

Nemours<sup>®</sup> Children's Health System



Your child. Our promise.

# Today's Presenters

**James J. Schnatterer**

Manager, Clinical Applications



**Mark A. Chamberlain**

Clinical Applications Analyst



# A Transformational Gift . . .

**“It is the duty of everyone to do what is within his power to alleviate human suffering.”**

*Alfred D. Sussman*



# A Leading Pediatric Health System



# One of the Nation's Leading Pediatric Health Systems

- Internationally recognized integrated children's health system
- Established as The Nemours Foundation through the legacy and philanthropy of Alfred I. duPont
- Owns and operates the Nemours/Alfred I. duPont Hospital for Children in Wilmington, Delaware, and Nemours Children's Hospital in Orlando, Florida
- Largest provider of online children's health information through Nemours KidsHealth.org with more than 2 billion site visits
- Supports research, education, prevention and advocacy programs in the communities it serves
- Provides care for nearly 410,000 unique patients each year



**Nemours/A.I. duPont Hospital for Children**  
Wilmington, Del. | 250 beds

## Nemours Patient Care in 5 States

- 410,000 Patients/1.7 million annual encounters
- 3,800 Trainees annually (1600 residents, fellows & students)
- 837 Employed physicians
- 228 Researchers
- 80 Pediatric care locations in five states
- 42 Specialties and Sub Specialties
- 49 Employed hospitalists
- 19 Collaborating hospitals

## Nemours Prevention & Population Health

- 23 States impacting > 1 million children
- Childhood obesity
- Asthma management
- Reading readiness

## Nemours Center for Children's Health Media

- 55 Children's hospitals
- 250 Community hospitals
- 250,000,000 Site visits annually



# A Culture of Excellence



# Committed to Quality & Safety

- Hospital 7-day readmission rate 44% better than national average for pediatrics
- Immunization rates for primary care >92%
- Inpatient medication closed loop bar-coding rate - >99.9%
- Overall medication error-free rate (not reaching the patients) – 99.65% of dosages administered
- Consistent top tier Quality and Safety scores in the U.S. News Survey – 4 years running
- Leapfrog scores (both hospitals) in top 10th percentile
- HIMMS Stage 7 recognition for EHR use and outcomes





**Leveraging Technology**  
**Better Connections. Better Care.**

# Clinical Logistics Center



# Clinical Logistics Center

- High-tech communication hub
- Dedicated Paramedics monitor patients from Florida to Delaware
- Access to EHR data for monitoring status of lab work, medications and Radiology, Cardiology and EEG results
- Audio and video links into patient room
- Paramedics are always 3<sup>rd</sup> tier for patient monitoring and nurse call alarms!



# Clinical Logistics Center

## Remote Inpatient Monitoring

- 24/7
- NCH – Florida
- NAIDHC – Delaware
- Up to 400 patients
- Audio/Video/Text
- EMR
- **1st in the world**



# Automated Electronic Surveillance

## CVL Infection (Central Venous Line Infections)

- **Property 1:** Patient has a CVL (may be defined as a Central Venous Line, Peripherally Inserted Central Catheter-PICC, Implanted Port)
- **Property 2:** Patient has documented fever  $\geq 100.4$
- **Property 3:** Patient has elevated WBC (WBC is a component of a CBC)

### Score: 1 –

Patient has a Central Venous Line (CVL)

#### Intervention:

- Place patient on watch list

### Score: 2 –

Patient has a Central Venous Line  
AND

Has a documented fever of 100.4 or greater OR Has an elevated White Blood Cell (WBC) count

#### Intervention:

- Place patient on watch list, if not there already

### Score: 3 –

Patient has a Central Venous Line  
AND

Has a documented fever of 100.4 or greater  
AND

Has an elevated White Blood Cell (WBC) count

#### Intervention:

- Check Medication administration record (MAR) for Vancomycin or Zosyn order.  
\*NOTE: For Hemonc patients look for Cefepime.
- If no order present, notify MD of triggered CVL infection rule and request an order for antibiotic.
- Send email to Director of Infection Control (Lydia Edwards)

ICD-9	ICD-10	Patient Name	Age/Sex	ABC	PCR	Fever	WBC	Med.	Interv.	Location/Unit	Expected Dis.	Admission Dx.	WBC	CRP	CRP	Score
ICD10	ICD10A	Zohar, Eyal	11 year old / M	0	6					Contact - NCI-10		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Ofir	7 year old / M	0	0					NCI-1000L 02/05/16		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Myl	11 month	7	1					NCI-10		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Myl	7 year old / F	9	2					Contact - NCI-10		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Omer	11 year old	7	3					Contact - NCI-10		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Yael	8 year old	1	2					Contact - NCI-10		None ordered	0	0	3	
ICD10	ICD10A	Zohar, Lior	8 year old	6	0					NCI-10		None ordered	0	0	1	
ICD10	ICD10A	Zohar, Sagit	10 year old	2	0					NCI-1000L		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Roni	11 year old	2	1					Contact - NCI-10		None ordered	0	2	1	
ICD10	ICD10A	Zohar, Ofir	7 year old / M	0	6					Contact - NCI-10		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Sarit	11 year old	5						NCI-1000L		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Nira	11 year old	0						NCI-1000L		None ordered	0	0	0	
ICD10	ICD10A	Zohar, Roni	11 month	4						NCI-1000L		None ordered	0	0	0	

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*Crit Care Med* 2015; 43(12S):880

# Clinical Rules Surveyed by Epic Monitor

- CLABSI – Central Line Associated Bloodstream Infection – (HAC)
- CAUTI- Catheter Associated Urinary Tract Infection – (HAC)
- Neonatal Sepsis
- PEWS- Pediatric Early Warning Score



# Operational Costs

- **“...the added cost of supplies, salary/benefits, and other operational expenses results in a cost of approximately \$20 per occupied bed per inpatient day.”**
- **“Based upon the frequency of alarms, number of patients, time required to answer and determine false vs. true alarms, number of minutes needed to coordinate an appropriate clinical team response, and a nurse hourly salary, the financial margin that the CLC generates is at least \$6 per occupied bed per inpatient day.”**

Dr. Stephen Lawless, VP Quality and Safety, Nemours

# Success Stories

- Zero delays to get the patient the help they need, exactly when they need it





# Success Stories

- **Catching seizures when no one is around**
- **CLABSI protocol triggers early intervention and patient to have surgical procedure with no delay**
- **Caught in the act**



# Success Stories

- **Simple text to RN about lead placement or rhythm changes results in MD interventions**
- **Early warning signs during a blood transfusion catches blood transfusion reaction**



# Leveraging Technology to Improve Patient Care Everywhere

- Epic *NemoursOne* electronic health record (EHR)
  - Allows for seamless integration of primary care, urgent care, sub-specialty and hospital patient interactions
  - Clinical Logistics Center (NCH) uses EHR data to provide added level of patient safety 24/7 for inpatients

<https://youtu.be/BVG-375iKul>

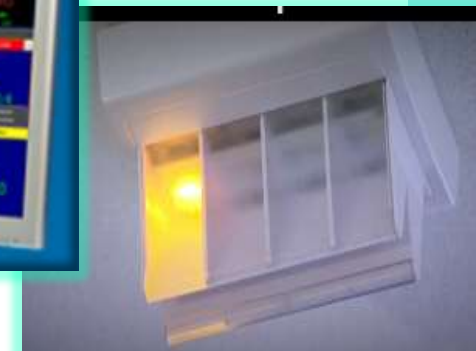


Shaping The Future.

**Connecting patients to  
caregivers through nurse  
call and physiological  
monitors.**

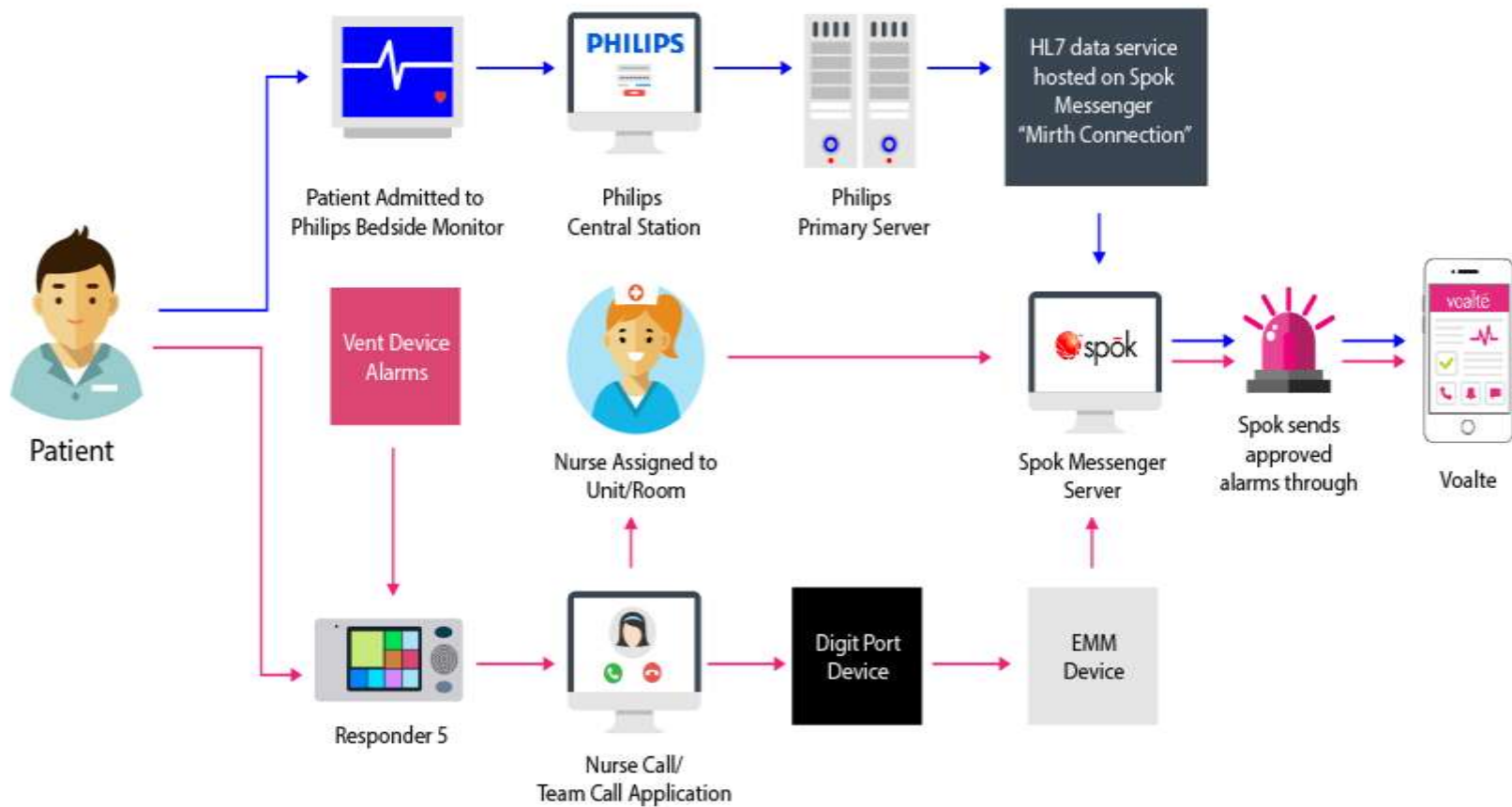
# Integrated Patient Care

- Rauland Responder 5 nurse call
- Philips patient monitoring
- Spok middleware
- Voalte Platform



Time	Priority	Device	Status	Response
8/26/2016 5:48:37 PM	0	Walker, Maria	Read	Message has been read
8/26/2016 5:48:37 PM	0	Walker, Maria	Delivered	Message has arrived at destination d
8/26/2016 5:48:37 PM	0	Walker, Maria	Transmitted	Message has been queued at WCTP
8/26/2016 5:48:37 PM	0	Walker, Maria	Transmitted	Message received by WCTP service
8/26/2016 5:48:37 PM	0	Walker, Maria	Dispatched	Sending message to WCTP server...
8/26/2016 5:48:36 PM	0	NICU	Queued	Message Queued
8/26/2016 5:48:36 PM	0	Walker, Maria	Queued	Message is queued for delivery
8/26/2016 5:48:36 PM	0	NICU	Sent	Label: Escalating only

# Integrated Patient Care



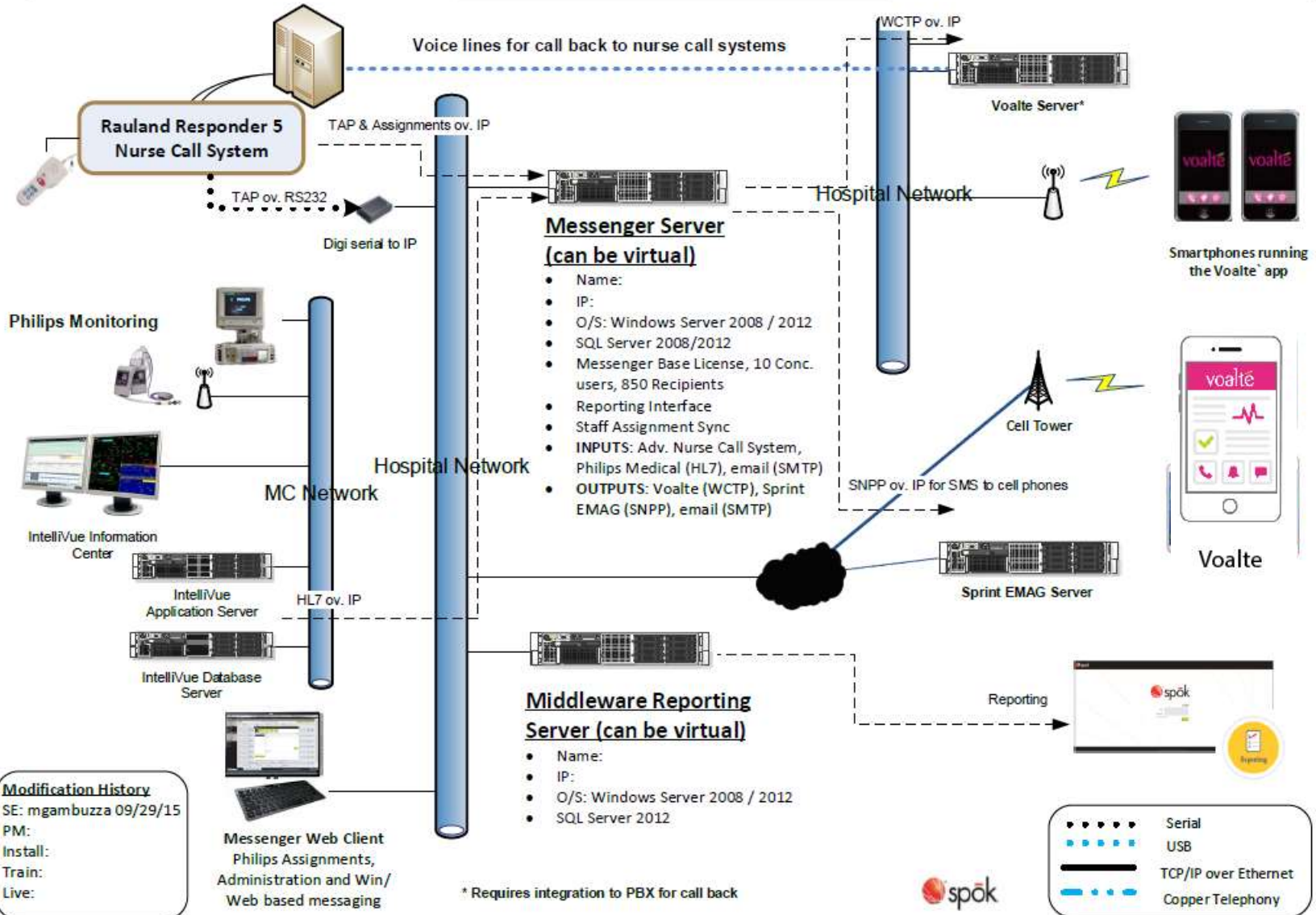


# Spok Messenger integration for Nemours Childrens Hospital

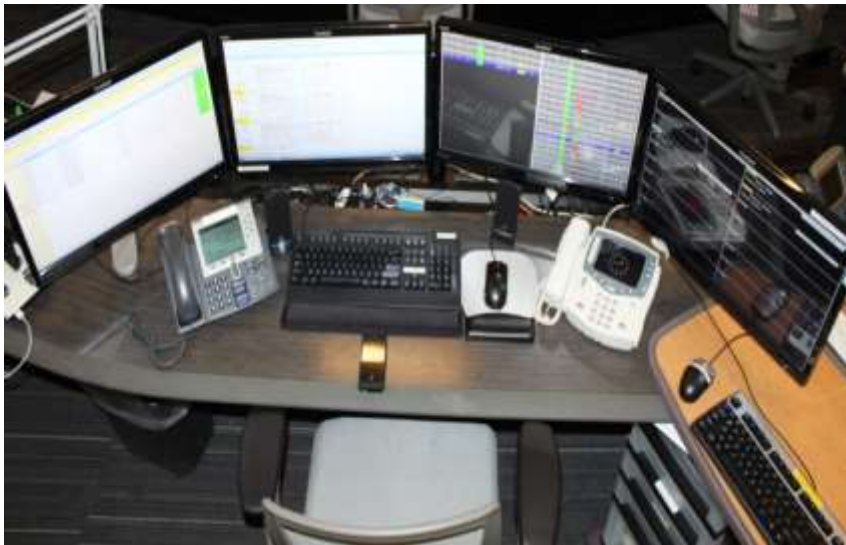
## Input Systems

## Integration Layer

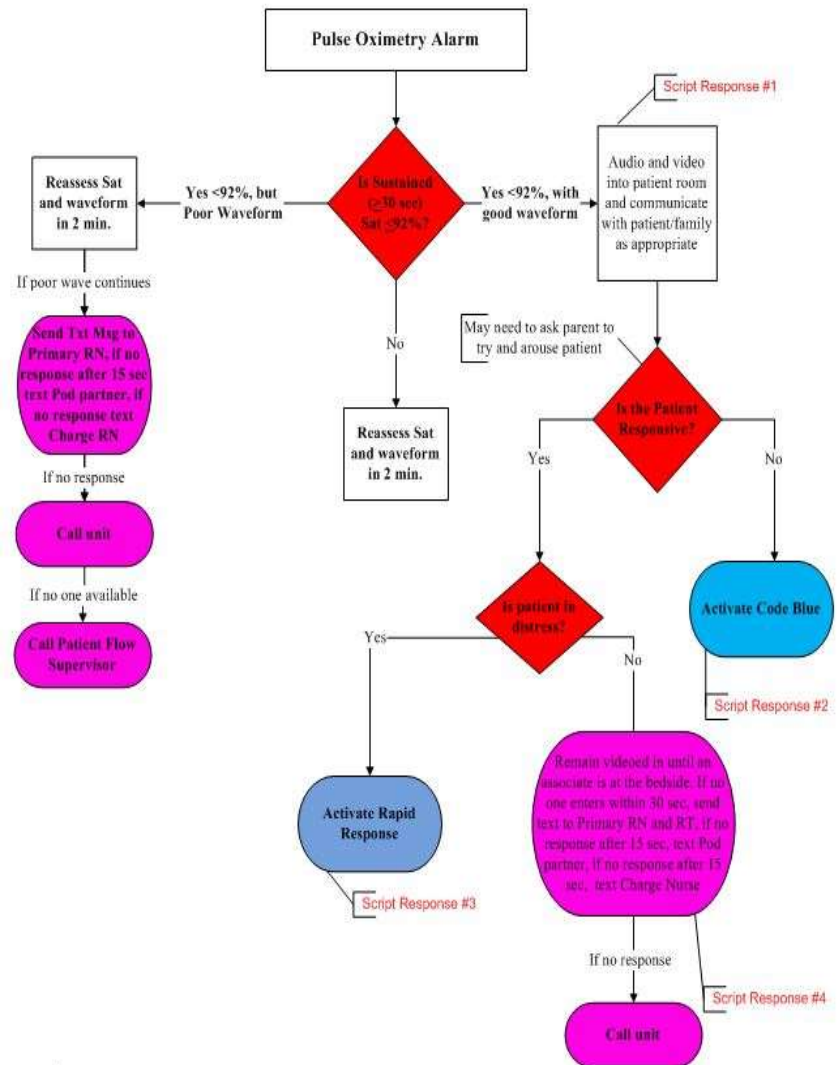
## Output Systems



# Physiological Alarms



## Pulse Oximetry Protocol



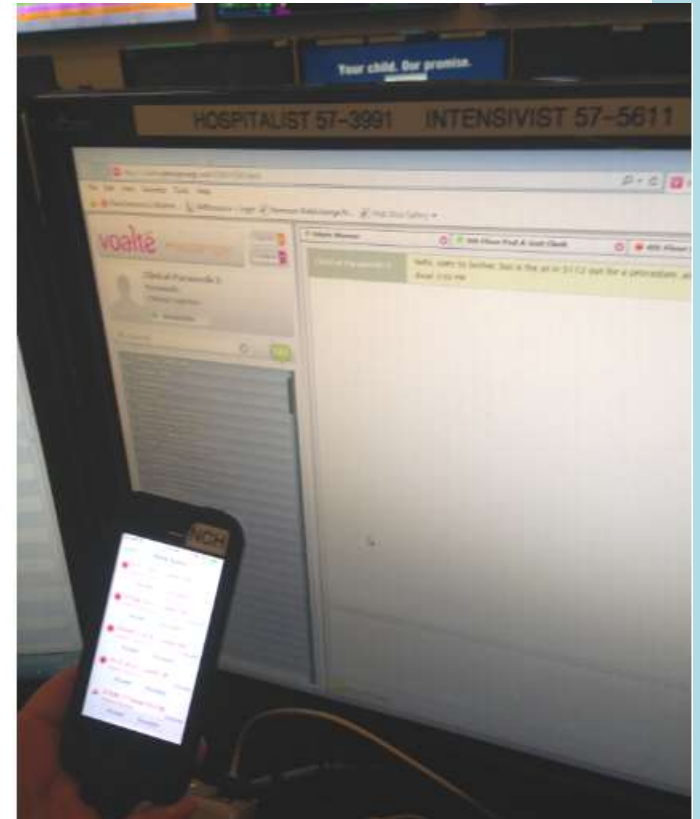
### Remember:

- Ask RN if he/she wants you to contact the physician
- Ask RN if he/she wants you to contact Radiology
- Document preceding events in EMR (if RRT or code was called)




# Clinical Logistics Center Uses Voalte Messenger and Voalte One

- Paramedics work with Voalte One and Voalte Messenger to provide clinical backup for physiological alarms.
- Voalte One receives the physiological/nurse call alarms. Voalte Messenger is used to follow up to ensure there is a response to the patient alarm.




# Clinical Logistics Center



An electronic command center provides an extra set of eyes for our patient's safety and care. Patients at greatest risk can be monitored every second of the day.

**Clinical Logistics**



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**Angie Tourtellot**  
Paramedic  
● Available


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**Barbara Lennon**  
Educator  
● Voalte Me 



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**Betty Bickerton**  
PIPS Coordinator  
● Voalte Me 

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**Cindy Brown**  
Patient Flow Supervisor  
● Available

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**Daniela Melendez**  
Nurse Manager  
● Voalte Me 

**Patient Alarm Escalation NCH 2**  
Patient Alarm Escalation NCH 2  
● Available

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**Publix Pharmacy NCH**  
Pharmacist  
● Available

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**TLC Medic 1**  
TLC Medic 1  
● Available

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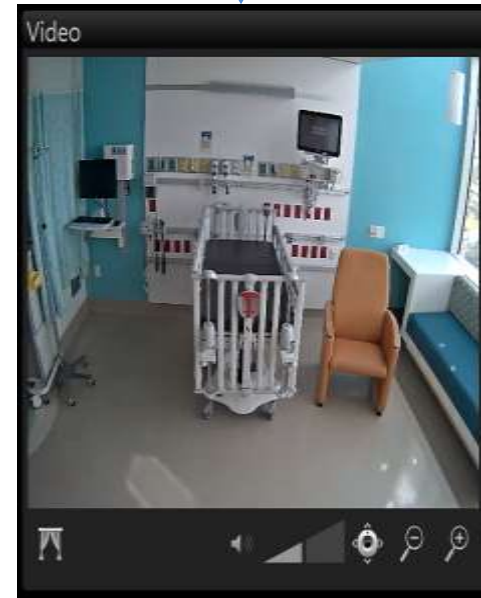
**TLC Medic 2**  
TLC Medic 2  
● Available

# Clinical Logistics Center

## Connecting to our patients

- Paramedics are stationed in the CLC around the clock, and they continually watch for trends or distress.
- If a child has any signs of difficulty, medical teams can be alerted right away. Paramedics in the CLC can call Code Blue/Staff Assist.
- Using the HD camera, the Paramedic has a fixed view of the patient bed, where they can zoom in close enough to see the rise and fall of a child's chest.

# Audiovisual Communication



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# AV Communication Impact Patient Care?



Yes

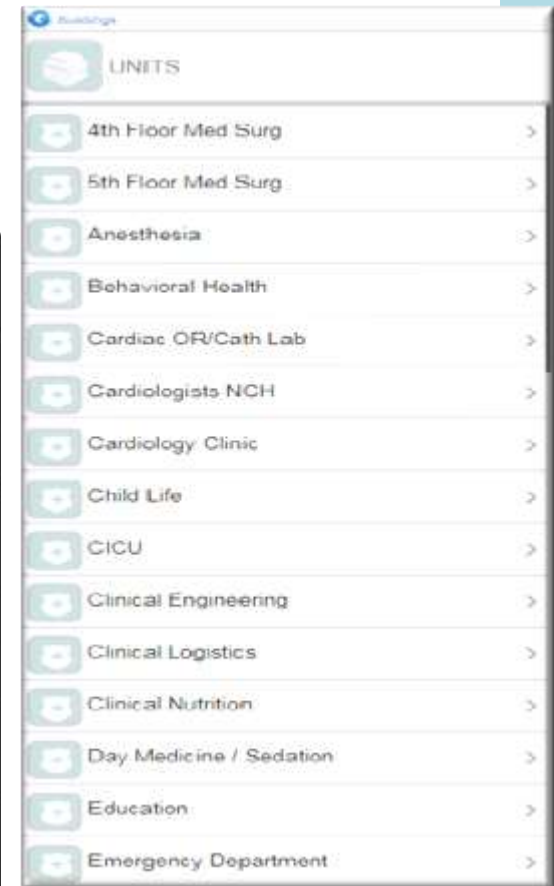
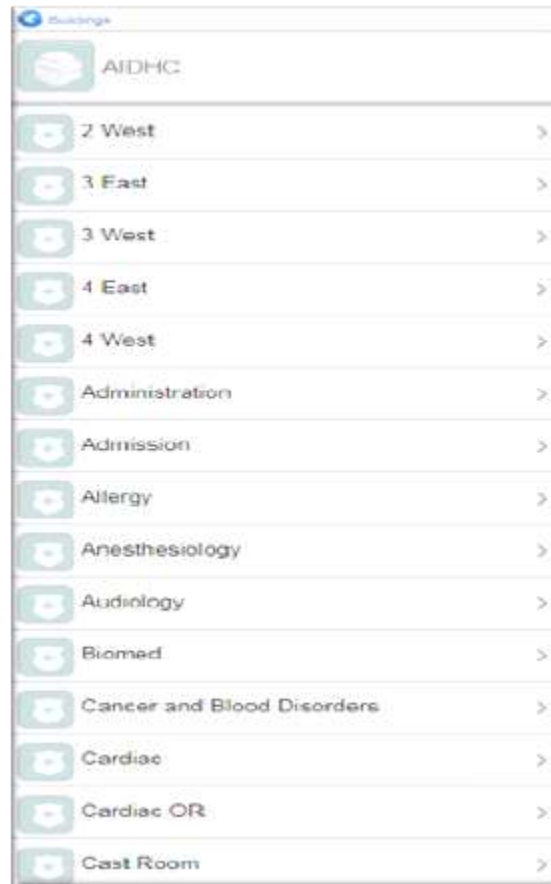
- 1137 total physiological alarms
- 244/1137 (21%) false alarms
- 159/893 (18%) actions taken by paramedics
- 115/159 (72%) were AV communications
- 24/115 (21%) audio only
- 91/115 (79%) were audio and visual

# AV Communication Impact Patient Care?

- **Type of alarms led to AV communication:**
  - low SpO2 (76/115, 66%)
  - tachycardia for age (19/115, 17%)
  - bradycardia for age (12/115, 10%)
  - bradypnea for age (3/115, 2.5%)
  - arrhythmia (3/115, 2.5%)
  - unknown (2/115, 2%)
- **45/115 (39%) secondary actions performed:**
  - 26/45 (58%) texts to provider
  - 17/45 (38%) phone calls to nurses' Voaltes
  - 2/45 (4%) rapid response team activated

# Clinical Logistics Center

Communication with nurse at the POC with Voalte Messenger on the desktop. They quickly send a text message to the appropriate staff member's TC51 mobile device.



# Voalte Platform

## Nemours AI duPont

- 427 Voalte One smartphones
- 300 Voalte Me licenses

## Nemours Orlando

- 365 Voalte One smartphones
- 250 Voalte Me licenses





# System-wide Communication

- Voalte One on 792 shared Zebra TC51 mobile devices
- Voalte Me on 550 personal physicians smartphones
- Voalte Messenger for desk-based staff



# Voice Calls vs. Text Messages

VUE18

## Nemours Al duPont



## Nemours Orlando





# TC51-HC Touch Computer

Better Connections. Better Care.

## TC51-HC Touch Computer

Everything Healthcare Workers Want. Everything Hospitals Need.



- Built with durability and medical grade standards for all-day, every day clinical use
- A contemporary design that looks and feels like a consumer smartphone
- A front-facing camera to enable remote consultation and tele-medicine use cases
- Enterprise class scanning and data capture features to boost productivity
- Started with Android Marshmallow, shipping with Nougat and support for Oreo
- Enterprise features to keep data and devices secure in compliance with US government computer security standards
- Best-in-class power, battery life and manageability

## Rugged and Ready for Clinical Environments



While the TC51-HC resembles a smartphone, it is built to handle all-day, everyday clinical use.

### Survives 4 ft./1.2 m drops over the entire operating temperature range

Survives multiple drops to tile over concrete across the entire operating temperature range

### Survives 500 1.6 ft./0.5 m tumbles

Our punishing tumble test simulates real-world tumbling that happens after a fall

### Uni-body design

Provides extra impact protection

### Corning® Gorilla® Glass touch panel and imager window

Fortifies two of the most vulnerable device elements with best-in-class scratch and shatter resistant glass

### IP65 Sealing

Protects against dust and jetting water

## The Most Sanitizable Housing Design



**Built with the industry's most resilient medical grade plastics to withstand constant sanitizing with a wide selection of aggressive disinfectants**

### **Purpose built for the most thorough sanitizing:**

- Screw holes are covered; crevices and seams are minimized (fewer places for germs to hide)
- Advanced medical grade plastics provide superior toughness





**8-YEAR  
SUPPORT**

## Unmatched Support for your TC51-HC – and Android

Zebra offers an unprecedented commitment of security support for your device...

Available for sale for 4 years from the day the TC51-HC is launched, with a total of 8 years of available service and support. The same model you buy today will be available for new staff.

LifeGuard™ for Android™: Zebra's software security solution extends the lifecycle of Android enterprise mobile computers with OS security updates for 6 years (*requires valid service contract*).

OS Upgrade Support: Shipping with Nougat and support for Oreo (*requires valid service contract*).

### THE RESULT?

A superior lifecycle. A superior return on investment. A superior value.

# Seconds Count

- Simplify - All alarms go to Voalte smartphones.
- In emergency situations such as a Code Blue, everyone on the team receives a Voalte notification simultaneously.
- Anesthesia Stat from nurse call allows the OR to get the “right” people quickly.





# Organizational Messaging

**Paramedics send organization-wide messages:**

- Codes
- Census notifications and updates
- Equipment outages such as MRI/CT
- Inspector arrival



# Better patient experience.

- Patient needs are addressed quickly.
- Streamlined communication from patient to nurse through escalation of alarms.
- Care providers can call into the patient room for immediate information.

# Benefits of a Communication Platform

- Decrease response time
- Improve communication among care teams
- Provide a better patient experience

*“I wouldn’t feel comfortable walking away to another room if I didn’t have Voalte with me. Having peace of mind that Voalte will instantly notify me of any critical alarms is comforting and alleviates anxiety.”*

***Derek Shroyer PICU Charge Nurse***

# Staff/Group Communication

- Quick messages to all Charge Nurses
- Quick messages to all Hospitalists
- Quick messages to Cardiac team
- After-hours food truck arrival

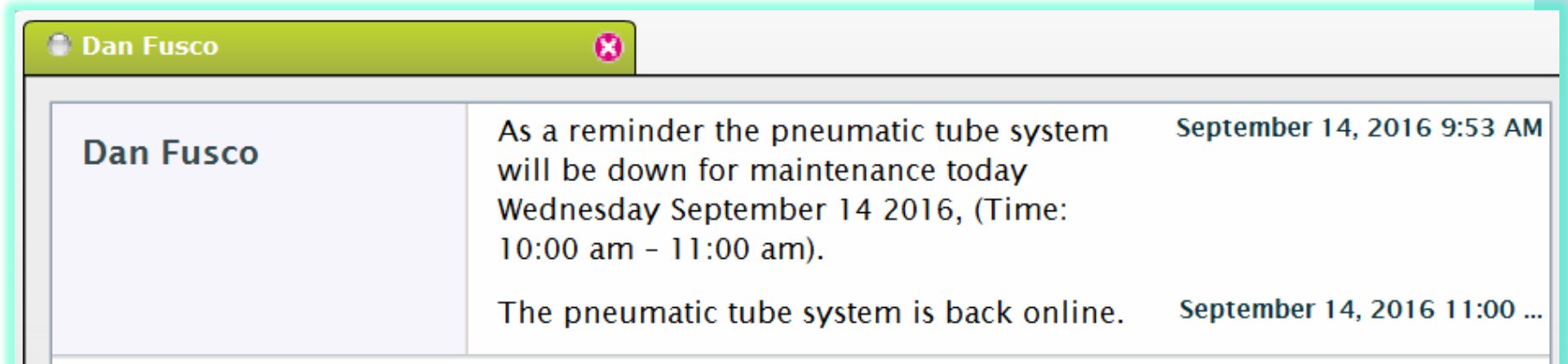
*“Voalte allows us to take inefficiencies of communicating out of the equation.”*

***Dr. Al Torres, Chief of NICU***

# Hospital-wide Communication

- Replaces email and overhead paging
- Reduces delays
- Immediate blast to all users – “Epic is down,” “Epic is available”
- Eliminates unnecessary noise for a healing environment

# Maintenance Notifications via Voalte Blast



The screenshot shows a notification window with a green header bar containing the name "Dan Fusco" and a close button. The main content area is divided into two rows of notifications. The first row contains a notification from "Dan Fusco" stating that the pneumatic tube system will be down for maintenance on Wednesday, September 14, 2016, from 10:00 am to 11:00 am, with a timestamp of September 14, 2016 9:53 AM. The second row contains a follow-up notification stating that the pneumatic tube system is back online, with a timestamp of September 14, 2016 11:00 ...

Sender	Message	Time
Dan Fusco	As a reminder the pneumatic tube system will be down for maintenance today Wednesday September 14 2016, (Time: 10:00 am - 11:00 am).	September 14, 2016 9:53 AM
	The pneumatic tube system is back online.	September 14, 2016 11:00 ...

**OUR PROMISE:**

TO TREAT EVERY CHILD AS IF THEY WERE OUR OWN.

**OUR COMMITMENT:**

TO DO EVERYTHING IN OUR POWER TO HELP CHILDREN GROW UP HEALTHY.

[https://www.youtube.com/watch?v=Mw  
mNG5qjU5c](https://www.youtube.com/watch?v=Mw<br/>mNG5qjU5c)





Questions?