Topics

- Meet the Presenters
- About Sentara Healthcare
- Sentara Laboratory Services
- Sentara and DI
  - History
  - Disciplines
- COVID-19 Impact
- Questions
Meet the Presenters

Keith Blackshear
Jeffrey Sanders
Keith Blackshear

• Clinical Laboratory Support Coordinator, Hematology & Urinalysis
• B.S., Biology, Univ. of S. Carolina
• MLS internship at Augusta Health in Fishersville, VA
• Pursuing MBA at Univ. of Southern Indiana
• 5+ years with Sentara Healthcare

Jeffrey Sanders

• 23+ years of IT experience
• Started at UNC Health – Pardee Hospital
• 17+ years at Sentara Healthcare
• 8+ years in my current role
• Over 80 Windows based servers supported
• Over 20 applications supported
  • (ex. Instrument Manager, BioRad QC, Haemonetics SafeTrace TX, Biomerieux Myla, Roche Infinity, Abbott RALS, Systemlink Histotrac)
Small Beginnings

- 1888: Retreat for the Sick
- 1892: School of Nursing opens
- 1903: Norfolk Protestant Hospital
Growth and Expansion

- 1972 - State’s First Merger of Two Non-Profit Hospitals: Norfolk General & Leigh Memorial
- 1984 - Optima Health Plan Started
- 1987 – The “Sentara” brand name was born.
- 1988 - Hampton General Hospital Merger
- 1991 - Bayside Hospital Merger
- 1995 - Sentara Medical Group Formed
- 1998 - Virginia Beach General Hospital Merger
- 2002 - Williamsburg Community Hospital Merger
- 2006 - Obici Hospital Merger
- 2006 - Sentara Heart Hospital Opened
- 2009 - Potomac Hospital Merger
- 2011 - RMH Healthcare Merger
- 2011 - Martha Jefferson Hospital Merger
- 2011 - Opening of Sentara Princess Anne Hospital
- 2013 - Halifax Regional Health System Merger
Growth and Expansion
Mission Statement:
We Improve Health Every Day

- Headquartered in Norfolk, Virginia
- 130 year not-for-profit history
- 12 hospitals
- 4 medical groups
- 3,800+ provider medical staff
- Nearly 30,000 Members of the Team
- Health plans (Optima Health and Virginia Premier)
- Outpatient campuses
- Advanced Imaging Centers
- Home health and hospice
- Rehab and therapy centers
- Nursing and assisted living centers
- Medical transport ambulance
- Nightingale air ambulance
SECTION THREE

Sentara Laboratory Services
Laboratory Services

• More than 700 laboratory professionals at 12 Sentara hospitals and 5 Limited Service Laboratories.

• Nearly 8 million billable lab tests performed in 2019

• Sentara Reference Laboratory is Hampton Roads' only full-service reference laboratory and operates hospital-based laboratories, ambulatory care center laboratories, dedicated Patient Service Centers and supports a wide range of physician offices, clinics, businesses, schools and insurance providers in Hampton Roads.

• Accredited by the College of American Pathologists and the Virginia Department of Health.

• Transfusion services and histocompatibility/immunology are accredited by the American Association of Blood Banks (AABB) and the American Society of Histocompatibility and Immunogenetics (ASHI), respectively.

• The only biosafety Level 3 microbiology laboratory performing mycobacteriology in the region.

• Named Medical Laboratory Observer’s 2016 Lab of the Year.
Sentara and Data Innovations
Instrument Manager Architecture

- Currently have four Production Systems
  - Hemo/Coag
  - Chemistry (Roche)
  - Martha Jefferson Chemistry (Roche)
  - LIS
  - One stand alone Test system

- Over of 200 Instrument Connections*
  - Across 16 physical locations
  - Other instruments are running, but not interfaced

- Servers are virtualized using VMWare virtual servers
Sentara and Data Innovations

Two Phases of Instrument Interfacing at Sentara

- Cerner Classic
  - Mix of Instrument Manager and Direct Connection to Cerner via Terminal Servers
- Epic Beaker/Haemonetics SafeTrace TX
  - Beaker Roll out Started 2015
  - 100% Instrument Manager
Cerner Classic
Epic Beaker
Lab Disciplines

- Coagulation
- Hematology
- Urinalysis
- Chemistry
- Processing/Total Lab Automation
- Transfusion Services
- Microbiology
Coagulation

- Analyzers
- Outgoing requests
- Incoming results
  - QC ID
  - Error Codes
  - Resolution of non-numeric results
  - Test dilution results
  - Test comments
  - “No value” rule
Coagulation – QC ID

- Utilizing unsolicited QC in Epic Beaker
- IM converts analyzer QC file name to Epic Beaker barcode lot ID

QC Material Summary

<table>
<thead>
<tr>
<th>Name:</th>
<th>SPAH CITROL 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Control [0]</td>
</tr>
<tr>
<td>Status:</td>
<td>Active [1]</td>
</tr>
<tr>
<td>Manufacturer:</td>
<td>DADE</td>
</tr>
<tr>
<td>Effective date:</td>
<td>6/14/2020</td>
</tr>
</tbody>
</table>

Lot Information

| Lot number: | 564813 |
| Lot status: | Active [1] |
| Expiration date: | 12/10/2022 |

Unsolicited QC Setup

| Barcode lot ID: | SPAH COAG 1 |
| Prevent unsolicited related QC order: | |

Proprietary and confidential
Coagulation – QC ID

```
IF (Specimen ID) (Contains) (Value List QC Name)
  THEN, (Set) (Specimen ID) = (Value List QC Breaker)
ELSE:
```

**Rules Setup – SPAH-CS-2500**

 SPAH-CS-2500

**Incoming result**

 - **Incoming request**
 - **Outgoing request**

**Tree View**

- Before Message Queued Internally
- **NEW QC ID**
  - IF (Specimen ID) (Contains) (Value List QC Name)
  - THEN, (Set) (Specimen ID) = (Value List QC Breaker)
- Else:
  - Error Codes
  - Suppress Dilution results
  - "*" Translation rule
  - Suppress Dilution
  - Stop sending test dilution
  - Suppress TEST comment
  - Stop sending test dilution
Coagulation – Error Codes

- Prevents release of questionable results
Coagulation – Resolution of “<” or “>” Results

- Non-numeric values accompanying results are treated as error codes
Coagulation – Test Dilution Results

- Analyzer sends a dilution value with every test result
- Dilution result interferes with results posting to Epic Beaker
Coagulation – Test Comments

- Siemens CS-2500 analyzer sends a “Final Information (Auto Output)” comment with test results
- Causes confusion for nurses and physician
Coagulation – No Value

- Suppresses non-numeric results
Hematology

- Instrumentation
- CBC Components
- Outgoing request rules
  - H&H&MCHC
  - WBC & nRBC
  - Run Count
- Sysmex analyzer flagging
- Error code resolution
Hematology – Outgoing Requests

- Add MCHC to H&H
- Add nRBC% and nRBC# to WBC

```plaintext
SLH XN-2000

Tree View

Before Message Sent to this Connection
- run count
  - If (Test Ordered) "51630" AND (Test Ordered) "51636" AND NOT (Test Ordered) "52364"
    - Then: (Add Test) "51812"
    - Else:
  - add SC
    - If: (Test Ordered) "52364"
      - Then: (Add Test) "NRBC%" AND (Add Test) "NRBC#" AND (Add Test) "RDW-SD"
    - Else:

Tree View  Grid View
```
Hematology – Run Count

- Creates a list of tests that IM will accept from analyzer
Hematology – Run Count

- Tests not in the run count are suppressed
Hematology – Sysmex Flagging

- Added flagging components to CBC test
  - 667: Instrument Flag
  - 668: Linearity flag
  - 927: Slide Review Flag

- Purpose is to logically organize analyzer flags so proper test is reflexed
Hematology – Sysmex Flagging/Mixing Error

- Mixing Error action message converted to a Linearity flag
Hematology – Outside Linearity

- CBC results outside linearity will create a linearity flag in Epic Beaker to prevent auto-verification
Hematology – “Q” Scores

- “Q” Score: Probability of presence of abnormal cells in a sample
Hematology – Bar Code Read Errors

- Results are suppressed if bar code read fails
Hematology – Immature Granulocytes (IG)

- Sentara currently not reporting IG
- Rule adds IG% and IG# to Neut% & Neut#
Hematology

- Honorable Mentions
  - Positive_Diff,
  - Positive_Morph,
  - Positive_Count
- Rounding rule
- IPF 0.0 rule
- “-” rules
Urinalysis

- Clinitek Specimen ID/Patient ID issue
- Result “fixes”
  - Trace Blood results
Chemistry

- Special Roche/DI build
- Auto-verification
- Dilutions
- Calculations
- Linear limits
### Chemistry

#### Test Worksheet

<table>
<thead>
<tr>
<th>Connection Name</th>
<th>Test Name</th>
<th>Result</th>
<th>Units</th>
<th>Result Date/Time</th>
<th>Test Comment(s)</th>
<th>Error Code(s)</th>
<th>Previous Result</th>
<th>Previous Result Date/Time</th>
<th>Test Status</th>
<th>Error Name(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1VNC-C0000-2</td>
<td>TP-UR RAN...</td>
<td>150.7</td>
<td>mg/dL</td>
<td>6/12/2020 12:27:47 PM</td>
<td>Wait For Dilution</td>
<td></td>
<td></td>
<td></td>
<td>Held for Verification</td>
<td>yABS</td>
</tr>
<tr>
<td>S1VNC-C0000-2</td>
<td>TP-UR RAN...</td>
<td>570.3</td>
<td>mg/dL</td>
<td>6/12/2020 12:27:47 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Held for Verification</td>
<td>N</td>
</tr>
</tbody>
</table>

**Patient Information:**
- **Name:** [Redacted]
- **ID:** [Redacted]
- **Date of Birth:** [Redacted]
- **Sex:** M
- **Location - Facility:** EPICHBOC
- **Ordering Physician:** [Redacted]
- **Collection Date/Time:** 6/12/2020 11:10:58
- **Specimen Comment(s):** [Redacted]
- **Specimen Type:** P
Specimen Processing

- Coming in 2020...Total Lab Automation!!!
- Roche 8100
  - Infinity software (SNGH)
    - Sending orders/results
    - Roche DI

Proprietary and confidential
Specimen Processing/Total Lab Automation

- Epic Beaker
- Roche Infinity
- Roche Infinity and Instrument Manager
- Norfolk General 8100
- All Other Non-SMJH Chemistry Instruments
- Norfolk General 8030 (x3)

Orders/Results flow between the systems.
Transfusion Services

- Epic Beaker
- Haemonetics
  - SafeTrace TX
  - STTX
    - Orders/Results
- LIS DI
  - Orders/Results
- Immucor
  - Echos
- Grifols Erytra (Rockingham)

Orders/Results
Transfusion Services

- IM, SafeTrace and Epic Beaker
  - No Epic BB module
  - SafeTrace serves as BB module
  - SafeTrace integrates to instrumentation via DI

- No reflex testing

- Rules Processing
  - No blood type, DI will hold results
  - Crossmatch results cross
  - Incompatible results held
    - Comments held
Microbiology

Epic Beaker → Order/Results → LIS DI
Order/Results → SNGH Myia
Order/Results → SMJH Myia

Norfolk Gen Micro Instruments →
Martha Jefferson Micro Instruments (In Progress)
Halifax Micro Instruments

Rockingham Micro Instruments (Future) →
No. Virginia Micro Instruments (Future)
Microbiology

- Integration of Myla as middleware
  - Order sent to DI, then to Myla, then to instrument
  - Myla doesn’t integrate directly to Epic
- Rules Processing
  - SNGH: One of first sites to integrate Myla & DI
    - DI rep on site to assist w/ build
  - Sending/receiving orders
  - BCI Codes/Tables
    - Antibiotics
    - Organism IDs
COVID-19 Impact

Test are currently run on:

- **Abbott m2000 (SNGH)**
  - Purchased specifically for Covid-19
  - Used in the COVID Lab

- **Roche Cobas 6800 (SNGH)**
  - Used in the Molecular Dept

- **GeneXpert DX (SNGH, SNVMC, SMJH, SRMH)**
  - Used in the Microbiology Dept

- **Diasorin Liaison MDX (SNGH) (Non-Interfaced)**
  - Used in the Molecular Dept

- **Diasorin Liaison XL (Fall 2020)**
  - Purchased Specifically for Covid-19

- **Hologic Panther (SNGH) (Possible)**
COVID Lab

Anatomy of Building a COVID-19 Lab in 10 Days

General Support (SNGH Facilities/Construction & RG Electric)
- New Plumbing (SNGH Pipe Shop/B&Z Plumbing)
- New Electrical (CPI Services)

EPIC/Interface Builds (Beaker Team and LIS Technical Team)
- Computer (Desktop Support)
- New Freezer (Purchasing/Receiving)
- Data Cables (Schick)
- Label Printer (IT Construction)

Biosafety Cabinet (SNVMC Lab)
- (SMJH Engineering who transported it)

Phone (Communications)

Chair (Serology Lab)
- Heat Block (EVMS)
- Remove Old Furniture & Clean Floors (ESD)

Bench (SNGH Molecular Lab)

Sink and Counter (SNGH Facilities)

Flammable Cabinet (SNGH Core Lab)

Abbott m2000 (Purchasing/Receiving)

Layout and Organization (Molecular Lab, Core Lab, and Histo Techs)

Centrifuge (ODU)
- Bench (SNGH Core Lab)
- Fabricating Top (SNGH Facilities)

New Door (RG Electric)
- Signage/Support (Lab Safety)
COVID-19 Testing

- Testing sent out to LabCorp initially
- First in-house testing limited to 30 tests/day
- Up to 5,500 – 6,000 PCR tests/week
- Currently over 40,000 in-house tests performed
Sentara’s Future with DI

- Retire the SMJH Chemistry
  - Merge into Enterprise Chemistry DI Server
- Upgrade the Hemo/Coag Server
  - Upgrade OS and DI Version
- Cloud Based Servers
- Immulink
  - Immucor Echo Instruments in Blood Bank
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Keith Blackshear – kmblack1@sentara.com

Jeff Sanders – jdsander@sentara.com