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Behavioral eManipulation



Technical Exploit

+

Human Behavior

Harm



Who Am 1?













Context

Attack Anatomies

Remedies



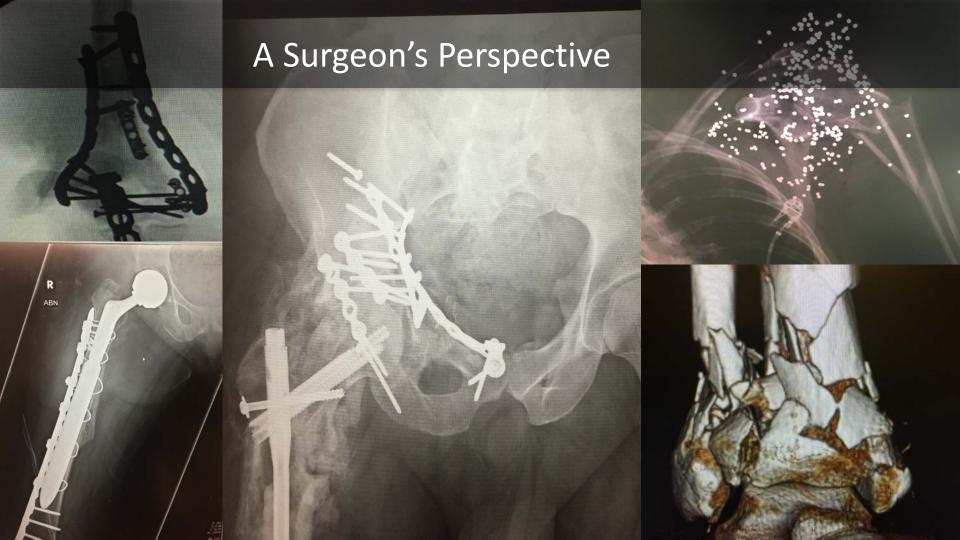


Context

Attack Anatomies

Remedies



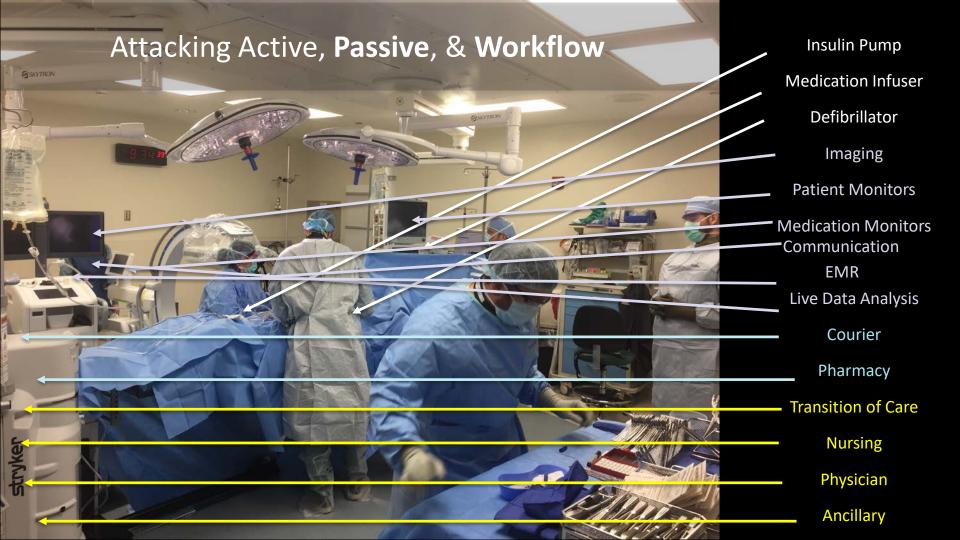




Insulin Pump

Medication Infuser

Defibrillator







Context

Attack Anatomies

Remedies







Hacking Hospitals

24 months, 12 healthcare facilities, 2 healthcare data facilities, 2 healthcare technology platforms, and 2 active medical devices

ONE Blueprint to secure healthcare assets



VIEW REPORT

Months

12 Hospitals

Many Medical Devices, EHR

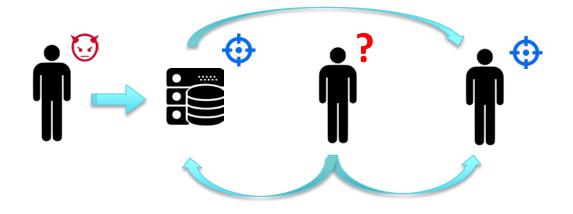
securityevaluators.com/hospitalhack

Digital attacks = patient harm?



Behavioral eManipulation: Attack Flow







Behavioral eManipulation: Methodology



- 1. Understand the care **workflow**
- 2. Manipulate <u>data</u>
- 3. Rely on *humans* to unwittingly deliver harm











Diagnostic Attack Scenarios





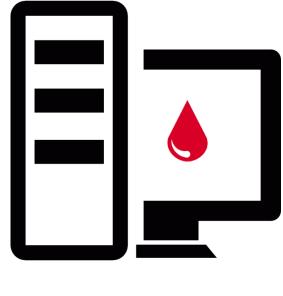


Data Interpretation



Examples: Attacking System of Safety Checks







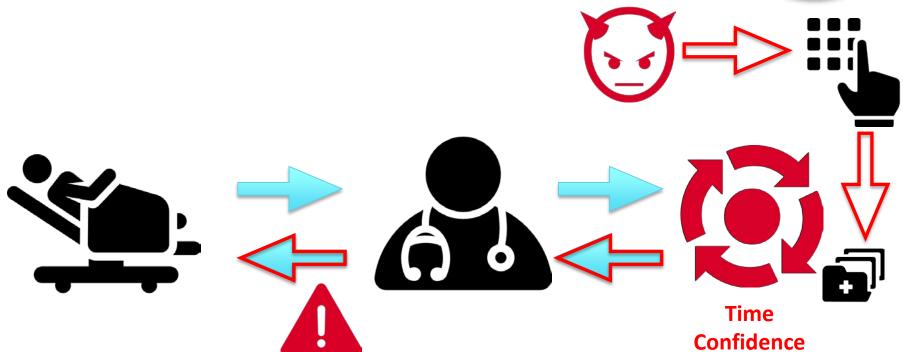


Allergies



Attacking System of Safety Checks

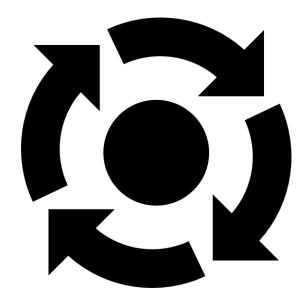




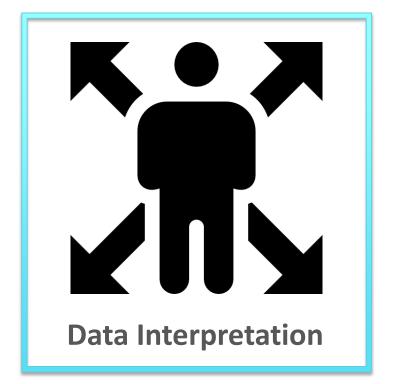


Diagnostic Attack Scenarios





System of Safety Checks





Examples: Attacking Data Interpretation





Monitoring

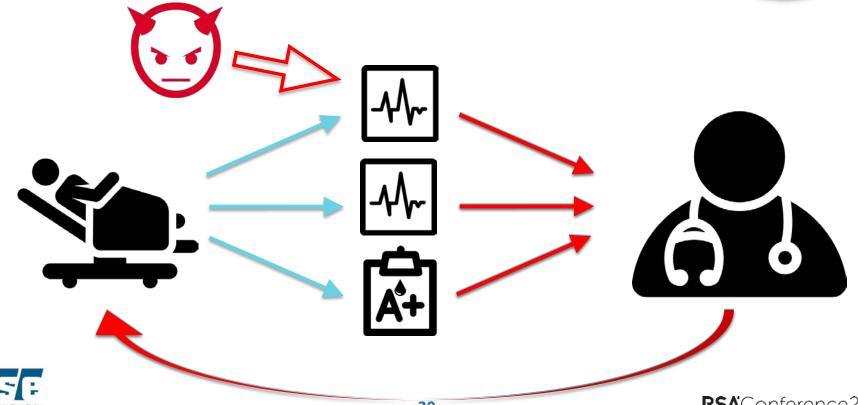


Labs



Attacking Data Interpretation





Fearmongering? 1) Who would even want to do this? 2) Why?

Patient Health v. Patient Data





HARM FEAR DISRUPTION/WARFARE



PROFIT





Context

Attack Anatomies

Remedies



Areas For Improvement



010101 010 11

Secure Devices



Train Medical Professionals



Think Like An Attacker Thinks









RS/Conference2018

Threat Model

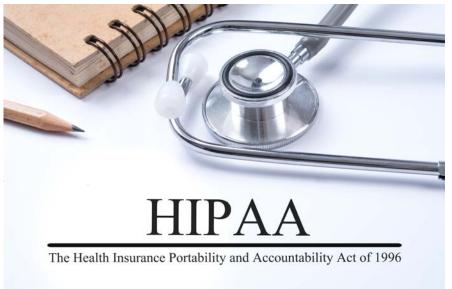






Recognize Role of Compliance









Apply



Solution lies primarily with **Device Manufacturers**

- Design & Implement Threat Model
- Design & Implement Trust Model
- Partner with security experts
 - Perform Security Assessments
 - Think like Attacker
 - Build security into **Design**







