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Cybersecurity and Hospital Infection Control: Overlaps and Opportunities

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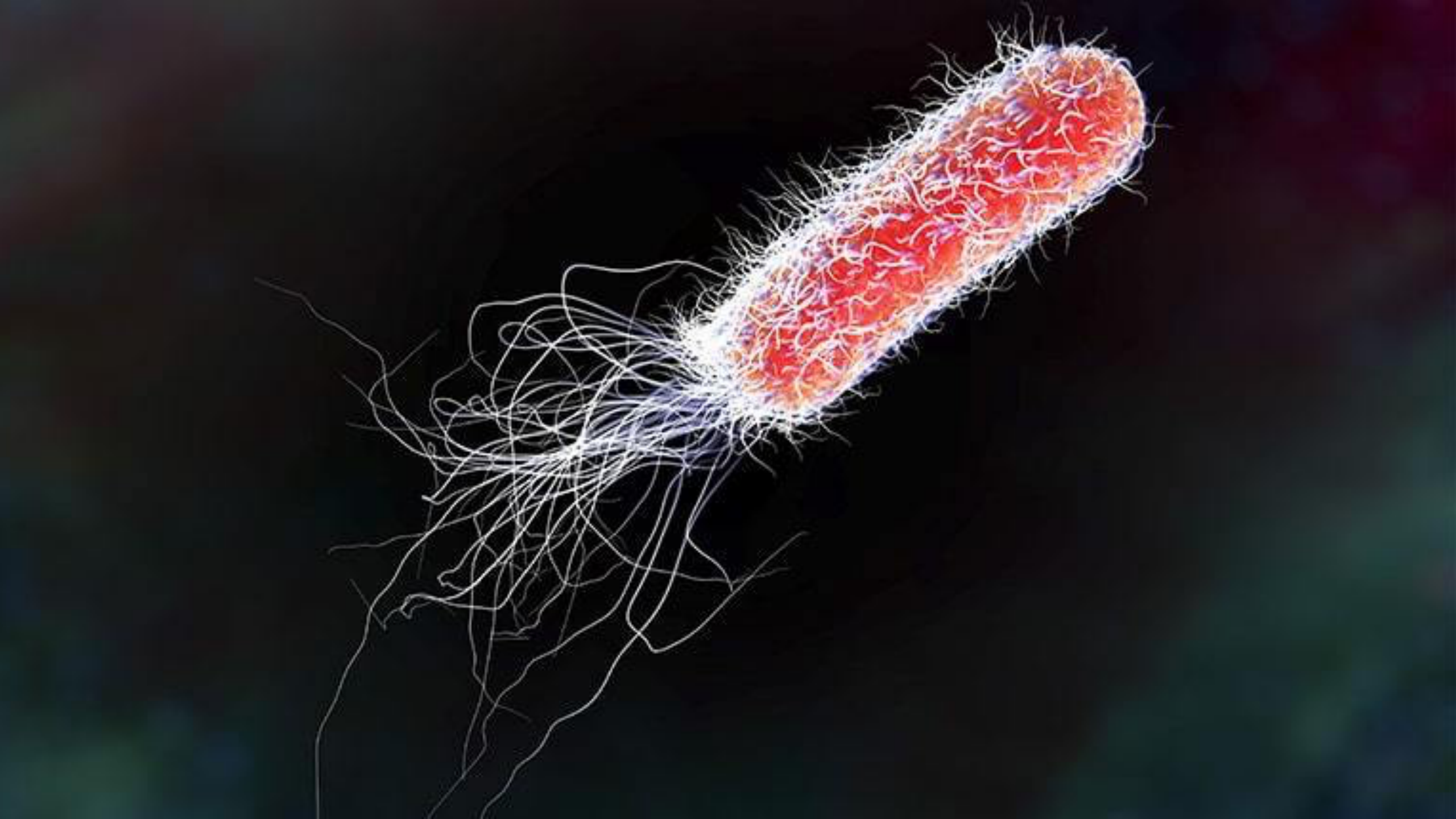
Cybersecurity and Hospital Infection Control



Hospital Infection Control

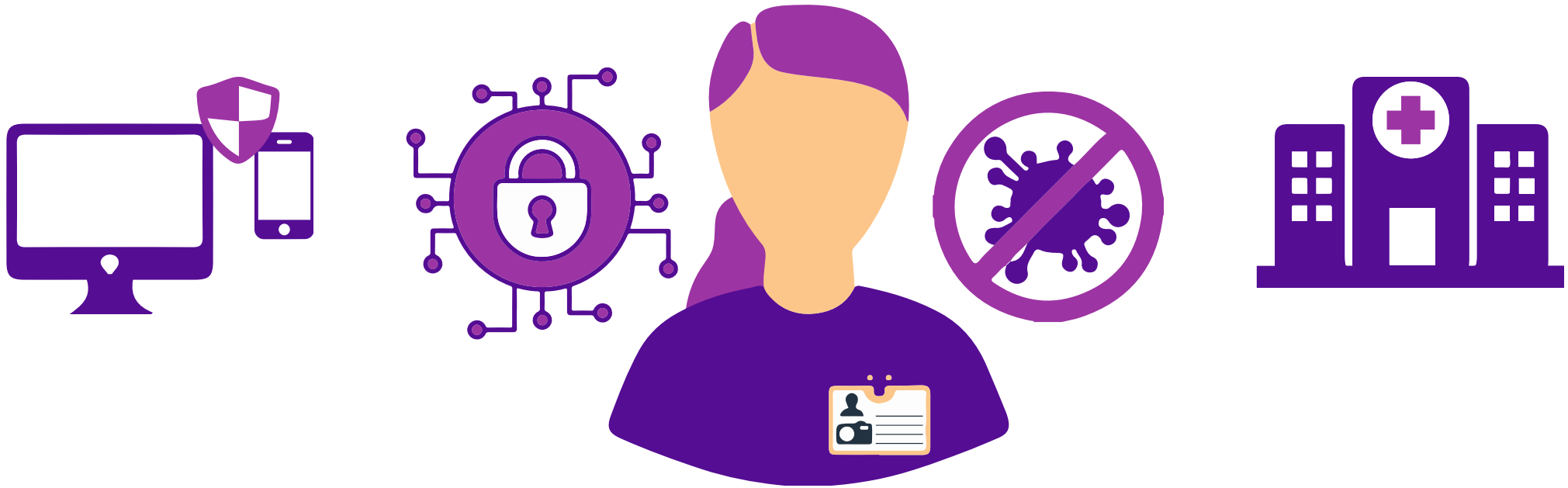
- **Infection prevention** and **control** (IPC)
  - is a scientific approach and practical solution designed to prevent harm caused by **infection** to **patients** and **health workers**. It is grounded in **infectious** diseases, epidemiology, social science and health system strengthening.

Hospital Infection Control

- **Infection Control Specialists**
  - work to prevent disease outbreaks from becoming **epidemics**
  - focus on **preventative actions** (encouraging good hygiene, preparing for an outbreak, etc.)
  - and **respond** to outbreaks in progress

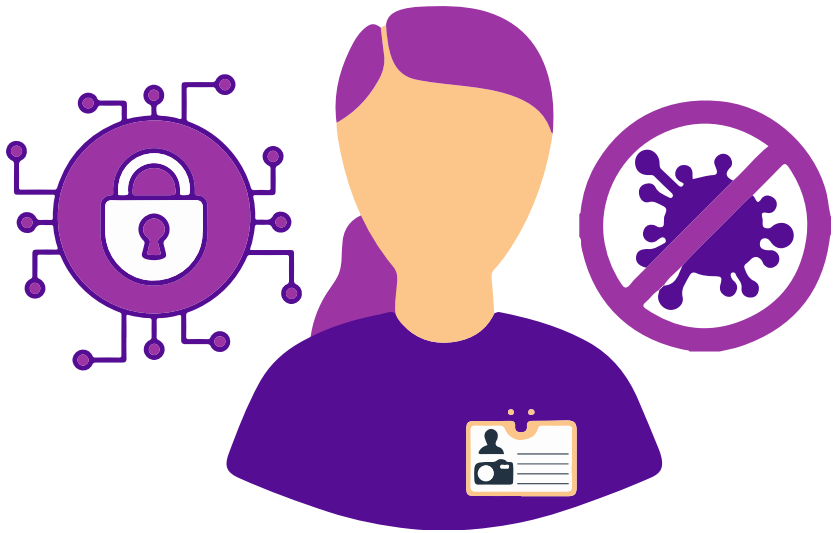
The Overlap

*Cyber security professionals and hospital infection control practitioners perform **similar roles** in very different environments…*



The Overlap

Cyber security professionals and hospital infection control practitioners perform ***similar roles:***



- **Phases**: Prevention, Detection, Response
- **Penalties**: regulatory, financial, public perception/reputation
- **Surveillance** system design
- Infrastructure to aid **prevention**
- **Behaviors** of individuals/end-users
- **Agility** needed to keep atop threats
- **Global** scale

The Big Differences

- **Expected Impact:**
  - **Healthcare**: Loss of life/health is possible or probable
  - **Cybersecurity**: Financial/reputational damage is most probable
- **Types of Threats:**
  - **Healthcare**: All threats are self-spreading, infectious diseases
  - **Cybersecurity**: Only a subset of computer viruses are “worms”

A Brief History of Infection Control

- Wait and see
- Witch burning/folk remedies
- Quarantine
- Individual treatment
- Immunization
- Preventative treatment
- Individualized/genetics-based treatment

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What's the Problem?

- Anyone admitted to a hospital has a **5%** chance of contracting an HAI.
- The hospital length of stay increases by **17.6 days** when patients get an HAI.
- Nearly **99,000 people** die in the United States annually from HAIs; this is more than breast cancer and prostate cancer combined.
- Around **9.4%** of inpatient costs are HAI-related.
- HAIs cost the healthcare system around **$35 billion** per year.
- HAIs account for **$1,100** per patient admission.

The Scope of the Cyber Threat

- Today, **1 in 13 web requests** lead to malware (Up 3% from 2016). (Symantec)

- Malware and web-based attacks are the two most costly attack types — companies spent an average of US **$2.4 million** in defense. (Accenture)

The Scope of the Cyber Threat

- **69%** of organizations don't believe the threats they're seeing can be blocked by their anti-virus software. (Ponemon Institute's 2017 Cost of Data Breach Study)
- By **2020**, we expect IT analysts covering cybersecurity will be predicting five-year spending forecasts (to 2025) at well over **$1 trillion**. (Cybersecurity Ventures)

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Case Study

WannaCry VS. Ebola

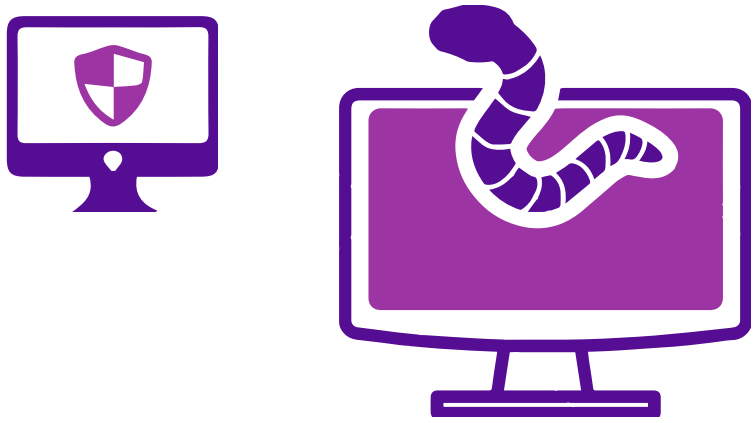
2017-Present

2014 – 2016 outbreak

Case Study: WannaCry vs. Ebola

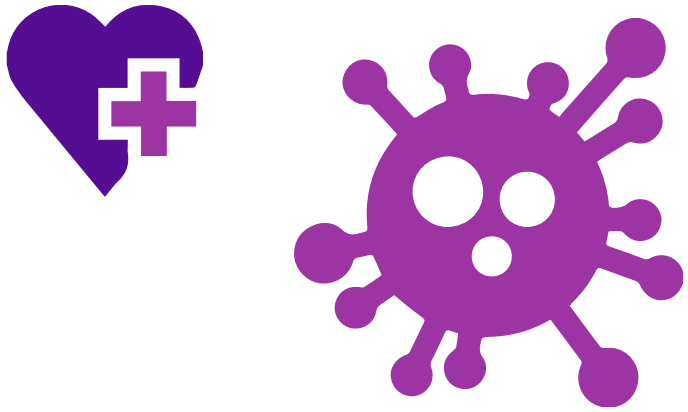
WannaCry 2017-Present

- Organizations poorly prepared to deal with worm using NSA exploits
- Discovery of a “kill switch” enabled propagation to be controlled



Ebola, 2014 – 2016 outbreak

- Long period to identify Ebola in an unexpected location
- Poor public health infrastructure and resources to control propagation



Case Study: WannaCry vs. Ebola

WannaCry 2017-Present

- Traditional cybersecurity policies and procedures harmful to managing the outbreak
- Use of outdated technology helped enable the worm to propagate
- Current device patching methodologies need a redesign

Ebola, 2014 – 2016 outbreak

- US Healthcare system inadequately trained/prepared (e.g., Dallas)
- CDC with delayed and perpetually updated guidance
- Personal protective equipment challenging and needs redesign

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Case Study

Business Email Compromise

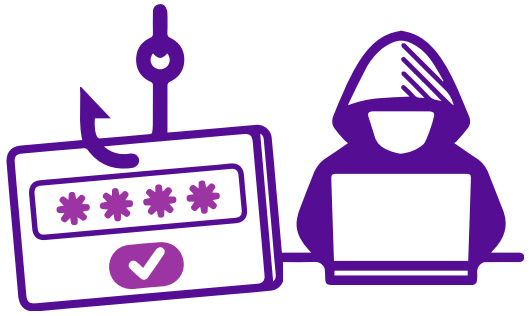
VS.

Typhoid Mary

Case Study: BEC vs. Typhoid Mary

Business Email Compromise

- Targets employees in positions of power or influence
- Victims commonly believe that it couldn't/didn't happen to them
- Often, BEC attacks are aimed at compromising other targets using the victim's trusted account



Typhoid Mary

- Worked as a chef, which enabled spread of the bacteria
- Mary Mallon never believed that she was a typhoid carrier
- Mary Mallon was an asymptomatic carrier and exhibited no symptoms

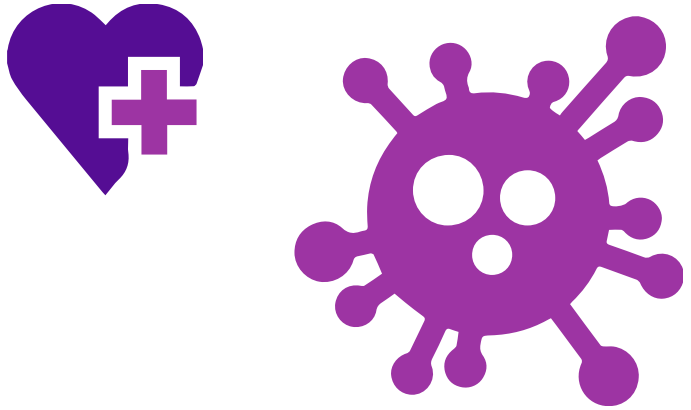
Case Study: BEC vs. Typhoid Mary

Business Email Compromise

- User's poor email security habits lead to compromise
- Users often return to old habits after a breach

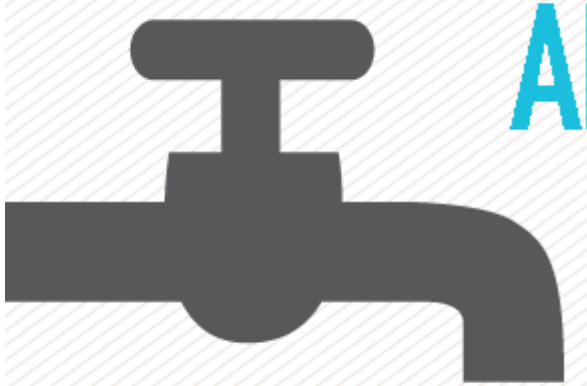
Typhoid Mary

- Failure to wash hands increases the probability of typhoid infection
- Mallon took a position as a cook under a false name after promising not to



AMERICANS' HAND HYGIENE HABITS

A majority of Americans are getting caught dirty-handed when it comes to their handwashing habits. A survey by SCA, a global hygiene company, uncovered that consumers understand the importance of hand hygiene but their practices may be grossly exaggerated.



On average, you come in contact with 300 surfaces every 30 minutes, exposing you to 840,000 germs*

71% say they practice good hand hygiene and wash their hands regularly

yet...

58% have witnessed others leaving a public restroom without washing their hands

- **20%** witnessed restaurant employees
- **35%** witnessed co-workers
- **33%** witnessed friends

MORE THAN HALF do not wash their hands after riding public transportation, after using shared exercise equipment, or handling money

39% do not wash their hands after sneezing, coughing or after blowing their nose

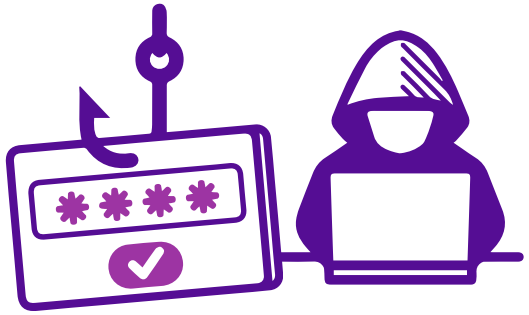
*According to 2011 Tork® Report

On behalf of SCA, KRC Research conducted 1,000 online interviews among a nationally representative sample of adults in the U.S. from October 4 to October 7, 2012.

SCA c/o Life

The State of Cyber Hygiene

- **90%** of cyber breach claims were caused by human error[1]



- **91%** of successful cyberattacks start with a spear phishing email[2]

[1] *Decode the Human Threat* Willis Towers Watson

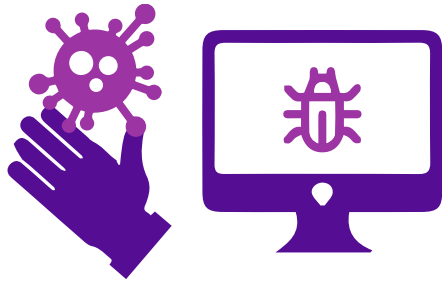
[2] *2016 Enterprise Phishing Susceptibility and Resiliency Report* PhishMe

The State of Cyber Hygiene

- In 2017, spear-phishing emails were the most widely used infection vector, employed by **71%** of those groups that staged cyber attacks. (Symantec)

- **65%** of companies have over **500 users** who are never prompted to change their **passwords**. (Varonis)

Takeaways



- Both the medical and cybersecurity fields have issues arising from poor user hygiene

- The lack of global epidemics means they're doing something right

- What can we apply from hospital infection control to our field?

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How Do We Solve It?

How is Physical Hygiene Promoted?

- Gentle reminders (signs, etc.)

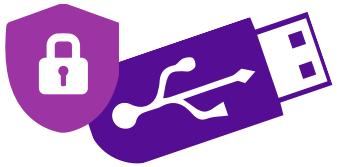
- Proactive gestures (providing hand sanitizer, wipes, etc.)

- Regular checkups

- Incentives for preventions (health awareness programs, etc.)

How Can We Improve Cyber Hygiene?

- Gentle reminders (signs, etc.)

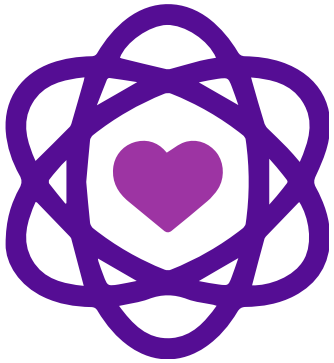


- Proactive gestures (providing free USB drives, AV subscriptions, etc.)

- Regular checkups

- Incentives for preventions (cyber health awareness programs, etc.)

Effective Cybersecurity Training



Has to be **relatable**

Has to account for **culture**

Has to be **human** centric not policy centric

Apply What You Have Learned Today

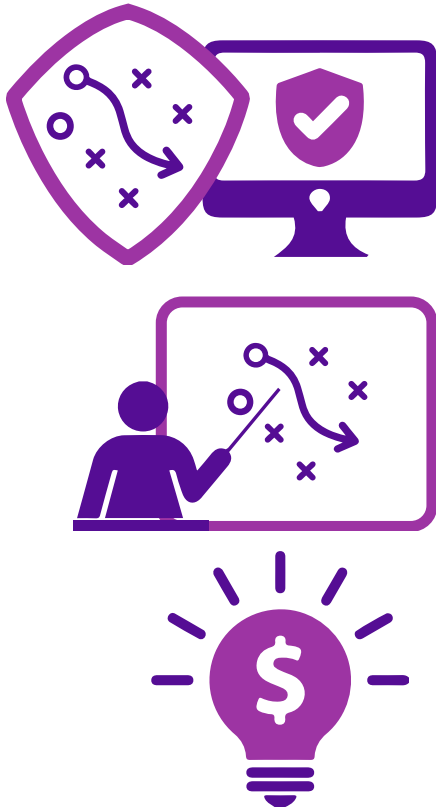
Next week you should:

- Evaluate how your organization is promoting good cyber hygiene
- Identify aspects of your organization's cybersecurity strategy where behavior change is necessary but difficult

Apply What You Have Learned Today

In the **first three months** following this presentation you should:

- Create user stories mapping good cybersecurity hygiene to good personal hygiene
- Develop a strategy for building training focused on behavioral change
- Identify and produce low-cost, high-impact cyber hygiene aids



Apply What You Have Learned Today

Within **six months** you should:

- Build cyber-awareness training modules designed to drive behavior change through making risks and best practices relatable to users

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Questions?