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CHICAGO April 13 -15, 2015

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"Healthier Living Through Technology"™

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Democratization
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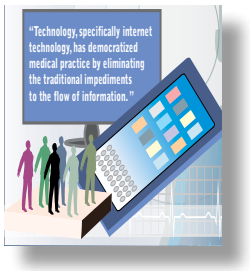

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Understanding And
Mitigating The Risk

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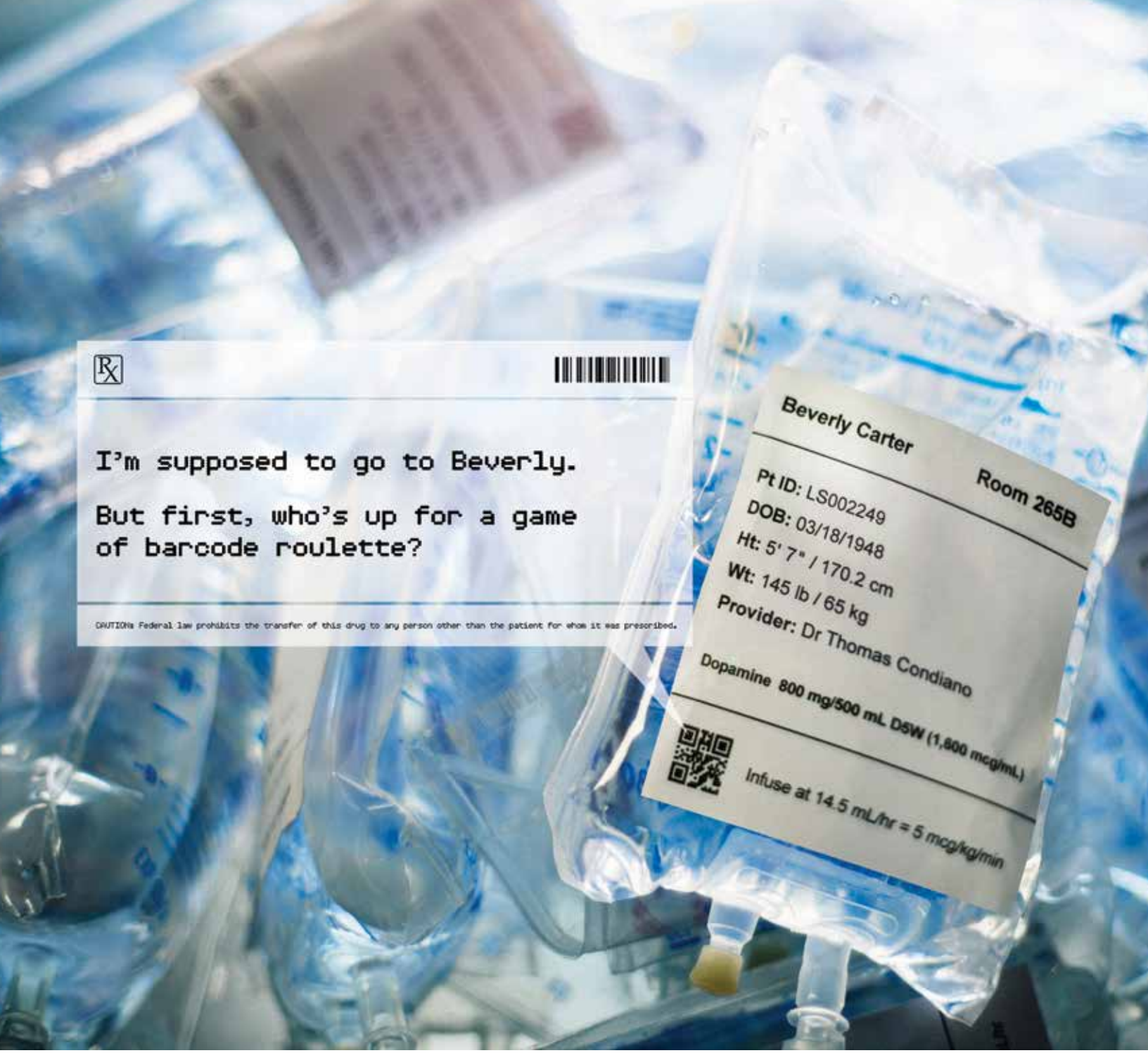
What is the IHA?

The Intelligent Health Association (IHA) is a global, technology based and technology focused organization comprised of many new technology communities and societies all operating under one organizational structure with a common goal: to help drive the "Evolution to the Health Revolution™" through the adoption and implementation of new technologies in the health eco-system. The IHA will accomplish this goal through the delivery of vendor neutral, technology agnostic educational programs in a partnership with other health related organizations, academic institutions, government, technology community, and standards bodies.

For further information please contact Harry P. Pappas, CEO, The Intelligent Health Association: hpappas@ihassociation.org

Cover design, art direction, layout, additional illustration and handbook content compilation by Andrew Neil Olscher, VP Media and Publications, the Intelligent Health Association. Individuals appear in photographs for illustrative purposes only and such appearance does not constitute an endorsement of any product, service or opinion detailed, offered or expressed within this publication, or The Intelligent Health Association.



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Find out what we've been up to. Visit carefusion.com/himss2015.

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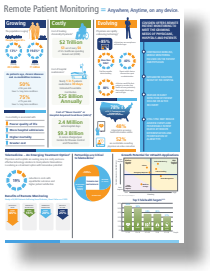

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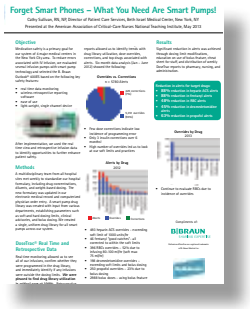

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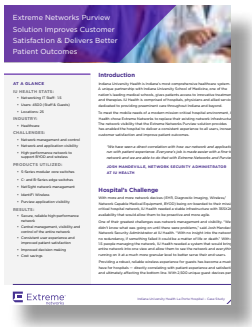
Indiana University Health La Porte Hospital



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EMR/Perinatal System Integration

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FROST & SULLIVAN

Healthcare & Life Sciences

Enabling Strategies in Digital Health Through Visionary Innovation.

Welcome From H. Stephen Lieber, CAE

President and CEO HIMSS

Welcome to HIMSS15 … and to the Intelligent Health Pavilion, your one-stop destination for live, working demonstrations of the latest technologies throughout the healthcare ecosystem.

Educational and interactive by design, the Intelligent Health Pavilion (formerly Intelligent Hospital Pavilion) showcases the latest advancements in all manner of health-related wearables and other innovative hardware and software solutions that are revolutionizing the way healthcare is being delivered. I invite you to discover how advanced technologies are seamlessly integrated to support caregivers and caretakers at each step in a person's health journey, contributing to improved patient outcomes, greater access to care, and a reduction in overall healthcare costs.

Returning this year to the pavilion is the i-HOME™, Intelligent Medical Home installation. The third locus of care, the i-HOME™ offers physicians a more complete health narrative for their patients between visits, providing advanced technologies and solutions that enable increased connectivity between patients and their healthcare teams.

HIMSS15 offers much more on interoperability - I encourage you to attend many of the other educational sessions throughout the conference that have this focus. Refer to the HIMSS15 Pocket Guide or stop by any Information Booth to locate a session or activity that interests you. Throughout the year, be sure to visit www.himss.org for the latest news, industry trends, career resources and RFID/RTLS healthcare applications.

Thank you for being part of the health transformation journey at HIMSS15.

Enjoy your interactive tour of the Intelligent Health Pavilion!

Welcome From Paul Frisch, PhD

President and Chief Technical Officer
Intelligent Health Association

As the President / Chief technical Officer of the Intelligent Health Association I'm delighted to welcome you to the 2015 Intelligent Health Pavilion. The Intelligent Health Pavilion reflects our broadened approach to include all facets of patient healthcare; not only in the hospital, but in outpatient environments and in the patient's own home.

This year's pavilion is designed to help showcase the continuing evolution, development and proliferation of technologies for the full continuum of healthcare from the hospital to the home. Our goal is to help raise the level of awareness of technologies that make healthcare more efficient, effective and comprehensive via wireless information delivery, as well as medical devices, wireless sensors applications and Auto-ID and RFID/RTLS platforms. The integrated technology and solutions displayed and demonstrated at the pavilion are designed not only to improve patient care in the hospital but to assure the wellness of that patient even after he or she goes home.

This year the Intelligent Health Pavilion will allow visitors to view technologies, in action, that improve wellness in a variety of settings. These include the traditional patient care and treatment environment, such as the OR, ICU, ED, Step Down, Ambulatory Care, Labor and Delivery, as well as pharmacy, clinical laboratories, supply chain suite and the i-HOME ™ Intelligent Medical Home.

The pavilion will provide demonstrations of diverse technologies and systems, and how they can be integrated through a series of use case demonstrations highlighting the impact in workflows, patient care and data sharing between the home and the healthcare provider.

The latest design of the Intelligent Health Pavilion is the result of close partnerships with physicians, nurses, administrators and industry to showcase how existing and emerging technologies can be combined and integrated most effectively in the real world.

We hope with this year's pavilion to continue delivering educational programs to the healthcare community, as well as to sponsor research and collaborate with standards bodies to ensure technologies provide the benefits most needed in the healthcare community.

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*We are proud to be a sponsor and exhibit in the **Intelligent Health Pavilion** at booth #6656 at the HiMSS Annual Conference & Exhibition. Stop by to learn more.*

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INTELLIGENT HEALTH ASSOCIATION
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Welcome From Harry P Pappas

Founder and CEO, the Intelligent Health Association
Co-Founder and CEO, the RFID in Healthcare Consortium

Welcome to the Intelligent Health Pavilion (IHP) at HIMSS 2015, a production of the Intelligent Health Association and its affiliated organizations, now in its FIFTH year at HIMSS. Experience the Intelligent Hospital and i-HOME™ 2015.

Come and experience the "Internet of Things in the Health Community™" at the Intelligent Health Pavilion at HIMSS15.
Come and witness the "Continuum of Healthcare through technologies™" at our Destination Pavilion.
Come and touch technologies that are disruptive and transformative for the Health Eco-System.

Healthcare today is more connected than ever before - just look around you. Whether you are in a hospital/clinical setting or recuperating in your home, or even in a nursing home/assisted living facility, there is a "Continuum of Health" throughout the entire health eco-system and technologies are an integral part of this landscape.

You will see examples of this "Continuum of Health" as you tour the Intelligent Hospital and the i-HOME™, Intelligent Medical Home Pavilions in our destination pavilion. These two pavilions serve as demonstration areas showcasing how advanced technologies - such as Auto-ID, BLE, NFC, RFID, RTLS, robots, sensors, wearables and mobile devices - are being seamlessly integrated to support care givers and care takers at each step of the health journey. See and hear about the positive experiences and the ROI derived from these technologies, one hospital at a time. When properly implemented and seamlessly integrated, these technologies contribute to improved patient outcomes, improved patient care, and a reduction in overall healthcare costs.
Once inside the NEW IH Pavilion experience the following:

- The Hospital Clinical laboratory
- Wearables and Augmented Reality demo in our OR room
- New Technology Demo Zone
- BLE and NFC technologies in both pavilions
- New Patient Hospital Room
- Learn and connect with exciting Key Note speakers in our 2 theaters
- Intelligent Health Association Awards program

We thank our many health professionals, technology sponsors, and organizations such as the UIC Chicago campus, Roosevelt University, the VA Smart Home Initiative, VA RTLS project, UCF, USF, Frost & Sullivan and the IEEE, who have devoted time and energy in making the IH Pavilion the success that it is today - now in its fifth year.

YES, we have come a long way and the health community, our members and sponsors have helped make our vision a reality. I therefore would like to thank our dedicated IHP staff, the RHCC Management Team, our friends in academia, and our wonderful volunteers, along with the entire HIMSS organization for making this pavilion the success that it is today. It has become a MUST SEE for anyone going to the HIMSS Annual Conference.

Of course, I would be remiss if I did not thank all of our sponsors who have financially supported our efforts from day one. They have unstintingly embraced our vision and mission and have become the backbone of the IHA and IH Pavilion.

The Intelligent Health Association and its affiliated groups, consortia, and alliances are focused on the adoption of new technologies in the health community. The IHA is a global, technology centric, vendor neutral, technology agnostic, educational organization driving the adoption of new technologies in the global health community. The IHA is the HOME for ALL technologies, from RFID to mobile devices to robotics and 3-D printing for healthcare. Visit our web site: www.ihassociation.org

Stop by our pavilion and join the "Evolution to the Healthcare Revolution™" that we are leading.

Harry P Pappas, Founder and CEO
The Intelligent Health Association
hpappas@ihassociation.org

INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

AWARDS 2015

Congratulations To The Recipients!

IHAssociation.org/awards

Emily Sopensky
Co-Chair, IH Awards

Congratulations To IHA Awards Recipients!

Collaboration among healthcare providers, administrators, innovation providers and vendors is the cornerstone for successful technology-based healthcare solutions. Facilities are in constant competition with themselves to improve healthcare delivery while maintaining quality and containing costs.

Implementation is a huge undertaking, calling on multiple disciplines within the healthcare facilities and working collaboratively to integrate the complex technology. Success demands courage and foresight. We at the Intelligent Health Association (IHA) honor these efforts through the competitive IHA Awards program.

In 2015, we offer six awards in five categories as follows:

1 Improving the Patient Experience: Care and Safety - University of Chicago Medicine
2 Improving Regulatory Compliance - UPMC
3 Most Innovative Use Case - University of Tennessee Medical Center
4 Most Innovative Use of Business Intelligence - Health First
5 Best Comprehensive Integration - Oschner Health System

GRAND AWARD - University of Chicago Medicine

PLEASE JOIN US FOR THE AWARDS CEREMONY APRIL 13, 2015

Please join us Monday, 5pm, April 13 at HIMSS15, Chicago, McCormick Place at the Intelligent Health Association Pavilion LEVEL 3 HALL B1, Booth 6656. Reception follows. For an invitation to the 2015 ceremony, please contact Anne Olscher: aolscher@ihassociation.org.

To be considered for any of these awards, one or more of the following technologies must be used in the healthcare solution: Auto-ID, BAP, BLE, BYOD, biometrics, nanotechnology, NFC, mobile devices, mobile apps, RFID, RTLS, sensors, telecommunications, and wireless.

Our thanks to our sagacious judges - Gisele Bennett, Georgia Tech Institute professor; Alfonso Gutierrez, University of Wisconsin distinguished researcher; Donna Hudson, University of California-San Francisco professor; and John W. Walz, consultant and retired Lucent Technologies manager.

To learn how to nominate a facility or peers for the 2016 awards, please contact esopensky@ihassociation.org

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  - Physician Orders
  - Nurse Call
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  - ADT
  - Dietary
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  - Communications

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Vision Statement:

To raise the awareness level and promote the adoption of Auto-ID, Biometrics, BLE, Mobile Device, NFC, RFID, RTLS, Sensors and Wireless and Wearable technologies in the healthcare, assisted living and nursing home industries through high quality, vendor neutral, educational programs.

IHA Team

Harry P. Pappas
Founder & CEO

Paul Frisch, PhD
President & CTO

Anne Olscher
COO, Sr. VP Conferences, Events & Trade Shows

Troy Reiff, RN
Sr. VP Supply Chain

Andrew Olscher
VP Media & Publications

Stephane Pique
VP European Operations

David Parry, PhD
VP Operations Asia

Mohammed Maghazil, PhD
VP Middle East Operations

Emily Sopensky
Co-Founder RHCC, Chair, Awards Committee

Shannon "JJ" Johnson, PharmD
Chair, Intelligent Hospital Pharmacy Committee

Bob Zemke
Co-Chair, Wireless Networks Committee

Linda S. Pappas
Director of Special Services

Gene Fedors
Director of Educational Programs

Scott Phillips,
Co-Chair, BLE, RFID & RTLS Committee

David Metcalf, PhD
Chair, Wearables Committee

Howard Landa, MD
Chair, Intelligent Hospital OR Advisory Committee

Alan Snell, MD
Chair, i-HOME™ Advisory Committee

Heather Ruchalski
Chair, Intelligent Hospital LDRP Advisory Committee

Randall Fahey,
Chair, BLE in Healthcare Consortium

Jeff Paynter
Co-Chair, Wireless Networks Committee

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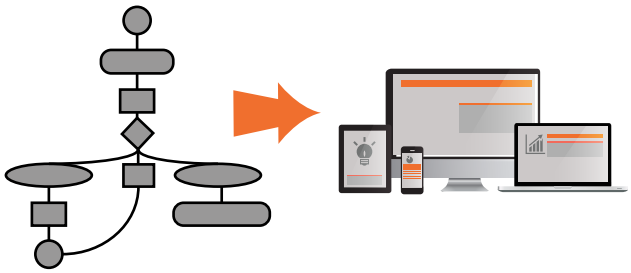

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INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

Welcome from Howard Landa, MD

Chair, OR Committee of the Intelligent Health Association and the Intelligent Hospital

The operating room is one of the most complex care environments in medicine today. The body's most basic homeostatic functions are taken off-line while invasive but potentially lifesaving procedures are performed. These substantial benefits must always be balanced by the inherent risks. The disparate systems and myriad number of people working in and flowing through the operating room provide a unique opportunity for technological risk mitigation and efficiency enhancement.

The individual abilities to identify the location, characteristics and availability of resources in real- time are useful, but not revolutionary. Leveraging the burgeoning "Internet of Things" to integrate these technologies into the workflow at an almost self-aware level is what is transformative. Incorporating real-time locating systems (RTLS) for personnel, medical devices, and equipment into the surgical encounter enables a new level of automated documentation and harm reduction strategies. The addition of monitoring tools and status data into the operative workflow pave the way for increases in the quality of care delivered.

The operating room in the Intelligent Healthcare Pavilion at HIMSS 2015 showcases what a modern, technologically integrated surgical environment could look like. This simulation will demonstrate realistic clinical scenarios and working technological systems to clinical medical professionals, healthcare executives, and healthcare IT innovators.

The members of the Advisory Committee for the Intelligent Health Pavilion look forward to sharing the future of integrated hospital technologies with you at HIMSS 2015.

Howard Landa, M.D. trained in urology at UCSD and Pediatric Urology at Texas Children's. In 1990 he joined the Loma Linda University to practice and developed his interest in medical informatics, becoming Director, Medical Informatics in 1996. He joined Kaiser Hawaii in 2001 and became CMIO in 2005. He led the implementation of their EHR, attaining HIMSS level 6, then 7. In 2009 he became the CMIO of the Alameda County Medical Center. He has been the Program Director and Vice-Chair of the Association of Medical Directors of Information Systems (AMDIS) since 1997; the Chair of the HIMSS/AMDIS Physician Community 2011-2013; and was named one of the top 25 Clinical Informatacists in 2010-12.

Operating Room

USE CASES

AiRISTA: Remote Temperature and Humidity Monitoring

AiRISTA's Healthcare Visibility Solution (HVS) Temperature and Humidity Monitoring provides real-time monitoring of room/refrigerator/freezer/deep freezer environmental conditions with real-time display of data via dashboards and other user interfaces. The temperature tags utilize existing Wi-Fi infrastructure to transmit the data for storing and processing. Alerting of abnormal conditions is achieved via email, SMS or other API.

Ascom: OR Nursecall Communicatation and Workflow Utilization

Ascom's workflow button allows staff to communicate with other areas within the hospital and provides staff reminders to update family of procedure status, and streamlines workflow to improve utilization.

Becton Dickinson: Intelliport - Medication Management System

The BD Intelliport™ System is an innovative medication management solution for IV bolus injections that may help manage the risk of medication errors and improve documentation accuracy through real-time drug identification, dose measurement, allergy alerts and automated data capture.

Cardinal Health: RFID-Enabled Supply Management and Usage Capture in the Operating Room

RFID-enabled workflows for automated tracking of high-value implantables as well as low-cost consumables, including high-compliance electronic usage capture and documentation. Leveraging multiple technologies and workflows to manage a variety of products, all linked to the same back-end data and analytics platform.

CareFusion: Enhanced Visibility, Control and Safety for OR Meds - Pyxis® Anesthesia ES System and Anesthesia Check

In the OR today, many hospitals use anesthesia medication trays to distribute medication in addition to automated cabinets. Anesthesia Check complements this approach helping hospital's increase patient safety, enhance stocking efficiency, improve anesthesia professional accountability and streamline their workflow. The system uses RFID-based technology to manage and track anesthesia medications, verify medications before use and support electronic documentation of controlled substance waste. Integration with industry leading AIMS enables electronic documentation of medication administration eliminating the need for paper records.

CreateASoft: Real-Time Schedule Optimization and Efficiency Improvement with SimTrack

SimTrack, powered by our patented smaRTLS® technology, uses real-time predictive analytics and an integrated optimization engine to maintain on-time procedure completion and increase operating department efficiency. SimTrack's real-time dashboards present dynamic schedule adherence views comparing planned, actual and forecasted schedules along with real-time staff notifications. SimTrack's toolset empowers the OR department staff to proactively increase efficiency and reduce scheduling delays.

DeRoyal Industries: Automated Usage Capture of OR Materials

Accurate usage capture in the OR has always been a challenge. In addition to his or her other responsibilities, a nurse is, traditionally, responsible for capturing all supplies used in a surgical procedure. Accurate usage is imperative for correct charging, inventory management, regulatory compliance, and item traceability. True usage data also helps create better preference lists for the future. While usage documentation is a very important aspect of the surgical procedure, it is also one that takes time away from patient care. With the Continuum Safe, usage documentation accuracy is drastically improved while virtually eliminating the time a nurse is required to manually document usage. The cloud based system allows for Information to be electronically shared between the OR IT, Materials, and Billing systems. This is accomplished via standard HL7 interfaces resulting in readily available data. In addition to usage capture, the system also verifies the expiration date to ensure the item is still viable.

Extreme Networks: High Performance Switching and Routing Products

Extreme Network sets the new standard for superior customer experience by delivering network-powered innovation and best-in-class service and support. The company delivers high-performance switching and routing products for data center and core-to-edge networks, wired/wireless LAN access, and unified network management and control.

Intelligent InSites: Operational Intelligence - Throughput Report with Milestone Durations

Intelligent InSites provides enterprise-grade operational intelligence to streamline workflows and communications while providing visibility that fuels continuous process improvement. With the OR Throughput Report, you can see how long patients spend in each workflow milestone on average, or by individual patient for the timespan you select.

InTouch: Health Vantage - Remote Surgical Collaboration

Enabling collaboration between specialists in the operating room, the InTouch Vantage® utilizes the InTouch Network to create opportunities for education and transfer of specialty knowledge to provide state-of-the-art care, anytime and anywhere. By bringing together specialists from around the world, collaboration and advancement of care is limitless with InTouch Vantage.

HID Global: HID Supports Compliant Electronic Prescriptions for Controlled Substances (EPCS)

HID Global offers a variety of architecture options for writing electronic prescriptions for controlled substances, within the certified EHR/EMR modules. HID supports compliant processes of identity proofing, identity binding using FIPS 140.2 credentials as well as biometric options. Return to e-prescribing narcotics online in a compliant fashion that saves time and money.

HID Global: ActivID Tap Offers Automated One-Time-Password Authentication with Innovative ID Badge

ActivID Tap by HID is an elegant, easy authentication solution to cloud-based or Microsoft ADFS services on any Windows7 or Android devices. In an ever increasing mobile environment, use the same ID Badge, powered by Seos, to get you in the door and authenticate you with a simple Tap.

Hospira: Hospira IV Pump Safety and Integration

Hospira's market-leading IV Clinical Integration solution enables infusion pumps to be Auto-Programmed from the Barcode Medication Administration system, ensuring 5 Rights administration of pharmacy-verified orders. Device starts/stops, alarms, and events can also be Auto-Documented to EMR. Interoperability can enhance a hospitals' ability to reduce medication errors, increase efficiency, and avoid preventable costs.

Nuvon, Inc.: Remote Monitoring of Medical Device Data to Support Clinical Interventions

All devices within the OR are integrated through Medical Device Integration (MDI) connectivity which provides access to vital signs and other data from connected devices. In addition to supporting clinical needs of patient charting, access to medical device data promotes remote monitoring of vital signs of intra-operative patients.

Nuvon, Inc.: Capnography Monitoring in OR

Remote monitoring of the vital signs of intra-operative patients can serve to assist anesthesia when multiple cases are ongoing by providing notifications as to trends and changes in vital signs measurements that merit closer attention. This use case seeks to illustrate a method by which remote clinical staff can be brought closer to the point of care in ORs through remote monitoring and viewing of patient data.

Omnicell: Anesthesia Workstation and Narcotic Control in OR

Omnicell's Anesthesia Workstation provides instant access to medications, ensuring the pharmacy tighter control in the OR. This automated system securely stores all medications and supplies needed for a full day of cases, automatically tracking inventory. It uses the Codonics Safe Label System to reduce medication errors and comply with the Joint Commission.

Omnicell: Case Supply Management Integrated with ORIS

Enables supply visibility for supply chain with nurses scanning supplies once to capture usage and then document in the ORIS system. This allows your facility to capture and analyze case costs, as well as manage supplies effectively with the same system that you use to manage supplies throughout the hospital.

STANLEY Healthcare: Patient Flow Visibility and Analytics: Improve Patient Experience, Operational Efficiency and Patient Throughput

The STANLEY Healthcare Patient Flow solution provides hospital - and clinic-wide visibility to improve patient experience and operational efficiency. By monitoring the status, location and interactions of people and resources, it provides real-time enterprise awareness coupled with powerful visual analytics to improve communication and immediate operational decision making. This solution helps understand underlying trends for process improvement and ultimately develops predictive modeling to anticipate patient loads and staffing and resource needs.

Sunquest Information Systems: Positive/Accurate Patient Identification and Container Labeling Using Mobile Specimen Collection System

Confirming the patient's identification is critical to patient safety. Labeling the patient's samples at the bedside reduces clutter and ensures the team is concentrated on only the labels required in an unpredictable trauma collection situation. In addition, using the container's barcode identifiers ensures the samples are received efficiently in the laboratory without concern of re-labeling, missing and/or incorrect labels.

Sunquest Information Systems: Eliminating Transfusion Errors and Increasing Efficiencies Using Sunquest Transfusion Manager

Confirming the patient's identification and verifying units of blood is critical to patient safety. Accidentally giving the patient the wrong type of blood is potentially fatal. Sunquest Transfusion Manager eliminates transfusion errors and eliminates the requirement of a second nurse to verify.

Vocera: Vocera for Hands-Free Communication

Vocera provides integrated, intelligent communication solutions for care team members on their device of choice; smartphones and/or with our hands-free badge. By leveraging time-saving features like role-based groups, pre-designed messaging options, and vocal responses to answer calls, all care team members benefit from an efficient and consistent communications experience.

Zebra Technologies: Identification of Patient Specimens Within the Operating Theater

Reduce the risk of mislabeling samples within the OR by bringing identification to point of care, utilizing proven, medical grade devices for label printing and scanning.

INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

Welcome from Paul Frisch, PhD

President and Chief Technical Officer,
Intelligent Health Association

It is my pleasure to welcome you to the Intensive Care Unit (ICU and NICU) of the Intelligent Hospital. Critical care is important in America.

The Intensive Care Unit, whether surgical, medical, pediatric and neonatal, is a crucial component of the spectrum of inpatient care and hospital-based informatics which stretches from the Emergency Department, operating rooms, interventional procedural suites, and post anesthesia care unit to the wards. However, the ICU / NICU is also a semi-autonomous, mini-hospital that cares for the sickest of all hospitalized patients, utilizing the highest staff to patient ratio within the hospital, as well as a myriad of costly and advanced devices, consumables and informatics systems. The Intelligent Hospital format allows the visitor to both conceptualize and visualize how these environments fit into the overall hospital care paradigm and how the technologies interact within the ICU patient room and across the ICU.

The ICU / NICU patient room at its core includes a patient bed, physiological monitor, mechanical ventilator, and infusion pumps, as well as a medical utility system that houses these devices and brings medical gases, vacuum, data ports, and power to the bedside. The room also contains communication systems, wired ports and a variety of wireless access devices. A connectivity envelope surrounds the patient to help bring the patient, staff, medical devices (really informatics platforms), supplies and ICU and hospital middleware, as well as the hospital bed management system and electronic medical record (EMR) into an informatics continuum. The NICU addresses critical care focused on neonates, including incubation and special neonatal infusions concerns. This envelope permits advanced monitoring of all aspects of care, the projection of imaginative displays that integrate diverse systems to create a modern view of the patient and the room's environment, and real-time locating systems that not only track assets but link with other middleware to push forward innovative critical care programming and help solve complex problems.

We hope that you enjoy your visit to the Intelligent Hospital and the ICU / NICU and come away with new thoughts and possibilities to advance informatics and care in your own critical care facilities.

ICU/NICU Unit

USE CASES

AiRISTA: Asset Tracking Solution

AiRISTA's Healthcare Visibility Solution (HVS) for Asset Tracking provides real-time and historical views of asset location, utilization and par levels as well as other use cases through the HVS Software Console and/or integrated third party applications such as materials management software. Users can view dashboards and business analytics to assist in the time consuming process of asset management. Historical breadcrumb location history playback is available within the HVS Console to assist in outbreak management containment.

AiRISTA: Hand Hygiene Compliance with Wireless Monitoring

AiRISTA's Health Care Visibility Solution (HVS) Hand Hygiene Compliance Monitoring provides individual hand hygiene compliance-monitoring of caregivers wearing an AiRISTA BLE/Wi-Fi personnel badge and an easy-to-install wireless solution that deploys without disrupting clinical care. Caregivers are identified upon entering patient rooms and are provided with the opportunity to comply with hand hygiene protocols including the WHO 5 moments of hand hygiene. The caregiver's hand hygiene compliance or non-compliance is detected and each time-stamped event is recorded. The AiRISTA HVS Software Console provides historical as well as real-time data analytics for individual, unit, site and enterprise compliance data.

Ascom: ICU Nursecall Communication and Workflow Utilization

Ascom's communication's solutions delivers simple, fast and reliable methods of requesting assistance and services that increase safety of staff and patients while enabling increased patient throughput. Ascom's Unite View allows distribution of pertinent events to locations and staff enabling better patient care that equates to better outcomes.

Cardinal Health: Kanban Inventory Management with Real-Time Intelligence

See how 2-Bin Kanban methodology can manage low cost med/surg supplies and trigger automated replenishment requests. This use case features clinically streamlined charge capture, workflows and highlights a series of advanced analytics tools that allow you to quickly identify and respond to changes with inventory consumption.

Cardiopulmonary Corp.: Local and Remote High Speed High Fidelity Real-Time Surveillance and Data Acquisition

Providing local and remote high speed high fidelity real-time surveillance and data acquisition via a multiport bridge of ventilator and pulse oximetry data along with integrated video and audio clinical surveillance; this data is displayed on a web-based clinical surveillance system and available anywhere within the hospital.

Cardiopulmonary Corp.: Analytics

The Bernoulli platform provides a series of comprehensive reporting and analytic tools that function to provide hospital subscribers with reports detailing operation within their health system. This platform summarizes and de-identifies high-fidelity, real-time data from the Bernoulli Enterprise System where subscribers can generate reports at the click of a button. Subscribers can generate automated reports ranging from alarms trending over time to bed occupancy to average length of patient stay, even including alarm limit reduction analytics, and compare them across their health system.

CareFusion: Simplified Medication Management - Pyxis MedStation® ES system

Managing an enterprise healthcare system requires a medication management system that supports it. With the Pyxis MedStation® ES system, nurses utilize a patient-centric workflow, providing quick and accurate medication delivery for their patients. Pharmacy and IT benefit from formulary synchronization and enterprise user management, helping standardize technology and leverage previous HIT investment.

borda

RFID Solutions for Healthcare

Borda Technology provides you with products and solutions focusing on RFID (Radio Frequency Identification) and RTLS (Real-Time Locating System) applications.

Borda Technology delivers solutions that increase operational visibility and awareness, enhance efficiency, reduce underutilizations, speed up operations, and increase the accuracy of all location based processes.

Lighthouse
RFID Software Platform

Borda Active Tags

Visit us
HIMSS Booth #6048 &
The Intelligent Hospital
Pavilion #6656-45

www.bordatech.com

CareFusion: Smart Infusion Pump with EMR Interoperability

Infusion EMR Interoperability (Alaris® Connectivity Service for EMR Interoperability)

Interoperability allows for the pre-population of infusion parameters to the Alaris® Pump and Syringe modules directly from the EMR system. Infusion status can then be transferred from the Alaris System for viewing through EMR system applications used by clinicians and pharmacists.

Alaris System - Comprehensive Infusion Safety

The Alaris® System combines a single point of care unit featuring Guardrails® Suite MX safety software with large volume pump, PCA, respiratory monitoring (SpO2 and EtCO2), syringe and barcoding capabilities to help protect every type of infusion.

CareFusion: Alaris Connectivity for Asset Management

Asset Management (Alaris® Connectivity Service for Asset Management)

Alaris System integration with the Stanley Healthcare / AeroScout asset management solution provides visibility of the specific location for each Alaris System and utilization history for the full infusion system fleet of devices. With this information, Clinical Engineering can optimize device utilization and distribute infusion devices to the highest priority areas based on actual usage data.

CBORD: Make it Easy for Employees to Spend with You

Help employees make the most of their time and drive retail sales while you're at it. Put cashless account balances and food ordering in the palms of their hands with mobile convenience. The result will be happier employees and a stronger bottom line.

DeRoyal Industries: Automated Usage Documentation of Supplies

In the ICU where clinical focus is so imperative, removing clerical tasks is a necessity. The Cloud based Continuum Safe allows for automated supply capture by simply tossing RFID-tagged supply wrappers or packaging into the provided bin. The items are automatically checked for expiration. Pertinent charges and device details are also associated to the patient. This information is then shared with the clinical and/or financial IT systems.

Emanate Wireless: RTLS Tag Reporting Location and Utilization on a Smartphone

Come see the latest innovation in WiFi RTLS tags! The PowerPath tag contains a rechargeable battery, so no need to ever replace batteries. Track power utilization over time to determine how much equipment you really need. Use your smartphone to locate nearby assets. Easily deployable within existing RTLS systems.

Extreme Networks: High Performance Switching and Routing Products

Extreme Network sets the new standard for superior customer experience by delivering network-powered innovation and best-in-class service and support. The company delivers high-performance switching and routing products for data centers and core-to-edge networks, wired/wireless LAN access, and unified network management and control.

HID Global: HID Supports Compliant Electronic Prescriptions for Controlled Substances (EPCS)

HID Global offers a variety of architecture options for writing electronic prescriptions for controlled substances, within the certified EHR/EMR modules. HID supports compliant processes of identity proofing, identity binding using FIPS 140.2 credentials, as well as biometric options. Return to e-prescribing narcotics online in a compliant fashion that saves time and money.

HID Global: ActivID Tap Offers Automated One-Time-Password Authentication with Innovative ID Badge

ActivID Tap by HID is an elegant, easy authentication solution to cloud-based or Microsoft ADFS services on any Windows7 or Android devices. In an ever increasing mobile environment, use the same ID Badge, powered by Seos, to get you in the door and authenticate you with a simple Tap.

Hospira: Hospira IV Pump Safety and Integration

Hospira IV infusion pumps operate safely at the patient bedside as a result of its resident rule-based Drug Library, defining IV best practice administration as well as soft and hard dose limitations for each drug. In clinical areas where pharmacy verified physician orders are present the Hospira IV infusion pumps can be fully Auto-Programmed and provide complete documentation to the EMR.

STANLEY®
Healthcare

PROVIDING OVER 5,000 HOSPITALS WITH GREATER SAFETY, SECURITY AND EFFICIENCY

From infant protection to fall management and asset management, STANLEY Healthcare is proud to provide an extensive portfolio of safety, security and operational efficiency solutions and analytics to hospitals worldwide:

- Leader in RTLS for healthcare, with solutions and visual analytics for asset management, temperature monitoring, clinical workflow and more
- Leader in patient security, protecting over 1.5 million infants annually, along with at-risk patients across the hospital
- Pioneer in patient safety solutions for fall management, now joined by innovative new solutions such as hand hygiene compliance monitoring
- Space and process efficiency experts, helping hundreds of hospitals re-engineer their physical space and workflows

For more information, visit us at **booth 2844** or **www.stanleyhealthcare.com**
Follow us at **twitter.com/stanleyhealth** and **facebook.com/stanleyhealthcare**

AeroScout | Hugs | SpaceTRAX | WanderGuard

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InTouch Health: VITA - Remote TeleICU Coverage

Enabling access to clinical expertise through a robust Telehealth Network platform with autonomous navigational capabilities, the InTouch VITA® Tele-ICU Solution creates unprecedented opportunities for workflow enhancement and team-based care. By leveraging intensivists, healthcare systems can proactively address the needs of patients in their ICU units, decreasing LOS and increasing throughput.

Omnicell: Savvy Mobile Med System with Remote Med Queuing App

Omnicell's Savvy Mobile Medication System creates a safer, simpler workflow that supports less rushed interactions between nurses and patients. Savvy wirelessly links in real-time to the automated dispensing cabinets, allowing nurses to remotely manage medications in quieter areas, reducing steps and leaving more time for patient care. The Savvy mobile medication workstation increases medication safety while cutting down on steps and interruptions that disrupt patient care.

STANLEY Healthcare: Asset Management Visibility and Analytics: Increase Operational Efficiency, Patient Safety and Lower Costs

STANLEY Healthcare's Asset Management is a visibility solution that uses the Wi-Fi network to automate the current manual processes that most hospitals have for managing their capital and rental equipment assets. With powerful visual analytics, the solution enables staff to monitor and proactively manage the location, status and condition of its assets in real-time.

STANLEY Healthcare: Hospital-Wide Infant Security and Mother/Infant Matching

STANLEY Healthcare Hugs® Infant Protection on Wi-Fi provides individual electronic security to protect infants from the threat of abduction and support the correct matching of mothers and infants in all parts of the hospital. The next generation of Hugs leverages a Wi-Fi infrastructure to provide this hospital-wide protection, while also offering a wide range or security and other integrations to expand security, increase patient safety and support efficient workflow.

Sunquest Information Systems: Positive/Accurate Patient Identification and Container Labeling Using Mobile Specimen Collection System

Confirming the patient's identification is critical to patient safety. Labeling the patient's samples at the bedside reduces clutter and ensures the team is concentrated on only the labels required in an unpredictable trauma collection situation. In addition, using the container's barcode identifiers ensures the samples are received efficiently in the laboratory without concern of re-labeling, missing and/or incorrect labels.

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Zebra: Wristband Monitoring in ICU

Clinicians use tags that are resident on the IoT. Some of the tags enable access to operate certain devices. Other tags do not. The devices are also resident on the IoT. Clinicians have access from a control center within the healthcare facility - or anywhere! They can enable tags, or disable tags, and know which medications have been selected by whom.

INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

Welcome from Sean C Blackwell, MD

Associate Professor and Chair, Department of
Obstetrics, Gynecology and Reproductive Services
UT Health - University of Texas Medical School

Labor, Delivery, Recovery, and Post-Partum (LDRP) Rooms are designed to provide a comfortable, home-like atmosphere that facilitates patient safety, operational efficiencies, and an overall favorable patient experience. In support of baby friendly hospital initiatives, the LDRP room provides a private environment that promotes the initial bonding between mother and child, allows for caregivers to deliver personalized education, and support for breast feeding and infant care.

Maternal-fetal monitoring during labor and delivery helps care providers implement best practices and improve patient outcomes. These rooms are designed to accommodate state-of-the-art fetal monitoring technology, medical equipment, and supplies that are ready for use when needed throughout the patient's entire stay. Perinatal systems capture and import data from the fetal monitor providing electronic fetal surveillance and remote monitoring. Perinatal system integration with the EMR allows care providers the ability to access patient information across the facility. The perinatal system provides patients with confidence that they are being monitored at all times, even when the care provider is not in the room.

The various technologies that contribute to patient care during the labor and delivery process will be exhibited during a guided tour in the new LDRP room in the Intelligent Health Pavilion.

Dr. Sean C Blackwell is the Director of the Larry C. Gilstrap M.D. Center for Perinatal and Women's Health Research and Chief of Women's Services at Children's Memorial Herman Hospital-Texas Medical Center. Dr. Blackwell completed medical school at the University of Illinois College of Medicine in 1993. He did his Internship, Obstetrics and Gynecology Residency, and Maternal Fetal Medicine through Wayne State University (WSU) in Detroit, Michigan. He joined the faculty at WSU and served as Assistant Professor from 2001-2006 and later practiced at William Beaumont Hospital in Royal Oak, Michigan prior to moving to UT-Health.

Labor & Delivery Room

USE CASES

Ascom: LDRP Nursecall Communication Utilizing Wireless and Workflow Technology

Ascom's communications solutions deliver simple, fast and reliable methods of requesting assistance and services that increase patient satisfaction. Ascom's Telligence workflow stations allow distribution of pertinent information to staff, enabling better patient care that equates to better outcomes. Reporting of events gives managers real-time visibility into unit performances, enabling them to proactively address care delivery effectively and efficiently.

CBORD: Improving the Patient Experience by Monitoring the Tray

Tracking and sharing meal nutrition information and delivery times improves patient care, and satisfaction. See how meal nutrition and intake is captured to better care for malnutrition patients. See how tray delivery information is used to insure timely delivery, and pick up of trays.

Extreme Networks: High Performance Switching and Routing Products

Extreme Network sets the new standard for superior customer experience by delivering network-powered innovation and best-in-class service and support. The company delivers high-performance switching and routing products for data center and core-to-edge networks, wired/wireless LAN access, and unified network management and control.

OBIX by Clinical Computer Systems, Inc.: Strategic Perinatal Software Solution

The OBIX system provides robust electronic surveillance and documentation capabilities that are designed around the clinical workflow specific to mother and baby care during the labor, delivery, and recovery process. All relevant data is able to be interfaced with the EMR providing an integrated perinatal system solution.

Skylight Health Systems: Interactive Rounding

Skylight Interactive Rounding eliminates the need for a separate rounding tool or additional hardware or software. It combines the platform's survey and close the loop functionality to collect and report rounding results. Executives can hold staff accountable, view daily reports, and quickly address patient satisfaction issues. Nurses can conveniently document individual patient rounding answers and rounding completion while in the patient room - saving time and providing valuable service recovery and documentation.

Skylight Health Systems: Interactive Meal Ordering

Skylight Interactive offers modules such as Interactive Meal Ordering that integrates with your dining provider enabling patients to order what they want, when they want. Using the pillow speaker, the patient is able to browse and select from a variety of menu options presented from the hospital's CBORD system and see nutritional value and adhere to prescribed diet limitations.

STANLEY Healthcare: Hospital-Wide Infant Security and Mother/Infant Matching

STANLEY Healthcare Hugs® Infant Protection on Wi-Fi provides individual electronic security to protect infants from the threat of abduction and support the correct matching of mothers and infants in all parts of the hospital. The next generation of Hugs leverages a Wi-Fi infrastructure to provide this hospital-wide protection, while also offering a wide range or security and other integrations to expand security, increase patient safety and support efficient workflow.

INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

Welcome from Shannon "JJ" Johnson, PharmD

Director of Pharmacy, Intelligent Hospital

Welcome to the Intelligent Hospital Pharmacy. This will be our third year for pharmacy participation in the Intelligent Hospital Pavilion and it continues to be a great success and addition to the pavilion overall. This year we will continue that success by providing participants and healthcare executives the opportunity to witness medication management technology integrating with patient care delivery.

The Intelligent Pharmacy is designed to simulate a realistic and busy health-system pharmacy environment. Modern pharmacists understand how complex systems in pharmacies, and throughout the hospital, can contribute to human errors - and pharmacy is only getting more complex by the day. Medication misadventures happen at any number of critical steps in the delivery of care. In the Intelligent Health-System Pharmacy at HIMSS15, you will see examples of some of the challenges we face today and how technologies are geared to increase patient safety and operational efficiencies and focus on improving the pharmaceutical supply chain from ordering all the way to the bedside. Tour participants will watch and listen as real pharmacist and pharmacy technician actors perform their daily duties, demonstrating a number of clinical scenarios while interacting with technology that helps them improve efficiency and accuracy at various stages of the pharmaceutical supply chain.

Our goal is to provide the viewers an opportunity to witness first-hand the latest medication management technology integrating with patient care delivery. We invite you to tour the rooms and see the new technologies first hand.

Dr. Shannon "JJ" Johnson is currently Director of Pharmacy for Sharp Memorial Hospital in San Diego, a level 2 trauma center with over 380 staffed acute care beds. In addition to his roles within Sharp, Dr. Johnson works to promote safe medication use in all aspects of the supply chain through his efforts collaborating with technology companies, startups, and government agencies on pharmacy issues related to various areas like healthcare technology, med-safety, legal issues, and disaster preparedness.

Pharmacy

USE CASES

AiRISTA: Remote Temperature and Humidity Monitoring

AiRISTA's Healthcare Visibility Solution (HVS) Temperature and Humidity Monitoring provides real-time monitoring of room/refrigerator/freezer/deep freezer environmental conditions with real-time display of data via dashboards and other user interfaces. The temperature tags utilize existing Wi-Fi infrastructure to transmit the data for storing and processing. Alerting of abnormal conditions is achieved via email, SMS or other API.

B. Braun Medical, Inc.: Get Ahead of the Curve. PharmView Real-Time Status View of IVs for Pharmacy IV Admixture Services

PharmView provides visibility to infusion data in real-time. With updates every 3 seconds, schedule your preparations based on actual time due, minimizing urgent requests and waste. Data fields and alerts are fully customizable.

CareFusion: Optimized Inventory Management and IV Compounding

Improving inventory availability and visibility across the IDN, Pyxis Pharmogistics® software helps reduce inventory waste, expirations and cost, while managing 100% of medications. The new Pyxis® IV system, supported by the CareFusion SmartWorks platform, is built off of the Pyxis Pharmogistics software - extending value from the central pharmacy to the IV room. The Pyxis IV system helps standardize IV workflow, which improves the accuracy of IV compounding, reducing errors and minimizing waste.

CareFusion: Medication Tracking and Delivery

With Pyxis® ES Link Track and Deliver module, Pharmacy and Nursing now have visibility into the medication transportation process. Helping Pharmacy track and prioritize the delivery of all medications can reduce IV waste and increase efficiency. Meanwhile, Nursing visibility to the medication delivery status and location allows them to plan for the best patient care, all thanks to the integrated Pyxis® ES platform.

CareFusion: Alaris Viewer Suite Infusion Management Dashboard

Pharmacists can now view infusions administered throughout their health system in near real-time. Using information provided by the Alaris® Viewer Suite for Infusion Viewer, pharmacists can make timely, informed decisions to improve pharmacy workflow and infusion preparation and management.

CBORD: Keep Watch Over Your Retail Operations

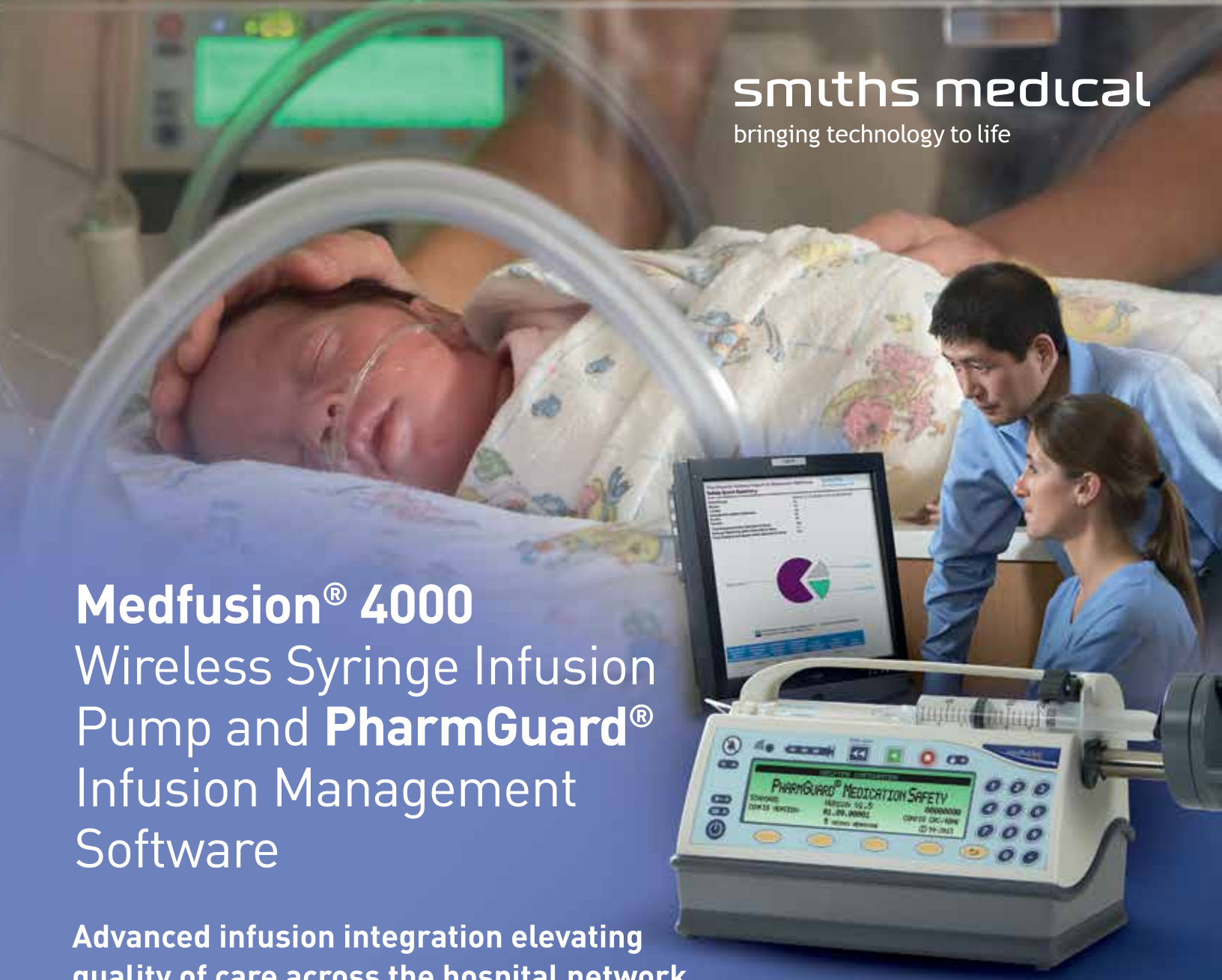
Keep your profits in the drawer by tying intelligent video surveillance to your point-of-sale registers. Easily query transactions and tie video surveillance to receipt detail. It's your business; don't leave your revenue to chance.

Extreme Networks: High Performance Switching and Routing Products

Extreme Network sets the new standard for superior customer experience by delivering network-powered innovation and best-in-class service and support. The company delivers high-performance switching and routing products for data center and core-to-edge networks, wired/wireless LAN access, and unified network management and control.

smiths medical

bringing technology to life



Medfusion® 4000 Wireless Syringe Infusion Pump and **PharmGuard®** Infusion Management Software

Advanced infusion integration elevating quality of care across the hospital network

Medfusion® 4000 wireless syringe infusion pumps are now interoperable, allowing auto-charting of infusion data into a hospital's electronic medical record (EMR). Infusion therapy data is sent wirelessly from a Medfusion® 4000 pump to a hospital's server via PharmGuard® Server software. The new PharmGuard® Interoperability software add-on module for the PharmGuard® Server software now takes that information one step further by automatically charting it directly into patient records on the hospital's EMR system via Integrating the Healthcare Enterprise (IHE) Integration Profiles.

Now Supports Interoperability!

Visit us at Booth #6957

www.MedfusionPump.com

medfusion™

HID: HID Supports Compliant Electronic Prescriptions for Controlled Substances (EPCS)

HID Global supports DEA compliant solutions for EPCS with EHR Integration, Identity proofing, identity binding using FPS 140.2 compliant credentials and biometric options. Return to e-prescribing narcotics online in a compliant fashion that saves time and money.

HID: ActivID Tap: NFC Tablet and Mobile Phone Authentication with ID Badge

ActivID Tap by HID is an elegant, easy authentication solution to cloud-based or Microsoft ADFS services on any Windows7 or Android devices. In an ever increasing mobile environment, use the same ID Badge, powered by Seos, to get you in the door and authenticate you with a simple Tap.

Omnicell: Omnicell M5000

The Omnicell M5000 is a multimed blister card packaging system designed to support pharmacies' efforts to help patients stay true to physician-prescribed medication regimens and to increase pharmacy profitability by improving practice workflow efficiencies and strengthening customer refill loyalty. It automatically packs, seals, verifies and labels multimed blister cards for institutional, retail and hospital pharmacies. The robot demonstrated is one of the featured technologies of the system.

Skylight Health System: Video Visit

Skylight Interactive Video Visit connects patients with people outside their room including family, friends, physicians and even the pharmacist. The HIPAA-compliant videoconference platform is the ideal tool to deliver a better patient experience while saving time for the hospital staff. While Skylight Interactive allows the patient to get prescriptions filled prior to discharge the Video Visit component allows the pharmacist to do a consultation for medication information and instructions via video conference, creating better adherence to medication regimens, enhanced care coordination, and better preparation for transition of care.

Talyst: AutoPharm Kitting and Compounding Use Case

The Talyst AutoPharm Kitting and Compounding solution provides barcode medication preparation (BCMP) by offering verification and inventory management for sterile and non-sterile compounding within your pharmacy. AutoPharm Kitting and Compounding provides a solution to manage complex multicomponent orders for your IV Room and all compounding needs. This module offers a preparation, verification, and check software component to your compounding areas while also tying into the inventory management and reporting capabilities of AutoPharm Enterprise. AutoPharm Kitting and Compounding can be used in your inpatient pharmacy or satellite compounding locations and can be integrated to existing compounding solutions.

Talyst: AutoVault Mini w/AutoCool +H

With your AutoPharm® Enterprise inventory system, AutoVault w/AutoCool +H provides secure access to medications (including controls and refrigerated medications) in central pharmacies, remote pharmacies, satellite pharmacies, outpatient clinics, and specialty clinics and fully integrates the transaction data for streamlined reporting and ordering.

Talyst: AutoPharm Enterprise w/AutoCarousel Mini

AutoPharm® Enterprise, a powerful software platform, provides enterprise-wide medication management across your entire health system to offer greater inventory control, enhanced workflow efficiency, and improved patient safety. AutoCarousel® Mini provides secure, automated storage for all your medications. This demonstrates the concept of high density automated storage, as well as the specific Mini product which is perfect for compact spaces.

Zebra Technologies: Labeling Medications

Zebra Technologies brings visibility to all aspects of healthcare including patient, specimen, medication, asset, and staff identification. Zebra's comprehensive healthcare solutions transform the physical to digital, creating the data streams healthcare facilities need to enhance patient care, increase operational efficiencies, optimize IT, and improve staff communication throughout the healthcare continuum.

INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

Welcome from Paul Frisch, PhD

President and Chief Technical Officer,
Intelligent Health Association

On behalf of the Intelligent Health Association, I would like to welcome you to the Step Down/Ambulatory Care area of the Intelligent Hospital Pavilion™. This area demonstrates both a moderate acuity environment responsible for managing a broad spectrum of patients as well an out-patient environment. Patients are typically increasingly mobile and the clinical staff is more dependent on the delivery of critical information directly to the point of care.

The Step Down is integrated with a proliferation of new and evolving technologies, including wireless information delivery, smartphones, medical devices and applications, coupled with wireless sensors, auto-ID and RFID/RTLS platforms which have expanded the possibilities for improving healthcare delivery and patient safety. In addition, the area supports the medical devices and systems required to provide physiological monitoring and assessment.

Within this simulated Step Down / Med Surg environment, you will see demonstrations of how diverse technologies and systems can be integrated through a series of use case demonstrations highlighting the impact on workflows and patient care. These use cases will further highlight the possibilities for process optimization and safety verification and the overall management of an institution's assets. This year's pavilion focuses on patient safety, emphasizing alarm management, validated medication delivery and process validation throughout the continuum of care.

Within the Ambulatory Care setting, the focus changes to maintaining a seamless continuity of care, providing access to all clinical patient information. The out-patient environment exploits technologies such as RTLS to optimize staff workflow and patient throughput. The design of this, and the overall Intelligent Hospital™, requires close partnerships between end users, including physicians and nurses, healthcare administrators, and industry, to determine how existing technologies may best be combined and integrated into practice.

It is the goal of the Intelligent Health Association to raise the level of awareness of the available technologies and provide educational programs around research, standards, regulatory issues, operational flow and optimization.

Ambulatory Care/Step Down Unit

USE CASES

ASCOM: Ambulatory Care: Smart Handheld Wireless Technology

Ascom's wireless handset is a purpose-built smartphone for healthcare, providing caregivers and clinicians pertinent information. This technology allows caregivers to be mobile and the information be distributed to the right caregiver, at the right time, enabling them to deliver fast and effective care to the right patient.

CBORD: Meal Orders Taken at the Bedside Increase Satisfaction

Assisting patients with meal orders at the bedside improves patient satisfaction. With a mobile tablet, the host is able to review the patient's diet order in real-time, along with any allergies and preferences.

CareFusion: Expanding Care Settings

With the focus on managing the entire patient care continuum, delivering patient care doesn't stop with a patient discharge. The Pyxis® Mini system is a compact, high-efficiency medication management system for the non-acute, ambulatory settings. The system leverages the Pyxis ES platform, extending the value of the Pyxis Enterprise Server, Pyxis ES Link modules, CUBIE® storage technology and the hospital's IT infrastructure.

Critical Alert Systems, Inc.: Centralized Nurse Call - Pain Med Request

Demonstrating a streamlined nurse call workflow, from initial request through fulfillment. A centralized unit clerk answers a call request using patient name. The call is triaged based on the request type and forwards the message to the correct nurse via her device of choice. Features include full reporting on the entire workflow without need for middleware.

Extreme Networks: High Performance Switching and Routing Products

Extreme Network sets the new standard for superior customer experience by delivering network-powered innovation and best-in-class service and support. The company delivers high-performance switching and routing products for data center and core-to-edge networks, wired/wireless LAN access, and unified network management and control.

Extension Healthcare: Clinical Alarm Management and Event Response

Extension Engage™ offers the most innovative approach for managing medical devices alarms, alerts from other clinical systems such as nurse call, lab, and order entry systems, as well as patient-centric texting; all within a single application. Engage helps reduce non-actionable event notifications, clinical interruption fatigue, and improves care team collaboration.

Intelligent InSites: Self-Rooming, Patient Status, and Provider Workload Application

Intelligent InSites provides enterprise-grade operational intelligence to streamline workflows and communications while providing visibility that fuels continuous process improvement. With InSites Ambulatory Flow, your patients self-room and get seen faster, your providers see their workloads and next moves at a glance, and your directors remove bottlenecks so more patients can be served.

Intelligent InSites: Operational Intelligence - Room Occupancy and Patient Cycle Time Reporting

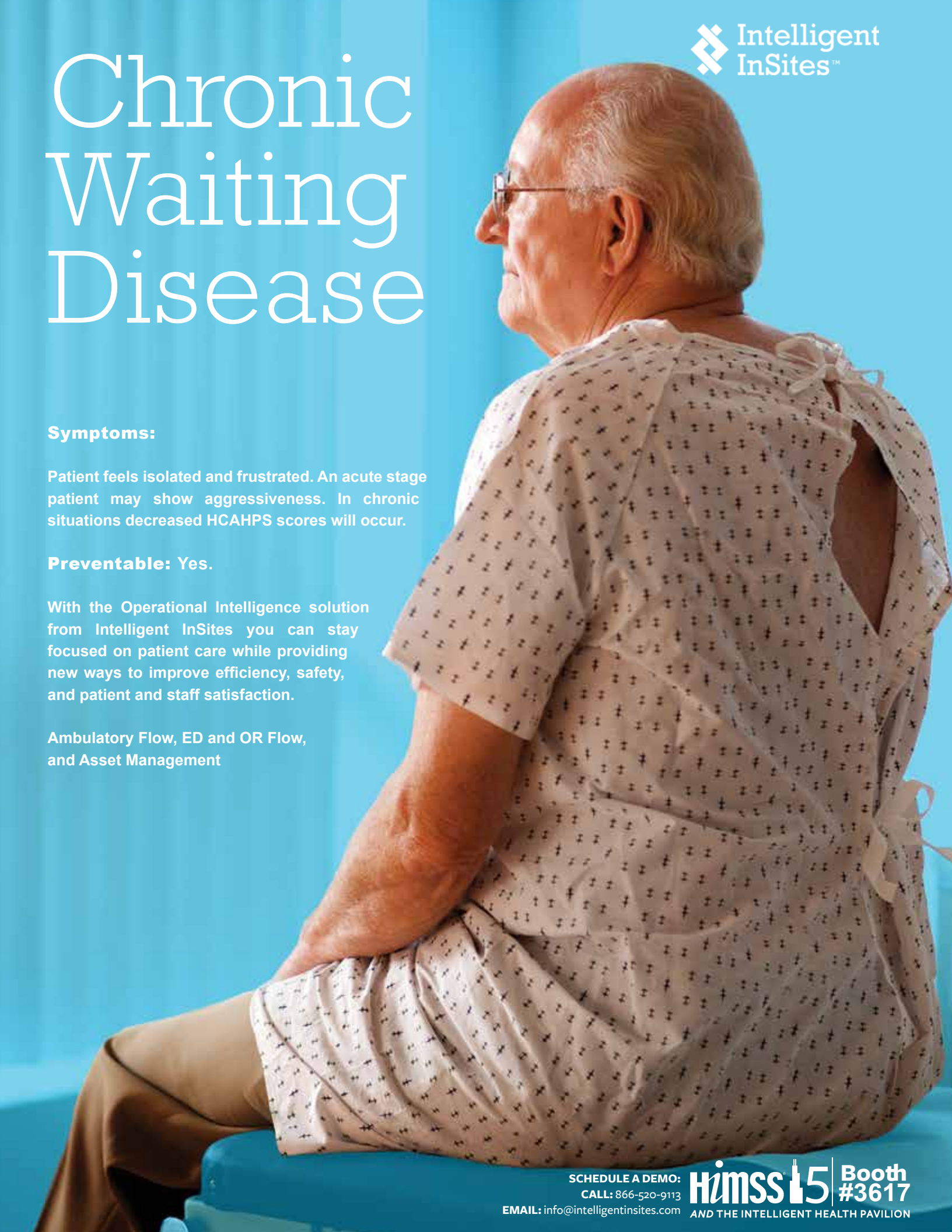
Intelligent InSites provides enterprise-grade operational intelligence to streamline workflows and communications while providing visibility that fuels continuous process improvement. Occupancy reports show the percentage of time that exam rooms are being utilized. Cycle Time reports show how much time patients spend waiting, and with various caregivers throughout their visits.

Skylight Health Systems: Patient Education

Skylight Interactive patient system allows the patient - using the TV at the foot of each bed - to watch procedure-specific education personalized to their individual condition and caregiver treatment plans. Providing streamlined, timely education engages patients in their care and prepares them for what to expect during their stay and how to follow through after discharge. Education viewing is documented directly in the EMR, which reduces clinical workload. This bedside interaction is augmented with the ability to enroll in the hospital portal in addition to access all of the Skylight education via a home computer.

Intelligent InSites™

Chronic Waiting Disease



Symptoms:

Patient feels isolated and frustrated. An acute stage patient may show aggressiveness. In chronic situations decreased HCAHPS scores will occur.

Preventable: Yes.

With the Operational Intelligence solution from Intelligent InSites you can stay focused on patient care while providing new ways to improve efficiency, safety, and patient and staff satisfaction.

Ambulatory Flow, ED and OR Flow, and Asset Management

SCHEDULE A DEMO:
CALL: 866-520-9113
EMAIL: info@intelligentinsites.com

HIMSS15 Booth #3617
AND THE INTELLIGENT HEALTH PAVILION

Skylight Health Systems: Patient Discharge

Skylight Interactive patient system creates coordination between caregivers and the patient, which is an essential element to a timely discharge. By using the patient's television whiteboard to trigger the Discharge Planning Checklist, Skylight can automate discharge milestones. This process ensures that the patient has been provided all the necessary tools for a safe and timely discharge, gives them the opportunity to answer questions, and can be configured to alert the appropriate caregiver or case manager if further action is needed.

Sunquest: Positive/Accurate Patient Identification and Container Labeling Using the Mobile Specimen Collection System

Confirming the patient's identification is critical to patient safety. Labeling the patient's samples at the bedside reduces clutter and ensures the team is concentrated on only the labels required in an unpredictable trauma collection situation. In addition, using the container's barcode identifiers ensures the samples are received efficiently in the laboratory without concern of re-labeling, missing and/or incorrect labels.

Vivify Health: Remote Care Technology for Care Transitions

Transitional Care Management Services are enabled with a mobile health kit for high-risk patients, including a tablet and health devices. The patient utilizes the kit for in-hospital education and surveys, then takes the kit home for continual engagement, monitoring and virtual visits. The cellular connectivity and simple experience eliminates in-home setup services.

Vocera: Vocera Care Experience

Vocera Care Experience takes a comprehensive approach to managing patient experience by combining patient engagement, communication, and care coordination into a single solution. Patients and their family members are empowered to continue care at home; accessing discharge instructions and patient education materials, to reduce readmissions and improve patient satisfaction.

Zebra Technologies: Specimen ID and Medication Administration

Zebra Technologies brings visibility to all aspects of healthcare including patient, specimen, medication, asset, and staff identification. Zebra's comprehensive, healthcare solutions transform the physical to digital, creating the data streams healthcare facilities need to enhance patient care, increase operational efficiencies, optimize IT, and improve staff communication throughout.

INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

Welcome from Paul Frisch, PhD

President and Chief Technical Officer,
Intelligent Health Association

On behalf of the Intelligent Health Association, I would like to welcome you to the Clinical Laboratory operations of the Intelligent Hospital™ Pavilion. Fundamental to supporting the complex operations of the Intelligent Hospital is the clinical laboratory providing a vital role in the diagnostic and on-going evaluation process of its patients. As patients arrive at the hospital one of the first steps focuses on diagnosis and starts with sample collection and analysis of biological markers, such blood, urine, bacteria cultures, and tissue samples. These samples are typically immediately delivered to the laboratory for STAT processing, providing clinical results before any treatment or medications are delivered to the patient.

Within the Intelligent Hospital the focus is on the clinical laboratory operations, including pathology, microbiology and chemistry. Microbiology receives almost any clinical specimen, including swabs, feces, urine, blood, sputum, cerebrospinal fluid, synovial fluid, as well as possible infected tissue. The work here is mainly concerned with cultures, to look for suspected pathogens. Microbiology encompasses, the sciences of bacteriology, virology, parasitology, immunology, mycology. Clinical Chemistry focuses on instrumental analysis of blood components, such as enzymology, toxicology, endocrinology, while Hematology supports automated and manual analysis of blood cells.

Besides the clinical analyzers and devices providing the sample diagnostics, the laboratories are integrated with a variety of information systems archiving patient specific results into the electronic medical record. This enables the delivery of information to a variety of locations and clinicians, including the point of care. The laboratory samples are RFID coupled to ensure the accurate association of samples and results to the patient and provide a validation that all process were performed and verified.

The design of Laboratory and overall Intelligent Hospital™ requires close partnerships between end users, including physicians and nurses, healthcare administrators, and industry, to determine how existing technologies may best be combined and integrated into practice.

Intelligent Lab

USE CASES

LogicNets: PALGA - Dutch National Pathology Foundation Synoptic Reporting System

PALGA - the national pathology foundation of the Netherlands - has deployed the LogicNets decision support platform for automating synoptic reporting on a nationwide basis in order to meet the organization's fundamental mission of providing standardized protocols to streamline workflow, eliminate errors, and enable nationwide outcomes-based research.

Sunquest Information Systems: GeneInsight Enables Interpretive Genetic Report

The curation of complex genetic information and the transformation of that information into concise, actionable clinical reports are delivered via GeneInsight. The system allows users to validate their own knowledge base and to connect to outside expertise using peer to peer data sharing networks. Report generation is made easy using templates; structuring the clinical interpretations in an efficient manner that can be delivered to clinicians and to other reporting systems.

Integrated Pathology Report Enables Holistic Diagnostics

Diagnostic medicine is becoming increasingly complex. There is often relevant surgical, clinical and molecular genetic data involved. Physicians hunt and peck through various EMR tabs and reports. Bringing data and interpretations from multiple pathology departments together into one comprehensive report will enable smarter healthcare and safer patients.

Complex Manual Testing Management Eliminates Paper

Molecular and genetic testing is transforming medicine by delivering personalized results that can direct precision treatments. Despite amazing strides in sequencing technology, much of the sample prep is still highly manual with paper records. Using electronic notebook protocol management functionality can help reduce paperwork and opportunity for errors.

Fully Automated Clinical Testing Leans Lab Workflow

Lean workflows that eliminate water and reduce potential for data transcription errors are critical in helping laboratories deliver reliable timely results that support patient-facing healthcare professionals. The use of a robust Laboratory Information System in conjunction with a laboratory automation system can achieve lean workflows by dramatically reducing human intervention.

INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

Welcome from Sy Sajjad,

Committee Chair and the Supply Chain Suite Advisory Committee of the Intelligent Hospital

Supply Change Management has a significant influence on improving quality outcomes, delivery of care and net revenue margins. Today, many supply chain management teams are faced with challenges ranging from changing business processes and policies to limitations arising from the lack of communication amongst the hospitals' systems.

With supply chain costs being second highest to labor costs in hospitals, increasing the efficiency of the supply chain department has the most impact in higher net revenue margins. To improve quality and delivery of care, supply chain operations must be accurate and precise to eliminate potential errors, to provide the right supply, at the right time to the right patient.

Utilizing technology, hospitals can realize the benefit of an efficient supply chain management by reducing complexity of tracking workflow processes. Innovative technologies that have been introduced in the market in the past few years provide the ability to streamline supply chain processes and gain better visibility into these processes without adding additional human resources. In some cases, new quality control measures can be added to further reduce potential errors and help the supply chain managers focus their team's efforts in making better and faster decisions. Both RFID and RTLS technology use cases are becoming more prevalent in supply chain management and these technologies are achieving great results while providing benefits to the hospitals.

Integration of RFID based solutions with Supply Chain Management System's (SCM) with various hospital systems, such as Enterprise Resource Planning (ERP) and Electronic Health Record (EHR) in real-time, has provided insight for the key stakeholders in hospitals to analyze and view supply chain data in a much bigger scope and more accurately on demand. The ability to take preventive actions to avoid mistakes, reduce reoccurring fees such as tracking rental equipment, or tracking the history of supply chain items and their movement, as well as ensuring availability of all required products effortlessly are some example of the latest Supply Chain Management Solutions.

The Supply Chain Suite is designed to provide a real world show case of such use cases within the hospital. In this year's Supply Chain Suite at the Intelligent Hospital Pavilion, we are demonstrating a wide-range of use cases ranging from Auto-ID technology along with supply chain HIT that is producing reliable and real-time data analytics. These innovative solutions are currently being utilized by hospitals around the world.

We look forward to seeing you at our Intelligent Hospital Pavilion at this year's HIMSS Conference.

Supply Chain

USE CASES

AiRISTA: Inventory Management of Devices/Supplies with Wireless RFID

AiRISTA's Healthcare Visibility Solution (HVS) with Track and Trace provides supply chain professionals the ability to scan received medical devices and supplies and manage inventory levels and par levels throughout the organization. Using wireless location technology with highly integrated Passive RFID enables scanning/receiving of medical supplies received at the dock doors of the hospital/facility. AiRISTA's Business Rules Engine integrates with materials management and other third party applications to provide a seamless automation of supply chain tasks and allow for inventory data synchronization. Online and wall-mounted dashboards provide visibility, insights, and par management in real-time.

Cardinal Health: RFID Technology for Orthopedic Products and Procedure Packs

Using RFID and Bluetooth Low Energy (BLE) for automated management of orthopedic products and procedure packs. The use case will also feature the utilization of BLE for contextual location based alerting.

CBORD: Manage Nutrition From Your Vendor to the Patient

Manage food traits, allergens, and nutrition from your vendor data to the patient's tray. Food service technology makes a significant impact in improving food safety and reducing food costs. See how easy it is to report on nutrition (e.g., organic, locally grown) and ingredient (e.g., allergens) information.

CBORD: Tracking Food Prices, Production, Consumption, and Waste Saves Money

Track food throughout the system and use that data to improve your forecasting, which results in less waste and lower food costs.

CreateASoft, Inc: SimTrack's Real-Time Prioritized Delivery Schedules Increase Supply Chain Efficiency

Improve supply chain efficiency and on-time delivery using SimTrack's real-time predictive analytics and integrated optimization engine. Powered by our patented smaRTLS® technology and EMR integration, SimTrack alerts staff, in real-time, with prioritized delivery schedules in order to maintain safety inventory throughout the supply chain. Integrated dashboards and historical reporting provide enhanced visibility, tracking, and traceability.

DeRoyal Industries: Automated Materials Tracking

Accurate supply chain management of high dollar supplies and implants in hospitals often presents many challenges for hospital managers. Due to frequent access of staff and vendors, the management and security of these items can create an even bigger challenge. The Continuum Vault automates inventory control and secures the products stored within it. The Vault requires all staff and vendors to authenticate their identity and assigns product custody to that person when items are removed from the Vault. This process ensures items are not being removed without accountability.

Extreme Networks: High Performance Switching and Routing Products

Extreme Network sets the new standard for superior customer experience by delivering network-powered innovation and best-in-class service and support. The company delivers high-performance switching and routing products for data center and core-to-edge networks, wired/wireless LAN access, and unified network management and control.

STANLEY Healthcare: Asset Management Visibility and Analytics: Increase Operational Efficiency, Patient Safety and Lower Costs

STANLEY Healthcare's Asset Management is a visibility solution that uses the Wi-Fi network to automate the current manual processes that most hospitals have for managing their capital and rental equipment assets. With powerful visual analytics, the solution enables staff to monitor and proactively manage the location, status and condition of its assets in real-time.

INTELLIGENT HEALTH ASSOCIATION
Healthier Living Through Technology™

Welcome from Paul Frisch, PhD

President and Chief Technical Officer,
Intelligent Health Association

On behalf of the Intelligent Health Association, I would like to welcome you to the Emergency Department of the Intelligent Health Pavilion™. This patient area represents a high pace environment focused on diagnostics, triage, rapid assessment and transport of the patient to appropriate treatment areas of the hospital. The ED requires quick response, optimized patient processing and a broad spectrum of clinical information to be readily available and documented.

To deal with the complex workflow of the ED environment, multiple diverse technologies need to be integrated, including clinical device data, RTLS and supply management, enabling the rapid assessment and movement of the patients through the ED.

Vital to these integrations and connectivity is the high performance wireless network - a seamless blend of multi-carrier cellular and Wi-Fi services. The ED incorporates advanced medical devices and sensors providing critical diagnostic parameters to be measured and reviewed. Establishing connectivity between these devices enables data to be archived and delivered throughout the institution for consultation and delivery directly to the point of care for immediate intervention. RTLS solutions provide the methodology to associate critical date directly with the patient, as well as track workflows, supplies and other resources. Mobile devices maximize staff to staff and patient to staff interactions at the point of care.

The design of the ED and overall Intelligent Hospital™ requires close partnerships between end users, including physicians and nurses, healthcare administrators, and industry, to determine how existing technologies may best be combined and integrated into practice.

Emergency Department

USE CASES

AiRISTA: Outbreak Containment with Wireless Exposure Tracking

In times of heightened outbreak risk, AiRISTA's Healthcare Visibility Solution (HVS) provides real-time and historical views of the location of staff, patients, and assets, with historical breadcrumb location history playback to assist in tracking who and what were exposed to known contaminated rooms or zones, and what assets or persons require additional isolation or decontamination according to hospital protocols. The HVS Software Console provides dashboards and analytics to determine in minutes the location history of people and assets tracked and traced by the AiRISTA wireless infrastructure, eliminating the risk of typical time-consuming retracement of contact with contaminated rooms or zones.

AiRISTA: Hand Hygiene Compliance with Wireless Monitoring

AiRISTA's Healthcare Visibility Solution (HVS) Hand Hygiene Compliance Monitoring provides individual hand hygiene compliance monitoring of caregivers wearing an AiRISTA BLE/Wi-Fi personnel badge and an easy-to-install wireless solution that deploys without disrupting clinical care. Caregivers are identified upon entering patient rooms and are provided with the opportunity to comply with hand hygiene protocols including the WHO 5 moments of hand hygiene. The caregiver's hand hygiene compliance or non-compliance is detected and each time-stamped event is recorded. The AiRISTA HVS Software Console provides historical, as well as real-time data analytics for individual, unit, site and enterprise compliance data.

ASCOM: ED Nursecall Communication and Workflow Utilization

Ascom's communications solutions delivers simple, fast and reliable methods of requesting assistance and services that increase safety of staff and patients while enabling increased patient throughput.

Cardiopulmonary Corp.: Real-Time Surveillance of Patients

Real-time surveillance of patients using WI-FI wireless bridges on the mobile critical devices such as the ventilator. This enables patients to be monitored anywhere in the hospital in real-time.

CareFusion: Simplified Medication Management - Pyxis MedStation® ES system

Managing an enterprise healthcare system requires a medication management system that supports it. With the Pyxis MedStation® ES system, nurses utilize a patient-centric workflow, providing quick and accurate medication delivery for their patients. Pharmacy and IT benefit from formulary synchronization and enterprise user management, helping standardize technology and leverage previous HIT investment.

CareFusion: Smart Infusion Pump with EMR Interoperability

Infusion EMR Interoperability (Alaris® Connectivity Service for EMR Interoperability)

Interoperability allows for the pre-population of infusion parameters to the Alaris® Pump and Syringe modules directly from the EMR system. Infusion status can then be transferred from the Alaris System for viewing through EMR system applications used by clinicians and pharmacists.

Alaris System - Comprehensive Infusion Safety

The Alaris® System combines a single point of care unit featuring Guardrails® Suite MX safety software with large volume pump, PCA, respiratory monitoring (SpO2 and EtCO2), syringe and barcoding capabilities to help protect every type of infusion.

A SOLUTION to the Healthcare Puzzle

- *RFID Solution*
- *Expired Item Alert*
- *Automated Charge Capture*
- *Chain of Custody Technology*
- *Automated Preference Card Management*

Intelligent Health Pavilion
Booth 6656

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CareFusion: Alaris Connectivity for Asset Management

Asset Management (Alaris® Connectivity Service for Asset Management)

Alaris System integration with the Stanley Healthcare / AeroScout asset management solution provides visibility of the specific location for each Alaris System and utilization history for the full infusion system fleet of devices. With this information, Clinical Engineering can optimize device utilization and distribute infusion devices to the highest priority areas based on actual usage data.

CreateASoft: Predictive Analytics and Real-Time Optimization with SimTrack

CreateASoft's SimTrack, powered by our patented smaRTLS® technology, provides predictive performance metrics of the ED's near-future performance including potential bottlenecks, inefficiencies, and the impact on provider workload. Based on the identified problems, SimTrack suggests real-time improvements and workflow changes in order to minimize delays and increase operational efficiency. SimTrack seamlessly integrates with existing RTLS and EMR systems.

Emanate Wireless: RTLS Tag Reporting Utilization and Location on Smartphone

Come see the latest innovation in WiFi RTLS tags! The PowerPath tag contains a rechargeable battery, so no need to ever replace batteries. Track power utilization over time to determine how much equipment you really need. Use your smartphone to locate nearby assets. Easily deployable within existing RTLS systems.

Extension Healthcare: Unified Clinical Alarm

Extension Healthcare: unified clinical alarm notification, event-driven, patient-centric messaging triage in the ED is often called the toughest job in the hospital. Applying keen diagnostic skills in an environment defined by interruptions is the essence of emergency medicine. Extension Engage™ clinical rules engine and notification capabilities can accelerate acquisition and assessment of diagnostic evidence by delivering the most urgent, time-dependent order and result notifications to clinicians on the wireless communications devices - badges, WiFi or smartphones or desktops.

Extension Healthcare: Clinical Alarm Management and Event Response

Extension Engage™ offers the most innovative approach for managing medical devices alarms, alerts from other clinical systems such as nurse call, lab, and order entry systems, as well as patient-centric texting; all within a single application. Engage helps reduce non-actionable event notifications, clinical interruption fatigue, and improves care team collaboration.

Extreme Networks: High Performance Switching and Routing Products

Extreme Network sets the new standard for superior customer experience by delivering network-powered innovation and best-in-class service and support. The company delivers high-performance switching and routing products for data center and core-to-edge networks, wired/wireless LAN access, and unified network management and control.

HID Global: HID Supports Compliant Electronic Prescriptions for Controlled Substances (EPCS)

HID Global offers a variety of architecture options for writing electronic prescriptions for controlled substances, within the certified EHR/EMR modules. HID supports compliant processes of identity proofing, identity binding using FIPS 140.2 credentials as well as biometric options. Return to e-prescribing narcotics online in a compliant fashion that saves time and money.

HID Global: ActivID Tap Offers Automated One-Time-Password Authentication with Innovative ID Badge

ActivID Tap by HID is an elegant, easy authentication solution to cloud-based or Microsoft ADFS services on any Windows7 or Android devices. In an ever increasing mobile environment, use the same ID Badge, powered by Seos, to get you in the door and authenticate you with a simple Tap.

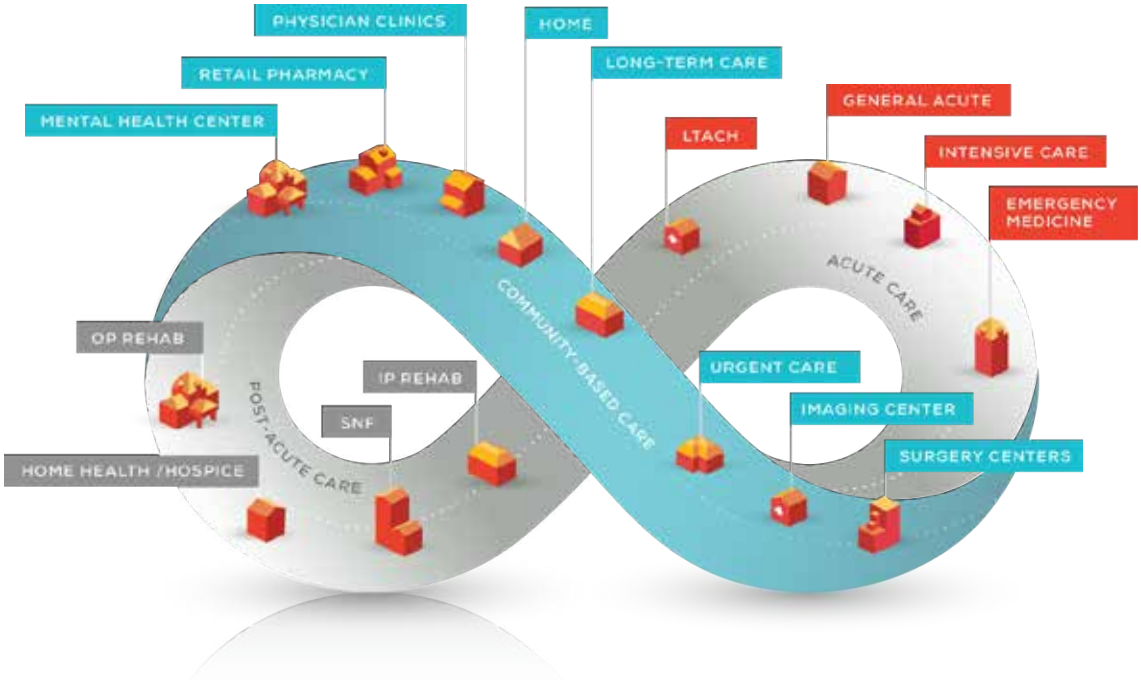
Hospira: IV Clinical Integration

Hospira's market-leading IV Clinical Integration solution enables infusion pumps to be auto-programmed from the Barcode Medication Administration system, ensuring 5 Rights administration of pharmacy-verified orders. Device starts/stops, alarms, and events can also be auto-documented to EMR. Interoperability can enhance hospitals' ability to reduce medication errors, increase efficiency, and avoid preventable costs.

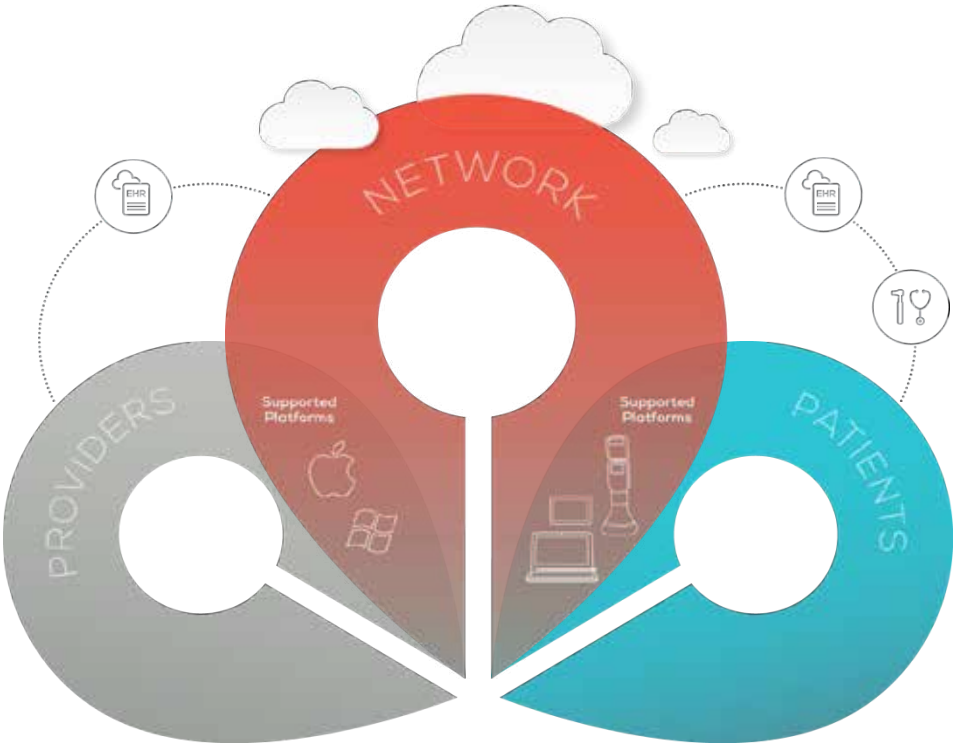
Intelligent InSites: Operational Intelligence - ED Patient Flow Dashboard

Intelligent InSites provides enterprise-grade operational intelligence to streamline workflows and communications while providing visibility that fuels continuous process improvement. With the Patient Flow Dashboard, directors and charge nurses have at-a-glance views of key metrics like length of stay, door to doctor, doctor to discharge, and ED hold time.

EXPANDING ACCESS TO CARE EVERYWHERE



With a Telehealth Network that is easy to deploy and easy to scale



Metro: Starsys Emergency Department Overflow Cart

The Metro Starsys ED Overflow Cart improves the speed of care by combining the storage capacity of a supply cart with the efficiency of a WOW. The compact footprint gives nursing the ability to treat and chart in any available space in a hospital's busy ED while providing access to supplies and critical information no matter where the patient is treated.

Nuvon, Inc.: Vital Signs Monitoring of Ed Patients to Provide Real-Time Decision Support for Sepsis Onset

Patients in ED are typically monitored for vital signs, including pulse and blood pressure. Research has shown that simple metrics associated with the monitoring of individual vital signs, has been used to identify patients at high risk of septicemia. Continuous monitoring of vital signs provides clinicians with access to real-time data, enabling them to identify patients trending towards adverse events.

Nuvon, Inc: Device Connectivity - ED Monitoring of Shock Index

Patients in ED are typically monitored for vital signs, including pulse and blood pressure. Research has shown that simple metrics, such as shock index (SI), have been effective in identifying patients at high risk for onset of septicemia. Continuous monitoring enables clinicians to identify patients trending towards adverse events.

STANLEY Healthcare: Wireless Environmental Monitoring Visibility and Analytics

STANLEY Healthcare Environmental Monitoring solution is a cost-effective way to continuously monitor temperature and humidity conditions across the enterprise. Combined with powerful analytics that transform real-time information into visual dashboards, healthcare organizations have entirely new levels of operational insight for immediate action, historical views and trend analysis. The automated, wireless solution enables hospitals and clinics to improve patient safety, facilitate regulatory compliance, increase staff efficiency and productivity - all while avoiding unnecessary costs.

STANLEY Healthcare: Patient Flow Visibility and Analytics: Improve Patient Experience, Operational Efficiency and Patient Throughput

STANLEY Healthcare Patient Flow solution provides hospital and clinic-wide visibility to improve patient experience and operational efficiency. By monitoring the status, location and interactions of people and resources, it provides real-time enterprise awareness coupled with powerful visual analytics to improve immediate operational decision making, understand underlying trends for process improvement and ultimately develop predictive modeling to anticipate patient loads and staffing and resource needs.

Sunquest Information Systems: Positive/Accurate Patient Identification and Container Labeling Using Mobile Specimen Collection System

Confirming the patient's identification is critical to patient safety. Labeling the patient's samples at the bedside reduces clutter and ensures the team is concentrated on only the labels required in an unpredictable trauma collection situation. In addition, using the container's barcode identifiers ensures the samples are received efficiently in the laboratory without concern of re-labeling, missing and/or incorrect labels.

Sunquest Information Systems: Eliminating Transfusion Errors and Increasing Efficiencies Using Sunquest Transfusion Manager

Confirming the patient's identification and verifying units of blood is critical to patient safety. Accidentally giving the patient the wrong type of blood is potentially fatal. Sunquest Transfusion Manager eliminates transfusion errors and eliminates the requirement of a second nurse to verify.

Vocera: Vocera for Desktop and Smartphone Users

Vocera provides integrated, intelligent communication solutions for care team members on their device of choice - at the desktop, on smartphones and with our hands-free badge. By leveraging time-saving features like role-based groups and pre-designed messaging options, all care team members benefit from an efficient and consistent communications experience.

Vocera: EHR Integration with Vocera

Vocera improves the efficiency of care team communication and coordination by integrating with popular EHRs, across mobile and desktop devices. Alerts can be sent to Vocera for events like orders and test results, and team members can access Vocera's calling and secure texting capabilities from directly within their EHR apps.

Zebra Technologies: Identify Patients at Admissions and Optimizing ED

Zebra Technologies brings visibility to all aspects of healthcare including patient, specimen, medication, asset, and staff identification. Zebra's comprehensive healthcare solutions transform the physical to digital, creating the data streams healthcare facilities need to enhance patient care, increase operational efficiencies, optimize IT, and improve staff communication throughout the healthcare continuum.

Capitalizing on the IoT with Visibility and Intelligence

-- Courtesy of Zebra Technologies --

On any given day, each moment matters to someone, somewhere. From a retail manager responsible for asset tracking and inventory control to a clinician charged with ensuring accurate patient identification and medical records, enterprises have the opportunity to positively impact their customer and employee experiences - and bottom line. We live in a connected world and technology is embedded in everything we do, and the Internet of Things (IoT) momentum is reaching critical mass. With cloud technology, organizations have access to their devices from any location for remote monitoring, management and data capture. While accessibility to devices and data enables productivity and quality improvements, the real potential of the IoT may not be realized without a broader set of enabling technologies and insight.

According to Peter Middleton, research director at Gartner Research, "The growth in the IoT will far exceed that of other connected devices. By 2020, the number of smartphones, tablets and PCs in use will reach about 7.3 billion units. In contrast, the IoT will have expanded at a much faster rate, resulting in a population of about 26 billion units at that time."[i]

It is these enabling technologies that allow enterprises to go beyond the incremental productivity and quality improvements to gain actionable intelligence on assets, people and transactions across their organization. This enhanced business insight is what enables more-informed decision making and improved performance. Put simply, Enterprise Asset Intelligence helps businesses yield maximum value from IoT solutions.

IoT: Opportunities and Challenges

Opportunities

Cloud and mobile technologies are increasingly available and affordable, and the IoT specifically, presents businesses with a multitude of opportunities. By leveraging the IoT, organizations can transform their business models to drive innovation and strategic advantages, utilize advanced analytics to become more predictive and automated and deliver more personalized customer experiences. Additionally, organizations can gain enhanced insight into their business operations to increase efficiency, reduce costs and improve security and safety, among other things.

Given the vast potential that the IoT brings, industry leaders are not hesitating to implement IoT solutions. In fact, many have already started to gain a competitive advantage with its use. However, without the proper set of enabling technologies, businesses may not be able to extract this value from the IoT. In order for businesses to gain real-time visibility into their assets, people and transactions and turn data into actionable intelligence, they need a portfolio of technologies, including:

- Devices that are equipped for data sensing, tracking and capturing in order to manage assets, people and transactions.
- Cloud technology that provides the interconnection of smart devices and the hosting of enterprise applications.
- Mobile technology that is extending business processes and information accessibility throughout the workforce.
- Big Data solutions that provide the advanced analytics necessary to gain actionable business insight from the raw data that is generated by these devices

Challenges

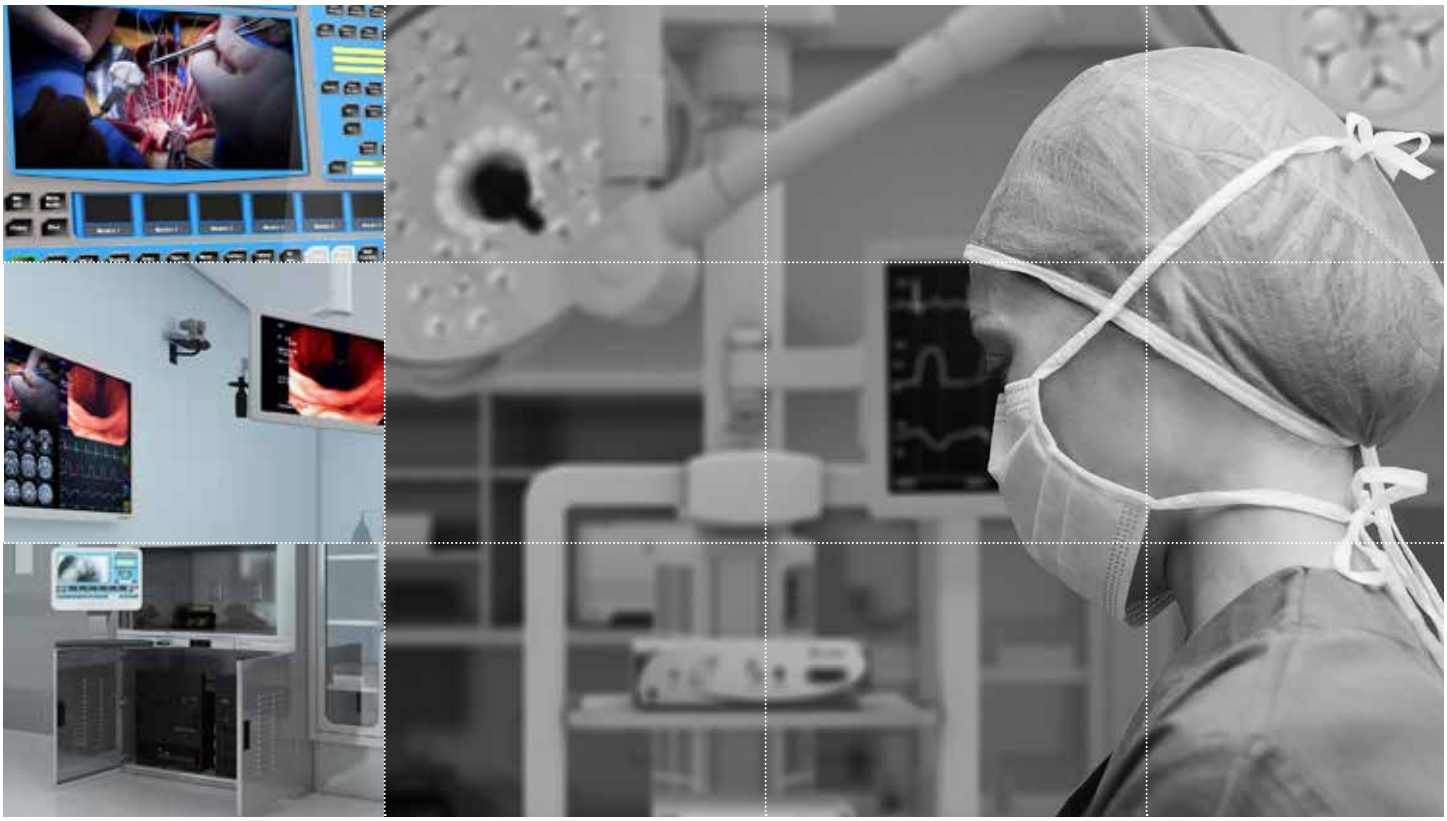
Though the IoT stands to deliver various benefits, it also presents challenges. And while the momentum doesn't seem to be slowing down anytime soon, there are factors that should be taken into account when making a business decision to adopt an IoT solution. Among the main challenges faced when deploying IoT solutions are:

- Complexity
- Device management
- Connecting legacy devices
- Data analytics
- Security standards

Regarding complexity, an IoT deployment has various moving parts. Between planning, integrating and testing the ecosystem, organizations have their work cut out for them. Specifying and connecting devices to the cloud can often be challenging, because device manufacturers typically use protocols and firmware for particular devices. This challenge is often a barrier to success adding risk and cost.

As it pertains to the connectivity of legacy devices, Forrester Research suggests that there is no standard to integration across IoT devices, applications and services.[ii] And while many devices are capable of connecting to Wi-Fi® and similar networks, a significant amount of devices are still Internet unaware, relying on basic LAN connectivity. In order to connect legacy devices to an IoT system and cloud technology, businesses will need to upgrade and/or replace their networking capabilities. As the number of devices grow, various types of formats, information sources, etc., can make it hard to manage all of them while in sync with one another, thus generally requiring a set of proprietary tools. Not to mention, many applications can only consume specific data from the field and support only specific process needs. The results fall short of end-to-end visibility into the data. Moreover,

SKYTRON® OR Video Integration



The simple way to manage OR technology

SKYVISION LINX 300

Surgical teams around the world know—a well-managed operating suite is critical to good patient care. Technology allows surgical teams like yours to share and communicate in new and exciting ways. Skytron OR Video Integration System, SkyVision LINX300, provides a platform to simply, reliably, and confidently manage the wide array of complex voice, imaging, and data technologies. SkyVision LINX300 features a user-centered design, vendor-neutral compatibility, future friendly and is backed by Skytron 24/7/365 support.

USER-CENTERED DESIGN features simple, two-touch routing on an easy-to-use, medical-grade touchscreen. All functions are accessible from the "home" screen for user friendly control.

VENDOR-NEUTRAL TECHNOLOGY compatible with virtually any device, brand, jack, cord, or cable in your operating suite (i.e. DVI, VGA, S-VIDEO, COMPOSITE, HDSDI). Universal connectivity faceplates support any integrated device to the system with 100% fiber optic infrastructure to ensure native resolution.

FUTURE FRIENDLY. Configure for your needs today and add capacity if they change. Our system is designed for flexibility and longevity—now and in the future.

TOTAL SUPPORT. Skytron understand the critical nature of the OR operating suite and provides complete support from "go live" and staff training to remote diagnostics and 24/7/365 technical support.

SkyVision LINX 300, streamlining communication by design.

SKYTRON®

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About Skytron Skytron is a privately held company specializing in capital equipment that drives efficiency in today's healthcare facilities. Our surgical tables, surgical & exam lighting, booms, video integration systems and other products help hospitals around the world work better. To learn more, visit our website at www.skytron.us.

as the number of connected devices continues to dramatically increase, so does the amount of available data. Two issues that are often presented by this phenomena include: data sets increasing in volume, velocity and variety, which make it difficult to process with standard database management systems, and the disjointed data silos in which much of this data sits - making it inaccessible across the enterprise.

Security also becomes an issue when physical assets are converted to digital and thus, susceptible to cyber attacks. The security of the device's data is also an issue when dealing with devices that are Internet aware. Though the aforementioned are just a few of the major challenges, successful IoT deployment requires solid connectivity, simple scalability and collaboration at every point. Connected devices don't yield intelligence by simply producing more raw data. Insight must be gained through the interpretation of the data. But to obtain real value, end-to-end solutions need to be delivered that address the challenges of implementing IoT technologies.

Enterprise Asset Intelligence Enables Businesses to Capitalize on the IoT

Once IoT deployment challenges are evaluated and met, organizations need to execute their strategy to reach Enterprise Asset Intelligence. Obtaining intelligence is about transforming an organization into a predictive and automated enterprise - which is a new way of doing business that drives innovation and revenue.

However, when it comes to allowing trusted, automated decision making, the intricacy lies in compiling intelligence, enabling the technologies to work together, defining processes and implementing workflow and security. Enterprise Asset Intelligence then enables machine-to-machine interactions that don't require human intervention, rather devices that act on signals in an automated manner. This automation is enabled by processed data with advanced analytics, which is transformed into predictive algorithms and programmed automated systems.

Enterprise Asset Intelligence provides the visibility organizations need to leverage the IoT, but beyond that, it provides enterprises the business insight they need to be innovative and earn their competitive advantage. Without this enhanced knowledge, enterprises have endless amounts of data and no sound interpretation and insight into how to use it to transform their business.

Five Essentials for Deploying IoT Solutions

When building an IoT organization, it's critical that the system supports both legacy and new smart devices. Further, it should provide support for multiple connectivity options (i.e., wired, wireless, etc.). IoT solutions should also have centralized and remote device management to allow for day-to-day provisioning, device setup and maintenance.

- Devices
- Connectivity
- Account/device management and security
- Application programming
- Analytics and reporting

To support application connectivity, the system should offer consistent application programming interfaces across a wide range of devices, while affording easy scalability and connectivity to the data center. Once an IoT solution is in place, it needs to be capable of comprehending advanced analytics in order to process Big Data. Business intelligence, enterprise resource planning and other applications enrich data collected, which ultimately yields insights, as well as predict outcomes and actions.

Conclusion

At the end of the day, the IoT enables a transformative business opportunity. However, businesses that don't navigate the complexities and take advantage of the technology won't be able to compete.

As the IoT continues to advance, so does the adoption of machine-to-machine (M2M) communications. Vodafone suggests that around 50 percent of companies will have adopted M2M technologies by 2020. The solution is accelerating companies' ability to remotely monitor equipment to improve external factors such as customer service. And like the IoT, M2M is becoming a critical component to company strategy and competitive advantage.[iii]

Businesses that leverage IoT technologies and data in such a way that supports strategic and innovative business models, advanced analytics and better customer service, are truly raising the bar for performance. Businesses need to partner with a company that has the technology, knowledge and experience to address the challenges in solution deployment and management. Zebra and its technologies enable Enterprise Asset Intelligence, which addresses the critical challenges enabling businesses to realize the competitive advantages afforded by the IoT. ~

References:

[i] Gartner Research, "Gartner Says the Internet of Things Installed Base Will Grow to 26 Billion Units By 2020," December 2013.
[ii] Forrester Research, Inc., "Preparing IT for the Internet of Things," April 2013.
[iii] Vodafone Ltd., "The M2M Adoption Barometer," July 2014.

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THE PROBLEMS

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"Severe sepsis poses substantial clinical, financial, and logistical challenges. Annual hospitalizations for septicemia or sepsis have more than doubled over the past decade, from 326,000 in 2000 to 727,000 in 2008, without a corresponding increase in overall hospitalizations for that time period." [2]

"Rapid-response teams have been introduced to intervene in the care of patients with unexpected clinical deterioration. These teams are key components of rapid-response systems, which have been put in place because of evidence of "failure to rescue" with available clinical services, leading to serious adverse events." [3]

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THE BENEFITS

- End users can set thresholds for selected notification when certain values are exceeded.
- Clinical end users can write and share their own rules to manage critically ill patients that combine parameters from multiple devices or non-device systems (for example, laboratory system data) to assess likelihood of an event in the future.
- Notifications can be delivered via text or email to smartphones, tablets, computers, and other similar devices.

Real-time viewing of multi-source data to support clinical decision-making

[1] http://www.healthcare.philips.com/main/products/patient_monitoring/products/patient_monitoring_gateway/

[2] Berger, Tony et al., "The Shock Index and Early Recognition of Sepsis in the Emergency Department – A Pilot Study." Western Journal of Emergency Medicine. 0.5811/westjem.2012.8.11546.

[3] Jones, DA, DeVita, MA, Bellomo, R. "Rapid-Response Teams." The New England Journal of Medicine. N Engl J Med 2011;365:139-46.

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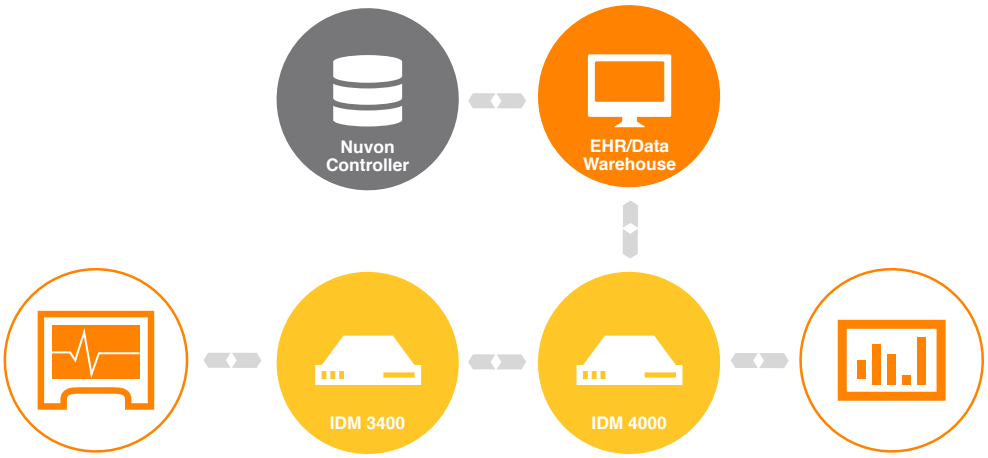

VEGA™ enables point-of-care data collection as well as data integration from existing network gateways. Data can be combined to develop rules and notifications to clinical end users, or can communicate with a nurse call system. Data are translated into standardized formats for communication directly to the EMR.

Nuvon's VEGA™ system allows data to be acquired from any source, whether bedside medical device, hospital laboratory gateway, or medical device gateway

Nuvon has an ever-expanding library of device drivers, which are developed so as to enable rapid prototyping and creation of medical device drivers for even the most obscure of devices found within the healthcare enterprise

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Moreover, Nuvon works directly with medical device manufacturers via OEM partnerships - providing HL7 connectivity and facilitating the delivery of solutions that are ready for integration "right out of the box."

Learn more about the Nuvon Vega™ System and Nuvon Vitals Charting System™, their benefits and capabilities. Contact Bill Zeruld, vice president of sales and business development, at bzeruld@nuvon.com.

Empowering the Institute of Medicine's Checklist for High Value Health Care

-- Raymond Gruby, MD

Chief Medical Officer, Intelligent InSites --

In June 2012, the Institute of Medicine (IOM) published the CEO Checklist for High-Value Health Care. I was thrilled to see the report, as the need to provide effective patient care in the most efficient way has never been greater. Even more exciting was how Real-Time Location Systems (RTLS) can support the quest for a more streamlined, value-driven, and quality-centered healthcare delivery system.

I've highlighted here just a few areas where RTLS software can transform the ideas shared in IOM's CEO Checklist for High-Value Health Care into reality:

Culture of continuous improvement

The RTLS solution can help healthcare providers automate many manual processes, such as finding available equipment, monitoring the temperature of medication fridges, or checking the status of rooms and other resources. In addition, healthcare providers can effortlessly - and in real-time - monitor KPI's such as door-to-triage, door-to-doc, and door-to-admit, then use this information to improve patient workflow processes, as well as report performance against target metrics.

IT best practices - automated, reliable information to and from the point of care

The RTLS solution provides healthcare organizations with instant access to automatically-collected and reliable data regarding the location and status of medical inventory, staff, and patients, allowing them make timely and accurate decisions at the point of care.

Resource utilization - optimized use of personnel, physical space, and other resources

By understanding actual utilization rates of equipment, rooms, and other resources; and by improving workflows with real-time information delivered by RTLS-enabled asset management solutions, optimal inventory levels can be achieved and maintained, reducing procurement costs and ongoing maintenance expenses.

Furthermore, by implementing location-enabled rental management processes, the process of making rental requests and rental pick-ups can be optimized to eliminate unnecessary rental expenses. The status information of the rental equipment allows hospitals to pay only for the rental equipment that is actually being used.

In addition to hard-dollar cost savings, significant productivity enhancements are gained by providing care givers, biomedical engineers, transporters, and other staff with the ability to instantly track the location and the status of people and assets via a browser on any computer or any handheld device, such as iPhone or iPad - allowing staff to spend more time at the patient bed side.

Embedded safeguards - supports and prompts to reduce injury and infection

By utilizing RTLS, requests for assistance can be delivered automatically, on the patient's behalf, when the system detects a potentially troublesome situation, such as a patient leaving a room without assistance or entering a restricted area. These proactive notifications can help reduce potential injury.

Additionally, most RTLS software provides a real-time map view of the facility, with an icon representing each staff member, patient, or even equipment, as they move around the facility. This enables staff to head to a specific alert location without any delay- a tremendous improvement over traditional nurse call systems, which rely on the patient to activate alerts and do not provide their current location.

RTLS solutions can also be instrumental in infection control. In the event that a patient tests positive for a contagious disease, staff can instantly access a report that identifies all of the locations, patients, staff, and equipment that the infected patient came in contact with. Care providers can then use this information to take appropriate actions to contain the spread of the infectious disease.

Another advantage of using an RTLS solution is to gain instant access to meaningful real-time and historical information for analyzing infection patterns and assisting with compiling data requested by regulatory government agencies, such as the Centers for Disease Control and Prevention (CDC).

Internal transparency - visible progress in performance, outcomes, and costs

More advanced RTLS solutions, which include business intelligence (BI) capabilities, provide healthcare organizations with easy access to vast amounts of contextual data stored in the BI database, allowing them to analyze trends, identify improvement opportunities within a hospital or across multiple hospitals, and report on Key Performance Indicators (KPIs). This enables healthcare organizations to gain enterprise-wide visibility into their processes and make a transformational impact on their organization's performance.

I applaud the efforts of the IOM Roundtable on Value and Science-Driven Health Care in creating the CEO Checklist, and I am looking forward to seeing how RTLS technology will transform these important ideas into reality! ~

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The Internet's Democratization of Medicine

-- Ashish Advani, Pharmacist And Assistant Professor,
Mercer University College of Pharmacy, Atlanta, GA --

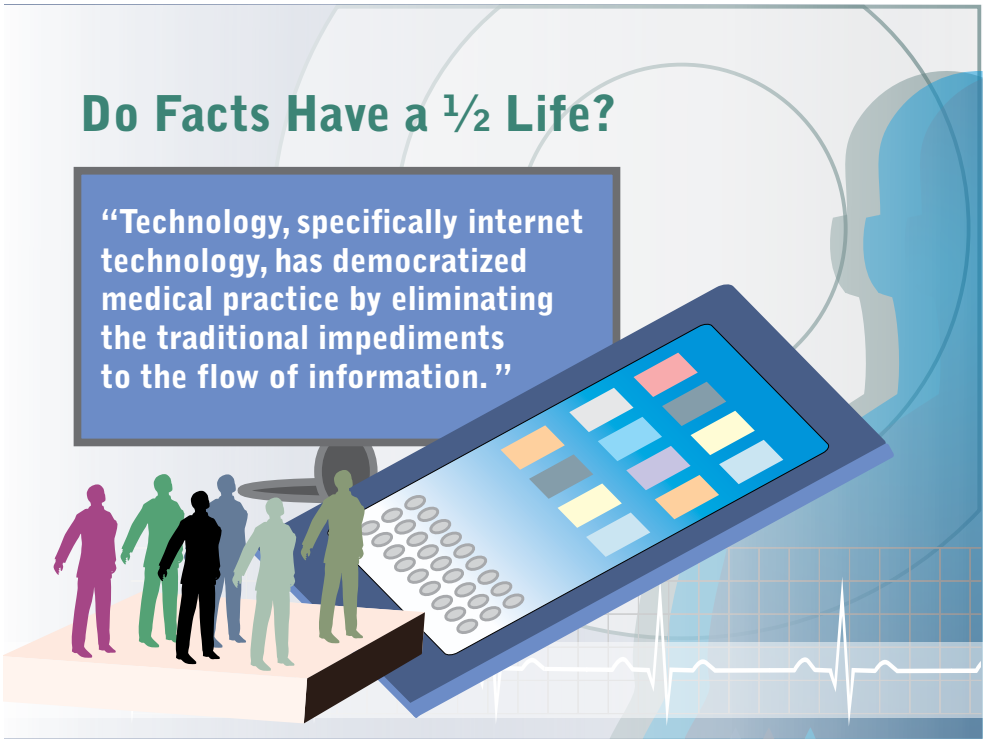
A few weeks ago, an article in Forbes asked, Do Facts Have a ½ Life?. While arguing that knowledge in every discipline decays over time, the ½ life of medical knowledge was estimated to be 45 years, based on a hepatitis and cirrhosis study. Clearly, our medical knowledge is quickly and dramatically evolving.

Recently, 505 neurologists were surveyed regarding four anti-epileptic drug (AED) announcements. Approximately 20% were not aware of four major drug safety risks: suicidality with newer AEDs, increased birth defect risks and impaired cognitive development from in utero divalproex exposure, and the requirement of haplotype screening in patients of Asian descent starting carbamazepine.

Clearly, a knowledge gap exists. It took decades for beta-blockers to go from contraindicated in patients with heart failure to the standard of practice it is today, in spite of evidence that treatment helped prolong survival. Clearly, medical practice adapts slower and less dramatically.

Why do we not keep up better?

Healthcare decisions have been and continue to be largely based on subjective determinants such as anecdotal evidence, experience, habit, ritual, instinct, and intuition. In short, the answer is that we are not consistently committed to making evidence-based decisions…yet.



The original model of evidence-based medicine went as follows: a clinical question arises at the point of care - the healthcare provider conducts a literature search yielding multiple articles - the healthcare provider selects the best articles - the healthcare provider evaluates the research and determines its validity - the healthcare provider decides what to do. Today, largely due to time and resource constraints, those authors acknowledge this does not actually happen….yet.

Technology, specifically Internet technology, has democratized medical practice by eliminating the traditional impediments to the flow of information. Suddenly, we are no longer constrained by what we happen to know or feel about a particular disease, condition, diagnostic tool, or treatment. We now have the ability to take population data and apply it to an N of 1, for every patient we see, every time we see them. (And, by the way, so does the patient. With the Internet, the patient has the ability to learn from the same resources we do, which creates a new layer of accountability.)

Not everyone sees this as a positive. An essay by Arnold Relman, a 90-year-old former editor of the New England Journal of Medicine, laments that "attention to the masses of data generated by laboratory and imaging studies has shifted [our] focus away from the patient. Doctors now spend more time with their computers than at the bedside."

I founded InpharmD precisely because I wanted to shift focus to the computer and data, but not at the expense of the patient. I believe that choosing between the two is a false dichotomy, because technology only helps healthcare providers make better decisions for the patient. I see a future in which each decision is based upon an equal mixture of individual clinical expertise, the best external evidence, and patient values and expectations. ~

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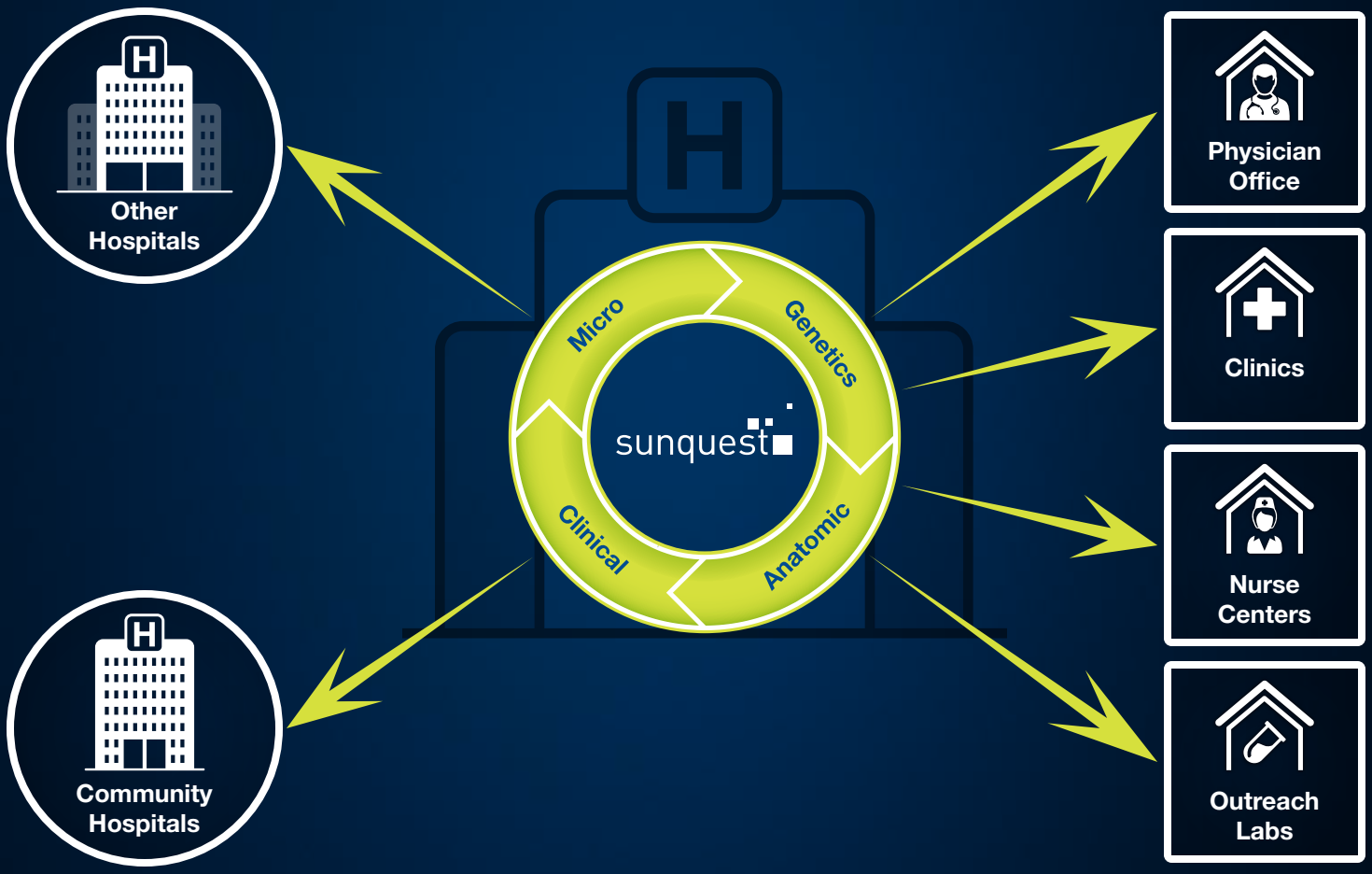

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Medical Devices and FDA Compliance

-- Courtesy of Extreme Networks --

In 2013, $1.3 billion was spent on mobile health technologies, a number that is predicted to grow to $10.2 billion by 2018. As more medical devices are added, it will no longer be acceptable to simply make all medical devices part of a dedicated network.

By segmenting medical devices, hospitals can optimize their network for performance and security

Wi-Fi is fast becoming the preferred method to connect medical devices in the hospital. The Wi-Fi Alliance reports that 71% of all global mobile communication is happening over Wi-Fi - a trend that will continue to increase. In 2013, $1.3 billion was spent on mobile health technologies, a number that is predicted to grow to $10.2 billion by 2018. As the shift from wired to wireless medical devices continues to increase exponentially, hospitals will be challenged to integrate these different devices. Hospitals will need to look at the network architecture in terms of bandwidth requirements, capacity and latency to deliver a secure, high-quality user experience while ensuring that mission critical medical devices are working properly.

To help hospitals keep up with the growing congestion of medical devices and applications on the network, the FDA has released guidelines for hospitals to follow to enable them to better protect devices on the network. As more medical devices are added, it will no longer be acceptable to simply make all medical devices part of a dedicated network. Medical devices will need to be isolated from each other in order to reduce the risk of unauthorized access or the misconfiguration of one medical device type impacting others.

By using policy management software to segment devices by manufacturer and type, hospitals can optimize the network for performance and security around them with minimal intervention.

Background

With the rapid adoption of Wi-Fi by medical device manufactures many hospital IT departments are finding themselves now supporting medical such as IV pumps, blood gas analyzers, telemetry systems, mobile X-ray machines, ultrasound units, hemodialysis devices and glucose meters on their wireless local area networks. As more medical devices are added, the strategy that organizations used during initial rollouts five years ago is no longer adequate. For example, a common approach was to make all medical devices part of a dedicated network, physical or virtual. The theory at the time was that these devices were being protected from outside performance and security risks, but that hasn't always been the case. Over the years, hospitals have experienced challenges supporting wireless medical devices from multiple manufacturers of a single medical device on their virtual network because of:

- Inability of legacy wireless medical devices to support latest authentication and encryption systems.
- Unique network configurations to accommodate the devices such as network quality of service parameters or security settings.
- Limiting access to a shared wireless password.
- A variety of medical devices on the same network, running the risk of negatively influencing each other.

New FDA Guidelines for On-Boarding Medical Devices

Aware of these growing challenges, the U.S. Food and Drug Administration recently released an advisory highlighting the current risks of medical devices on hospital networks along with the following basic recommendations for hospitals:

- Restrict unauthorized access to networks and medical devices, and track network activity.
- Update anti-virus and firewall efforts, as well as security patches.
- Create and evaluate strategies for maintaining functionality during an adverse event. For many IT departments, medical device support is new territory. Best practices formerly included placing all medical devices on a single VLAN protected by a firewall. However, this process is outdated due to a number of factors including:
- Failure to restrict and track internal access by employees, contractors and manufacturer maintenance personnel.
- Risk of misconfiguration of one medical device type impacting others.

Best Practices for Integrating Wireless Medical Devices

To address these risks and issues, many IT departments are segmenting wireless medical devices onto dedicated VLAN or service set identifiers based on their authentication and encryption requirements. In the long term, this approach is not scalable because provider organizations may find themselves trapped into adding dozens of independent networks, which add significant management traffic and system complexity. With the exponential growth in the number of wireless medical devices, it is becoming crucial to keep traffic management to a minimum.

The approach of using a large number of wireless access points to address the growing device numbers is also no longer sufficient to accommodate the onslaught of devices. Sometimes less is more, and

too many access points can lead to poor overall performance of the network.

Another challenge for IT departments is that the next-generation medical devices are often measurement devices that integrate with smartphone applications.

The shared functionality of the smartphones is forcing IT administrators to focus on the applications in addition to the networks for quality of service and security.

To address these challenges, the necessary approach is a combination of technology as well as operational changes. Using this process is a way to ensure that the right types of devices are selected going forward and that support processes are addressed before use. From an operational standpoint, the following practices are recommended:

• Start with an audit of wireless medical devices in the environment. It's crucial to first understand what is already operating in your organization.

• IT and clinical engineering departments should collaborate closely to determine policies and support of wireless devices.

• Use of a formal evaluation/certification process to vet every device before it is brought into the network.

A Case Study:

Henry Ford Health System

The Association of Advancement of Medicine (AAMI) developed a framework for risk management when dealing with wired/wireless medical devices, called 80001. Henry Ford Health System set up their own certification and on-boarding process for which they have received several awards. The process entails:

• Testing devices from a technical perspective and disclosing everything you find.

• Working with departments to find out if the device works with the current workflow.

• Understanding how to support the device and who is responsible if something breaks.

• Putting a formal device procurement process in place. The process was launched in 2012 with much success and now HFHS can keep a close eye on all of their Wi-Fi medical devices, which saw growth from 100 mobile Wi-Fi medical devices in 2006 to 2,900 by the end of 2014.

Conclusion

Healthcare networks and devices are becoming significantly more complex, presenting a growing challenge for the IT staff supporting them. Rather than thinking in terms of device counts and bandwidth, now is the time to reassess an organization's approach to medical device support and how best to apply business intelligence to the network.

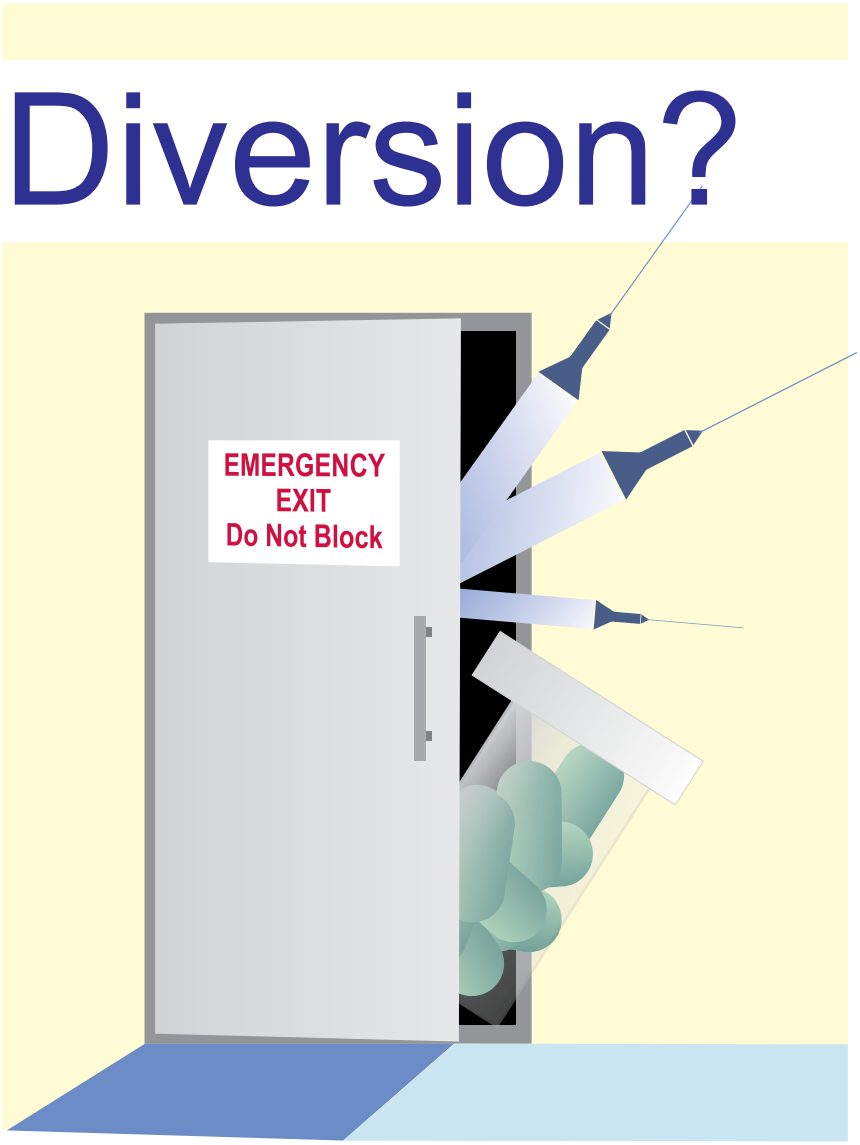
Available solutions allow hospitals to meet the FDA guidelines by isolating medical devices by vendor, type and application requirements, allowing centralized management for access and auditing, and the ability to leverage these solutions for performance and analytical data. ~

Diversion: Understanding and Mitigating the Risk

-- Kimberly New, JD, BSN, RN --

The Centers for Medicare and Medicaid Services defines drug diversion as the diversion of licit drugs for illicit purposes. Drug diversion harms patients, staff members, the community, institutions, and the diverters themselves. While there are no reliable national estimates of the prevalence of drug diversion by healthcare personnel, diversion occurs in facilities across the US every day. Access to narcotics represents an under-appreciated occupational hazard and patient safety risk.

The Institute of Medicine and World Health Organization have deemed patient safety to be indistinguishable from the provision of quality healthcare. Federal agencies such as the CDC and Department of Health and Human Services are promoting the development of a set of best practices to improve drug security and to respond when diversion is identified. Basic public safety and patient safety considerations demand effective, reliable safeguards to maintain the security of prescription opioids in all healthcare settings.

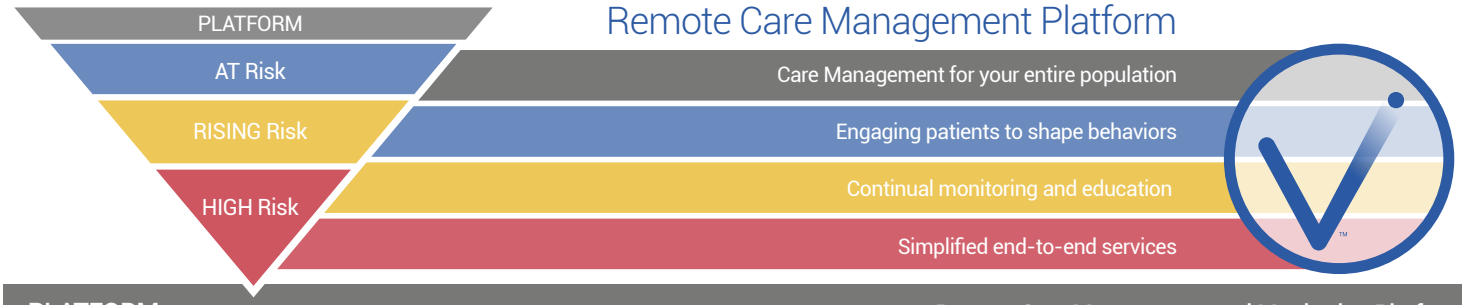


Harm to patients from healthcare personnel who divert opioids may take many forms, including care delivered by an impaired provider, untreated pain, and infection risks stemming from tampering with injectable drugs. Since 2004, there have been 4 recognized hepatitis C outbreaks associated with infected healthcare workers who diverted fentanyl, involving more than 25,000 potentially exposed patients. The community may be impacted indirectly by secondary exposure or DUI-related incidents.

Facilities vary greatly in their approach to diversion by clinicians and other staff. Some focus on prevention and early detection, while others view diversion events as isolated occurrences and take a more reactive approach. Facilities may be reluctant to openly discuss diversion issues because they worry about potential negative ramifications.

When diversion occurs, healthcare facilities face several areas of risk, including regulatory liability and penalties. Because hospitals are required to provide care in a safe setting free from abuse (42 C.F.R. § 482.13(c), 2006), a diversion case involving patient harm may result in Immediate Jeopardy (Centers for Medicare and Medicaid Services, 2004), which is a threat of termination from the Medicare and Medicaid programs due to deficiencies in care that have or are likely to cause serious injury or death. Immediate Jeopardy could result, for instance, in a case in which a diverter is substituting saline for an opioid and leaving blood-tainted syringes for use on patients. Healthcare facilities may also face negative publicity and civil liability as a result of diversion. In order to help prevent the harm associated with diversion, a formal program is essential. While diversion can't be prevented entirely, the program should focus on prevention, detection, and the response

Remote Care Management Platform



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*The research findings were published in the January 2015 KLAS® report "2014 Best in KLAS Awards: Software & Services"; January 2014 KLAS report "2013 Best in KLAS Awards: Software & Service"; December 2012 KLAS report "Best in KLAS Awards: Software and Professional Services"; May 2012 KLAS® report "Labor and Delivery 2012: Pursuing Interoperable Functionality"; December 2011 KLAS report, "2011 Best in KLAS Awards: Software & Services"; December 2010 KLAS report, "2010 Top 20 Best in KLAS Awards: Software & Professional Services"; September 2010 KLAS report, "Labor & Delivery 2010: Who's Evolving, Supporting, and Integrating?"; December 2009 KLAS report, "2009 Top 20 Best in KLAS Awards: Software & Professional Services"; December 2008 KLAS report, "2008 Top 20 Best in KLAS Awards: Software & Professional Services"; March 2008 KLAS report, "Labor & Delivery".

to diversion. The program must include detailed policies and procedures, which must be followed consistently and without prejudice. Channels of communication among clinical and non-clinical departments should be defined. External reporting requirements must be established, and a collaborative relationship with regulatory and law enforcement agencies is essential. A comprehensive program of staff education is crucial to fostering a culture of vigilance and reporting.

A kind of diversion program structure that has proven effective for many facilities involves organized efforts by teams and committees. A diversion oversight committee provides strategic guidance for the diversion program. The oversight committee is a multidisciplinary group that includes representation from Human Resources, the Medical Staff, Employee Health, Infection Prevention, Pharmacy, Nursing, Security, Risk Management, Anesthesia and other relevant departments. The committee ensures that policies and procedures are in place and kept up to date, monitors diversion data over time, directs diversion related performance improvement measures, and performs a root cause analysis following each diversion event.

A diversion team provides tactical guidance. The team, also a multidisciplinary group, examines monthly auditing results and drug cabinet usage trends, meets and determines the course of action when diversion is suspected, and provides direction when there is concerning information that doesn't rise to the level of reasonable suspicion of diversion.

In addition to the committee and team, a designated individual must perform the daily activities of the diversion program. The individual, a diversion specialist, must have a clinical background, knowledge of medications used within the institution and the ability to conduct an effective investigation. He or she serves as a resource to staff, oversees education and policy development, and ensures that all diversion related activities are documented. The diversion specialist takes a lead role in prevention, surveillance, and diversion investigations, and ensures regulatory compliance.

One of the most important aspects of a formal diversion program is an auditing and surveillance program. Many facilities have automated drug cabinets that produce dispensing reports that flag suspicious transactions. Such technology is less common in long-term care facilities. However, even when a facility uses analytical software to flag suspicious transactions or trends, drug cabinet records must be compared with medication administration records and nurses' notes. Many transactions that were highly suspicious for diversion may be explained when entries in the medical record are reviewed. In addition, procedures specific to a particular area can provide a justification for actions that otherwise seem to be a cause for concern.

Each facility should have an auditing plan that involves a review of controlled medication transactions on a regular basis. Regular review enables facilities to identify worrisome transaction patterns and address them quickly, minimizing the risk of patient harm. For the auditing program to be effective, those involved must be familiar with common methods of diversion, and understand the analytics reports available to help identify diversion. Because diversion can be detected very quickly with analytics reports, often before behavioral manifestations of drug abuse appear, the ultimate goal is for the majority of diversion schemes to be identified via analytics reports.

Discrepancies in controlled substance counts can also be a sign of diversion, yet many facilities experience unresolved discrepancies daily. Discrepancy reports should be reviewed consistently. The discrepancy resolution process should be addressed by policy, and discrepancies should never be allowed to remain unresolved for longer than 24 hours. All discrepancies and their resolution should be documented, and the documentation should be reviewed regularly to ensure that a concerning pattern does not go unrecognized.

Drug diversion is a widespread problem in healthcare institutions. Every institution needs a robust program to prevent and deal with diversion. The program must include policies and procedures to cover education, surveillance, investigation, response and reporting. ~

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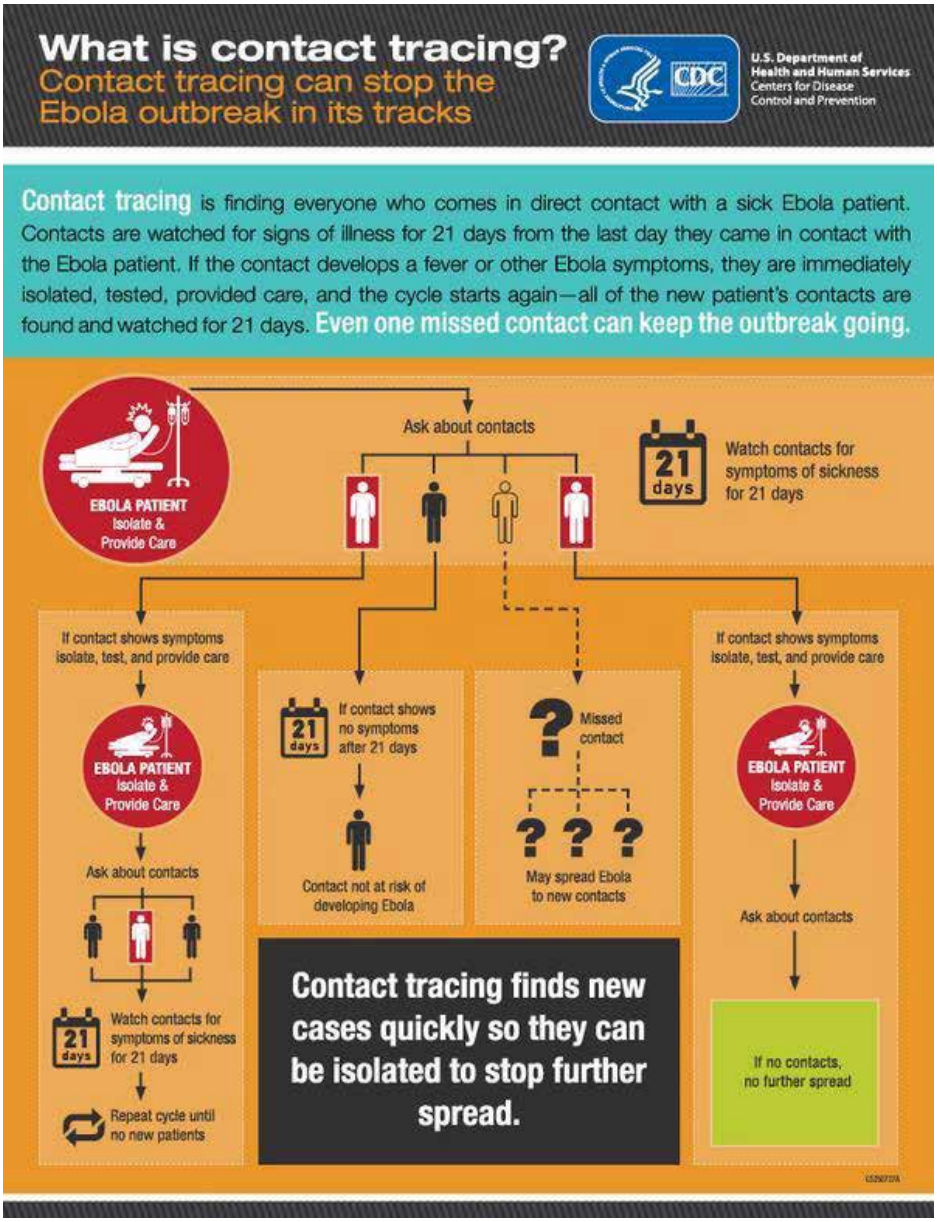
Contact Tracing and Effective Infection Prevention

-- Courtesy of CenTrak --

As a result of the recent Ebola outbreak, healthcare execs across the country and around the globe have been reevaluating the recording of their hospitals' staff, patient and visitor interactions. Supporting and improving infection control best practices, as per the Centers for Disease Control (CDC), is imperative to both a healthcare facility's own safety but also general public health.

There is a specific protocol when it comes to containing and preventing further spread of infectious diseases - at patient, facility and public levels. As outlined in Outbreak Control Management Procedures, put forth by Mercy Hospital's Infection Control Manual the stages below are employed by healthcare executives to contain the disease and ensure patient safety:

1. Perform a preliminary evaluation of available information
2. Seek additional cases
3. Formulate hypothesis
4. Control Measures
5. Communication
6. Conclusion of investigation
7. Evaluation[1]



Steps 1-3 are specifically related to what the CDC calls "contact tracing" which is an established, reactive process to dealing with outbreaks. Basically, every person who has had direct contact with the infected patient must be identified, in addition to any 2nd or 3rd level connections that may have also been exposed to the virus. Monitoring and immediately isolating any connections who have shown symptoms is critical to containment. [2]

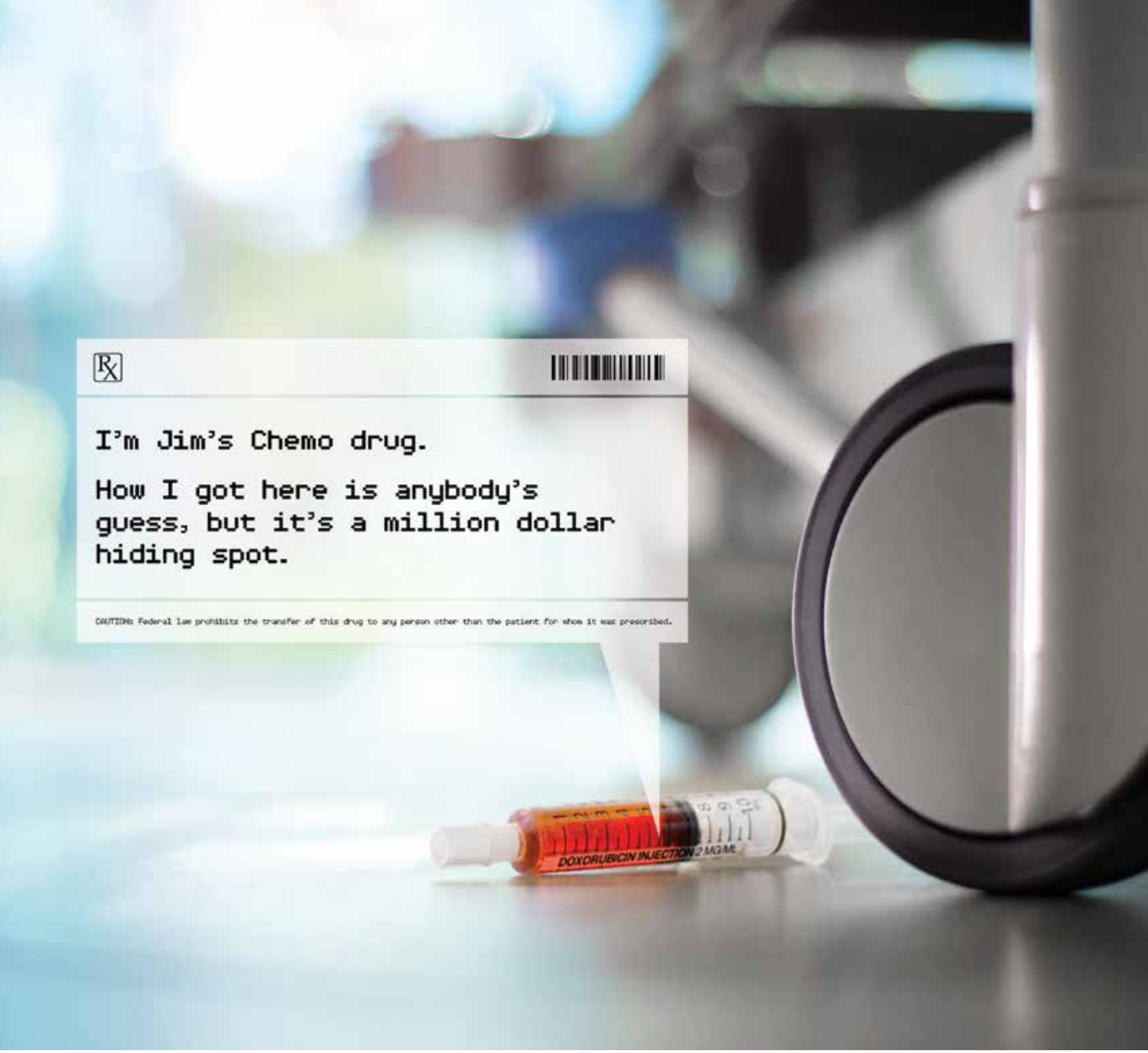
A recent infographic tweeted by the CDC summarizes the current contact tracing process nicely (left).[3]

Although the contact tracing process is effective, many facilities are seeking a more pro-active approach to managing infectious disease control. Real-time location systems (RTLS) offer a means to automate the tracking of relevant data sets related to clinical interactions and outcomes.

So, how exactly can RTLS help to prevent and control the spread of infectious diseases? Hospitals which deploy real-time location systems (RTLS) are able to automate many of these processes. For example, RTLS, or indoor- tracking technologies can connect caregivers to patients, visitors and equipment. By monitoring location and status of all people and assets, hospitals can have visibility to the associations and between each group (patient-staff, patient-equipment, etc.) and have data available to confirm interactions at any given time and place.

This enables hospitals to:

- Save time by eliminating manual reporting
- Customize and gather accurate data sets
- Isolate and contain affected parties to prevent the transmission of infectious agents.
- Capture clinical milestones, automate contact tracing, data collection and reporting.



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Because this solution eliminates the need for manual reporting, decision makers have accurate location data to work from and a leg-up on their competition - the outbreak.

An RTLS system can track (with active-RFID tags) the location and interactions among people, objects, and their surroundings in real-time.

Oftentimes, reporting during these critical times is dependent on manual data collection/recording. In these time-sensitive situations, healthcare executives must make every moment count when assembling risk management teams and the processes associated with the gathering of information and data around critical patient-staff interactions.

In battling infectious disease procedure and preparedness, our government has urged hospital executives to reevaluate how they define communication, leadership, data collection, culture, transparency.[4]

Top 7 Benefits of Automating Contact Tracing

RTLS and similar solutions are critical to taking proactive measures against the spread of infectious diseases. Accurate data means smarter, more timely decision-making: By automating important infection control processes such as contact tracing, healthcare facilities can turn to RTLS solutions to find assurance.

According to a recent survey of 1,039 acute care hospitals conducted by the Association for Professionals in Infection Control and Epidemiology (APIC), "Only about 6 percent of American hospitals have infection control procedures in place to effectively and safely handle Ebola patients. Among these facilities, "about 6% said they were 'well-prepared,' and about 5% said they were 'not prepared'."[5]

RTLS technology gives healthcare organizations the confidence that potential exposure lists are accurate, up-to-date, so that monitoring and treatment are properly targeted. With this added support, healthcare executives are better equipped to fight the spread of infectious diseases more efficiently, comply with Joint Commission outbreak response standards of safety[6], through greater visibility and less human error.

Photos courtesy of CenTrak

Disposable active-RFID tags with Clinical-Grade Locating are ideal for patient contact tracing.

TAG-TRACK-ERADICATE-MONITOR…REPEAT!

1. Bigger, Better Data

- Moving away from manually recorded data (location, temperature, humidity, etc.) to automated RTLS allows for more accurate, complete contact tracing.
- Hospitals that tag their staff, patients, & assets can have accurate records of location data sets for each individual group but also information regarding the interactions among them (staff-patient-equipment).
- No need to manually record data means…

2. Faster Reporting

- Improved workflow for staff and patients, and during an outbreak, gathering that information can be as simple as logging into your application and downloading the reports you need. Analysis & communication are a lot simpler as a result.
- So what to do with all this data during crisis time? Well, a facility that has tagged all patients, staff, & assets can simply run a report which showed all team members' schedules and location which leads to better communication and response…

3. Informed Communications Strategy

- RTLS can help you not only identify which rooms or units people or equipment was in, but how long they were there. This can help hospital leadership teams decide on communications strategy. For example, you could send a customized email notifications to various groups – a) staff who came in direct contact with an infected patient b) staff who were on-site but not in direct contact with infected patient c) staff and visitors who weren't scheduled/ on-site during the time in question.

4. Disposable and/or waterproof devices

- Dispose of or disinfection of any active- RFID tags that came into contact with infected people or objects.
- Tags which are fully enclosed, and can be fully immersed in cleaning solution are necessary to ensure no further infection risk.

5. Historical Reporting

- Automation not only allows for ease of recording, but also quicker more accurate reporting on this data. Information can be gathered immediately or retrieved later. Most customer-facing applications store data for up to 30 days.

6. Improve Safety & Security

- Enable more complex safety and security use cases, for example door and elevator locking systems. In an isolation-type scenario, access control can be enabled so that all patients, staff, etc. who have not been given specific tags are locked out of the hospital unit containing the infected patient to prevent unwanted contact.

7. Integrate with EMR/EHR

- For infections which are treatable by vaccine, compare schedule & location data set against staff, patient, & visitor vaccinations reports or medical records to determine risk level and send communication. The location-enabled data prevented the miscommunication/grief a mass email (to non-relevant hospital staff) would have caused.[7] ~

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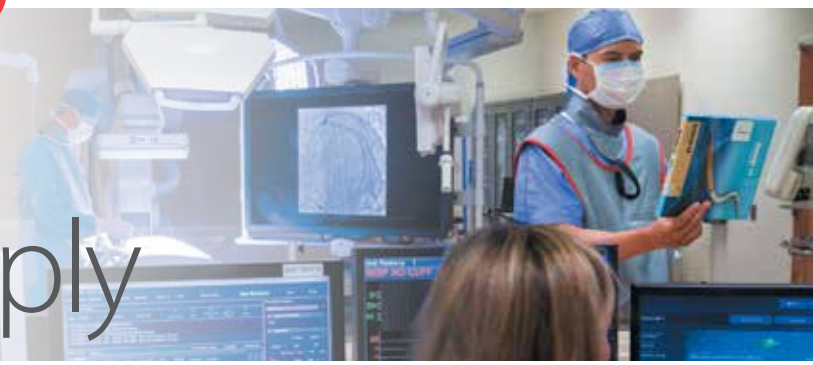
Knowledge is power



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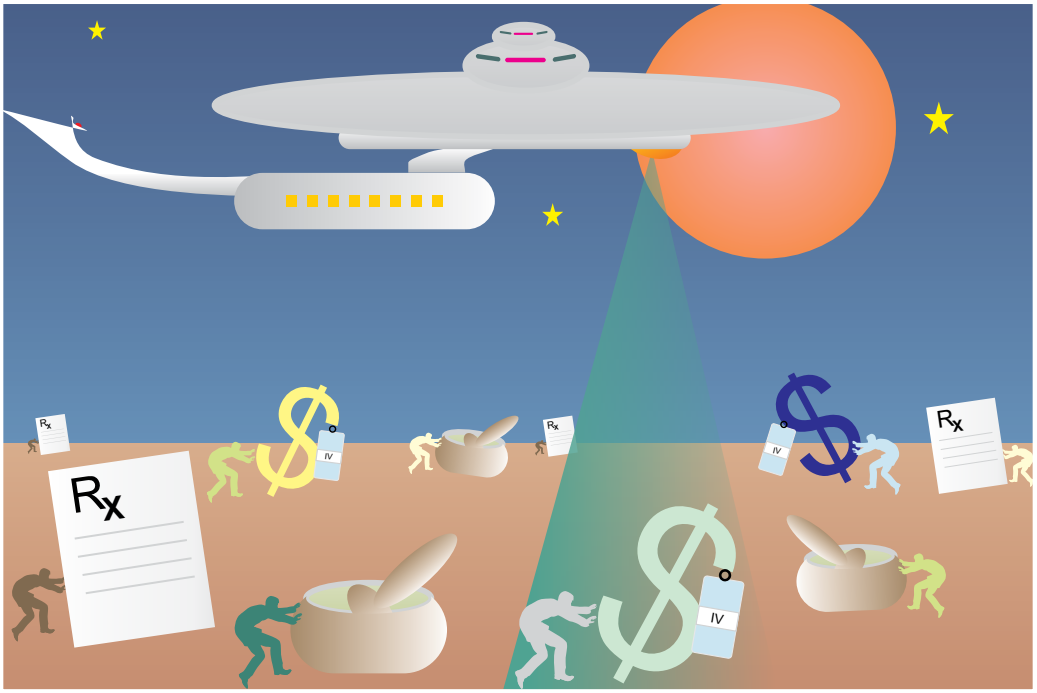
IV Compounding: The Last Frontier of Pharmacy Automation

-- John Barickman, R.Ph., MBA, FACHE --

"Space" may have been the final frontier for the starship Enterprise, but as hospitals and health systems have deployed pharmacy automation, such as cabinets and robots, to address cost, productivity and safety issues for oral solids and liquids, it is apparent that limited "clean room" space is a major factor in providing robotic intravenous (IV) medication compounding, a breakthrough form of pharmacy automation missing from most pharmacies.

Hospital and pharmacy executives realize that compounding IV medications is a cumbersome manual process with significant risks, but aren't fully aware that there's a safer and more efficient solution they can leverage that's cost-effective and productivity-enhancing technology. This technology can help to handle the increasing need for IV medications as hospitals care for more acute inpatient populations. While low-level automation has assisted pharmacists and pharmacy technicians with some IV compounding functions over the past 10 years, the most time-consuming activities involved in compounding, namely aseptic manipulation of the drugs, have not been automated until recently.

As the number of IV products per patient has increased, pharmacy leaders have wrestled with choices - from expanding the size of sterile, IV compounding rooms to outsourcing compounding activities to a third party. Neither choice provides an ideal solution: space is always at a premium in a pharmacy, so expanding one area often means shrinking other critically-needed workspaces, and using a third party to compound medications can negatively impact the hospital's bottom line in terms of sheer costs. The difficulties in monitoring quality at an outside provider's location can also add a potential patient safety risk. In addition, there are increasing concerns about how to provide adequate safety measures that protect employees who manually compound hazardous materials in-house.



Pharmacies that integrate IV compounding within an overarching automation strategy can realize various benefits in three key areas:

1. Financial

The cost of IV admixed product waste can be significant so compounding must be performed in a time frame that enables use of the product prior to its expiration date, which can be 24 hours or less for some medications. Because third party providers can manage sterility and stability of products to extend expiration dates, some hospital pharmacies opt to outsource compounding of frequently used products. Still, the cost is high and the risk of product waste still exists. Automating compounding to enable in-house batch production of frequently used IV medications not only eliminates the cost of outsourcing but also gives hospital pharmacists more control of inventory, with the ability to adjust compounding activities as demand fluctuates.

2. Workflow efficiency

There are two types of IV compounding within a pharmacy - batch production of frequently used products and patient-specific medications. With less than five percent of hospital pharmacies automating IV admixtures, most pharmacists and pharmacy technicians must manually manipulate, sort and label medications. Even specialized technology designed to produce parenteral products requires pharmacy staff to provide continuous hands-on support to operate the equipment.

Technology that can automatically mix IV medications, sort, conduct quality tests and label the product in a self-contained, sterile, positive or negative-pressure environment enables pharmacists to work top of license and better manage productivity of pharmacy staff. For example, an automated solution can batch produce IV medications 24 hours a

day. The only staff interventions required are daily cleaning, stocking the equipment with the right products and setting protocols. While the robot produces the most frequently used IV admixtures, pharmacy staff can focus on patient-specific admixtures, thus improving productivity throughout the pharmacy.

3. Safety

Along with increased productivity and cost-savings, IV automation enhances quality and accuracy of admixtures. As errors in IV medications are more likely to create serious injury or death and are more difficult to discover, the process control gravimetric measurements built into IV pharmacy automation improve the accuracy of admixtures, ensuring that diluents and medications are added according to set protocols. With public examples of the potential risks of IV medication errors occurring regularly and more frequently, such as the 2012 New England Compounding Center's contamination of injectable compounds resulting in a meningitis outbreak which resulted in over 60 deaths and affected hundreds more, IV medication safety is a national concern that the new IV automation can help address.

In addition to enhancing patient safety, hospital executives can also improve employee safety by ensuring that employees' handling of hazardous materials such as antineoplastic drugs used in cancer chemotherapy, antiviral drugs, hormones and some bio-engineered drugs, is minimized and occurs in well-controlled settings. With new regulations requiring the handling and storage of these medications in a negative-pressure environment, automated solutions that remove the need to manipulate drugs and providing a self-contained negative-pressure, sterile environment can provide added protection to employees, as well as patients, from exposure to hazardous drugs.

IV automation: Getting started

Hospitals or health systems exploring IV automation for compounding should begin first with a clear evaluation of pharmacy workflows. Understanding the workflow associated with IV compounding, preparation and distribution enables the selection of technology that best addresses the pharmacy's needs to produce a productivity-enhancing solution.

To ensure the best use of IV compounding technology, hospitals should address the area in which the technology can have the most effect. For example, a pharmacy that serves a cancer center can focus on production of admixtures used most frequently in chemotherapy, ensuring adequate supply of IV medications when needed and controlling inventory to minimize wasted product.

Although hospital and pharmacy executives face ever-increasing challenges related to cost and quality of care as the healthcare industry continues to move into uncharted territory of more accountable, value-focused healthcare, automation of pharmacy functions, such as IV compounding, provides the tools needed to address these challenges. ~

About the author

John Barickman is the senior executive pharmacist consultant at Aesynt.

mHealth: A Pathway to the Intelligent Hospital

-- Rick Krohn, MA, MAS

President, HealthSense --

Like the glass that is either half empty or half full, the hospital can be viewed as either a) a fossilized delivery model incapable of redemption, or b) a time-tested institution in need of lubrication. Either way, no one is suggesting that it's a well-oiled machine.

Today's hospital is a dynamic environment

in which clinical staff, patients, and assets are continually in motion. Daily operations rely on a complex orchestration of information, people, processes and physical assets, within an increasingly distributed service architecture. In such a fluid environment, where information is often siloed and clinical processes occur independently, duplication and waste are endemic - with a crippling effect on quality, efficiency, cost and patient satisfaction.

In their search for solutions, hospitals are re-engineering themselves as "intelligent" institutions - enterprises that employ knowledge and technology tools to leverage their human and capital assets. These tools aren't just a clinical lubricant - they are ushering in a new era of care delivery.

mHealth is central to this strategy, applied as both purpose-built tools and as the foundation of integrated clinical solutions across the range of hospital operations.

Over the past three years, and with astonishing speed, mobile health has been catapulted from the wings to healthcare's center stage. And as the mHealth market continues to mature, it is finding the hospital environment a rich field for innovation. Innovation that introduces fresh thinking about clinical communication and collaboration, affordable care, and the integration of complimentary health technologies.

Through mHealth innovation, hospitals are creating new patient-provider touch points, capturing and sharing clinical knowledge at the point of care, and addressing healthcare's intractable problems of cost and quality. Both inside the hospital and beyond, mHealth innovation is serving as an incubator of the intelligent hospital.

mHealth adoption in the hospital is being driven by favorable economics (reimbursement trends, cost pressures), systemic gaps in care (lack of specialty physicians, lack of patient access), and a new focus on the patient experience and clinical excellence. But it's also driven by advances in technology - expanding broadband network coverage and web-based applications, improved video communications technology, the convergence and standardization of health technologies, and increasingly powerful, smaller, cheaper equipment. There is also a subtle but influential human factor: the culture of healthcare delivery is changing as providers and patients become comfortable with an electronic dialogue and the efficiency and convenience of virtual medicine in an already stretched industry. Collectively, these trends are reordering the structure of hospital based services and tellingly, the provider-patient relationship.

Knitted with complementary technologies, mHealth is building best of breed clinical solutions for the intelligent hospital. From simple solutions aimed at patient outreach and education, to more sophisticated applications like telemedicine and remote patient monitoring, the catalogue of hospital based mHealth tools continues to grow. It is changing the calculus of hospital based services - mHealth is a clinical service extender that allows hospitals to remain connected and involved in a patient's health outside the hospital walls, and between encounters.

Emblematic of this "clinical convergence" of mHealth and hospital services is the marriage of RTLS and mHealth. In the hospital, Real-Time Location Systems have been employed to establish granular asset and personnel location awareness, bringing order to clinical work flows. RTLS is being employed to streamline staff activities, to monitor

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patient throughput and wait times, and to allocate human and physical assets in areas like the ER and OR. As a standalone solution this real-time insight can dramatically alter the course and resource consumption of hospital operations. It's a powerful clinical tool in its own right, but in combination with mobile, RTLS can surpass location awareness and establish "contextual awareness" of people and things – a seamless integration of information technologies that reveals a wealth of information about the status and flow of hospital operations, delivered on demand, on the fly.

In the intelligent hospital, mHealth and RTLS are being mated to stage-manage patient movements throughout the facility, to make predictions about likely bed use, admissions and discharges over the next several hours. With RTLS and mobile inspired contextual awareness, the intelligent hospital can glean insights into operations aimed at cost reduction, process optimization and clinical service quality. Here are some examples:

Extendable Work Flow Solutions

Hospitals are building upon single purpose clinical solutions, like hand washing monitoring, as the springboard towards a range of sophisticated mobile/RTLS patient care analytic and reporting tools, made available in real time.

Remote Patient Monitoring

In the facility, staff can monitor (and act upon) patient throughput, wait times, and high value asset allocation. With multi-parameter monitoring devices for post acute care, these tools are cheap, prevent unnecessary health events and hospital re-admits.

Wearables

Multi purpose watch or badge captures location and process data in regard to patient services, enterprise work flows, and consumptive tasks. In nursing services for instance, wearable RTLS badges and wristbands are being mated with mobile and BI technologies, delivering a patient engagement and behavior change tool.

Business Intelligence and Modeling

Mobile enabled RTLS data – including big data – can reveal a wealth of information at the staff level about the speed and effectiveness of clinical operations, identify weaknesses, allocate resources, and model solution sets. With these analytics, hospitals can make efficient use of staff time, allocate equipment, adjust appointments, boost quality and compliance, and increase capacity.

Implantables

Somewhat forward leaning, implantable devices like the cardioverter defibrillator (that can be controlled electronically) can significantly reduce follow up visits and health events, while locating patients in distress.

mHealth innovation isn't just shaping the next generation of hospital operations - it is a "force of mass disruption " to establish patterns of care that translate into patient satisfaction and clinical efficiency. And we're still at the beginning - there are huge opportunities to populate the intelligent hospital with mHealth knowledge solutions.

Looking ahead, mHealth innovations are being designed with the user experience in mind – there are now biometric monitors that capture data via ear buds, mHealth coaches that intuitively modify care plans as new data is obtained, and non invasive diabetes testing and reporting tools. In the intelligent hospital, the convergence of mobile with boutique solutions like RTLS means better POC information, better coordination of assets, effective patient engagement, streamlined processes, and better outcomes. For the patient and the consumer, this convergence means better control of their health issues, better coordination with their care team, and perhaps most importantly - a sense of inclusion. ~

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How to Measure the Utilization of Clinical Assets

-- Mark Bildeaux,

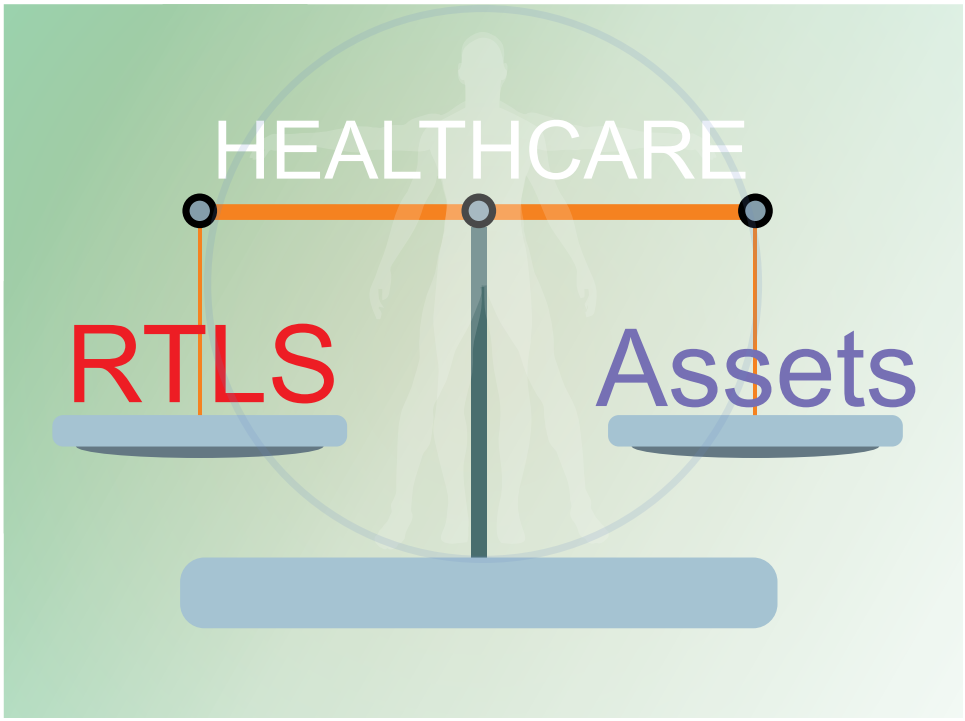
Solution Designer at Intelligent InSites --

Effective patient care requires the right medical equipment to be ready for use when needed. Given the complex nature of healthcare facilities - with thousands of staff, assets, rooms, patients, and square footage - maintaining appropriate inventory levels and finding the needed equipment can be challenging.

Knowing the status of the equipment in real-time, generated by automatic, unbiased sensors, is essential to ensure that clinical staff have what they need to provide the best patient care. Empowered by asset utilization information, administrators will benefit through the ability to make data-driven decisions about equipment redistribution, rental needs, and additional purchases.

Deploying a Real-Time Location System (RTLS) can provide invaluable insights into the actual status of the utilization of clinical assets, however it is crucial for the healthcare organization to define what "asset utilization" actually means to them.

This can be defined as either broad or very detailed - depending on the level of granularity of the installed RTLS hardware and the level of integration with other healthcare information systems.



There are three main ways to determine equipment utilization:

Location-Based Asset Utilization

The most common way to define utilization is based purely on the location of the equipment. By knowing that a piece of equipment is in a patient room, you can say it is in use, as it is not available to be redistributed somewhere else. This is the quickest and easiest way to determine the equipment utilization.

Interaction-Based Asset Utilization

As healthcare organizations evolve their RTLS deployment and start to tag patients, they can have a more granular view of what is happening. For instance, if a pulse oximeter is in a room, it will not show as being utilized until a patient's presence is being reported in the same room.

Usage-Based Asset Utilization

Some organizations might want to define asset utilization as the actual usage of the equipment. For example, an infusion pump would be considered in use only if it is actually pumping. This level of reporting would require direct integration with smart devices.

There are many ways to determine the utilization of clinical assets, and there is no right or wrong way of measuring it. It all depends on how the organization wants to track utilization to make appropriate business decisions.

But one thing is certain - only by deploying an RTLS-enabled asset management solution can healthcare organizations start making evidence-based decisions related to managing their equipment.

All this is possible without needing to throw away current computerized maintenance management system (CMMS). These systems can be enriched with real-time location information, boosting them to the next level of operational intelligence. ~

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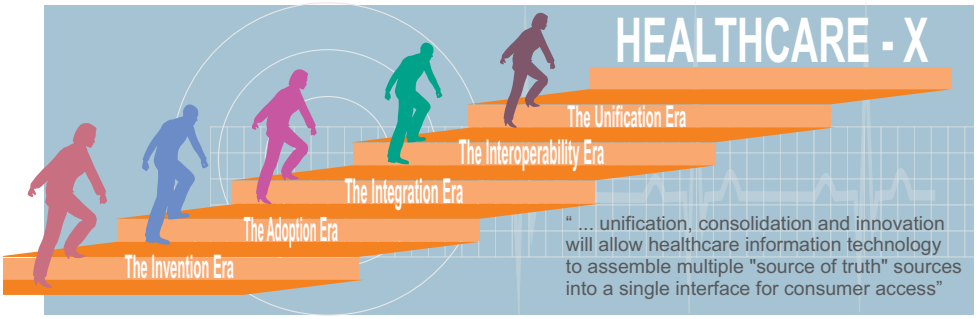
Healthcare X - The Interoperability Era

-- Dave Whitney

Senior Consultant, Ascendian Healthcare Consulting --

Interoperability - The juggernaut of information exchange. Consumer-based interoperability exists practically everywhere in our digital world.

From social media to the automobile industry, home automation and personal finance, all responding to a consumer-based need to represent relevant and real-time information directly to the consumer's application of choice. Global technology industries pursue this product demand, willingly or hesitantly, to uncouple services for a more flexible approach to providing consumers what they need, where they need it, and when they need it. This is not a new concept for the manufacturing industry. What has changed is the broad availability and greater quantity of technology solutions



across a greater market of consumers. Thomas L. Friedman identified the paradigm shift in how business is and will be conducted, nearly 10 years ago in his 2005 book "The World Is Flat". An important component of Friedman's observations is that this flattening not only represents a globalization of products, services and technologies, but also associated standards. We see evidence of these standards rapidly changing as consumer-driven needs define interoperability requirements. Products such as data analytics, web services, and mobile devices all require effective and standardized methods of communicating with one another. And, the challenge with standards adoption is implementation ahead of the rapid consumer demand.

It's no surprise to say that Healthcare technology has been slow to mature. Influencers aside, we are experiencing the evolution of a technologically delivered consumer-based product. This same evolution can also be identified across many other technical markets and consolidated into 5 iterative eras:

1. The Invention Era - Technology is applied to a need
2. The Adoption Era - Technology becomes a standard
3. The Integration Era - Technology becomes a component of workflow
4. The Interoperability Era - Technology provides data liquidity
5. The Unification Era - Technology presents an optimized and seamless environment

The challenge with using this model as a holistic approach is the understanding that many components of the overall healthcare product are at varied stages of need, discovery, use, and adoption. And a unified healthcare system must not only account for a consumer base of general population users, but also each user type interacting with a multitude of interconnected systems. The healthcare industry has many years of work ahead to fully achieve and implement a unified product line to meet all consumer demands. However, using healthcare imaging as an example we can see how a major component of healthcare services is contributing to the overall evolution.

The Invention Era - In the very late 1800's through 1913, experiments led to the birth of nuclear chemistry and resulted in the invention of the hot cathode tube. These developments led to early attempts to visualize cancer.
The Adoption Era - Immediately following the Invention Era and extending up through the 1960's, the birth of the Western Roentgen Society, general use of radiographic films, and further development of the emerging industry's components signaled standardized use and need for imaging technologies.

The Integration Era - Although invention and adoption rapidly continued in many areas, the birth of the PACS (Picture Archiving and Communication System) in 1985 crossed a major milestone in the industry. The result of this milestone meant that the radiology industry could now consolidate its data into a single platform for managing workflow. This consolidation meant that previously isolated systems must communicate with a central platform and exchange information. Achieving this integration required a standard for modalities and systems to communicate, thus producing the DICOM standard that same year.

The Integration Era continued to evolve rapidly over the following 30+ years with implementation of integrated workflow and information management (RIS), system to system communication, telecommunications, integrated voice recognition, electronic health records and medical records (EHR and EMR), and the birth of Healthcare Information Exchanges (HIE). Healthcare Information Technology (HIT) development continued at a torrid pace. Standards were created, revised, and deprecated rapidly while evolution of storage methodologies and advanced transport protocols began establishing a baseline for performance, reliability and standardization.

The Integration Era crossed the threshold between consolidated system platforms with a shift to a stratified model for system architecture. The result of this deconstruction and stratification created silos of technology. Each silo requiring complex integration methodologies with varying results in the information each system could share with another. Custom interfacing was commonplace in order to overcome non-existent or inefficient standards. It became clear that true standards-driven interoperability was required.

The Interoperability Era - While the Integration Era continued to experience infusion of new technologies and a race to keep up with demand, healthcare technologies began to struggle with large-scale implementation. The Interoperability Era represents our current period and one which focuses on system providers deploying capabilities designed for not only one-to-one integration, but one-to-many interoperability. This need has become increasingly evident over the past five years. Indicators of this shift in focus to interoperability can be identified with previously well-respected companies beginning to suffer from government policies and political backlash. Current government requirements dictate the utmost interoperability and delivery based on their initiatives and definitions of interoperability. An example of this scrutiny was seen in early 2014 with sustained criticism of Epic Systems' interoperability. And not only is this a requirement dictated by government entities, the emerging demand for a consumer-based service requires that a multitude of systems must interconnect to display a longitudinal service line of care. These requirements clearly dictate the rising demand for interoperability based standards.

The shift to the Interoperability Era is also evident with the underlying push for iterations of standards such as HL7 FHIR (Fast Healthcare Interoperability Resources) which addresses a methodology change from solving 20% of exceptions to meeting 80% of system use cases. This change is evidence that creating consistency and streamlining data exchange is a key component of interoperability. Not only is system data exchange methodology undergoing standardization, so is the exchange of image objects. Now that multitudes of imaging systems are required to interconnect and synchronize changes in real-time, the birth of transport and change control standards such as IOCM (Image Object Change Management) are being developed. However, and in the case of both examples, all interconnected systems must adhere to the finalized standard for it to be implemented successfully. This means each system provider must begin accounting for the applicable standards and rapidly develop capabilities to implement them as they are finalized. Although these are only two ongoing standards, many other standards continue to iterate, emerge, or repurpose. For instance, existing web standards have recently been adopted as an efficient method for image transport, access, and display. Medical image viewing providers are breaking away from proprietary software applications and cumbersome transport protocols and have begun utilizing existing web-based standards. This combination allows image distribution to function with consumer based products such as commercial browsers and mobile technologies, resulting in flexible low-overhead applications.

The Unification Era - As we round out the interoperability era in the upcoming years, we can continue to expect larger amounts of systems to operate cohesively. This cohesion will provide a collaborative and unified approach to presenting data in a single interface of the user's preference, regardless of the origin and format. In fact, we already see some of this taking place with the big data initiatives and aforementioned EMR (Electronic Medical Record) systems. These systems attempt to aggregate multiple sources of data and present them with in a single and normalized user interface. VNA (Vendor Neutral Archives) have existed for a period of time, but are now gaining traction as organizations understand the need to consolidate imaging data in a single platform. At one point, we considered imaging data to be radiology-specific and DICOM only. We now appreciate imaging data as an aggregation of all types of medical imaging collected within (or outside of) a healthcare organization, regardless of type. This includes cardiology, pathology, dermatology, wound care and any other sources and service lines where images are acquired.

Unfortunately, the consolidation of contextual data (EMR) and image data (VNA) still requires mutually exclusive interfaces for visualization. Much the same as we saw with reconsideration of medical imaging types, the expectation that contextual data should be considered an image when "visualized" will shift in how we perceive it should be handled. This means all "data" will be considered an image when visualized by the consumer. Inversely, it also implies that all image-type data be considered "data" when utilized for analytics. Over time and during the unification era, consumer demand to visualize both contextual and image data within a single interface will drive providers to rethink how they approach managing data.

The Holy Grail and The Source of Truth

Ultimately, this era of unification will not only account for a consolidation and reconsideration for how we manage data (image, contextual, or otherwise), but also visualization and manipulation of this data within a single interface of the consumer's needs or choice. This dramatically changes what we consider the "source of truth" in respect for presenting data. Historically, consumers have utilized applications directly connected to the native source of the data they wish to view. The "source of truth" was almost always the native repository and provided a myopic view of available data. Multiple interfaces were required to view multiple sources of truth, which limited the ability to aggregate and calculate correlation and causality of information. The advent of unification, consolidation and innovation will allow healthcare information technology to assemble multiple "source of truth" sources into a single interface for consumer access. Depending on the consumer's need, an application may aggregate many different sources of truth to the user, manipulated and visualized in very different ways from application to application. From a user's perspective, the specific applications will become a virtual or proxy "source of truth" in which data is handled and presented according to the requirements of the application.

As we apply these 5 eras of technological evolution to the healthcare system, we begin to see the timeline of a consumer-based product unfold. Although many components will continue to emerge and iterate through these 5 eras, it is clear that we are in the midst of an age of interoperability. The success of Unification Era, and the product as a whole, depends greatly upon the outcome of interoperability. Although the Unification Era is inevitable and failures simply delay evolution, the industry must continue the path towards interoperability and standards to sustain an environment of highly collaborative technology. ~

The Value of Tagging Staff

-- Joanna Wyganowska, MBA, PMP,

Director of Marketing for Intelligent InSites, Lean Healthcare Fanatic --

Ensuring patient and staff safety along with improving satisfaction is a top priority for each healthcare organization. Real-Time Location Systems (RTLS) have a direct and positive impact on both metrics.

The basic use case many people think of for an RTLS solution is assisting with finding available equipment so patient care can be delivered faster. However, there are many other ways healthcare organizations leverage an RTLS solution to provide meaningful value to staff, patients, and the healthcare organization as a whole, such as the following:

Patient workflow system for areas such as:

- Ambulatory, ED, OR, and in-patient transitions
- Patient elopement system
- Staff rounding and workflow
- Staff locating
- Contact tracing for infection control
- Automated temperature monitoring for fridges

While some clinical staff may have reservations about wearing an RTLS badge, it is important to understand that an RTLS solution is designed to show the location of equipment, patients, and staff in the areas where patient care is delivered. For example, the current status of each individual can also be determined and displayed, showing when a caregiver is with a patient and prompting appropriate workflows.

As a general rule, healthcare organizations typically exclude specific areas such as bathrooms or staff lounges where patient-care is not delivered or equipment is not stored. A typical RTLS solution also allows reporting to be done in an anonymous, role-based way instead of by individual.

One of the primary reasons healthcare organizations use the data generated by staff and patient RTLS badges is to gather metrics on staff and patient interactions, patterns, and workflows. This helps identify opportunities for process improvements with the ultimate goal of increasing both safety and satisfaction.

According to Jeff Hoss, Vice President of Clinical Operations at Sanford Health, "Our use of tags is to help us predict workflow. It's to help add control in an

area of variation. It's to let people know when the next patient is in the room. It's not guess work, it's preparation. It helps us create leading indicators that help predict what patient satisfaction is going to be at the end of the month, based on things like wait time."

Displaying location and calculating interactions between people is already mainstream through a variety of applications and devices. Hospitals use nurse call systems to assist patients and track response times. Entertainment parks use RTLS wristbands to track visitors' activities, and our own smartphones deliver location information to various mobile apps constantly.

It is important to remember that an investment in an RTLS technology is an investment in providing hospital patients and staff with an additional information related to personal safety. Almost every day we hear unsettling news about a violent patient attacking hospital staff or a virus, like Ebola, spreading unknowingly amongst medical staff and patients. With information about staff's current location from an RTLS system used in addition to a facility's formal staff duress system, security staff may know more precisely where everyone is when an incident occurs. Faster and more effective containment of communicable diseases is promoted with the ability for infection control personnel to know all interactions between the infected person, hospital staff, other patients, and medical equipment.

The true value of an RTLS system, like any other IT system, comes when the entire staff embraces the change and realizes the benefits. Here are four guiding principles which help you get your staff on board for an RTLS implementation:

(1) Include your staff into the conversation early, rather than mandating it.

(2) Make a commitment that the use of RTLS location information will not be used for disciplinary purposes.

(3) Engage your staff in configuring the system to support your processes, not to hinder them.

(4) Constantly communicate and demonstrate the value of an RTLS system for the staff themselves, not just to the hospital overall. ~

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Is Your Pharmacy Ready for FDA's DSCSA 2015 Implementation?

-- Chris Chandler, PharmD - USDM Life Sciences --

The FDA Drug Supply Chain Security Act (DSCSA) has 4 areas of compliance for pharmacies and the first deadlines are January 1, 2015:

(1) Trading partners of a dispenser may be only authorized trading partners and

(2) Dispensers shall develop systems and processes to be able to comply with the verification requirements.

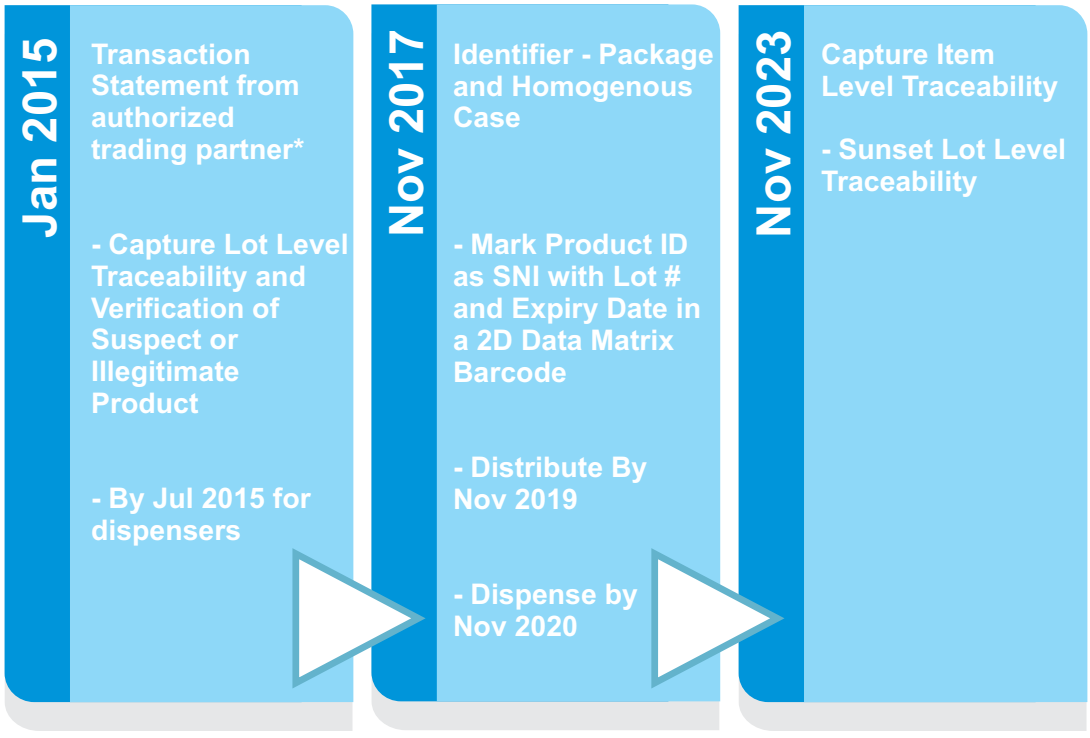
The remaining provisions on transaction documentation begin July 1, 2015 and we will see product serialization on packaging to meet package level traceability requirements over the next 10 years.

(3) Product tracing- dispensers shall not accept ownership of a product, unless the previous owner provides transaction history (TH), transaction information (TI), and a transaction statement (TS). In the event of a recall or for the purpose of investigating a suspect or an illegitimate product, a dispenser shall, not later than 2 business days after receiving the request or in another such reasonable time as determined by the Secretary, based on the circumstances of the request, provide the applicable TH, TI, TS which the dispenser received from the previous owner.

(4) Product identifier- Beginning not later than 7 years after the date of enactment of the Drug Supply Chain Security Act, a dispenser may engage in transactions involving a product only if such product is encoded with a product identifier.

As we have thousands of pharmacies in the US and are less than 70 days away, how are you and your trading partners intending to meet the detailed requirements? How can we utilize the enhanced product information for recall processes, supply chain efficiency and patient safety?

The law intends to help protect consumers from exposure to counterfeit, stolen, contaminated, or otherwise harmful prescription drug products by building an electronic, interoperable system to identify and trace their distribution. All trading partners are required to comply for products to move throughout the supply chain. Refer to our webinar archives http://www.usdm.com/webinars.html for DSCSA news to help you plan for future implementation deadlines now and over the next 10 years.



*Refer to the Act for definitions, data storage requirements, exceptions (direct purchase, drop ship, returns, 3rd party solutions, 3PLs, repackagers, effect on State laws) DQSA (H.R 3204) November 27, 2013 www.fda.gov/Drugs/DrugSafety/DrugIntegrityandSupplyChainSecurity/DrugSupplyChainSecurityAct/

SNI= Standardized Numerical Identifier

Chris Chandler, Pharm.D. is the Vice President of Healthcare Solutions and Services at USDM Life Sciences (www.usdm.com) and Co-Chair of the Intelligent Pharmacy Pavilion Advisory Board. Chris focuses on helping healthcare providers, hospitals and pharmacies develop supply chain solutions for medical devices and pharmaceuticals that meet regulatory compliance requirements. Chris and her team specialize in Unique Device Identification (UDI), Drug Supply Chain Security Act (DSCSA) and Drug Quality and Security Act (DQSA) regulations.

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Case Study: Hand Hygiene Compliance Monitoring Solution at Greater Baltimore Medical Center

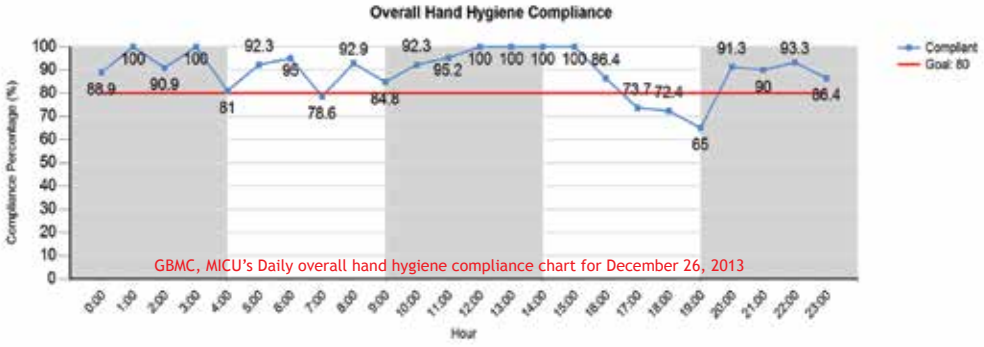
The Greater Baltimore Medical Center Improves Hand Hygiene Monitoring and Feedback with RTLS/Wi-Fi Compliance Monitoring System

The Greater Baltimore Medical Center (GBMC), a 327 bed hospital in Baltimore, Maryland has implemented a real-time hand hygiene monitoring solution in efforts to improve compliance and increase the number of hand hygiene observations available for study. The Medical Intensive Care Unit (MICU) has implemented AiRISTA's (Sparks, MD) Hand Hygiene Compliance Monitoring solution and Real-Time Locating System (RTLS) platform, providing the unit with immediate compliance feedback and detailed customizable reports.

Each MICU team member (n=46) wears a unique tag/badge and is monitored for hand hygiene on entry and exit of each patient care room. The tag provides a signal if hand hygiene was missed upon entry or exit, allowing the staff an opportunity to self-correct. AiRISTA's software solution provides portal access allowing Infection Prevention and MICU Leadership to evaluate hand hygiene over time as well as drill down to specific hours, patient rooms and specific team members. Daily compliance reports are also emailed to all unit personnel providing the compliance detail by the hour, by discipline and by entry vs. exit opportunities.

The median number of hand hygiene opportunities in the MICU increased from 30 observations a month utilizing anonymous observers to approximately 430 observations in a normal 24-hour period. Hand Hygiene compliance has increased to a current average of 82%, ranging from 76.3% to 93.3% daily.

With AiRISTA's RTLS/Wi-Fi Hand Hygiene Solution, the Greater Baltimore Medical Center is driving improvements in hand hygiene and culture of safety in the Medical Intensive Care Unit.



"Hand Hygiene is the single most important thing healthcare workers can do to keep our patients safe. AiRISTA's Hand Hygiene Monitoring Solution is a great asset in improving our overall compliance and in detecting the barriers that our team members often face in order to be compliant".

Stephanie Mayoryk
RN BSN CIC
Infection Prevention Manager
Greater Baltimore Medical Center

www.airista.com

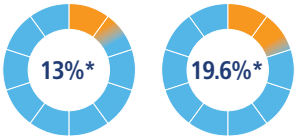
Remote Patient Monitoring = Anywhere, Anytime, on any device.

Growing

The population is aging[1]

Aging Population
People Ages 65+

1 in 8 Americans



2010 (Current) **40.3 million**

2030 (Projected) **71 million**

As patients age, chronic diseases and co-morbidities increase[2]

50% of 65 year olds have 1+ long-term conditions

75% of 75 year olds have 1+ long-term conditions

Co-morbidity is associated with

- **Poorer quality of life**
- **More hospital admissions**
- **Higher mortality**
- **Greater cost**

Costly

Cost of treating chronically ill patients[3]

$2 Trillion

$3 out of every **$4** of U.S. healthcare spending
Annual cost (2009)

Cost of hospital readmissions[1]

Nearly **1 in 5** patients readmitted in **30 days**

Estimated Preventable Cost Burden

$25 Billion Annually

Cost of "Never Events" or Hospital Acquired Conditions (HACs)[4]

2.4 Million extra hospital days

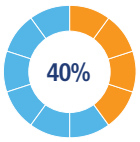
$9.3 Billion in excess charges/year
Centers for Disease Control and Prevention

Evolving

Physicians are rapidly embracing technology[5]

of physicians use smartphones and medical apps

Find they expedite decision making



Report mobile devices decrease time spent on administration

of doctors would like their patients to monitor their health at home, particularly their weight, blood sugar, and vital signs

48% interested in accessing health information online

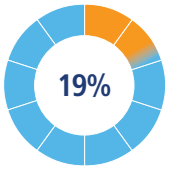
52% are comfortable consulting physicians via video connection

COVIDIEN OFFERS REMOTE PATIENT MONITORING TO MEET THE GROWING NEEDS OF PHYSICIANS, HOSPITALS AND PATIENTS

- CONTINUOUS WIRELESS, MOBILE MONITORING FOCUSED ON THE PATIENT AND PHYSICIAN
- INTEGRATED SOLUTION IN/OUT OF THE HOSPITAL
- MAY AID IN EARLY DETECTION OF PATIENT DECLINE OR ACTIVE RECOVERY
- VITAL SYNC MAY REDUCE ADVERSE EVENTS AND PREVENTABLE PATIENT DEATHS BY REMOTE DIFFERENTIATION AND PRIORITIZATION OF ALARM TYPE

Telemedicine – An Emerging Treatment Option[6]

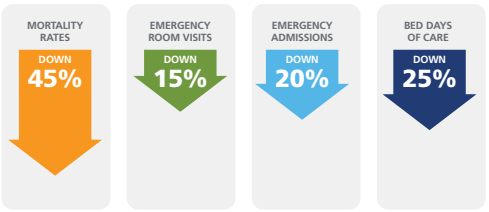
Physicians and hospitals are seeking new, less costly and more effective technology solutions to treat patients. Telemedicine is evolving as a treatment option with tremendous potential:



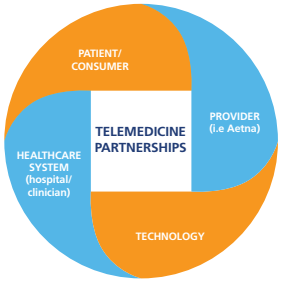
reduction in costs with equal/better outcomes and higher patient satisfaction

Benefits of Remote Monitoring

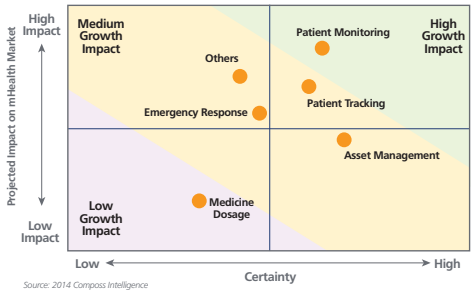
Study of 6,000 Patients Suffering from Diabetes, Heart Failure or COPD



Partnerships are Critical to Telemedicine[7]

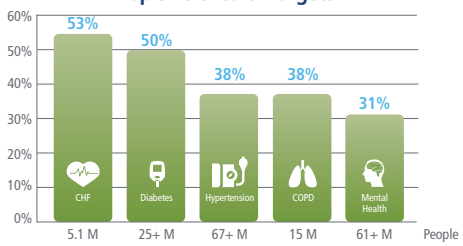


Growth Potential for mHealth Applications



Source: 2014 Compass Intelligence

Top 5 Telehealth Targets[8-10]



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1. California HealthCare Foundation, Congressional Budget Office, U.S. Centers for Disease Control, CMS, AAMC, and NEHI.
2. UCL Partners Academic Health Science Partnership, www.uclpartners.com/our-work/academic-health-science-network/integrated-co-morbidities.
3. Centers for Disease Control: http://www.dcd.gov/copd, http://www.cdc.gov/diabetes/pubs/estimates11.htm, http://www.cdc.gov/dhdspdata_statistics/-fact sheet/docs/fs_heart failure.pdf, http://www.cdc.gov/media/releases/2012/docs/dpk-hypertension-FACT%20SHEET_VS_Sep_BP%20Control_Final.pdf.
4. Centers for Medicare Advocacy, Inc., http://www.medicareadvocacy.org/InfoByTopic/Reform/Reform_08_09.25.NeverEvents.htm.
5. IDC, Gartner, Forrester, Frost & Sullivan, YouGov.comScore, CISCO Global Cloud Index 2013, CISCO Visual Networking Index Study 2013, Intel, AMD, IMS Research, Manhattan Research 2012, Rock Health Digital Funding Mid Year 2013, Paw Internet and American Life Project Health Online 2013, Epocrates 2013 report, and American HER Partners 2013 survey.
6. National Health Service (NHS) in England and 3millionlives.co.uk/.
7. American Telemedicine Association.
8. 2013 Market Data, Healthcare Intelligence Network.
9. Healthcare Intelligence Network, 2013 Healthcare Benchmarks: Telehealth and Telemedicine. www.hin.com.
10. National Alliance on Mental Health, www.nami.org/factsheets/mentalillness_factsheet.pdf.

ascom

CASE STUDY

Customer: Person Memorial Hospital

Location: Roxboro, North Carolina, USA

PERSON MEMORIAL HOSPITAL: IMPROVING PATIENT CARE AND SATISFACTION WITH THE HELP OF THE ASCOM TELLIGENCE NURSE CALL SYSTEM

"I knew the technology could support successful rounding in our hospital. Now we are seeing measurable results."

– Lindsay Atkinson, MBA, BSN, RN, CEN
Director of Emergency Services and Respiratory Therapy
Person Memorial Hospital

Pictured above, Lindsay Atkinson, MBA, BSN, RN, CEN, works with clinical staff to improve workflow and optimize direct patient care. The Ascom Telligence Staff Stations and wireless devices allow efficient staff-to-staff communications.

CHALLENGE

Shortly after Lindsay Atkinson joined Person Memorial Hospital as the Director of Emergency Services in 2010, she was tapped also to manage the facility's Medical/ Surgical Unit and find ways to improve care efficiency and satisfaction.

One area of potential improvement Atkinson said, was the hospital's nurse call system. This older technology stood in the way of her, and her employer's, mission to provide local residents with exceptional care without the need to travel to major markets.

The Process

The shift to a state-of-the-art nurse communications system began soon after Person Memorial Hospital was purchased by Duke LifePoint Healthcare in 2011. Taking the opportunity to share her goals with Duke LifePoint leadership, Atkinson's perseverance enabled her to secure the funding needed to implement a new nurse call solution and provide wireless telephones for staff.

"Our timing was right and we were really lucky that they could help us make this happen," Atkinson noted. "Safety and convenience were important factors, along with finding a solution that we could build on for future needs. In today's healthcare culture, the right technology solution can support nurses in their efforts to provide more efficient care.

CASE STUDY

By supporting patient rounding initiatives with Ascom technology applications, Person Memorial Hospital is achieving positive, measurable results, including increased patient satisfaction scores and fewer patient falls.

"If I am delayed in completing an hourly re-assessment, it could impact the patient. It was really important to find a solution that would support staff and their efforts."

After considering several options, Atkinson and other staff selected the Ascom Telligence Nurse Call System. By working closely with Ascom's local Strategic Partner, Pathway Technologies, Atkinson and her team were able to support their overall clinical objectives by integrating staff stations and wireless telephones. Since its implementation, Atkinson reported, the Ascom system has made a tremendous difference in staff efficiency.

Results

One of Atkinson's most important clinical initiatives was the implementation of rounding in the Medical/Surgical Unit. She had seen an increase in patient satisfaction scores when rounding was employed in the Emergency Department, and she anticipated similar results in this department, as well. In support of this goal, she deployed Ascom Telligence Staff Stations configured with reminders that alert staff when it is time to perform hourly rounds, check a patient's vitals, conduct an assessment or perform other actions. In addition to promoting an increase in HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) scores, reminders would be used in an effort to provide excellent skin care, through compliance with patient re-positioning standards, among other patient-centered pursuits.

"In the case of hospital-acquired wounds," shared Atkinson, "our incidence rate has dropped to 0-percent since we implemented the rounding and repositioning reminders." *(See Figure 1, left)*

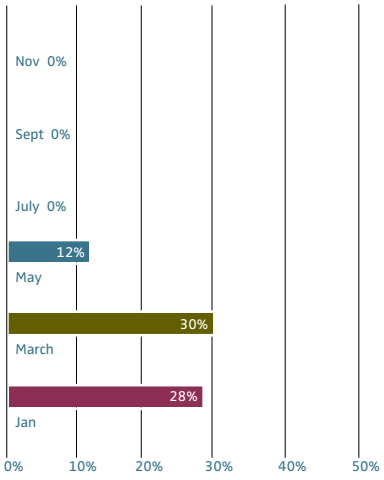

Figure 1: Hospital Acquired Pressure Ulcers
2013 Incidence Rates on PMH Medical/Surgical Unit

Indeed, research[1,2] supports scheduled rounding as a powerful evidence-based tool to improve patient care, safety and satisfaction. Studies also indicate that this scheduled attention fosters nurse job satisfaction and retention. And, of course, a more comfortable patient population and fulfilled staff help enhance institutional reputation and sharpen the competitive edge.

When powered by the right enabling technology, rounding can be permanently engrained in the staff workflow and the organization's best practices, reducing steps and stress by regular attention to patients' more mundane needs before they have to call for help and promoting timely interventions.

[1] *Margo A. Halm, RN, PhD, CNS-BC. Hourly Rounds: What Does the Evidence Indicate? American Journal of Critical Care, November 2009, Volume 18, No. 6, pages 581-584.*

[2] *Christine M. Meade, PhD, Amy L. Bursell, PhD, Lyn Ketelsen, MBA, RN. Effects of Nursing Rounds on Patients' Call Light Use, Satisfaction, and Safety. AJN, September 2006, Volume 106, No. 9, pages 58-70.*

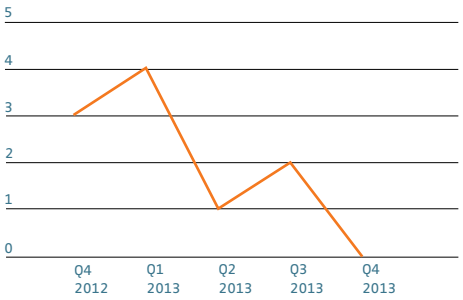

Figure 2: Average Inpatient Falls 2013
(Reported Quarterly)

The mobility enabled by the use of wireless devices also has had great impact on staff satisfaction, Atkinson said.

"Staff like that physicians can call them directly; they don't have to page a doctor and camp out at the nurse's station waiting for a return call," she continued. "Physicians can call a patient's nurse directly, which frees the nurse to continue her rounds. And from the patient's perspective, the nurse is able to spend more time with the patient, rather than at a desk waiting for a call. Our patients really like the added personal interaction." Atkinson shared that Person Memorial Hospital has posted modest gains in HCAHPS scores for nurse communications with patients, as well as response times.

Staff members on the Medical/Surgical Unit echo Atkinson's praise for the Ascom system. Cherie Allen, a Registered Nurse who joined Person Memorial Hospital less than a year ago, said she appreciates the functionality of the Telligence solution, which supports her work by keeping her organized and on schedule.

"My favorite feature is the reminders on the touchscreen Staff Stations," she said. "It takes the stress out of remembering everything on my own. We also use the Staff Stations to alert the Rapid Response Team and to let Environmental Services know there is a room that needs attention."

Prior to implementing the Telligence Nurse Call Communications System, Atkinson explained, clinical staff utilized a board in the nurses' station with magnets to designate "dirty room" status, with Environmental Services periodically checking the board for assignments. Now, when a room needs attention, clinical staff press the Room Readiness button on the Telligence Staff Station, and a text message is sent directly and immediately to Environmental Services. Additionally, a blue light is illuminated outside the patient room as a visual cue to addresss room turnover. This new process is speeding room readiness and reducing the time incoming patients may wait for available beds, according to Atkinson.

"When patients and their families see our workflow stations, they know we are using the latest technologies to support care giving," she added. "I am very proud that we can give the residents of our community the care that they need and they don't have to travel far to find it. We really are making positive changes for our patients."

Cherie Allen, RN, uses an Ascom wireless device to respond to calls from her patients. In regards to responsiveness to patient calls, satisfaction scores on the Medical/Surgical Unit have improved since implementing the Telligence Nurse Call solution.

About Person Memorial Hospital

Person Memorial Hospital, a Duke LifePoint Hospital, is a community hospital located in Person County, North Carolina. Dedicated in September 1950, Person Memorial has continued to grow and expand to provide the technology and services needed in Person County and the surrounding areas. For more information, visit www.personhospital.com.

CASE STUDY

About Duke LifePoint Healthcare

Duke LifePoint Healthcare, a joint venture of Duke University Health System, Inc. and LifePoint Hospitals® (NASDAQ: LPNT), was established to build a dynamic network of hospitals and healthcare providers. The joint venture, which brings together LifePoint's experience in community-based hospital management and Duke's world-renowned leadership in clinical service, is strengthening and improving healthcare delivery by providing community hospitals the clinical, quality and operational resources they need to grow and prosper. For more information, visit www.dukelifepointhealthcare.com.

About Ascom Telligence Nurse Call Workflow Solutions

The Ascom Telligence Staff Station is a wall-mounted touchscreen device for the patient room (pictured below) that promotes clinical workflow and communication across the hospital enterprise. The Staff Station is fully configurable to support the care processes crucial to any healthcare facility. Solutions may include rounding, falls or pressure ulcer prevention, medication reminders, precautions, room readiness alerts, rapid response team alerts and other clinical initiatives.

(Above) The Ascom Staff Station

(Left) Cherie Allen, RN, uses a Staff Station to set Reminders on the Medical/Surgical Unit.

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September 2014 M0292801 Ver A

CASE STUDY:
Mission Hospital

Mission Hospital
ST. JOSEPH HEALTH SYSTEM

- 552-bed facility in southern California with two campuses
- **Rate of lost or stolen devices dropped from 13.8% to 0%**
- **$150,000 to $200,000 annual savings** due to the reduced rate of lost or stolen devices
- **More than 50% increase in nursing satisfaction** relative to equipment availability
- **Significant increase in equipment utilization**

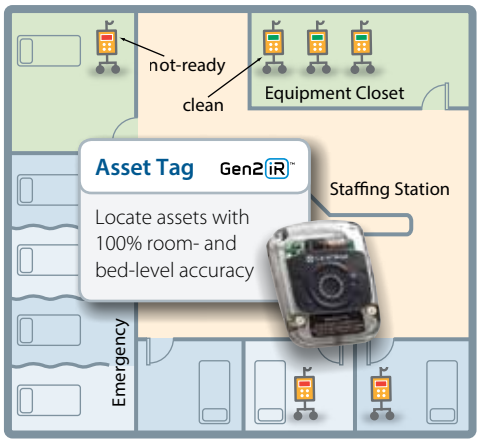
Major Southern California acute-care facility realizes significant savings and new efficiencies with CenTrak RTLS

Background

- Mission experienced substantial inefficiencies relating to moveable medical equipment and its management.
- Equipment shrinkage exceeded $150,000 annually, and rental costs were excessive.
- Nursing, BioMed and Equipment Management staff spent a great deal of time searching for equipment.
- The extensive searching for equipment caused the staff to hoard equipment.
- There was no reliable way to determine equipment utilization and purchasing needs.

RTLS Solution

- Mission Hospital hired VIXIA, an RTLS solution provider, to solve these equipment distribution and maintenance problems.
- VIXIA selected CenTrak's Second Generation Infrared (Gen2IR™) and Active-RFID system to track the location, cleaning and maintenance of its moveable medical equipment, resulting in significant savings for the hospital.
- VIXIA deployed the system and configured its own unique software to deliver an end-to-end asset management solution.
- CenTrak was chosen because of its industry-leading performance and ease of deployment. Key features include:
  - 100% accuracy at the room- and bay-level
  - Near immediate location update speeds (as fast as 1.5 seconds)
  - Wire-free infrastructure



Using the CenTrak's Second Generation Infrared (Gen2IR™), Mission Hospital is now able to track the location, cleaning and maintenance of its moveable medical equipment

Return on Investment and Results

- Rate of lost or stolen devices dropped from 13.8% to 0%.
- Annual savings of $150,000 to $200,000 due to reduced rate of lost or stolen devices.
- Nurse satisfaction increased more than 50% relative to equipment availability.
- Staff no longer hoarded equipment, making the equipment readily available.
- Significant increase in equipment utilization.

CenTrak – The *Smarter* Real-Time Location System

For more information please visit our website **www.centrak.com,** email us at **sales@centrak.com** or call us toll-free at **800-515-2928.**

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Improving Medication Infusion Safety Through Technology and Practice

Rosanne Raso, RN, MS, SVP Nursing - Joan Velletri, RN, MSN, AVP Nursing Education
Steven DiCrescento, RPh, MS Lutheran Medical Center
Presented at the American Organization of Nurse Executives 42nd Annual Meeting, April 2009

Lutheran Medical Center

Objective

This study was conducted to determine the incidence of averted infusion-related medication events after implementing smart pump technology with practice changes and to identify potential areas of risk for continuous process improvement.

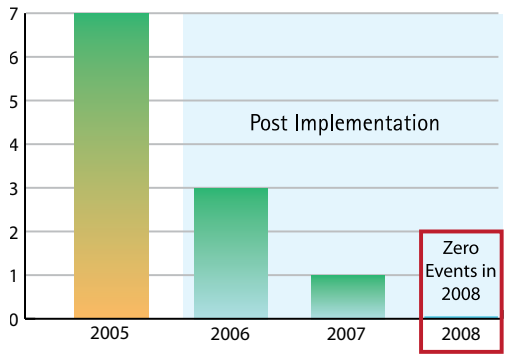
Methods

- 275 smart pumps were implemented in 2006.
- P&Ps were established to support smart pump use, to require independent double-checks for all dose overrides, and to provide random compliance checks.
- Retrospective analyses of pump data logs were conducted at three and 27 months post implementation. Data logs were analyzed for incidence of averted events, dose corrections and overrides.
- Based on analysis findings, process improvements were implemented.

Results

One year after implementation of smart pump technology and evidence-based protocols, we experienced a 57% reduction in infusion-related medication events. By year three, our infusion-related medication events were zero.

Infusion-related Medication Events 2005-2008



Analysis of the data logs demonstrated there were a total of 8 averted medication errors out of 1,536 programmed doses, representing an error rate of only 0.5%. Averted errors were associated with midazolam, propofol, vasopressin and amiodarone. No errors were associated with insulin or heparin.

Additionally, we found:

- 100% compliance with dose mode
- 100% wt-based ordering practice
- Low incidence of programming error (0.5%)

Impact of Data Analysis

- Identified dosing trends and issues
- Provided practice recommendations
- Provided drug library recommendations
- Documented 0 alerts with insulin or heparin
- Documented low incidence of error
- Documented positive results = positive staff

References

Raso, R., Velletri, J., DiCrescento, S. (2007). Making the most of data for patient safety. Patient Safety & Quality Healthcare, May/June 2007.

Acknowledgements

Lutheran Medical Center utilizes B. Braun Medical Inc.'s Outlook® Safety Infusion System and DoseTrac™ Analysis Services.

Discussion

Our concrete reduction in infusion-related medication events was due to:

- Easy-to-use smart pump technology
- Multi-disciplinary development of a drug library that reflected true clinical practice
- Adoption of protocols for dose mode use, override verification and compliance audits
- Ongoing education of nursing and resident staff
- Vendor support for data analysis to identify improvement opportunities and library changes
- Total engagement of management and staff
- Sharing of positive results

Improve Infusion Safety and Reduce Alarm Fatigue in the ICU

Cathy Sullivan, MSN, RN, FNP, CCRN, Director Patient Care Services
Mount Sinai Beth Israel
Presented at AACN NTI 2014

Objective

Our objective was to improve medication safety and reduce alarm fatigue through wireless integration of smart pumps, real-time monitoring and new data on dosing trends and practices.

Methodology

We implemented B.Braun Outlook® 400ES wireless smart pumps across a 4 hospital system including:

- A single, uniform drug library
- DoseTrac® real time monitoring & retrospective reporting
- DoseTrac® Analysis Service

A 2012 DoseTrac Analysis identified our top drugs associated with 51% of our override alerts at Beth Israel Hospital. We made modifications in dosing limits and practices, resulting in an overall 70% reduction in these alerts (Phase 1).

In 2013 a second DoseTrac Analysis was conducted comparing trends across the system, identifying our top drugs associated with 67% of system alerts. Additional improvements were made across the 4 hospital system (Phase 2).

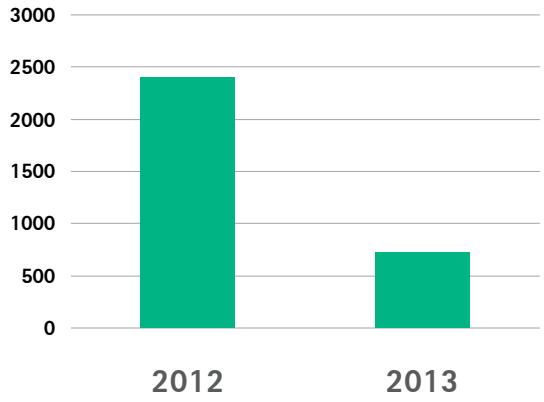
Results Phase 1

2012 Beth Israel Analysis

- 100% drug library utilization in ICUs
- Only 7% corrections and only 3 insulin alerts
- 51% of overrides associated with key drugs
- Drug library adjustments made
- Practice issues identified and addressed

2013 Results

70% REDUCTION
IN BETH ISRAEL ALERTS



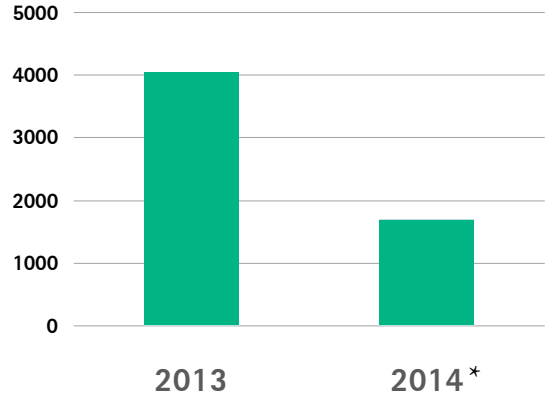
Results Phase 2

2013 System Wide Analysis

- Only 7% corrections across system
- 67% of system overrides associated with key drugs
- System wide drug library adjustments made
- System practice deviations (bolus dosing) identified and adjusted to enhance patient safety

2014 Results

58% REDUCTION
IN SYSTEM ALERTS



* Through April 2014

Conclusion

We significantly reduced our alerts and improved safety across our health system through the unique insight of the DoseTrac real-time monitoring, reporting and analysis service. We maintain our gold standard of care through scheduled reports, ongoing monitoring & routine data reviews with our vendor.

B BRAUN
SHARING EXPERTISE

Forget Smart Phones – What You Need Are Smart Pumps!

Cathy Sullivan, RN, NP, Director of Patient Care Services, Beth Israel Medical Center, New York, NY

Presented at the American Association of Critical-Care Nurses National Teaching Institute, May 2013

Objective

Medication safety is a primary goal for our system of 4 major medical centers in the New York City area. To reduce errors associated with IV infusion, we evaluated several infusion pumps with smart pump technology and selected the B. Braun Outlook® 400ES based on the following key safety features:

- real time data monitoring
- wireless retrospective reporting software
- ease of use
- light-weight, single channel device

After implementation, we used the real time view and retrospective infusion data to identify opportunities to further enhance patient safety.

Methods

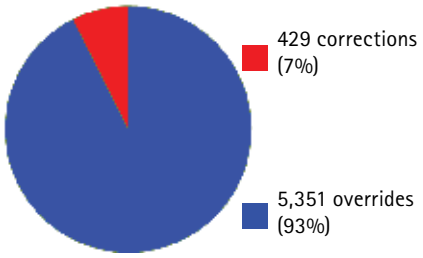
A multidisciplinary team from all hospital sites met weekly to standardize our hospital formulary, including drug concentrations, diluents, and weight-based dosing. The new formulary was updated in our electronic medical record and computerized physician order entry. A smart pump drug library was created with input from various departments, establishing parameters such as soft and hard dosing limits, clinical advisories, and bolus dosing. We created a single, uniform drug library for all smart pumps across our system.

DoseTrac® Real Time and Retrospective Data

Real time monitoring allowed us to see all of our infusions, confirm whether they were programmed in the drug library, and immediately identify if any infusions were outside the dosing limits. **We were pleased to find drug library utilization in critical care at 100%.** Retrospective reports allowed us to identify trends with drug library utilization, dose overrides, corrections, and top drugs associated with alerts. Six month data analysis (Jan – June 2012) showed the following:

Overrides vs. Corrections

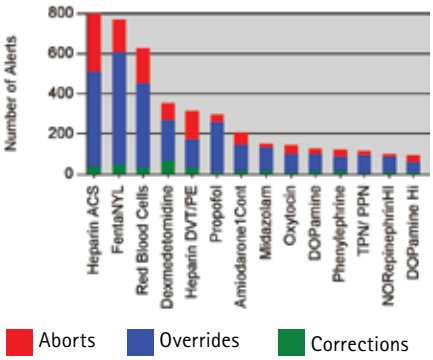
n = 5780 Alerts



- Few dose corrections indicate low incidence of programming error
- Only 3 insulin corrections over 6 months!
- High number of overrides led us to look at our soft limits and practices

Alerts by Drug

2012



- 493 heparin ACS overrides - exceeding soft limit of 1000 units/hr
- 46 fentanyl "good catches"- all corrected to within the soft limits
- 396 RBCs overrides – 52% due to infusing 80-100 ml/hr (soft max 75 ml/hr)
- 198 dexmedetomidine overrides – exceeding soft limits and bolus dosing
- 250 propofol overrides – 23% due to bolus dosing
- 2988 bolus doses - using bolus feature

Results

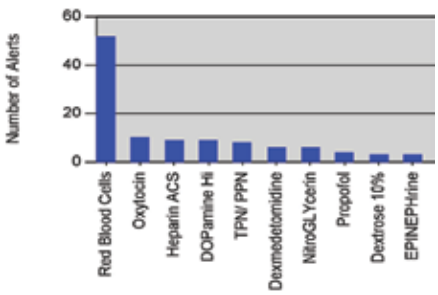
Significant reduction in alerts was achieved through dosing limit modifications, education on use of bolus feature, cheat sheet for staff, and distribution of weekly DoseTrac reports to pharmacy, nursing, and administration.

Reduction in alerts for target drugs:

- **88% reduction in heparin ACS alerts**
- **88% reduction in fentanyl alerts**
- **48% reduction in RBC alerts**
- **45% reduction in dexmedetomidine alerts**
- **63% reduction in propofol alerts**

Overrides by Drug

2013



- Continue to evaluate RBCs due to incidence of overrides

Compliments of:

B BRAUN
SHARING EXPERTISE

Smart Pumps: Achieving 100% Drug Library Compliance & Averting Medication Errors

Christine Ruhl, BSN. CCRN, Nurse Manager CVU, ICU, Cardiology Services. Cheryl Grogg, BSN, Nurse Manager HLC
Presented at the American Association of Critical-Care Nurses National Teaching Institute, May 2013

INTRODUCTION

Goals of the Project

- Uphold the health system culture of patient safety by improving medication administration processes and monitoring
- Standardization of practices, supplies, and implementation of new technology to decrease potential for pump related errors and associated patient harm

Problems Identified

- Old Technology with limited safeguards
- Clinician manual programming for IV drip infusions
- Customized medication concentrations and infusions leading to large variability
- Multiple types and models of IV pumps and accessories throughout the organization
- Reporting of medication errors relied solely on direct observation and self reporting

IMPLEMENTATION

PHASE I

- Development of the multidisciplinary team with members from Pharmacy, Nursing, Education, Biomed, Materials Management, and Management
- Research and investigation regarding different vendors and technology available including site visits and testing of IV pumps in-house with our wireless system.

Over 400 Outlook® ES IV pumps were installed throughout the health system, almost a full year from the start of the project!

PHASE II

Drug Library Development

- Pharmacy applied best practices and evidenced based guidelines for medication infusions to recommend standards for IV drip concentrations and infusions

Examples:

  - Fenoldopam in both 10 mg/250ml and 20mg/250ml-standardized to 20mg/250ml
  - Norepinephrine prescribed both mcg/kg/min and mcg/min dosing-standardized to mcg/min
  - Epinephrine and phenlyephrine dosed both mcg/min and mcg/kg/min-standardized to mcg/kg/min

- Collaboration between Pharmacy, Physicians and Nurse Clinicians to evaluate practices and preferences
- Safety "double-checks" including clinician advisories on high risk medications Heparin and Insulin
- Soft minimum and soft maximum dosing limits set for all drugs to alert clinicians of programming that is above or below the customized limits set
- Soft limits designed to warn but not restrict
- Hard maximum limits set for high alert drugs preventing clinicians exceeding specified dosing limit

PHASE III

- Drug Library Validation Workshop
  - Multidisciplinary review of the drug library by all areas
  - Nurses, physicians, and pharmacists included
- Training Workshops
  - Clinical Mentors (Resource staff for each area)
  - All nurses received hands on training immediately before pump implementation
- Patient ID scanning procedure with handheld and built in pump scanners for patient specific real time monitoring

INNOVATION

DoseTrac® Real Time Data

- Monitoring by clinicians and pharmacy to view pump settings, alerts and active alarms
- Pharmacists use real time monitoring to improve workflow and decrease turnaround times

DoseTrac Reports

- Retrospective reports of pump infusions and alerts to understand trends, identify education opportunities and drug library improvements

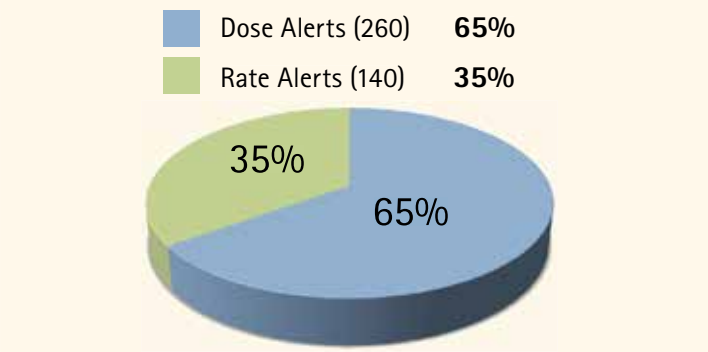
Technology Integration

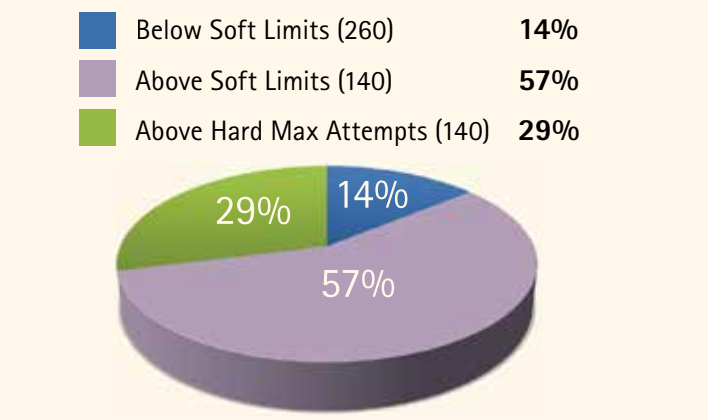
- Smart pump IV solution is embedded with BMV process
- Smart pumps are integrated with nurse call and portable phone technology
- Alarms from IV pumps are directed through nurse call system directly to the phone of the primary caregiver

DATA ANALYSIS RESULTS

- Initial data analysis was completed 6 weeks post implementation
  - Total of 11,784 infusions – 35.34% used drug library

Post Implementation: Total 400 Alerts in 11,784 Infusions





INTERVENTION

- Weekly unit-based audits to assess and document drug library utilization and compliance due to
  - Overall low drug library utilization (35%)
  - High number of aborts
  - Wrong care area/location selections
- Targets of 95% established across key infusion pump metrics:
  - Dose delivered infusions, rate delivered infusions, correct location, and correct care area

OUTCOMES

Compliance Rates

	Target	12/2011	07/2012
Dose Delivered	95%	93%	**100%**
Rate Delivered	95%	49%	**100%**
Correct Location	95%	92%	**100%**
Correct Care Area	95%	62%	**100%**

- **Compliance increased to 100% through awareness, education, and process improvements**
- **Within the first three months of implementation, seven (7) adverse drug events were averted**

LESSONS LEARNED

- Alert fatigue from soft maximum limits set too low vs. actual infusion practices was a concern
  - Limits adjusted to prevent potential alert fatigue and maintain safe dosing
- Ongoing education: Bolusing, oncology drug infusions
- Communication with staff
  - Outcomes, good "catches" and averted errors
- Custom concentrations could possibly increase errors:
  - Propofol entered as 10mg/100ml instead of 1000mg/ml could result in 100 times higher rate
  - Norepinephrine 8mg/250ml programmed as 4mg/250ml could result in an infusion rate double the intended rate
  - These examples demonstrate opportunities for error when custom concentrations are enabled
  - Supported decision to limit entering custom concentrations on as many drugs as possible
- Smart pump technology resulted in improving medication safety, preventing patient harm, faster recognition and response to alarming pumps, and further promoting a culture of safety!

Compliments of:

B|BRAUN SHARING EXPERTISE

CardinalHealth
Essential to care™

Seeing new opportunity

Cardinal Health Inventory Management Solutions optimize the supply chain at Emory Saint Joseph's Hospital

Taking control of the future

The Affordable Care Act (ACA) mandates that health systems eliminate waste, and across the country they're responding by pledging to cut billions of dollars in unnecessary costs. A prime target is the medical-surgical supply chain. And for Emory Saint Joseph's Hospital in Atlanta, a key strategy is improving inventory management by automating product tracking and utilization.

"With the rollout of the ACA and changes to reimbursements, it's important that we control expenses more than ever," said Julie Swann, MBA, MHA, BSN, RN, Specialty Director, Cardiology Services/eICU for Emory Saint Joseph's Hospital. "Over the next five years, it will be a mandate for C-Suites everywhere. At Emory Saint Joseph's, we're being careful with supply costs, so we don't have to look at reducing labor to control expenses. The Cardinal Health RFID solution is a solid way to help us do that. Now we have an up to date and live look at inventory—easily seeing expired and missing products in real time and setting par levels." And that's just the beginning.

Meeting aggressive goals

Part of the Emory Healthcare system, Emory Saint Joseph's Hospital was founded by the Sisters of Mercy in 1880 and is Atlanta's oldest hospital. Today, the 410-bed, acute-care facility is recognized as one of the top specialty-referral hospitals in the Southeast.

The Cardinal Health RFID solution is helping Emory Saint Joseph's effectively manage more than $2.5 million in inventory, monitoring over 2,000 SKUs in seven Cardiac Catheterization labs and three Electrophysiology labs. The approach is improving financial, clinical and operational performance by:

- **Saving inventory costs:** The Cardinal Health RFID solution reduces and right-sizes on hand inventory, setting accurate par levels based on real-time usage patterns. The approach also optimizes bulk buys to take advantage of cost savings without tying up cash on the shelves with unneeded products. And it eliminates overnight shipping due to stockouts.
- **Maximizing revenue:** Emory Saint Joseph's captures all patient charges at the point of care—and manages missing items daily to avoid loss charges.

ROI at a glance

Saved
3 hours in labor every day ordering products.

Eliminated
100% of overnight shipping costs due to stockouts.

Recovered
$300,000 in chargeable product costs through active alerts.

Improved Electrophysiology Lab (EP) inventory turns by 60%

Automated
100% of expiration and recall alerts to meet highest patient safety standards.

Tracked
100% of short-dated products to help avoid expiration and maximize utilization.

Reduced aging inventory and maximized throughput with
84% of products less than one year old.

Meeting aggressive goals *cont.*

- **Automating inventory management:** Now hospital staff can order products based on projected usage, decreasing shelf life and improving turn rates. The system monitors high-use products to avoid stockouts—and low-use products to exchange them before expiration. Automated processes help prevent manual errors.
- **Optimizing clinical workflow:** From picking products to capturing usage to returning unused products to inventory, the Cardinal Health RFID solution improves efficiency everywhere.
- **Improving patient safety:** Automated alerts notify staff of expiring and recalled products—before they can be used with patients.
- **Increasing clinical satisfaction:** Now there is greater product availability, so clinicians don't need to be concerned about stockouts.

"It's important that we control expenses more than ever. Now we have an up to date and live look at inventory."

Julie Swann, MBA, MHA, BSN, RN
Specialty Director, Cardiology Services/eICU
Emory Saint Joseph's Hospital

Better than barcoding

When Emory Saint Joseph's first decided to update its inventory management and usage tracking system, the plan was to implement barcoding in two high-volume procedure areas, the Cardiac Catheterization and Electrophysiology labs. Then the Cardinal Health RFID solution came to the table and that changed everything.

"Emory Saint Joseph's saw that there would be an immediate ROI with a minimal investment of time and IT resources," said Lisa Stepps, Account Manager for Cardinal Health. "There wouldn't be the year of transition that barcoding would require." Instead of extensive new construction, Emory Saint Joseph's could simply replace the current wire shelving in the procedure areas with Cardinal Health Smart Cabinets.

The Cardinal Health RFID solution was an attractive alternative to barcoding for another critical reason: "Barcoding can't tell you what inventory you have on hand, every minute of every day," Stepps said. The Cardinal Health RFID solution provides that unprecedented visibility, giving Emory Saint Joseph's an effective, data-driven tool to optimize inventory, while improving patient safety and clinical satisfaction.

"The true advantage of the Cardinal Heath RFID solution is providing real-time supply chain visibility for the real world," said Carola Endicott, Vice President, Operations and Services for Cardinal Health. "This is the first end-to-end supply chain solution that can give Emory Saint Joseph's what every provider needs to succeed in the new healthcare world: more control over supply costs."

Greater inventory control in…

4 simple steps

1. **Tag the item**
   Either the manufacturer or hospital staff can easily attach the tag to the product in seconds.
2. **Store the item in the supply area**
   There are several storage options, including Smart Cabinets and a handheld Smart Wand for use with conventional shelves.
3. **Use the item during a procedure**
   By waving or scanning at the point of use station, the item is recorded as "used" and linked to the patient's chart. Unused items are returned to storage and automatically logged into inventory.
4. **Replenish, analyze and optimize your inventory**
   Automated reordering streamlines the replenishment process. Then our advanced, cloud-based software unlocks actionable business insights.

Tracking products, setting pars

"The problem in the procedure areas was that there was a lot of product in the storerooms," Swann said. "When we first started using the Cardinal Health RFID solution, we were able to do some 'spring cleaning' right away and save $10,000 in inventory holding costs." With that baseline inventory level established, Emory Saint Joseph's was then able to adjust par levels to match utilization.

"Before RFID, our inventory visibility was limited to knowing what we had ordered. Now, we're tracking actual usage patterns in real-time—and automatically setting accurate par levels," said Chuck Naylor, Senior Business Manager at Emory Saint Joseph's Hospital. "There's not enough time in the day to manually set pars. Now, they're preset and can be overridden if necessary—and there's no learning curve to do it."

"Now we're tracking actual usage patterns in real time—and automatically setting par levels."

Chuck Naylor
Senior Business Manager
Emory Saint Joseph's Hospital

In the first 18–24 months of using Cardinal Health RFID, Emory Saint Joseph's was steadily shrinking inventory to match utilization. According to Naylor, "Cardinal Health RFID definitely reduces inventory," in a controlled and measured way. Automated reports also improve inventory management. For example, Emory Saint Joseph's can create prospective reports for products due to expire in the near future. So they can be used or replaced, as needed, before expiration.

The Cardinal Health RFID solution improves revenue as well. "Cardinal Health RFID integrates with our charting and documentation system, which cuts down on manual errors and improves charge capture," said Lisa Newton, Unit Director of the Electrophysiology (EP) Lab.

"Cardinal Health RFID integrates with our charting and documentation system, which cuts down on manual errors and improves charge capture."

Lisa Newton
Unit Director, EP Lab
Emory Saint Joseph's Hospital

Launching success

"Once the RFID infrastructure was set up, the Cardinal Health team came in en masse," Naylor said. "There were plenty of boots on the ground. During the first month of implementation, there was a dedicated Cardinal Health RFID person on-site."

"The staff said, 'This is all I have to do, and Cardinal Health does the rest?' There was immediate buy-in."

Lisa Stepps
Account Manager, RFID-enabled technologies
Cardinal Health

Products were tagged over a weekend, and Emory Saint Joseph's was able to identify and pull expired products right away. "It was eye opening. The staff was pleasantly surprised—and it was a win-win from day one," Stepps said. "The staff said, 'This is all I have to do, and Cardinal Health does the rest?' There was immediate buy-in. There was also a lot of confidence from the physicians, who have never been without a product since the implementation of the Cardinal Health RFID solution."

Because of the high product visibility that the system provides, there is ample flexibility to adjust inventory levels based on changes in utilization patterns. "Can I order more or less, based on these patterns—and still save money as I do? Cardinal Health enables Emory Saint Joseph's to do just that," Stepps said.

Improving supplier relations

"Suppliers love the stronger communication and collaboration that Cardinal Health creates," Stepps said. For example, the data generated by the Cardinal Health RFID solution supports the hospital's compliance with their market share agreements. "In fact, many suppliers tag their products for us," Stepps said, further saving staff time at Emory Saint Joseph's.

Just getting started.

The more hospital systems are tasked with reducing costs while improving patient care, the more technology can play a critical role. For Emory Saint Joseph's, the Cardinal Health RFID solution is an important part of the leading hospital's savings and quality strategy. And we're just getting started.

cardinalhealth.com/cims

Cardinal Health
7000 Cardinal Place
Dublin, Ohio 43017

CardinalHealth
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Keeping a careful eye on Cath Lab Inventory Management

The Affordable Care Act (ACA) mandates that health systems eliminate waste and across the country many have responded with innovative ways to cut billions of dollars in unnecessary costs. Memorial Hospital in Chattanooga, Tenn., has cut expenses significantly with fully integrated, RFID-based inventory management systems across their seven labs.

By Mary C. Tierney

"It made us nervous not knowing if we had what we needed, so we put a lot of work into constantly checking the shelves," says Cath Lab Director Terri Siever, RN, RT. Now she lets the products count themselves. More than five years and 30,000 cases later, the team at 365-bed Memorial Hospital has myriad lessons to share with facilities needing to take control of their inventory.

After labor, inventory represents the single largest expense for most hospitals. Costs in the cath and EP labs are especially high with high-cost implantables, as well as a wide variety of physician preference items. The team at Memorial also had a mission to streamline inventory and workflow in the cath lab with the help of an inventory management system, says Siever, who was part of the implementation team.

"On the clinical side, we knew there were things we could do a better job on," she says. "With this system, we were confident we could have an impact on performance from several perspectives: clinical, financial and operational. When we ran the numbers in potential savings and ways it could improve safety, our administration bought in pretty quickly."

In each of Memorial's labs, Cardinal Health Smart Cabinets read contents automatically while RFID-enabled point of care stations capture usage, with a real-time feed to the hemodynamic monitoring system. Web-based software includes reports on inventory, while mobile barcode capability tracks all other supplies.

Before an interventional team starts a procedure, the clinician simply pulls the supplies from the cabinet. No access codes are needed. The system automatically notes the time and date items are removed. When items are used during the procedure, the clinician either waves the RFID tag or scans barcodes at the point of care. Staff returns unused supplies to the cabinet, which automatically logs them back into inventory.

"We have significantly reduced our inventory of balloons and stents," Siever says. "We stock all essential supplies with an emphasis on quality not quantity."

Confidence in making sure expired or recalled devices don't reach patients gives the Memorial team peace of mind. "We have that confidence thanks to our inventory management system," Siever says. "It is essential to managing labs these days. It makes life so much easier for cath lab staff. Administrators get revenue integrity and expense quickly and accurately."

A clinician scans a product at an RFID-enabled point of care station.

What's the real value of live, RFID-based inventory management?

- Greater inventory visibility, tracking and control
- Real-time consumption data and on-hand inventory value
- Physician utilization patterns by product type and cost
- Hospital market share data — supports enterprise visibility
- Tracking what clinicians use most, enabling bulk buys and reduced per-unit costs — provides strategic purchasing
- Prevents expired and recalled items from reaching patients
- Proactively manage recalled and about-to-expire devices
- Staff focus on patient care, not inventory — eliminate manual counts
- Instant charge capture through interfaces — ensures accurate billing for reimbursement

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As seen in
Cardiovascular Business

Case Study: NYC Health & Hospitals Corp.

HHC NEW YORK CITY HEALTH AND HOSPITALS CORPORATION
nyc.gov/hhc

Carter.
Henry J. Carter Specialty Hospital & Nursing Facility

NEW CONCEPTS IN HOSPITAL BASED

Alarm Management

About HJC

A facility member of the New York City Health and Hospitals Corporation (HHC), the new Henry J. Carter Specialty Hospital and Nursing Facility (HJC) offers the latest in clinical technology and expertise in a modern, beautiful, and welcoming environment. Unique among New York City's healthcare resource centers, Carter provides safe and superior-quality care across the continuum of long-term acute care and skilled-nursing care, with clinical excellence and a patient-focused philosophy as its cornerstone.

The Challenge

The New York City Health and Hospitals Corporation technology team had a strategic vision for medical device integration. They wanted a robust and extensible technology infrastructure that offered vendor-neutral connectivity. Starting with the new Carter facility, specific integration points were required including interfaces to hospital information systems(HIS) such as the ADT system, and an existing Nurse Call solution. The first challenge was to deploy the infrastructure rapidly and provide an intelligent solution to manage clinical alarms, while integrating existing Nurse Call and wireless communication technology solutions.

Since the Carter facility was brand new, the technology infrastructure components had to be deployed on a Sunday morning, starting at 2am. A schedule was set to transfer patients on a Sunday morning for minimal impact to patients and to avoid New York city traffic. Once the patients were transferred, everything had to be setup, connected and operational. The CPC team worked around the clock to install the required components, test all medical devices and ensure a seamless transition to the new facility.

The Solution

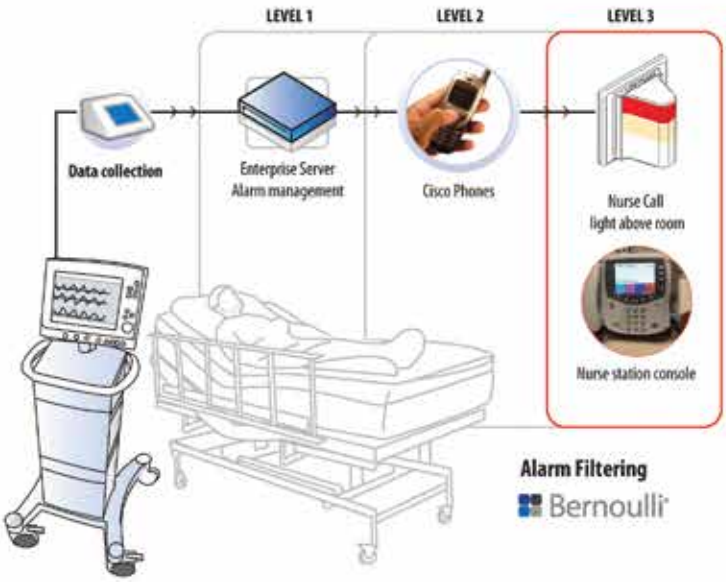
Bernoulli Multi-Port Bridges (MPB) provide continuous and high fidelity data collection of over 130 bedside ventilators and pulse oximeters. An ADT feed automatically assigns patients to the correct medical device, based on the room assignment. Vital patient information is collected, while alarms and alerts are sent to nurses' and respiratory therapists' wireless devices (Cisco phones) as well as the Nurse Call mechanism.

Alarm Filtering

HJC required a more intelligent approach to addressing clinical alarms and alerts. Bernoulli MPBs send data to a Bernoulli server which distributes alarms immediately to Cisco Phones. One thing HJC quickly realized was that the volume of alarms being distributed to Cisco phones was very high and unmanageable. They needed a way to both filter alarms, and utilize the Nurse Call system for lethal alarms only. The Bernoulli solution fit perfectly for this.

Bernoulli
CARDIOPULMONARY CORP.

System Overview



About Cardiopulmonary Corp.

Cardiopulmonary Corp. is a well established leader in real-time data integration and has extensive experience in the deployment of software solutions for a wide variety of applications, which include data migration to Electronic Medical Records via standard HL-7 interfaces supporting all major HIT vendors, and mission-critical patient safety applications for use in active patient monitoring, clinical surveillance, alarm management, analytics and ICU high acuity telemedicine.

Bernoulli Enterprise is a vendor-neutral, device-agnostic solution. Key features include, but are not limited to:

- FDA 510(k) clearance as a Class II Medical Device, for data integration, active patient monitoring and alarms
- Collection, processing, and distribution of high–fidelity data, including waveforms
- Integrates with ADT/EMR systems, third-party applications, tools, utilities and emerging technologies

The Leader in
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for over 2 decades

Flexible and modular

Bernoulli Enterprise software provides a web-based control panel for defining alarm behavior for supported medical devices, providing the first level of alarm intelligence. The next level involves alarm distribution, consisting of a flexible system designed to support enterprise systems such as Nurse Call, Emergin, Ascom, Spectralink, and Cisco, as well as traditional paging methods. Bernoulli Smart Alarms enable additional alarm intelligence, independent of the medical device, which can be used to reduce nuisance alarms or add an additional layer of patient safety to critically ill patients.

Customer: NYC Health & Hospitals Corp.
Facility: Henry J. Carter Specialty Hospital and Nursing Facility
Number of Beds Monitored: 150
Number of devices connected: 150

Bernoulli
CARDIOPULMONARY CORP.

Call 800-337-9936
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*** Visit us at the 2015 HIMSS Intelligent Hospital Pavilion - Booth number 6656-11 to learn more.**

CASE STUDY

Best practices in medication management

Pyxis Pharmogistics® inventory management software helps connect pharmacies at three hospitals, providing a perpetual inventory system and near real-time access to pharmaceutical stock levels

Situated three hours west of Chicago along the Mississippi River, UnityPoint Health-Trinity serves the greater Quad-Cities metropolitan area. As part of its efforts to strengthen its Midwestern presence, Trinity implemented an electronic medical record (EMR) system in three of its hospitals. Dovetailing on this transition, Trinity's leaders made a strategic decision to invest in additional technology to address several challenges in its pharmacies.

"We made a thoughtfully planned capital investment to create a regionalized pharmacy structure for three of our hospitals," says Jean B. Doerge, Chief Nurse Executive at Trinity. "Each of those pharmacies was functioning independently, but we were confident we could gain many efficiencies if we created one central hub for dispensing medications. We had specific objectives and issues to address. This change wasn't undertaken just for the sake of technology."

As a result of its strategic decision, Trinity has streamlined inventory management practices, increased the efficiency of pharmacy staff and decreased costs.

Increasing inventory management accuracy

With the implementation of its EMR, Trinity moved from a centralized robotic pharmacy dispensing system to a decentralized model using automated dispensing cabinets (ADCs) known as Pyxis MedStation® systems. The uniqueness of this transition comes from a centralized ADC replenishment strategy in which one hospital picks the medications to refill pharmacy shelves and Pyxis MedStation systems across the three Trinity hospitals.

The backbone of this solution is the Pyxis Pharmogistics® inventory management software from CareFusion and two carousels at the Trinity Bettendorf hospital campus. The software interfaces with orders placed in the EMR, Pyxis MedStation system replenishment orders and the ordering system from Trinity's medication wholesaler.

At set times during the day, the software collects orders from all three hospital campuses and uses the carousels at the Bettendorf campus to fill them. By automatically receiving this information, Pyxis Pharmogistics software helps process requests quickly to accelerate inventory turns, maintain stock at optimal levels and reduce waste from expired drugs.

"Medications are one of the costliest commodities in a hospital," says Doerge. "In our prior state, we manually counted our inventory, which took an enormous amount of time and work. As we moved to the new system, we

learned that we had many more supplies on hand than we actually needed." By implementing Pyxis Pharmogistics software, Trinity has been able to increase inventory turns by more than 25% and decrease inventory costs by more than $140,000 across the three hospitals.

"Because the inventory is managed through Pyxis Pharmogistics software, we now have a perpetual inventory system that has near real-time access to pharmaceutical stock levels at all three hospitals," says David Scott, Pharmacy IT Project Coordinator at Trinity. As a result, the state-of-the-art system has allowed Trinity to expand its Pyxis MedStation system utilization across all areas to improve charge capture for its pharmacies. In addition, because orders are generated automatically, a single buyer can fill a majority of medication needs across the three hospitals, which helps standardize the procurement process.

Optimizing pharmacy staff

The implementation of Pyxis Pharmogistics software also increased pharmacy staff efficiency by allowing them to prioritize their work on more value-added, patient-centric activities.

"Before, completing a Pyxis fill required a great deal of handwritten paperwork and involved several pharmacists and pharmacy technicians—no one misses that now," says Daniel Petefish, PharmD, Lead Pharmacist at Trinity. With the workflow efficiencies gained through Pyxis Pharmogistics software, Trinity's pharmacists have more opportunities to apply their knowledge and expertise in the clinical setting by interacting with care teams.

As the work processes changed for Trinity, its leaders understood that the pharmacy staffing structure itself might also need to be adjusted. They evaluated its staffing plan on an hour-by-hour basis at every campus, looking at patient volumes, types of medications requested and the method of administration.

This data informed revisions to pharmacy staffing plans. Some employees were redeployed so they could work at the top of their license in other areas, such as oncology. As a result, Trinity experienced an unexpected ROI of several hundreds of thousands of dollars.

"That kind of savings wasn't our goal, but it was an area where we were able to translate the technology into a true process savings around pharmacy personnel," says Doerge. "It allowed us to circle back and think about labor standardization and our staffing plans. I don't know if we would have ever done this without the technology."

"The efficiencies that resulted went beyond our expectations and significantly improved the pharmacy's operations while positively impacting the entire health system."

Jean B. Doerge
Chief Nurse Executive,
UnityPoint Health-Trinity

Assessing from the bedside to distribution

Doerge believes one of the keys to revamping any pharmacy process is to start from the bedside and work backward to distribution in the pharmacy, assessing the strengths and weaknesses at each point along the way. As Trinity did so, it learned more than expected. For example, it developed several other systems for tracking expiration dates and meeting regulatory requirements when pharmacists are preparing compounds.

For more, visit **carefusion.com/himss2015.**

Note

* UnityPoint Health-Trinity results reflect the hospital system's medication management process in conjunction with Pyxis technologies.

Pyxis®

CareFusion

CASE STUDY

Wireless interoperability helps optimize intravenous infusion safety, documentation and management

Children's Hospitals and Clinics of Minnesota integrates CareFusion Alaris® System smart pumps with *Cerner Millennium*® electronic health record system

Children's Hospitals and Clinics of Minnesota (Children's Minnesota), partnering with CareFusion and Cerner, became the first pediatric hospital system to achieve interoperability between smart intravenous (IV) infusion pumps and an electronic health record (EHR) system. Children's Minnesota is also the first hospital of any type to implement infusion interoperability for both large-volume and syringe IV infusions. The state's largest provider of neonatal, cancer, diabetes and cardiac care, Children's Minnesota is a nonprofit, independent pediatric health system with 381 inpatient beds, 1,700 professional staff, 12,218 inpatient admissions, 20,453 surgical cases, 403 active research programs and approximately $590 M in annual revenue.

Following its successful pilot study in a PICU in March 2012, Children's Minnesota has implemented smart pump-EHR interoperability for all 381 inpatient beds throughout its Minneapolis and St. Paul hospitals, including ICUs, medical/surgical units, short-stay units, the ER and surgical services for acutely ill pediatric patients ranging from 400-g neonates to 150-kg adolescents. The goal is to continually increase medication safety while reducing costs, using technology to help decrease costly adverse drug events (ADEs) by 10% to 15% per year.

High-risk IV infusions present much greater medication safety challenges than non-infusion medications.[1] IV infusion errors, which involve high-risk medications delivered directly into a patient's bloodstream, are the medication errors with the greatest potential to cause harm—especially for pediatric and neonatal patients requiring precise weight-based dosing.[2] Traditional barcode medication administration (BCMA) systems,

which help ensure the 5 rights *(right patient, medication, dose, route and time)* for a single dose, provide only limited safety value for high-risk IV infusions.[3]

Improved infusion administration

Dose-error-reduction software (DERS) in Alaris® System smart pumps alerts clinicians to manual infusion-pump programming that exceeds hospital-established limits. Smart pump Auto-ID systems have used barcode scanning to populate the pump with limited infusion-order information from the IV medication label. Now wireless interoperability between the Alaris System and the Cerner *CareAware Infusion Suite*™ EHR makes it possible to pre-populate the pump with the ordered infusion parameters transmitted directly from the EHR.

Scanning the barcode labels on the patient wristband, medication label and infusion pump helps verify the 5 rights and triggers wireless transmission of the ordered infusion parameters from the EHR to the smart pump module. This solution helps eliminate order transcription errors and almost all of the error-prone manual programming previously required to begin an IV infusion. The solution also automatically engages the Alaris System Guardrails® dose-error-reduction software to further protect the infusion. During IV administration, infusion data is wirelessly transmitted from the Alaris System in near real-time to populate Cerner *CareAware Infusion Suite* documentation, graphing, patient infusion view, and unit infusion views. This helps secure the 6th Right of medication administration—right documentation.

Results

Results from the six-week PICU pilot study of the integrated system* showed that nurse compliance with barcode scanning was close to 90%. Guardrails-protected infusions increased by 15%, and manually programmed infusions decreased by 33%. Personnel-reported medication errors

decreased by 71%. Nurses increased their adoption of scanning for pre-population of infusion parameters at a higher rate than with the earlier Auto-ID. Since completing enterprise-wide implementation of the new system, preliminary data show even greater, sustained increases in Guardrails-protected infusions. The integrated system can also help Children's Minnesota quantify the return on investment (ROI) to the leadership team.

"We've broken new ground and shown what's possible," says Bobbie Carroll, Senior Director for Patient Safety and Clinical Informatics at Children's Minnesota. "While this is not the first time barcodes have been used to match medications with patients, it is the first time they have been used to pre-program both large-volume and syringe infusion smart pumps in a children's hospital. This really opens a new era in IV medication safety in helping protect our most vulnerable patients."

For more, visit **carefusion.com/himss2015.**

Note

* Children's Hospitals and Clinics of Minnesota's results reflect the facility's infusion processes and protocols in combination with Alaris technologies.

References

1 Carroll, B. Integrated solution helps improve pediatric patient safety, streamline IV medication management. *Pt Safety Qual Healthcare*, March/April 2013. **2** Williams, C., Maddox, R., Heape, E. et al. Application of the IV Medication Harm Index to assess the nature of harm averted by "smart" infusion safety systems. *J Patient Saf*, 2006, 2:132–139. **3** Vanderveen, T. IVs first: A new barcode implementation strategy. *Pt Safety Qual Healthcare*, May/June 2006.

Alaris®

CareFusion

CareVia
Healthcare Connected

The Healthcare Industry is Undergoing Significant and Undeniable Transformation

The Challenge:

As the healthcare landscape shifts from fee-for-service to value-based care, real-time health data availability will prove critical to the success of clinical care and wellness organizations. Increased focus on patient engagement means staying ahead of the curve. A critical overlooked component of successful population health programs is the data collected in the home. Most clinicians rely on limited or inaccurate patient data which doesn't include the daily life of a patient.

Michael J. Condron, CEO Advisor to CareVia states: "As healthcare services undergo dramatic technology transformation and shift in reimbursement and revenue models, the availability of real-time bi-directional data and timed-interactions will prove critical to the success of provider organizations. Carevia's platform allows organizations to easily monitor their patients and coordinate their care across the entire health care continuum".

The Solution:

CareVia's transformative communications technology provides a flexible, scalable and complete solution that brings all aspects of remote patient monitoring and communications together in one platform, allowing the entire healthcare community - payors, providers and patients to achieve measurable savings. CareVia's integrated bi-directional video communication, remote monitoring with data overlay and timed-interactions features enables care to be administered wherever, whenever.

Quick Facts:

New CY2015 CMS reimbursement allows chronically-ill patients to age-in-place and by combining data from the home with observations from clinical visits, clinicians are better equipped to create successful care plans. Providers can now avoid unneccesary hospital readmissions with proactive real-time monitoring before patients have an emergent event, as well as facilitate population health management to achieve shared savings. The following CY2015 billing criteria for services provided via telehealth include the following:*

- Over the course of a month, at least 20 minutes of clinical staff time directed by a physician or other qualified health care professional must be devoted to provision of the services;
- Patients must have multiple chronic conditions that are expected to last at least 12 months, or until the death of the patient;
- The chronic conditions create a significant risk of mortality, acute exacerbation/decompensation, or functional decline;
- A comprehensive care plan must be established, implemented, revised or monitored. Services do not have to be provided face-to-face and include overseeing patient self-medication, ensuring receipt of recommended preventative services and reviewing data reported about the patient from a remote monitoring device.

Connect with CareVia in the Intelligent Health Pavilion at Booth 6656

*Subject to the publication of the 2015 Medicare Physician Fee Schedule Final Rule

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Case Study

Finding a Healthy Balance at Strong Memorial Hospital

More than ten years ago, Strong Memorial Hospital made a commitment to offer healthy, balanced meals to guests, visitors, and staff. The "Be in Balance" program started after a group of Cornell University dietetic interns created guidelines for building healthy, balanced menus. Using pricing as an incentive, they set out to change behavior. They lowered prices on healthy foods and raised prices on unhealthy foods to encourage healthy eating. For example, salmon and two vegetable sides cost $5.95, while a hamburger and fries retails at $6.95. Al Caldiero, Director of Food & Nutrition, refers to this as a "Fat Tax" and believes it is an effective tool that helps in their efforts to influence healthy decisions.

"Over the years, I have learned by trial and error that the more you force customers to eat healthier by taking away unhealthy options, the more they will resist and go elsewhere to eat. Pricing plays a subtle role, and over time can make a difference," said Caldiero of the strategy. "Ten years ago, nobody wanted anything to do with lower fat and sodium. Now customers are demanding low fat, low sodium, and gluten free options. Everyday people ask us for more healthy choices."

Strong Memorial Hospital has recently made some exciting changes to the kitchen and main cafeteria areas that take the availability of healthy food choices to the next level. Changes include the addition of food stations in the cafeteria and the ability to cook more fresh meals upon request. Café 601 at Strong, the hospital's main cafeteria, features fresh salad and fruit bars, in addition to traditional homestyle, deli, grill, pasta, soup, and pizza stations. Café 601 at Strong also implemented the Creation Station, which offers fresh made choices daily, such as creative salads, stir-fry, and sushi. The reaction to these changes has been overwhelmingly positive and customers love all the choices. Since opening the new kitchen, Caldiero reports a 20% increase in sales and in customer counts.

In addition to pricing, a strong communication plan supports the hospital's mission of providing high quality, fresh, and flavorful foods, in addition to offering education, support, and guidance for healthy eating. Video monitors stationed at the cafeteria entrance list each day's healthy menu items, complete with enticing pictures. Signage, primarily countertop signs, point out the healthy menu choices at each station.

Strong Memorial Hospital also uses CBORD's web-based NetNutrition® solution to give customers access to nutrition, ingredient, and allergen information. Not only can customers view nutritional information for specific items, but they can also see nutritional information for full meals or days. Customers can even filter the menu options by allergens (e.g., gluten) or other preferences (e.g., Vegetarian, Vegan) to plan their meals. The easy to use NetNutrition website is optimized for use on any web-enabled device, including smartphones, tablets, and computers. Strong Memorial Hospital also offers Nutrition Kiosks, which are conveniently located in the dining area, that provide access to the NetNutrition website. NetNutrition has proved to be a powerful tool to showcase the many healthy dining options available at Strong Memorial Hospital.

IT Perspective on Nurse Call: Leveraging a Common Information Path for Converged Communications, Improved Clinical Workflow and Better Patient Care

Nurse Call Technology Highlights:

- Highly configurable, software-based approach with no third party middleware
- All patient requests sent to a centralized operator for triage and staff assignment
- Integration of Cisco WiFi network and the Electronic Medical Record
- System serves as primary alerting and messaging platform
- Meditech integration using HL7
- CAT5/CAT6 home run wiring for room by room troubleshooting

Project Scope

When it comes to nurse call, hospital IT departments play a crucial role in system oversight, functionality and maintenance. The nurse call selection committee for Elmhurst Memorial Healthcare's new Main Campus was a multidisciplinary internal team that included IT and Nursing representatives. One of the top priorities for the new system was to meet caregivers' needs and leverage the technical infrastructure to deliver the best experience for the patient.

"We wanted to support the caregivers and make sure the nurse call business decision was sound from a technology perspective," said Matt Sterling, Director of Information Services, Elmhurst Memorial Healthcare. "Going into the selection process, we also wanted to verify that the nursing staff was comfortable with the technology and could understand how to leverage the nurse call system."

From a technology standpoint, the old system did not provide adequate reporting or management information and had staff basically "chasing lights." Sterling and his team wanted a nurse call system for the new Main Campus that would integrate into existing systems, including the Cisco WiFi network and the Electronic Medical Record.

Elmhurst's Approach

Going into the selection process, Elmhurst Memorial looked for a nurse call system that could serve as the primary common path alerting and messaging platform for the Main Campus. The new system had to be robust enough to leverage the information in the system to manage events, alarms, messages, bed exits, patient monitor alarms and all other activities central to workflow management. The Elmhurst Memorial team also wanted to minimize the number of systems used to accomplish these tasks.

"When looking at Critical Alert's solution, we were impressed that they eliminated the need for third party middleware—that makes management of the entire system easier. Their centralized call answering approach, and the technologies to support it, were what sold us on CommonPath."

Deployment Highlights

A principal factor for Elhurst's team was the configurability of CommonPath's nurse call rules and workflows engine that expedites the fulfillment of patient requests. "It was important for us to walk through the assignment of alerts and escalations with the Critical Alert team so we could configure a nurse call system that would adapt to the requirements of the new facility," noted Sterling. "What we didn't realize until later was that this process really spearheaded much of how we were going to operate in the new Main Campus."

A primary focus was the integration with Meditech using HL7. Once the selected data was determined and the data mapping was completed, this integration was easily accomplished by Intego. The ability of nurse call to leverage Cisco wireless phones was another key IT consideration. The CommonPath messaging, shift assigner and escalation engines made delivery of the right message to the right staff seamless.

Clinical workflow management was streamlined and improved due to CommonPath ability to allow care providers to assign staff offline and then activate, without needing to access a separate system. This helps ensure that alarms are answered in a timely fashion and that staffing and workflow specifications align with shift changes and other variables.

"We also wanted a system that would be easier to troubleshoot on a room by room basis and liked the fact that the Intego system used standard CAT5/CAT6 home run wiring to meet this requirement," observed Sterling.

System Benefits Since Deployment

Critical Alert's CommonPath Centralized system was first implemented in the new Main Campus. Sterling confirms that the primary goal was achieved – to install a nurse call system that delivers on nursing's specifications and improves the patient experience. In fact, Elmhurst Memorial Hospital's Patient Care Services has reported a marked increase in patient satisfaction using the CommonPath Centralized system.

From an IT perspective, working with CommonPath's software and system since launch has also delivered on the goals to leverage information to improve clinical workflow and converge communication platforms. According to Sterling, the CommonPath system has provided the information needed to meet clinical and patient expectations and to provide accountability.

There have also been some unanticipated benefits as the Elmhurst Memorial Hospital staff began working with the CommonPath Centralized system. The new system has become a tool that the hospital now uses to improve communication between departments, as well as between patient and caregiver. But it's been the nimble, scalable nature of CommonPath's system design that has made a real impression with Sterling.

"The fact that CommonPath is software-based was not a major consideration for us in the selection process," notes Sterling. "But now that it's been implemented, we're seeing firsthand how easy and quick it can be to develop new applications and integrations. The ability of CommonPath to easily make these kinds of changes means we're going to get more value out of this purchase as time goes on."

Elmhurst Memorial Healthcare is taking full advantage of that flexibility, with in-house developers working on further integrations that use Critical Alert's CommonPath to help reduce and simplify systems without reducing services.

CMIO

By Jeff Byers

Leading Edge Patient Monitoring

Now Piggybacks on Facility Wi-Fi

Patient monitoring is key to excellent patient care. Southeast Alabama Medical Center (SAMC), a 420-bed facility in Dothan, Ala., is an innovator in this space, standing at the forefront of progressive cardiac patient monitoring. The difference comes in stepping away from telemetry and into truly wireless patient monitoring. The enabler is the Dräger Infinity M300 patient monitoring system that brings wireless telemetry to a new level: Increasing mobility for patients and accessibility for caregivers, while decreasing complexity for the facility IT department.

SAMC first installed wireless networking technology in the 1990s and has been improving on it year after year to stay up to industry standards. Last year, as SAMC prepared to expand its telemetry services in its inpatient unit, an upgrade to its mobile devices in efficiency and volume was needed, says CIO Eric Daffron. One solution stood out among the rest: The Infinity M300 is the only monitoring system that utilizes a hospital's established Wi-Fi network, bypassing the need for the device's own proprietary network. That saves time, money and manpower.

"The way telemetry was done in the past, you needed a proprietary network for any mobile device that you would use. If you wanted to expand the network, you had to increase the number of antennas in the facility," says Daffron. "Now we have 100 percent coverage with any possible expansion and there's no additional cost infrastructure-wise." This means patients, as they increase their mobility as they recover from surgery or an illness, can travel freely throughout the facility, with caregivers having constant access to vital data and the ability to instantly track them if a problem arises.

How it works

Pulling from a 50-mile radius within Alabama and serving a catchement area of 600,000 people throughout southeast Alabama, southwest Georgia and the Florida Panhandle, SAMC averages 320 patients daily within its tertiary care center. About 150 of those beds are filled daily with cardiac patients who are monitored using the M300 from what is dubbed the "war room" on the 4E Unit, says Bobbye Corbin, director of the unit.

Each device, which runs on IEEE 802.11 b/g industry standard wireless technology, provides continuous patient monitoring—even if the patient inadvertently moves out of the hospital's wireless net-

work coverage area. It is assigned an individual IP address, much like a laptop when logging onto a Wi-Fi network. Two-way communication between the wireless monitor and the central monitoring station facilitates wireless data exchange and signal integrity within the hospital's wireless network coverage area. The CentralStation gathers and displays information from Infinity bedside and patient-worn monitors for central monitoring of up to 32 patients on the Infinity Network.

Drawing on the power of an internal Cisco IT network at SAMC, the 6-lead EKG monitors are connected to the patient and can do a 12-lead EKG when a patient is laying down as much as three floors away, Corbin says. "The system gives you a great compass point to see well enough to get up and walk around, they enjoy complete mobility throughout the facility while their heart is monitored 24/7."

"In the past, if a patient went for an x-ray, he or she was essentially not monitored because there were no antennas in the x-ray room," explains Daffron, adding that "now patients are able to be centrally monitored and move about the 1 million square feet campus freely." All the while, caregivers can keep a careful eye on them and even go to them if an emergency arises.

Patient monitoring central

Within the centralized monitoring center, SAMC has the capability to monitor 200 patients with individual monitors, displaying 16 patients on each screen. Four technicians continuously monitor patient's rhythm, changes in rhythm, patient alerts and any arrhythmia first hand. They immediately call on a patient's nurse if they spot a problem.

"Anyone can have an adverse event," Corbin says. "With cardiac disease, we want to be on top of identifying those events and make sure arrhythmia is taken care of immediately. Lives are saved daily whereas when you don't have monitoring of this capability, time is lost and those critical 1 to 5 minutes makes the difference between life and death."

Southeast Alabama Medical Center, Dothan.

Another boon to the rollout was dual functionality that the new system offers in monitoring both heart rate and oxygen saturation in one device rather than two. "Cost wise, there are savings simply by employing one simple transmitter," says Daffron. It also simplifies the stay for the patient not having to lug around two devices, he adds.

Logistics of keeping the monitors running is easy as well. Charging the monitor's rechargeable battery is like charging a cell phone. Either charge it in a small bedside charger or at a central multi-charger. The clinical cardiac staff likes this feature, Daffron says, compared with the once-a-shift 9V alkaline battery changes they had to do with the prior generation of technology. "The rechargeable battery has made SAMC a super saver in terms of battery costs, resulting in savings of over $35,000 a year in battery costs alone."

Seamless integration

Transitioning from one clinical system to another is often problematic. But not this time. "Painless" is the way Daffron describes the transition to wireless patient monitoring. The project took about a month to complete, but only involved 10 human hours because technicians and clinical staff were already well-versed in wireless technology and workflow.

Noting that a health IT network is not a "set it and forget it" infrastructure, Daffron predicts a boom in patient care technologies that utilize internal Wi-Fi networks. This is "our first test of having medical devices operate over our internal Wi-Fi network and it's been a success so far. We anticipate other vendors and devices to shortly be following suit," says Daffron.

"Lines are being blurred between health IT networks and portable medical devices," he continues. "The mobile health IT game is becoming one in the same, operating on one, central network and having a lot of the same functions."

Patient monitoring is a brave new world, keeping up with the needs of more mobile patients and caregivers. Wireless mobile devices have the strength of full-size, bedside monitors with the versatility of multiple monitoring systems. The future is now. CMIO

Here's how it works.

The wireless patient monitor, about the size of a large cell phone and weighing about 0.6 pounds, is worn in a lightweight pouch around a patient's neck. Its color display shows ECG for all monitored leads, heart rate, oxygen saturation and electrode status as well as demographics to confirm patient identification. Built-in sound capabilities allow SAMC caregivers to hear alerts at the patient's side, and handle them by pushing a button on the device, as well as at the Infinity CentralStation. Built-in ACE (Arrhythmia Classification Expert) and pacer detection algorithms enhance ECG processing, while helping to reduce false alarms. A 'find device' function helps caregivers locate lost devices or patients in distress within the hospital.

Extreme Networks Purview Solution Improves Customer Satisfaction & Delivers Better Patient Outcomes

AT A GLANCE

IU HEALTH STATS:

- Networking IT Staff: 1.5
- Users: 4500 (Staff & Guests)
- Locations: 25

INDUSTRY:

- Healthcare

CHALLENGES:

- Network management and control
- Network and application visibility
- High-performance network to support BYOD and wireless

PRODUCTS UTILIZED:

- S-Series modular core switches
- C- and B-Series edge switches
- NetSight network management
- IdentiFi Wireless
- Purview application visibility

RESULTS:

- Secure, reliable high-performance network
- Central management, visibility and control of the entire network
- Consistent user experience and improved patient satisfaction
- Improved decision making
- Cost savings

Introduction

Indiana University Health is Indiana's most comprehensive healthcare system. A unique partnership with Indiana University School of Medicine, one of the nation's leading medical schools, gives patients access to innovative treatments and therapies. IU Health is comprised of hospitals, physicians and allied services dedicated to providing preeminent care throughout Indiana and beyond.

To meet the mobile needs of a modern mission-critical hospital environment, IU Health chose Extreme Networks to replace their existing network infrastructure. The network visibility that the Extreme Networks Purview solution provides has enabled the hospital to deliver a consistent experience to all users, increase customer satisfaction and improve patient outcomes.

> *"We have seen a direct correlation with how our network and applications run with patient experience. Everyone's job is made easier with a fine-tuned network and we are able to do that with Extreme Networks and Purview."*
>
> **JOSH MANDEVILLE, NETWORK SECURITY ADMINISTRATOR AT IU HEALTH**

Hospital's Challenge

With more and more network devices (EHR, Diagnostic Imaging, Wireless/ Network Capable Medical Equipment, BYOD) being on-boarded to their mission-critical hospital network, IU Health needed a stable infrastructure with 365X24X7 availability that would allow them to be proactive and more agile.

One of their greatest challenges was network management and visibility. "We didn't know what was going on until there were problems," said Josh Mandeville, Network Security Administrator at IU Health. "With no insight into the network and no redundancy, if something failed it could be a matter of life or death." With only 1.5 people managing the network, IU Health needed a system that would bring the entire network into one view and allow them to see the network and everything running on it at a much more granular level to better serve their end-users.

Providing a robust, reliable wireless experience for guests has become a must-have for hospitals — directly correlating with patient experience and satisfaction and ultimately affecting the bottom line. With 2,500 unique guest devices per day,

bandwidth was becoming an issue for IU Health's GuestNet. IU Health required a wireless solution that would allow them to provide a consistent experience to staff, patients and guests.

Extreme Networks Solution

IU Health decided to replace their Cisco and Juniper infrastructure with an Extreme Networks solution that offered redundancy, unified management, granular visibility and top-notch support at a better price point than the competition. Mandeville says that the transition has been "amazingly smooth" and in one building, the conversion from Cisco to Extreme Networks was performed with less than two hours of downtime.

The Extreme Networks solution, designed to meet the high-demand and high-availability requirements of a hospital environment, includes S-Series switches at the core, C- and B-Series switches at the edge and IdentiFi Wireless. The entire infrastructure is easily managed by the Extreme Networks NetSight network management solution and Extreme Networks Purview provides visibility into applications for improved decision making to create a better user experience.

"With Purview, NetSight and GTAC Support, we finally have real vision into our network and the support to back us up," says Mandeville, who calls Purview one of the best tools for actually seeing what is happening on your network. "Purview gives us an amazing ability to create policies and proactively shape our staff and patient's experience on our network," he says. With improved patient outcomes being at the center of everything they do, Extreme Networks is enabling IU Health to deliver a consistently better experience so that doctors and nurses can spend more time treating patients.

Results

The Extreme Networks solution has given IU Health a stable, reliable infrastructure that can handle the mobile needs of a demanding and mission-critical hospital environment. The NetSight and Purview tools have given their small IT staff the ability to view, manage and control the entire network and all the applications running on it, allowing them to make informed decisions to provide a consistent user experience, improve customer satisfaction and improve patient outcomes.

1. **Central management, visibility and control of the entire network –** The unified NetSight network management console enables IU Health to manage their entire network from one system. According to Mandeville, "We couldn't find anything that could do that until we found NetSight." Extreme Networks Purview gives IU Health complete visibility and insight into all the applications running on the network, enabling them to proactively shape and direct traffic to better serve end-users. "Purview allows us to give the same consistent experience to all of our users. It truly is an MRI for the network," remarks Mandeville.
2. **Improved patient satisfaction –** IU Health has seen definite customer survey improvements. Their customer satisfaction rate went from 85% to 94% as a result of the improved time and productivity savings that Purview has enabled. "Because we are able to tweak and shape traffic to better serve our customers, doctors and nurses are able to spend more time with patients rather than being frustrated at their computer," says Mandeville.
3. **Consistent user experience –** Within two weeks of having Purview up and running, IU Health was able to actually yield numbers to prove that if they had a better firewall to stop torrenting, they could provide an improved and consistent experience for all users by provisioning equal amounts of bandwidth to all patients and visitors.
4. **Improved decision making and cost savings –** By using Purview to measure application usage and adoption by physicians and staff, IU Health has been able to confidently support the decison to reduce the amount of licenses for software that are not being used, thereby increasing their cost savings. "We were debating on housing internal or moving to Office 365 and Purview allowed us to make that decision based on usage numbers by staff. We're also seeing more traffic in the new EHR that has been rolled out, which means an uptick in adoption of it," says Mandeville.

In Mandeville's opinion, the Extreme Networks technology has made diagnosing issues much easier: "Our systems are much more complicated than they were two years ago, however I believe we have a better handle on the network now which helps all of our user experiences – doctors are spending more time with patients and patients and their guests can relieve the stress of being in a hospital by streaming Netflix or FaceTiming with friends and family – all of this has had a positive effect on patient outcomes."

With the support of GTAC, IU Health will continue to upgrade all 25 locations with Extreme Networks to provide a consistent user experience to benefit patients, guests and the bottom line. "Extreme Networks has helped us achieve what we couldn't even dream of before. We wanted to deliver the best experiences possible to improve patient outcomes, and now we can." concludes Mandeville.

Extreme networks

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The Value of Enterprise-Grade Operational Intelligence

How Wake Forest Baptist Health Leverages Real-Time Technologies to Optimize Resources and Streamline Workflows

"It is so rewarding to see our staff so engaged with technology. Every day they come up with new and innovative ideas on how to use sensory data to provide the ultimate patient experience."

Conrad Emmerich, VP Clinical Operations, Wake Forest Baptist Health

The Situation

The goal of Wake Forest Baptist Health is to provide the best quality patient and family-centered care to improve the health of those who live in the communities they serve, and to do this more efficiently and effectively to lower medical costs. One of the key initiatives at Wake Forest Baptist is to use real-time technologies coupled with process improvements to optimize resources, streamline workflows, and assist in creating the "Ultimate Patient Experience."

The Solution

In order to meet this strategic objective, Wake Forest Baptist established the Office of Enterprise Visibility. This office is responsible for the implementation of processes, supporting technologies, driving Service Excellence, Patient Safety and Satisfaction, Operational Excellence and Efficiency, and the Transformation of Healthcare Delivery (SPOT). As the result of this focus, Wake Forest Baptist has been recognized as having the most comprehensive implementation of real-time technologies in the healthcare industry.

Wake Forest Baptist has successfully implemented more than 50 use cases leveraging real-time location data. These use cases include asset management, temperature monitoring, wait-time management, infection control, patient/staff locating, milestones of care, and many more. Achieving breadth and depth of use cases is enabled through the execution of a specific vision and multi-year plan along with an enterprise-grade operational intelligence platform. The platform's API's are being continually utilized to develop additional integrations and several additional high-value applications.

The Benefits

The value of leveraging real-time technologies at Wake Forest Baptist is measurable and sustainable, accounting for more than $8 million in benefit – all in just the last 34 months. By automating temperature monitoring processes, Wake Forest Baptist is experiencing a savings of $970,000 per year. Additional benefits include asset management, which is providing a savings of $2 million per year, and an increase in staff productivity that is valued at over $2 million per year. Wake Forest Baptist has also been able to save $3.5 million by eliminating the need to purchase redundant systems and avoiding unnecessary costs. The staff at Wake Forest Baptist fully embraces the value of technology and incorporates it in their daily operations.

Looking back upon the project, Wake Forest Baptist is able to justify the effort and cost based upon the return already received, and is looking forward to even more value as the ROI continues to grow with each new use case being deployed.

Software Platform Partner: Intelligent InSites
RTLS Hardware Partner: CenTrak
Program Management and System Integration: Infinite Leap

Intelligent InSites™

Real-Time Location System Tracks Staff, Patients, and Equipment, Reducing Costs, Improving Infection Control and Room Turnaround, and Generating High Satisfaction

Description of the Innovative Activity

Two Texas Health Resources (THR) hospitals—a large 40-year-old facility and a new smaller facility—use a real-time location system enabled by radio frequency and infrared identification (RFID) technology to monitor the current location and recent movement of major pieces of equipment; one hospital (the new facility) also uses it to monitor the whereabouts of patients and staff, with the other hospital is currently adding this capability. Integrated into other THR information systems and overseen by a centralized mission control unit, the system is used to improve various clinical and nonclinical processes, including asset management, infection control, room turnover, and transportation. Hospital leaders prohibit its use in a punitive manner with staff.

Selecting Hardware and Software

THR already used a software system throughout the organization, and leaders decided to continue working with that vendor (Intelligent InSites) to integrate the real-time location system. With respect to hardware, the project manager first worked with the information technology team to investigate available options and then issued an extensive request for proposals. This process began about a year before the hospital opened and concluded roughly 4 months later with the decision to contract with CenTrak for the RFID tags, monitors, and other needed hardware and equipment.

Results

The system has significantly reduced annual equipment costs, room turnaround time, and staffing costs, and contributed to high levels of patient, physician, and staff satisfaction.

Significant reduction in annual equipment costs: The system has reduced equipment-related costs at both hospitals. At the 650-bed flagship hospital, the system generated nearly $1 million in savings the first year, including roughly $285,000 on rental equipment, $100,000 on budgeting for "shrinkage" (the common practice of intentionally purchasing more equipment than needed because of missing items), and more than $600,000 in procurement-related expenses because of better utilization of equipment. At the new hospital, the system allowed leaders to avoid budgeting any money at all for shrinkage—by contrast, many hospitals routinely add 35 percent or more to their equipment purchase budget to account for missing and lost items.

Faster room turnaround: At the 58-bed hospital, room turnover occurs more quickly than at any other THR hospital, averaging 40 minutes, well below the 47-minute average for the system as a whole.

Lower staffing costs: While hard data are not available, the centralization of communications, transport, and other operational functions requires fewer staff than the typical decentralized approach. For example, when working in separate departments, telephone operators and transporters often have significant periods of downtime. With the centralized approach, downtime tends to occur much less frequently.

High patient, physician, and staff satisfaction: The 58-bed hospital enjoys very high patient satisfaction rates, which leaders believe are due in part to the timely, high-quality services enabled by the real-time location system. For example, in 2013 the hospital ranked in the 95th percentile or higher on patent satisfaction ratings for the following categories directly related to the system: promptness of response to call bell, pain control, and wait time in the ED before being admitted to the hospital. Physician satisfaction with the hospital's information technology ranks in the 92nd percentile, with 10 percent of physicians specifically listing technology as one of the hospital's greatest strengths. In addition, overall employee satisfaction ranks in the 90th percentile at the hospital.

Source: AHRQ Health Care Innovations Exchange. Real-Time Location System Tracks Staff, Patients, and Equipment, Reducing Costs, Improving Infection Control and Room Turnaround, and Generating High Satisfaction (Texas Health Resources). In: AHRQ Health Care Innovations Exchange [Web site]. Published: August 27, 2014. Available: https://innovations.ahrq.gov/profiles/real-time-location-system-tracks-staff-patients-and-equipment-reducing-costs-improving

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Powered by smaRTLS®

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A regional academic medical center dedicated to the passionate pursuit of improving the health of the community in the region through the delivery of exceptional and compre-hensive quality care to our patients, excellence in education and train-ing, and leadership in innovative research

Goals

Increase OR Efficiency
Reduce Scheduling Delays
Reduce Unplanned Overtime

The Challenges

Our OR runs on schedule 30% of the time. Surgeon delays, cleaning not completed on time, ED surgeries, and patients not sufficiently prepped are among the causes. The OR constantly requires overtime from our staff, and despite all the scheduling improvements and analysis we have performed, the high degree of variability in our surgery requests makes it highly unpredictable. Our main goal is to achieve the best on-time schedule possible without impacting our patient care.

The Solution

SimTrack Health's® Real-Time schedule optimization powered by smaRTLS®.

Results

Increased OR Capacity 15%
Increased OR Efficiency 20%
Increase On time start by 50%

CreateASoft, Inc
3909 75th St. Suite 105
Naperville, IL 60504
Sales@createasoft.com
630-428-2850

CASE STUDY

SimTrack Health's® real-time schedule optimization delivers improved on-time case starts and increased operating department efficiency and capacity.

Leveraging existing RTLS, EMR, and other tracking technologies, SimTrack Health® transforms big data into actionable predictive analytics through real-time schedule optimization. The changes and schedule modifications are presented to OR staff along with forecasted efficiency gains.

The OR staff now has the full picture with required metrics to determine the best way to proceed with an optimized work flow. Including; Real-time schedule comparison of planned, current and optimized schedules.

Existing RTLS technologies only present a current state picture of the tracked entities locations. On the other hand, SimTrack Health's® smaRTLS® data analysis maintains the relationship of all tracked entities across multiple data sets (EMR) and tracking systems (RFID) providing a clear view of near-future performance of the OR department. Insights on scheduling changes and scheduling scenario comparison, along with the ability to analyze past events are a must for improved efficiency and increased capacity.

Staff can now focus on increasing patient satisfaction through optimized work flows and OR schedules that decrease wait and unnecessary delays. Before SimTrack Health® staff spent many hours trying to sift through piles of RFID data.

DYNAMIC SCHEDULE ADHERENCE

REAL-TIME OPERATIONAL OPTIMIZATION

"Our staff now has a full view of the current state of the OR along with a clear and accurate representation of the upcoming daily activities. The schedule adherence feature provides insights and improvements that show an improved on-time start by 50%."

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“Put me in, Coach!”

Paul Szotek, MD

The Challenge

Training the healthcare worker of the future is evolving rapidly with widespread disruption of the healthcare system by technology. In the ever-changing environment of healthcare education, we continue to meld the technical applications of the consumer market to those of the healthcare enterprise market. This process is occurring secondary to the demands construed by decreased funding and educational time, combined with increased emphasis on safety and outcomes. These forces have posed a burning question to the educators of tomorrow’s healthcare providers: How can we efficiently, cost-effectively, responsibly, and safely educate the providers of tomorrow during their training and during their professional life to ensure quality, cost-effective, care to the patients?

Healthcare professionals are one of the few groups in any industry that train their students formally during a relatively short period of time and then release them to practice what they have learned without actively “coaching” them during the initial deployment of their craft. For example, surgical residents train for a finite period of time and then they enter practice to deploy their craft with very little guidance or tools for self-assessment. A professional athlete on the other hand, trains for a period of time, applies his craft in a game, and then reviews the results each time by reviewing tape and through evaluation by their coach. It is no wonder that we often have poor outcomes leading to increased costs to the healthcare system without such continuous real-time assessment and mentoring. As the greatest college basketball coach of all time John Wooden once said, *“Failing to prepare is preparing to fail”*.

What is HCview℠

Fully encrypted, HIPAA compliant, real-time video streaming tele-mentoring platform via optical wearable technology

Live Features

- Two-Way Audio & Video
- Live Telestration
- Cloud Based Platform
- Group or Individual
- Upload Important Materials for all participants to view (XRAY, Ultrasound, etc.)

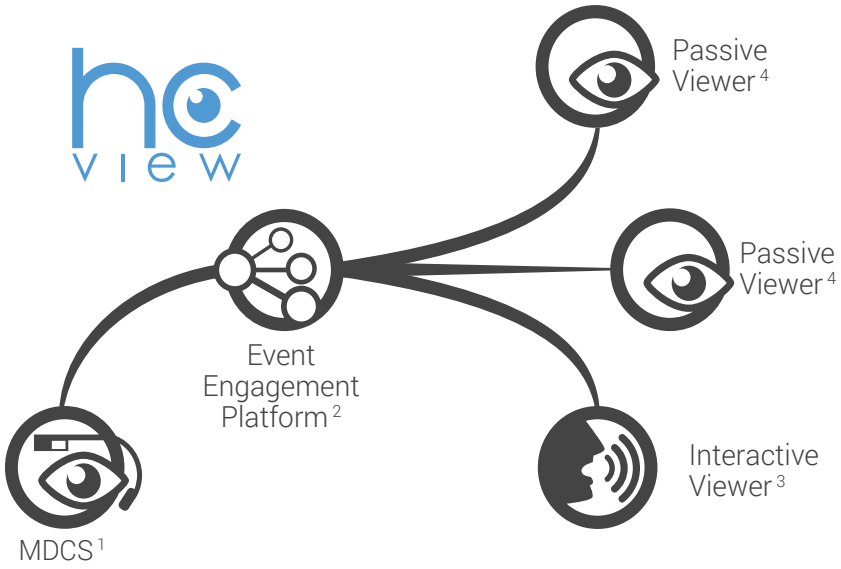
Scheduling

- Mobile App Based
- Specific to Procedure
- Confirms Mentor Availability
- Reminder notification via text message or email to participants

www.hodeitech.com/HIMSS2015

The Solution

Hodei Technology provides tele-mentoring and education through live, interactive peer-to-peer "coaching" sessions between professionals via the HIPAA compliant HCview℠ solution. The HCview platform enables "coaching" in difficult situations by senior mentors which can prevent morbidity and mortality, improve outcomes, and reduce costs. These mentors can observe live cases, interact via either voice or chat messaging, telestrate directly on to images and send back to the OR for improved clarity and direction, and retain a record of the event. Healthcare professionals now have the essential materials to review and hone their craft through process improvement, similar to that used in all other industries. As has been proven in the airline industry and others, such process improvement works to improve results and in the healthcare setting can help to improve outcomes for our patients and by extension reducing costs associated with poor outcomes.



HCview (as shown above) consists of: a mobile dual communication solution (MDCS) (1) that features a Point-of-View optical wearable and the ability to stream data feeds from multiple sources to a remote proctor; and an event engagement platform (EEP) (2) that enables real-time remote proctoring and training to occur. HCview allows a mentor (3) to observe live cases, interact with the person being proctored [or other remote viewers (4)] via either voice or chat message, telestrate directly on images and send them back to the OR for improved clarity and direction, and retain a record of the event.

Rib Fixation Case

Post-graduate training is often accomplished by a combination of brief on-site course instruction and mentoring by a senior physician. This can become a costly endeavor which may not adequately prepare the physician for implementation. We performed a pilot case study applying the interactive HCview platform to the performance of rib fixation by myself, Paul Szotek, MD, with the live guidance of Timothy Polman, MD. Prior to performing the procedure, I took the standard half day course.

Key Outcomes

- Live expert advice on technical aspects of the procedure
- Enhanced safety by prevention of inadvertent events real-time
- Improved comfortability of the learner with the mentor virtually present for guidance
- Ability to "watch film" for the next case to assist in enhancing technical skills in a newly trained procedure
- Decreased training costs with shorter time to proficiency

www.hodeitech.com/HIMSS2015

CASE STUDY

Connecticut Children's Medical Center

Hartford, Connecticut, USA

HID Global's EasyLobby® Secure Visitor Management Software Provides an Effective Visitor Registration Process for Connecticut Children's Medical Center

"What we particularly like about the EasyLobby software is its flexibility and expandability."

Phillip LeClair
CHPA, Security Manager
Connecticut Children's Medical Center

Products/Technology

- EasyLobby Secure Visitor Management (SVM™)

Challenges

Connecticut Children's Medical Center was searching for a system to improve their existing visitor management solution, which consisted of color-coded plastic badges and paper sign-in sheets.

"Getting the right pass for the right person was an extremely cumbersome process," said Phillip LeClair, CHPA, security manager with Connecticut Children's Medical Center.

The medical center's search for a better solution was accelerated by a security incident, after which the state asked the hospital to enhance the way they processed and tracked visitors.

Solutions

The medical center initially became interested in HID Global's EasyLobby® Secure Visitor Management (SVM™) software after learning about its robust feature set, which closely aligned with their organizational goals to manage visitors securely, flexibly and simply.

Once they watched a free web demo, they were also impressed with the power and flexibility the platform provided. Of particular interest was the ability to configure EasyLobby with all of the peripherals the medical center wanted, including business cards, drivers licenses, barcode scanners and digital cameras.

"Today, EasyLobby is used to the fullest at Connecticut Children's Medical Center," said LeClair. "We use EasyLobby to check in every visitor who enters our facility, at every entrance. All locations in the hospital are listed in the Category field and the inpatient being visited is prominently displayed. Visitor badges are printed with a barcode for easy check-out. Even employees who have lost or forgotten their IDs are processed via EasyLobby."

The medical center also uses EasyLobby to produce multi-day visitor passes, allowing guests to be checked in and out with a quick and easy barcode scan, either at a badging station or with EasyLobby's mobile scanners. Service levels are enhanced by using EasyLobby's self-check-in kiosk, which provides a touch screen and drivers license scanner for visitors, and the e-Advance web-based system that allows employees to pre-register visitors using their intranet.

Results

Connecticut Children's Medical Center uses the percentage of visitors checked out as an ROI indicator and since has achieved a 90 percent check-out rate. The medical center has also benefitted from being able to use EasyLobby database records for internal investigations to assist law enforcement and prevent incidents.

"What we particularly like about the EasyLobby software is its flexibility and expandability," said LeClair. "We started with one workstation and quickly expanded to eight workstations to encompass the entire facility. The EasyLobby solution has been great to work with and is actually one of the security tools that sold me on taking the job as Security Manager at Connecticut Children's Medical Center – it really does help us live up to our mission to protect our future.

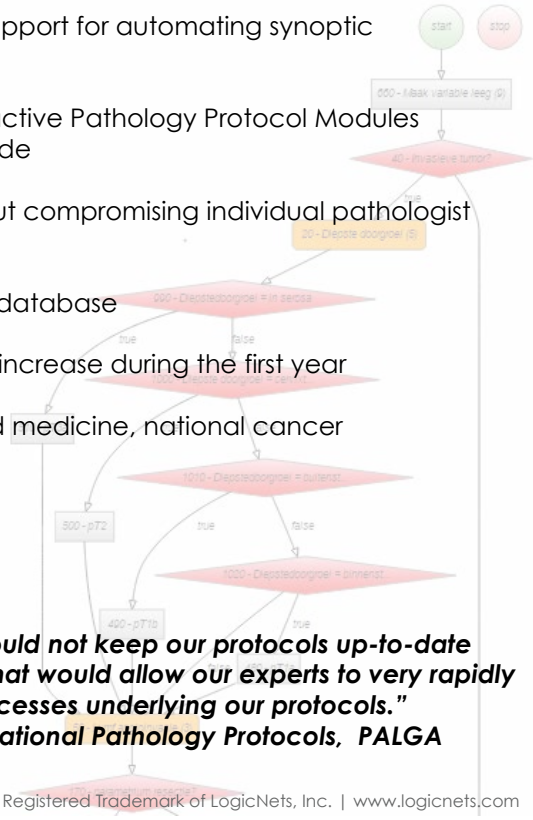
When the medical center was audited by a leading security consultant, they not only received a top review, but also were told they may be among the most secure children's hospitals in the United States.

As Connecticut Children's Medical Center expands to multiple buildings and facilities, the organization plans to implement EasyLobby in its expansion and new developments.

"Right now we're a fairly small operation, but we badge 2,200 visitors a day as well as 50-100 vendors," said LeClair. Over time, the medical center is planning to expand the use of EasyLobby for mobile solutions, and to use EasyLobby in satellite and remote facilities.

2014-02-20-ct-child-med-ctr-cs-en PLT-01189

- Netherlands National Pathology foundation had critical need to use decision support for automating synoptic reporting in order to meet organization's core mission
- LogicNets selected as platform to allow rapid development of a library of interactive Pathology Protocol Modules (PPM), delivered to over 400 pathologists at over 50 pathology centers nationwide
- LogicNets enables rapid standardized data entry and dynaimc reporting without compromising individual pathologist workflow
- System integrates with EHR and exports results to national pathology outcomes database
- System deployed and put into production within 5 months with 40% user ratings increase during the first year
- The LogicNets platform and approach will be critical to integrating personalized medicine, national cancer screening programs, and clinical quality registration



palga

"Pathology is constantly changing, and we could not keep our protocols up-to-date without a flexible and highly intuitive system that would allow our experts to very rapidly model and maintain the decision-making processes underlying our protocols."
- Paul Seegers, Advisor and Administrator of National Pathology Protocols, PALGA

The Pathology Company

Leica BIOSYSTEMS

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Better patient care starts with access to the right pathologist, to analyze the right slide, at the right time.

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REQUEST

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Speed

Faster access to slides

Expertise

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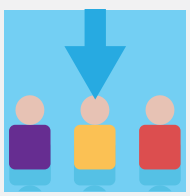
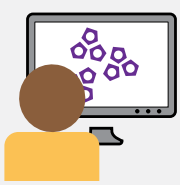
ASSIGN

A dispatcher receives the case, determines the subspecialty, and routes it to the appropriate pathologist for expert insight and collaboration.



REVIEW

The subspecialist reviews the case, completes the secondary review, and then easily and securely, makes the findings available to the requesting pathologist.



CONCUR

Aperio ePathAccess facilitates optimal outcomes by providing a superb viewing experience and a streamlined workflow. This, coupled with state-of-the-art encryption technology, means accessing subspecialty expertise has never been faster or more secure.

EMR/Perinatal System Integration

OBIX
perinatal data system
BY CLINICAL COMPUTER SYSTEMS INC.

Overall, healthcare is extremely complex and in many ways unequal in terms of workflow complexity. Expanding attention to the quality of patient care requires greater automation and interoperability with transparency of data between departmental and EMR systems. Documentation needs vary across departments, therefore clinical systems tend to be diverse. To achieve full interoperability while maintaining a single record for each patient, the departmental systems need to be fully integrated to the EMR.

Interoperability, Integration, & Interfacing

These three terms are used to describe the capability of data exchange between two or more systems. The difficulty lies in the interpretation (and use of data) – for example, is data merely being transmitted from one system and stored in another or is there potential for the data to be modified in one system and automatically updated in the other system.

It is important to clarify the levels and types of data exchange to fully comprehend how the data is communicated. Based on the 2013 HIMSS[1] definition of Interoperability, there are three levels: 1) Foundational, 2) Structural, and 3) Semantic. Foundational interoperability involves one system sending data to another without requiring the receiving system to interpret the data. Structural interoperability allows data exchange between systems in which the data is interpreted at the field level. Semantic interoperability is the highest level and allows exchanged data to be used and interpreted by both systems.

Perinatal System Integration

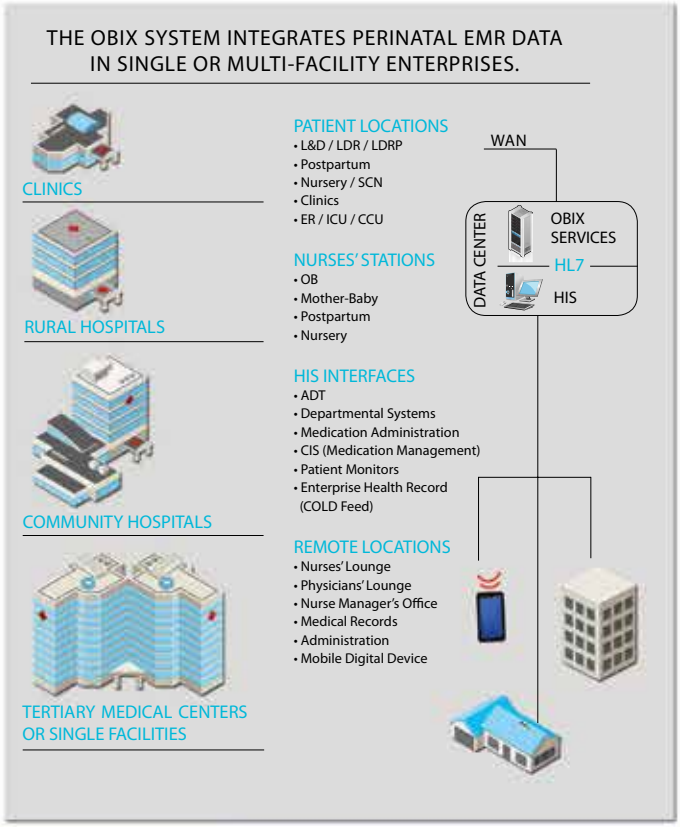
For improved continuity of care, clinical collaboration, and consistency of documentation in labor and delivery, it is imperative that the perinatal system has strong integration with the EMR at the Semantic level. Data exchanged bi-directionally keeps patient data in sync and flowing to the appropriate locations in a single entry. In addition, data captured from medical devices (such as fetal monitors) is able to be collected in both systems, providing a complete clinical record. This level of integration allows users to access and document patients' care that creates workflow efficiencies which removes the need for duplicate charting; providing more time for clinicians at the bedside.

The highest level of integration between systems is achieved more successfully through direct collaboration of vendors. Data is mapped to flow directly to the appropriate locations within each system versus translation of data and fields between systems. This type of integration provides a value by design; eliminating system interpretation and the time needed for hospital IT staff to develop, monitor, and maintain multiple system interfaces which enables them to focus on the strategic needs of the facility.

OBIX Perinatal Data System

The OBIX system provides robust electronic surveillance and documentation capabilities that are designed around the clinical workflow specific to mother and baby care during the labor, delivery, and recovery process.

The OBIX system offers enterprise-wide support and integration to the hospital EMR repositories, providing a single source of truth for the patient's medical record. System interfaces provide integration to the EMR for features such as single sign-on, patient registration, laboratory results notification, medication administration, patient vital signs, COLD Feed, EFM notes, etc. Users are provided a seamless interaction between the OBIX and EMR systems using an SSOPC interface.



The multi-facility feature provides robust architecture to allow scaling to enterprises of various sizes. Patient records are stored in a single database in central location with partitions for each individual facility. The system is configured to provide continuous patient surveillance even while WAN connections are temporarily interrupted or degraded. Patient records are able to be reconciled later within the enterprise record and the system's advanced search function locates both matched (reconciled) or unmatched patient records.

The system can be deployed in many environments and is virtualization compatible, allowing for easy mass deployment and support. The system utilizes the enterprise network and is archived on the SAN or NAS. The data center allows patient records to be accessed, with proper clearance, across the enterprise enabling patient consultation of care providers between facilities.

Healthcare is an environment that requires adjusting and complying with ever-changing data desires and regulations, systems need agility and continued integration. With greater connectivity, the clinical care teams have improved productivity and efficiency, while ensuring the correct information is at the right place, at the right time. The overall goal is to provide high quality, cost effective, and a positive patient engaging experience with great outcomes for Mother and Baby.

About Clinical Computer Systems, Inc. (CCSI)

CCSI is an employee-owned, high technology company located in Elgin, Illinois. The company's business is dedicated to the development, marketing, and support of the OBIX Perinatal Data System. For over 20 years, CCSI has been a leader in perinatal data systems with innovative, customer-driven, computer-based solutions, and support services. The company's total-system approach includes expert service and support specialists. CCSI is committed to their customers by providing solutions that fit within their enterprise strategy and work to collaborate with leading HIS companies to provide a more integrated systems experience.

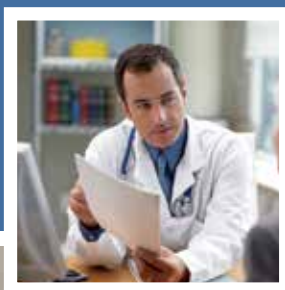
For more information on the OBIX system, contact us at 888-871-0963 or visit us at WWW.OBIX.COM.

[1]http://www.himss.org/library/interoperability-standards/what-is-interoperability

The Dollars and Sense of Interactive Patient Systems

SKYLIGHT HEALTHCARE SYSTEMS

A Case Study



Shawnee Mission Medical Center and Skylight Interactive Improve Patient Experience

About Shawnee Mission Medical Center

Shawnee Mission Medical Center (SMMC) is a 504-bed facility with nearly 20,000 inpatient admissions and more than 200,000 outpatient admissions annually. SMMC has the busiest emergency department in Johnson County, the area's first accredited Chest Pain Emergency Center, and delivers more babies each year than any other hospital in the Kansas City metropolitan area. SMMC employs more than 2,900 local residents and supports an exceptional staff of 700 physicians representing 50 medical specialties. The hospital's mission, Improving Health Through Christian Service, is at the core of everything it does.

Since 2008, Shawnee Mission Medical Center (SMMC) has used Skylight Healthcare Systems' interactive patient engagement platform to improve the patient experience. The following are four case studies that demonstrate the hospital's expanding use of the platform and the subsequent improvements, revenue, cost savings and patient satisfaction scores it realized as a result.

A Case Study

Interactive Meal Ordering

Results

IMPROVE MEAL ORDERING PROCESS AND DELIVERY

One of the most difficult challenges hospitals face today is how and where to reduce costs while enhancing the patient experience and improving the quality of care. SMMC is no different. After a review of its non-clinical operations, its meal ordering process was identified as a process in need of improvement. SMMC also wanted to bring restaurant-style menus to patients and make the process of ordering meals and fulfilling meal requests as seamless, efficient, and accurate as possible.

In 2011, the hospital was using the tray-line method. New diet menus were created, printed and distributed to patients every month. Patients placed their order using pencil and paper. Orders were collected. Nutrition assistants would interpret the written requests of patients and manually enter meal orders into the dietary system. This old and cumbersome process was not ideal for patients or staff. It created inaccurate orders and wasted food.

Strategy and Approach

SMMC used Skylight Interactive™ to streamline the process, reduce paper forms, improve accuracy and improve the patient experience.

SMMC and Skylight Healthcare created a process where meal ordering was completed by the patient using the in-room television. Orders were automatically sent to food services eliminating the need for manual order entry and paper-based orders.

An interface with the hospital's dining and nutritional services made it possible to display patient-specific nutrition information during the meal-ordering process. Patients are only able to view menu selections based on their personal diet restrictions. Not only does this reduce waste and ensure dietary restrictions are followed, it also serves as an additional mechanism to educate patients.

With Interactive Meal Ordering, SMMC has:

- Saved $115,000 annually
- Reduced full-time resources by 50%, saving approximately $50,000 a year
- Improved patient satisfaction scores around meals from 44.3 to 51 percent
- Eliminated paper menus, saving more than $50,000 in printing and toner costs
- Saved $345,000 in 3 years
- Reduced the number of late trays
- Improved order accuracy resulting in improved patient satisfaction around meal ordering
- Saved $15,000 by reducing food waste

SKYLIGHT® HEALTHCARE SYSTEMS

IMPROVE NURSE COMMUNICATION AND ENHANCE PATIENT EDUCATION

In 2012 a review of SMMC's HCAHPS scores identified space for improvement in the hospital's communication between nurses and patients. SMMC decided that it could optimize nurse involvement in patient education as a means to improve these scores.

Strategy and Approach

SMMC turned to its interactive patient engagement platform, Skylight Interactive to streamline patient education workflows on four units: OB, HNVU, MSU and PCU-7.

Staff was trained on how to create, edit and assign patient-specific video content sets using Skylight's administrative tool. A nurse would prescribe a patient education video and the unit secretary information associate would then assign the appropriate content set to the patient using Skylight Content Manager. The videos in the content set are automatically added to the patient's television.

A section under Patient Education titled "My Videos," created a personalized experience for patients. Nurses also created small handouts for each patient that listed assigned videos and instructions on how to use the pillow speaker to navigate through the system.

Nurses would also monitor patient video views by checking the patient's dashboard. This was often done during the bedside shift change to eliminate breaks in the communication among nurses and between nurses and patients.

Results

By the end of 2012, patient education video viewings in the designated units increased from 768 in January to 1,649 in December. Education videos watched per admission also increased from 0.44 to 1.14.

SMMC also moved from the 60th percentile for Nurse Communication to the 80th percentile.

IMPROVE PATIENT EXPERIENCE WITH VIDEO CONFERENCING

SMMC is a leader in caring for women and committed to providing patient-centered care. In 2013, the hospital opened its new Birth Center. A state-of-the-art facility, the Center illustrates SMMC's emphasis on technology and patient-centered care.

The Center's NICU occupies the fourth floor, while the Mother and Baby rooms are located on the third floor. This can be a challenge for mothers experiencing excessive pain or those on medications that leave them bedridden.

Strategy and Approach

SMMC used Skylight Healthcare's video conferencing solution to connect mothers who could not leave their rooms with their newborns isolated in the NICU. Using portable cameras, a secure phone line and Skylight's interactive patient engagement system, SMMC was able to address the emotional needs of mothers and connect them via video with their newborn.

Mothers were also able to share video with friends and family outside of the hospital. Using the television, a mother could email family members a request to connect via video conference. Once accepted, the friend or family member can see the mom in her hospital room. Cameras are easily turned off and controlled by the mother using her pillow speaker.

Results

With Skylight's video conferencing, SMMC is able to deliver a great patient experience, differentiate itself from other hospitals and centers in the area, and demonstrate its commitment to patient-centered care.

"Utilizing the NICU View from Skylight Interactive truly connected me with my baby while it was in the NICU. This made me less worried and allowed me to feel as if I were right in the room with my baby. This has truly made a huge difference in my experience here at the hospital."

Patient
Shawnee Mission Medical Center

A Case Study

Medication Communication

Results

IMPROVE DISCHARGE PROCESS, GENERATE PHARMACY REVENUE, REDUCE LIKELIHOOD OF READMISSION

During a regular review of its patient satisfaction scores, SMMC determined that it could improve its communication with patients regarding medication, especially at discharge. If SMMC could encourage patients to order and purchase prescriptions from the hospital's on-campus pharmacy, it would be able to increase pharmacy-generated revenue, deliver a better patient experience, create more educated populations, and potentially decrease the likelihood of readmission.

Strategy and Approach

Using Skylight Interactive's built-in messaging capability, patients were sent messages via the in-room television twice a day asking if they would like their prescriptions filled. If the patient answered yes, a notification was sent to the hospital's onsite pharmacy. The pharmacy would then contact the patient to confirm receipt of request and gather any necessary information. Working with the nursing staff, pharmacy personnel would then collect patient prescriptions and personally deliver medication to the patient on the day of discharge.

To date, prescriptions filled as a result of Skylight alerts have generated more than $31,840 in pharmacy net revenue.

By providing a convenient method for patients to order necessary prescriptions, SMMC improved the patient experience, and—ultimately—increased pharmacy revenue.

- HCAHPS scores for discharge improved from the 75th percentile to the 95th percentile
- HCAHPS scores for explanation of medications improved from the 70th percentile to the 80th percentile
- Approximately 84% of the discharge prescription service requests from patients result in a prescription being fulfilled
- Average additional monthly net revenue generated by Skylight medication alerts is $2,000. Utilizing push messaging resulted in an average increase of more than $690 in monthly net revenue

SKYLIGHT® HEALTHCARE SYSTEMS

STANLEY Healthcare

Staff Workflow Case Study:

Celebration Health

Florida Hospital Pioneers Use of RTLS and Business Intelligence to Improve Nursing Workflows

Overview

Florida Hospital Celebration Health is a 174-bed, state-of the-art hospital that serves as a showcase of innovation and excellence in healthcare. Celebration Health bases its care on a patient-centric philosophy. It has long recognized that nursing is a key factor in the efficient delivery of high quality patient care. Nursing also represents the hospital's highest cost of labor. Given these factors, administrators at Celebration Health sought business intelligence tools to better understand current nursing performance and pinpoint opportunities for workflow improvements leading to higher patient and staff satisfaction.

Celebration Health's Innovation Tower includes a 31-bed surgical/medical unit designed to be a "living laboratory" for innovation. In keeping with the hospital's patient-centric philosophy, Celebration Health made a strategic decision to invest in a real-time locating system (RTLS).

With RTLS, the hospital aimed to address a range of operational and culture challenges, seeking not only to raise efficiency but also improve the patient experience and staff satisfaction. Building on the early successes in improving asset tracking and monitoring of temperature and humidity, the hospital turned its attention to using RTLS for business intelligence: understanding and improving complex processes related to clinical workflow.

The Solution

Using STANLEY Healthcare's AeroScout® RTLS platform and MobileView® software, Celebration Health has pioneered the use of technology to track, analyze and enhance clinical workflow. This investment has been accompanied by proactive change management and communication to ensure that nurses understand and support process improvement initiatives. This initiative enables Celebration Health to more fully leverage the benefits of the STANLEY Healthcare Visibility and Analytics Platform, which it previously implemented for RTLS Asset Management and Environmental Monitoring.

The Results

By documenting travel patterns and time spent per location, administrators have been able to investigate specific aspects of nursing workflow, partnering with nursing staff to find new and better ways to optimize staffing levels, improve the efficiency of unit layout, and establish and implement best practices for compassionate, compliant nursing care. The redesigned workflows have helped Celebration Health raise hourly rounding compliance to greater than 90%, while also driving the separation rate for registered nurses to 8.57%, well below the industry average.

CELEBRATION HEALTH
FLORIDA HOSPITAL
The skill to heal. The spirit to care.®

Solutions Implemented

- AeroScout Staff Workflow
- AeroScout Asset Tracking
- AeroScout Environmental Monitoring
- AeroScout Patient Flow

"With the advent of new reimbursement models and staff needing to work more efficiently, we saw a tremendous opportunity to use RTLS for ongoing research and process improvement.

- Patty Jo Toor, BA, RN, OCN
Chief Nursing Officer
Celebration Health

Solution Benefits

Since the unit's launch in 2011, Celebration Health has monitored staff workflow in the Innovation Tower; in 2013, it added oncology and telemetry patient units, and the OR, as well. Today, over 123 nurses and techs are part of the workflow improvement initiative across those four units.

"For years, hospitals have made certain assumptions about nursing staffing," says Director of Performance Improvement Ashley Simmons. "We realized we could use our STANLEY Healthcare solution to study nursing at a whole different level—to question many of those longstanding assumptions and to truly understand how and where our nurses spend their time."

"Celebration Health is leveraging the RTLS data provided by the STANLEY Healthcare solution to correlate staff actions with HCAHPS scores. The hospital can not only monitor care team processes and workflows, but understand the way the flow is viewed from a patient perspective.

In deploying the solution, Celebration Health gave particular attention to managing cultural change, working closely with the clinical staff to educate them on the intent of the technology and to address any "Big Brother" fears. By making it clear that the solution was intended to improve the work experience by making shifts run more smoothly and efficiently, and that the data would never be used in a punitive way, the hospital has been able to turn the clinical staff into engaged participants, eager to see and understand their own workflow patterns. This strategy has made Celebration Health highly successful in retaining its nursing staff, with a separation rate for registered nurses of just 8.57%, well below the industry average. Keeping staff turnover to a minimum reduces recruiting and training expenses, and helps foster a stable environment for care teams.

Having access to detailed data—and being able to run a wide range of analyses and reports—has revealed some important findings. With the ability to drill down by service line, by time of day and even by individual nurse or technician, the hospital has uncovered opportunities to make small but important changes.

Heat maps confirmed how much time and attention clinical staff members were devoting to Head and Neck Surgery patients. "The data showed that if you had multiple head and neck patients, you were just swamped," Ms. Toor notes, adding that the hospital has since made assignment changes to better balance workload.

Celebration Health has also started to understand and respond to the different dynamics of the day and night shifts. It has become clear to the hospital that, contrary to a widely held assumption, the night shift is just as busy as the day shift. The way it is busy, however, is very different. Activity on the day shift is more or less constant, whereas the night shift is characterized by periods of intense activity at the start and end of the shift, with a lull in between. By shifting some activities to the quieter hours, the hospital has helped reduce bottlenecks and addressed a point of dissatisfaction for the clinical staff.

Significantly, the nursing staff is now taking ownership of identifying ways to enhance processes. The spaghetti maps of movement across a shift enable each nurse to actually see how the day is spent, and identify areas for improvement; for example, by combining multiple trips to the supply room into a single visit to eliminate tiring "back and forth" movement.

"When they see data, they're starting to think differently," Ms. Toor says. "It has been rewarding to watch them take control of their own environments—to ask the tough questions and then try to fix it."

Celebration Health follows a Purposeful Rounding practice, encouraging meaningful engagement between clinician and patient at every room visit. The data from the AeroScout solution provides objective validation that this is in fact occurring. Hourly rounding compliance stands at a healthy 90%, and the length of time nurses are spending in patient rooms provides evidence that they are doing so with intent. "Each time that they round they're spending at least 2 to 4 minutes in the room," says Ms. Simmons. "It's not just a quick poke your head in."

Looking to the future, Celebration Health is leveraging the RTLS data provided by the STANLEY Healthcare solution to correlate staff actions with HCAHPS scores. The hospital can not only monitor care team processes and workflows, but understand the way the flow is viewed from a patient perspective. "There is still a lot more we can learn from really understanding nurses and their workflow and how it impacts the bottom line for the hospital," Ms. Toor notes.

Read the full case study at **www.stanleyhealthcare.com**

STANLEY Healthcare

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Case Study: Real-Time Data Drives Action

Nuvon brings a unique combination of high-fidelity data collection from bedside devices and tools to support post-processing and clinical action by licensed clinicians. In combination, these capabilities make for an offering that facilitates clinical action at the bedside by combining data with notifications and targeted actionable communication of events.

Data communication and targeted notifications support the clinical end user in research, studies, and "what-if" scenarios so often required to facilitate clinical decision making, clinical research and trials.

This year, Nuvon brings demonstrations of its data collection capabilities to the Intelligent Hospital Pavilion OR and ED demonstration rooms.

- In the OR, Nuvon demonstrates the collection of data from anesthesia machines to show the benefits of remote monitoring of technologically-dependent patients receiving anesthetic gases and respiratory monitoring, with the focus on capnography, vital signs collection and clinically-identifiable events and triggers.

- In the ED, Nuvon extends this model to show physiologic data collection and monitoring in support of clinical triggers associated with patients at risk for sepsis. The tools Nuvon brings to support the clinical decision maker enhance and extend straightforward charting by providing the means to collect, combine and create triggers associated with specific data elements normally collected at the bedside with other, non-real-time information (e.g., patient demographics, laboratory data, etc.) to facilitate a more well-rounded view of the patient condition.

Given this context, the clinical end-user can set up automated alerts to trigger on the occurrence of specific events, which extends beyond simple threshold communication.

For a more detailed discussion of these capabilities and specifics, please visit the Nuvon Kiosk here in the IHP Exhibit, Kiosk #33, Booth #6656-18.

Case Study: Sunquest Collection Manager™

Using Technology to Transform Workflow and Reduce Mislabeled Specimens

The Challenge

In Southeastern Pennsylvania, a network of 16 hospitals and medical centers performs six million annual lab tests on collected specimens. For 10 years, the organization has worked to eliminate an ongoing mislabeled specimens issue. Led by nursing, they decided to take a new approach that focused on a patient care model.

Fast Facts

Organization: Not-for-profit health system
Number of Locations: 16 hospitals and medical centers
Number of Employees: About 10,000
Number of Physicians: 2,000

The RESULTS

99%
Reduction in Errors

3,600
Nursing and Lab Staff Use Collection Manager

"Absolutely I would recommend Collection Manager for nursing. It gives a peace of mind knowing you have the correct patient every time. Turnaround time is good, and time spent running back and forth is reduced."

Director of Nursing Operations

The Solution

The hospital organization selected Sunquest Collection Manager as the technology of choice to drive down error rates. A selection committee consisting of IT, Lab and Nursing administration reviewed Collection Manager and other competitive solutions through an official RFP process. **Sunquest Collection Manager was the ideal choice; largest install base, ease of use, integration capabilities and efficient implementation was unmatched.**

The implementation began in one unit of one hospital, but as the project was carried out, excitement spread and other units wanted to be a part of the project. One Project Manager explained, "nurses were tired of following up on labeling errors and were clamoring for Collection Manager." The organization sped up the implementation process to cover half a hospital at a time.

The Project Manager credits the nursing staff training as critical to their success. When Collection Manager went live, the nurses were well prepared. Currently, we have it deployed in medical surgery, critical care, nursery, OB, labor and delivery, most outpatient draw centers, and the Emergency Department, with more to come.

The Chief Medical Information Officer believes that Sunquest Collection Manager has impacted patient safety and been important in consistently sustaining low error rates for the organization. Sunquest Collection Manager is a proven solution that ensures positive patient ID and prints lab-ready labels at the bedside in the presence of the patient. **The solution enables caregivers to provide the highest quality of care and safety to patients without mistakes and without the paperwork, which is essential to every healthcare organization.**

sunquest

To learn more about Sunquest point of care solutions visit www.sunquestinfo.com or call (800) 748-0692.

HEALTHCARE SOLUTIONS

Advancing Patient Care Through Connectivity

Nine hundred-bed US hospital based in the south focuses on patient satisfaction, efficiency and reliability for campus-wide transport systems

A 900-bed hospital in the Southern United States serves as the major referral hospital and trauma center for patients throughout region, comprising several buildings connected by bridges and a tram system, which moves people between treatment sites.

For more than 20 years, the hospital has partnered with Swisslog, utilizing its TransLogic® Pneumatic Tube System (PTS) to deliver documents, drugs and specimens to and from 80+ PTS stations across campus.

"We run thousands of transactions daily. And we're growing, adding new stations as we go. The customized Swisslog pneumatic tube system—connecting our main buildings, our hospital for women and children and our four pharmacies, quickly and dependably delivers blood samples and lab specimens. That means less waiting and manual labor"

Electrician for Facility Operations

The Challenge

The hospital faced some serious performance issues with high transaction times and dissatisfied users. When Swisslog visited the campus to consult on a proposal to build an off-site laboratory facility, they identified some significant challenges in ensuring that their new project could be supported with the best possible pneumatic tube system performance.

Outdated technology was not going to provide the hospital with the best possible solution and there were significant steps in moving from their current system to one that was state to state of the art. The first step was to evaluate the positive aspects of their existing system, then brainstorm potential solutions. In conducting a system design analysis, they determined that 95 percent of the hospital's existing lab traffic arrived in 5 minutes or less. However, the emergency department or ED, was a bottleneck, with inbound traffic taking up to 20 minutes to arrive in the lab.

Rather than simply drive a complete straight forward Swisslog solution to upgrade existing systems and connect the proposed new lab, Swisslog approached the situation with a layering strategy—proposing a series of simple changes that provided them with choices on what their future could look like. Adding in new technology could provide them with chain-of-custody capabilities, in addition to improving their throughput and speed. Offering successive "layers" of capability, the project gradually migrated from a simple upgrade to a fully retrofitted campus with radio frequency identification (RFID), badge access security (WhoTube®), Nexus™ PTS Station Panels, Nexus PTS software on a virtual server and full Xpress™ System.

Securing Transactions Through Chain-of-Custody

Pneumatic tube system chain-of-custody solutions provide control over carriers and their contents. This allows users to limit access to authorized users and to track and trace carriers and their contents throughout the hospital campus.

The Swisslog chain-of-custody solutions installed at the hospital include radio frequency identification (RFID) technology, which permits carrier tracking and monitoring and inventory management. RFID ensures real-time verification that patient-critical pneumatic tube transactions have arrived at the right station at the right time. ID badge verification further ensures that only approved staff members can access the system.

When RFID implementation is complete, the hospital will also upgrade to the new NexSeal™ Carriers, which are designed for easy opening and secure closure, with leak-resistance to eliminate risk of system contamination.

Swisslog notification and reporting solutions ensure that stat, routine and error transactions receive prompt attention. Specifically, Nexus Software with dashboard support and alert messaging communicates key PTS transport events throughout the campus.

With alert messaging, managers can receive critical notifications on cell phones, mobile devices, computers and pagers to ensure that issues are flagged immediately for faster response. By configuring customized rules to trigger alerts and messages, the hospital readily identifies lost or misdirected carriers and immediately notifies staff to take corrective action.

"The badge reader works great. If something didn't make it to the lab, I can find out exactly who badged in and where the carrier is…it's ideal for troubleshooting. And when RFID goes online, we'll know exactly where a tube came from, which means that each station will automatically maintain the number of tubes assigned to it," said the hospital's electrician for facility operations. "The iPod Touch is very handy for troubleshooting. I can receive notifications, and take care of problems wherever I am…without having to be at my computer."

Swisslog Healthcare Solutions
healthcare.us@swisslog.com
USA: 800.764.0300
Canada: 877.294.2831 | 905.629.2400

www.swisslog.com/healthcare

swisslog
inspired solutions

TALYST

The University of Virginia Health System

The University of Virginia Health System (UVAHS) is an integrated delivery network comprised of a leading 600 bed academic medical center in Charlottesville, VA and 150 clinics serving a diverse population in central Virginia. The system includes a Level 1 Trauma Center, transplant, and dedicated oncology services. UVAHS Department of Pharmacy serves both Inpatients and Outpatients, which includes two retail pharmacy locations that dispense over 1,000 prescriptions per weekday. UVAHS handles over 30 thousand admissions per year and more than 650,000 outpatient visits with a budget exceeding $100 Million.

The Challenges of Getting the Most out of 340B While Maintaining Program Compliance

Although UVA achieved substantial savings on its drug spend through the 340B program, the organization felt certain that valuable opportunities were being missed. Like most health systems, UVA employed pharmacy staff to manage and oversee their 340B program. Staff worked diligently to manage the 340B program, but these staff members were focused on medication management, patient care, patient safety and core pharmacy operations - not managing the challenges of a compliant 340B program.

Employee turnover further complicated the already challenging task of managing an effective 340B program - new employees had to learn how to manage 340B variables and often missed savings opportunities during these periods of transition. When new clinics or programs were added at UVAHS, often representing the possibility of substantial added savings, staff struggled to incorporate them into the larger 340B program, foregoing additional savings. Under this system, significant savings from prior years were certainly missed; if these missed eligible dispenses could be identified then UVAHS could either get wholesaler credit or build up their quantities of eligible dispenses. This would allow all new purchases of a given drug be made under reduced 340B pricing until the prior accumulated savings opportunities were exhausted.

Additionally, with the drastic increase in HRSA audits, UVAHS understood that an audit was inevitable. With Talyst's expertise and 100% audit compliance record for its customers, UVAHS understood the importance of outsourcing to industry experts.

Fully Managed 340B

UVAHS made the decision to utilize Talyst's 340B Fully Managed solution, the first of its kind outsourced 340B program management service that allows pharmacy departments to retain full control over "core" pharmacy operations. UVAHS pharmacy staff at each facility place their drug orders and Talyst splits the orders into 340B eligible and GPO orders, ensuring that the correct pricing is applied.

More importantly, Talyst 340B experts, working on behalf of UVA Health System:

- Verify that order files are processed
- Identify and fix crosswalk issues (unknown items) which can be a big source of lost savings
- Perform spot-checks to look for anomalous data (e.g., unusually large or small quantities) which can be indicative of multiplier or other data issues that can lead to lost savings or compliance issues
- Identify Penny Saver Special - even if normal PAR/inventory levels wouldn't indicate a need to order such drugs, the massive savings available usually make it worthwhile
- Provide weekly, monthly, quarterly and annual savings and operational reports to enable continuous program improvements
- Conduct periodic "all hands" program reviews, where results are assessed, and where Talyst shares 340B program updates and best practices gleaned from leaders throughout the industry
- Perform both "spot" and more comprehensive "self-audits" to both identify compliance issues early and create a documented track record of compliance efforts. This is especially important in an era of heightened compliance pressures.

The initial implementation took just six weeks from program kick-off to go-live. The program is fully EDI-enabled, allowing for seamless uploads of orders to UVA's drug wholesaler, Cardinal Health.

The program is run for a single monthly flat fee, which avoids capital costs/committee approvals and allows the program to literally pay for itself and enabling UVAHS to retain all program savings.

Results

In its first full year of operation the UVAHS/Talyst 340B Fully Managed program reported that its savings approached two million dollars, including credit-rebill of previously missed savings and accumulation of prior dispenses that can now be used to purchase new drugs at 340B prices until the "buckets" run out. ROI easily exceeded 400%, even without counting labor savings and redeployed labor. As the program has continued to operate, additional annual savings have continued to grow.

Recently UVAHS went through a HRSA audit – and the results were highly successful with no deficiencies found in their data sets or program integrity measures. A variety of items were reviewed in the audit including sample claims, provider credentials, operating procedures, unique registrations and National Provider Identification numbers. Utilizing Talyst 340B Fully Managed products and their own qualified internal resources, UVAHS was well positioned for the successful audit process.

The pharmacy staff remains excited to focus on what they do best and compliance and audit reporting is now a systematic part of operations. Several FTEs have been re-purposed, and UVA is now focusing on increasing Medication Assistance Programs, which will generate additional savings.

Talyst 340B Fully Managed has increased the savings at UVAHS while helping the organization to maintain compliance in an increasingly complex regulatory environment. While by law, responsibility for 340B compliance must always remain with the covered entity, by partnering with Talyst, UVAHS has established an effective and compliant 340B program

Contact Information: For more information on Talyst Fully Managed 340B, please contact:

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Posted on April 17, 2014 by StaceyG

High-Tech Gadget Keeps 90-Year-Old Pearland Man Out of Hospital

Kimberly Berg, R.N. stops by Pearland resident, 90-year-old James Weir's home recently to check on him. "The nurse showed me how the Virtual Care Check system worked; straight-forward, simple questions and directions, easy to operate. Great technology is like driving a car versus a wagon," said Weir.

PHOTO: Nicole Rose, Memorial Hermann

HOUSTON (Apr. 17, 2014) – Pearland resident, 90-year-old **James Weir** practiced law for more than 50 years and isn't letting his age or health problems stop him from doing exactly what he wants anytime soon. Besides, going to the doctor is work and he says he is "allergic to work."

After suffering from shortness of breath last December, Weir was admitted to Memorial Hermann Southeast Hospital and diagnosed with congestive heart failure. While he enjoyed the "delicious" chocolate milk and the pretty nurses, he wanted to be back home with his family. So, he was eager to try the Virtual Care Check by Memorial Hermann.

"It's like a doctor in your home, but without all the headaches of Houston traffic," said Weir. "The nurse showed me how the Virtual Care Check system worked; straight-forward, simple questions and directions, easy to operate. Great technology is like driving a car versus a wagon."

Virtual Care Check is a remote patient monitoring system from Memorial Hermann that keeps patients out of the hospital, dramatically improves quality of life, and decreases health care costs, according to co-developer **Vivify Health**. Patients, like Weir, with chronic medical conditions requiring frequent monitoring now have access to convenient, easy-to-use, mobile health care that sends updates to their health care providers at Memorial Hermann.

"In terms of managing chronic diseases, improving care transitions, and reducing readmissions, Virtual Care Check is a real game changer," said **Pat Metzger**, chief care management officer. "Memorial Hermann is looking at the future of health care and actively transforming it to revolve around the consumer."

Patients are provided small, easy-to-use tablet computers with a wireless connection, weight scales, pulse oximeters, and blood pressure devices. Depending on the plan customized by a physician, patients log on and typically answer a daily health survey, keeping track of their vital signs. On the other end, health care providers monitor the patient's progress remotely, make recommendations, and communicate with the patient and other members of the health care team.

"These new, mobile devices help our patients take better care of their health by providing them a more active role in their own well-being," said **Kimberly Berg**, R.N.. "Patients in this program enjoy greater peace of mind knowing the people responsible for their medical care have their latest heath information."

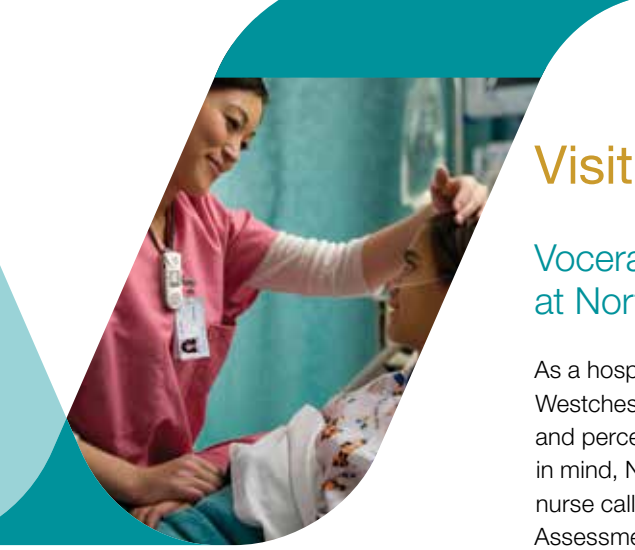
"I feel like my old self again. Virtual Care Check ensures I stay healthy without a whole lot of work," said Weir. "I am living a better life because of this amazing technology from Memorial Hermann."

Memorial Hermann health care providers, in addition to a significant number of physicians affiliated with Memorial Hermann, are already using Virtual Care Check to monitor patients who suffer from complex chronic diseases, as well as those discharged with specific diagnoses such as heart failure, heart attack, and pneumonia.

"Memorial Hermann Home Care patients have demonstrated noteworthy improvements in their medical conditions and a reduction in unscheduled clinic and emergency visits," said Metzger. "Virtual Care Check improves self-care, treatment, and medication compliance by educating, motivating, and monitoring patients on a daily basis."

Remote health care technology does not replace routine medical appointments; rather, it allows doctors to deliver higher quality, more personalized patient care, efficiently and cost effectively, anytime, anywhere. Virtual Care Check also enables patients to take a more educated and active role in their well-being and have peace of mind knowing their health care providers have up-to-date information every day in order to adjust their medical care.

For more information go to www.vivifyhealth.com or call 855-4VIVIFY



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Vocera with Nurse Call Integration Boosts Patient Satisfaction at Northern Westchester Hospital (Mount Kisco, NY)

As a hospital dedicated to being the leader in patient and family-centered care, Northern Westchester Hospital (NWH) embarked on a workflow redesign to elevate patient satisfaction and perception of staff responsiveness to the call button. With this patient-experience goal in mind, NWH integrated the Vocera hands-free communication system with the hospital's nurse call system. The result was a dramatic improvement in HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) scores related to nurse responsiveness.

Focusing on Communication, Responsiveness

According to NWH Chief Nursing Officer Lauraine Szekely, the HCAHPS survey measures the percent of "always" — meaning patients evaluate the consistency of how a hospital executes on patient-centered processes.

"Let's face it, when you are a patient and you need help going to the bathroom, you don't want to wait — it's very uncomfortable and stressful," Szekely said. "We heard loud and clear from our patients that they wanted to talk directly to their nurses without going through a middleman. Vocera was already our communication solution internally, so integrating with nurse call was a logical extension."

Before NWH took on integrating the nurse call system with Vocera, the hospital started with staff communication and engagement, making sure the fundamental infrastructure was in place and that clinical and support staff were comfortable with the proposed new process. NWH began its integration with the maternity unit because HCAHPS score for responsiveness on this unit registered in the lower quartile.

In NWH's previous workflow, a patient would press the call button and be connected with a telecommunications operator who would find the appropriate nurse and relay the message. The nurse would then get back to the patient. This process involved many handoffs and possible delays. Now, the patient presses the call button, and the message is conveyed directly to the Vocera Badge® of the nurse assigned to that patient. The nurse responds immediately, through an audible call speaker next to the patient's pillow.

Within a few months of integration, and in conjunction with other communication improvements, the maternity unit's HCAHPS responsiveness score skyrocketed to the top one percent in the nation. Next, NWH integrated Vocera with the nurse call system on the medical-surgical units, where maternity nurses assisted with and supported integration using best practices they had learned during their process. After two months, HCAHPS scores for the medical/surgical unit also climbed to the top one percent.

Restoring the Human Connection

Raising the scores so significantly demonstrates the seriousness of NWH's commitment to listening to the voice of the patient and creating processes to exceed patient expectations.

"It's important that we partner with companies whose products and strategies are patient-centered, and that's why we're so pleased to work with Vocera," said Joel Seligman, President and CEO of NWH. "Our integration of Vocera and nurse call, in conjunction with all the other improvements we've made with communication, means that our patients don't have to tell their story or give their request to a message-taker, or re-tell it two or three times to different people. It means demonstrably faster response times by clinical staff. It restores the human connection to care — establishing that direct, one-to-one communication that is so crucial to a patient's care, recovery, and experience."

NORTHERN WESTCHESTER HOSPITAL

"Our integration of Vocera and nurse call, in conjunction with all the other improvements we've made with communication, means that our patients now have the shortest path to the right person to respond to their needs."

Joel Seligman
President and CEO
Northern Westchester Hospital

For More Information
Visit www.vocera.com,
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or telephone 1-888-9-VOCERA.

GLOSSARY of TERMS

802.11 Standard

A wireless local area network (WLAN) standard in the 2.4, 3.6 and 5 GHz frequency bands. It is maintained by the IEEE LAN/MAN Standards Committee (IEEE 802). 802.11 Standard is the basis for Wi-Fi specification. This technology is used by some RTLS solutions to calculate location.

802.15.4 Standard

A standard which specifies the physical layer and media access control for low-rate wireless personal area networks (LR-WPANs). It is maintained by the IEEE 802.15 working group. 802.15.4 Standard is the basis for the ZigBee specification. This technology is also used by some RTLS solutions to calculate location.

Accountable Care

A healthcare delivery and payment model that ties provider reimbursement to quality metrics and reductions in total cost of care. The Accountable Care Organization (ACO) is a group of coordinated healthcare providers that provides care to a given population.

Active RFID Transponder (Tag)

An RFID tag that has an on-board battery and periodically transmits an ID signal, rather than reflecting back a signal from the reader as a passive tag does. While most active tags use a battery to transmit a signal to a reader, some tags can gather energy from other sources. Active tags can be read from 300 feet (100 meters) or more, but they are more expensive than passive tags.

Application

Software that utilizes data coming from middleware and that directly interacts with the end user. Examples of applications include: asset tracking and management, patient flow, temperature monitoring, infection control and hand hygiene, staff duress, inventory tracking and management, positive patient identification, business intelligence and reporting and wireless nurse call.

Air Interface Protocol

A radio-based communication link's protocol that governs how tags and readers communicate.

Backscatter

A reflection of waves in the direction from which they came. RFID tags using backscatter technology to reflect radio waves back to the reader, usually at the same carrier frequency. The reflected signal is modulated to transmit data.

Bandwidth

The range or band of frequencies, defined within the electromagnetic spectrum, that a system is capable of receiving or delivering.

Barcodes

Consist of small images of lines (bars) and spaces affixed to retail store items, ID cards and postal mail to identify a particular product number, person or location. A barcode reader uses a laser beam that is sensitive to the reflections from the line and space thickness and variation. The reader translates information from the image to digital data and sends it to a computer for storage or for another process. 2D barcodes store information not only horizontally, as one-dimensional barcodes do, but vertically as well. That construction enables 2D codes to store up to 7,089 characters. The traditional, uni-dimensional barcode has only a 20-character capacity.

Battery-Assisted Passive Tag (BAP)

RFID tags, with batteries, that communicate using the same backscatter technique used by passive tags (tags with no batteries). They use the battery to run the circuitry on the microchip and sometimes an onboard sensor. They have a longer read range than a regular passive tag because all of the energy gathered from the reader can be reflected back to it. They are sometimes called "semi-passive RFID tags."

Biometrics

Technology used to identify individuals by comparing biological data, such as fingerprints, voice characteristics and iris patterns, against stored data for that individual. Biometric systems consist of a reader or scanning device, software that converts the scanned biological data into a digital format and compares match points, and a database that stores the biometric data for comparison. Authentication by biometric verification is becoming increasingly common in corporate and public security systems, consumer electronics and point of sale (POS) applications. Specific biometric AIDC (Automatic Identification and Data Capture) technologies include finger-scanning, electro-optical fingerprint recognition, finger vein ID and voice recognition.

Bluetooth Low Energy (BLE)

A wireless network protocol, especially suited for sensors and other small devices, that requires extremely low power consumption. The protocol enables devices such as an iPhone to transmit a Bluetooth signal to beacons, with a read range up to 50 meters.

Data Retention

The ability of a microchip to maintain the information stored in EEPROM (Electrically Erasable Programmable Read-Only Memory). RFID tags and other microchips can typically retain data for 10 years or more, but data retention depends on temperature, humidity and other factors.

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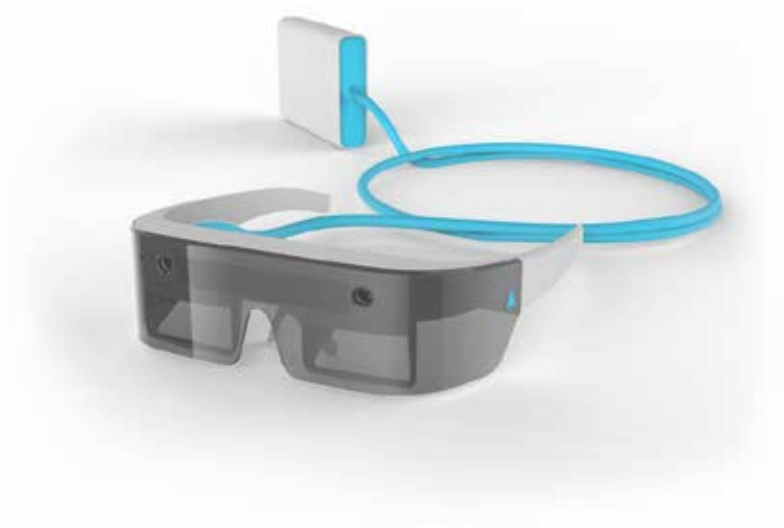

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E-pedigree or Electronic Pedigree

An electronic document that provides data related to the history of a batch of a drug. The e-pedigree is used to identify a drug prior to sale, purchase or trade of that product. The states of California and Florida have set deadlines for mandatory compliance to an e-pedigree system for tracking of medications through the supply chain. The FDA has also established electronic pedigree regulations to reduce risk of counterfeit products.

Electromagnetic Interference (EMI)

A phenomena in which the electromagnetic field of one device disrupts, impedes or degrades the electromagnetic field of another device, potentially blocking transmission.

Electromagnetic Spectrum

The range or continuum of electromagnetic radiation, characterized in terms of frequency or wavelength.

Electronic Product Code (EPC)

A unique identifier for every physical object anywhere in the world, for all time. Its structure is defined in the GS1 EPCglobal Tag Data Standard; an open standard available for download from the GS1 EPCglobal website. The EPC is designed as a flexible framework that can support a variety existing coding schemes, including many coding schemes currently in use with barcode technology. EPC identifiers currently support seven identification keys from the GS1 system of identifiers.

Encryption

Translation of data into a code for the purpose of keeping information secure from all but the intended recipient.

EPCglobal

A joint venture between GS1 (formerly known as EAN International) and GS1 US. It is an organization set up to achieve worldwide adoption and standardization of Electronic Product Code (EPC) technology.

Excite

The transmission of radio frequency energy from the RFID tag reader to stimulate a passive RFID tag to provide power to transmit its data back.

Frequency

The number of cycles a periodic signal executes in unit time. It is usually expressed in Hertz (cycles per second) or appropriate weighted units such as kilohertz (kHz), Megahertz (MHz) and Gigahertz (GHz).

GS1

An international organization to develop and maintain standards for supply and demand chains. The four key standards of focus are: Barcodes (used to automatically identify things), eCom (electronic business messaging standards allowing automatic electronic transmission of data), GDSN (Global Data Synchronization standards that allow business partners to have consistent item data in their systems at the same time) and EPCglobal (which uses RFID technology to immediately track an item).

Health Insurance Portability and Accountability Act (HIPAA)

The U.S. Congress enacted HIPAA in 1996 to regulate the interchange of private patient data to help prevent unlawful disclosure or release of medical information.

Healthcare Information and Management Systems Society (HIMSS)

A not-for-profit association of 50,000 individual members and 570 corporate members. This organization is dedicated to improving healthcare quality, safety, access and cost-effectiveness through the use of information technology and management systems.

Healthcare Information Exchange (HIE)

The process by which health information is mobilized electronically between or across organizations within a region, community or hospital system. Federal and state regulations regarding HIE's are still being defined. In the meantime, multiple state and healthcare provider exchanges have been developed in the U.S. to manage movement of electronic records.

High-Frequency (HF)

The frequency bandwidth from 3 MHz to 30 MHz. HF RFID tags typically operate at 13.56 MHz, can normally be read at short range: three feet or less, and transmit data faster than low-frequency tags, although they consume more power than low-frequency tags.

Infrared (IR)

A technology that uses electromagnetic radiation with a wavelength that is longer than that of visible light but shorter than that of microwaves and terahertz radiations. The IR signal does not penetrate walls, ceilings, floors or large objects inside a room, but it does bounce off any object in its path. This technology is used to enable RTLS systems and is often used in conjunction with RFID.

Intensive Care Unit, (ICU)

A department within a hospital or healthcare facility dedicated to intensive care of patients with severe or life-threatening injuries or illnesses that require constant, close monitoring and support.

Interactive Voice Response (IVR)

A telephony technology in which an individual uses a touch-tone phone to interact with a database to acquire information from, or enter data into, the database.

International Organization for Standardization (ISO)

A non-governmental organization consisting of the national standards institutes of 205 countries. Each member country has one representative and the organization maintains a Central Secretariat in Geneva, Switzerland, that coordinates the system. Most RFID related ISO Standards are: ISO 10536: The international standard for proximity cards ISO 11784: The international standard defining frequencies, baud rate, bit coding and data structures of the transponders used for animal identification. ISO 14443: A set of international standards covering proximity smart cards. ISO

15693: The international standard for vicinity smart cards. ISO 18000: A series of international standards for the air interface protocol used in RFID systems for tagging goods within the supply chain. ISO 7816: A set of international standards covering the basic characteristics of smart cards, such as physical and electrical characteristics, communication protocols and others.

Joint Commission on Accreditation of Healthcare Organization (JCAHO)

A non-profit, U.S. association that accredits healthcare organizations and programs as part of its mission to improve healthcare. A majority of state governments recognize the Joint Commission's accreditation as a condition of license and the receipt of Medicaid reimbursements.

LAN (Local Area Network)

A relatively small network covering areas such as a room, a department, a building, a campus, etc.

Low-Frequency (LF)

The frequency bandwidth from 30 kHz to 300 kHz. Low-frequency RFID tags typically operate at 125 kHz or 134 kHz. Low-frequency RFID tags must be read from within three feet, and their data transfer rate is slow, but they are less susceptible to interference than UHF tags.

Machine to Machine (M2M)

The term for technologies that enable devices (such as sensors or meters) to communicate with each other or another device (such as an appliance). An M2M network can consist of a connection between two devices or multiple devices. M2M healthcare applications include patient monitoring solutions or drug dispensing tracking.

Memory

A means of storing data in electronic form. A variety of random access (RAM), read-only (ROM), Write Once-Read Many (WORM) and read/write (RW) memory devices can be used. In RFID terms, memory is the amount of data that can be stored on the microchip in an RFID tag. It can range from 64 bits to 2 kilobytes or more on passive tags.

Mesh Network

A Mesh network consists of wireless nodes that relay data to other nodes as part of a network that ultimately forwards data to a server. An example of a mesh network is Zigbee digital radio technology that forwards data via "hops" from one node to another.

Micro-Electrical Mechanical Systems (MEMS)

A term that refers to the combining of electrical and mechanical components on a chip to produce a very small system. MEMS medical devices are being developed to replace traditional devices because they are so small they can be used within a patient's body or a very small tool such as a scalpel, for example, in surgery. The MEMS devices promise to be more sensitive and robust than traditional technology. MEMS technology can be used within a host body or in biological samples to detect and diagnose health status.

Microwave Tags

A term that is sometimes used to refer to RFID tags that operate at 5.8 GHz. They have very high transfer rates and can be read from as far as 30 feet away, but they use a lot of power and are expensive. (Some people refer to any tag that operates above about 415 MHz as a microwave tag.)

Middleware

In the RFID world, this term refers to software that resides on a server between readers and enterprise applications. The middleware is used to filter data and pass on only useful information to enterprise applications. Some middleware can also be used to manage readers on a network.

Modulation

A term to denote the process of superimposing (modulating) channel encoded data or signals onto a radio frequency carrier to enable the data to be effectively coupled or propagated across an air interface. Modulation is also used as an associative term for methods used to modulate carrier waves. Methods generally rely on the variation of key parameter values of amplitude, frequency or phase. Digital modulation methods principally feature amplitude shift keying (ASK), frequency shift keying (FSK), phase shift keying (PSK) or variants.

Near Field Communication (NFC)

A set of standards for smartphones and tablets to establish radio communication with each other or tags by touching them or bringing them into close proximity, usually no more than a few centimeters from each other or a tag. Existing and anticipated applications include contactless transactions, data exchange, and simplified setup of more complex communications such as Wi-Fi.

Outcomes Measures

Used to assess the impact of health services in terms of improved quality and/or longevity of life and function.

Passive Transponder (Tag)

A battery-free data carrying device that reacts to a reader's inductively coupled or radiated electromagnetic field, by delivering a data modulated radio frequency response. Having no internal power source, passive transponders use the power they require to respond from the reader's electromagnetic field.

Patient Activation/Engagement

The extent to which patients have skills, knowledge and motivation to participate as part of their care team.

Population Management

The health outcomes of a group of individuals, as well as the distribution of such outcomes within the group; an approach that aims to improve the health of an entire human population.

Protocol

A set of rules governing a particular function, such as the flow of data or information in a communication system.

Radio Frequency Identification (RFID)

A technology that incorporates the use of electromagnetic coupling in the RF portion of the electromagnetic spectrum

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1 CDC, October 2002: Guideline for Hand Hygeine in Health-Care Settings: Adherence of HCWs to Recommended Hand-Hygiene Practices.

to uniquely identify an object, animal or person. RFID can transfer data from a tag attached to an object, for the purposes of automatic identification and tracking. RFID is an alternative to barcode, as it does not require direct contact or line-of-sight scanning. RFID systems consist of three components - the antenna, the reader or transceiver (often combined into a single device) and a transponder (tag). The antenna transmits a signal that activates the tag, which then transmits data back to the antenna. The data is used to notify a programmable logic controller that some specific action should occur.

Read Only

Term applied to a transponder or tag in which the data is stored in an unchangeable manner and can therefore only be read and not changed. Writing to a read-only tag is also impossible.

Read Range

The distance from which a reader can communicate with a tag. Active tags have a longer read range than passive tags because they use their own power source (usually a battery) to transmit signals to the reader. With passive tags, the read range is influenced by frequency, reader output power, antenna design, and method of powering up the tag. Low-frequency tags use inductive coupling, which requires the tag to be within a few feet of the reader.

Read Rate

The maximum rate at which data can be communicated between transponder and reader/interrogator, usually expressed in bits per second (bps or bits.s-1).

Read/Write

When applied to an RFID system, this term refers to the ability to both read data from a transponder and to change data (write data) using a suitable programming device. See RFID Reader.

Readmission

Term that describes an admission to an acute care hospital within 30 days of discharge from an acute care hospital.

Remote Care or Virtual Care

Synonymous with Telemedicine or Telehealth, this term refers to the use of telecommunication and information technologies to provide clinical care at a distance.

Resolution

Determines how well a tagged person or item can be tracked to a specific location (e.g., resident room, ER bay).

RF-IR

A hybrid technology that uses both radio waves and infrared for identification and tracking purposes. This technology is used to enable some RTLS systems.

RFIDba

The International RFID Business Association (RFIDba) was founded in April 2004 as a not-for-profit, educational, technology and frequency agnostic, trade association dedicated to serving the business needs of the end user community with vendor neutral information on RFID and RTLS technologies along with information on other associated, complimentary technologies.

RFID in Healthcare Consortium

The RFID in Healthcare Consortium (RHCC) was founded on September 13th, 2008, initially to address EMI issues with RFID and RTLS technologies but has since transformed itself into a full-fledged trade organization. The Consortium is a primary source for vendor neutral, educational programs; industry information; and other value added services pertinent to RFID and RTLS technologies. The RHCC serves the needs of end user communities in the healthcare, assisted living, and nursing home industries.

RFID Reader

A device that is used to interrogate a passive RFID Tag. The reader has an RFID antenna that emits radio waves; the tag responds by sending back its data.

RFID Receiver

A device that listens for RF (radio frequency) signals and converts them into data packets that are available for further processing. It is used with active RFID tags, which continuously emit pre-programmed messages.

RFID Transponder (Tag)

A microchip attached to an antenna that can be applied to an object. The tag picks up signals from, and sends signals to, an RFID reader. The tag may contain a unique serial number, and may have other information such as a customer account number. Tags come in many forms, such as smart labels that have a barcode printed on them, or the tag can simply be mounted inside a carton or embedded in plastic. RFID tags can be active, passive or semi-passive.

RTLS (Real-Time Locating System)

Refers to technology that is used to locate and track people and items (such as assets, equipment, inventory) by associating a tag with each person or item. This term is commonly used in reference to "active," battery-powered locating technologies.

Step-down Unit

A hospital nursing area dedicated to care of patients who have undergone surgery. As opposed to the ICU, the Step-down Unit serves patients who are stable but may require monitoring due to the recent surgery.

Telehealth

Sometimes called telemedicine. The use of telecommunications and information technology to deliver health services and transmit health information to another location.

Telemetry

The automatic transmission and measurement of data from remote sources by wire, radio or other means.

Transponder

An electronic transmitter/responder, commonly referred to as a tag.

Ubiquitous Sensor Network (USN)

A network of sensors providing coverage of every single part of an area such as healthcare facility, however remote. Such networks are typically managed from a control center.

Ultra-High-Frequency (UHF)

The frequency bandwidth from 300 MHz to 3 GHz. Typically RFID tags that operate between 866 MHz and 960 MHz send information faster and farther than high - and low-frequency (HF and LF) tags. However, UHF signals cannot pass through items with high water content. UHF tag generally consume more power than low-frequency tags.

Ultrasound

A technology that uses a cyclic sound pressure with a frequency greater than the upper limit of human hearing. The production of ultrasound is used in Real-Time Location Systems (RTLS) as it can provide room level location accuracy because the sound does not penetrate walls.

Ultra-Wideband (UWB)

Any radio technology used at a very low energy level for short-range, short-duration, high bandwidth communications. UWB technology pulses within a bandwidth exceeding the lesser of 500 MHz or 20 percent of the center frequency. The UWB pulses are received by sensors which determine a tag's location based on Time-Difference-of-Arrival (TDoA) and Angle of Arrival (AoA). This technology is used to enable accurate indoor positioning for RTLS systems.

Unique Device Identification (UDI)

A system used to mark and identify medical devices within the healthcare supply chain. The FDA has released a rule that a unique number should be assigned by the device manufacturer to each version or model of a medical device, in both human readable format and Auto-ID format (such as barcode or RFID).

Unique Patient Identifier (UPI)

An identification code used in the management of healthcare information and record-keeping. The UPI is used to identify and access patient care information as well as for medical record chart analysis, billing and reimbursement. The Joint Commission on Accreditation of Healthcare Organization (JCAHO)'s Information Management Standards mandate that the unique patient identifier be part of a patient's medical records.

Video Conferencing

Also known as video-teleconferencing, this term refers to the use of a set of telecommunication technologies that allow two or more locations to communicate by simultaneous two-way video and audio transmissions.

Virtual Care

See Remote Care or Telehealth

WAN (Wide Area Network)

As its name suggests, this is a computer network that covers a far wider area than an LAN, such as cities, countries, continents and the whole world. A WAN is formed by linking LANs together.

Wi-Fi

Refers to any system that uses the 802.11 Standard, which was developed by the Institute of Electrical and Electronics Engineers (IEEE). Wi-Fi networks operate in the 2.4 and 5 GHz radio bands, with some products that contain both bands (dual band). Wi-Fi is a very common wireless technology that is used to connect machines in an LAN. This technology is used by some RTLS systems for locating purposes.

Wireless Medical Telemetry Services (WMTS)

The remote monitoring of a patient's physiological parameters including pulse and respiration rates using RFID or other medical telemetry devices.

Wireless Sensor Network (WSN)

A network of spatially distributed autonomous sensors to cooperatively monitor physical or environmental conditions including motion, temperature, pressure, sound, or vibration. A sensor network is typically equipped with a radio transceiver or other wireless communications device, a small micro-controller, and an energy source - usually a battery.

Write

The RFID process of transferring data to a transponder (tag) from a reader, as well as storing the data on the transponder, which may also encompass the reading of data to verify the data content.

Write Once Read Many (WORM)

A label distinguishing a transponder that can be partially or totally programmed once by the user, and thereafter only read.

Write Rate

The rate at which data is transferred to a transponder and stored within the memory of the device and verified. The rate is usually expressed as the average number of bits or bytes per second over which the complete transfer is performed.

ZigBee

See 802.15.4 Standard

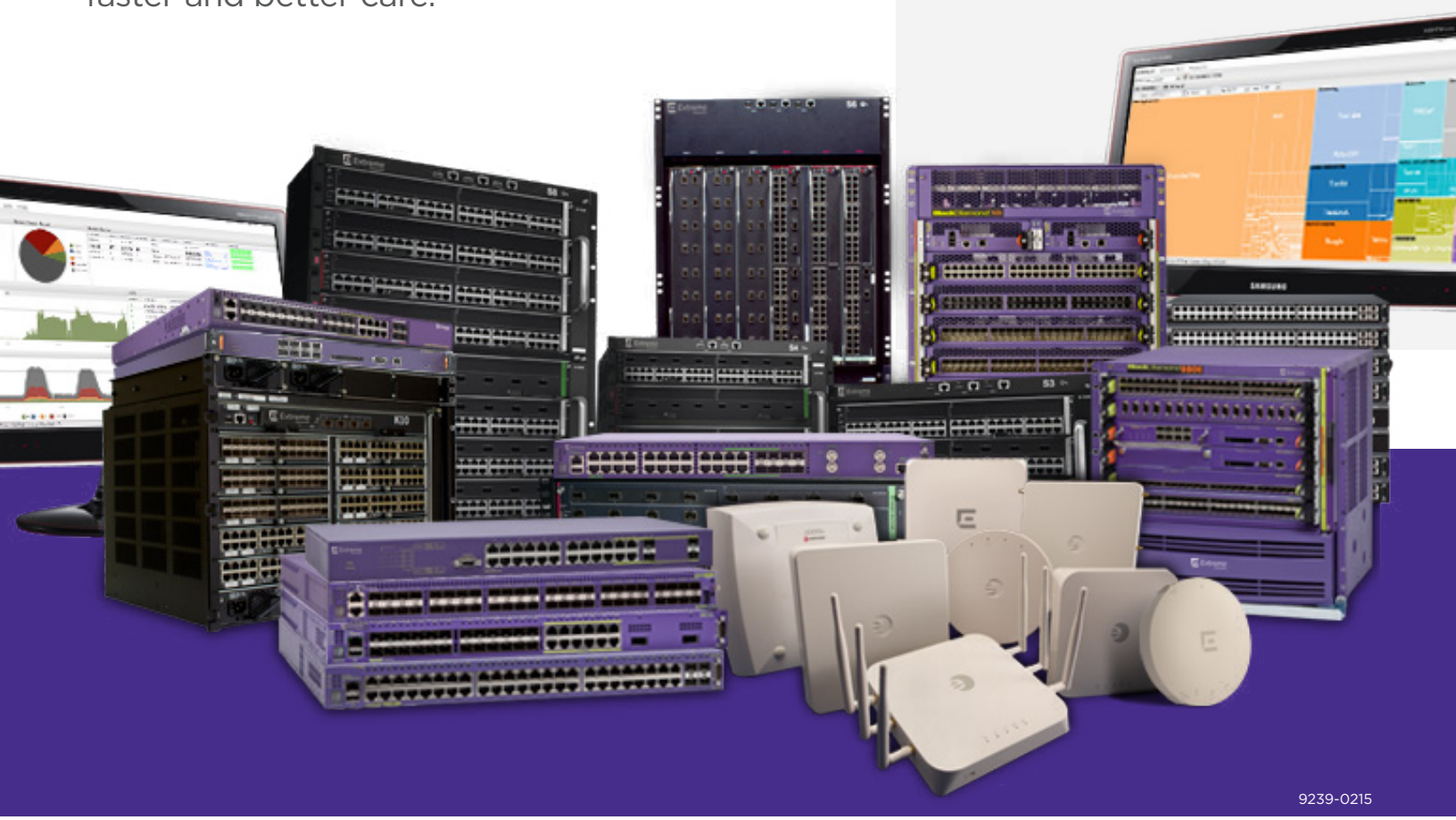
Infrastructure to Deliver Critical Healthcare Applications

Purpose-built to support the requirements of today's hospitals, Extreme Networks delivers a consistently positive user experience for clinicians and guests all on the same network, while also guaranteeing SLAs for critical applications. Whether it's providing physician access to electronic medical records from any location with any device, seamless biomedical device support such as wireless infusion pumps, or patient Internet access, Extreme Networks allows caregivers to more effectively collaborate and provide faster and better care.

Your data network should be viewed as a strategic business asset. Extreme Networks provides more than connectivity, we provide insight with evidence based network analytics

Extreme Networks: Providing life critical and mission critical networks for hospitals around the world.

Simple, Fast, and Smart networking solutions for today's hospitals.



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Zebra Technologies provides the visibility into patient, medication, specimen, medical device, and staff identification that leads to more positive outcomes. Our comprehensive solution set, healthcare designed product portfolios, and relationships with the leading EHR providers makes Zebra the best choice to bring visibility to patient care, and all aspects of your healthcare operations.

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