Cyber Attack Awareness For Hospital Pharmacies

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Learning Objectives

1) Recognize how the pharmacy buyer needs to take initial action after identification of a cyber attack.
2) Describe how to complete purchasing activities throughout the downtime.
3) Explain the different types of roles the pharmacy buyer can play during a cyber attack.
4) Outline the resources a buyer should prepare in the event of a cyber attack.
5) Review the specific opportunities the pharmacy buyer can have within a pharmacy disaster plan committee.

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Nebraska Medicine

809 Total Beds
- 729 bed academic hospital; Bellevue-80 beds acute care hospital
- 4 surgical centers
- 3 infusion centers
- 60+ Hospital Owned Departments (HOD)/clinics
- Pharmacy supply/warehouse located on main campus

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Nebraska Medicine *(continued)*

Modified "Hub & Spoke" Model Of Medication Distribution

- 193 Automated Dispensing System (ADS) locations, robot, high-density storage, 3 carousels
- 63% dispensed via Automated Dispensing Cabinets (ADC)

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Nebraska Medicine (*continued*)

Frontline Staff
- 3 Buyer full-time employees (FTE)
- 115.6 FTE RPh or Resident FTE's who are either centralized and decentralized, with intense involvement on rounding teams and stewardship programs
- 85.3 Pharmacy Technician/Intern FTE's
- 10.4 Support Staff FTE's

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Setting The Stage

September 20th, 2020…
- COVID numbers are on the rise
- Final preparation for implementation of a new inventory system house-wide
- Nebraska Medicine determined to be the central distribution center for the COVID-19 vaccine in Nebraska
- Preparing for pump integration

Finally, Sunday – Relax & Restore…

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All Systems Down

Day One: Where do we start?
Command Center Activated

All systems are down

- No access to internet
- No access to computer network files
- All automation has been taken offline
- Told to plan for 48 hours of downtime

Day One (*continued*)

Assess what you do have:

- Fax machine still worked
- Desktop phones still connected (not mobile network phones)
- Only access to documents on computer desktops
- Work related apps downloaded on personal phones were accessible
- Tube station
- ADS placed on override–all new patients entered as temp

Identify Priorities

1) Print medication administration record (MAR) from bar coded medication administration (BCMA) computers
2) Retrieve downtime files and equipment
3) Alert units where to fax medication orders
4) Set up robot oral medications on shelves
   - Package-Package-Package

Identify Priorities (*continued*)

5) Documents identified inventory location of medications in carousels, etc.
6) Staffing Needs–setup stations
   a) Central pharmacy functions
   b) Clinical staffing functions: Central vs decentralized
   c) Pharmacy warehouse–ADS restocks

Other Considerations

- No ADS replenishment report –How do we restock the ADS?
- Redefined day to day staffing plan – created more stations
- Documented IV medication dispensation
- Where are the patients?

Other Considerations *(continued)*

- Education on proper medication orders with pertinent information (floor, nurse contact info, legible)

- High Alert Medications/collection of pertinent lab information

Initiative & The Pharmacy Buyer

1) Time to blow the dust off the downtime binder!

2) Three buyers – huddled to develop their game plan

   a) What duties need to be completed?
- Clinics closed/Operating Rooms closed
- Redefined separation of coverage for purchasing

Initiative & The Pharmacy Buyer (*continued*)

   b) How will we submit orders?
- Define the possible options
- Split billing software available
- 340B vs. wholesale acquisition cost (WAC), vs. GPO considerations discussed

Buyer Role Throughout Downtime

1) Identification of Needs
- Buyers identified and initiated needs for extra materials specific to downtime–labels for Dymo printers, medication packaging, etc.
- Extra bins were ordered for medications being packaged
- Shelves were walked daily to determine needs based on "gut"
- Premade/Unit dose medications reviewed for availability to order

Buyer Role Throughout Downtime- (*continued*)

2) Placement of Order
- Most orders were manually placed at home via Primary Wholesaler
- Hotspot from personal phone while at work, for PRN orders
- Many orders called in via phone
- Continued to use split billing software
- Buyers were asked to limit amount of purchases during downtime
- Good relationship with vendors– they will help!

Question: How Can A Buyer Submit An Order During A Cyber Event?

a) Automatic order created by the electronic health record (EHR) for submission to the wholesaler
b) Email drug rep
c) Wholesaler app from personal phone
d) Call in an order to wholesaler
e) Printed forms at home brought in to submit via fax
f) B through E above

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Answer: How Can A Buyer Submit An Order During A Cyber Event?

Answer: "f) B through E"

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f) B through E above

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"Other Duties as Assigned"

- All our buyers are trained as pharmacy techs
- Assist technical staff with pulling ADS restock
- Run requests between central pharmacy location and pharmacy supply/warehouse
- Daily Huddles—collect feedback and provide updates

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"Other Duties As Assigned" (continued)

- Be a part of daily huddles
- Lead
- Safety-Safety-Safety

  ➤ Most barcode technology is lost.
  ➤ Safety is now biggest concern, so don't forget the checks and balances.

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Recovery

Immediate

- Continue to need extra staff after "go live"
- Enter all current orders into EHR
- Cycle count all inventory

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Recovery (continued)

Long Term

- Enter all patient orders into EHR—which took a few months, due to lack of staff
- Charge Capture
- Catch up on Billing**
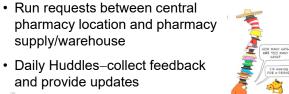- Update the Downtime Binder

Complete a "Hot Wash"

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REST!

Recognize the Staff!

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Question: What Are The Roles A Buyer Can Play During A Cyber Event?

a) Order entry of new patient medication orders

b) Assist pharmacy techs with pulling ADS restock

c) Run restock requests between pharmacy locations

d) Complete billing during recovery stage

e) Place drug orders to vendors requested through daily huddles

f) All except a

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c) Run restock requests between pharmacy locations

d) Complete billing during recovery stage

e) Place drug orders to vendors requested through daily huddles

f) All except a

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Disaster Plan Committee

- Buyers should be a part of the Disaster Plan Committee

- Drills or Discussion:
  - Plan with pharmacy department
  - Plan with other departments
  - Plan with your own staff (buyers, etc.)
  - Plan with vendors/wholesalers

- Review protocols and procedures periodically

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Preparedness In The Pharmacy: Business Continuity Plan

Criticality (1, 2, 3, 4) Sequence #		Process Name	Process Frequency (D=Daily; M=Monthly; A=Annually; O=Other-annotate after)
1	1	Set up pharmacy incident command location and assign critical positions	Immediately if needed
1	1	Print patient medication lists from BCA computer NOTE: If BCA computer has been deemed infected medication lists can be printed from data center backup files (contact Enterprise Applications Executive Director)	Immediately if needed
1	1	Retrieve and Set Up Emergency Extended Downtime Supplies from • File folders for each unit/bed • Binder of critical downtime order sets to photocopy • Stored in pharmacy storage room 2203	As needed
1	1	Identify immediate service needs	As needed
1	2	Setup manual MAR system by unit and bed • Photocopy each MAR for unit based pharmacists prior to filing • Update manual MAR with new orders as needed • File new orders as needed	As needed
1	2	Setup system XXX for manual generation of IV and oral syringe labels utilizing fill lists	As needed

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Business Continuity Plan: Staffing

1) Took great deal of coordination throughout the event that would last an unknown amount of time

2) Calling Tree

3) Buyers—staff on weekends/on call

1	2	Organize and deploy personnel as needed • Pharmacists to assess TPNs • Technician/pharmacist to generate labels using packing system as above • Pharmacists to organize and check IV room production (two) • Pharmacists to process, fill and check new orders in unit dose (two) • Pharmacist to update manual MARs after new orders are processed • One pharmacist per patient care unit to coordinate communication of new orders – check them for completeness before sending to inpatient pharmacy for processing • Technician/pharmacist to evaluate supply needs and stock levels relative to fill lists • Additional technicians required in pharmacy supply to obtain stock needs from Omnicell, fill and restock • Additional technicians required to begin cart fill on evening shift	Ongoing

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Business Continuity Plan: Staffing (*continued*)

1	2	Set up system for ADS maintenance and tracking of removals • Cabinets will keep track of removals for stocked items • New patients must be loaded manually • New medications will require a PH3 form to be stocked • Restock lists must be printed at each cabinet/anesthesia station	Ongoing
1	3	TPN plan • Clinimix for adults • Clinimix or hand compound pediatrics • Hand compound NICU Alternative plan for rare patients who cannot tolerate Clinimix – call Methodist to see if we can arrange for them to compound for us	Immediately and as needed
2	4	Develop recovery plan	As needed
3	5	Execute recovery plan and return to normal activities	On-going till recovered

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Business Continuity Plan: Be Specific

Task	Reference

1. ☐ Set up pharmacy incident command location and assign critical positions
  • MAR system manager
  • IV room/label generation manager
  • Personnel deployment manager
  • Omnicell/pharmacy supply manager
  • Logistics site leader per Incident Command Activation
	◦ ADM010 Pharmaceutical Downtime Procedures

2. ☐ Print patient medication lists from BCA computer NOTE: If BCA computer has been deemed infected medication lists can be printed from data center backup files (contact Enterprise Applications Executive Director)	◦ ADM010 Pharmaceutical Downtime Procedures

3. ☐ Retrieve and Set Up Emergency Extended Downtime Supplies from room 2203
  • Separate file folder for each unit/bed
  • Binder of critical downtime order sets to photocopy
  • Pharmacy phone directory	

4. Setup manual MAR system by unit and bed ☐ Photocopy each MAR for unit based pharmacists prior to filing ☐ Update manual MAR with new orders as needed ☐ File new orders as needed	

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We had a downtime binder, do you?

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Downtime Binder

1) Copies of State licenses

2) Copies of DEA licenses

3) Tax ID's

4) Disproportionate share hospital (DSH) number

5) Paper forms to place orders for certain vendors

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Downtime Binder *(continued)*

6) Local hospital buyer contact information

7) Excel document of all vendors also needs to be printed

– Binder updated twice a year

– Meet and make a plan specific to the buyers, as an addendum to the Disaster Plan

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Downtime Binder: Example Tab

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Question: What Are Important Pieces Of Information In A Downtime Binder?

a) Excel document of all vendor contact information and medication purchased

b) DSH number

c) Copies of state licenses

d) All of the above

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Answer: What Are Important Pieces Of Information In A Downtime Binder?

Answer: "d) All of the above"

a) Excel document of all vendor contact information and medication purchased
b) DSH number
c) Copies of state licenses
d) All of the above

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Is there anything else you think could be added?

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Inventory

• Copy of all inventory locations for automation

– Staff that knew the locations of medications helped speed up the pull

– Replenishment of the ADC's

– Packager

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Compliance

• Refrigerator Temperature monitoring

• IV room documentation of cleaning

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What Went Well With Our Plan?

• We had a Disaster Plan (just lacked specifics)
• Downtime Binder had been created by the buyers
• BCMA computers worked
• Files prepared to pull out for a downtime
• Staff pulled together and willing to work extra

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What Went Well With Our Plan? (*continued*)

• Enough staff had work related information on their personal phones (drug information resources, communication ability, etc.)

• Pharmacist, Physician & Nurse collaboration

• Centralized clinical pharmacists to clarify/verify orders

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What Went Well With Our Plan? (*continued*)

- Those with thorough knowledge of inventory locations ran carousels–helped to speed up workflow, instead of using the inventory spreadsheet to find meds
- Tube station
- Food & drinks–this is a must ☺
  - Who can help with this? The Buyer? Secretary?

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Gaps In Our Plan

1) An estimated 48-hour downtime ended up being 8 very long days
2) Did not think through creation of medication labels with printers being down, and the equipment needed to do this
3) Didn't have a standard MAR-documentation plan for med administration
4) Did not have a plan for communicating patient location/transfers

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Gaps In Our Plan (*continued*)

5) Did not have a strong plan for staffing stations–developed as we moved through
6) Did not have printed order sets
7) No ADS restocking plan–unknown what drugs are in ADS
8) Did not have an updated inventory location sheet

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Gaps In Our Plan (*continued*)

9) Difficult to get nurses or others, to give appropriate communication information on orders
10) Re-dispenses were plentiful

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Documentation

- How are you going to make labels?
  - PO drugs (taken orally) vs. IV (intravenous)
- Updating new orders on MARs and discontinuing orders during downtime
- Process/plan to enter orders as system comes back online

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Documentation (*continued*)

- Where do you want to backfill administration/charges
  - Process to match up patient account/MRN to patient administrations during downtime
  - Major 340B implications
    - Timing with buyers sending orders
  - Anesthesia workstation (AWS) medications
  - Infusion Centers

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Collaborate With IT

➢ What can be brought online and what cannot?

- ADS brought back online day ~3; not linked to EHR

- Carousel–no patient information, so should have been able to be brought back online

- IV Automation–able to use the safety pieces of the system and verification by pharmacists

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Collaborate With IT *(continued)*

➢ What can be brought online and what cannot?

- Robot–not brought back online until all systems cleared

- Access to files were not available for at least a month

➢ Prioritize automation with your IT department

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Other Collaboration Efforts

- Standard MAR was not created for hospital-wide use

- Providers "forgot" how to write an appropriate paper order

- Process for sending all faxed orders to pharmacy and documenting its completion

- Process to identify location of a patient to send meds

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Other Collaboration Efforts (*continued*)

- Systematic approach for pharmacist verification of medication orders, validating labs, typical day to day monitoring of anticoagulation protocols, renal dose adjustment protocols, IV to PO protocols, and pharmacy consults

- Communication with nursing staff for clarifications

- Make sure electronic drug information systems available

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Buyer-Specific Lessons Learned

- Update Downtime binder more often

- Could not access files, but could reach desktop
  - Have a printed copy of all vendor records

- Did not have purchasing forms for certain meds

- Laptops were necessary for buyers to place orders

- Does Hotspot work in your area?

- List of initial supplies to order and have more of (label paper, bins, etc.)

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Question: Is It Is *Not* Important For The Buyer To Be A Part Of The Disaster Plan Committee?

a) True

b) False

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Answer: Is It Is *Not* Important For The Buyer To Be A Part Of The Disaster Plan Committee?

Answer: "False"

The Silver Lining

- Staff stepped up
- True dedication to patient care
- Worked along staff never worked with before
- Unknown strengths showed through
- Teamwork like we had never seen before
- Collaboration
- Innovation, Adaptability, Nimbleness

Be Prepared!

- Between January 1st and July 31st, 2021, there were 2,084 reported ransomware compliants[1]

- Nebraska Medicine cyber attack lasted for 8 long & exhausting days; another hospital was 25 days of downtime

- Lingering effects of our downtime took months to correct with significant financial impact

1. Cybersecurity and Infrastructure Security Agency. Ransomware awareness for holidays and weekends. Available at: https://us-cert.cisa.gov/ncas/alerts/aa21-243a.
Accessed April 21, 2022.

Never say "That won't happen to me". Life has a funny way of proving us wrong.