Managing EHR Downtimes: Implementing Tools from Response

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Agenda

- Review of Downtime Prevalence BCH
- Implementing Lessons Learned
  - HICS
  - Resources and Assets
  - Staffing
  - Communication
- Culture Shift
- Current Status
BCH ISD Disruptions

Percentage of ISD disruptions from all HICS activations 2010-2017
Cyberattack hits Children’s Hospital

May be the work of group opposing teen’s treatment

By Michael B. Farrell
and Patricia Wen

The infamous computer hacker network known as Anonymous threatened to attack Boston Children’s Hospital over the child custody case involving Justina Pelletier last month, just a few weeks before the medical center’s website was subjected to numerous cyber-attacks.

Anonymous has made its interest in the case clear. Several weeks ago, the group claimed responsibility for an attack on the website of Wayside Youth and Family Support Network, the Framingham residential facility where 15-year-old Justina has been living since January under state custody.

After the more recent attack on Children’s, some patients and medical personnel could not use their online accounts to check appointments, test results, and other case information after the hospital shut down those Web pages.

The threats from Anonymous are the latest to emerge against the hospital that needs to keep its system available to its patients.

By Meghan E. DeReus
5 Day Downtime 2015

March 20 at 1:05 p.m. until March 25 at 8:52 a.m.

All CHAMPS systems impacted

Systems returned for a 12-hour period beginning approximately March 20 at 9 p.m. until March 21 at 9:15 a.m.
Impacts beyond the EHR

- Paging and communication systems
- Online drug formulary
- Custom applications
- Polices & Procedures
- Web-based clinical resources
- Research databases/registries
- Patient food ordering
- Lab instrument interfaces

Not all downtimes are created equal. EHR, Network, and single application downtimes have different impacts to the institution.
Capturing lessons learned: The Emergency Management Process

After Action Reports are created after a Hospital Incident Command System (HICS) activation. All Action Items are prioritized and assigned a responsible party and an Emergency Management staff member to track to completion.
We had some experiences…

So what did we learn?

Lessons learned

• Hospital Incident Command System
• Resources/Assets
• Staff
• Communication
Lessons Learned: Hospital Incident Command System

Themes:

– Inadequate departmental downtime plans
– Training needed for HICS positions for downtime roles
– Further understanding of impacted systems and integration of systems for decision making purposes
– Need for Recovery Roles
Downtime Planning

Plans created for the following areas:

- Inpatient Units
- Lab
- Pharmacy
- Radiology
- Ambulatory Areas
- Nutrition
- Food Services
- Physical Therapy
- Satellite locations
- Social Work
Successful planning tips

• Ensure departmental buy-in
• Flexible planning options (checklist)
• Ensure a sustainability plan
  – Use during planed downtimes
Incident Command Training

• HICS Training and Role Clarification
  – Nursing Administrator on Call
  – Informatics Fellows
  – Network liaisons
  – Recovery positions and responsibilities
Establishing Command and Control

Clinical Education and Informatics created multiple tools to help inform response decision making.

Tools inform response decision making.
# Systems Integration Information

The following systems may be impacted if the hospital disconnects internet connection. Systems marked **Down** are currently down (This is not a comprehensive list).

NOTE: For all other systems that are not listed below (i.e., CHAVES), follow standard downtime procedures.

<table>
<thead>
<tr>
<th>Application</th>
<th>Current State</th>
<th>Responsible Department</th>
<th>Hosted internally or externally?</th>
<th>Severity</th>
<th>IF AFFECTED—Short Term Contingency</th>
<th>IF AFFECTED—Long Term Contingency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc (Clinical Works)</td>
<td>Unaffected</td>
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<tr>
<td>ePhrase</td>
<td>Unaffected</td>
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<tr>
<td>Xray Paging System</td>
<td>Unaffected</td>
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<tr>
<td>VPN/Remote Login</td>
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<tr>
<td>Life Image</td>
<td>Unaffected</td>
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<tr>
<td>Telemedicine Systems</td>
<td>Unaffected</td>
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<tr>
<td>eNBN—Patient Eligibility and</td>
<td>Unaffected</td>
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<tr>
<td>MyChildren's Patient Portal</td>
<td>Down</td>
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<tr>
<td>eNBN—Patient Provider Portal</td>
<td>Down</td>
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<td>sLab Comp</td>
<td>Unaffected</td>
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<tr>
<td>NeoIndex</td>
<td>Unaffected</td>
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<tr>
<td>Secure email</td>
<td>Unaffected</td>
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<td>IM</td>
<td>Unaffected</td>
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<tr>
<td>Computer Assisted Coding</td>
<td>Unaffected</td>
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<tr>
<td>Scanning</td>
<td>Unaffected</td>
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<tr>
<td>ticker Deliveryway/CHV Fax</td>
<td>Unaffected</td>
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<td>Transcription System</td>
<td>Unaffected</td>
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<tr>
<td>Outlook</td>
<td>Unaffected</td>
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<tr>
<td>Intelbridge (Biomed)</td>
<td>Unaffected</td>
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<td>Neofax</td>
<td>Unaffected</td>
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# Timeline and Impact List

<table>
<thead>
<tr>
<th>SYSTEM NAMES</th>
<th>Description</th>
<th>SYSTEM CONTACT</th>
<th>0-15</th>
<th>16-30</th>
<th>31-59</th>
<th>1-2 hr</th>
<th>2-3 hrs</th>
<th>3-4 hrs</th>
<th>4-5 hrs</th>
<th>&lt;5hrs</th>
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</thead>
<tbody>
<tr>
<td>Champs Corner Classic (PFT &amp; Blood Donor Ctr)</td>
<td>Processing &amp; Tracking Blood Donations</td>
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<tr>
<td>Pathnet</td>
<td>Pathology Results</td>
<td>Support</td>
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<tr>
<td>Power Chart</td>
<td>Main patient chart (all clinical activity)</td>
<td>Support</td>
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<td>Essential</td>
<td>Essential</td>
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<td>Essential</td>
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<tr>
<td>PharmNet</td>
<td>Drug administration/management</td>
<td>Essential</td>
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<tr>
<td>FirstNet</td>
<td>Patient processing/tracking</td>
<td>Essential</td>
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<tr>
<td>SurgiNet</td>
<td>operation/schedule/process of surgical cases</td>
<td>Essential</td>
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<tr>
<td>RadNet</td>
<td>Radiology results</td>
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<tr>
<td>Synapse (PACS)</td>
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<tr>
<td>Epic</td>
<td>Admission, discharge, transfer</td>
<td>Essential</td>
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<tr>
<td>Eclipsys</td>
<td>EMR for ICUs (Entirely separate system)</td>
<td>N/A</td>
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<tr>
<td>EM Station</td>
<td>Old ED Operations Software</td>
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<td>Chemo Order Entry (COE)</td>
<td>order &amp; administer chemotherapy</td>
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</tbody>
</table>

- **Synapse (PACS)**: coming soon
- **EM Station**: If estimated return to normal operations is known, then xx. If unknown, then yyyy
# System Status Grid

<table>
<thead>
<tr>
<th>Application</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIMS</td>
<td>Epic</td>
</tr>
<tr>
<td>ALICE</td>
<td>External Record Portals</td>
</tr>
<tr>
<td>API/STAARS/PCS</td>
<td>External Web</td>
</tr>
<tr>
<td>Capacity Insight Dashboard</td>
<td>GetWell</td>
</tr>
<tr>
<td>CHAMPS</td>
<td>Interfaces</td>
</tr>
<tr>
<td>CHMenu and all web apps</td>
<td>Internal Web</td>
</tr>
<tr>
<td>COE</td>
<td>Network (Internet access)</td>
</tr>
<tr>
<td>Data Warehouse</td>
<td>Network drives (P; J; S)</td>
</tr>
<tr>
<td>Email</td>
<td>Nurse Call</td>
</tr>
<tr>
<td>Enterprise Faxing</td>
<td>Paging</td>
</tr>
<tr>
<td>Available, no impact</td>
<td>Intermittent or partial impact</td>
</tr>
<tr>
<td>Patient Flow</td>
<td>PeopleSoft Finance/Materials Mgt</td>
</tr>
<tr>
<td></td>
<td>PeopleSoft HR/Payroll</td>
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<td></td>
<td>Printing</td>
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<td></td>
<td>Radiology/Synapse</td>
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<tr>
<td></td>
<td>Remote logins (VPN and Web VPN)</td>
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<td></td>
<td>Report Viewer</td>
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<td>SharePoint</td>
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<td></td>
<td>Safety Event Reporting System (SERS)</td>
</tr>
</tbody>
</table>

The following applications will be unavailable or not receiving data updates during this time:

<table>
<thead>
<tr>
<th>Application</th>
<th>Reduced Availability</th>
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<tbody>
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</table>
Process to go to Paper

• AOD makes the final decision to go to paper (under guidance from CEI, ISD)
  – Goal is to make a decision within one hour of disruption

• Information is sent to users with the downtime pin
  – Communications sent to phones, email, pagers with downtime pin
  – RICOH Printers used for printing
Lessons Learned:
Resources and Assets

Themes:
– Downtime Forms
– Lab resource/asset needs
– Pharmacy needs
Documentation and Information Management

Issues
Staff inexperience with paper documentation
- Old documentation forms being used
- Delays in billing due to coding
- Documentation from downtime had many compliance issues (i.e. missing dates, times and/or signature, etc.)
- Potential for duplicate documentation

Solutions
Revised/standardized downtime paperwork
- Prepared an annual downtime education for all clinical staff
- Outdated form removal
Focused Education

• How to use a paper flow sheet and paper Medication Administration Record (MAR)
• Prescriber guidelines for an EHR downtime
• Ordering during downtime
  – Essential components of an order
  – Prescriptions during downtime
  – Order re-entry during downtime recovery
• Documentation during downtime and recovery
Creating a Downtime Binder

- Prescriber Order Forms
- Medication Administration Record (MAR)
- Nursing Admission Assessment (NAA)
- Progress Notes
- Inpatient and Critical Care Flow Sheet
- Management Plans
- Blood Bank Requisition and Lab Order Sheet
- Discharge Plan, Summary, and Additional Instructions

- Documentation policies
- Sample orders
- Sample Prescriptions (including DME)
- Reminder to use downtime order sets
- Directions for documentation of medications
- Guidelines for completing requisitions
- Area downtime preparedness checklist
- Medication History form
Version Control

Use of an internal website with instructions/documents.

- Acts as the single source of truth
- Command Center can update in real time
- Available to address immediate staff questions
- All communication refers to this website
- Contact information included
Laboratory Medicine

Issues
- Decreased productivity/throughput
  - Variability/errors/ambiguity in paper requisitions
  - Increased turnaround time for test results
  - Inability to ensure prompt receipt of results to providers

Solutions
- Updated downtime process
  - Collected and phased out old paper requisitions
  - Created new, simplified paper requisitions
  - Standardized process for delivery of lab results during downtime
Lab Solutions

- Limited menu of lab orders created during a downtime
- Formalize support agreements from neighboring institutions to help process labs
Pharmacy Operations

**Issues**

Delays in Medication orders and delivery

- Lack of medication tracking
- Medication safety
- Staff overworked and exhausted

**Solutions**

Review and increase resource utilization

- Established dedicated phone line for stat orders and requests
- Revised medication request process
- Increased number of fax machines
- Created an electronic database to track new order entries, refills and label generation
Prescription Pads

• Process created to distribute pads
• Information on how prescribers can fill out prescription pads.
Lessons Learned: Staffing

• More staff needed
  – In many different departments
  – For a multitude of tasks
  – In all phases of response

...There's an App for that
When activated the “HELP” application can query staff availability for multiple operational shifts.
Lessons Learned: Communication
Communication Feedback

After surveying hospital staff after a 5 day downtime communication was the number one opportunity for improvement.

Feedback included:

• Need for increased frequency of communication
• Stronger leadership presence during long term activations
• Visible leadership on the floors
• More transparency and coordination within messaging
Communication Insights

- **Employee heroics vs system capabilities:** Cumulative system and human stressors
- **Marshalling Senior Clinical Leadership Committee** guidance early and often
- **Making capacity management decisions** – balancing safety, quality, access, and employee considerations
- **Internal and external communication** – media, employees, and patients & families
  - Creation of an emergency family education sheet to distribute during an emergency.
Action Items

- Risk Communication training given to incident commanders.
- Response tools compiled of methods to communicate with staff.
- Ensure frequency of updates to all staff.
- Regular updates to senior leadership.
- Facilitate regular communication with IT response and HICS Command Center.
- Better ways to facilitate “town hall” meetings to reach large amounts of staff.
Shift to High Reliability

• A cultural shift to focus on error prevention, transparency, and situational awareness

• 5 Principles:
  – Preoccupation with failure
  – Reluctance to simplify interpretations
  – Sensitivity to operations
  – Commitment to resilience
  – Communication at all levels

  Goal: zero serious events of preventable harm

An enterprise-wide commitment to doing things right the first time, every time
System Resiliency

Move to Remote Hosting!
Current Environment

Percentage of ISD Activations

- 2008: 10%
- 2009: 10%
- 2010: 60%
- 2011: 20%
- 2012: 50%
- 2013: 70%
- 2014: 40%
- 2015: 30%
- 2016: 40%
- 2017: 80%
- 2018: 20%

Graph shows the percentage of ISD activations from 2008 to 2018, with a notable increase in 2017 followed by a decline in 2018.
Questions?

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