Finding the Hidden Tune Using Pre and Post System Implementation Metrics

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Introduction

https://www.sfdph.org/dph/RebuildSFGH/

November 2008 San Francisco voters approved Proposition A to build a new acute care facility for San Francisco General Hospital to meet required state seismic standards[1].

In May 2016, the 283-bed facility, Zuckerberg San Francisco General Hospital and Trauma Center (ZSFGH), opened its doors to patients offering state of the art care, and **utilizing several newly implemented clinical applications and systems[1]**.

Opportunity

"Implementing a new system that involves multiple components/ applications is a major task for any organization. Conducting a pre- and post-implementation study to document the level of success is important, but finding the time, energy, and resources to do this is not done as often as we as professionals would like." (Tyler, 2012) [2]

USF Graduate Student Internship provided ZSFGH the resources for a metrics and data gathering during transition when implementing new clinical technologies. Pre Implementation Time Study conducted 2015, Post data gathering in 2016 one month post "go live" with Med Surg focus of study.

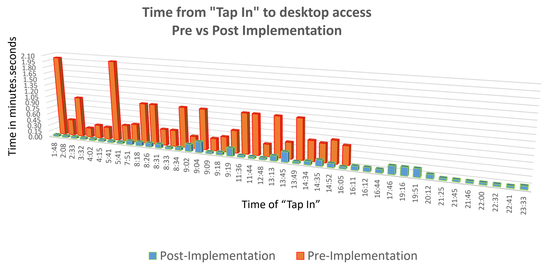
Project Activities Details	Hours
Research phase of Time Study Project	5.5
Project Planning	4
Design of Time Study Data Collection Form	7.5
Time Study Observation Unit Orientations	2
Train Additional Interns as Observers and Data Collectors	3
Time Study Observation/Data Collection Medical Surgery 4D, 5A	48
Time Study Observation/Data Collection Emergency Department	30.5
Time Study Data Compilation and Preliminary reporting	35
Post Implementation Data Compilation	40
Combined Pre and Post Reporting and Analysis	24

Virtual Desktop Image (VDI)

Purpose: to measure systems and clinical applications accessed by single sign on as part of transition to new hospital facility.

Study: Information such as the times for "Tap In" (badge access using desktop card reader), times for completed log in process, whether or not the end users were logging into the system for the first time, typing in either user name or password (Manual), or if the end users were re-logging into the system via "Tap"(Automatic) were observed and recorded into excel via Google form.

Results: The x axis notes the time of "Tap In", the y axis time from "Tap In" to completed log in. Pre and Post data includes both Manual and Automatic processes, these were kept together for measurement. From the initial analysis it can be seen that implementation was successful as accessibility improved Post Implementation and speed to log in increased by over 50%. Data findings were reinforced by positive comments recorded from clinical staff stating log-in process "was faster" and "easier" than before. This was a significant outcome as the implemented VDI had been modified to include new applications such as Nurse Call, Vitals Signs Integration, In Room Patient Education and monitoring software. By adding to an image already including electronic medical record, medication administration record, enterprise intranet, etc., the Post Implementation VDI was not only faster, but the build was also more complex.

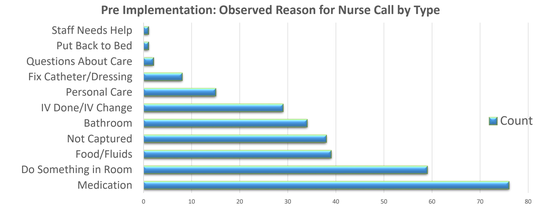


Nurse Call

Purpose: to provide baseline metrics for the Pre Implementation Nurse Call system (single push button call light, single over door room light, one master unit at clerk desk) and Post Implementation Nurse Call system (enhanced pillow speaker, wall unit, bed plug, multi-color over door lights, multiple master console units, software application, integration with wireless phones for RN's and PCA's).

Study: First step in the development of Pre Implementation study design was to gather resources and perform research on previous clinical time studies. Design concepts were determined, based on table 9.2 Comparison of Methods for Capturing User Requirements from Chapter 9: Human Computer Interaction, "Essentials of Nursing Informatics".[3] Nurse call questions captured data which included: census, patient call activated (time), patient call answered (time), patient call deactivated (time), time elapsed for patients to contact desired health professional (number for time), patient call answered by (health professional and mode), patient call activated unintentionally (T or F), reason for patient call (multiple choice), overhead page activated (T or F), when overhead page activated (time), when overhead page de-activated (time).

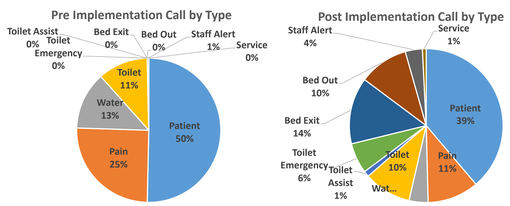
Pre Implementation Results: Initial observed results: Medication, Do Something in Room, Food/Fluids, Bathroom and Not Captured highest volume of calls.



Pre Implementation Nurse Call Types were recategorized to be comparable to Post Implementation Nurse Call Types.

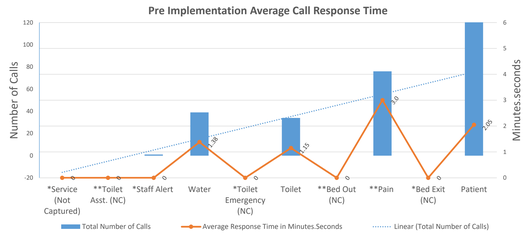
Pre Implementation Call Type	Re-Categorized Call Type
Medication	Pain
Do Something in Room	Patient
Food/Fluids	Water
Not Captured	Patient
Bathroom	Toilet
IV Done/IV Change	Patient
Personal Care	Patient
Fix Catheter/Dressing	Patient
Questions About Care	Patient
Put Back to Bed	Patient
Staff Needs Help	Staff Alert

Pre and Post Results Comparison: Although the overall volume of Nurse calls increased (25%) Post Implementation, the general distribution of Call Type remained the same; with Patient Calls occurring at the highest frequency both Pre and Post. The integration of bed and bathroom station alarms into the Post Implementation Nurse Call system account for almost 1/3 of total Call by Type, where previously these could not be measured. Reduction in Pain, Water, and Toilet Calls from Pre to Post could be explained by the increased specificity of the implemented Nurse Call system (reduction in call type cross over or introduction of additional call types), or improvements in clinical work flow showing an overall reduction in these call types.

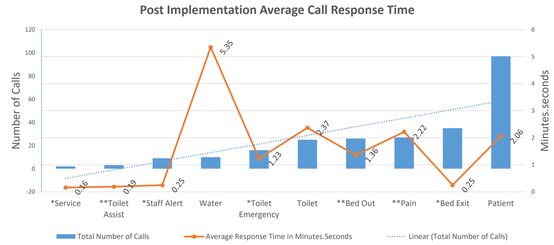


Nurse Call continued

Pre and Post Results Comparison Average Call Response Time: The Average Call Response Time graphs display the number of Nurse Calls and the average response times of RN's or PCA's to patient's initial request within a 48 hour period. The y axis displays Numbers of Calls and minutes.seconds. The x axis displays Call Type: * indicating Urgent calls and ** indicating Priority calls, NC indicates the Call Type was not captured . Pre Implementation data shows an average response time no greater than 3 minutes for any Call Type. The highest call volume (Patient) with a response time of 2.05 minutes suggests that increased call volume is not indicative of increased response time.



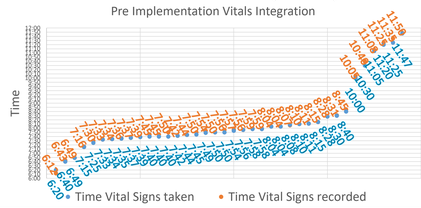
Post Implementation data findings included the measurement of Urgent calls (Service, Staff Alert, Bed Exit) with response times </= 0.25 seconds. Priority calls (Toilet Assist, Bed Out, and Pain) had response times </=2 minutes 22 seconds. These findings suggest that Nursing staff seemed to be responding quickly to newly implemented Nurse Call types 30 days post "go live". Call type Water is an example of data skewed by implemented system rules and should be adjusted down from 5 minutes 35 seconds to 3 minutes 35 seconds to adjust for Nurse Call System call tier. Implemented Nurse Call system routes Water Calls to PCA first, if unanswered for 2 minutes, call is routed to next tier which is RN. The Post Implementation reporting does not account for routed calls only answered calls.



In comparing Pre to Post data, Post Implementation Call volume increased, Urgent and Priority calls were integrated into Nurse Call system and could be included in measurement, however average maximum response time @ 3 minutes stayed the same. Nursing staff handled increased volume of calls, with no loss of or negative impact on response time.

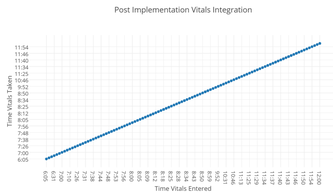
Vital Signs Integration

Pre implementation vital sign observations were collected as individual data points, and analyzed as trends. The median time difference between the time patient vital signs were taken and the time vital sign measurements were manually recorded into the electronic medical record was 1 hour and 15 minutes (1:15:00).

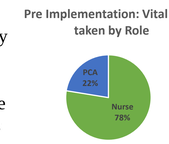


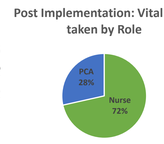
Vitals Integration continued

Post Implementation vital sign integration data measurements represent the time vitals taken at the bedside (y axis) and the time entered in the electronic medical record (x axis). Post integration bedside monitors to software application to electronic medical record made this process instantaneous. The time difference between these processes was 0:00:00.



Perceptions of Vital Signs Clinical Work Flow - Pre and Post Implementation:
Comments made by RN's to the observer included the perception that they believed they were taking more patient vital signs, than Patient Care Assistants (PCA's) Post-implementation due to the early warning score (EWS) workflow implementation in the vitals integration process. Assessment of the AVPU required for generating an EWS could only be done by RN's either time when vitals taken or within a two hour 'Reassessment' period.
While the amount of vital signs measurements increased from Pre to Post-implementation for both roles (RN = 197:414, PCA = 57:165), the general distribution of which roles performed the work did not change significantly as illustrated here.





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Acknowledgements and Contact

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