medigram

Saving Lives Through Mobile, Contextual Information

medigram

Mobile ≠ Desktop

August 4, 2017
(ISC)2 East Bay Summer Conference
Cyber Health, Privacy, and Automation
Track 6: Sherri Douville, CEO Medigram

Industry 4.0 Health IT Leader
Unlock the Mobile & IoT Gold Rush

medigram

How I Got Here Today

Interests:

- Lifelong interest in healthcare
- Mobile computing & mobile security
- Biophysics, R coding/#3 Big Data/IoT certificates
- Video, mobile games childhood hobby
- 10+ Yrs. regulated clinical sales with J&J, #12 disease states/service lines
- Strategic business advisor
- NorCal HIMSS Board: Innovation Conference 2017 co-chair & board nominating committee
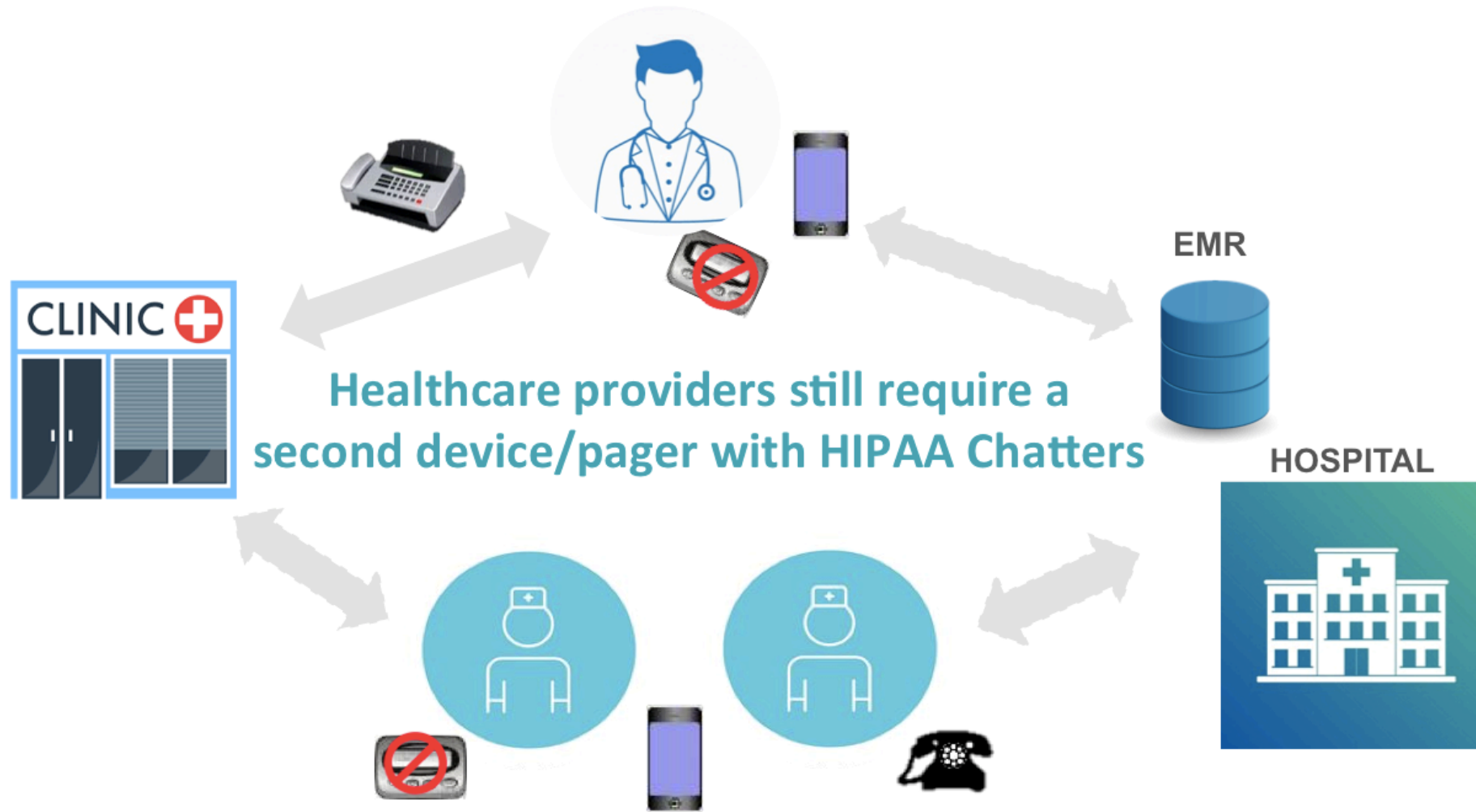
medigram

Agenda:

Mobile Computing, Hospital Challenges, & Mobile Security

- IoT is exciting, more work to do
- Mobile challenges in hospitals
- Mobile security complexity
- How to Talk to Physician executives
- How to Engage Your Board

Trust

medigram

Care Teams Scramble to Track and Report

Healthcare providers still require a second device/pager with HIPAA Chatters
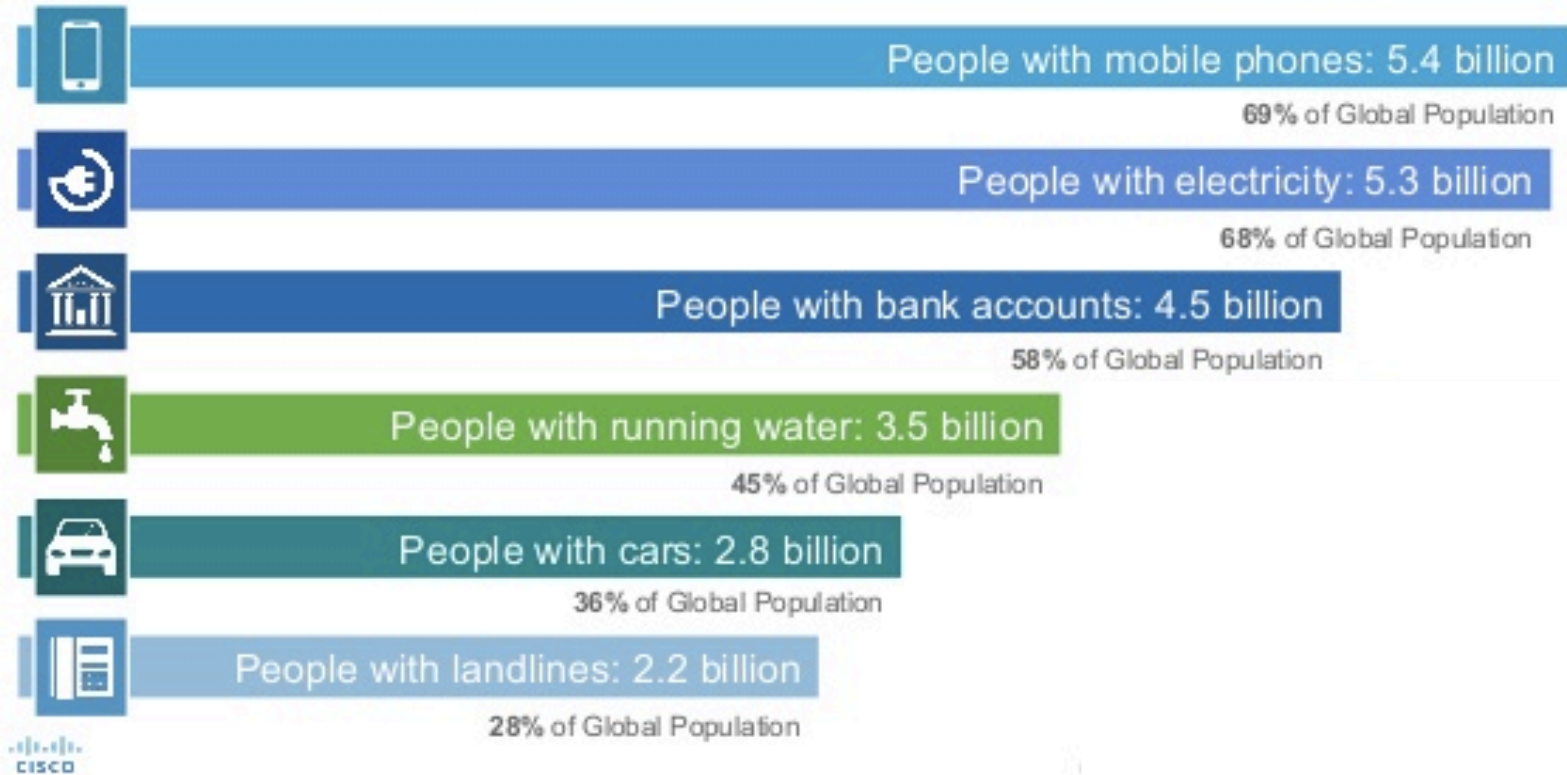
CLINIC

EMR

HOSPITAL

Communication Delay = Leading Cause of Preventable Death

medigram

Mobile: A New World

Mobile Growth Continues Through 2020
By 2020, more people will have mobile phones than electricity at home

People with mobile phones: 5.4 billion
69% of Global Population

People with electricity: 5.3 billion
68% of Global Population

People with bank accounts: 4.5 billion
58% of Global Population

People with running water: 3.5 billion
45% of Global Population

People with cars: 2.8 billion
36% of Global Population

People with landlines: 2.2 billion
28% of Global Population

CISCO

medigram

Newer Chips: Harder to Run Web/Sequential Software
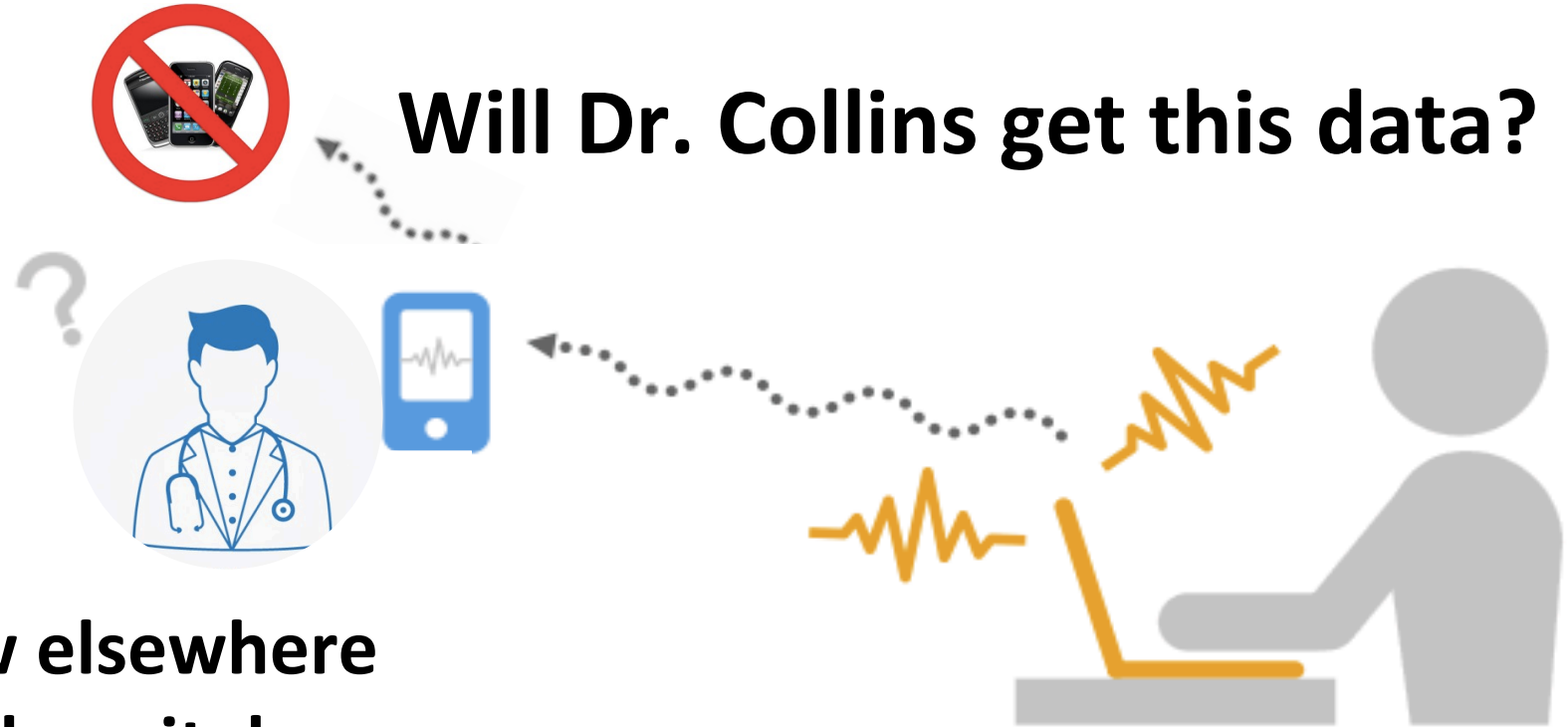## Why Apps That Are "OK" at Home Don't Work in Hospitals

What was your first phone?

-What's wrong with 8 cores?

Popular Smartphone Multi-core CPUs, Q3 2016
Data Source: Antutu Benchmark (2016.07-09)

other 2.52%
10-core 9.43%
six-core 10.23%
octa-core 50.46%
quad-core 27.36%

- octa-core
- quad-core
- six-core
- 10-core
- other

medigram
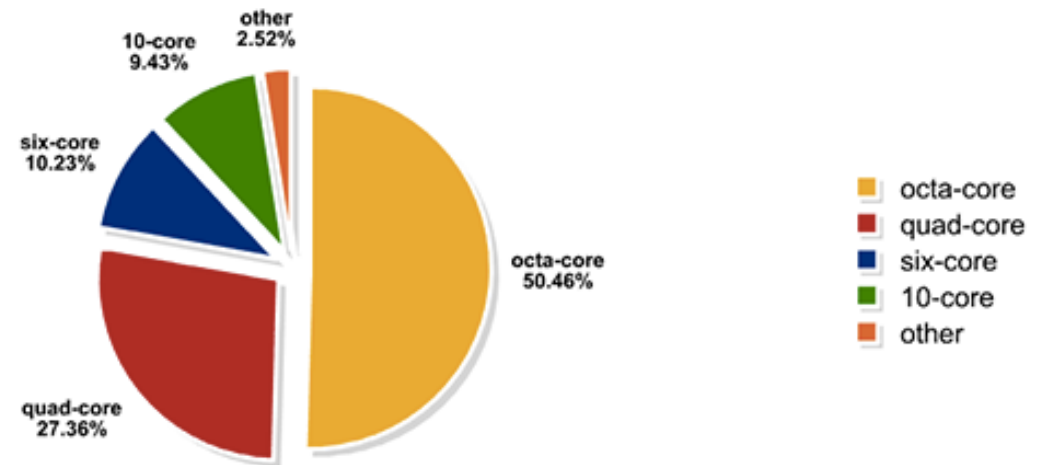
EMI/RFI/ISI Impact on Mobile Phone (& App) F(x)

Will Dr. Collins get this data?

Software which is slow elsewhere doesn't work in many hospitals

Phone Drops Signal & Slows Performance

Image source: Murata

medigram

Hospitals = Faraday Cage
Why Smartphones Are Hard in Hospitals

Faraday cage   (spark)

Person is safe from electric shock inside the cage!

(spark)

Source of high voltage
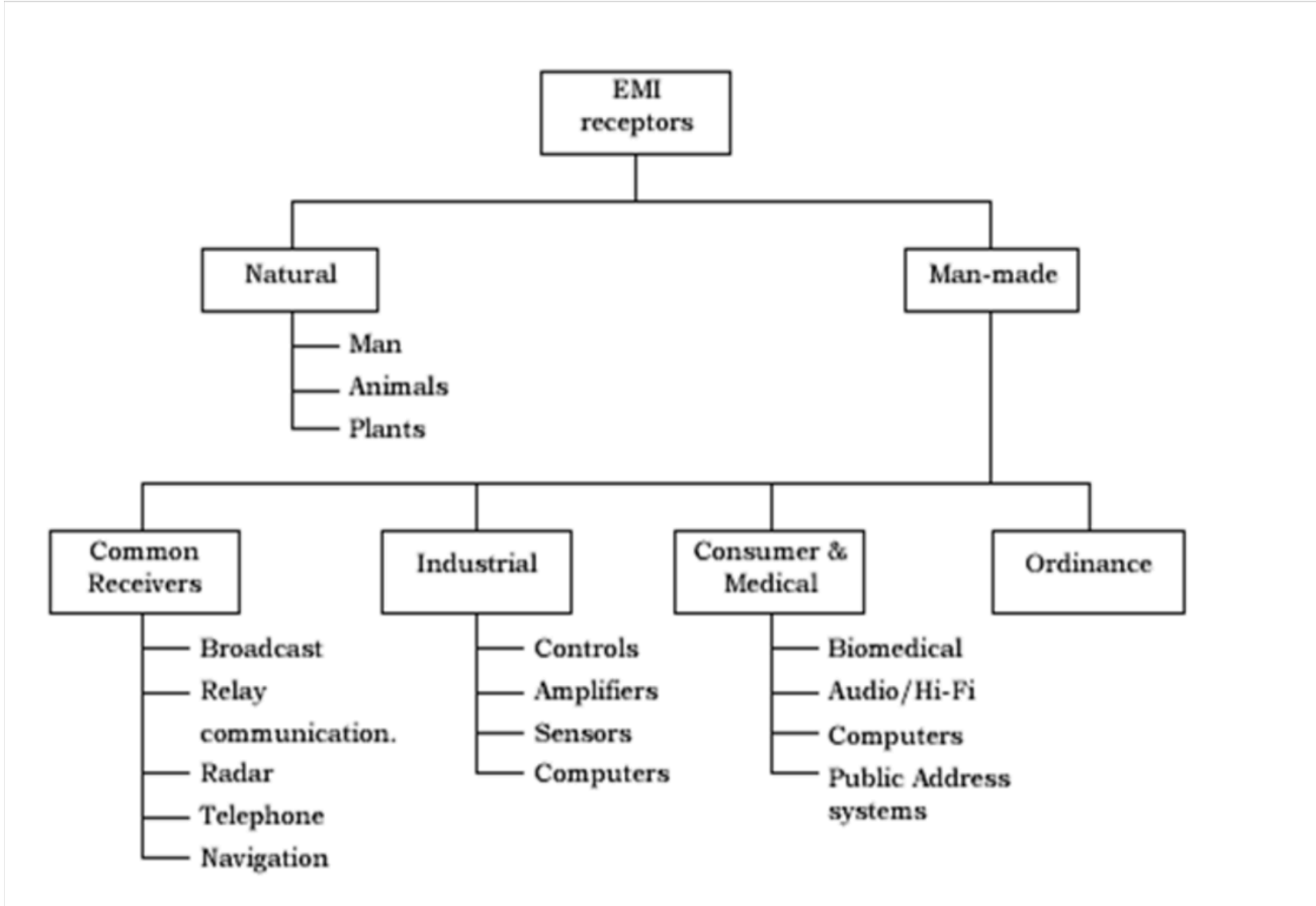
Nothing gets in or out here!

medigram
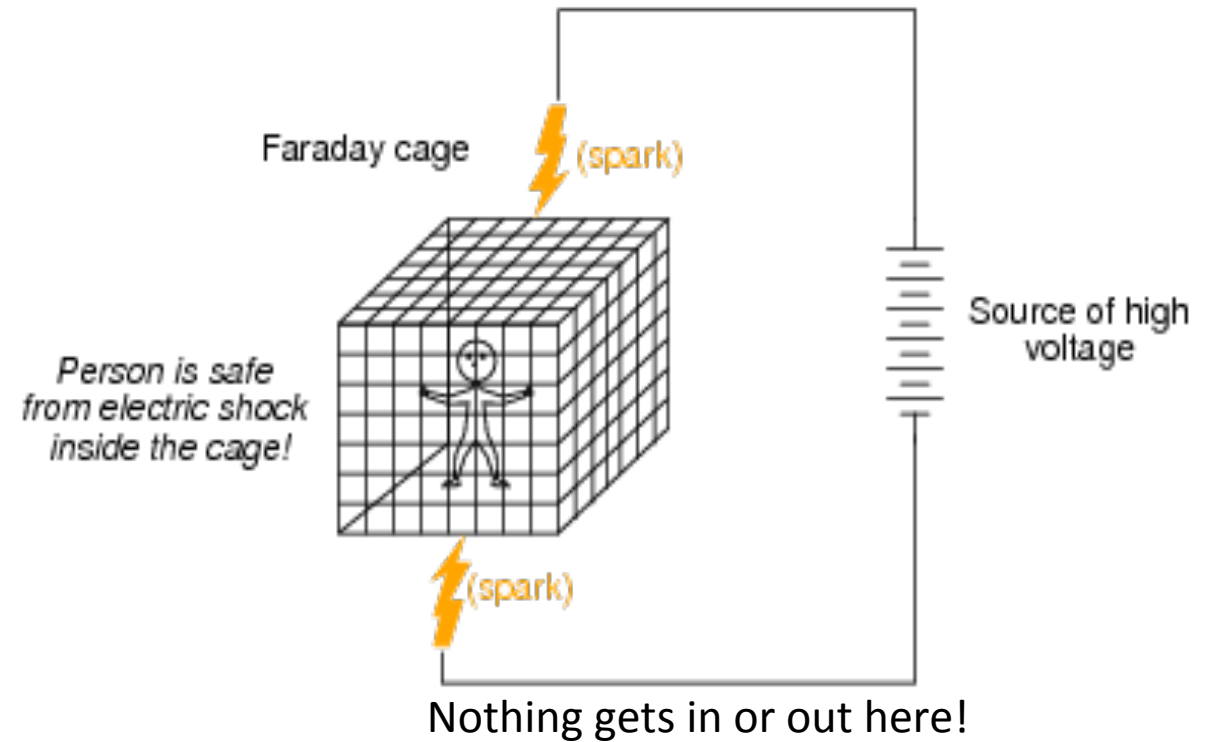
CONNECTIVITY WORSENS: OLDER, WEB, & CONSUMER TECH FAILING

Devices Connected to Hospital Wi-Fi Networks

Apps that worked two years ago no longer work in hospitals

medigram

Where EMI Comes From –High Level

New Med Technologies
Create New Unexpected Sources of EMI/RFI

Sources of EMI Are Found Most Commonly in Hospital Environments

⌘ Sources of EMI that interfere with pacemaker operation include surgical/therapeutic equipment such as:

- Electrocautery

- Transthoracic defibrillation

- Extracorporeal shock-wave lithotripsy

- Therapeutic radiation

- RF ablation

- TENS units

- MRI

Medtronic

medigram

Mobile ≠ Desktop
App Crashes Due to Latency

medigram

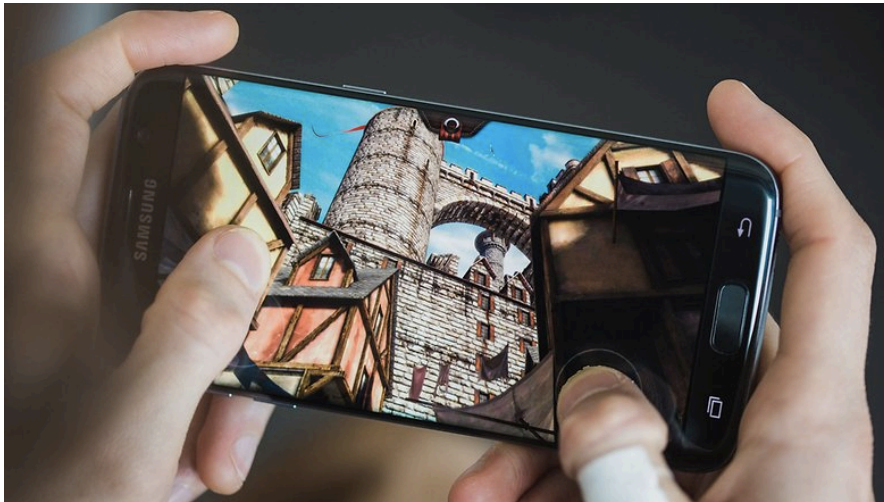# 2-second delay load = <u>abandonment rates up to 87 percent</u>
Latency Is Security Vulnerability

60%

Rate performance/response time as the #1
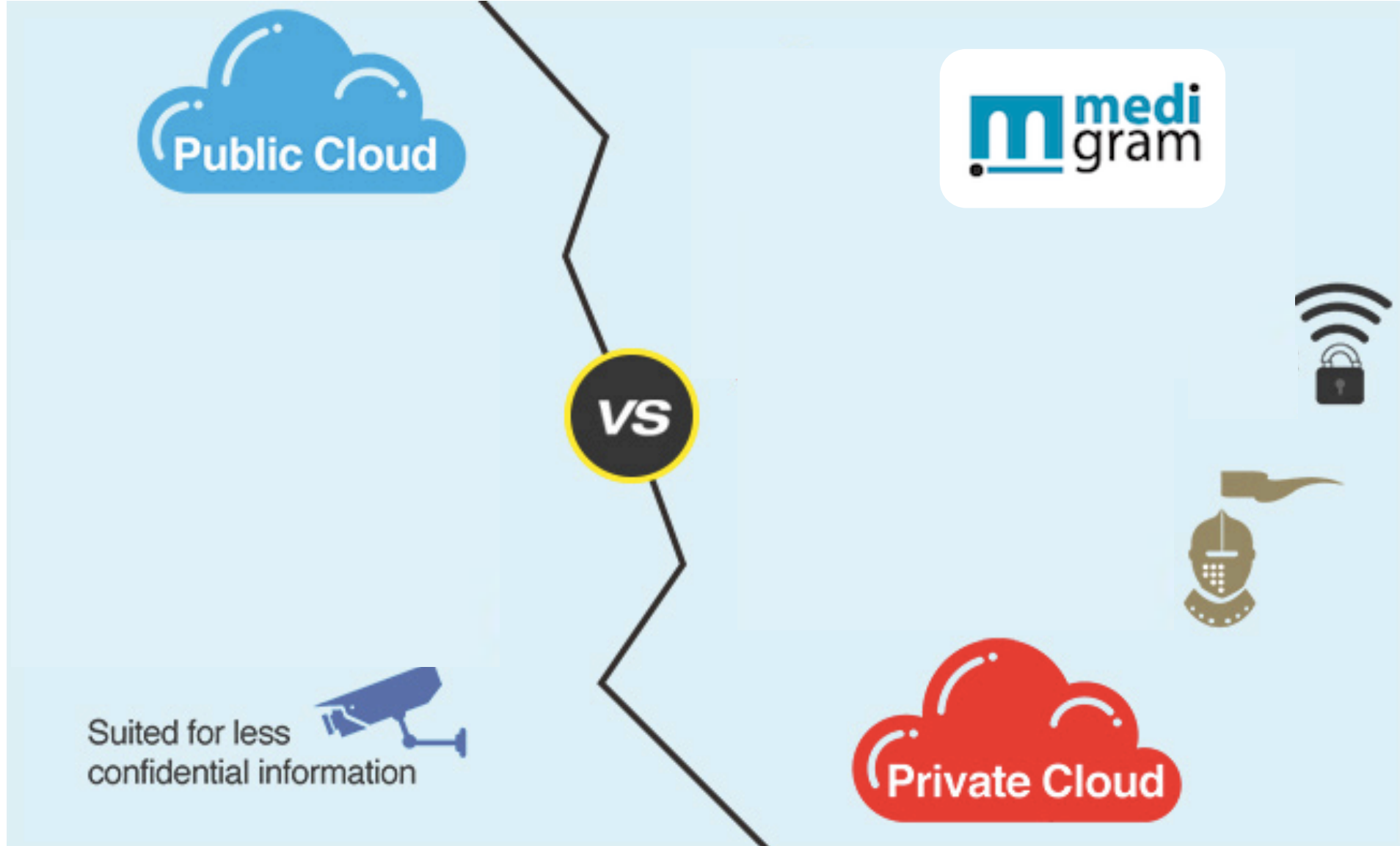mobile app expectation
- ahead of features and functionality

BEYOND20 SIXTEEN   #b20Con

medigram

Saving Lives

Designing For Bad Connectivity & Low Latency
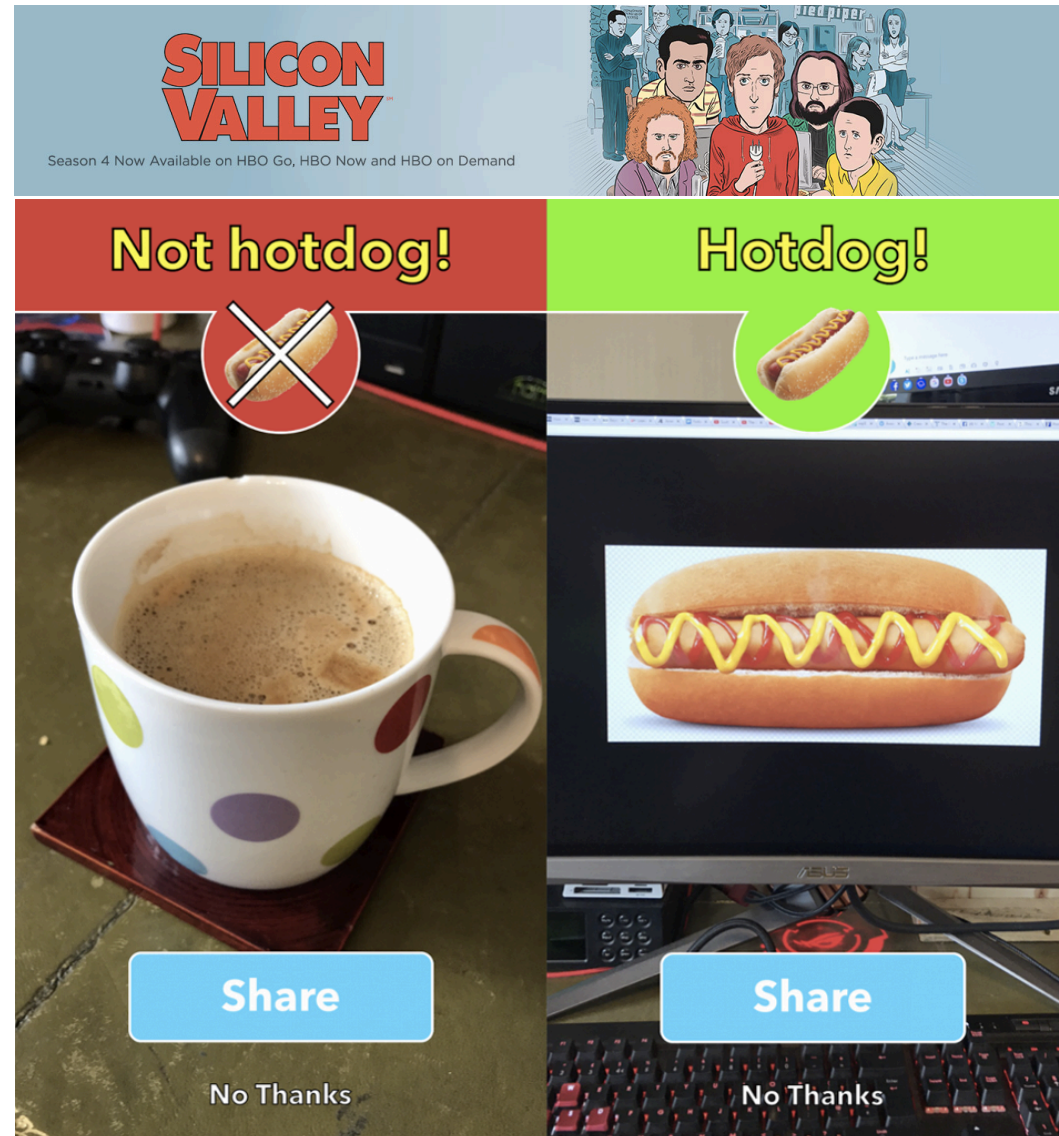
medigram

- **Guaranteed Notifications**

- **Always know if the message was received in seconds**

Combating Latency

Successful HIT & SV Jokes: Combating Latency

Network Security Necessary, Not Sufficient
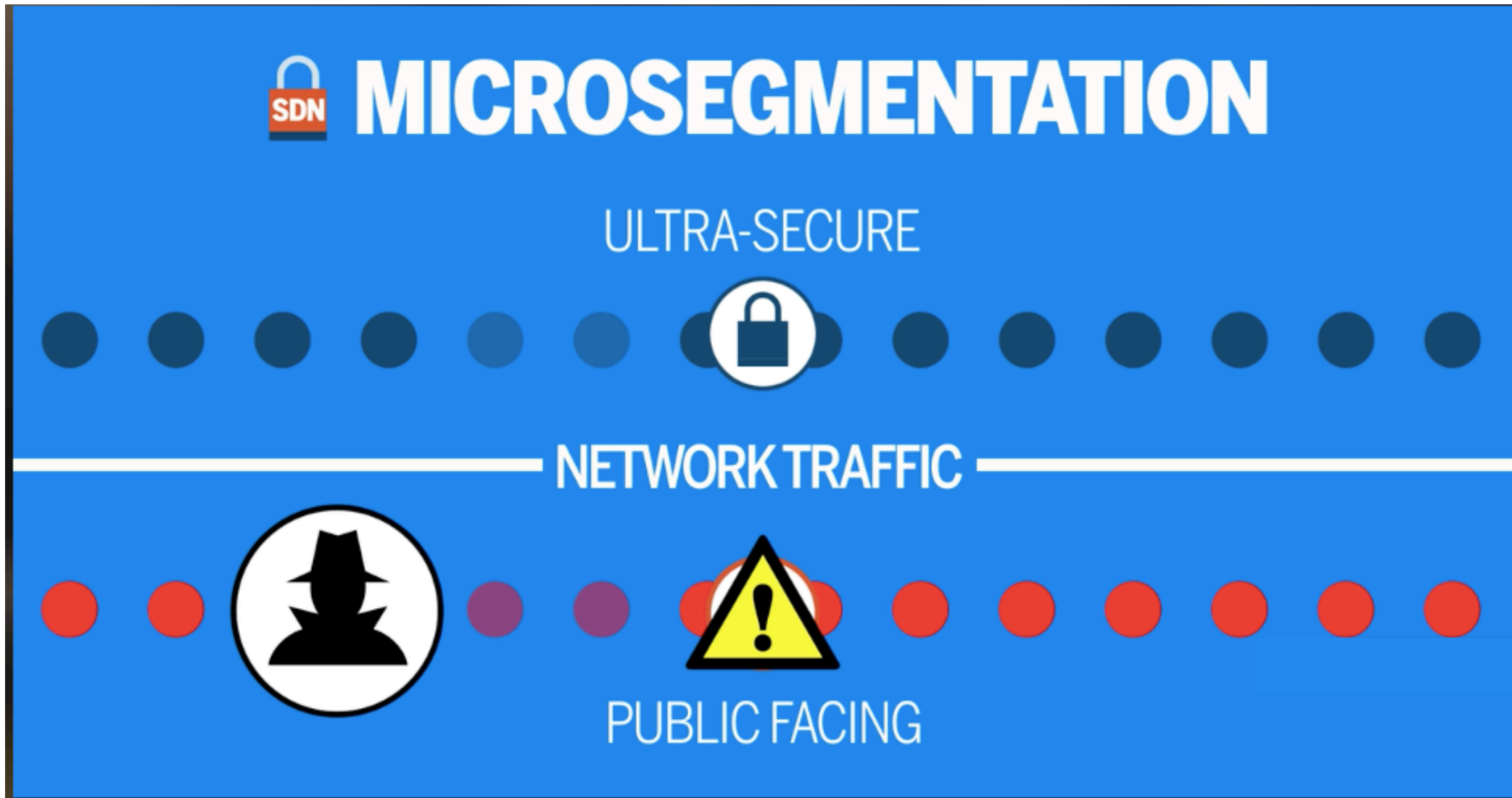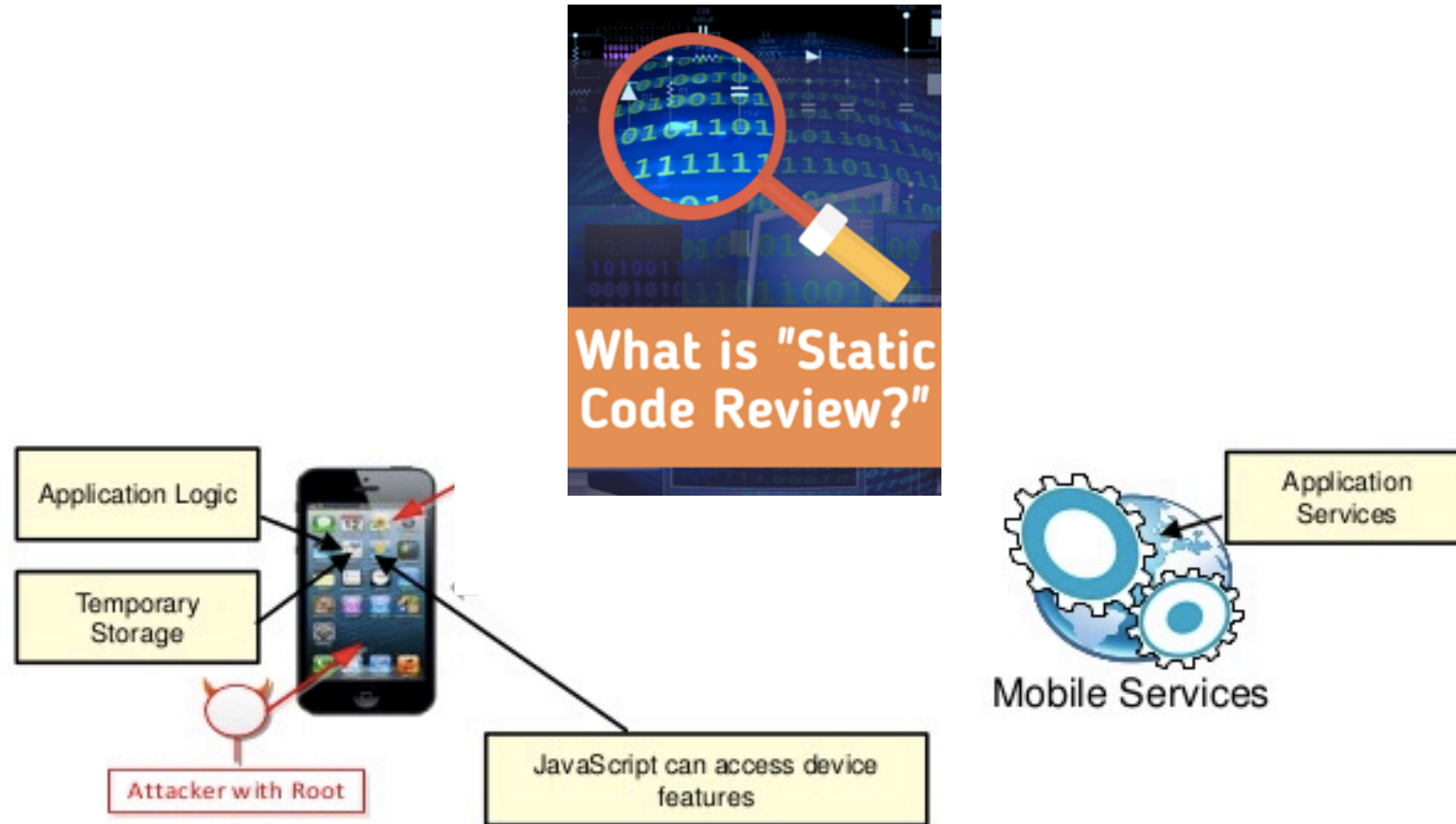
IT App Management Technique

Image credit IDG

Mobile: More Ways Into the Network

What is "Static Code Review?"

Application Logic

Temporary Storage

Attacker with Root

JavaScript can access device features

Application Services

Mobile Services

medigram

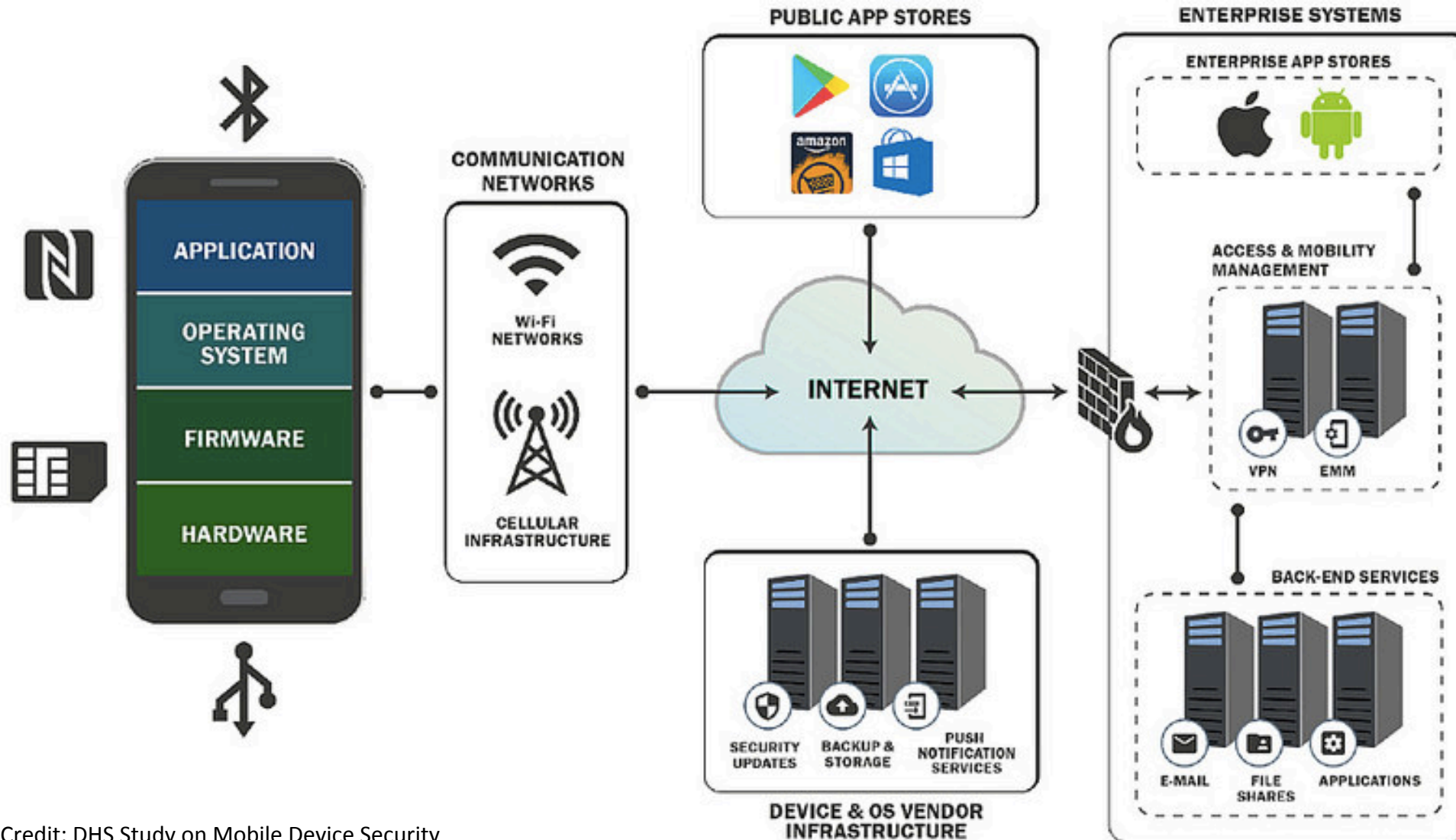# IoT No. 1 Exec Cyber Security Concern in Tech Pro Research
-80% of IoT applications not tested for vulnerabilities
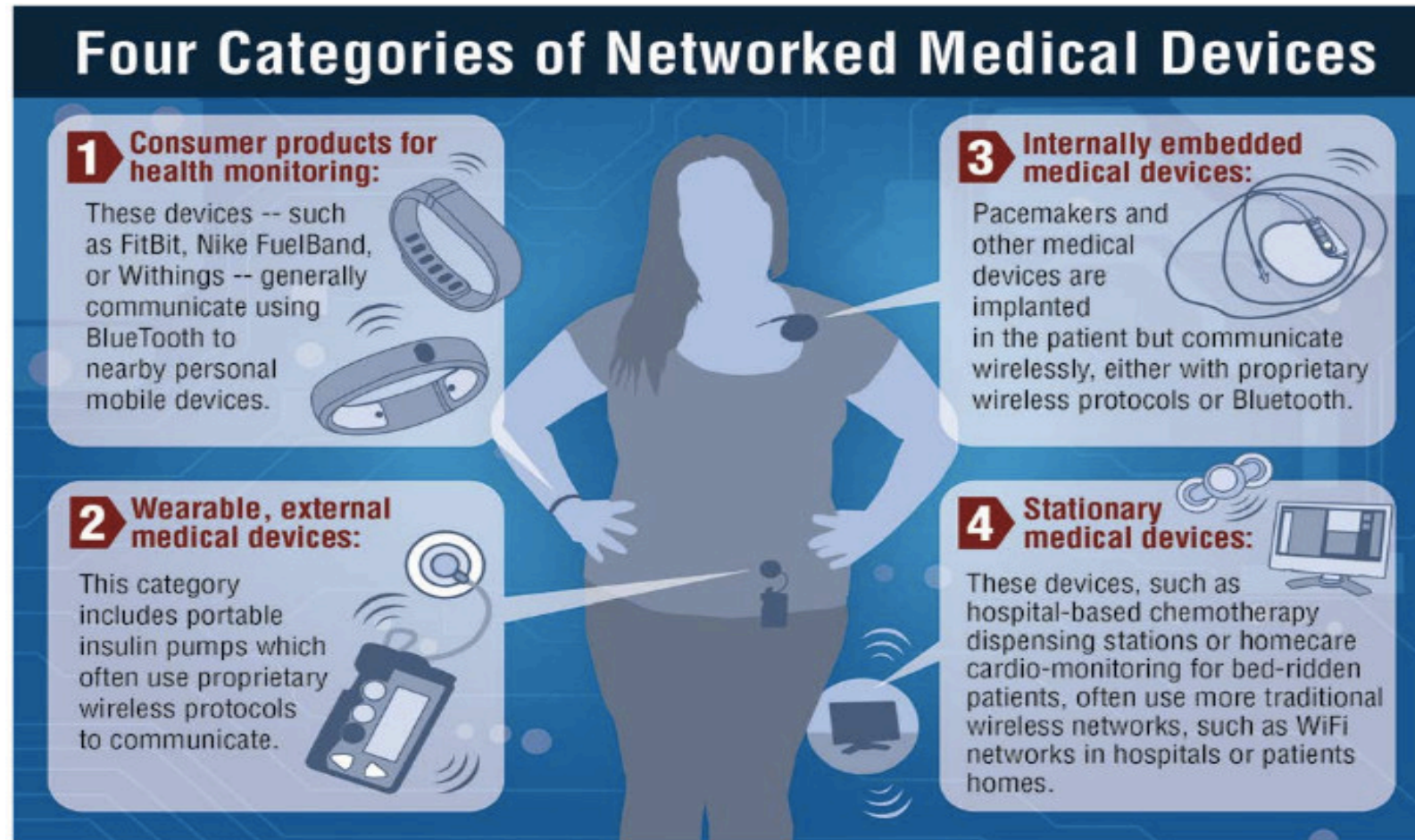
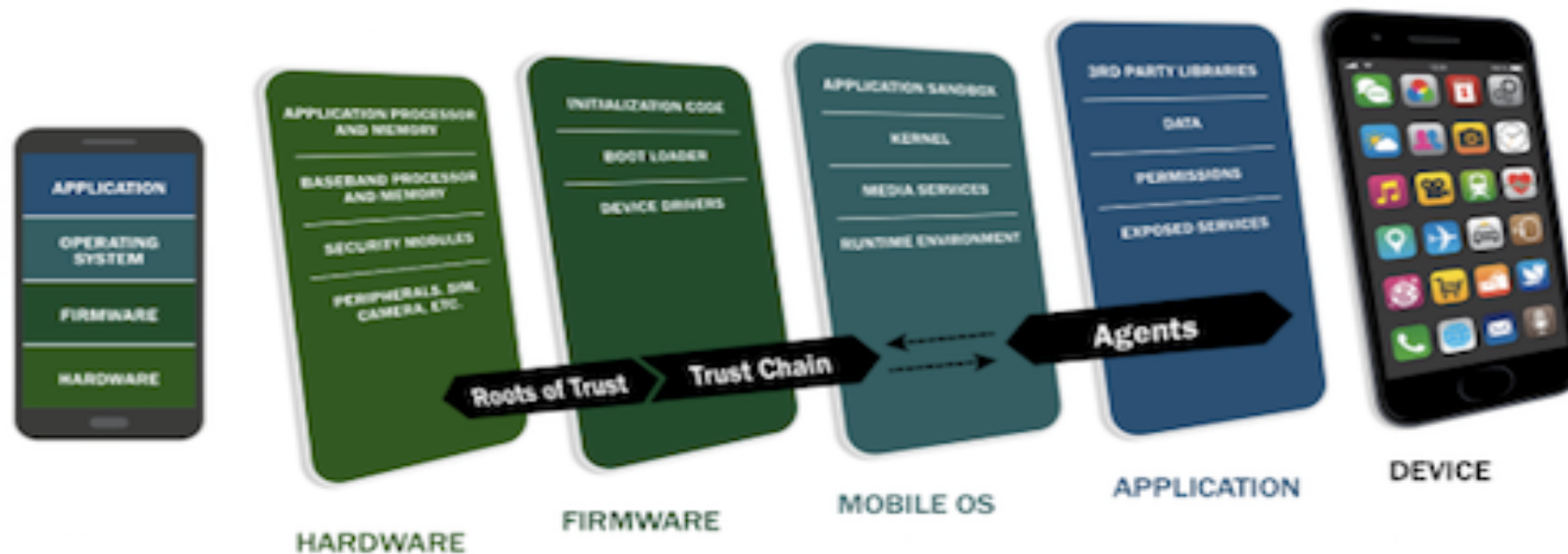# Addressing Compliance & Security

Unprecedented Complexity, Entry Points

Credit: DHS Study on Mobile Device Security

Mobile Computing Stack

Vulnerabilities in any of these components may be targeted by threats.

Figure 4. Mobile Device Technology Stack

Credit: DHS Study on Mobile Device Security

IoT Security Threat Map
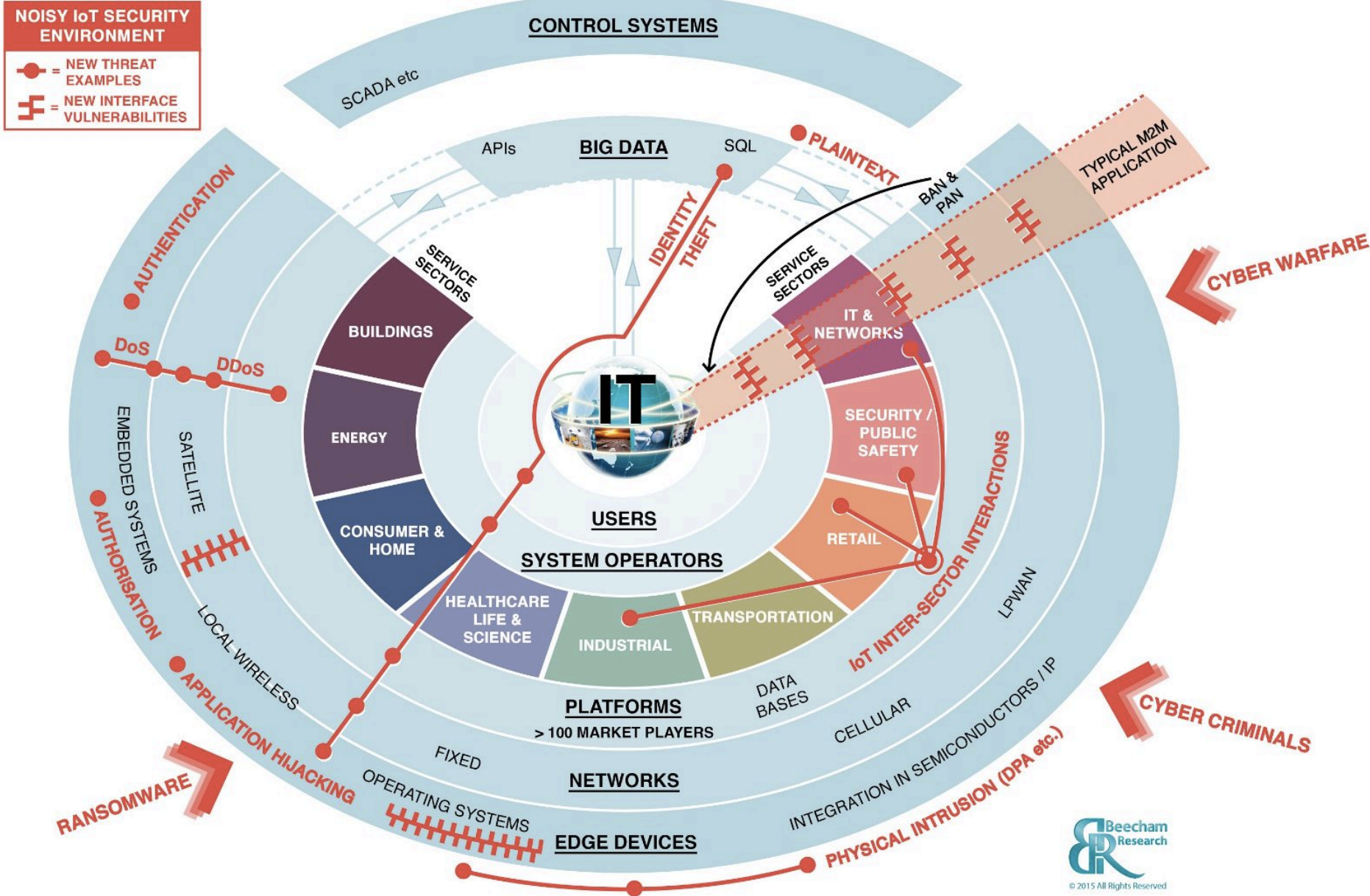
What's at Stake?

Medical Devices

Wearable external medical devices

Implanted medical devices

Systems and Software

Remote Device Management

Network Bandwidth Management

Data Analytics

Application Security

Network Security

Connecting Technologies

NFC

Wi-Fi

Bluetooth

NFC

Enjoy your digital life

medigram

Homeland Hack: Will Life Imitate Art?
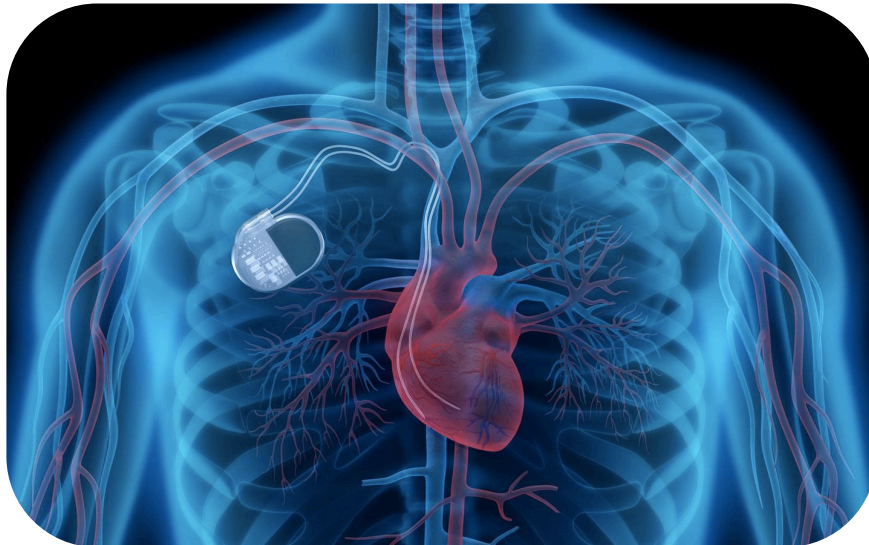
Mobile Security Management

MDM, MAM, EMM, IIC –What's It Going to Be?
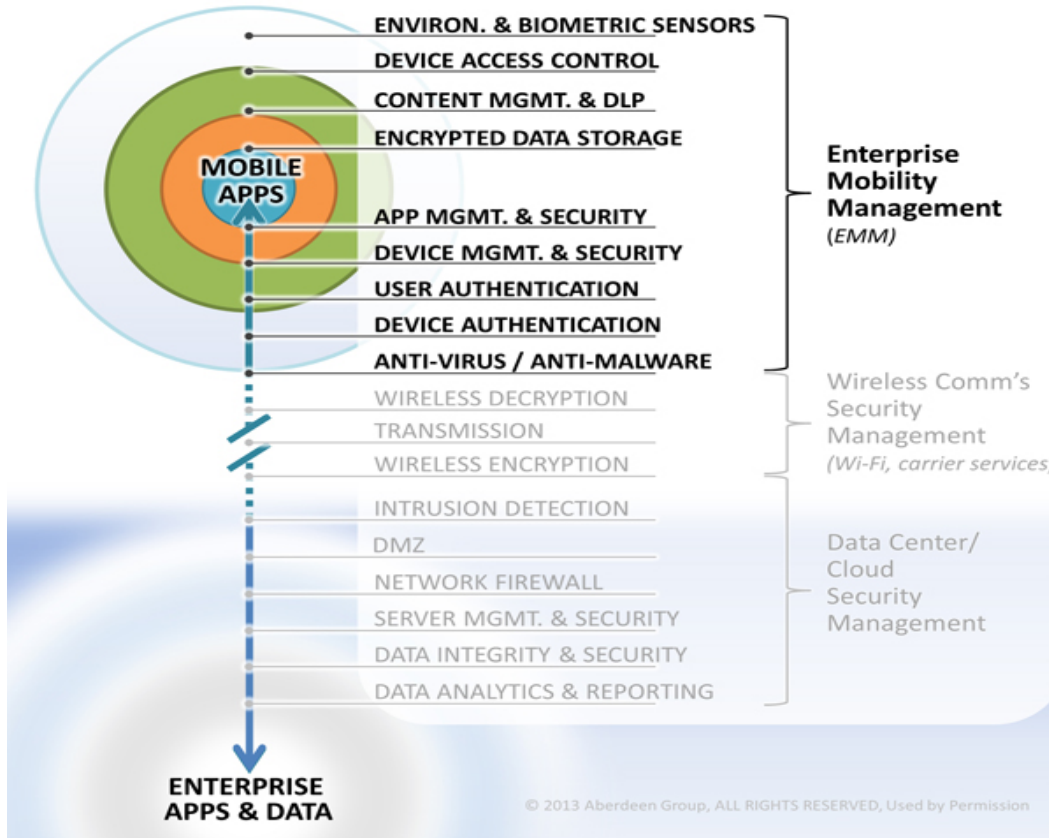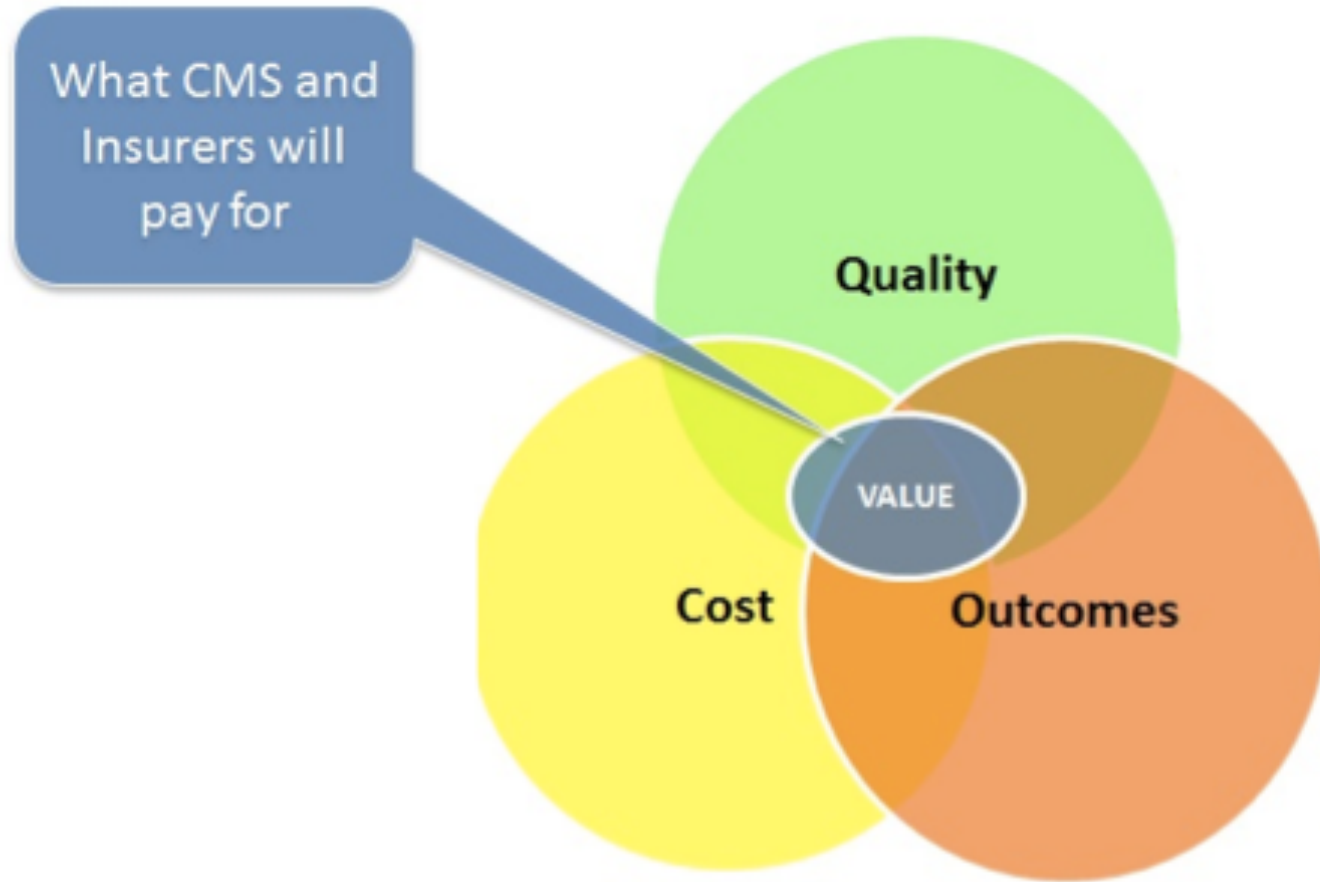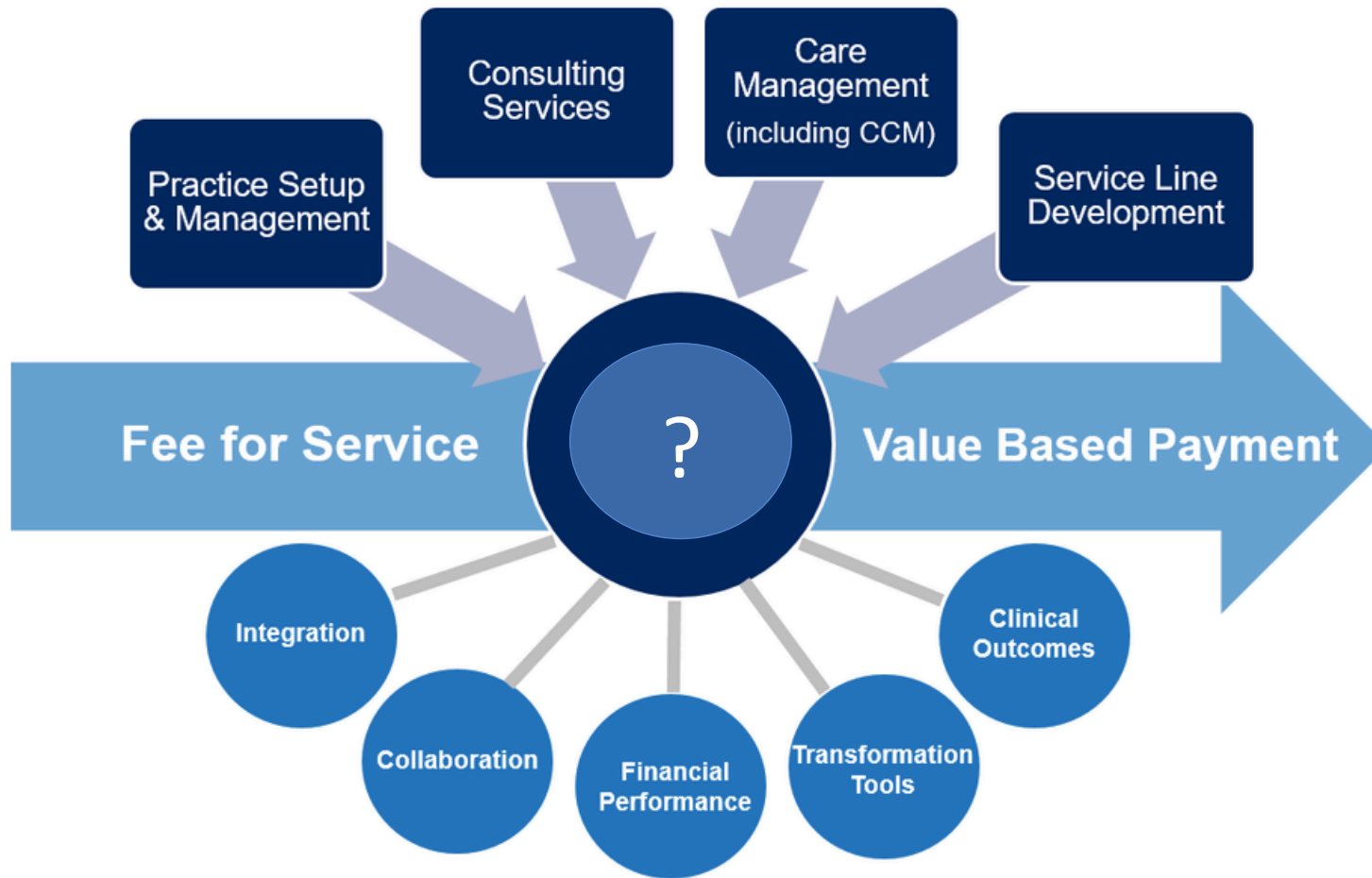

Credit: Aberdeen Research

Relating to Physician Leaders: Bring Data

Physician Leader Aspirations?
What's Internal & What's Not

Ask: What Are Key Clinical Service Lines?

Clinical Services Reconfiguration Program (CSRP) Governance Structure

Legend: Decision-making responsibility

HMC Executive Management Committee (EMC)

CEOs Forum (Reference Group for Service Location Sub-program)

Clinical Services Reconfiguration Program Board (includes Workstream Clinical Leads)

Clinical Executive Committee – CEC (Reference group for Service Design Sub-program)

Clinical Services Reconfiguration Program Executive

Senior Responsible Owner

Enabling, addressing unmet pressures, and coordinating capacity changes

Service Location Program

Program Director & Program Administrator

Service Design Program

Preparing for AHS, Creating specialties, modernizing clinical practice

Women's & Newborn Health | Dentistry | Diagnostics | Mental Health

Medical | Cancer | Pharmacy | Cardiac | Emergency Care

Children's | Surgical & Anaesthetics | Long Term Care | Home Care | Rehabilitation

14 clinically led Workstreams with authority to recommend change across the corporation

medigram

Partnering With Your Board

DIRECTOR'S HANDBOOK SERIES

Cyber-risk Oversight in the Boardroom

80%

Directors who believe they can improve their **cyber knowledge**

Download NACD's Cyber-Risk Oversight Handbook at
NACDonline.org/Cyber
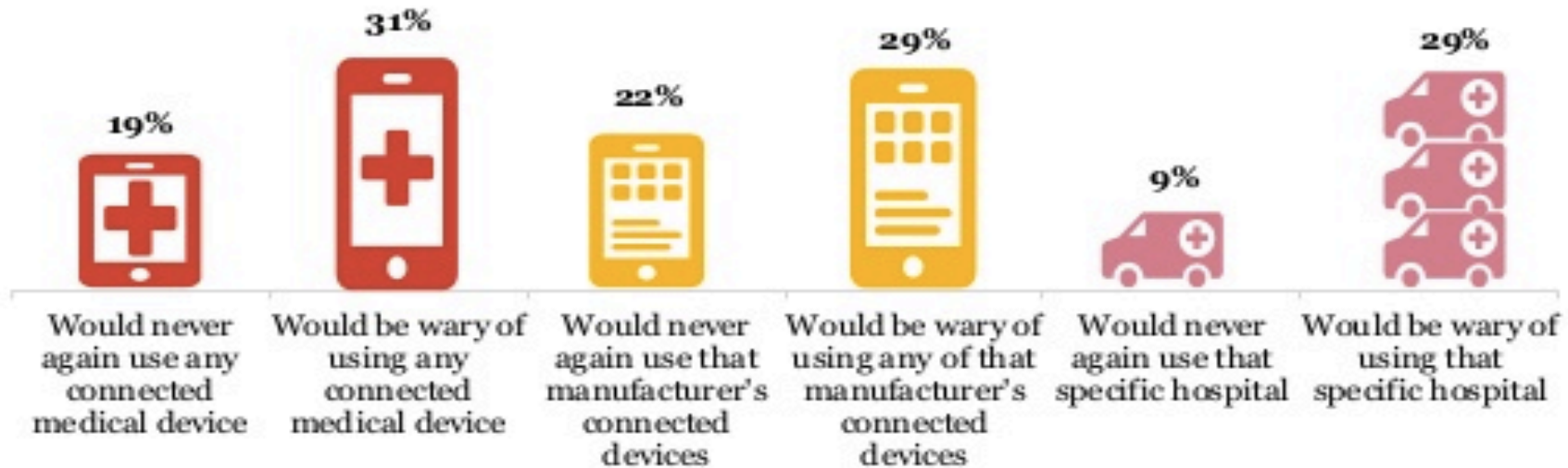
Sources:
2014-2015 NACD Public Company Governance Survey, Bloomberg,
Business Week, CNN Money, Institute of Internal Auditors Survey,
Institutional Shareholder Services, NACD Cyber-Risk Oversight Handbook,
Ponemon, SANS Research Director

NACD
NATIONAL ASSOCIATION OF
CORPORATE DIRECTORS

1/2
of directors are not satisfied with cyber information from management

m medigram

How to Talk to Your Board

Hacked devices, lost customers

Many customers say they would never use, or would be wary of using, medical devices known to have been hacked or the or healthcare facilities where the hack occurred.

19%	31%	22%	29%	9%	29%
Would never again use any connected medical device	Would be wary of using any connected medical device	Would never again use that manufacturer's connected devices	Would be wary of using any of that manufacturer's connected devices	Would never again use that specific hospital	Would be wary of using that specific hospital

"Some medical devices (e.g., in hospitals) are now connected to the Internet to allow for software updates. You heard that a medical device (e.g., a blood pressure monitor, etc.) had been the subject of a hack that left a patient injured physically and/or financially. How comfortable would you feel using another..." – HRI Consumer Health Survey 2015

PwC

medigram