TECHNOLOGY ADVANCES IN HEALTHCARE TO WATCH IN 2023

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On the heels of **HLTH 2022** and **41st Annual J.P. Morgan Healthcare Conference 2023**, new and emerging technologies are looking promising. While investments might not be matching previous years, many products are finally making it to market, and ready to realize the promised value.

As the Internet of Things (IoT) devices, are increasingly being used in healthcare to improve patient care and outcomes, we examine three areas where these recent technologies will potentially disrupt the **healthcare sector**.

ADVANCES IN EARLY DIAGNOSIS:

The trend that is reshaping the healthcare industry is early diagnostics and this is expected to result in significant changes within the sector. Globally there is a strong push to detect diseases at an early stage to improve the quality of life of patients.

This focus on early diagnosis is strongly observed not just in patients where healthy lifestyle and self-care are gaining increasing importance, but also noted on the government's side as there is an enhanced focus on preventive strategies.

Key technologies considered pioneers in this space include:

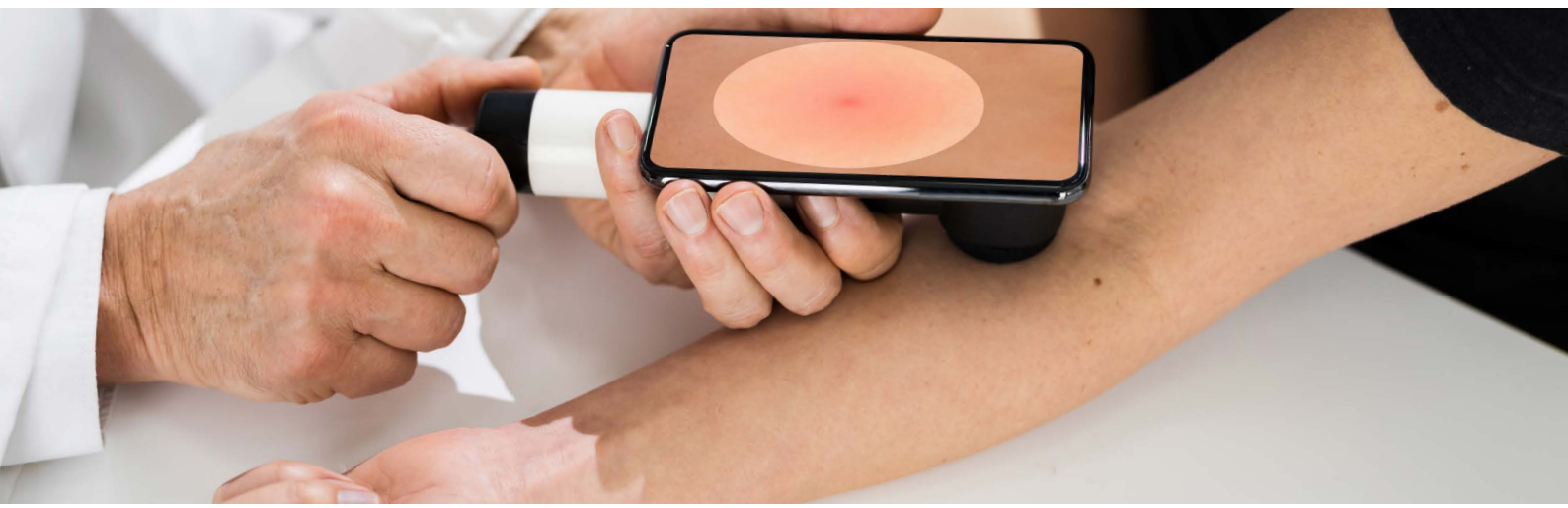
Dermatology: Skin checking apps are penetrating healthcare that enable quick detection of anything unusual via smartphone app powered by AI algorithm.

Vocal Biomarkers: The potential to detect a disease over a phone call to the doctor will disrupt the diagnostics sector. Certain diseases that affect the heart, vocal folds or the brain can alter a person's voice. With AI-based voice analysis, the vocal biomarkers help in early detection of risks and serious diseases.

GPT-3, the third generation of OpenAI's ChatGPT: The artificial intelligence algorithms behind OpenAI's General Pretrained Transformer (GPT) chatbot program, ChatGPT will help identify the onset of dementia in early stages, by identifying the subtle speech characteristics from spontaneous speech, and can be 80% accurate.

Spectral phenotyping: A new and promising technology developed by scientists at Lawrence Berkeley National Laboratory (Berkeley Lab) for early diagnosis of Alzheimer's disease.

Low-Abundance Biomarker Detection Platform: A unique technology created by Yu Lei from UConn, addresses the major limitation that enzyme-linked immunosorbent assay (ELISA) has when there is low concentration of molecule of interest, by adding two amplification steps to the process, which is highly useful in early-stage detection of diseases and treatment.



ADVANCES IN TREATMENT MONITORING

Remote Patient Monitoring (RPM) is transforming the health systems globally and increasing number of hospitals are adopting this technology to improve outcomes and reduce cost. Over **60 million US patients** are expected to use RPM technology by 2024.

Interestingly, advances in treatment monitoring are not just limited to wearable devices, but Insideables and Implantables are also emerging.

- A **battery-free ingestible "smart-pill" biosensor** developed by UCSD researchers runs on glucose, helps in continuous monitoring of the small intestine, and has produced promising results in proof-of-concept testing.
- Smart implants are proving to be highly effective in providing real-time biofeedback. A **sensor-enabled 3D-printed smart metamaterial implants**, help in monitoring spinal healing.

Patients at-risk of falling while hospitalized is a major cause of worry for caregivers as the consequences can be serious. To address this, researchers have developed a **PUP (Patient is Up) Smart Socks**. The pressure sensors in the wireless smart socks alert the caregivers, who can then arrive and assist.

ADVANCES IN WHOLE-PERSON CARE:

Preventive care, telemedicine, remote monitoring, subscription-based models among others are all proving to be important for a "hospital at home" or a **patient-centred approach.**

Key promising progress in this area include:

The significant rise of **at-home lab tests** with access to a range of analyses without having to wait at a diagnostic lab. **Cough analyzing apps**, **breathalysers**, **miniaturized platform for urine analysis** are some of the recent examples of such tests.

With no effective biomarkers to diagnose Parkinson's early, an **AI-enabled sensor** looks promising that monitors breathing patterns during sleep, helping detect the disease and as well track its progression over time.

Medication tracking added to **Apple's iPhone Health app** is, on the one hand, promising convenience to specialty drug patients, as the frequency of taking drugs is higher in this group, and on the other, will help pharma companies integrate their products with patients' health files via the mobile app.

Bionic pancreas are proving to be more effective than fingerstick glucose testing for managing type 1 diabetes.

Mental health issue around the world is growing rapidly and approximately **20% of the world's population** have a mental health condition. Digital technology is playing an important role in identifying and as well treating the condition.

- Wearables, smartphone apps and Artificial Intelligence (AI)/ Machine Learning (ML) solutions are being leveraged by companies to collect and analyse data real-time so that timely assistance can be provided. **Juli.co** is one such example of an AI-enabled app for chronic patients with the data collected being constantly supervised by doctors.

- Augmented Reality (AR) and Virtual Reality (VR) technologies have significantly transformed mental healthcare from prevention to therapy. **Altoida** is developing AR/VR tools to detect the likely onset of neurodegenerative diseases. **Bump Galaxy's** "Game World Therapy" is a virtual world built in Minecraft that provides physiological experiences of safety and social support through play.

CONCLUSION

The technology advances in healthcare have had a profound impact on the industry, improving the quality of care, increasing efficiency, and ultimately saving lives.

Greater use of newer technologies from early adopters will be seen more in the coming days across all specialties for improved clinical outcomes and patient experience.

The key will be to get the tech into the right hands and integrated into the proper workflows to realize the value.

In conclusion, these technological advances in healthcare are helping HCPs to deliver better care, more efficiently and at a lower cost, while empowering patients to take a more active role in managing their health.

Sources

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