

Industry 4.0 and Medicine

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We all live in the Fourth Industrial Revolution today. Few of us realize this. It means that our daily life is hosted by this revolution. Let us make a short tour!

The First Industrial Revolution appeared in the 18th century, when steam engines developed. They allowed the appearance of mechanized industry and essentially contributed to urbanization.

The Second Industrial Revolution, electricity and related technologies lead to mass production.

The Third Industrial Revolution started in the 1950s. The first computers, large as a house, followed by the spread of micro digital technology overall led to the automation of manufacturing. New industrial branches appeared, mainly banking and communication.

And now, the Fourth Industrial Revolution, which brings a fusion between artificial intelligence, robotics, the Internet, genetic engineering and many other important approaches. It blurs the boundaries between the physical, biological and digital worlds.

The term was introduced by Klaus Schwab, a German professor of engineering and economy, born in 1938. In 1971, he founded the World Economic Forum, which keeps its annual meeting in Davos, Switzerland. This forum tries to engage business, political, academic and other personalities to shape the world agendas of development.

He introduced the term and definition of Fourth Industrial Revolution (4IR or Industry 4.0), which was the best, although large enough introduction to this term for beginners is in Wikipedia – the Free Encyclopaedia.

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Let us note some titles of works in health care in the era of Industry 4.0!

The paper of Antoniadou *et al* (1) discusses several items, including artificial intelligence (AI) in prediction and management of arrhythmias; use of cloud computing; use of drones (deliver drugs, vaccines at remote destinations); use of medical robots (*ie*, diagnose at distance parasitoses or tuberculosis); and use of mobile health (monitoring medical parameters).

The paper of Krittanawong and Kaplin (2) deals with the following items: machine learning models; deep learning models; and natural language processing.

The paper of Crea (3) summarizes papers on genetics in medicine published in a whole issue of *European Heart Journal*, including epigenetics in heart failure with preserved ejection fraction; genetics in sick sinus syndrome; childhood onset of hypertrophic cardiomyopathy; genetics of dilated cardiomyopathies; ACEI and Duchenne

muscular dystrophy survival; and influenza vaccination and reducing cardiovascular morbidity in high risk patients.

In his paper on cardiology published in 2021 (4), Eugen Braunwald increases the idea of implying a large and hyper competent heart team in the diagnosis and treatment of complicated cases.

In his paper (5), Cinteza shows that Covid-19 pandemic has dramatically increased the role of telemedicine as well in the doctor-patient relationship, outside physical medical visits and relations between doctors for delivering a second medical opinion.

To develop all the above-cited titles would construct a monograph. What is important is that most items conclude with practical diagnostic and therapeutic consequences.

And when searching the literature, we may see that what we have cited here is only a piece of sand in what Industry 4.0 brings into health care today. □

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