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Summer Institute in Nursing Informatics

Code Yellow: Mission Continuity for Technology Interruptions

Wednesday, July 18, 2018

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Mission Continuity: All year long

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Policies and procedures in place to plan for temporary interruption of organization's normal operations, its core programs and services. Staff and providers are trained in these policies, procedures & related tools.

GOAL

Develop a **sustainable, enterprise-wide program** to uphold core missions and to resume programs and systems that may be impacted or threatened during a crisis in as timely a manner as possible.

Extends *beyond* crisis management planning… includes disaster recovery and business continuity - processes/functions & management decisions,

Continuity plans inform decision-making and ensure that Johns Hopkins is prepared for interruptions in mission critical services.

Adapted from University of Pennsylvania Mission Continuity: http://www.upenn.edu/missioncontinuity/

Go to mentimeter.com - Enter code 865248

Vote on your phone: Question 1

Responses: Q1 Responses

HOW PREPARED ARE YOU?

Code Yellow: Today's Topics

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1. Introduction
2. Resilience & Safety
3. Risks
   - Critical systems, long term outages, resources
4. Phases of emergency preparedness
5. Take it home!

Advancing Resilience… Ensuring Safety

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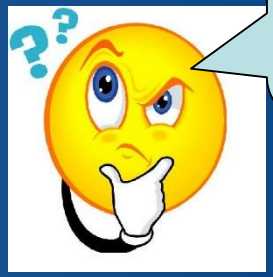
- High Reliability Organizations
- Interruptions increase likelihood of errors
  - 13,025 interruptions experienced by medical and surgical nurses (36 units, 9 hospitals): 90% of interruption-related errors resulted in *delays of treatment or loss of concentration or focus*
- Impact
  - Lab specimen collection & results
  - Medication Administration
  - Delays in care
  - Stress: Clinicians & Lab techs



"*Why* do we have to have a 4 hour downtime?"

McGillis Hall LM, Ferguson-Paré M, Peter E, et al. *Going blank: factors contributing to interruptions to nurses' work and related outcomes.* J Nurs Manag. 2010;18:1040-1047

Categories of Downtime Incidents

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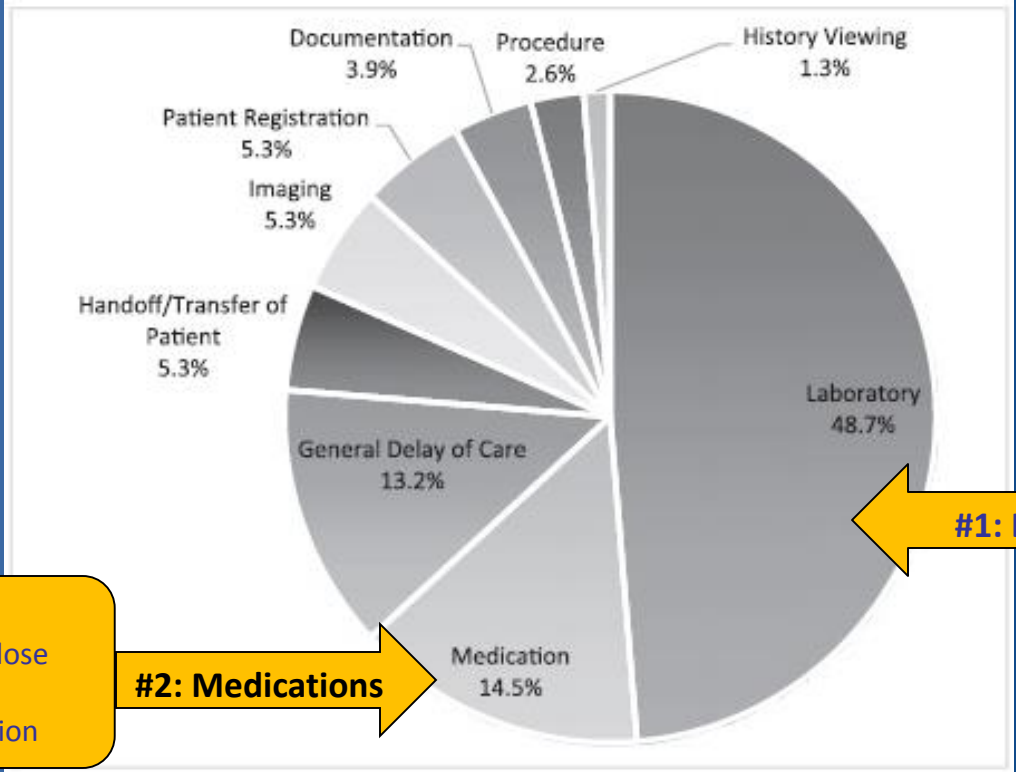

Figure 1. Downtime Incident Category Breakdown ($n = 79$).

#1: Lab

- Specimen Labeling & Tracking
- Patient identification

#2: Medications

- Delays
- Wrong dose
- Wrong medication

Ethan Larsen &Raj M Ratwani (2018). *Implications of electronic health record downtime: An analysis of patient safety event reports JAMIA*, 25:2, 187–191, https://doi.org/10.1093/jamia/ocx057

Cyber Risk Assessment Framework

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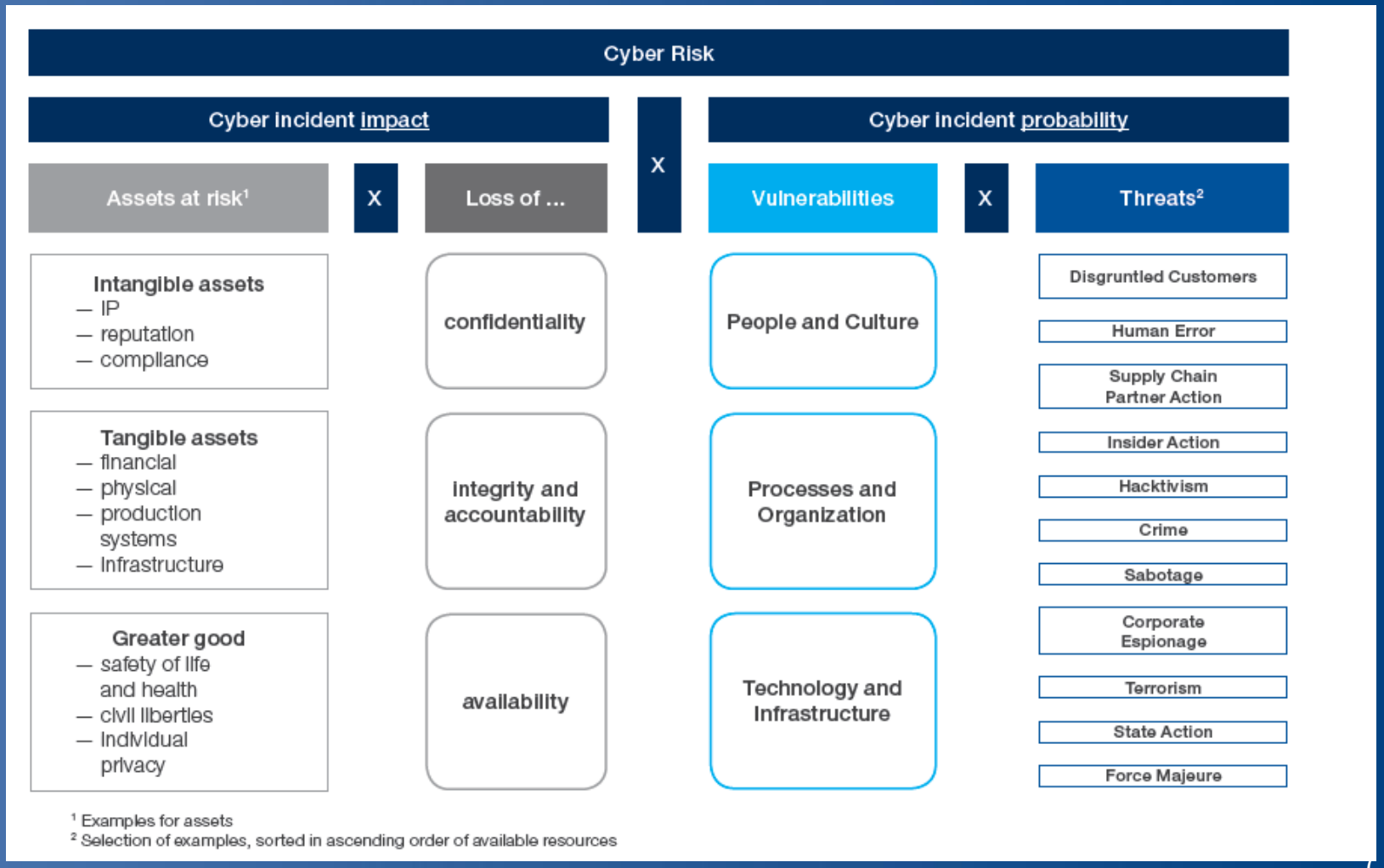

Advancing Cyber Resilience: Principles & Tools for Boards, World Economic Forum with Boston Consulting Group & Hewlett Packard Enterprise, January 2017

FEMA*
5 Phases of Emergency Preparedness

*Federal Emergency Management Agency

Prevent, Mitigate, Prepare…

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HROs…
Learning,
Commitment,
Understand complexity,
Preoccupation with failure,
Deference to front line staff

Prevention & Mitigation

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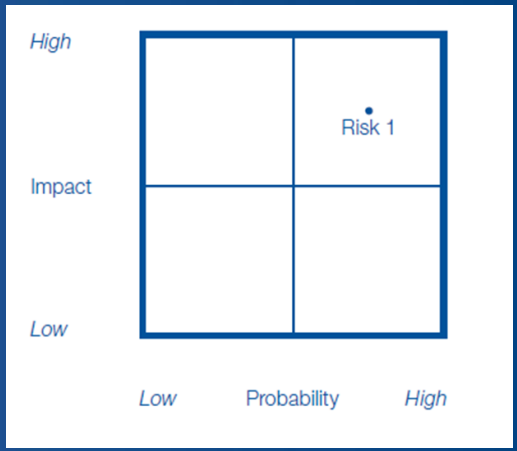
- Prevention
  - Risk Assessment
  - Cyber hygiene
  - Maintenance updates
    - Planned downtimes
- Mitigation
  - Technical Infrastructure
    - Redundant systems
  - Governance Infrastructure
  - Business Continuity Plans – BIA
    - Services we can & cannot provide by outage length



Enterprise Structure for EMR Downtime Readiness & Risk Mitigation

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- BCA Steering Committee & Task Forces
  - Reports
  - Forms
  - Interfaced systems
  - Training
  - Technical
  - Communication
  - Recovery
- Accountability
  - Safety & Quality Leadership

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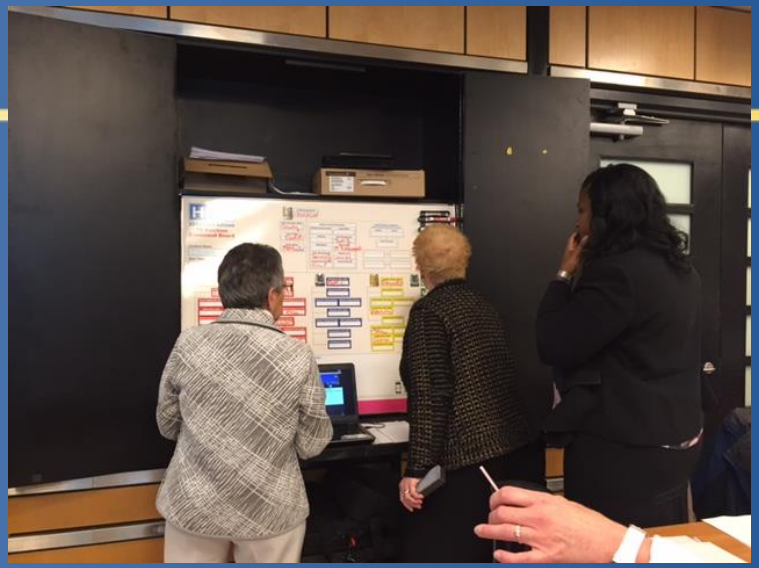

Practice til you can't get it wrong…

PREPAREDNESS

Readiness: Are we there yet?

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- Organizational priority
- Infrastructure in place
- Policies including R & Rs
- Communication plans
- Training/competency

- Tools, forms, back up technology
- Meaningful, accessible C & O reports
- BCP plans readable, quick reference
- Know interdepartmental dependencies
- Recovery plan for back entry including R & Rs, plan for additional resources

Practice Exercises

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- Hardwiring downtime skills
  - Nearly *half* of patient safety event reports analyzed indicated downtime procedures either were *not followed or were not in place*
    - Increase confidence & team building
    - Create or recreate realistic scenarios
      - » Power outage
      - » Network disruption
      - » Interface engine down
      - » No internet access
      - » Wireless outage

Preparedness Partners

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Emergency Planners (OEM)

Executives & Marketing

CEPAR

Clinical & Operations Leads

IT & Clinical Informatics

Lessons Learned

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- Providers: Just-in-time training
- Communication
  - Tools during network & internet outage
- Command center infrastructure
- Advance decision-making
- Recovery: Extended outage
  - Resources needed
  - Sequencing & Coordination

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Implement Plans

RESPONSE

Situational Awareness

- Determining scope & impact
  - Incoming
    - Help Desk
    - Clinical Informatics or IT
    - Staffing office, units, clinics, lab, imaging

- Communicate status & plan
  - Outgoing (network vs. non-network dependent)
    - Screen message (i.e., Alertus, NetPresenter)
    - Page
    - Email
    - Non-network dependent (i.e., RAVE, Voxer)

Bidirectional Communication: PTA™ (Pause to Assess)

- When: Multiple users/multiple departments
- Determine
  - Time Zero
  - Scope & Impact
  - Need for Incident Command
- Notify: PTA and/or P1 Processes
  - We have a problem
    - Standard: Within 15 minutes
  - Provide regular updates

Situational Awareness, PTA & Communication Process

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1. Assess Scope: Incoming & Outgoing contacts

2. Notify PTA Group: Initiate RAVE or PING group

3. PTA: Present Condition, Downtime/Outage Situation level, Communication Plan

4. Communicate: To leadership & affected users, Help Desks, P1 call

5. Provide regular updates & resolution notification

PTA (Pause-to-Assess) Group

updated 4/26/2018

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Use paging or RAVE & Phone to initiate PTA Group – they will call into conf line 1-888-333-4444 (Host & participant codes); IT Manager will call Technical Priority conf line

JHB PTA Group Members (10/14/16)
IS Manager on Call (MOC)
Clinical Informatics/Application Team Lead
LAN (Network) on call
Provider Lead – “Triple 0-9” Provider”
PCC- Staffing Office
Pharmacy Manager on Call
Lab
Imaging/Radiology
AOC (Administrator on call)→ Notifies ED & Registration
Support Services/Supply Chain
Emergency Preparedness Lead (for Level 1, 2, 3 outages)
Operating Room Charge Nurse
Ambulatory Lead
ED Registration
Communications (M&C)

Downtime/Outage Matrix: DT Level & Communication Plan

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Downtime Level	Situation	Next Steps
Level 4	Isolated Ancillary system or that system's interface not functioning, such as Pyxis SafeTrace Soft Telemetry PACS Obix Cardiology CBORD Par Excellence	• Continue documentation in EHR • Communicate information to end-users (via Alertus) with specific instructions per system (ex., call pharmacy for STAT meds, lab results will be faxed/tubed/called, etc.) • Notify Help Desk
Level 3	Epic not available (Includes Citrix issues where users who are already in the system can continue, but users not in system cannot login) Epic interfaces not available (also Level 3?)	• Initiate EHR Downtime (Lab, Pharma, Rad, Registration) • Communicate via Alertus (include Pyxis Override) • Notify AOC • Notify Help Desk • Consider Command Center activation

Level 2	Network Outage
	(including, Epic not available)
	
	Paging may not be available
		• Initiate Network Downtime
		• Communicate via
		  • Overhead system (Code Paper: Level 3)
		  • Phone calls to PCC, Charge nurses
		  • Physical rounding
		• Notify AOC
		• Notify Help Desk
		• Activate Command Center

Level 1 - Catastrophic	Network Outage + interruption of physical/environmental structure
	• Tube system
	• Landline phones
	• Spectralink phones
		• Initiate Network Downtime
		• Communicate via
		  • Overhead system (Code Paper: Level 4)
		  • Phone calls to PCC, Charge nurses
		  • Physical rounding
		  • Walkie-talkies
		• Notify AOC
		• Notify Help Desk
		• Activate Command Center

Adapted from framework by Theresa Caruso, JH@IT, 2016.

Business Continuity "Downtime" Plans

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- Written plan for each department
  - 1-2 pages max
- Teach departments about cross-departmental plans
  - Lab, imaging, pharmacy, supplies
- Clearly marked
  - Where plans are kept
  - How to access

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Samples of Business Continuity Plans

LAB SPECIMEN LIFECYCLE & PATIENT IDENTIFICATION DURING OUTAGES

Sample Downtime: Lab

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Downtime Laboratory Orders & Specimens

- Use downtime labels to label specimens. There should be a pre-printed supply on the unit.
- Send downtime paper requisitions for STAT labs. Do NOT use any other requisition except those printed from the Intranet (there are NO colored forms). There should be a pre-printed supply on the unit.
  - Lab General requisition
  - Arterial Blood Gas requisition
- Fill out requisition completely with 2 patient identifiers, patient name, requesting provider, ordering location, tests requested, collection date and time, collector's initials/JHED.
- Results will be faxed to the location specified on the requisition. No fax number on the requisition, no results will be faxed.

Downtime Blood Administration

- Call the Blood Bank for blood product orders
- Print and complete the Blood Bank Authorization pick up form to obtain prepared products.
- Record product transfusion documentation on the paper attached to the unit. Save this paper for data entry when the system is back up.

Downtime Surgical Pathology and Cytology

- Use downtime labels to label specimens. There should be a pre-printed supply on unit.
- Send downtime paper requisitions for Surgical Pathology or Cytology specimens. Do NOT use any other requisition except those printed from the Intranet (there are NO colored forms). There should be a pre-printed supply on the unit.
  - Surgical Pathology requisition
  - Cytology requisition
- Fill out requisition completely with 2 patient identifiers, patient name, requesting provider, ordering location, site and type of specimen, collection date and time, collector's initials/JHED.

Sample Downtime Plan: Patient ID

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Infant Identification Procedure during Downtime (Downtime-BCA)

L&D, Newborn Nursery, Neonatal Intensive Care

August 2017

A. Policy

1. Assure proper identification of infants admitted to the Newborn Nursery and the Neonatal Intensive Care Units from Labor and Delivery (L&D) during an electronic system downtime, or in the event that an infant is born outside L&D where birth identification bands are not readily accessible.

B. Procedure

1. During Downtime
   a. Infant and Mother will be identified with a set of handwritten birth identification bands that have matching preprinted numbers.
   b. The Infant's birth ID band will have the Infant's name (sex-mother's name, ex. BB Smith, Jane), Date and Time of Infant's birth, and the infant's unique Epic Medical Record number, not the mother's Epic Medical Record number.
   c. The Mother's birth ID band will include the Infant's name (sex-mother's name, ex. BB Smith, Jane), Date and Time of Infant's Birth, no Epic Medical Record number.
   d. The Companion's birth ID band will include the Infant's name (sex-mother's name, ex. BB Smith, Jane), and Date and Time of Infant's Birth.

2. **Post Downtime/Recovery**
   a. NICU/Newborn
      i. The handwritten birth ID bands will be replaced once the Epic Identification bands are printed.
      ii. The nurse will attach the handwritten birth ID bands on form # 04-751-0005 once they are removed.
      iii. Place completed form # 04-751-005 in the permanent medical record in the legal section.
   b. Application of Epic identification bands
      i. Verify infant's identification in the mother's presence, if she is still hospitalized.
      ii. If the mother is not present at the time new identification bands are placed on the infant, the nurse will place the companion bands in a designated secure location until the bands can be placed on the mother and/or father/significant other (Newborn Nursery only).

Downtime “BCA” Workstations

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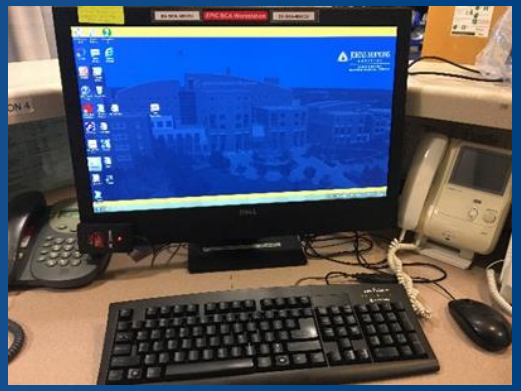
- Locally mapped workstations & printers
- Provide census, other critical clinical & operational reports for all areas
- Refresh data at regular intervals
- Balance patient information needs vs. overloading printers & servers, ease of searching for critical information
- Require vigilant monitoring & testing



*BCA = Business Continuity Access

Downtime "BCA" Workstations

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Business Continuity Access (BCA)

EPIC PLANNED OR UNPLANNED DOWNTIME:

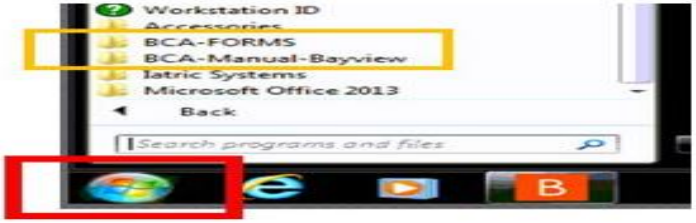
1) Go to and click on the BCA Printing-2017 ICON on the desktop
2) Enter password "DT:R3ports"
3) Select the reports that need to be printed; hold down the CTRL button while selecting multiple reports
4) Click on the "Print" button and make sure the printer name is "EPIC BCA PRINTER"

NETWORK OUTAGE:

1) When trying to log in during a network outage, select "Cancel" at the ESSO log in screen
2) Follow instructions above for an EPIC planned or unplanned downtime.

3) Other features that are available only on the BCA PC during a network outage
   - The entire HPO policy library

   - In the Start Menu go to BCA Forms for updated downtime forms
   - In the Start Menu go to BCA Manual for detailed downtime instructions



Response Phase: Challenges

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- Volume of forms, current version
  - Burden of ensuring that content of forms matches content of EMR for back-entry purposes
- Ensuring that BCA workstations work!
- Ensuring users understand to use downtime forms when told to…
  - Even if they think “EMR will be back up soon”
  - Longer outages lead to care delays & user frustration when they don’t use paper for timely documentation
  - Avoid “half in/half out”
- Just-in-time training tips/guides

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People, Process, Technology

RECOVERY

Opportunity: Revenue Cycle

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- In prior BCP exercises, hospital billing (HB) identified as opportunity
  - Inconsistent or undocumented processes
  - Roles & responsibilities unclear
  - Lack of accountability for users to document & back enter HB dependencies

Discovery

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- Determine *who, what, when and how* of billing downtime & recovery processes
  - Document charge capture process
  - Document accurate patient movement & level of service
  - Determine recovery dependencies & sequencing
  - Resource planning (staff & equipment)
- 10-question survey 17 departments
  - Assess Current state

Discovery, continued

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- 75% (13) responded
- Findings
  - All respondents knew documentation required to capture charges during Recovery
  - Most listed a limited number of employees with access to manually perform charge entry
  - EMR assigned roles limit who can enter certain data by role (RN cannot enter MD charges)
  - Need to secure resources dedicated to back data for specified length of time: Roles, Space, Budget

SURVEY QUESTIONS

- What documentation is required to capture hospital patient service charges during outage?
- What is required in Epic for charges to generate via charge calculator during downtime recovery?
- Are you working with departmental counterpart at other JHM entities for downtime recovery processes?

Recovery Deep Dive

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Recovery Challenges
Next Steps

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- Challenge: Resources to back enter data for outage >8 hours: People, Space, Tools/Workstations, Budget
- Development of downtime resources by role
  - Master matrices of work to be done, roles & responsibilities
    - Patient Movement
    - Routine nurse & provider documentation
  - Dependencies & sequencing
    - Understand *cross-departmental dependencies*
- Estimate recovery resources needs for extended downtime & plan accordingly
- Communicate & train harmonized processes

Why Resilience and Preparedness?

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- Best Practice: SAFER Guides

2	EHR downtime and reactivation policies and procedures are complete, available, and reviewed regularly.	Worksheet 2	○	○	○ reset

- Safety: Care for patients during outages
- Engagement: Provide tools & training
- Regulatory: Joint Commission, CMS

BRING IT HOME!

Go to mentimeter.com - Enter code 865248

VOTE on your phone: Question 2

RESPONSES: Q2 Responses

IDENTIFY 2 ACTION ITEMS YOU WILL TAKE BACK TO IMPROVE PREPAREDNESS?

QUESTIONS… DISCUSSION…

Cartoon courtesy of Agenci Ltd, 2012

Advancing Resilience

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"Beyond individual organizations, cyber risk is a systemic challenge and cyber resilience a public good. Every organization acts as a steward of information they manage on behalf of others. And every organization contributes to the resilience of not just their immediate customers, partners and suppliers but also the overall shared digital environment."

- Rick Samans, Presentation to ***World Economic Forum in Davos, January 2017***

References

1. *SAFER Guides* The Office of the National Coordinator of Health Information Technology has recognized the risks associated with downtime and has sponsored development of the Safety Assurance Factors for EHR Resilience (SAFER) guides, which provide high-level guidance and recommend that downtime procedures be put in place and practiced. https://www.healthit.gov/topic/safety/safer-guides

2. Ethan Larsen &Raj M Ratwani. *Implications of electronic health record downtime: an analysis of patient safety event reports,*, *Journal of the American Medical Informatics Association*, Volume 25, Issue 2, February 2018, pp. 187–191, https://doi.org/10.1093/jamia/ocx057

3. McGillis Hall LM, Ferguson-Paré M, Peter E, et al. *Going blank: factors contributing to interruptions to nurses' work and related outcomes*. J Nurs Manag. 2010;18:1040-1047. https://www.ncbi.nlm.nih.gov/pubmed/21073575

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Summer Institute in Nursing Informatics

Code Yellow: Mission Continuity for Technology Interruptions

Thank you to the JHM BCA Steering Committee, Deb Sherman, Pat Zeller, Task Force Leads & participants, JHBMC BCP Steering Committee & JHHS Department of Emergency Management

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