



SOLVING THE \$14 BILLION PROBLEM

Leveraging Real-Time Location Systems (RTLS) to Enhance Nursing Efficiency and Elevate Patient Care

A systematic analysis of peer reviewed research conducted by Georgia State University, sponsored by Vizzia Technologies.

ABSTRACT

A systematic review of 42 peer-reviewed research projects was conducted by Georgia State University to assess if the application of RTLS improves healthcare delivery. The findings concluded that there is up to \$14 billion wasted annually by clinicians searching for equipment, and RTLS is an effective method to assess workflow, productivity and asset management.

Many of the findings are documented in this White Paper and a summary was published by the Healthcare Information and Management Systems Society (HIMSS) in 2023.

The United States faces a critical need to improve patient care, with nurses playing a vital role in achieving this goal. The healthcare sector has been significantly impacted by the ‘Great Resignation’ resulting in a 20% workforce loss, including 30% of nurses. Job burnout is a major reason for nurses leaving patient care, emphasizing the importance of enhancing nursing job satisfaction.

To optimize nursing efficiency and enhance patient care, addressing time management waste is essential. Up to 60 minutes per shift are wasted by nurses searching for equipment. Real-Time Location Systems (RTLS) offer a promising solution to address these challenges, allowing nurses to spend more time on direct patient care. Leveraging RTLS technology can elevate nursing efficiency, improve patient care, and transform healthcare delivery.



RTLS can help hospitals improve workflow analysis, quality and patient safety.



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STAFFING SHORTAGES AND TIME MANAGEMENT CHALLENGES

The 'Great Resignation' from 2020 to 2022 has hit the healthcare sector particularly hard, with an estimated 20% workforce loss, including 30% of nurses. Job burnout has been identified as a major reason for nurses leaving patient care, highlighting the importance of enhancing nursing job satisfaction.

Efficient time management is crucial for nurses to spend more time on direct patient care and less on administrative tasks. Reducing waste, particularly in time spent looking for medical equipment, can significantly improve nursing efficiency and ultimately enhance patient experience, care, and outcomes.

\$14 Billion per year is wasted searching for equipment.



The nursing shortage and challenges related to the COVID-19 pandemic have led to increased waste in the healthcare industry. Among the various areas of waste, time management stands out as an enormous opportunity for improvement which can drive significant impacts in patient experience, staff utilization, and quality of care. Nurses, representing a substantial portion of the healthcare workforce, face challenges that contribute to waste within the system. One major area that can be improved is time spent searching for medical equipment.



Research indicates that preventable wasted time accounts for about one-third of each nursing shift, with nurses spending only about 30% of their time directly with patients and around 12% of their shift looking for equipment. The impact of time wasted looking for equipment goes beyond inefficiency; it can lead to life-threatening situations in critical care settings. Studies reveal that nurses spend an average of 21 to 60 minutes per shift searching for lost equipment, significantly affecting their productivity. For an estimated 1.7 million

registered nurses working in hospital or surgical settings, this translates to up to 200 hours of lost productivity annually per nurse. With an estimated average salary of \$40 per hour for a hospital RN, the time spent looking for equipment is wasting \$14 billion dollars per year.

INDUSTRY CHALLENGES



Up to 60 minutes per nursing shift is wasted searching for lost equipment, significantly affecting productivity



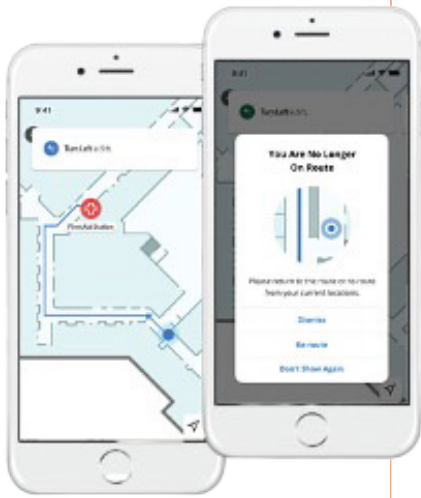
One study using RTLS helped identify that clinicians only spent 12% of their time in patient rooms



A 2013 study found that \$60 million is wasted annually due to poor management of assets



REAL-TIME LOCATION SYSTEMS (RTLS) FOR NURSING EFFICIENCY



To address the challenges of waste and improve nursing efficiency, healthcare institutions are turning to Real-Time Location Systems (RTLS). RTLS is an indoor tracking system that identifies the real-time physical location of personnel and equipment within a healthcare facility. By utilizing various software applications and sensors, RTLS can provide instant access to equipment locations, enhancing workflow and resource management.

RTLS technology offers a comprehensive solution to optimize nursing efficiency by streamlining processes such as equipment location and availability. Hospitals have traditionally employed inventory tracking systems for medications, supplies, and documents. RTLS is particularly effective in tracking high-cost and limited-quantity equipment. By providing real-time data on equipment locations, RTLS empowers nurses to spend less time searching for medical devices and more time on direct patient care.



THE ROLE OF RTLS IN REDUCING EQUIPMENT SEARCH TIME

Implementing RTLS has shown promising results in reducing equipment search time and increasing nursing efficiency. Reports estimate that billions of dollars are wasted in nursing time each year, with nurses spending approximately one-third of their time trying to locate medical equipment. However, healthcare facilities that have adopted RTLS have reported substantial time savings.

For example, Southeastern Regional Medical Center in North Carolina reported that nurses using the RTLS system saved an average of one hour each day. This demonstrates the potential of RTLS in improving nursing efficiency and overall hospital productivity. Some key stats from this medical center:

- \$750,000 indirect cost savings when applied to 120 nurses and one hour saved each day.
- 117 nurses who had been using the RTLS asset tracking system for three months evaluated it as valuable, and indicated that they would be willing to keep using it.
- Biomedical engineering staff spends most of their time searching for medical equipment. This search takes 85% of the time to find the last 15% of “could not locate” equipment during preventive maintenance.

Real-world success stories provide compelling evidence of the benefits of RTLS implementation in healthcare facilities. Various studies have highlighted the positive impact of RTLS on workflow, staff resource assessment, asset management, and patient safety.

One study found that RTLS data can effectively illustrate optimal provider scheduling, leading to improved utilization in an outpatient clinical setting. Improved workflow and resource assessments have been observed, with RTLS aiding in identifying areas of improvement in physician residents’ time spent in patient rooms. RTLS also enables better asset management, significantly reducing wasteful spending on misplaced or underutilized equipment.



THE WAY FORWARD: FUTURE DIRECTIONS IN RTLS AND NURSING EFFICIENCY

In a comprehensive systematic review of 42 peer-reviewed research projects examining the application of RTLS (Real-Time Location Systems) in healthcare delivery, it was found that while certain limitations exist in hospital data integration and software implementation, RTLS proves to be an effective method for assessing workflow, productivity, and asset management. One key area which requires additional research focus is nursing productivity and its direct correlation to nursing job satisfaction, increased patient care time, and overall improved quality of care.

By leveraging RTLS technology, hospitals can enhance workflow analysis, quality, and patient safety, contributing to advancements in inpatient healthcare delivery and therapeutics over the past decade. Vizzia Technologies is already at the forefront of this research with several mature RTLS implementations proving the hypothesis that location-based workflow technologies are transforming the experience and quality of care for nurses and patients.

THE OPPORTUNITY IS IN FRONT OF US



INCREASED PATIENT SATISFACTION.

RTLS enables staff members to spend more time with patients and less time searching for medical equipment.



SCHEDULING AND UTILIZATION MANAGEMENT.

In a 2018 study, researchers found that RTLS data could be effectively leveraged to identify the optimal provider scheduling to improve utilization in an outpatient clinical setting.



IMPROVED STAFF AND PATIENT SAFETY.

Utilizing a discrete panic alert from RTLS enabled badges to alert security of a safety concern. A Wake Forest Health system utilizes RTLS to trace and track the proximity of an infection person which aids in improved safety.

At a CommonSpirit Health hospital in Colorado, nurses were spending hours a day looking for people and equipment, often clocking several miles walking around. With RTLS, one nurse saved at least 1- 2 hours per shift and said the RTLS had helped her find the joy in medicine again.



ELEVATING NURSING EFFICIENCY FOR ENHANCED PATIENT CARE

Real-Time Location Systems (RTLS) offer a transformative solution to enhance nursing efficiency and elevate patient care in healthcare settings. By leveraging RTLS technology, healthcare institutions can significantly reduce the time nurses spend searching for medical equipment, allowing them to dedicate more time to direct patient care. Collaborations between technology providers like Vizzia and academic institutions play a crucial role in advancing RTLS technology and its successful implementation.

RTLS can help healthcare institutions significantly reduce the time nurses spend searching for medical equipment, allowing them to dedicate more time to direct patient care.



As the healthcare industry continues to evolve, embracing technological advancements like RTLS can empower nurses and healthcare professionals to provide the highest level of patient care. The positive impact of RTLS on workflow, asset management, as well as staff and patient safety underscores its essential role in the logistical aspects of hospital settings.

By optimizing nursing efficiency and streamlining operations through RTLS, healthcare institutions can achieve cost savings, improve patient outcomes, and ultimately deliver better care to their patients.

OTHER RTLS APPLICATIONS SUPPORTING NURSES

STAFF DURESS

The same core technology used to track equipment can be used to ensure safety of the valuable nursing team.

In today's healthcare facilities, it is crucial to intervene quickly and prevent violent threats from escalating. A recent Healthcare IT News article indicated that by implementing RTLS, facility leadership can provide a robust staff duress solution and other crucial resources that benefit the overall health, safety, and efficiency of staff.

By implementing RTLS, modern healthcare facilities prioritize the safety and needs of both patients and employees. When a staff duress alarm is activated, a discreet alert is triggered. Smart beacons report the exact room location to designated security personnel, enabling them to provide immediate help. Real-time location sharing ensures efficient response times and facilitates prompt assistance when it matters most. The RTLS-enabled Staff Duress Solution equips healthcare workers with wearable mobile panic buttons, allowing them to quickly summon assistance.

AUTOMATE NURSE CALL CANCELLATION

Leverage the core RTLS technology to automatically cancel nurse call alarms, reducing alarm fatigue and protecting nurses from unnecessary infection risks from added button presses and time wasted cancelling calls.



MONITOR HAND HYGIENE COMPLIANCE

With the installed RTLS system, sensors are installed on handwashing equipment and throughout the facility. The sensors communicate with caregiver badges and provide real-time alerts when a caregiver forgets to wash their hands.

This solution eliminates the need for manual monitoring and provides more accurate data about who is and isn't compliant. The technology protects nurses and patients, and reduces infection risks among staff members.





COLLABORATION WITH ACADEMIC INSTITUTIONS

Collaboration between technology providers like Vizzia Technologies and academic institutions has been instrumental in advancing RTLS technology and its implementation in healthcare settings. Vizzia has partnered with three prominent academic institutions to conduct research and implement RTLS solutions.

GEORGIA STATE UNIVERSITY

Georgia State University (GSU) is ranked No. 2 in the U.S. for Innovation by U.S. News & World Report, with more than \$1 billion in research expenditures during the last five years. The Byrdine F. Lewis College of Nursing and Health Professions has educated more than 12,500 health professionals. 91% of Nursing graduates passed the NCLEX (registered nurse licensure exam) and 97.5% passed the Advanced Practice Nurse registration exam.

Vizzia partnered with Georgia State's Health Informatics department to sponsor a peer-reviewed research project on the applications of RTLS to improve healthcare delivery. Many of the findings are documented in this White Paper and a summary was published by the Healthcare Information and Management Systems Society (HIMSS) in 2023. Ms. Marci Bennafield, MPH, Clinical Instructor of Health Informatics spearheaded the research in conjunction with graduate students and academic resources. Vizzia's CSO serves on the advisory board of the GSU Lewis College of Nursing and Health Professions.





THE UNIVERSITY OF NEW MEXICO

The University of New Mexico (UNM) serves as the state's premier institution of higher learning and provider of health care. The UNM Health Sciences Center is the only Trauma 1 Hospital in the state of New Mexico. The UNM School of Engineering is the highest-ranked engineering program in New Mexico, and the only Carnegie R1 (highest research activity) university in the state. UNM is a member of the Sandia Academic Alliance, along with University of Illinois at Urbana- Champaign, University of Texas at Austin, Purdue, and Georgia Tech.

Vizzia Technologies' Internet of Things Laboratory (IoT Lab) is located at the UNM School of Engineering. The IoT Lab was developed to create an unbiased testing ground to evaluate emerging sensor technologies. This collaborative project between Vizzia and UNM is overseen by the Department Chair of Electrical and Computer Engineering Department. Vizzia's CEO is a distinguished alumni award recipient and earned his BS in mechanical engineering from UNM.

EMORY UNIVERSITY, SCHOOL OF MEDICINE



Emory University is one of the top-ranked institutions for research funding from the National Institutes of Health (NIH). Emory School of Medicine has 10 departments in the top 20 for federal research funding. The Emory Investigational Drug Service (IDS) is a research pharmacy operation that supports all Emory investigators in the conduct of industry and federally funded drug studies. IDS has systems and procedures in place to meet requirements of sponsors, the FDA, and other regulatory agencies.

Emory IDS relies upon Vizzia to automatically monitor the temperature and environmental conditions of medical supplies in clinical trials. Real-time alerts let clinicians know if a refrigerator, freezer, or a room deviates from desired conditions to protect important and expensive products. Vizzia's CFO received her BS in Biology from Emory University.



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Georgia State University campus during the Fall Semester.



About Vizzia Technologies

DRIVEN BY A VISION TO IMPROVE HEALTHCARE

Vizzia Technologies is a recognized leader in advanced real-time location systems (RTLS) and data analytics for healthcare organizations. Its innovative InVIEWSM software platform provides real-time, actionable data and process visibility to improve enterprise efficiencies and patient care. Vizzia serves several of the largest hospitals and health systems in America, designated by Becker's Hospital Review.

FROST & SULLIVAN RTLS COMPANY OF THE YEAR (2023)

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Real-Time Healthcare Visibility