CASE STUDY

Impact on Operating Room Efficiency and Patient Safety, after 1 year with **ORCOCKPIT**[+]

Background – Rates of harmful surgical complications (3.6 million cases/year) and Surgical Site Infections (160,000/year) in the US are still enormous while over half of them are avoidable.[2] Smarter IT systems and swifter, more consistent safety checks are needed to protect patients and caregivers.

Solution – The ORCOCKPIT[+] SUITE is a smart IT integration that provides a real-time dashboard and OR analytics solution. This solution was installed department wide providing surgical staff with real-time insights and alerts into patient safety, workflow and OR productivity, everywhere they go.

Results – Surgical staff members indicated a substantial reduction in work related stress and departmental miscommunications. They also indicated that working in real-time has not only reduced adverse events and complications by an estimate of 15-30%, but drastically improved individual and team accountability making nurses feel more empowered. Measured compliance to every single WHO Patient Safety protocol has continued to increase throughout the year while compliance to the overall SCIP/SSI Bundle of Care went from 52% before the implementation of OR Cockpit[+] in 2015, to over 90% in December of 2016. A significant improvement of patient safety levels! Consequently, recorded SSI's over 2016 also dropped by 12%. The transparent performance data, benchmarking and celebrating team improvements has enduringly instilled a high performance culture of Continuous Learning.

Surgical care is an essential part of health care, with an estimated 36 million operations performed in the US annually.[1] Although surgical care can prevent loss of life or limb, it is also associated with considerable risks; studies show US perioperative rates of death in surgery to be 0.4-0.8% (216,000 deaths annually), rates of major complications to be 3-17% (3.6 million complications/year) and over 160,000 harmful Surgical Site Infections (SSI's) are created every year. Such SSI's have been shown to increase mortality, costly readmissions, length of stay and high costs for patients who incur them. Notably, over half of these harmful SSI's and complications are avoidable.[2]

Certain progress has been made to reduce anesthesia-related accidents and SSI's – the landmark 2008 WHO surgical checklist impact study[2] found a drop of 36% in surgical complications and a 21% drop in SSI's, upon the introduction of the Surgical Checklist. Undoubtedly, a great and much required step, but also is just the beginning. Smarter safety measures, actionable information and IT tools are need to better protect patients and caregivers. These significantly reduce the occurrence of surgical complications.[3,4]

The hospital's need

To optimize both the quality and value of care delivered to patients, a leading academic hospital with 12 ORs was eager to utilize their upcoming OR renovation to enhance their EMR with visual real-time decision support, full IT interoperability and OR performance analytics. Their previous standard EMR software did not provide actionable, real-time information, nor live big data analytics. An unfortunate waste of potential, as substantially valuable data is already available. Easy to use, modern day data analytics can provide the department with striking insights into their performance, allowing

[1] World Health Organization Bulletin 3-94, March 2016, "Size and distribution of the global volume of surgery in 2012".

[2] Atul A. Gawande M.D., A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population, New England Journal 2009.

[3] Mazzocco K, Petitti DB, Fong KT, et al. Surgical team behaviors and patient outcomes. Am J Surg 2008 September 11.

[4] Lingard L, Regehr G, Orser B, et al. Evaluation of a preoperative checklist and team briefing among surgeons, nurses, and anesthesiologists to reduce failures in communication. Arch Surg 2008.

benchmarking, accountability and continuous improvement. People tend to improve when processes are measured and performance outcomes are easily accessible for view.

Better Safety Checks

Safety Checklists and Surgical Care Improvement Project (SCIP) measures have proven to be of great value when it comes to protecting patients. The slightest mistake or miscommunication in surgery can have disastrous consequences. In the aviation industry, sound safety protocols were developed in the 90's to eradicate human factors from causing plane crashes. Compliance to these safety protocols are now upwards of 99%.(ICAO.int)

In stark contrast, when safety compliance was randomly sampled during one week of 2015 in this hospital, it was found to be only slightly over 50%. The already high workload and data registration requirements on caregivers were mentioned as the main contributors for such low safety compliance rates. Therefore, better perioperative safety checks need to be smarter, swifter and without any double data entry.

The Solution

The hospital engaged NewCompliance to implement its surgical process support solution, OR-Cockpit⁺. This solution completely met their needs for enhancing the EMR with real-time and combined with essential information, swifter aviation-style safety protocols and smart performance analytics.

Upon implementation, NewCompliance observed and interviewed the key user groups in the OR and identified a range of opportunities for improving workflow. Workflows were discussed, benchmarked, improved and digitized. Throughout the department, customized real-time dashboards were designed for each OR user group.

Simultaneously, the IT integration of the EMR, Facilities and Patient Monitors, completed in 3 months time, introduced an unprecedented opportunity to interpret and combine essential information from all these sources through OR-Cockpit⁺, in real-time.

The departmental solution contained software and dashboards inside and outside of each of the 12 Operating Rooms, plus large screens at the department's central desk, staff lounge, Pre-Op and PACU units.

The ORCockpit⁺ install assists the hospitals in reaching best practice levels of patient safety and OR productivity through:

- *Real-time dashboards to eliminate human error, non-compliance & double data entry* - presenting vital information live to each OR team; team & patient data, smart alerts, environment updates, allergy & infection risks, safety and productivity scores, next steps, turnover progress, bed planning etc.

- *Improved safety protocol compliance* - the hospital's safety protocols (e.g. Time Out, Sign Out, Fire Assessment, Day Start/End, Cleaning, and Equipment Checks) are now all swiftly and consistently done on the large touch screens. The teams are scored in real-time and now always complete all mandatory safety checks.

- *Smart OR analysis and automated reporting* - monthly in-depth analysis of OR performance. The easy to use Analytics Tool provides instant access to analysis of all Patient Safety metrics, SSI contributors, patient safety scores & OR productivity; late starts, turnover times, Block Utilization etc.

After a total of 5 months of implementation, the hospital went live with OR Cockpit⁺ in Dec 2015.

Exposing low bundle compliance

Monitoring patient safety normally involves different IT platforms and multiple staff members. This often leads to individuals incorrectly assuming that safety compliance is high, since nobody has the overview of the combined measures. However, a bundle of safety measures is only truly effective if the entire bundle is consistently applied, not just a few measures done well on every different patient. The hospital had invested a lot in safety trainings and employs highly regarded medical teams. Everyone was convinced that patient safety protocol compliance was high. Nonetheless, when safety bundle compliance was measured, it showed that only in 50% of cases the entire bundle was followed correctly. An unexpected shock to all the caregivers. The OR Department Manager said, "These low bundle compliance levels had never before been visible and always been an 'unknown unknown'."

Results and improvements

In total 11,594 operations took place throughout the year of 2016. In graph 1, EMR data illustrates that compliance to important WHO patient safety metrics steadily increased throughout the year, through the use of ORCockpit⁺ (from avg 80% to 95%). Furthermore and even more significantly, graph 2 shows the increase in following *all* measures correctly on *each* patient. This can eliminate the risks of avoidable SSI's.

Due to the visibility of the Patient Safety Bundle of Care compliance score on their dashboards, bundle compliance immediately rose from the sampled 52% to an initial 64% at the start of using ORCockpit⁺. Going forward, with teams now being scored during each case for adhering to proven patient safety protocols, and New-Compliance helping the hospital to analyze their data and celebrate improvement, bundle safety compliance shot up throughout the year to over 90%. This team culture change, of working at much higher safety levels, has now become the new norm.

At the end of the year, staff members reported a reduction in work related stress, adverse events and miscommunications. Nurses mentioned they feel more empowered now that they are working with real-time visual support.
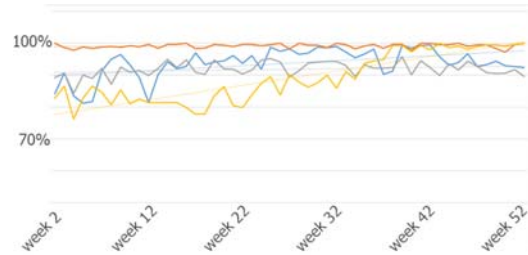
Graph 1 – antibiotics delivery (blue), door movements (orange), normothermia (grey) and hair removal (yellow) conform protocol
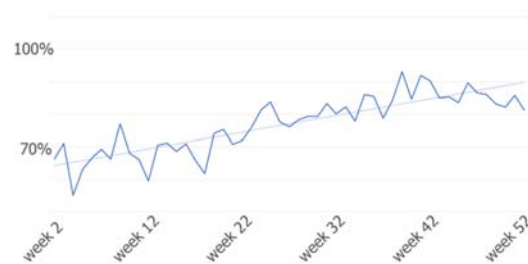
Graph 2 – compliance to the bundle of patient safety indicators

With the increased compliance to the Bundle of Care from 52% to over 90% and all other factors remaining constant, an associated drop in SSI's over 2016 by 12% was recorded.

Notably, the new visual data transparency, team benchmarking and celebrating improvements have installed a culture of accountability and Continuous Learning in this hospital. This has created a huge leap forward in terms of the quality of care provided to patients, as well as lowering its cost.

Learn more about ORCockpit⁺ and improving OR efficiency! Call us at 1-800-SKYTRON or visit www.skytron.us