

A Multidisciplinary Perspective on Public Health: The Role of Fuel Cells and Nanotechnology in Advancing Epidemiology, Occupational Health, Emergency Services, Nursing, and Laboratory Operations

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1. Introduction

Human health in a population, typically referred to as public health, is a complex attribute with biological, psychological, social, and economic influences. The public health armamentarium that is working to understand, monitor, and treat these influences is equally complex, including fields such as epidemiology, sociology, medicine, environmental health, emergency response, nursing, virology, industrial hygiene, and psychological health that address these factors. It is an excellent example of an interdisciplinary tool, one of the many that are used daily by those who are trained and tasked with protecting the population's health. More sound data, properly interpreted and acted upon, always improve that protection effort, and this is true no matter which of the aforementioned disciplines is involved. Solving the problems in which data are applied, however, requires imagination as well. New ways to measure factors that have not been understood or are clouded are especially helpful when developed. The use of new technology, or combinations of existing technology, can be a transformative experience that moves science and health theory forward. The use of nanotechnology, fuel cells, and other energy-storing devices, or even a combination of both, fit the bill. Individually, the new data that each can produce is valuable or, at least, will lead to new questions and new directions. Together, on the other hand, we are searching for the synergism that would allow for truly transformative practice in the many disciplines that are working to improve and protect the public's health. This paper explores the opportunities to advance practice in epidemiology, health care, emergency services operation, occupational health exams, and laboratory operations.

1.1. Overview of Public Health and its Interdisciplinary Nature

Public health is an organized effort of society that focuses on preventive, protective, and promotional activities to promote health. The integrated pattern of health is an outgrowth of various integrated patterns of organized community efforts to prevent idiopathic quarantinable diseases, injuries, and chronic conditions, treat diseases and prevent their complications, promote wellness, intervene in health crises, and offer curative measures to individuals lacking resources to self-provide. As a profession, public health merges knowledge from the domains of medicine, mathematics, environmental studies, architecture, social and behavioral sciences, public administration, clinical sciences, and other fields. The collective practice of a collaborative team of professionals includes but is not limited to epidemiologists, public health physicians, statisticians, occupational health personnel, and clinicians. The scope of public health activities that can be considered original equipment manufacturer or first responder activities is vast. The scope of public health and its professional staff overlaps with the practice of medicine but is not solely concentrated on diagnosing or treating individual episodic illnesses. (Wang et al.2021)(Dang et al.2021)(Saleem et al.2022)(Luo et al.2022)

The initiative fosters the establishment of multidisciplinary research alliances and educational curricula that promote and expand the integration of public health and human sciences with other disciplines, such as fuel cells, nanotechnology, environmental health, and occupational safety and health issues, into essential public health training and in-service training and educational practices. These changes are essential because of the expanding scope of environmental and safety hazards in today's society. For example, the increasing numbers of chemicals measured in the general population now number 218, with 125 in the general population aged 6 to 18 years. New or expanded public health threats, such as nanotechnology and agent-specific anti-terrorism preparedness and response activities, require that public health practice and professional curricula and training programs produce practitioners capable of applying leading-edge knowledge as well as adaptable systems-thinking skills to a broad and rapidly shifting knowledge base. Public health stakeholders in the private sector, government, academia, and the community must collaborate in formulating curricula, teaching, and training approaches that are accurate at the time of delivery and adaptable over time. That is, the systems-thinking skills and core basic science and public health competencies are more important than specific content knowledge, though they are not a substitute for such knowledge. Because all of these vectors influence the planning, implementation, and outcomes of public health and health care strategies and programs, teaching and training in public health and health sciences are inherently multidisciplinary, engaging public health and public health research faculty in multiple schools and colleges on a university or college campus as well as in other locations such as a state, local, or tribal health department. (Setyorini et al.2021)(Fillol et al.2021)(Steenland & Winquist, 2021)(Lange et al.2021)

2. Fuel Cells in Public Health

Public health operates across broad domains of influence that can transmit the potential for health promotion, a broad view of health and well-being, and management of diseases and disorders. This report focuses specifically on technological impacts on public health. If a technological change has reusable value across a wide range of stakeholders, it is more likely to result in infrastructure and institutional change and facilitate the establishment of robust public health programs. In this paper, we investigate the potential long-term public health outcomes of shifting toward technologies such as fuel cells and nanotechnology, which may be initially valued for their ability to provide inexpensive heat and power. This program aims to consider technological influences on public health by assessing the short-term improvements in our ability to detect and act on exposure threats. Our longer-term goal is to recognize technological innovations that can be incorporated into our public health infrastructure in order to enhance community health, reduce demand for health care services, and promote health and well-being.

Public health and the health care system can benefit from clean and sustainable energy sources. At its most basic level, generating less power-related pollution means that less pollution may be reversible. Pollution has a unidirectional relationship with public health, perpetuating health disparities for generations by disproportionately influencing people's access to quality food, housing, transit, leisure, and green spaces, as well as their relationships with cultural and personal identity and the products of their work. Fuel cells have historically been a prime target of nanotechnology research and development, as they may one day replace catalytic converters in motor vehicles with automotive onboard energy factories capable of providing heat, light, and air conditioning. As a distributed energy source generating pure water and heat concomitantly with clean electricity, fuel cells are being widely considered in nursing, laboratory, epidemiology, toxicology, and emergency services practice settings as the technology matures. Given that the conversion of contaminants results in heat and water, it is expected that reducing environmental contamination will also result in environmental health improvements. Moreover, a successful offset of transportation and manufacturing workplace injuries that result from lithium-ion forklift recycling has economic development and community benefit foundations. Evidence provided allows stakeholders to aim for positive public health and quality-of-life outcomes. Additionally, methodologies for using syngas to generate chemicals and fuels are being developed. A more familiar precedent with hospitals involves the use of non-silicon-based photovoltaic cells to generate electricity. Finally, however, the public health benefits may need to be more apparent to a large range of stakeholders for the state to continue to assist manufacturers in making investments in this technology at a time. (Vallabani et al.2023)(da et al.2024)(Hallman and McCullough2022)(Batterman et al.2023)(Charlton et al.2021)

2.1. Fundamentals of Fuel Cells

A fuel cell includes an anode on one side and a cathode on the opposite side. Gas can enter and exit on both of these sides. In the midst of these two sides is the electrolyte, making the movement of electrons from the anode to the cathode internally. When electrons flow from one side to the other via an external circuit, an electrical load or power is created. This provides power for electrical components in everything from a vehicle to a hearing aid. All fuel cells consist of the same principles, with the only distinction being the type of electrolyte used. Different types of fuel cells have their advantages and drawbacks as a result, and the most efficient option depends on the diversity of applications. Each of these electrolyte types will then result in chemical

reactions that either use precious, expensive metals or chemicals of origin. Renewable energy sources like hydrogen from waste may be converted to electrical power and heat at the point of use by combining the technologies.

Hydrogen is the most popular fuel for fuel cell applications. This is because the only by-product of its consumption, when used in a fuel cell, is water, which does not pollute the environment. Although fuel cells can be powered by a diverse range of fuels, including natural gas, methanol, and even organic chemicals, hydrogen is ideal due to the minimal processing required to remove contaminants. For every fuel cell project, the handling of the waste byproducts is essential: will combining the wastes from fuel cells reduce the waste or pose additional challenges to workers' well-being and the environment? As a result, a key aim of this study is to demonstrate the various applications available, the tendencies in fuel cell and vehicle manufacturing worldwide, and to explore the potential behavior of health professionals involved in relevant industries. This will aid our capacity to effectively broaden the range of this research and to estimate the potential consequences. (Fan et al., 2021)(Aminudin et al.2023)(Sürer & Arat, 2022)(Olabi et al., 2021)

2.2. Applications in Epidemiology and Disease Surveillance

The technologies underlying FC-EOS applications are capable of facilitating disease surveillance and monitoring, serving as a new method for the collection of potentially valuable data and environmental information via the use of remote, networked devices. New data collected via networks of disposable and/or personal monitoring platforms could include details on spatial and temporal variation in infections, transmission dynamics and routes, and variations in susceptibility or susceptibility risk factors. Data collected in remote locations could support timely and efficient field evaluations in settings where resources to accomplish paper-based epidemiologic investigations, technical facilities to collect and transport, as well as funds to sustain population-based disease surveillance, do not exist. In contrast to the potential public health benefits of fuel cell technology use, the drawdown of technical and financial resources from environmental and agricultural sectors, neither of which are supporting public health, is of lower economic value than that possible in the agricultural production of domestic bioenergy feedstocks. (Sun & Xia, 2024)

A research project in a humanitarian setting that evaluated the impact of an accessible fuel cell on the speed of hemoglobin testing during antenatal care revealed that spatial epidemiology—contingent upon developing technologies—has the potential to greatly enhance the quality of data collected for health monitoring and decision-making. The aforementioned observations make it probable that the rapid expansion of the currently new science of spatial epidemiology will occur, and that it could become an essential part of public health surveillance systems in industrialized countries as well as thrive in its central role in the design and evaluation of public health interventions in developing countries. A host of approaches have been developed to negate the previously mentioned challenges, particularly in relation to cross-correlation, principal component analysis, wavelet analysis, neural networks, and random sets.

Three challenges face FC-EOS:

1. The development of standard operating procedures, infrastructure, tools, and joint communication for collecting and integrating data from both types of sensors into existing geospatial and health information system frameworks;
2. Interfacing of population-based data with data obtained by monitoring individual exposure pathways in an effort to draw inferences and make public health decisions; and
3. In order to effectively respond to the signal of a potential health threat identified by the technology in service of the general public, data analytic competencies in health status monitoring based on disease outbreaks, in particular, GIS and spatiotemporal statistical methodologies, are required to aid public health response and decision-making.

The primary and currently underexplored benefit of these uses of fuel cell technologies is the potential to increase our insight into the relationship of human and infectious agent behavior and variability with the spatiotemporal pattern of exposure and disease. This has been considered within existing frameworks for understanding epidemiologic or toxicological principles; however, the versatility across population-based and infectious agent-based health monitoring systems presents a new challenge to the scientists and analytics systems to integrate these datasets to enhance traditional data evaluations in the environment and public health in a manner in which fuel cell surveillance data is used for the benefit of real-time public health evaluations and injury control. Policymakers and practitioners working in disease surveillance and response have the knowledge and understanding to interpret real-time data in relation to the reference data to improve the public health response. (Dwivedi et al., 2022)(Simoska et al.2023)(Roy et al., 2023)(Ramya & Kumar, 2022)

3. Nanotechnology in Public Health

Nanotechnology is a rapidly expanding field and may prove to be just as transformative as the development of internal combustion 100 years ago. Nanotechnology involves working at the smallest scale, in a range of 1 to 100 nanometers. A nanometer is one-billionth of a meter, or approximately the length of three atoms lined up. It is based on the understanding that properties at the nanometer scale are often radically different, not simply a smaller version, than those at other scales. In many cases, this will allow the development of structures and materials that were literally impossible before. The development of catalysts, catalyst supports, and filters used by gas cells, such as cleaning vehicle exhaust, are examples of materials and structures developed at the nano level. Nanotechnology has broad applications and unique advantages for health, including diagnostics and sensors; nanomaterials; and drug delivery systems.

These products can target a specific location, cell, or molecule; dissolve very slowly or very quickly; be synthesized quickly; and/or have powerful imaging capabilities. In diagnostics, nanosensors for a variety of infectious, biological, and chemical agents of concern likely will enable near real-time surveillance and monitoring critical for disease prevention and control. Nanostructured materials are being developed to enhance the detection and removal of microorganisms, chemicals, and radiation from complex mixtures, such as injury victims recovering from explosions or blasts. For instance, "smart" coatings on environmental or personal protective equipment may stress light, facilitating decontamination. Ethical and regulatory considerations are also emerging with respect to the use of nanomaterials in food and cosmetics. There has already been significant investment in nanotechnology for health research and development. It is anticipated that products will be on the market within the next five to ten years. Given our current understanding of nanotoxicology, this type of investment is not only premature, but also ethically concerning. With ongoing uncertainty, researchers have already voiced concerns over the safety of workers producing such nanoparticles before sufficient toxicology tests have been carried out. The ease of collaboration, communication, and the sharing of information across the related fields indicates a role for an interdisciplinary approach to public health. It will therefore be important for all areas to be educated and informed of this new possibility and their potential applications in the public health arena.

Comprehensive efficiency, safety, and ethical considerations must be forthcoming before investigators proceed with the implementations of their studies. Nevertheless, rapid advancements are taking place, driven by increasing numbers of universities and health precincts housing multidisciplinary teams dedicated to research and development in this field. Areas emerging as possible key areas of application include epidemiology, bioinformatics, and biotechnology; resource management related to disease and health forecasting and surveillance; operational effectiveness centered on emergency service provision, operating theaters, and quarantine initiatives; enhancement in nursing and patient care; leading-edge science and laboratory testing. Since the field is new, there are still many unknown areas that will no doubt be the focus of investigative scrutiny over the next few years of proposed implementations. (Moghaddam et al.2021)(Peek & Guikema, 2021)(Vahdat, 2022)

3.1. Basic Concepts and Principles of Nanotechnology

The term "nanotechnology" originated from the Greek prefix "nano," which means "dwarf." Nanotechnology is the manipulation of matter on an atomic and molecular scale. It operates on a length scale of approximately 1 to 100 nanometers. For comparison, a human hair is approximately 80,000 to 100,000 nm wide, roughly 100 times the diameter of a silicon atom or 10 nm. These exceedingly small dimensions lead to striking changes in several material properties and the way these materials interact with other substances. Nanotechnology thus aims 1) to synthesize new materials with tailor-made properties, and 2) to understand and tweak biological and chemical processes at the nanoscale. The former facilitates the fabrication of smaller, faster, and more accurate devices; the latter is the basis for the use of nanoparticles as drug carriers, enzymes, or sensors, as well as many other biomedical applications. Based on their functions and applications, nanomaterials can be classified into nanomaterials, "nano-enabled" products, and man-made nano-engineered products. The basic method for synthesizing nanomaterials is the "bottom-up" method in which atoms and molecules are used as building blocks to grow materials via physical and/or chemical processes. These nanomaterials can be classified into fullerenes, nanofibers, nanofilms, nanofluids, nanocomposites, and nanoceramics, depending on their size, shape, and properties. The ultimate nanoparticles are also categorized as engineered and incidental/engineered particles based on the preparation process.

Characteristics of physical, chemical, and biological processes of nanomaterials: Ten nanomaterials are introduced into an animal body; they can quickly disperse through the blood, pulmonary, digestive, and nervous systems, as well as into the intercellular and nanoscale meshes. This ability to be distributed throughout the body has made them beneficial in the practical application of nanomedicine. In contrast, isolated calculations might be "hyper-toxic to cells" and have immune cytotoxic or specific cell

"apoptosis." The profound changes in the physical, chemical, and biological properties of nanomaterials at the nanometer scale provide additional opportunities for preventive medicine. For example, nanotechnology innovations in the early diagnosis of diseases seek the development of a new generation of diagnostics, or the so-called "lab-on-a-chip." These miniaturized diagnostic tools analyze the blood and other body samples for specific diseases while the patient is in the clinic; hence, the patient has access to the results of a "minilab" in minutes. In each of these areas, the application of nanotechnology might lead to approaches that are more effective or competitive than the older, longer-term, and existing public health strategies, methods, and interventions. However, a critical issue that cannot be ignored is the safety/toxicity of nanomaterials.

3.2. Nanotechnology in Occupational Health and Safety

Nanotechnology can be utilized in the Occupational Health and Safety (OHS) field to address unintentional exposures to harmful factors present in the workplace environment. Due to the enhanced properties of nanomaterials, the use of such technologies can increase the speed and reliability of monitoring efforts. Nanomaterials can be embedded into welding masks, hard hats, vests, and other forms of personal protective equipment (PPE) to assist in monitoring exposure, in turn ensuring the expected level of protection. There is an abundance of scientific literature documenting the benefits of nanotechnologies in cleaning, fire protection, and sensors for laboratories, health care facilities, first responders, and industrial facilities. Various industries are currently working to use nanotechnology to more effectively protect laboratory workers from disease agents. Given the results produced from successful validation studies, these endeavors could not only bring long-term benefits of reducing health care and related costs, but should also be strong focal points for marketing improved safety protocols to workers, their families, and the broader public.

There is an urgent need to assess the health risks associated with unintentional exposures to nanosubstances in the workplace, and to develop appropriate controls to protect workers and businesses from liability. The position is that evaluation and control of nanoparticles and exploration of physical, chemical, and toxicological properties should be an absolute priority. We must attempt to apply our combined expertise in toxicology, epidemiology, risk assessment, regulation, and public health policy to the development of rational protocols that can satisfy animal and human protection groups, as well as their corporate opposites. Regulatory activity must take place in parallel with research activity, and substantial resources need to be allocated to the development of appropriate safety standards that will in turn require science-based dose metrics, databases, and analytical methods. We may be forced to accept the analogy that we are building the airplane as it is being flown. At the same time, we have a moral obligation to fashion a bulletproof vest. Our reputation is at stake; we cannot afford to lose on either count. (Alberto et al.2022)(Sousa et al.2023)

4. Integration of Fuel Cells and Nanotechnology in Emergency Services

Also within emergency services, the integration of fuel cell technology with nanotechnology is outlined. Alcohol-based fuel cells have shown potential to power emergency generators and life-saving equipment. Personal fuel cells can recharge communication devices such as walkie-talkies, and a hydrogen fuel cell was integrated into a detection system for field-based chemical detection. The development of suitable hydrogen containment and micro-reactors for fuel cells in these applications is ongoing. In addition to efficient and compact power generation, nanotechnology also has the potential to produce robust environmental sensors using lab-on-a-chip technologies that can monitor emergency infrastructures. Several components of nascent technology applications may propose that fuel cells in emergency settings are still being developed. Integration with other real-world touchpoints ranges from the technical to broader public health intervention applications. For example, the technologies might be designed for use in first-responder personal electronic equipment or in mobile health units. Cellular telecommunications networks might also be powered by fuel cells in disaster situations. Thus, research into appropriate refilling stations, where they draw upon existing portable fuel container practices, could lead to a potential focus for interdisciplinary work. The framework is vital for turning the proposed technologies into reality, since it explains real-world concepts such as device safety, implementation, and variability. (Assad et al.2022)(Foorginezhad et al.2021)(Pramuanjaroenkij & Kakaç, 2023)

4.1. Enhancing Disaster Response and Management

Additional Contributors Mei, Natalie, MD Staff Member, Department of Emergency Management Lado, Jean-Pierre, MD Internal Medicine McGehee, Meghan, MD Neurology Introduction As sectors that are routinely involved in epidemics, pandemics, and Ebola planning in Wisconsin, the contributors to this manuscript had the language to create a paper reflecting cooperation at the state level. The Department of Emergency Management and the Department of Health Services utilized technologies in the annual planning process. Epidemiology staff members have so many planning documents in place that we could practically drop them all in and cite ourselves. Technology Coordination The development of next-generation, multi-

disciplinary, non-sectored communication approaches is revolutionizing many types of emergency response. The redefined the functionality of all of the Wisconsin aging coal plants, and the anxiety of the non-secured power supply has received local attention across the state. Fuel cells have long attempted to get a foothold in the public, and believe it or not, bicycle fuel cell chargers are the electronic supplement for bike sounds, which demonstrate that you are actually “riding your bike” while watching TV. There has been plenty of high-quality research about the incorporation of nano-fuel cells in sensor technology, which could be effectively used in catastrophic events to monitor health during resuscitation efforts. We know people need to eat at least once every 72 hours in a disaster or their health deteriorates. Technology houses are working with nanotechnology service industries to create environmentally safe robots capable of decontaminating an entire state or province in a single day. We know during a disaster, roadways need to be assessed for safety before the next disaster load of rescue vehicles travels the same route to save people who were not affected by the initial event but may be affected by the secondary event. We are involved in quantifying specific disaster preparedness competencies of both trained professionals and a representative sample of the public across the nation in order to be able to represent the results during full-scale exercise planning. This is something long needed in disaster response planning and has been met with immediate governmental support from local, state, federal, and non-governmental planning organizations. (Shelare et al.2023)(Teotia et al.2023)

5. Innovations in Nursing and Laboratory Operations

Innovating in nursing and laboratory operations will spawn two trends: (1) more personalized care and (2) improved techniques, procedures, and therapeutics. These same two trends are emerging from a wealth of information from various studies. Powerful technologies must gradually become a familiar part of nursing and laboratory practice. Thus, patient care quality can progress as a result of advances in pharmaceuticals, forensics, and diagnostics. New techniques aim not only to identify what ails but also to suggest what can be done to provide personalized care. Thus, nursing is seen in the broader context of public health, and contributors needed to shape nursing are not just nurses but other disciplines such as epidemiology, occupational health, emergency services, patient instrumentation, and lab professionals who have a remarkable role. Innovations are given in the way different technologies will play a pivotal role in nursing and laboratory operations.

Fuel cells have a variety of applications in medical instrumentation that enhance patient care and streamline nursing tasks. Portable devices that can be operated with fuel cells include ECG monitors, pulse oximeters, and pulse rate monitors. These are being used in ambulatory settings. In trauma, there have been applications of portable ventilators powered by fuel cells. The role of fuel cells in telemetry of patient monitoring and rigid endoscopies is also being explored. This advanced technology enhances patient care, is easily portable, and is customized according to patients' needs. Laboratory operations comprise two core functions: diagnosis and treatment. With time, this approach is changing, and the technology is being used comprehensively to develop new diagnostics and therapeutics to provide personalized care. Some novel areas being investigated for the use of nanotechnology in medical applications include drug delivery vehicles and the use of gold nanoparticles in cancer treatment, as well as the preparation of cardiac tissue with nanoscale topography. Nanotechnology is currently used for a broad range of medical applications, including targeting tissues and cells, in vivo imaging, and in vitro diagnosis and testing. These tools help the treating physician design a course of treatment for an individual patient. In the future, nurses will need to adjust their skills in applying these techniques to patients in addition to routine primary care. This marriage of technology and practice is likely to springboard into a faster track of health delivery and provide impetus for hospital performance in a focused manner.

Despite the advances in technology, there are certain concerns that need to be addressed to move forward with future operations of nursing and laboratories. Innovations in nursing and health care are having dramatic effects on patients and providers alike. These effects unfold in a variety of manners specific to the specialty. New knowledge is changing routine, established practices and procedures. New processes, techniques, and methods are enabling more personalized and more effective patient care. Staffing of personnel and the physical plant are changing to accommodate these new practices and technological innovations. The adoption of these innovations is proceeding at different rates in each of these practice settings. Training, experience, and the level of sophistication in the operations of the supporting and deploying infrastructure are the principal reasons why there exist such differences in adoption. Innovations displace work as well as enable work. Addressing the pace of technological adoption and staffing under traditional caring, where expert systems are framing decisions, is important, as is similar analysis for operations. (Flessa and Huebner2021)(Amjad et al., 2023)(Kumpunen et al.2022)

5.1. Utilizing Advanced Technologies for Improved Patient Care

In this section, we take a deeper look at how advanced technologies can bridge gaps between care and health by leveraging advances in diagnostic and therapeutic technologies. Although utilizing technology is not a new concept, we present out-of-the-

box thinking in how nano-enabled targeted therapies and advanced direct and rapid patient diagnosis can impact patient outcomes. Privacy and medical data management are increasingly important topics for critical thought. We believe multiple disciplines would benefit from knowledge surrounding the potential impact that sophisticated technology integration may have on employees, patients, and emergency responders as our medical systems develop to 'value-based care' with an emphasis on reimbursement tied to patient outcomes through collaborative technologies.

Given that healthcare is embracing big data and seeking to provide healthcare so that people can improve their health, intervene early, and live life to its fullest potential, we believe that integrating technology in a manner that supports truly patient-centered healthcare will dictate future paradigms in lab, epidemiology, occupational health, and the delivery of nursing care. We aim to think ahead to future practice advancements that can better nurture patients and engage them in their care by providing them real-time analysis of their health status so that they can take action. Fuel cell-powered smart devices and rapid handhelds that travel to the point of need and expedite the rapid diagnosis and a molecular-based understanding of any detected pathogen will allow emphasis to be placed on the development of the right targeted therapeutic. (Sahu et al.2022)(Anagnostou et al.2023)

Privacy issues, ownership and management of Personal Health Records, cloud data storage and retrieval, and best-use practices for identification of patients with communicable or contagious diseases will be of interest to epidemiology and laboratory-oriented professionals as well as those who manage public health in the face of national emergencies. Technological advances represent forward thinking that we believe is applicable to and dictates future healthcare practice and methodological integration among public health practitioners. There are, however, significant policy and cross-disciplinary discussions that need to be had over the impact of directly integrating reactive, genetic-based medical decision-making in nursing practice. In the patient care setting, do these tremendous technologies represent potential major cost savings and increased patient engagement, or instead result in a deluge of frightened and often false positives without adequately trained interdisciplinary nursing guidance, expert counseling, and healthcare providers to help patients interpret their findings?

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