Future-proofing Your Capital Equipment Maintenance Programs

Samantha Jacques, PhD, FACHE
Clinical Engineering Director, Penn State Health System

Calvin Sproul
Manager Wireless Technologies, Johns Hopkins Enterprise
Planning a Capital Equipment Maintenance Program

Samantha Jacques, PhD, FACHE, Clinical Engineering Director, Penn State Health System
Learning Objectives

• Review several tools and how they are used to identify and document support roles/responsibilities
  • Support Plans
  • RACI diagrams
  • Contracts/Service Level Agreements

• Understand options for ongoing maintenance of capital equipment.
  • Discuss factors to consider when assessing whether to insource or outsource maintenance.

• Identify ways to measure and monitor your program.
  • Vendor Management Scorecards
Ongoing Maintenance

SO, NOW WE HAVE ASCERTAINED WHO IS RESPONSIBLE....
Tools used to Define Support

• Support Plans

• RACI diagrams (Responsible, Accountable, Consulted, Informed)
  • Describes the participation by various roles in completing deliverables for a support process.
  • It is especially useful in clarifying roles and responsibilities in cross-functional/departmental processes.

• Contracts
  • Service Level Agreements
  • Vendor Contracts
Roadmap to Support Capital Equipment

- 4 W’s and H
- End User
- Technical

Scope

Roles Responsibilities
- People
- Process
- Technology
- Vendor Management

Support Plan
- Workflow Development
- Documentation
Scope

• Who, What, Where, When, How of system needs
• End User Scope – processes, regulatory requirements, business needs, support needs
• Technical Scope – Training, FTEs, Servers, Database, Interfaces, Hardware, Software, Security, Access, etc.
• Take-Away
  • Needs Assessment
  • Ideal State Workflows
  • Architecture Diagrams
Defining Roles/Responsibilities

• People
  • Technician, System Admin, IT Help Desk, Clinical Engineering, IT 2nd Tier Support, Vendor Support

• Process
  • Ordering supplies, add users, run reports, escalating issues, replaces hardware, downtime process

• Technology
  • Upgrades, Lifecycles, System Enhancements
Document the Support Plan

- System Application Overview/Vendor Contacts
- Technical Information
  - Server/Appliance, Database, Interface, Firewall, VPN, Network, Application, Hardware
- Technical/Application/Architecture Diagrams
- Roles/Responsibilities
  - IT Service Areas
  - Clinical Engineering
  - Facilities
  - End User
  - Vendor
- Support Processes
  - Service Level Agreements
- Knowledge Articles
- Sign Offs
<table>
<thead>
<tr>
<th>R</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Who is / will be doing this task?</td>
</tr>
<tr>
<td></td>
<td>Who is assigned to work on this task?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>Accountable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Who’s head will roll if this goes wrong?</td>
</tr>
<tr>
<td></td>
<td>Who has the authority to take decision?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>Consulted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anyone who can tell me more about this task?</td>
</tr>
<tr>
<td></td>
<td>Any stakeholders already identified?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I</th>
<th>Informed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anyone whose work depends on this task?</td>
</tr>
<tr>
<td></td>
<td>Who has to be kept updated about the progress?</td>
</tr>
</tbody>
</table>
## RACI Matrix Template

### ROLE

#### Project Deliverable (or Activity)

<table>
<thead>
<tr>
<th>Phase Activities</th>
<th>Project Leadership</th>
<th>Project Team Members</th>
<th>Project Sub-Teams</th>
<th>External Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initiate Phase Activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Request Review by PMO</td>
<td>A/C</td>
<td>R/A</td>
<td>R/A</td>
<td>A/C</td>
</tr>
<tr>
<td>Submit Project Request</td>
<td></td>
<td></td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Research Solution</td>
<td>I</td>
<td>A/C</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Develop Business Case</td>
<td>I</td>
<td>A/C</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td><strong>Plan Phase Activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create Project Charter</td>
<td>C</td>
<td>C</td>
<td>R/A</td>
<td>C</td>
</tr>
<tr>
<td>Create Schedule</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Create Additional Plans as Required</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td><strong>Execute Phase Activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build Deliverables</td>
<td>C/I</td>
<td>C/I</td>
<td>C/I</td>
<td>C/I</td>
</tr>
<tr>
<td>Create Status Report</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td><strong>Control Phase Activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perform Change Management</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>R</td>
</tr>
<tr>
<td><strong>Close Phase Activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create Lessons Learned</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>R/A</td>
</tr>
<tr>
<td>Create Project Closure Report</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
</tbody>
</table>
Vendor Contracts/Service Level Agreements

• User Input
  • Service hours, expectations

• Support Input
  • Uptime, software patches, etc.

• Legal Input
  • Indemnity, Contract Termination

• Quality Measures or Vendor Management Measures (Scorecards)
Factors to Consider For Insourcing/Outsourcing

• Are needs more than can be provided with existing support models?
• Are existing staff able to be trained for support?
• Is this standard equipment or “unicorn” equipment?
• How much does it cost to support over it’s lifetime?

Scope, Roles, and Responsibilities

Cost
Measure and Monitor using Scorecards

• Clearly linked to the requirements, specifications, schedules and quality metrics

• Clearly identify responsible party

• Each scope of work should have its own vendor scorecard.

  • Implementation based
    • Timelines, deliverables, shipping, and acceptance testing, invoicing and customer service metrics

• Service, Support, or Ongoing Maintenance Based

  • Response time, time to resolution, invoicing, customer service and value
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Measurement</th>
<th>Result/Outcome</th>
<th>Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor follows policies on badging and vendor</td>
<td>• Audit of vendor credentialing software</td>
<td>All onsite vendors were credentialed in Vendor Credentialing software as measured on August 1. However on one occasion (June 5) hospital observed John Smith entering unit without his badge. Staff discussed with him and issue was resolved immediately.</td>
<td>Please review vendor credentialing policy with vendor’s staff and assure all staff is credentialed. Follow up review will be conducted next quarter.</td>
</tr>
<tr>
<td>credentialing</td>
<td>• Assessment of badges when vendors are onsite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendor required to meet June 1 deadline for</td>
<td>• Review of schedule and deliverable</td>
<td>Staff Education presented to team on June 1. Staff review of documentation show it to be complete and accurate.</td>
<td>None</td>
</tr>
<tr>
<td>creation of staff education.</td>
<td>• Feedback from</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Scorecard Example

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Measurement</th>
<th>Result/Outcome</th>
<th>Next Steps</th>
</tr>
</thead>
</table>
| Vendor responds to service calls in timely manner (contract specified 4 hrs) | • Turn around time from service call to vendor service on site | Responses time averages 3.2 hrs during weekdays = meeting expectations  
Response times on weekends = 4.2 hrs = below expectations | Review weekend response times and barriers to meeting service levels |
| Vendor invoices are accurate and timely | • Receipt and review of invoice | Invoice not paid as errors in invoice | Rebill |
Recap - Learning Objectives

• Review several tools and how they are used to identify and document support roles/responsibilities
  • Support Plans
  • RACI diagrams
  • Contracts/Service Level Agreements

• Understand options for ongoing maintenance of capital equipment.
  • Discuss factors to consider when assessing whether to insource or outsource maintenance.

• Identify ways to measure and monitor your program.
  • Vendor Management Scorecards
Thank you!
Future Proofing Wirelessly Connected Medical Devices from an IT Provider Perspective

Calvin Sproul, Manager Wireless Technologies, Johns Hopkins Enterprise
Future proofing connected devices.

Building robust security mechanisms into connected medical devices and equipment.
Tracking inventory of what you have is pivotal for successful management. Inventory what you have efficiently.
Evaluate potential connected medical devices. Check wireless network compatibility with security standards.
Be able to capture event driven information. Make it a requirement to track problem codes in event logs.
Confirm application fixes and updates concerning identified patient safety issues and security vulnerabilities.
Setup a RFP (Request for Proposal) process and evaluation guidelines. Ask vendors to answer questions included in the RFP criteria.
Enlist stakeholders to participate and identify what attributes are essential. Identify operational support before onboarding devices.
Determine what the expected life of the medical device is before it is declared End-Of-Life or End-of-Support.
Unique identifiers such as mac address, serial number, model number, FDA GUDID Global Unique Identification Database.
Track network connected medical devices. Determine if the equipment remains in one place, is it used in multiple locations or leaves the hospital premises.
Insist on a device management program to manage and configure the medical devices/equipment remotely.
Have the ability to remotely program and device configuration through management and interface control.
Have the ability to log data, translate that data into actionable information, and interface with analytic databases.
Government Compliance. Anticipating new regulations and standards. Difficult to anticipate unless you participate in the process.
IoMT - Internet of Medical Things
RTHS - Real Time Health System
IoHT - Internet of Healthcare Things
• Secure
• Manage
• Monitor
Using RFID (Radio Frequency Identification) tags to medical devices to track their location was one of the first IoT applications.
• Implementation
• Distribution
• Operational
• Manage – Patch
• Connect – Secure
• Scale - Support
• Motivation
• Goal
• Innovate
• Problem Solving
• Futureproof
• Common Operating Platform
• Planning - Specifications
• Expandable - Modular
• Monitor
• Track (RTLS, RFID, IoT)
• Replace and/or Upgrade
• Environmental Considerations