NHA 2016 ANNUAL CONVENTION
Health care Transformation Through Innovation

In-Patient
Secrets to Success: Selecting and Incorporating Innovation Solutions

October 12th, 2016
Michael J. Sutter, CINO, CRNA

Carle

Carle Fact Sheet

Carle offers:

- Clinic locations in 14 communities
- 25 departments including surgical, cardiovascular and neonatal ICUs
- The primary teaching hospital for the University of Illinois College of Medicine at Urbana-Champaign

Accreditations, Certifications or Special Designations:

- DNV Full Accreditation
- DNV Primary Stroke Center Accreditation
- Designation as a Level I Trauma Center and a Level III Center for Perinatal Care by the Illinois Department of Public Health
- Magnet Status for excellence in nursing care for Carle Foundation Hospital and Carle Physician Group
- ISO 9001: 2008 Certification

Carle

Carle Fact Sheet

Accreditations, Certifications or Special Designations Continued:

- Designation for Carle Hoopeston Regional Health Center as an Emergent Stroke Ready Hospital by the Illinois Department of Public Health
- Accreditation as a Chest Pain Center by the Society of Cardiovascular Patient Care
- Designation as a Lung Screening Center by the American College of Radiology
- Bariatric Surgery Center of Excellence by the American Society for Metabolic and Bariatric Surgery (ASMBS)
- Full accreditation for Inpatient Rehab, including Stroke Specialty, by the Commission on Accreditation of Rehabilitation Facilities (CARF); Brain Injury Specialty Certification
- Certificate of Accreditation with commendations for the Carle Cancer Registry from the Commission on Cancer; Academic Comprehensive Cancer Program through 2017
- Emergency Department Approved for Pediatrics (EDAP)
- Sponsoring institution for an ACGME Accredited General Surgery Residency Program

Carle

The Carle Foundation

Service area population	1,346,558
Total employees	6,871
Carle Foundation	5,813
Physicians	412
Mid-level providers	245
Specialty & subspecialty areas	80
Communities	14

Data as of 12/31/2015

Carle

Inpatient Locations

CARLE FOUNDATION HOSPITAL

Based in Urbana, Illinois, The Carle Foundation Hospital is a 393-bed regional care hospital that has achieved Magnet® designation. It is the area's only Level 1 Trauma Center.

CARLE HOOSPESTON REGIONAL HEALTH CENTER

Carle Hoopeston Regional Health Center is comprised of a 25-bed critical access hospital and medical clinic based in Hoopeston, Illinois.

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Carle Foundation Hospital

Average Daily Census	352
Inpatient Admissions w/Newborns	25,045
Births	2,679
Neonatal Intensive Care Unit	671
Emergency Department Patients	84,763
Trauma Patients	1,280
Outpatient Visits	1,009,137
Outpatient/Inpatient/ASC Surgical	19,470

Data as of 12/31/2015

Carle

Carle Hoopeston Regional Health Center*

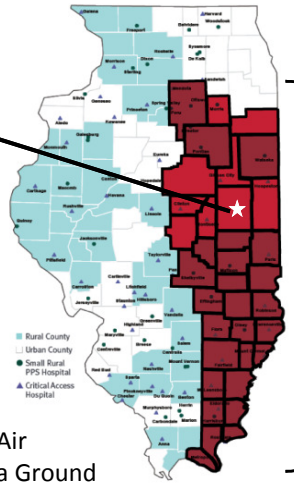
Average Daily Census	4.32
Inpatient Admissions	413
Emergency Department Patients	10,204
Outpatient Visits	204,291
Outpatient/Inpatient Surgical Patients	708
Annual Visits	171,806
Total Unique Patients Served	49,934
Physicians	47
Mid-Level Providers	36

Includes data for Carle Hoopeston Regional Health Center and its eight outpatient locations (including Danville on Fairchild, Mattoon on Hurst, and Tuscola)

Data as of 12/31/2015

Carle

Carle's Service Area



90% of population live in rural designated areas

1.5 Million

120×320 miles

Up to 40% of care provided by rural hospitals

Primary Service Area

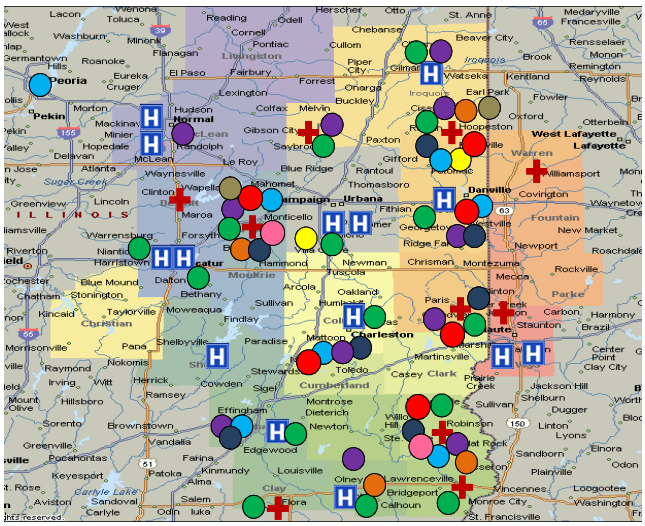
11 Critical Access Hospitals
6 Community Hospitals

Transport Times:

- 12 - 44 minutes via Air
- 27 – 144 minutes via Ground

Partnering Throughout the Region

Community Hospital **Critical Access Hospital**



- Teleradiology/Cardiology Interpretations
- Visiting Cardiology
- Visiting Physician Specialists
- Share/Use of EPIC
- Radiology Image Transfer Connections
- Pharmacy Services w/ 24/7 Pharmacist access
- Hospitalist Services
- ED Physician Services
- Telemedicine Services

What is Innovation

in·no·va·tion (/ inəˈvāSH(ə)n /)

noun: **innovation**

the action or process of innovating.

Synonyms: change, alteration, revolution, upheaval, transformation, metamorphosis, breakthrough, change, alteration, revolution, upheaval, transformation, metamorphosis

- **Innovation doesn't happen in a vacuum.**
- **Expertise, a collaborative spirit, and an entrepreneurial focus are all key ingredients in successful innovation.**

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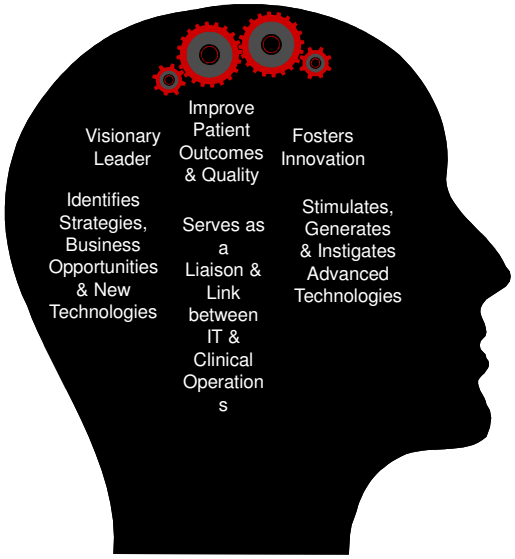
Role of the Chief Innovation Officer



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Test for Chief Innovation Officer

GEGS
GGSE N
EGSG

X _ O X

0
M.D.
Ph.D.
D.D.S

KNEE
LIGHT

|R|E|A|D|I|N|G|

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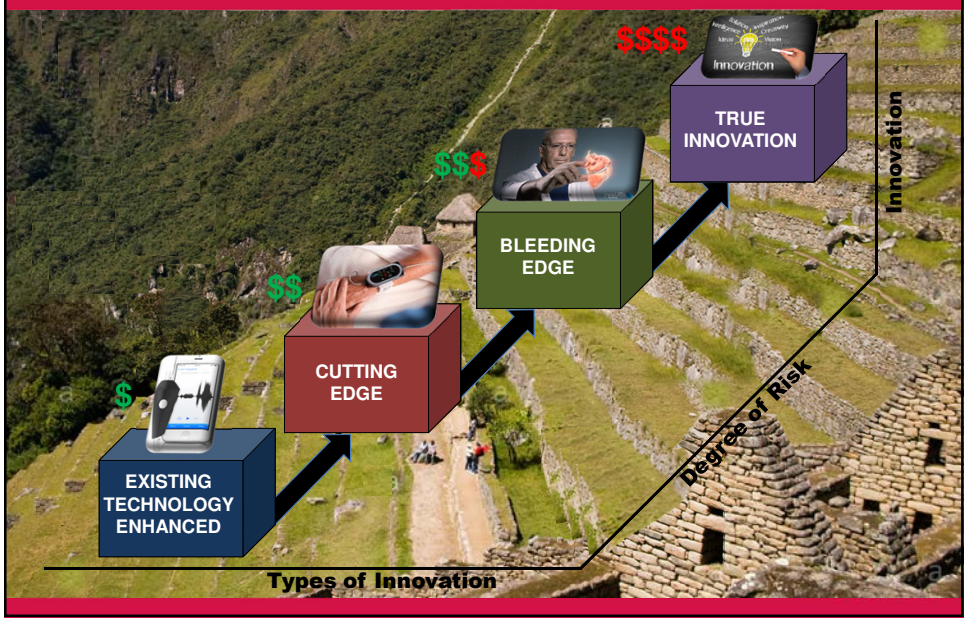
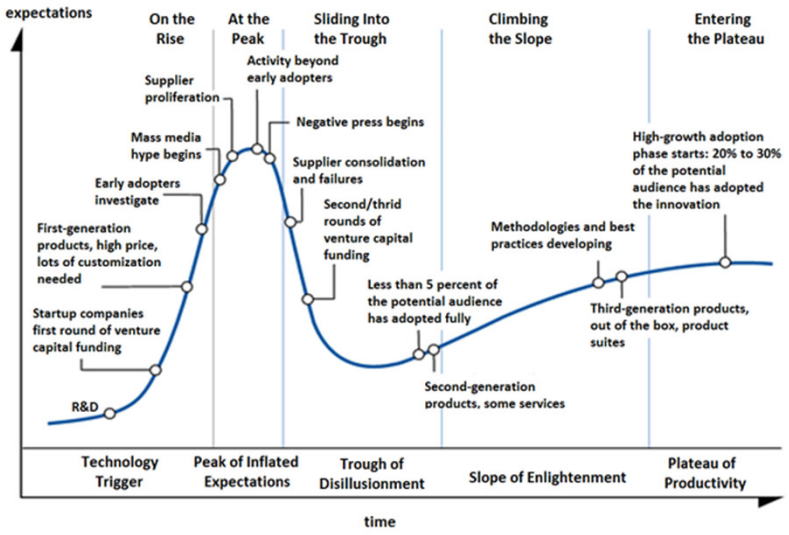
Types of Innovations



Garner's "Hype Cycle"



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Disruptive Innovation

What is Disruptive Innovation?

1. *Launches as an inferior product and lower in price than the incumbent. Price sensitive customers are attracted by its low price.*

2. *Then, it must evolve to become "good enough" in performance while at the same time remaining lower in price.*

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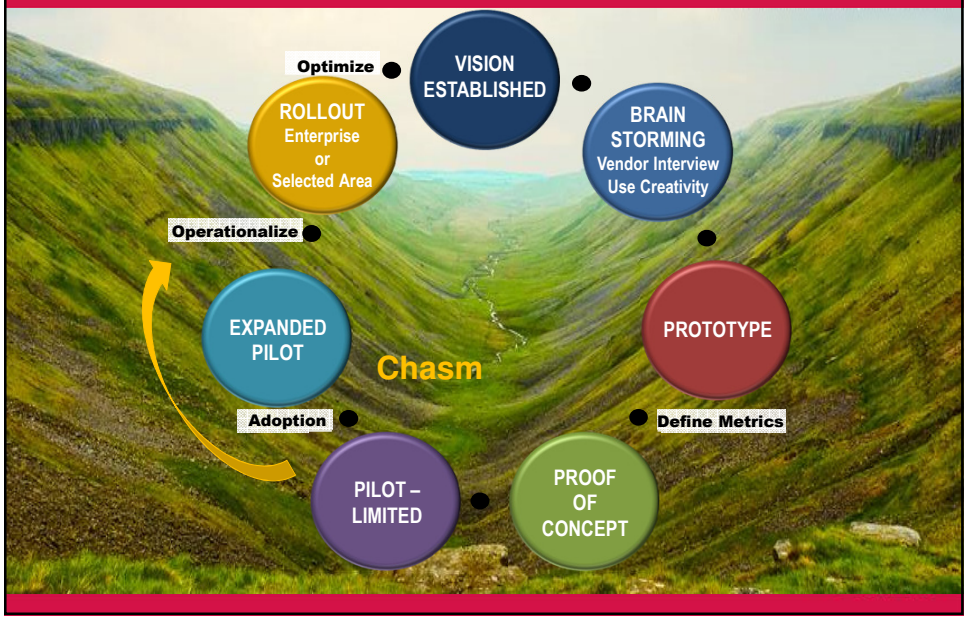
Examples of Disruptive Innovation

Phases of Innovation



BLEEDING & CUTTING EDGE TECHNOLOGY

MOBILE COMPUTER HAND HELD

Honeywell Dolphin CT50h Mobile Computer

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Honeywell Dolphin CT50h Mobile Computer

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Honeywell Dolphin CT50h Mobile Computer

Voalte

AirStripONE

ResMD

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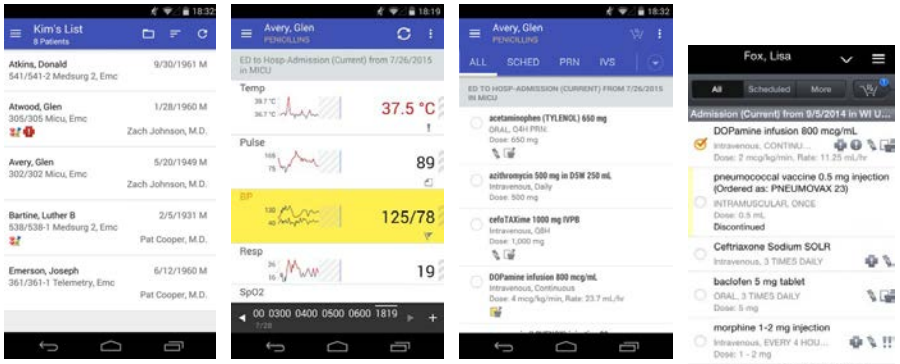
EPIC Rover

Carle

EPIC Rover



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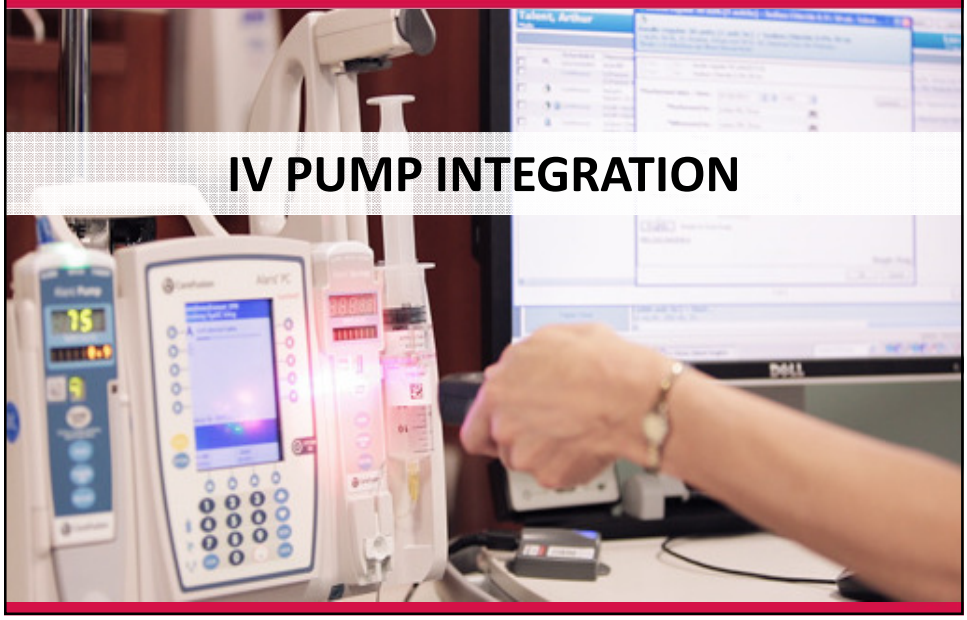
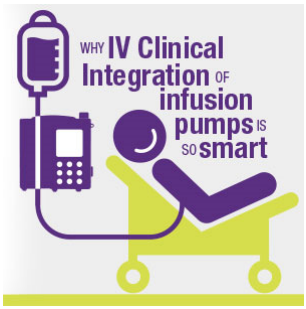
IV PUMP INTEGRATION



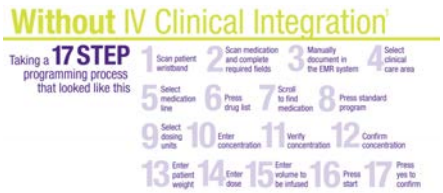
Hospira Clinical Integration

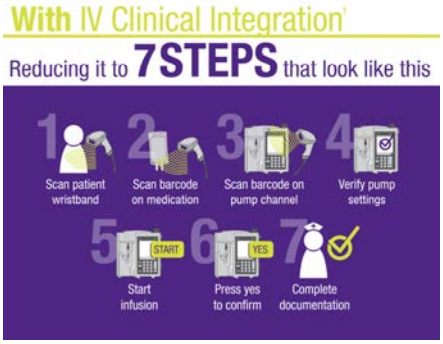
Enhancing Current Technology



Carle WIRELESS

Hospira Clinical Integration





Carle WIRELESS

Hospira Clinical Integration

Carle WIRELESS

IV Clinical Integration (IVCI) Solution

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ALARM MANAGEMENT

Connexall Clinical Alarm Management

Alarms

- **Purpose:** Alarms serve to alert equipment operators that some monitored variable or combination of variables is outside some region
- **Motivation:** recognition of limited attentiveness capability in humans, even under good operating conditions

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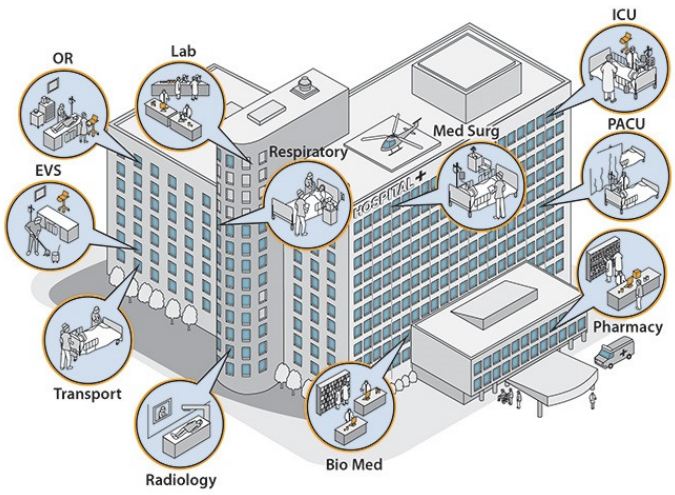
Connexall Clinical Alarm Management



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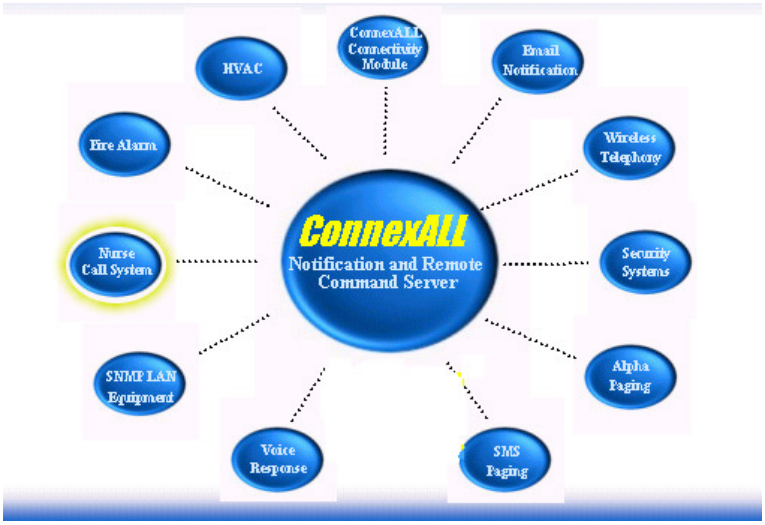
Connexall Clinical Alarm Management



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Connexall Clinical Alarm Management

- Centralized Clinical Alarm Monitoring
- Eliminating Nuisance Alarms
- Patient Monitoring
- Nurse Call
- Infusion Pumps
- Ventilators
- Incubators
- EMR
- Reporting

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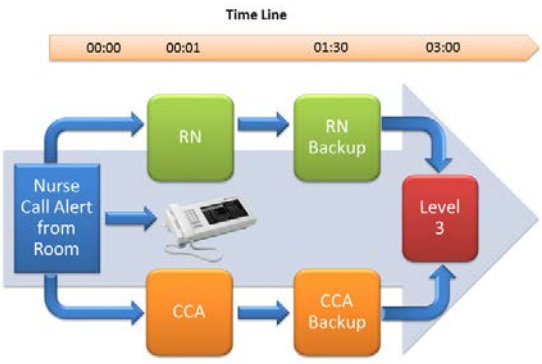
Connexall
A BETTER WAY TO WORK
enabling the internet of all things
VERIFIABLE INDUSTRY LEADER IN ALARM MANAGEMENT AND EVENT NOTIFICATION



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SECURED COMMUNICATION

voalté
voalté
Reimagine healthcare communication.
Carle

Voalte

voalté

One unified directory, across all Voalte clients

Built from the ground up with one single database

voalté me | voalté messenger | voalté one

Personal Smartphones ⟷ *Web-based desktop client* ⟷ *Shared Smartphones*

Carle

Voalte

voalté

Advanced directory.

See at a glance which caregivers and physicians are available, busy or offline. Physicians save time with a quick view of assignments, such as which nurse is assigned to a patient room, the Charge Nurse on a specific unit, or members of the Rapid Response Team. From the Directory, send a text or place a call with one swipe.

Availability and status.

Physicians can let others know whether they are available or busy with one screen tap. They choose Available to receive messages immediately, or Busy for vibrate only. By entering a status message, they can indicate if they are "in surgery" or "rounding." The Directory makes this information visible to the entire care team at a glance.

Alert notifications.

Physicians receive important information such as lab results and patient transfers automatically, eliminating the need to check systems repeatedly or track down other members of the care team. By integrating with the EMR, admissions, nurse call and alarm systems, Voalte Me keeps everyone in the loop, no matter where they are working.

Alert integration.

Voalte Platform Server integrates with alert sources, such as patient monitoring and nurse call, and ties in with alarm middleware to deliver notifications via Voalte One. When caregivers receive an alert, they can Accept, Escalate, or Accept & Call back the patient directly via the nurse call system.

Power texting.

Voalte One delivers priority messages with a tone that emphasizes urgency. Caregivers can send and receive photo attachments, and manage group conversations by defining messages as broadcast (one-way) or collaborative (two-way). They can also name conversations with a subject, such as "EMR update tonight."

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Secure Communication via texting or VoIP

- **Implementation**
  - **Simulations, use cases and go-live support to optimize smartphone implementation**

Voalte

Inside communication.
Using shared smartphones, caregivers connect inside the hospital and access electronic medical records and barcode scanners, all on one device.

- Voalte One™
- Voalte Connect™ MDM
- EMR & barcode scanning
- Alarm management

Outside communication.
Bridge the gap between doctors and other care team members inside and outside the hospital with secure texting via personal smartphones.

- Voalte Me™
- Voalte Connect™ MDM
- EMR

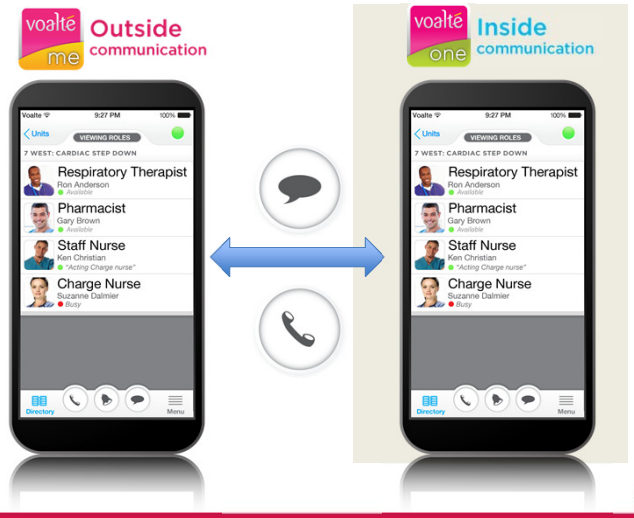
Technology collaboration.
Voalte works with your technology partners to help you leverage current investments and prepare for the future.

- Nurse call & middleware
- Wi-Fi & PBX
- EMR & barcode scanning
- Future technologies

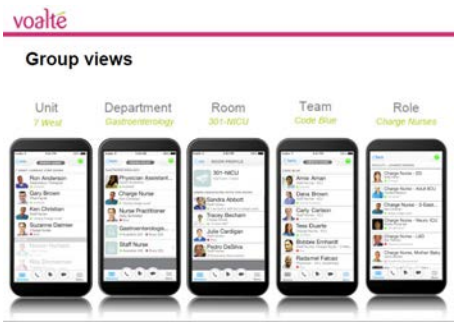
Voalte

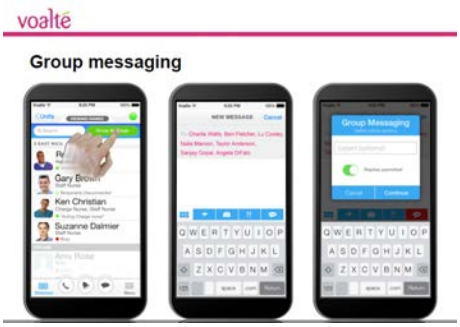
Enhancing care collaboration.

Connect staff outside and inside the hospital.

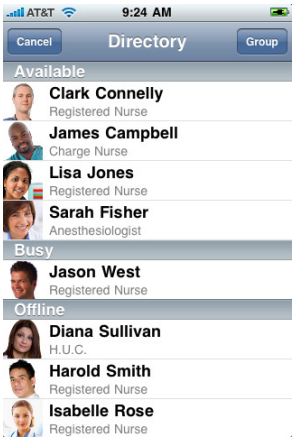


Voalte Messaging

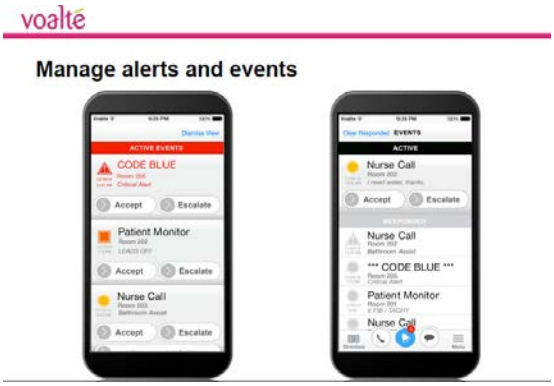




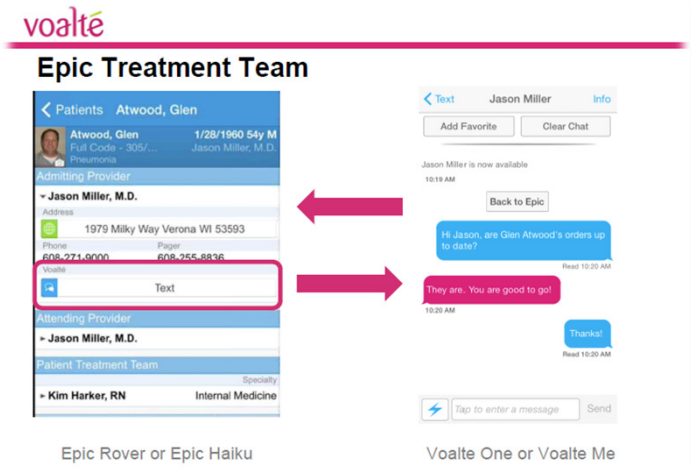
Delivery Confirmation



Manage Alerts and Events

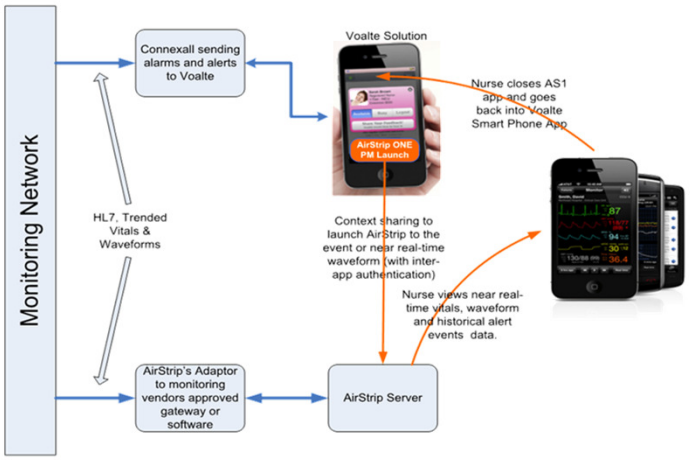


Voalte – EPIC Rovers



Integration With Alert/Alarm Systems - Connexall -> Voalte -> AirStrip

Nursing Workflow with Patient Monitoring Waveforms



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Integration Workflow

AIRSTRIP®

HEALTHCARE WITHOUT BOUNDARIES

JULY 2016

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Leveraging AirStrip

Anesthesia

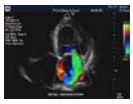
OB

MUSE ECG

Radiology PACS

Epic

AIRSTRIP™


Cardiac Ultrasound

Telemetry

GE CareScape Pt Monitors

Ventilators

Capsule Tech Medical Device Capture

Carle

HEALTHCARE TRANSFORMATION IS IN THE AIR

ADDRESSING COMMUNICATION AND CLINICAL COLLABORATION WORKFLOWS WITH SMART DEVICES

Integrated Platform for secure mobile clinical communications

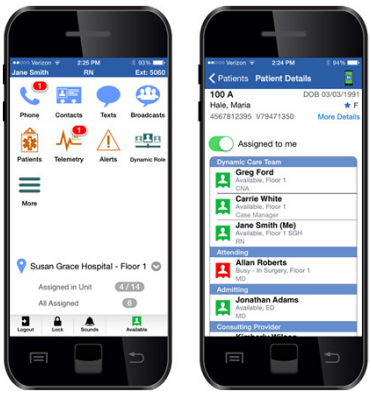
- Voice calling
- Enhanced text messaging
- Push data

Communication with context

- Consolidated care team for each patient
- Dynamic staff roles and status
- Real-time patient information "pushed" to phone
- Ability to mobilize workflows
  (critical test results, orders, wound care, patient flow)

True enterprise capabilities

- Clinicians and providers
- Shared devices and BYOD
- Acute and ambulatory multi-facility support



AIRSTRIP®

Connexall CONNECTIVITY WITHOUT LIMITS

voalte

AIRSTRIP®

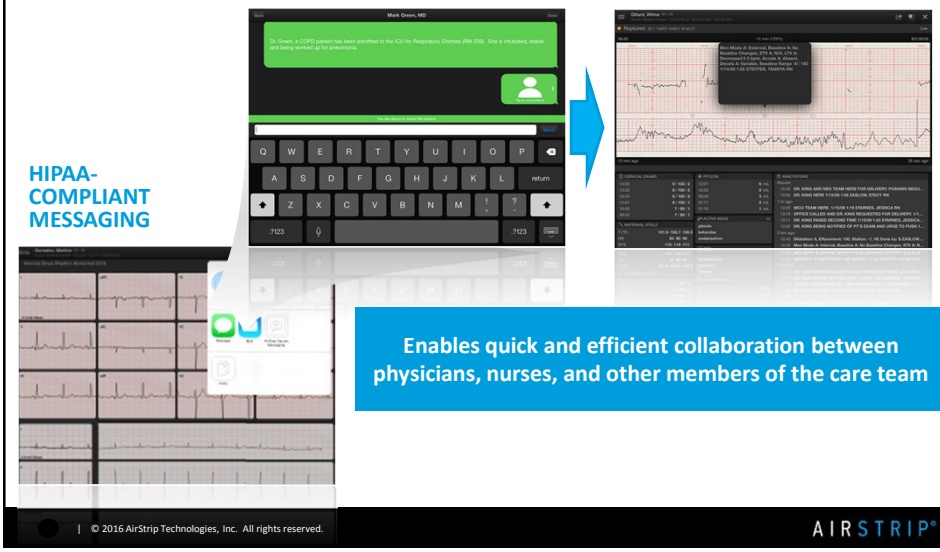
HEALTHCARE TRANSFORMATION IS IN THE AIR

SEAMLESS, SECURE COMMUNICATION ABOUT A PATIENT WITHIN THE CONTEXT OF TREATMENT

HIPAA-COMPLIANT MESSAGING

CLEAR CONTEXT

IMMEDIATE CLINICALLY RELEVANT DETAILS



Enables quick and efficient collaboration between physicians, nurses, and other members of the care team

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HEALTHCARE TRANSFORMATION IS IN THE AIR

ADDRESSING ALARM FATIGUE WITH SMART DEVICE ALARM WORKFLOWS

Alarm start

Event List

Event detail

View AirStrip streaming waveforms & numerics (single button press)

Additional workflow options:

- Request assistance
- Forward alarm
- Text message
- Voice call

AIRSTRIP® Connexall CONNECTIVITY WITHOUT LIMITS voalté

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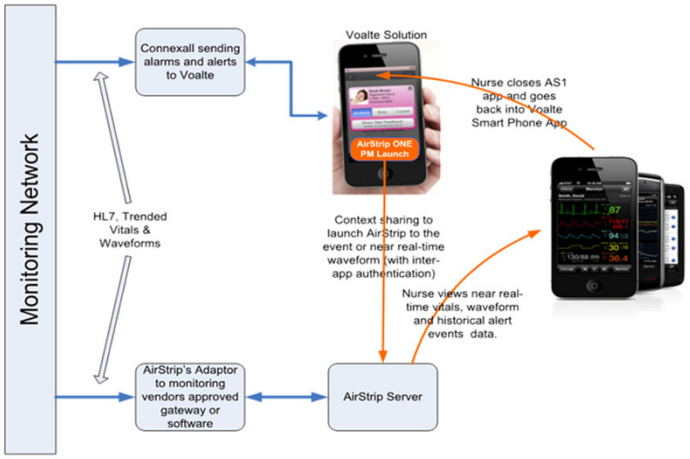
Integration With Alert/Alarm Systems - Connexall -> Voalte -> AirStrip

Nursing Workflow with Patient Monitoring Waveforms



Carle

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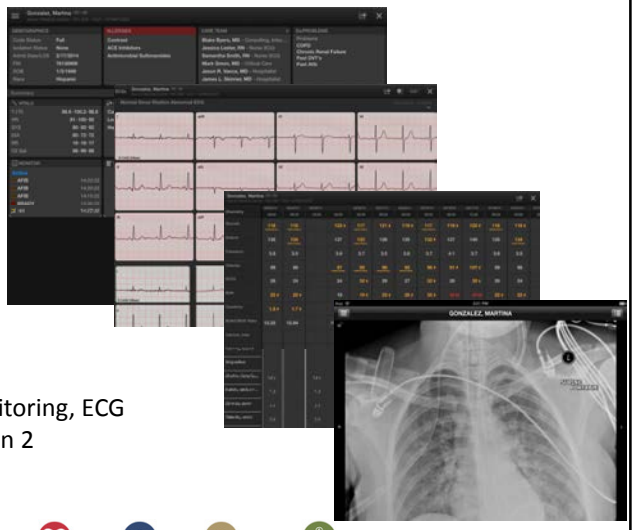
Address Unified, Seamless and Collaborative Care Delivery in Key Service Lines with Mobility

AirStrip ONE®

With a single sign-on and modular tile based user interface, a clinician will get complete context for required care decisions across pre-hospital, inpatient, outpatient, and home settings with data from:

- Epic EMR
- GE Imaging, Patient Monitoring, ECG
- Capsule SmartLinx Neuron 2
- Perigen Perinatal



PILLAR ONE BENEFIT THE COMMUNITY · PILLAR TWO PROVIDE VALUE TO PATIENTS · PILLAR THREE FOCUS ON OUR PEOPLE · PILLAR FOUR DELIVER INTEGRATED CARE · PILLAR SEVEN USE FINANCIAL RESOURCES WISELY

Carle

HEALTHCARE TRANSFORMATION IS IN THE AIR

CARLE FOUNDATION - ADDING CLINICALLY RELEVANT DATA TO DASHBOARD / VENTS, PUMPS, ETC.

AIRSTRIP®

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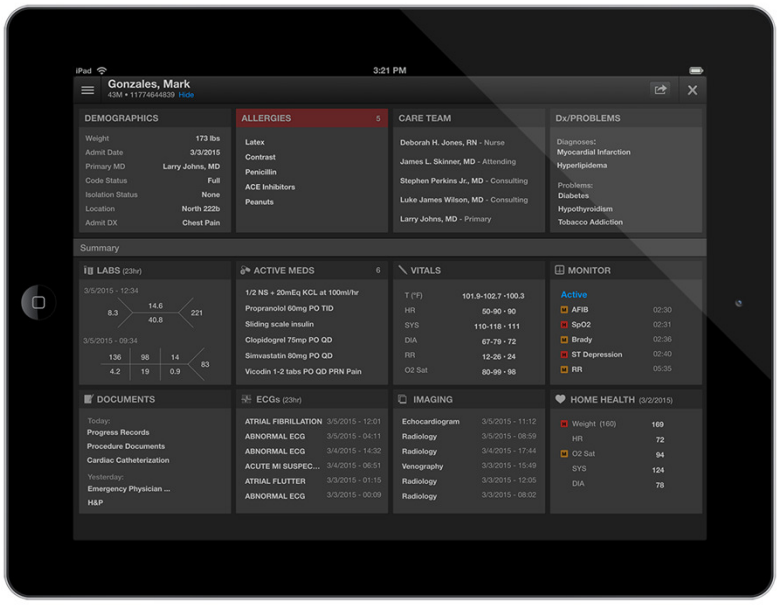
HEALTHCARE TRANSFORMATION IS IN THE AIR



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AIRSTRIP®

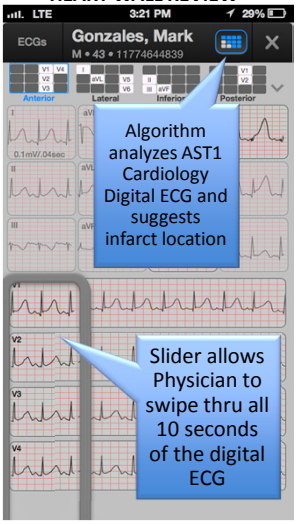
View Real Time Cardiac Rhythms with Mobility

Carle

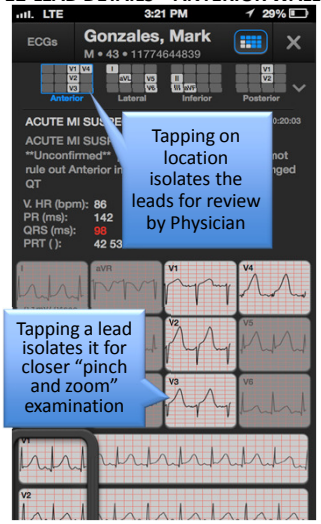
"Mindful MYOCARDIAL INFARCTION Viewer"

- accelerating time to intervention

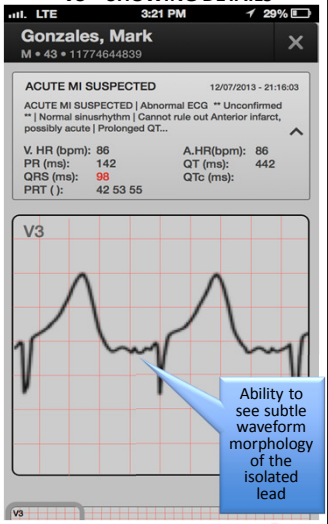
HEART WALL REVIEW



12-LEAD DETAILS – ANTERIOR WALL



V3 – SHOWING DETAILS

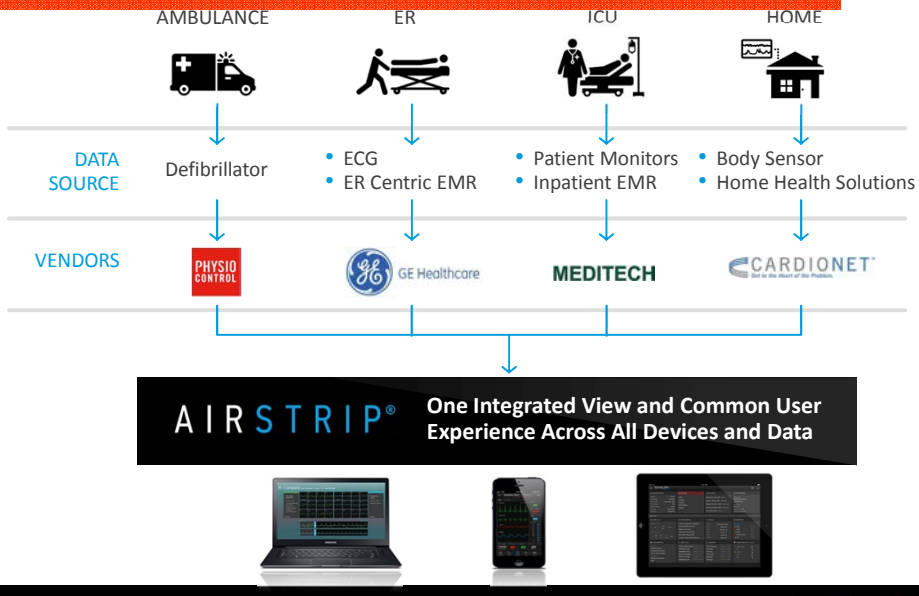


Pending regulatory approval

Carle

HEALTHCARE TRANSFORMATION IS IN THE AIR

VENDOR AND DATA AGNOSTIC ACROSS THE CONTINUUM OF CARE



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AIRSTRIP®

Leverage the AirStrip ONE® Platform - Carle / AirStrip Innovation Collaboration

INNOVATION IDEAS

- Sending ECG waveform PDF snippets to EPIC
- Auto-generated end of shift Patient Monitoring waveform PDF snippets to EPIC
- User directed Patient Monitoring waveform PDF snippets to EPIC or Code Blue events
- Integration to Capsule for Anesthesiology machines and other devices
- Interface to EXltek Brain Monitor and development of mobilization of EEG waveforms
- In conjunction with CapsuleTech provide remote monitoring for non Carle regional facilities

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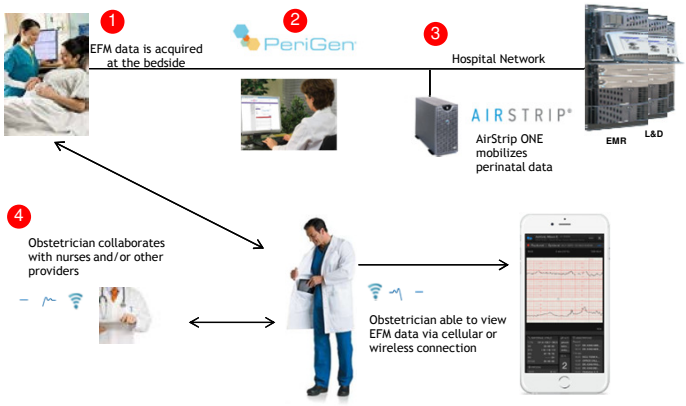
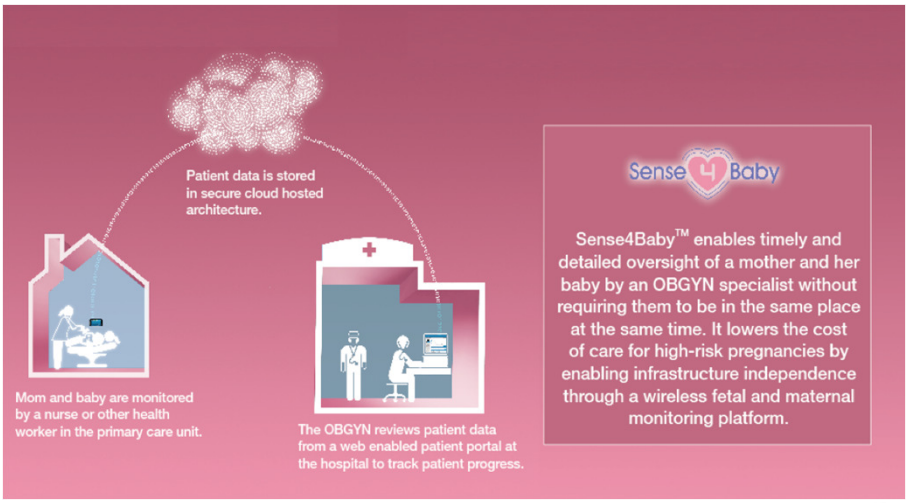
AirStrip ONE® Obstetrics Module

AirStrip ONE®– OB: Perigen Workflow



…and high risk patients at home (optional)

AIRSTRIP™



Pending regulatory approval

Carle

AirStrip ONE® Sens4Baby

Sense4Baby AIRSTRIP™

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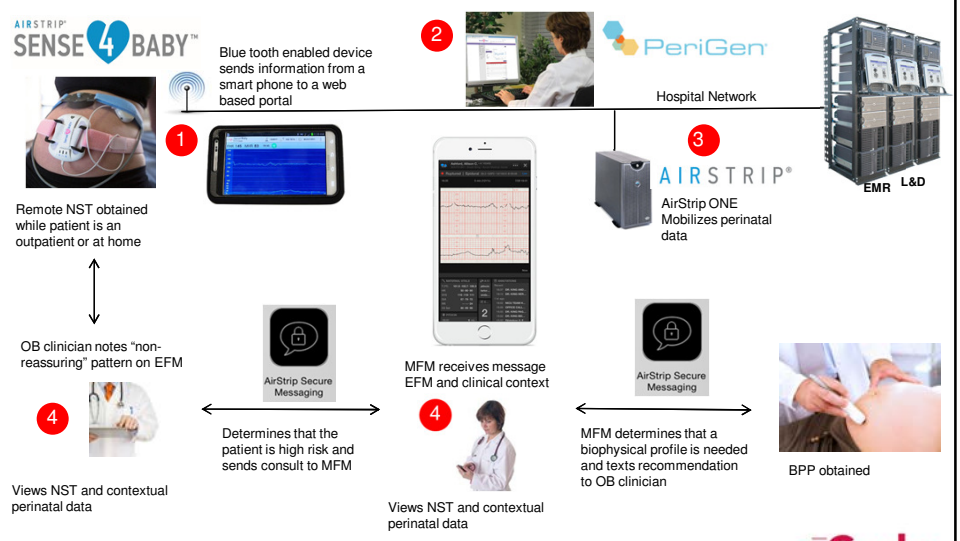
AirStrip ONE® – OB: Remote Monitoring (Optional)

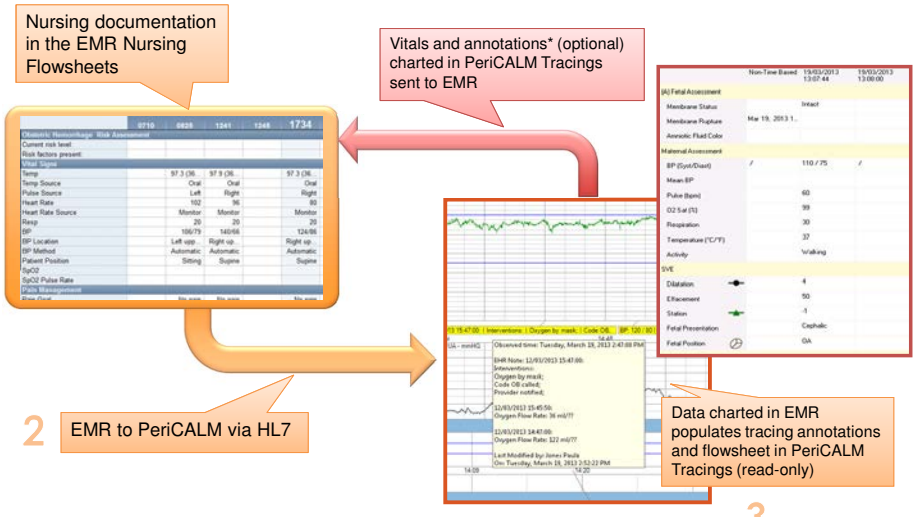


AirStrip ONE® Sens4Baby – Apple Watch

https://www.youtube.com/watch?v=99uIn7QJhV8&feature=player_detailpage

AirStrip ONE® Sens4Baby – Apple Watch

Seamless and Flexible Epic Workflow



* Annotations from PeriCALM to EMR are optional depending on customer requirement.

ADVANCED PATIENT MONITOR TECHNOLOGY

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VISI MOBILE PATIENT MONITOR TECHNOLOGY

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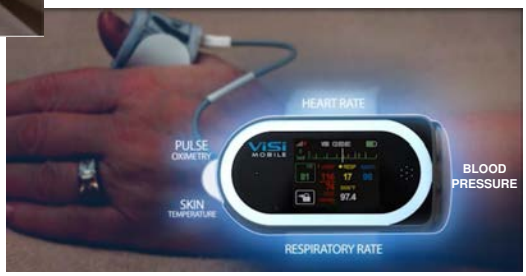
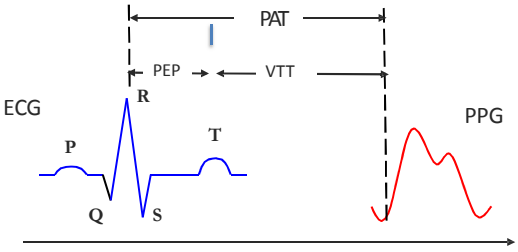
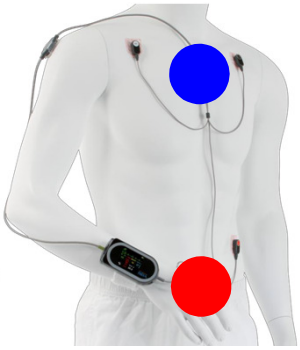
Sotera Wireless – ViSi Mobile



ViSi Mobile cNIBP Based upon Pulse Arrival





PAT = VTT + PEP

The occurrence of electrical activity, or the onset of the R wave, is measured by the chest sensor The arrival of the resulting pulse at the of the thumb is detected by the thumb sensor

Blood pressure is best correlated to Vascular Transit Time (VTT) but the ViSi Mobile System cannot isolate VTT. As an alternative to VTT, PAT is utilized. In order to account for changes in PEP, accelerometers are utilized to detect changes in posture.

ViSi Mobile® – Digital Body Worn System Scaleable Platform

- **Continuous vital signs+**
  - **SpO_2/Pulse Rate**
  - **ECG, Respiration Rate & Skin Temperature**
  - **Motion/Posture***
  - **NIBP (cuff based)**
  - **Continuous NIBP (cNIBP)**
- **Wireless communication**

Motion/Posture not yet FDA cleared

Patient Posture and Activity

Pressure ulcers and falls are two of the most common and costly adverse events in hospitals.

All vital signs plus position/ posture

"Immobility alert" to prevent bed sores

Patient fall detected

Tracheotomy patients (Are they sitting up?)

Is this patient getting out of bed?

Pilot Details

Pilot Dates: April 21-July 21

Scope of pilot:

- 32 devices (8 purchased, 24 on loan)
- 2 Remote Viewing Devices (RVD) (1 purchase, one on loan)
- Monitored on average 3-6 patients per day, focused on patients with frequent vitals
- Total number of patient's monitored: 364 through 7/3

ViSi Saves / Early Intervention

BP events (8 Saves):

- Patients' blood pressure dropped, I was able to give adequate fluids much earlier than if I would have waited for the next set of due vitals. I was able to continue to monitor closely after interventions.
- I had a patient whose B/P was in the 70's unexpectedly that the Visi monitor caught. I was able to intervene earlier than I would have otherwise.
- I had a hypotensive patient, I was able to call the doctor and give fluids. Visi caught this before our unit rounds would have been done.
- I had a patient whose B/P was frequently changing and this helped see it when it dropped lower than "normal."

ViSi Saves / Early Intervention

O2 events:

- Low O2 sat alarm at 84%, called RT to increase optiflow and improve O2 sat.
- Over sedated patient with low O2 sat. O2 added, patient stabilized.

Heart rate events:

- HTN and high HR alarm sounded. Patient assessed and stat RN called. Patient transferred to SDI.
- Patient bradycardic on Visi, symptomatic, code speed called, transfer to SDI.
- Patient on cardizem gtt reading low heart rate on tele monitor. RN checked Visi HR and found a normal HR. Changed tele pads to obtain an accurate HR. The additional monitoring equipment stopped the RN from adjusting the cardizem gtt inappropriately.

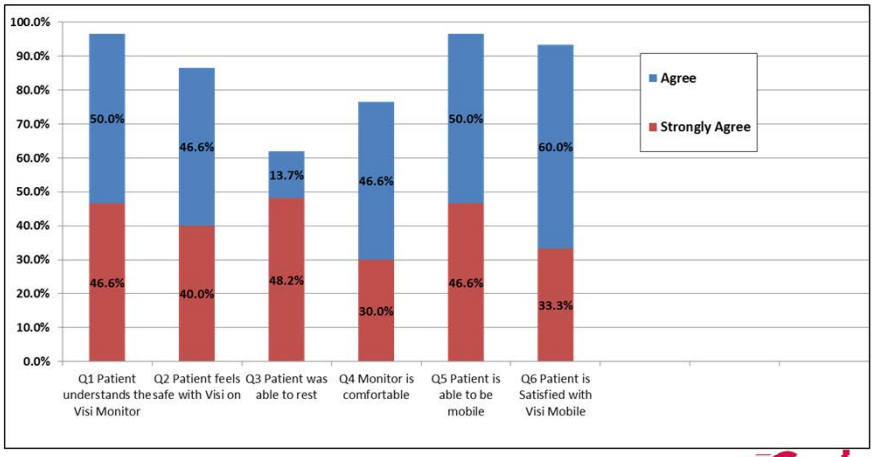
ViSi Saves / Early Intervention

Other:

- RN received 2 admissions at the same time (one post procedure, one ED on gtt). Both required frequent vitals. RN was able to monitor both patients adequately due to the frequent updates from the monitor.
- I've had patients on drips and post procedures who had had significant changes in vitals; I was able to catch them because of the continuous monitoring.

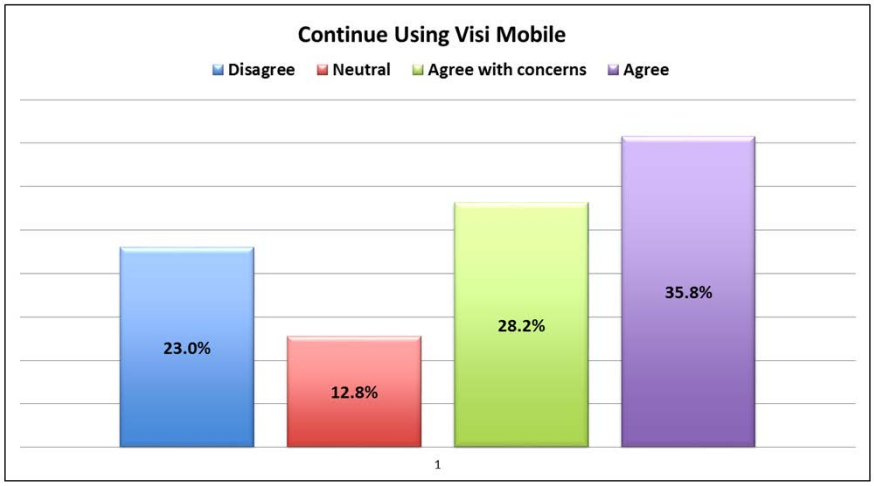
Patient Survey Results

Patient Survey: Percent Positive Response
April-July 2015
N = 30

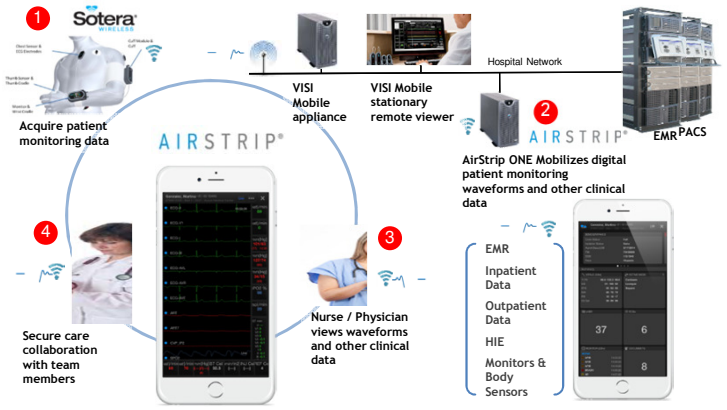


Post - Pilot Staff Survey

Would you like to continue use of Visi mobile? N = 39

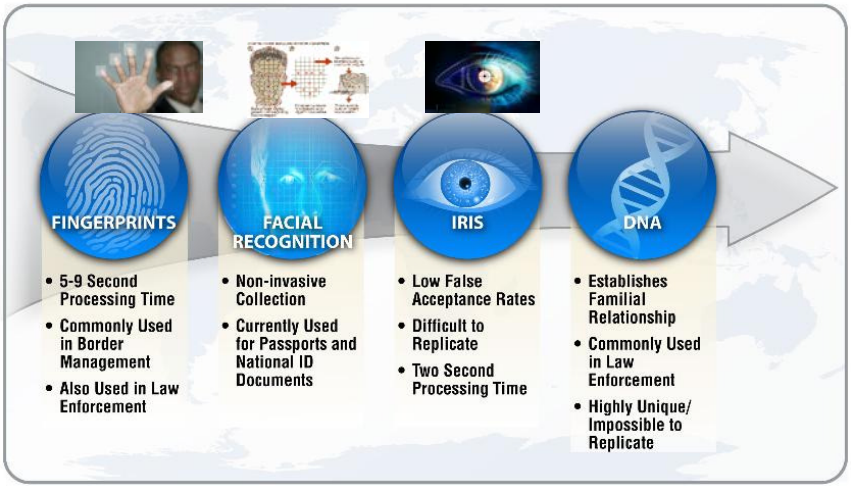


Display Sotera Monitoring Data



BIOMETRICS

Biometric Options



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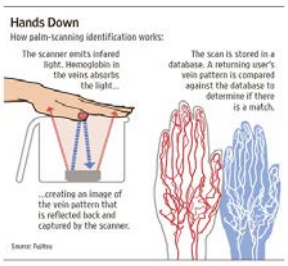
Biometric Fingerprint Recognition

BIO-key™
Revolutionizing Authentication

Carle

Biometric - Palm Vein

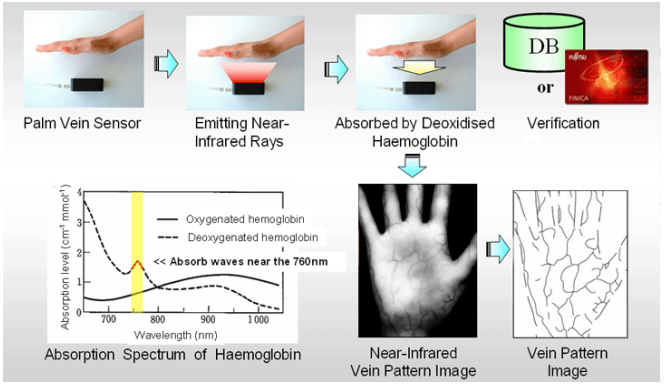


Palm Vein Recognition

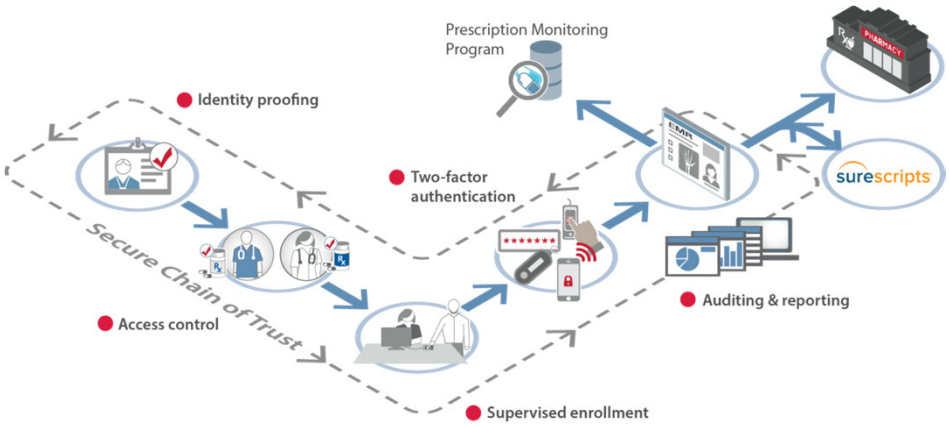
Biyo uses the unique vein patterns in your palm to create the most secure and convenient password that you never have to remember.

Accuracy is 99.99992%

Unlike fingerprints, no trace is left on the device.



Electronic Prescription Controlled Substances



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REAL TIME LOCATOR (RTLS) TECHNOLOGY

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Stanley Real Time Locator Service

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Real Time Locator Service ASSETS

Carle

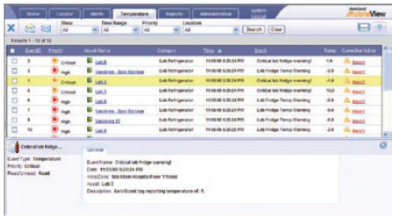
Real Time Locator Service
PATIENTS

Carle

Real Time Locator Service
PEOPLE

Carle

Real Time Locator Service



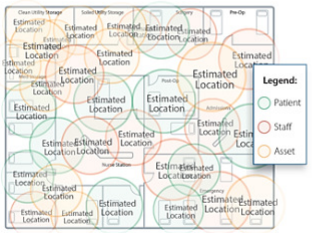
Carle

RTLS Solutions

CENTRAK®

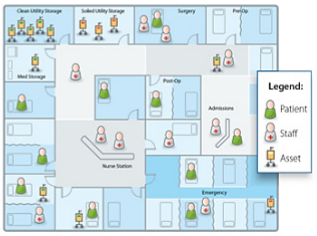
Location Accuracy of Critical Resources

Estimated, RF-Only Locating



Estimated location of critical resources

CenTrak's Clinical-Grade Visibility



Certainty-based locating of critical resources

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Wrap-Up

Questions?

Thank You for joining us today!!