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WHERE **THE WORLD** CONNECTS FOR HEALTH

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IoT and Wayfinding: Optimizing Healthcare

Session 158, March 7, 2018

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ENGAGED

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Conflict of Interest

Cletis Earle and David Frumkin have no real or apparent conflicts of interest to report.

Agenda

- **IoT:** Where is healthcare now?
- **IoT and wayfinding:** Making the connection
- **Kaleida Health case study:** Challenge, opportunity and solution
- **Outcomes** of Kaleida's wayfinding program
- **Implementation** objectives and recommendations

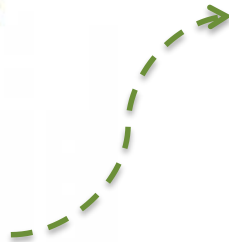
Learning Objectives

- **Analyze** IoT strategies and best practices that set the stage for immediate and long-term connected health success
- **Identify** strategies for launching successful IoT technologies that deliver measureable benefits in terms of improved patient experience, outcomes and operational efficiencies
- **Explain** how organizations may best select the IoT solution on which to build a foundation for future IoT initiatives
- **Discuss** emerging technologies in the healthcare IoT space and their potential benefits
- **Identify** opportunities for IoT devices to be leveraged and integrated into the wayfinding experience, as demonstrated by Kaleida Health's journey

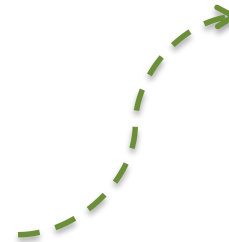
What is the Internet of Things?

Billions of physical devices around the world that are now connected to the internet, collecting and sharing data

From a toaster (1990)



To self-driving cars (2010)

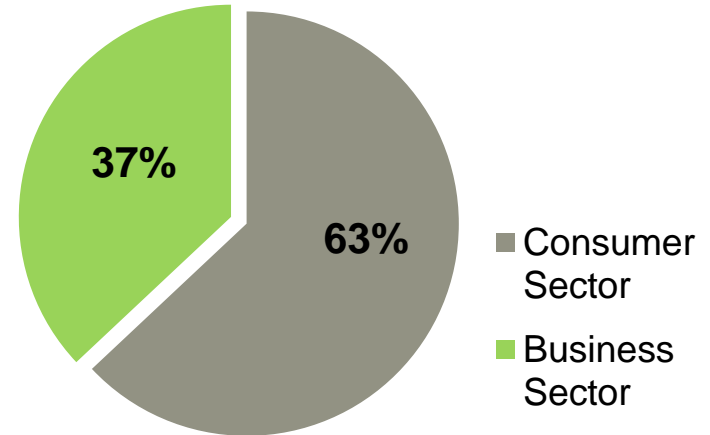


**And
Beyond...**

The IoT – A Growing Market

- **8.4 billion** connected things in 2017
 - More connected “things” than people in the world
- Estimated 11.19 billion devices in 2018, 20.4 billion by 2020
- Consumer devices in 2017: 5.2 billion
 - 63 percent
- Business-related devices in 2017: 3.1 billion
 - 37 percent

Connected Devices

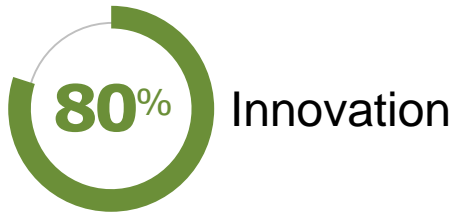


The IoT in Healthcare – Setting the Scene

\$410 billion

Projected global healthcare
IoT spend in 2022¹

IoT benefits in healthcare ²



1. Source: [Grand View Research](#)
2. Source: [Aruba Networks](#)

Common IoT Use Cases in Hospitals

- Remote monitoring of vitals
- Smart sensors for security and safety
- Controlled lighting, heating and cooling
- Automated door locks
- Remote video monitoring
- Tracking mobile assets
- Patient and staff tracking
- Bluetooth wayfinding maps



IoT Benefits

- Operational efficiency
- Improve patient experience
- Improved patient care ¹
- Security
- Human error reduction ²



1. Source: [HIMSS](#)
2. Source: [Internet of Things Institute](#)

IoT Challenges

- Interoperability between medical devices
- Proper electronic health record (EHR) integration
- Patient/provider participation
- Security
- Internal resources and skills
- Human nature



IoT – Making the Leap



Welcome to Kaleida Health



Kaleida Health

- Kaleida Health serves **eight counties in New York**
- Averages **17,000 visitors per day**
- More than **1 million patients annually**
- **Goal in implementing a wayfinding system:**
Help 17,000 daily visitors confidently navigate Kaleida's ever-evolving campuses



Wayfinding and IoT – Making the Connection

If visitors do not have direction **every 30 feet** while traveling through a facility, they will likely ask an employee for directions, which can increase patient/visitor anxiety, interrupt staff and decrease productivity ¹



1. Source: [LH Companies](#)

Wayfinding Tools



- Indoor GPS and mapping
- Bluetooth Low Energy (BLE) beacon technology
- Mapping applications (e.g., Google Maps)
- Location- and condition-sensing technologies and platforms
- IoT aggregation platforms
- Contextual messaging
- Parking management systems
- Digital signage
- Self-service kiosks

The Purpose of Wayfinding

Convenient end-to-end experience

“ To be sick and dealing with cancer issues in a building that is not user-friendly is your worst nightmare.¹ ”

By 2019: **25% of healthcare organizations** will use experiential wayfinding²

1. Source: [The Wall Street Journal](#)
2. Source: [Gartner](#)

Reasons for Implementation at Kaleida

- Understanding where users are going
- Cutting wait times and improving on-time appointments
- Reducing staff interruptions
- Balancing demand and capacity
- Improving customer satisfaction and the patient experience
- Lowering stress
- Differentiating from competitors



Key Considerations Before Beginning



Patient and staff awareness:

- Provide training



Security and privacy:

- Ensure compliance with HIPAA
- Balance information sharing and privacy



Costs:

- Beacons
- Virtual mapping system
- Maintaining the data collected

IoT Wayfinding: Technology Essentials



The **device**:
typically a
smartphone



The **local network**:
Bluetooth beacons
and WiFi networks



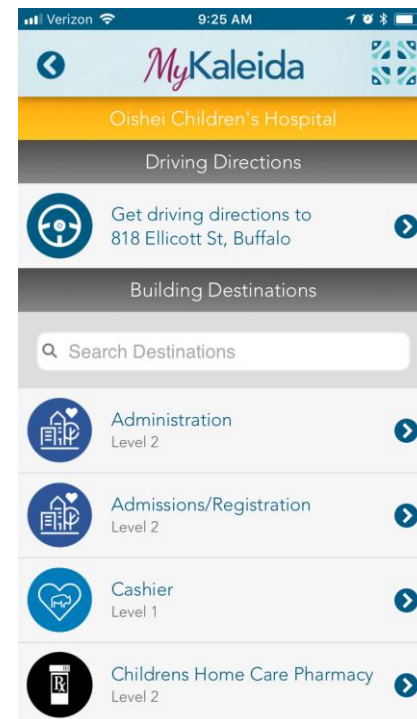
The **Internet**
connects it all
together



The **back-end
service**:
The finished
product

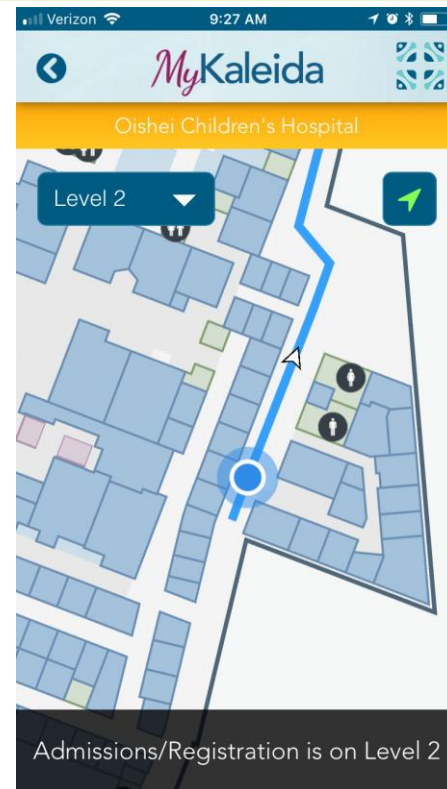
The End-to-end Experience

- The experience begins at home
 - Appointment notifications on patient's smartphone
 - Driving directions to the parking lot closest to appointment location
 - Suggestions on when to leave home
 - Integrated with City of Buffalo's parking system, as well as other parking garages and flat-lot systems



Inside the Hospital

- Internal geofence shows 3D map to patient's destination
- Blue dot moves along the route to indicate the patient's location
- Secure connections tie back to patient's electronic medical records, closed-loop patient experience
- Just-in-time marketing integrations



Key Benefits

- Improved efficiency
- Improved patient satisfaction
- Increased patient engagement

Visiting the hospital is no longer transactional, but an integrated experience



Future Opportunities

- Planned rollouts at five more facilities
- Support overall operations in addition to patient use
- Track valuable and high-demand equipment to reduce retrieval times
- Map rounding lists for physicians
- Assist volunteers in navigating the campus
- Integration with patient portals and infotainment systems for a complete patient experience

Best Practices for Implementation



Assessing
benefits,
opportunities,
risks and barriers



Learning
from others



Thinking short-
and long-term



Training and
education

Questions



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