



Continuous uptime in the healthcare industry

The need for continuous clean power

Access to continuous, clean power is vital in the healthcare industry. While just a few seconds of downtime can cost a business hundreds of thousands of pounds, in the medical world, any disturbance in power can also cost lives. And even if the stakes aren't always life and death, power quality issues are a bitter pill to swallow for today's healthcare organisations.

With technology now driving the practice of medicine, power anomalies can cause significant pain across the industry, from disrupting patient care to causing equipment damage, data loss and injured reputations. Power issues have been a frequent cause of fractured operations at healthcare facilities, with hospitals forced to turn away new patients, transfer existing patients, and reschedule elected surgeries in the wake of unexpected outages. In many cases, hospital generators will fail to kick in, leaving facilities vulnerable to downtime and the risk of life-threatening outcomes.

Understandably, continuous uptime is an unspoken expectation at Europe's more than 141,000 hospitals, not to mention the hundreds of thousands of independent doctors' offices, surgery centres, imaging facilities, and other healthcare establishments that maintain sensitive medical devices – all of which require clean power at all times.¹

With such a wide variety of devices and systems, all of which can be impacted by power outages – with potentially life-threatening consequences – it's vital that healthcare providers employ well thought-out power protection across their entire IT infrastructure.

The need for continuous uptime in the healthcare industry

Imagine the chaos a loss of power can spark across modern healthcare facilities which rely on the 24/7 availability of a plethora of machines to keep patients alive and well.

Yet it doesn't take a full-blown blackout to wreak havoc with sensitive medical equipment and critical processes. In healthcare environments, a few seconds without power can result in compromised patient care, significant costs, and reputational damage – even a single voltage dip lasting one hundred milliseconds can prove extremely damaging.

In imaging centres, for instance, if electricity is cut to magnetic resonance imaging (MRI) or computerised tomography (CT) scans during diagnostic procedures, tests must be repeated, putting patients at risk from additional exposure to radiation. And in surgical centres, power is needed for the numerous monitors and devices that help keep patients alive during procedures.

Worryingly, power issues are becoming more prevalent, with a combination of climate change and ongoing geopolitical factors leading to a growing risk of power outages. As a result, governments across Europe have taken steps to minimise the impact of outages on domestic and industrial energy users, while NHS trusts across the UK have drawn up plans to deal with a shortage in energy supplies.^{2,3}

Notes:

¹ - List of Hospitals Europe - BoldData

² - Europe prepares blackout plans to head off winter energy chaos – Bloomberg

³ - English hospitals make emergency plans amid winter power loss fears – The Guardian



Powering Business Worldwide

Uninterruptible power supplies (UPS) and other power management products are, therefore, needed to sustain daily operations in healthcare facilities including hospitals, labs, and outpatient locations. In addition to providing emergency power during outages, UPSs are essential to shield critical devices - such as life-sustaining equipment and imaging solutions – against a wide range of power anomalies.



UPS solutions help healthcare providers to:

Protect against volatile utility power.

From grid overdemand to aging infrastructure to extreme weather conditions, today's range of acute threats make it increasingly challenging for healthcare organisations to fulfil the basic requirements of supplying continuous clean power.

Ensure the safety and comfort of patients.

From electrical medical records to sophisticated diagnostic machines, technology has revolutionised the healthcare landscape. But growing threats to power quality make it challenging to always assure reliable power. If electricity is cut, it is essential that all surgical equipment, life-support systems, and other critical devices remain up and running.

Avoid repeated tests.

During an imaging study, even the smallest drop in power before the sequence is complete can necessitate a repeat examination, resulting in additional cost and inconvenience.

Protect investments.

Healthcare organisations allocate substantial capital to cutting-edge medical technology, so consistent power is essential to protecting that investment. UPS protection can safeguard sophisticated equipment against power anomalies, downtime, repairs, and early replacement.

Keep data available.

Healthcare facilities require continuous uptime to securely manage data. UPS solutions are instrumental in keeping electronic medical records and other data accessible, as well as helping facilities adhere to GDPR and other privacy and security requirements.

Reduce overall costs.

UPSs not only increase a healthcare facility's operational efficiency and productivity, but they also contribute to reduced operating costs. The upfront CAPEX cost of purchasing a UPS is much lower than the OPEX price tag associated with dealing with the long-term effects of downtime.

Support backup generators.

Hospitals and critical care facilities are required to install and maintain generators, but these devices are not always without their faults. To prevent electrical interruption, a UPS is needed to bridge the gap between utility failure and generator start-up.



UPS - a life-support system for healthcare providers

A properly designed power protection solution helps hospitals, labs, imaging centres, and other medical facilities provide exceptional patient care, protect hygienic environments, and securely perform tests and procedures. UPSs are also essential for maintaining continuous power in critical spaces such as surgical suites and intensive care units, where the consequences of power failure are potentially deadly.



Powering the healthcare environment

Today's healthcare facilities use a wide range of voltage-sensitive equipment that requires clean, consistent power at all times. Unfortunately, though, the electrical environments in these facilities often fail to provide the optimal conditions, leaving critical devices at risk of damage and downtime.

There are numerous healthcare applications where power protection is imperative, including:

Imaging equipment – Special consideration must be given to ensure CT and MRI machines maintain a clean bill of health amid changing power conditions, especially as manufacturers of these devices specify compliance with certain power requirements, such as maintain voltage parameters and eliminating electrical noise.

Life support equipment – Most life support equipment today has its own built-in battery backup to bridge the downtime between a loss of power and a generator startup. But due to instances where hospital generators have failed, it is always best to deploy an additional layer of backup protection for this vital equipment.

Surgery centres – Many surgeries now take place outside of hospitals, such as orthopaedic, cosmetic, and endoscopy procedures. These centres include anaesthetic and other equipment where battery backup is needed to ensure safety.

Operating theatres and surgical suites – With electronic devices including surgical equipment, anaesthesia machines, and ventilators in today's operating environments, it has become increasingly common to install UPS systems to support the rooms' isolated power panels.

Oncology departments – Oncology relies on various electronic devices including CT simulators, on-board imaging, and high-dose-rate (HDR) brachytherapy. Some departments may also use nuclear medicine devices such as CT and positron emission topography (PET) scans, nuclear cameras, and single-photon emission computerised topography (SPECT) scans, all of which can be disrupted by even minimal power outages.

Cardiology departments – In the past, it was common to support Cardiology labs on a building's generator. Today, though, it is normal practice to include UPS protection to assure uptime during the transfer time to a generator, allowing cardiologists to continue procedures without interruption.

Clinical laboratories – UPS systems can support a range of medical and research lab equipment. Many blood analysers, for example, operate in long, timed processes where even the slightest interruption can result in the loss of a specimen, impacting lab results that could be crucial to a patient's life.

Vaccine refrigerators – The global pandemic highlighted the importance of refrigerators in keeping vaccines and other medicines within precise temperature parameters to ensuring they remained viable. But without backup power, outages can frequently result in large losses of perishable vaccines.

Other systems – In addition to medical devices, healthcare organisations support several other systems that require continuous, clean power, including telephones, internet, temperature control, and sterilisation facilities.

The evolution of healthcare uptime challenges

In recent years, modern technology has vastly altered the healthcare landscape, making it infinitely easier to enhance and optimise patient care. But these advancements don't come cheap. Globally, 45 percent of healthcare providers increased their IT investment between 2021 and 2022, while spending by the NHS on technologies such as cloud, digital, and cyber rose by nearly 50 percent year-on-year, signifying an even greater need for availability and uptime.^{4,5}

At the same time, the monumental advance afforded by technology represent an array of equally



significant challenges for medical organisations, including:

Managing and protecting massive data – Healthcare is responsible for 30 percent of the world's data.⁶ This can be attributed to a range of factors, including large diagnostic imaging files, the increase in patient life expectancy, and the transition from paper to electronic health records. Anytime-access to such enormous amounts of data has breathed new life into the healthcare sector, providing medical professionals with the ability to create holistic views of patients, personalise treatments, improve communication, and enhance health outcomes. However, with these advantages comes an increasing need for secure and robust data management and protection.

Notes:

⁴ - 2022 Healthcare Provider IT Report – Bain & Company

⁵ - Health tech spending in the NHS: What to expect in 2023 – Health Tech World



The need for more data centres – As the use of medical technology and the accompanying data continues to grow, so too does the need for modern data centres. Rather than struggle to maintain outdated on-premise IT infrastructure or pay to use inefficient data centre facilities they have long outgrown, healthcare providers are turning to cloud storage and hybrid data centres for a quick, secure, and scalable solution.



Supporting telemedicine – Physicians now routinely rely on video conferencing to interact with patients without the need for a physical appointment. Since the pandemic, more patients – and healthcare providers – have recognised the value of telemedicine, leading to an increase in the technologies which underpin it.



Managing the IoT – The rise in mobile, always-connected technologies means that a pacemaker in a patient's heart can stream data to doctors in real-time, alerting them immediately if an issue arises. Likewise, vitals can be transferred to healthcare providers to give patients fast, accurate treatments. Just like imaging devices, the wealth of health-related IoT wearables is flooding the industry with vast amounts of granular, historical data on a growing pool of patients, all of which needs to be managed and protected.



Ensuring cybersecurity. Digital threats are on the rise. While the overall number of cyberattacks grew by 38 percent between 2021 and 2022, the healthcare industry experienced a concerning 74 percent increase, largely due to the value of the sensitive data held by medical organisations.⁷ With potential consequences ranging from the loss of personal information to downtime and ransomware and denial-of-service attacks, healthcare organisations must do everything they can to ensure their connected technology is secure and resilient.

⁶ - The healthcare data explosion – RBC Capital Markets

⁷ - 2023 Cyber Security Report – Check Point Research



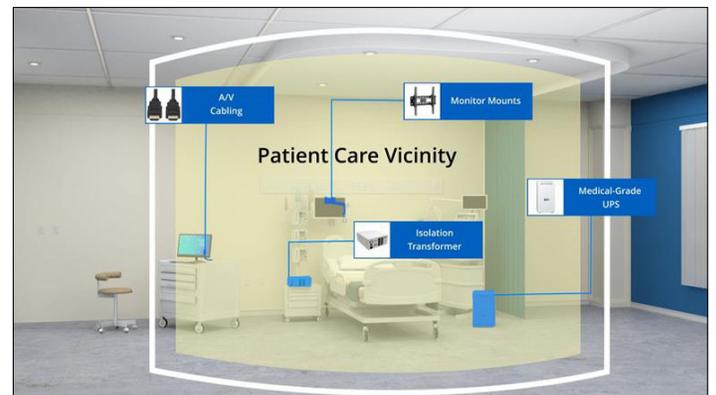


A complete power protection solution

Across the healthcare industry, where any interruption in electricity can result in consequences ranging from mild inconvenience to unimaginable tragedy, a holistic power protection strategy addresses multiple functions.

Whether safeguarding equipment in an operating theatre, imaging centre, or clinical laboratory, Eaton offers the necessary solutions for healthcare organisations to withstand and reduce disruptive power events, ensure optimal patient care, preserve the availability of sensitive medical equipment, and maintain a comfortable, safe, and secure electronic environment.

Eaton's generation of power protection, including UL 606001-1 compliant medical grade solutions, is designed to support healthcare providers with integrated solutions for both patient care and hospital IT departments.



Regulatory compliance

Selecting power products compliant with stringent safety regulations is essential. Defined as "a space, within a location intended for the examination or treatment of patients (i.e., patient-care space) extending 1.8 m beyond the normal location of the bed, chair, table, treadmill or other device that supports the patient during examination and treatment and extends vertically to 2.3 m above the floor", the patient-care vicinity has strict regulatory requirements.

In a patient-care vicinity, only medical and diagnostic equipment that requires power backup at all times are to be plugged into a UL 60601-1 compliant UPS, for instance, whereas all non-medical equipment and personal devices that do not require power backup can be plugged into a UL 60601-1 compliant isolation transformer. Eaton offers UL 60601-1 medical-grade solutions.

Distributed IT infrastructure solutions for powering the modern healthcare sector



Patient room care



Hospital IT room



Patient care solutions



Eaton's Tripp Lite Series SmartPro Medical-Grade UPS – Fully compliant with **UL 60601-1 standard**, this line-interactive UPS is ideal for use in medical facilities, including patient care vicinities.



Eaton's Tripp Lite Series A/V – Connects audio/video components to a display in a healthcare application.



Eaton's Tripp Lite Series Medical-Grade Isolation Transformer – With **full UL 60601-1 standard** medical-grade listing, this transformer offers complete line isolation from input AC mains power, cumulative leakage of less than 100 μ A, and protects sensitive medical electronic equipment from EMI/RFI line noise and surges.



Eaton's Tripp Lite Series Ethernet Network Isolator – Isolate medical devices connected to an Ethernet network to protect patients from dangerous leakage currents.



Eaton's Tripp Lite Series Monitor Mounts – Low-profile mount hangs a flat or curved-panel television, monitor or other display on the wall.

Hospital IT room solutions



Eaton 9PX G2 UPS – Energy-efficient power protection for hospital IT rooms and infrastructure, it's the perfect UPS for IT and Facility Managers concerned with energy cost and looking for a next-generation power protection solution.



Eaton 93PX UPS – Eaton's rack-mounted 3-phase UPS offers reliable, efficient power and advanced cybersecurity. Its compact design saves rack space in healthcare IT, enabling more critical equipment integration.



Eaton Rack PDU G4 – A full range of PDUs from basic rack mount models to advanced models for comprehensive monitoring and control in hospital IT environments.



Eaton's Tripp Lite Series Server Racks and Cabinets – Eaton's premium-grade floor and wall mount server racks and cabinets organize and secure IT equipment for hospitals.



Eaton Gigabit Network Card M3 – Compliant with UL 2900-1 and IEC 62443-4-2, it enhances healthcare operations by ensuring business continuity through zero-trust architecture, advanced management, and early issue detection.



DITPM (Distributed IT Performance Management) – The ideal solution for distributed infrastructure, it monitors your healthcare power devices, identifying and fixing issues before equipment fails. Mass firmware updates for the Gigabit Network Card save time and resources.



Warranty Extension – Enjoy peace of mind with warranties extensions for UPSs up to 200 kVA, including on-site exchange, covered logistics, and a professional help-line.