



LOCATION AWARE HEALTHCARE

**Mayo Clinic Launches
Staff Duress Solution
for 7,000 Employees**

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Safety for Hospital Staff WITH BLE AND RTLS

Mayo Clinic deployed a mobile solution for emergency situations based on BluFi, BLE and RTLS technology at its hospital in Rochester, Minnesota. To protect employees from violent or threatening situations, and to avoid calling out patients and their families, 7,000 employees on the Rochester campus of Mayo Clinic received a badge. This badge is equipped with an emergency button and an integrated BLE beacon. In the event of a critical situation, each employee can be located so that help can be provided immediately. HID's software and hardware components are combined with the clinic's implemented RTLS infrastructure.

For the seventh consecutive year, Mayo Clinic Hospital in Rochester, Minnesota was named the No. 1 Hospital in America in the U.S. News & World Report 2022-2023 Best Hospitals.



Monica Sveen Ziebell
Administrator at
Mayo Clinic in Rochester

“The hospital management is open to technological innovations, as we want to provide the highest level of service for patients and the highest level of safety for employees. We are leaders in numerous applications.”



Derick D. Jones
Emergency Medicine
Physician Board Certified in
Clinical Informatics and Chair
in RFID Technology at Mayo
Clinic in Rochester, Minnesota

“The IT platform already supported us doctors with diagnostics, asset localization and workflows. Now, with staff duress, a crucial application for the safety of the 7,000 employees has been added.”

Mayo Clinic
Mayo Clinic employs a total of approximately 76,000 staff, 7,300 physicians and clinical residents, and more than 66,000 nursing staff. In 2022, Mayo Clinic treated approximately 1.3 million patients from every U.S. state and nearly 130 countries around the world. The clinic also operates two international sites, Mayo Clinic Health-care in London and Sheikh Shakhbout Medical City in Abu Dhabi.

Mayo Clinic in Rochester, Minnesota
Mayo Clinic Hospital in Rochester, Minnesota represents the origin of the Mayo Clinic network and has the largest campus with 2,059 beds.

Mayo Clinic in Florida
In 1986, the hospital opened in Jacksonville, Florida. This hospital currently has 304 beds and plans to increase this to 428 by 2026.

Mayo Clinic in Arizona
In 1987, the hospital opened its doors in Scottsdale and Phoenix, Arizona, with 47 physicians and 225 medical assistants. A 648 million USD expansion plan, "Arizona. Bold.Forward," will nearly double the hospital's Arizona footprint by 2024.

Mayo Clinic Health System
Established in 1992, the Mayo Clinic Health System consists of community-based medical facilities. These facilities serve patients from Minnesota, Iowa and Wisconsin.

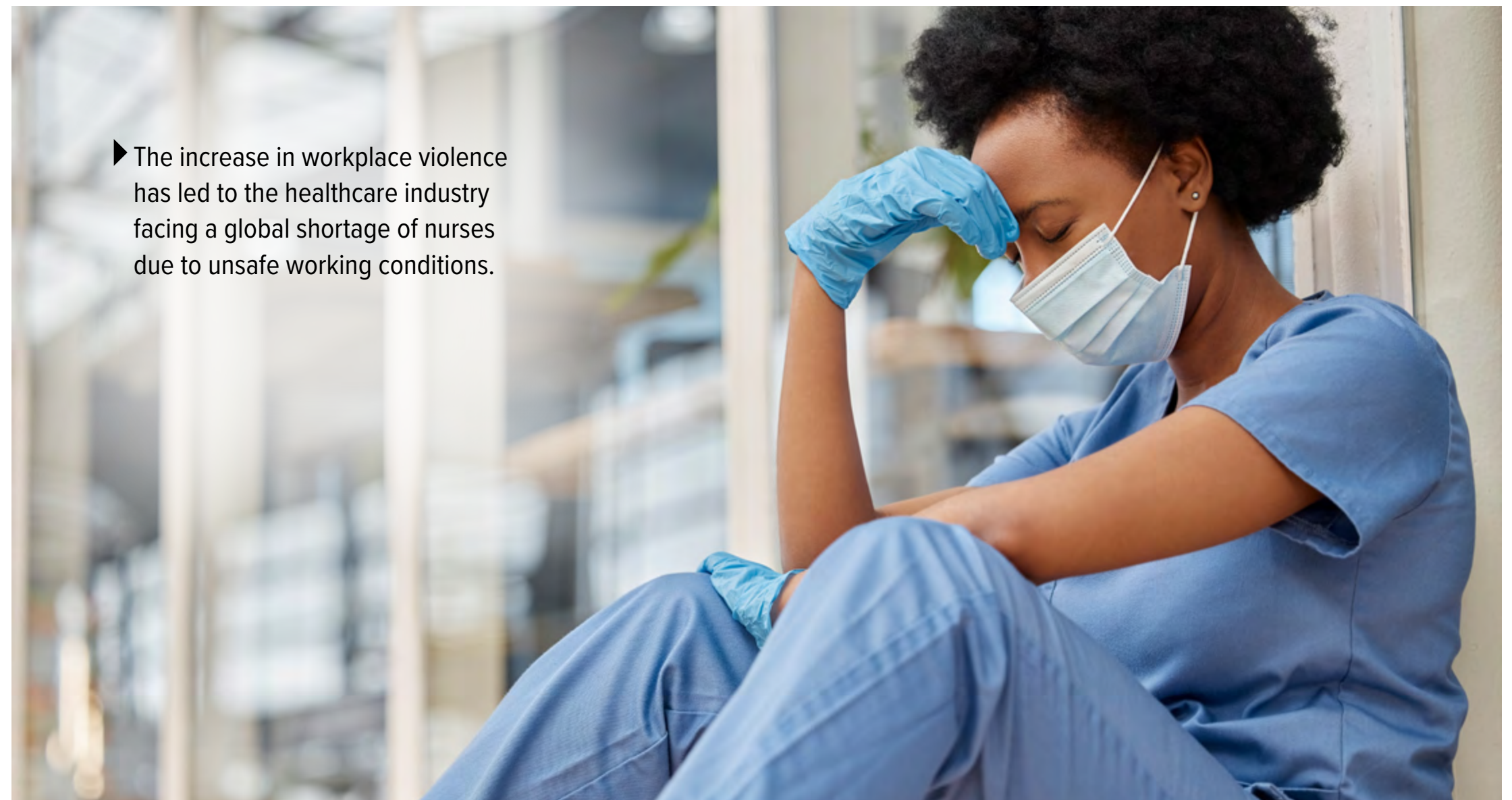
Workplace violence has a negative impact on the quality of patient care.

What Does Workplace Violence Mean?

Workplace violence is defined by the National Institute for Occupational Safety and Health (NIOSH) as "violent acts (including physical assaults and threats of assaults) directed at individuals in the workplace or on duty."¹ According to the World Health Organization, between 8 and 38 percent of healthcare workers experience physical violence during their careers. In addition, a certain percentage of healthcare workers face situational threats and verbal aggression. Most of these incidents originate from patients and visitors. Healthcare workers most affected by violence are those directly involved in patient care, such as nurses, emergency room staff, and paramedics.

Increasing Aggression in the Workplace

According to a report by the Occupational Safety and Health Administration (OSHA), 75 percent of all workplace assaults in the United States are related to healthcare or social services². Physical assaults account for 11 percent of these workplace assaults. The 2018 U.S. Bureau of Labor Statistics report shows that healthcare workers are five times more likely to experience workplace violence than workers in other occupations³. The rate of workplace violence in healthcare nearly doubled between 2010 and 2021. Survey results show that 48 percent of 2,500 hospital nurses have experienced an increase in workplace violence, up from 30 percent in 2021⁴. As a result of workplace violence, burnout



► The increase in workplace violence has led to the healthcare industry facing a global shortage of nurses due to unsafe working conditions.

rates among nurses are increasing, and 30 percent of nurses are considering changing careers in 2023⁵. Five of the top 15 reasons for doing so are related to workplace safety⁶. According to the American Journal of Managed Care, only 30 percent of assaults on nurses are reported worldwide.

A Safe Workplace

Healthcare professionals should not have to fear for their safety when caring for

patients in hospitals. With rising rates of workplace violence in healthcare, the EP9 requirement of the Joint Commission Workplace Violence Prevention Standards mandates that hospitals must have "policies and procedures in place to prevent and respond to workplace violence." A Joint Commission report also shows that timely intervention helps prevent assaults. Prevention measures can take the form of verbal intervention or physical restraint.

Discreet, body-worn emergency buttons, for example, are an effective way to prevent workplace violence in hospitals.

Sources

1. CDC/NIOSH. Violence. Occupational Hazards in Hospitals. 2002.
2. <https://www.osha.gov/sites/default/files/publications/osha3148.pdf>
3. <https://www.bls.gov/iif/factsheets/workplace-violence-healthcare-2018.htm>
4. <https://www.nationalnursesunited.org/press/survey-reveals-increases-in-unsafe-staffing-workplace-violence-moral-distress>
5. <https://www.nurse.com/blog/the-nursing-shortage-looking-ahead-to-2023>
6. <https://www.nursingprocess.org/why-are-nurses-leaving-the-profession.html>

Mayo Clinic started the implementation of its RTLS infrastructure in 2018.

RTLS INFRASTRUCTURE



Blufi Readers	>25,500
Asset Beacons	>27,500
Coverage Areas	>22,500
Coverage (sq. ft.)	>7,600,000

RTLS Infrastructure at Mayo Clinic

Mayo Clinic began implementing RTLS architecture and infrastructure across all clinical areas at its three destination sites in 2018. Today, more than 650,000 sqm of Mayo Clinic is covered by an RTLS network with active RTLS solutions.

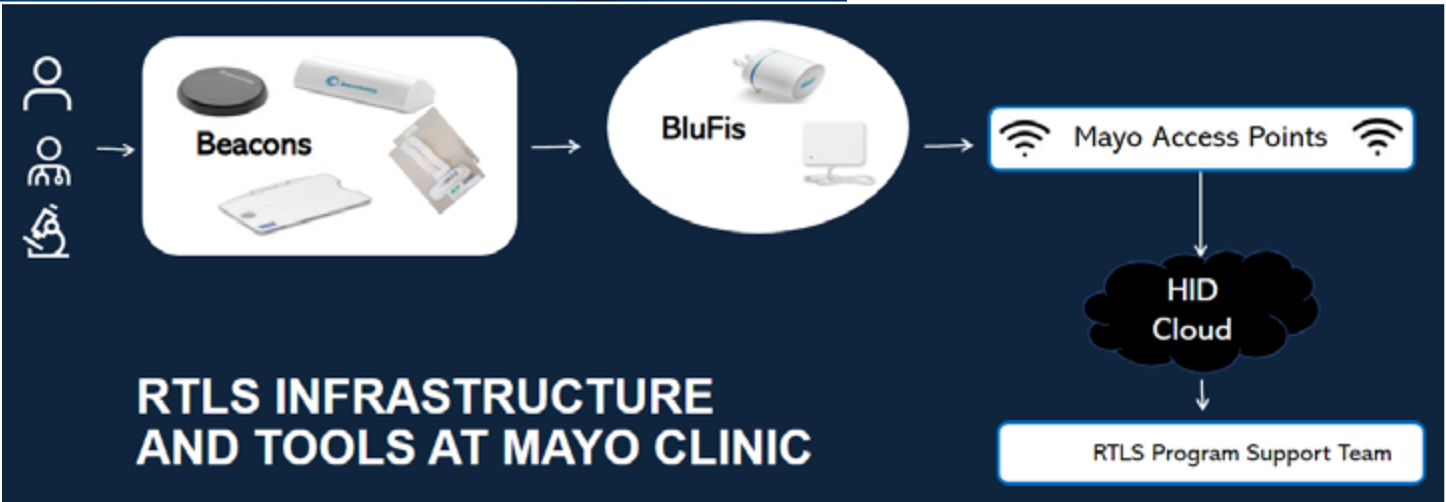
Hardware: BluFi Readers & Asset Beacons

At Mayo Clinic, hardware including BluFi BLE readers, receivers and antennas, as well as asset beacons and WiFi gateways, are installed and used in combination with the RTLS infrastructure. Solutions such as patient or staff localization are implemented this way. Mayo Clinic has over 25,000 BluFi readers and over 27,000 asset beacons across all of its locations in North America. Installation of the entire RTLS infrastructure and platform began in 2018 and continues to expand. This installation is scheduled for completion by the

end of 2023. The hospital's largest campus in Rochester has 13,200 BluFi readers and 15,100 asset beacons installed alone. The Scottsdale site in Arizona has 1,000 BluFi readers and 91 asset beacons, and the Phoenix site in Arizona has 5,200 BluFi readers and 7,300 asset beacons. Minnesota facilities have 13,200 BluFi readers installed, followed by 15,100 asset beacons. The BluFi BLE antennas and receivers are connected to the power supplies in the patient rooms. They communicate over the mesh network and coordinate with WiFi gateways already installed in the building.

Software: Bluzone

Mayo Clinic uses Bluzone, a cloud-based Software-as-a-Service (SaaS) for the centralized management of BLE beacons via WiFi gateways. Bluzone is a web-based console that provides a user interface to read and configure the entire fleet of BLE beacons and BluFi devices. Mayo Clinic configures different policy types for all beacons or for a group of beacons so that emergency signals are sent in different situations. These policy types include presence, battery, temperature, motion, location and more. Violations of these policies are documented and sent as an alert via email to the appropriate personnel.



If an employee becomes distressed, they can press the emergency call button on the back of their ID badge cover without being noticed.

RTLS SOLUTION

A Solution for Personnel Emergencies

Mayo Clinic has introduced a wearable solution to address workplace violence: the Staff Duress Badge for employees who encounter duress. Leveraging the already implemented RTLS infrastructure, Mayo Clinic has rolled out this solution at its campus in Rochester. The project began in November 2021 and was completed in November 2022. HID collaborated with Mayo Clinic in this project. The project was designed to support 7,000 hospital staff and healthcare providers in care units identified as high risk violent behavior.

How Does it Work?

BLE beacons are integrated into the employee badge covers. These beacons actively transmit a signal on different frequencies and communicate with the RTLS infrastructure. On the back of the badge cover is a button that triggers an emergency signal when pressed. When an employee presses the button, an LED begins to flash and a signal is sent. The signal is received by BluFi BLE antennas or receivers. These antennas and receivers communicate over the mesh

network and transmit the received data to the Bluzone Cloud. In the cloud, various data cleaning technologies are applied to determine a location based on signal thresholds for each of the antennas. Through the system, the security team automatically identifies the identity, occupation, and current location of the person who is in an emergency situation. Active location updates are received, allowing the security team to accurately locate the distressed employee, even if they have moved since the emergency call was initiated. Once the security team arrives, they follow standard Mayo protocols to mitigate the situation. After the event, they generate an incident report so the situation can be further investigated.

The Results

During the 12-month project, 167 emergency calls were recorded at Mayo Clinic in Rochester. When a badge was put into service, tests were conducted to reduce false alarms. The result: the false alarm rate dropped from 32 to 11 percent. 84 percent of employees feel relatively safe at work, and there is increased awareness of areas and situations where violence is possible in healthcare.



Software and hardware components combine to provide a high-level security system at the touch of a button for staff.

HARDWARE & SOFTWARE

BLE BEEKs Duress Beacons

The badge holder is equipped with the BLE BEEK Duress Beacon along with an alarm button. When the button behind the BEEKs Button Badge Holder is pressed, an LED starts flashing and sends an alarm or distress signal to the Bluzone Cloud.



BluFi BLE Antennas & WiFi Gateways

BluFi are BLE to WiFi gateways. They route signals between BEEK's beacons and the Bluzone Cloud.

With BluFi, BEEK's beacons can be centrally managed via the cloud. BluFi BLE antennas are connected to the power supply of the hospital room.



Bluzone

Bluzone is a cloud-based Software-as-a-Service (SaaS) designed to centrally manage BEEK's BLE beacons via BluFi BLE to WiFi gateways. Security personnel are notified via Bluzone where the employee in need is located.



Safety Measures

Once the security team arrives, standard security protocols are applied to defuse the situation and provide security. After the event, a report of the incident is prepared so that the situation can be further investigated.

