Connectivity:
Get out the tin cans and string! Saving your sanity using connectivity for POCT!

Objectives
- Describe connectivity and how it relates to POCT
- Outline implementation steps for connectivity
- Review troubleshooting strategies

Speaker Financial Disclosure Information
1 I am employed by Instrumentation Laboratory
Connectivity Definitions
- ADT
- DHCP
- Docking Stations
- Drivers
- FTP
- Hardwired
- HTTP/HTTPS
- Interface
- Lantronix
- Middleware

More Definitions
- POCT-1A
- Remote Access
- Remote Desktop
- Servers
- SQL
- SSL
- Virtual
- VPN
- Wi-Fi
- Wireless

Connectivity
- It’s like learning a new language
- Speaking and translating between the vendor, IT, LIS and the end users
- No two connections are alike either – every vendor is different and every hospital is different
Why Connectivity?

- POCT = lab testing done at the bedside, near the patient
  - 32 different locations
- POCT = hundreds of devices
  - 171 devices
- POCT = thousands of operators running tests
  - 2525 operators
  - Some use one device, some use 5!

Connectivity = Sanity!

Why Connectivity?

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Connectivity = Sanity!

Connectivity Benefits

- Meter Inventory
  - Approximately 170 POCT devices
  - Seven different physical locations and 52 departments utilizing POCT in some fashion
- Manual tests scattered around as well
- Monitor downloading frequency
- Troubleshooting

*One stop shop
Connectivity Benefits

Quality Control
- Data can be monitored
- Trends (both good and bad) can be fleshed out
- Failures observed
- Lot numbers tracked
- Levey-Jennings reports

Results
- Patient ID errors flagged and stopped before they cross over to LIS and EMR
- Set parameters to flag results that may need review before sending on to LIS/EMR
- Critical result flags to monitor compliance
- Instrument flags – out of range errors, bad sensors, star outs, flow errors, QC failures

Proficiency Testing
- Permanent record of results and operators for those inspectors

Calibration Verification
- Results stored and tracked
- Graphs produced

*One stop shop*
Connectivity Benefits

- Manual testing
  - Results entered via software at the bedside
  - Results tracked the same
  - QC tracked the same
  - Proficiency tracked the same
  - Lab numbers tracked the same
  - Competency tracked the same
  - LOS & TAT decreased thereby increasing patient satisfaction

*One stop shop

Connectivity Benefits

- Competency
  - Thousands of operators; Many locations
  - Operator usage varies from hourly to once a year
  - Connectivity between middleware and instruments enables lockouts
  - Connectivity between e-learning software and middleware enables tracking of e-learning
  - Patient testing. QC, proficiency testing and electronic learning can be used to set up a comprehensive competency program

*One stop shop

Table 1: Numbers of operators for each device type and cumulative minutes needed to update records

<table>
<thead>
<tr>
<th>Device</th>
<th>Number of Operators</th>
<th>Minutes to Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetprep</td>
<td>225</td>
<td>1125</td>
</tr>
<tr>
<td>Uristix</td>
<td>32</td>
<td>160</td>
</tr>
<tr>
<td>DCA</td>
<td>54</td>
<td>270</td>
</tr>
<tr>
<td>ACT</td>
<td>83</td>
<td>415</td>
</tr>
<tr>
<td>Hemocue</td>
<td>356</td>
<td>1780</td>
</tr>
<tr>
<td>Nova StatStrip</td>
<td>277</td>
<td>1385</td>
</tr>
<tr>
<td>Rapid Streptococcus</td>
<td>27</td>
<td>135</td>
</tr>
<tr>
<td>Rapid Trichomonas</td>
<td>136</td>
<td>680</td>
</tr>
</tbody>
</table>

Totals: 3743 operators, 18715 minutes

Table 3: Corresponding fields in People Soft used to create .csv file.

<table>
<thead>
<tr>
<th>Field Needed</th>
<th>PeopleSoft Field Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator Hire Month</td>
<td>Active Directory Account</td>
</tr>
<tr>
<td>Operator Title</td>
<td>Operator Email</td>
</tr>
<tr>
<td>Active Directory Account</td>
<td>Operator Middle Initial</td>
</tr>
<tr>
<td>Operator First Name</td>
<td>Operator Last Name</td>
</tr>
<tr>
<td>Operator Email</td>
<td>External ID</td>
</tr>
<tr>
<td>Operator Middle Initial</td>
<td>QML Operator ID</td>
</tr>
</tbody>
</table>

Development of a new interface for POCT competency tracking.

Objective: Reduce the time it takes to update competency records. The development of an electronic interface to track elements of competency for the POCT department at a multi-site pediatric hospital system.

Methodology:

- Gather the correct data needed to create the .csv file.
- Use TELCOR QML® as middleware software to create the .csv file.
- Use PeopleSoft to enter all the information.
- Use an automated report to update operator records.
- Use the same network where QML knows to look for it.
- Use the same software to track the same.
- Use the same middleware to track changes, departmental changes and terminations.
- Use the same network to deliver information such as new hire additions, name changes, departmental changes and terminations.
- Use the same middleware to automatically pull that report and update operator records.
- Use QML to look for staff that has successfully completed POCT e-learning courses.
- Use QML to run an automated report each day.
- Use the same electronic medical record (EMR) to track the same.
- Use the same middleware to set parameters for each device type in use.
- Use the same middleware to enable lockouts.
- Use the same middleware to track proficiency testing and/or linearity testing.
- Use the same middleware to track instrument upkeep and other regulatory compliance.
- Use the same middleware to implement an e-learning interface drastically reduces the number of hours needed scheduled on a daily basis and an alert occurs within QML if issues arise.
- Use the same middleware to save a report as a .csv file in Children's.
Its as easy as 1, 2, 3.....or 14, 15, 16

Connectivity Benefits

• BEFORE: Manual updates of all operators for each of their competencies added up to 39 eight hour days of time
• AFTER: The interface updated approximately 1200 operators in seconds
• Implementation of the e-learning interface saved time
• One stop shop

<table>
<thead>
<tr>
<th>Device</th>
<th>Number of operators</th>
<th>Minutes to update</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>50</td>
<td>74</td>
</tr>
<tr>
<td>AHS</td>
<td>35</td>
<td>109</td>
</tr>
<tr>
<td>Operator Last</td>
<td>54</td>
<td>272</td>
</tr>
<tr>
<td>Operator First</td>
<td>532</td>
<td>325</td>
</tr>
<tr>
<td>Operator Middle</td>
<td>1044</td>
<td>1776</td>
</tr>
<tr>
<td>Operator Email</td>
<td>325</td>
<td>7125</td>
</tr>
<tr>
<td>Active Directory</td>
<td>25</td>
<td>139</td>
</tr>
<tr>
<td>Total</td>
<td>2454</td>
<td>1077</td>
</tr>
</tbody>
</table>

Connectivity

• BEFORE: 4 computers & 3 monitors
• AFTER: Single computer access from everywhere

• This was not a large institution
• Cloning hasn’t yet been perfected
• Servers are housed at a remote location
• Need access from anywhere though
• The only constant is change!
Ready Set Connect

In order to connect there must be KEY PLAYERS identified

- **Customer side:**
  - POCC &/or Project Manager
  - IT – Network Architects; IT security; Server team;
  - LIS/EMR resource for building result interface and validation
  - ADT/Orders resource for building interface and validation
  - Biomed

- **Vendor Side:**
  - Project manager for each vendor
  - IT specialist – interface coordination and build
  - Applications Specialist – installation, training, verification of analyzer

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Ready set connect

- Indicate current and needed levels of commitment
- Identify potential reasons for resistance
- Develop action plans aimed at reducing or eliminating resistance
- Indicate responsible parties and target dates for action plan initiatives

**KEEP THE BALL ROLLING!!**

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Before the kick off call

**Customer and Vendor needs:**
- Paperwork in and a clean deal approved on both sides
- BAA type agreements signed
- Customer IT department is AWARE that this is happening
- Customer IT requests submitted
- Resources assigned on BOTH sides
Kick off call

- Resources listed previously
- Project timeline – a.k.a Implementation Plan
- Anticipated GO LIVE date (don’t forget to factor in other projects, holidays, vacation)
- An open mind – hurdles happen

- Extra credit: number of devices, locations and operators predefined

Kick off call

- Kick off call/meeting to outline the IMPLEMENTATION PLAN
- Checklists from IT and vendors need to be completed

- Things to consider: Servers, drivers, ports, power, memory, capacity (space), network requirements, firewall requirements, batteries, cables, meters, docking stations, Wi-Fi network, dead spots, future expansion capabilities, blinking lights, space on the floors

Ready Set GO!

- IMPLEMENTATION PLAN

- "Detailed listing of activities, costs, expected difficulties and schedules that are required to achieve the objectives of the plan.”
Implementation Plan

Ready Set GO!

- Customer and Vendor each may have an implementation plan document
- Choose one and stick to it
- Pieces may be pulled from both to create a new version

* Use this document to stay on task and on target

Configuration Documents

Detailed step by step instructions for enabling and configuring the interface on the device is the single most useful piece of documentation.

Even if configured initially by the vendor, at some point down the road the customer is going to need to make an adjustment.
10,000 foot view – Device Connection Steps

Establish the workflow
1. Current vs future state
2. Connectivity options – wifi/hardwired; network connections; middleware (vendor or neutral or both)
3. Instrument operation – operators; test panels; QC
4. Network access
5. Firewall restrictions
6. Server build
7. Set up interface
8. Install instrument
9. Build panels
10. Enter operators
11. Test

10,000 foot view – Middleware Connection Steps

1. Connect device to middleware – from programming an IP address into a device to configuring a Lantronix box to connect to a device
2. Connect ADT/orders feed to middleware – create port in middleware and direct or build a feed from EMR, LIS or engine to download patient information to instrument
3. Build exception processing and reporting features in middleware (translations, reference ranges, flags)
4. Build result interface in middleware (outbound HL7 message)
5. Connect middleware to LIS/EMR – build a port in LIS/EMR and point middleware result interface to that port

*For 1, 2, and 5, Firewall exceptions may need to be defined and these can be different at every customer

Interface Implementation

*If issues develop (resistance), understand the root causes and make adjustments
*Insist on individual compliance with the plan
*Instruct, educate and coach throughout the plan
*Look to others for implementation tips

>ASK QUESTIONS
Interface Implementation

- Stick to the timeline to keep the project moving
- Find your champions and allies
- Arm yourself with knowledge
- Get vendor, middleware and/or IT to work with you and show you how things work and connect
  - POCCs should educate themselves on the nuances of their IT network
- Test, test, test
- Ask questions

Connectivity = Activity

- It’s a puzzle to be solved on a daily basis
- Create your network
- It’s as easy as 1, 2, 3...
- Or is it?

Connectivity Puzzle

- Using the pieces in front of you, work together to create your own POCT network
- There are 3 different instrument types in the puzzle
- Each communicates differently and independently of any other instrument type
- The pieces are somewhat color coded
  - Remember that devices need to “talk” to a computer
- The final goal: Get those patient results into the chart (HIS/EMR)
Connectivity Puzzle

1. Each group will receive their problem piece.
2. Work together to determine the best solution for your given problem.
3. Each group will report their solution at the end of the given time period.

Ready...Set....Go!
Problem #1: There is no network jack available
Solution Options:
1. Identify who is in charge of network jacks in the IT department
2. Order a new jack to be installed
3. Be sure the network jack is active once installed

Problem #2: Network Jack is available, but is not working
Solution Discussion:
1. Verify settings for device - DHCP versus static IP
2. Is the IP address correct
3. Has your IT changed the IP address without you knowing
4. Is there a network outage

Problem #3: There is no Wireless signal on the unit
Solution Discussion:
1. Identify who is in charge of the wireless signal in the IT department
2. Be sure device settings match needs of wireless system
3. Hard wired connection with network cable may be only choice
Problem #4: There is intermittent wireless signal on the unit

Solution Discussion:
1. Verify wireless settings on device
2. Some manufacturers have multiple wireless settings to turn signal on and off while searching for Wi-Fi hub
3. Check strength of Wi-Fi on unit
4. Increase signal if necessary

Problem #5: Wireless signal is turned off on instrument

1. Check in user manual for instructions and turn on wireless signal
2. Verify your IT configuration requirements for Wi-Fi (many are moving from 2mhz to 5mhz for better cybersecurity)
3. Make sure this instrument isn’t configured for a hardwired network cable

Implementation and Troubleshooting

- No two installs are the same
- POCCs should educate themselves on the nuances of the devices
- What lights blink when?
- What network are the devices on?
- Where are the Wi-Fi routers?
- Has it been in the data closet again?

Have you tried turning it off and on again?
Implementation and Troubleshooting

- How is each device set up?
- Does device software need tweaking?
- Does the docking station need to be programmed?
- Does the middleware need to be edited?
- Make a cheat sheet and keep it close

Troubleshooting

- The end is NOT near
- The sky is NOT falling
- Ask questions
- It's all in the DETAILS
- POCC knowhow
- Vendor SUPPORT is there

It's the little things

- How observant are we?
- Watch this 5 second video on the next slide to find out
Quick Connections

It's really the little things
- The lights may not seem important but knowing how they blink can save time and sanity
- Every vendor connects differently as does each hospital system
- The lights all blink differently
- That video was only 5 seconds long
- POCCs must be observant

Connectivity
- It's all about the connections
- Details details details
- Cheat sheets help
- Ask questions
- Make allies – they can be the links in your web
- Create your network and use it to help YOU
Connectivity

- It's all about the connections

References

- Shaw, Julie LV, Practical Challenges Related to Point of Care Testing, Practical Laboratory Medicine, 4 (2016)
- Camacho-Ryan, Olga and Bertholf, Robert, Monitoring Point of Care Compliance, Clinical Laboratory News Articles, February 1, 2016
- Blick, Kenneth, The Essential Role of Information Management in Point of Care/Critical Care Testing, Journal of The International Federation of Clinical Chemistry and Laboratory Medicine, Vol 12, No 4, 2001
- Salka, Leana and Kiechle, Frederick, Connectivity for Point of Care Glucose Testing Reduces Error and Increases Compliance, Point of Care, Vol 2, No 2, 114-118
- Tirimacco, et al, Point of Care Testing, Clinical Biochemist Reviews, August 2010, 71-73
- Paxton, Anne, POC Connectivity Takes Hold, CAP Today, June 2005, 1
- http://www.businessdictionary.com/definition/implementation-plan.html
- https://techterms.com/

Thank You!!

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