Sharpening Public Health's Goals and Tools in Currently Global Issue

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Abstract. Public health programs aim to assure fair access to high-quality care for all necessary health care packages, including preventive, promotional, curative, rehabilitative, and palliative care. Currently, we face numerous global issues, including issues in the public health aspect. Some of the popular and essential global issues are (1) generation XYZ, (2) industrial era 4.0, and (3) society 5. As these issues revolve around our everyday life, the public health response to those issues are essential. In this study, we extracted virtual materials supporting the idea, description, and of a paper. Our analysis results suggest that (1) gen Z can serve as a goal model since gen X and Y tend to follow, (2) aspects of the 4.0 industry such as artificial intelligence, Internet of things, big data, augmented virtual and so forth, can be used as tools, and (3) society 5.0 can be used as perspective tools and goals.

Keywords: global issue · gen XYZ · industry 4.0 · society 5.0

1 Introduction

Public health programs aspire to guarantee equal access to high-quality, fundamental healthcare packages, including preventative, promotional, curative, rehabilitative, and palliative care. This program also entails preserving and enhancing the provision of healthcare product delivery. In this situation, with the help of public health, individuals, families, communities, and populations must all have better health and quality of life. Also, it should be implemented at the national, local, and certainly the global level. As generally acknowledged, public health is a branch of science intending to safeguard and enhance the well-being of individuals, communities, and a larger group of people, which could be as tiny as a community or as large as a global region.

Currently, numerous global issues appear in media with different focuses. These differences are mainly because of different terms and or viewpoints. Examples of those popular and essential global issues are (1) society 5.0, (2) Generation XYZ, and (3) industrial era 4.0.

The recent progress of science and technology, such as big data analysis, the Internet of things, smart sensor, and cloud communication induced by industrial 4.0, offers the best chance of finding innovative solutions to the global health crisis and ensuring healthy

populations. They could potentially and fundamentally transform global health. Further, in transforming the community or population into society 5.0, the generation x, y and z must be considered as redefining the goal of community health. In this study, we aims to discuss the small scope of public health goals and tools. There are 3 (three) kinds of view corresponding with public health, namely (1) public health and characteristics of generations x, y, and z, (2) public health and society 5.0, and (3) public health and industrial era 4.0.

2   Method

The study aims to examine the association between global issues (1) society 5.0, (2) Generation XYZ, and (3) industrial era 4.0. With public health aspects. In garnering the data, we extracted corresponding virtual materials supporting the idea, description, and analysis relevant to the research objective.

3   Results

A generation is a disparate and independent group of people who share similar world-views, experiences, and attitudes. Strauss et al. define that generation is ascertained by people's years of birth as well as a specific set of prevalent social and economic conditions that prevailed throughout those years [1]. Generation X, Y, and Z mark different demographic groups of people who were born in different periods. These individuals have certain experiences, goals, ways of life, generational backgrounds, demography, and values.

Currently, we have four generations of legal adults, consisting of the Silent Generation (Traditionalists or the Greatest Generation; those born between 1922 and 1945), the Baby Boomers (born from 1946 to 1964), Generation X (born from 1965 to 1977), and Millennials (born from about 1977 to 1993). Then, we also have the Z Generation, who were born between 1993 to 2005 [2].

In addition, [2] showed that Gen Z is beginning to join the workplace. By 2020, they are expected to occupy about 20% of the workplace. Due to their general "coming of age" mentality and the ease of access to information made possible by digitization, millennials stand out from the crowd. Generation Z, which is commonly known as Gen Z, represents the following generation after Millenials. This generation subsists of people born between 1995 and 2019. This generation has typically absorbed knowledge from their elders and has so taken a more creative outlook on life.

It is undeniable that healthcare is continuously impacted by the progression of technology, such as transforming the way people accept care, get information on their health, and communicate with their providers. However, due to their distinct idea on healthcare provision, the generation Z, newest member of young adults, are expected to completely upend the health business.

The generation Z was born in the era of mobile devices, mobile broadband and Wi-Fi, mobile applications, and social media. The Gen Z is accustomed to this cutting-edge technology, platforms, and means of accessing the Internet, unlike previous generations (baby boomers, gen X, and Millennials) who still needs some adjustments. Consequently,

Generation Z is used to having continual connectivity and having access to entertainment and information whenever they want.

Similar to their other aspects of life, the Gen X has heavily relied on technology for their health and wellness. Additionally, if they have any queries about their health and wellness, they never hesitate to check up or ask their social networks. However, as adolescents, members of Generation Z are mentored and greatly influenced by their parents, many of whom are members of Gen X, as well as their teachers and coaches at school. Also, as social media, mobile devices, and applications shaped Gen Z's upbringing, they prefer service transactions with minimal human interaction or waiting in lines (Table 1).

Orsolya Papp-Zipernovszky et al. study on the gap between generations in Digital Health Literacy showed significant differences in eHealth literacy among the generations, along with in the self-perceived empowered gain. EHealth [4] is the application of information and communication technology (ICT) to activities connected to health. The study showed that Boomers have the lowest eHealth scores and show the highest empowerment. Meanwhile, the data showed no distinction for Internet usage for finding health information. The participants who more frequently access health information through the Internet reported a reduced level of self-rated health, while those with higher eHealth scores state they are in better subjective health. That study also highlights the correlation among the variables with the frequency of using healthcare services among the older generations (Boomers and X). In contrast, for the Boomers, the percentage of healthcare internet literacy was only correlated with Internet use for seeking out health information, different from Generation X, who frequently used eHealth.

As baby boomers use the Internet for finding health information just as frequently as younger generations, this becomes a compelling reason to improve their eHealth literacy. Consequently, since older generations' subjective health condition is influenced by their level of eHealth literacy, it is essential that health promotion initiatives make use of this

Table 1. Personal and Lifestyle Attributes of Each Generation [3]

	X Generation	Y Generation	Z Generation
Core Values	Skepticism Informality Fun	Extreme fun Realism Social Confidence	Familiar with Internet Efficient feature Communicator
Communication	A way to get there	An incredible expense	Can have many acquaintances without personally meeting them
Media	Cell phones Call me only at work	Internet, picture, phone, and email	Technology ruling the world
Dealing with Money	Cautious Conservative Save, save, and save	Earn to spend	Knows how to manage and what is worth for

high frequency of Internet health information searching. Besides, they are the ones most able to use the data to make decisions.

The central health issues encountered by Generation Z are connected to their stages of life, such as managing stress, getting enough sleep, building self-esteem, maintaining their grades, and having time to socialize with family and friends. Stress is frequently observed as the top issue encountered by adolescents, so nearly half of them deal with anxiety and stress management or prevention. This anxiety and stress prevention is the second most common issue, following colds and skin problems, and prior to issues about weight. In comparison, recently, baby boomers have used the Internet to research health issues as frequently as younger generations. Thus, it offers a strong incentive for them to improve their eHealth literacy. Therefore, since older generations' eHealth literacy abilities affect how they perceive their own health, it is crucial to design health promotion initiatives that take advantage of this high frequency of Internet health information searching. Besides, this generation has the greatest ability to use information for making decisions.

In addition, most Gen Z demands these three following elements from the healthcare system [3]. (1) Quality enhancement: The Gen Z group is the least likely to have a primary care physician. Gen Z presents low satisfaction with our recent healthcare model and is on the search for an alternative of a more convenient, efficient, and transparent service model, (2) Wellness techniques: Due to their holistic approach to health, Gen Z is more likely to embrace alternative treatments like acupuncture, (3) Digital skills. Technology presents a crucial role in the way Gen Z interacts with medical information, performs and keeps track of actions linked to health, as well as accessing healthcare services. Compared to the previous generation, Gen Z is more likely to choose health providers offering online test results and prescriptions.

In conclusion, Gen Z could be seen as a goal model for the future healthcare system since the other generation presents a tendency to adhere to their behavior. Accordingly, public health should sharpen its goal. In this situation, technology is vital for their practice of wellness and health, as in every other element of life. Thus, they don't ponder finding information related to their health and wellness from their social networks.

4 Discussion

4.1 Public Health and the Era of Industrial 4.0

Industry 4.0 [5] symbolizes what is known as the fourth industrial revolution, characterized as a new level of organization and control over the whole value chain of a product's life cycle. It is designed to meet the needs of increasingly personalized customers. In order to achieve continuous improvement that concentrates on value-adding activities and waste avoidance, Industry 4.0 calls for the strict integration of humans in the manufacturing process.

Industry 4.0 is developing completely novel strategies that involve people and organizations in a revolutionary way. By offering customers a variety of items without requiring interaction, the industry 4.0 platform attempts to match supply and demand in a very cost-effective manner. Besides, this era started in this century when a combination of technology and human changed the way of human life. This technology combination,
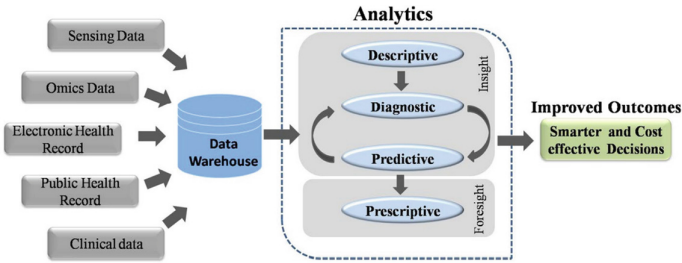
Fig. 1. Workflow of big data analytics

including IoT (Internet of Things), cloud computing, robotics, radio frequency identification, smart sensors, cyber-physical systems, and big data, is crucial in the implementation of the industry 4.0 concept [6]. Progress in health services in facing this industry 4.0 will open opportunities to develop faster and more effective health services, enabling people to monitor their health through health applications.

During industry 4.0, healthcare (healthcare 4.0) has encountered substantial transformation. It is always changing as numerous medical professionals and researchers construct new techniques. For instance, during the COVID-19 pandemic, Healthcare and Industry 4.0 merged and developed together, resolving concerns like data security, resource allocation, and data openness. IHC (Industrial Health Care) enables a variety of technologies, including big data, the Internet of things (IoT), machine learning, blockchain, cloud computing, and information and communication technologies (ICT), to keep track of medical records and help reduce the spread of COVID-19 [7].

Smart sensors help with the prevention of health issues and active aging, as well as the improvement of healthcare services for both acute and chronic illnesses. Further, smart sensors also offer increasingly innovative responses to a number of pertinent healthcare challenges, such as early detection of pathologies or minimally invasive management and prevention of high-burden diseases (cardiovascular diseases and cancer). Besides, the development of miniaturized and lightweight smart sensors-based systems is vital for the rapid progression of unobtrusive and unsupervised alternatives to home rehabilitation and continuous patient monitoring [8].

In addition, in the industry 4.0 era, big data offers enormous amounts of information that can be quite beneficial. This fact has positioned big data as a topic of special interest for the past two decades. In the healthcare industry, hospital records, medical records of patients, results of medical examinations, and devices, and a part of the Internet of things, such as biomedical research, also generate a significant portion of big data relevant to public healthcare. Dash et al. [9] show the procedures to manage big data to improve outcomes, as presented in Fig. 1 [9].

As widely recognized, cloud computing is a part of industry 4.0. With its Infrastructure (IaaS), Software (SaaS), and Platform (PaaS) as a Service delivery model, Cloud computing represents a model providing on-demand access to a network-based cluster of shared computing resources and storage units, as well as promising numerous advantages over conventional in-house solutions [10]. Meanwhile, the National Institute of Standards and Technology (NIST) reported cloud computing's capacity to be applied as

a model that enables a selection of adaptable computing resources for quick and easy network access—something that is not normally available in conventional healthcare contexts.

In the healthcare system, cloud computing can operate as software, platform, or infrastructure as a service. Software as a service is a business model offering quick access to cloud-based web applications, such as G-suit and Dropbox. Meanwhile, in essence, platform as a service is a cloud model foundation that enables customers to design, test, and organize various business applications. In its most basic form, infrastructure as a service is a virtual arrangement of computing resources that can be accessed through the cloud.

The benefits offered by cloud computing range from scalability and flexibility in work, security, cost-effectiveness, artificial intelligence, reliability, data storage, machine learning to management [10]. In conclusion, cloud computing presents the capacity to enhance data management procedures in the healthcare industry. Also, it may help the data storage and management, facilitating easy access for the organization. The healthcare sector may be able to store data effectively and economically while reducing the use of physical servers by using cloud computing technology.

In addition, virtual reality and augmented reality (AR) are also widely accepted as part of industry 4.0. AR. It is an interactive environment in which computer-generated perceptual data is used to improve the appearance of real-world things. Meanwhile, virtual reality the computer technology adoption to create simulated settings. Therefore, with virtual reality, users can access a three-dimensional experience. Thus, instead of viewing a screen in front of them, users are immersed in and interact with 3D worlds.

AR and VR have a promising role in healthcare as they enable people access a representation of real-world settings even without being physically present in the same place. Junaini et al. reviewed the relevant literature (AR, VR in occupational safety and health) published between 2016 to 2020 and reported that a growing number usage of augmented and virtual reality for safety instruction and rehabilitation [11]. Thus, given the strong research trends in this area in the post-pandemic era, the use of augmented reality and virtual reality games offers exciting possibilities, especially for safety training and rehabilitation.

Further, the characteristics of AR or VR enable them to be applied to surgical simulation training or medical education. VR can be utilized for amblyopia treatment, rehabilitation training, and the management of some mental conditions, while AR can be used to help surgery or direct surgical robots. Min-Chai Hsieh and Jia-Jin Lee. 2018 uncovered that medical applications for AR, VR, and MR include telemedicine, surgical simulation, neurological rehabilitation, and medical education and training [12].

Additionally, artificial intelligence (AI) is also part of industry 4.0. Artificial intelligence (AI) is the science and engineering of building intelligent computers through algorithms or a set of rules followed by the machine to replicate human cognitive processes like learning and problem-solving [13]. Secinaro. et al. investigated the role of AI from 288 peer-reviewed papers using qualitative and quantitative methods from Scopus [14]. The investigation showed the emerging AI application in this field. AI is frequently used in health services management, patient data, diagnostics, predictive medicine, as well as clinical decision-making. In this field of AI application, China, the United States,

and the United Kingdom present the greatest contribution to studies. Meanwhile, according to keyword analysis research, AI might help doctors make diagnoses, foresee the spread of diseases, and provide personalized treatment plans.

With the recent progression of AI, the future of healthcare may become more personalized, accurate, predictive, and portable. Besides, AI can be used to identify and promptly treat patients who are in danger of deterioration through intelligent telemedicine using wearables or sensors. Also, AI can help to identify symptoms and recommend further actions in the community and primary care settings. As reported by the Massachusetts Institute of Technology, AI can also mark the presence of ambient sensing without the need for any peripherals, such as a touchless, wireless sensor platform with machine learning for tracking behavior, sleep, and breathing remotely [13].

In conclusion, industry 4.0 and the field of health can fuse and evolve simultaneously, addressing issues including resource allocation, data security, and data transparency. All aspects of industry 4.0 are tools for healthcare.

4.2 Public Health and 5.0 Society

According to its definition, [15] society 5.0 is a human-centered society that uses a system that merges cyberspace and physical space heavily to solve social problems while advancing the economy in a balanced manner. In short, society 5.0 is a human-centered society. For the vision, Society 5.0 needs to reframe the links between technology and society as well as the people's relationships with society mediated by technology.

Healthcare is a domain that carries extensive benefits using the technologies. In society 5.0, cyberspace (virtual space) and physical space (real space) converge to a great extent. Meanwhile, in the prior society (Society 4.0), people used the Internet to search, retrieve, and analyze data from databases in cyberspace. Society 5.0 defines that technology and humans coexist to improve the quality of human life in a sustainable manner. Data science is at the root of these technologies. Its usefulness can be felt in various fields, including healthcare. During this era, the role of statistics in healthcare is aided by machine learning methods. In Society 5.0, cyberspace is the repository for a substantial amount of data collected by sensors in physical space. Further, in cyberspace, artificial intelligence (AI) analyzes this massive data, and the analysis output is then communicated to humans in physical space in a variety of ways.

From a study carried out by Bulc. et al. [16], we can note that (1) in order to enable society 5.0, a human-centered health ecosystem (Health 5.0) that integrates digital and artificial intelligence and has a high level of transparency is required; (2) ITC and AI are essential in the area of health and healing, but we contend that they should complement rather than replace human judgment; (3) through person-centered treatment strategies and the emerging paradigm of personalized or precision medicine, aspects of systemic thinking are emerging in the medical industry.; and (4) clinical gaze provides the cognitive framework for healthcare activities, as well as the difficulties and advantages of a human-centered health system.

5 Conclusion

Currently, technology is central to Gen Z's health and wellness practices. As Gen Z grew up during the age of mobile broadband and Wi-Fi technology, mobile devices, mobile applications, and social media, they could be seen as a goal model since the other gen tend to follow. It is non-arguable that technology continues to impact healthcare provision, altering how patients receive care, communicate with providers, and stay informed about their health. Thus, we need specific technological tools to benefit from the available technology. All aspects of Industry 4.0 can serve as tools for healthcare, such as the Internet of things, big data, Artificial intelligence (AI), and so forth. Society 5.0 is a society with the capacity to adopt technologies, positioning society 5.0 as a goal model for public health. On the other hand, society 5.0 life and work in industry 5.0 era circumstances, so they can serve a perspective society to develop tools.

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