient and even with a maximum patient census, we likely can complete the survey within the allotted time frame. Cynthia L Fialho, RN, Pediatric Critical Care unit
• . . . using the iPad survey tool made the study much more efficient and saved a lot of time. It also lessens the chance of information getting lost. Kelly Wood, RN, Adult Neuro Critical Care unit
• It was a nice change from all the paperwork we have been having to fill out. Andrea Mostny, RN, Intensive Care Nursery