The impact of energy shortages on health and healthcare in Europe

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PERSPECTIVE

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The impact of energy shortages on health and healthcare in Europe

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1 | INTRODUCTION

The prices of electricity and gas have been steadily increasing in Europe since the winter of 2020. The reduction in natural gas supply from Russia in retaliation to the support of the European Union (EU) to Ukraine has led to an eightfold increase in gas prices in comparison to the last decade's average. European Institutions, national and local authorities, are adopting measures aiming to restrict energy consumption and prevent further rises in the cost of energy. These provisions range from dissociating the prices of gas and electricity to imposing limits on the utilization of electrical devices and heating.[1] The impact of the so-called energy crisis on healthcare is yet to be discussed.

2 | IMPACT OF THE ENERGY CRISIS ON HEALTH AND HEALTHCARE

Large invoices, and partial (brownouts) or total blackouts, have a dire effect on healthcare facilities, healthcare workers, patients, and medical technology enterprises and supply chains. Healthcare facilities are energy intensive. Operating rooms, and supporting infrastructure in particular, account for the majority of energy utilization in healthcare, which are equivalent to 4.8% of the total energy consumption of commercial buildings. Apart from surgical procedures, lighting, air-conditioning, and biomedical devices can culminate in energy intensity higher than 234 kWh/m^2.[2] Evidence from sub-Saharan Africa suggests that power outages longer than 2 h increase inpatient mortality by up to 43%.[3] Inconsistent energy supply threats the life and well-being of inpatients and disrupts the continuum of in-hospital care, and the capacity of outpatient and emergency departments. Irregular voltage can damage biomedical equipment and result in the degradation of thermosensitive supplies such as vaccines, insulin, and blood transfusion products.

Although hospitals have secondary energy generators, patients dwelling at home face a twofold risk: power outage and disconnection of energy supply due to debt to energy providers. In both cases, biomedical or ambient living devices, from respirators to refrigerators, can temporarily stop functioning or sustain mechanical damage. Patients may not be able to monitor vital health parameters, receive medication or food, move around, or seek help. These threaten patients' physical well-being, cause significant mental distress, and may lead to overload in emergency departments if patients are unable to receive device-dependent treatment at home.

On a broader scale, a lack of electricity can lead to unfortunate incidents and hazardous behaviors. For example, cold temperatures can deteriorate cardiovascular, respiratory, and mental health conditions across all ages.[4] People with limited resources for heating might resort to CO-emitting self-manufactured heaters, a practice with marked mortality.[5] Similarly, the reduction of street lighting can significantly increase traffic injuries.

Healthcare workers are equivocally vulnerable to power outages. During their working hours, they can experience psychological stress and physical exhaustion in case they are expected to manage critically ill patients without the necessary electrical equipment. The image of physicians ventilating patients manually in the lack of respirators became common during the coronavirus disease 2019 (COVID-19) pandemic. As we approach the end of the pandemic, likely physicians will still have to ventilate with their own hands due to the lack of electrical current for the respirators. On a different note, restrictions on heating and air-conditioning in hospitals might force surgical personnel to work in conditions rendering surgical clothing unbearable and compromise their performance.[6] Experiencing blackouts at home or being unable to afford electricity supply can deplete healthcare workers of the peace they need to recuperate after a challenging day at work. The latter applies particularly to residents, trainees, or assistive personnel, whose relatively low salaries have already made it challenging for them to cope with rising inflation across a wide spectrum of goods.[7] Likewise, healthcare workers using computers and other devices to get informed about the latest guidelines in their field or conduct research during their spare time will not be able to fulfill these tasks. Certainly, healthcare workers suffering from health conditions themselves face similar risks to patients as explained above (Figure 1).

In a recent statement, MedTech Europe outlined the implications of the energy crisis on health technology enterprises.[8] Disruptions in energy supply compromise their ability to produce adequate amounts of medical devices, safely store those available for delivery, maintain those that already operate in healthcare settings, and certainly experiment and innovate. Apart from the evident sequelae on the smooth function of the healthcare system, and the safety and well-being of patients, this can result in financial repercussions toward the medical technology industry. The latter comprises mainly low and middle-size enterprises that have already strived to survive during the financial crisis of 2009 and the COVID-19 pandemic.[8,9]

Medical supply chains consist of the nexus between the industry and healthcare facilities. Energy shortages can supply them at many levels. Storage infrastructure might fail to sustain the quality of medicines and sensitive devices rendering them ineffective or even dangerous. Information technology systems supporting the logistics of transportation and distribution might fail to meet their normal workload resulting in life-threatening delays. The disruption of supply chains can also go beyond European healthcare facilities, as Europe relies on third parties for the supply of raw materials or critical components for the pharmaceutical and the health technology industry. For instance, the production of magnesium has already been reduced due to power outages in China, one of the major suppliers of the material.[10]

3 | RECOMMENDATIONS

Action is needed to safeguard individual and population health, and to secure the medical technology industry and supply chains amidst the upcoming energy crisis. The previous health crises have shown that the EU tends to adopt a central framework of action, which serves as a guideline for member states and organizations operating across different regions and member states. The specifics of dealing with the crisis fall upon delegation between European Institutions, and national and local governments. Nevertheless, based on

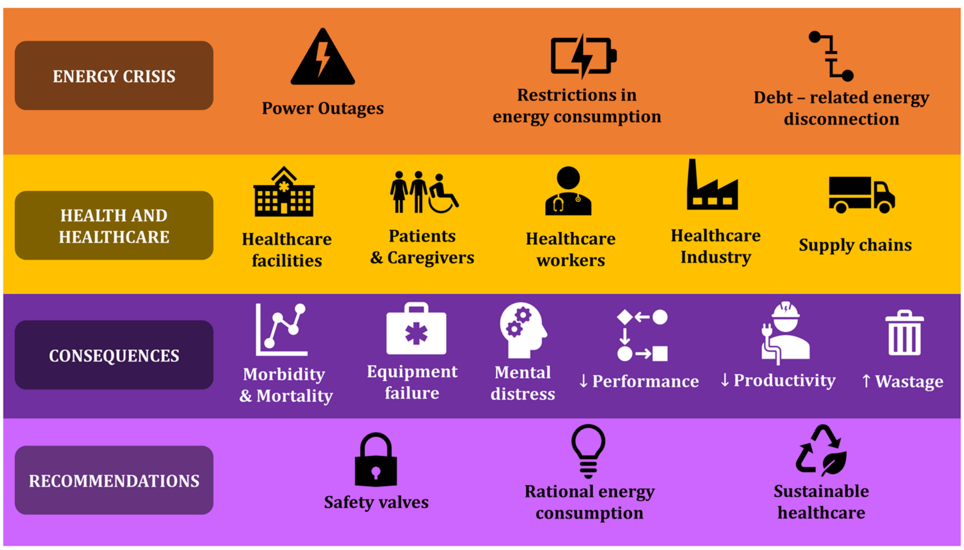

FIGURE 1 The potential impact of the energy crisis on health and healthcare.

the above, a two-pronged strategy can be recommended, to ensure a sufficient energy supply for health and healthcare systems.

First, red lines related to the continuous provision of energy to healthcare facilities, healthcare workers, home-dwelling patients, and biomedical enterprises and infrastructure need to be agreed upon. All facilities, from tertiary hospitals to day clinics, need to have sufficient secondary sources of energy, such as generators, in case of power outages. The same applies to homes where patients reside. Energy providers need to be informed—in a personal data-sensitive manner—about the health needs of households and prioritize those where electrical device-dependent patients reside for energy provision and energy provision restoration. Ideally, patients should be entitled to batteries or generators that can keep essential devices such as respirators functional until help arrives. The latter indicates that prehospital care services should be trained and employed with additional personnel capable of covering these needs. As debt to energy providers can lead to disconnection from energy supply, lawmakers should prompt a universal framework protecting patients, healthcare workers, healthcare facilities of any size and capacity, and health technology enterprises from disconnection. The persecution of individuals and entities on the grounds of debt to energy providers should be suspended as well. The reportedly detrimental effect of financial worries can only deteriorate the fragile health of patients and limit the capacity of healthcare professionals, facilities, and enterprises to face this crisis.[11] State funds directed towards the alleviation of rising energy prices can serve as a safety valve for those unable to afford electricity bills. The same can support the financial stability of energy providers. State authorities can lay a framework of cooperation between energy and healthcare providers. Such agreements can support both the need of healthcare facilities to operate safely and the need of energy providers to earn sufficient amounts of money. Energy providers can be encouraged to invest part of the fees earning from healthcare facilities to sustainable sources of energy or directly to the installation of alternative forms of energy infrastructure, such as solar panels, in healthcare facilities. In this manner, both energy providers can retain and probably increase their profit, whereas healthcare systems increase their energy security and efficiency.

Furthermore, steps should be taken towards the rationalization of energy consumption in healthcare facilities. In the short term, these entail guidelines for reducing unnecessary lighting, and air-conditioning—notably in spaces and timeframes when neither personnel nor patients benefit from them. Healthcare personnel should be educated about the energy intensity of commonly used devices and guidelines about the management of power outages should become available. Similarly, patients and caregivers can be informed about the optimal management of electrical devices at home. In the long term, this is an asset towards accelerating the sustainable transformation of healthcare. This is a complicated endeavor, whose implementation ranges from increasing the green energy supply to healthcare facilities and constructing or repairing hospitals with energy-saving materials to manufacturing thermostable medicines.

4 | CONCLUSION

Overall, the upcoming energy crisis can affect healthcare in Europe and beyond. The EU and its member states are still striving to recover from the health sequelae of the COVID-19 pandemic. Therefore, it is pivotal to mitigate the impact of the energy crisis on health with timely interventions.

AUTHOR CONTRIBUTIONS

Christos Tsagkaris: Conceptualization; Writing – original draft. **Lily Laubsher**: Investigation; Writing – review & editing. **Lolita Matiashova**: Visualization; Writing – review & editing. **Lu-Chieh Lin**: Supervision; Writing – review & editing. **Anna Isayeva**: Supervision; Writing – review & editing.

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The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

No data were generated through this article.

TRANSPARENCY STATEMENT

The lead author Lolita Matiashova affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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