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Pandora's Box: The Pandemic in Years To Come

How to change the approach to a new emergency in a customer-centered health program

Abstract: The Covid-19 pandemic was a devastating event for humanity that caused millions of deaths around the world, worsened by an absolute unpreparedness of health organizations both at a national and global level and by the lack of a common global vision to tackle at best the problem. Still, appropriately customized technologies can support the innovation of the healthcare system by improving the quality of life of patients, strengthening the prevention, collaboration and reaction phases when facing a health emergency, trying to foresee future scenarios, intervening quickly when needed and offering the means to face a possible danger with greater awareness and ability to react. Means such as Artificial Intelligence cam profoundly change the health system, by rationalizing and creating a more preventive and prepared treatment network. The project described envisages the hypothesis of a pandemic scenario in the upcoming years – 2030,2050,2070 – and hypothesizes the most diverse solutions, considering that even the worst experiences can be taken advantage of to draw valuable lessons.

Keywords: Pandemic Covid-19, Health System, Technology, Artificial Intelligence, Digital Health.

Introduction

The world-wide pandemic of COVID-19 has completely changed our way of life, from the social, psychological, and economic angles[1]. It has already caused enormous numbers of victims, and the tally still grows daily. The vaccination campaign, that has now got under way, is the most massive in history. Social life is curtailed and social distancing, as it is called, implies dense patterns of socially negative physical and moral significance[2].

The world of medicine is under pressure, with doctors, healthcare workers and hospitals under immense pressure, all committed to sharing the load[3]. At first hospitals were close to collapse, unable to deal with the pressure of the waves of demand. There is general agreement, however, that this experience must be put to good use if – or when – the disease repeats or alarming new situations

arise in the next few years. This is why we have called this study Pandora's Box.

This 'project' – guessing at the possible future of the health system - involves a group of students of the Customer Experience and Innovation Masters at IE University in Madrid. We tried to foresee the future of the health sector, taking account of the challenges the COVID pandemic has brought the world, and faced with the risk of another global health alarm in the future.

Methods

This method started with identifying the what, where, why, who and how of the current health system in order to predict them in the future. This gave a picture of the relations between different stakeholders. It was clear that on the one hand there is a lack of channels for the health industry to reach patients, and on the other, people are 'manipulated' by distorted information from the industry, whose main aim is, of course, profit.

There is widespread awareness of the importance of an efficient healthcare system, and people realize that cuts in funds and staff in recent years have lowered the quality of care[4]. This widespread perception should be exploited to build up not only resources but also ideas and solutions in line with our times, with an eye to the future as well. We must take care not to ignore this experience and must not go back to the old ways as soon as the emergency is over.

The timing is certainly hard to predict. We are still not taking sufficient advantage of technology to reach and connect health professionals and patients and must always bear in mind that the human factor is the key to relations based on trust between doctors and patients[5]. But in the future, we may have to redesign and modify everything!

We drew five important conclusions from our investigation: First, as a global community we are good at working together on promising projects, for instance ending poverty, but not at cooperating for crisis scenarios. Second, we must all speed up the adoption of new technologies. Instead of imagining new things, we should be looking at those we already have, and changing how we make use and benefit from them. This should still be achieved without losing the human aspect of treatment, searching for new ways in which these existing technologies could add value. Third, the health system does not have enough separate channels to cure people more efficiently. Fourth, emotional aspects are important since emotions can limit the negative ripple effects in a crisis; and fifth, disinformation plays a huge role not only by disseminating fake news, and we must consider how people actually feel when they absorb information.

These thoughts led us to identify three areas of opportunity; Prevention, Collaboration, Reactivity, in that order. We need to be much better at prevention, to create more sophisticated ways of working together, so that in the end we reach better ways to react to future crisis scenarios.

Results

So what ideas did we come up with for the future of health? And why? Because we want to help save lives. Last year in the USA the CDC forecast 500,000 deaths by March 2021 due to COVID. However, just wearing a mask could bring that down to 300,000. This is a 20% reduction in lives lost: such is the power of prevention alone.

Our program comprises three phases, Health-on-the-Go (2030), Pandora (2050), and One world (2070), and each one is additional and complementary to the previous one.

Let us look at a day in the year 2030.

Health-on-the-Go is a personalized health system based on the interconnections in a user's device, which serve perfectly as a support for prevention. The system prevents a symptom or an illness arising even before the user perceives it, by changing behavior.

This fits perfectly with two of our ideas. These technologies already exist - we see them in our everyday lives. There is no need to imagine new means to accomplish this. What changes is how we benefit from them. That is the true value: the fact that we can match up a user's detailed information with reliable medical knowledge to keep ahead of possible long-term future problems. This evidently results in new, diversified channels to maximize health in the population.

Therefore, the main points and health benefits are:

1) **Cultural changes** - Prevention is truly powerful when it becomes part of culture, and Health-on-the-Go tackles this through 'storytelling': people are gradually led to introduce prevention among their daily habits.

2) **Personalized prevention** - the technology can be personalized on the basis of each user's preferences and needs.

3) **Reliable diagnosis and recommendations** - based on each individual's routine and lifestyle, Health-on-the-Go provides accurate and specific suggestions on how to improve one's daily activities towards healthy habits

4) **Tracking** - the technology saves all of each user's data and offers suggestions, also based on past behavior, to correct and redefine future habits in the best way.

5) **Reduction of harmful habits** - with tracking and real-time information, Health-on-the-Go helps individuals remove harmful and unhealthy habits and behaviors.

Prevention needs to be a basic ingredient of culture, and this was confirmed during the COVID epidemic, where countries like Japan were able to tackle the pandemic more efficiently thanks to their cultural distancing patterns. Prevention cannot be just isolated campaigns about the need for certain actions.

So here we are now, 20 years later, in 2050

Health-to-Go has a complementary service: Pandora. This, is divided into three parts: the Health Hub, Pandora X, and Pandora Community. All these are based on a subscription model, and you choose the model that works best for your needs.

Pandora Health Hub & Pandora X use holograms and alternative frequency medicine to provide the fullest possible analysis of your health. The user and the service are connected through the Health-to-Go software. The third service, Pandora Community, is where you can communicate anonymously

with someone anywhere around the world who is part of this community if you want to learn more about a health experience they have been through.

Briefly, Pandora offers the following benefits:
1) **Comprehensive health report** - at the end of each diagnosis, Pandora provides its users with a complete, detailed report on their current health status, based on precise medical data and knowledge.
2) **Overall health improvement** - on the basis of the report users gain an all-round picture of their current health status, and can then take appropriate action and specific medication, as needed, to tackle any issues, leading to radical health improvement.
3) **Collaboration among stakeholders** - Pandora aims to smooth the processes involved in medical analysis. The technology enables users to connect with other individuals who have, or have had, the same health problems, or with doctors specialized in the particular condition.
4) **Collaboration and improving technology** - the technology continuously improves, step by step, on the basis of the data received, becoming more and more accurate through continuous use[6]. In addition, diagnosis and analysis become quicker and simpler, reducing the time spent by medical experts or hospitals on medical tests, examinations, and analyses.
5) **Reduction of fake news effects** - by communicating with other stakeholders in the system and using Pandora, customers can obtain reliable and precise medical information, instead of basing their decisions on often false information found online.

Example.
Ava is 28 years old and she has been introduced to Pandora.
She is feeling very tired and thirsty, with blurry sight and always hungry. Health-on-the-Go advises her to go to the Pandora Health Hub, to receive a complete scan of her health. She follows this advice and after the evaluation she is informed she has recently developed diabetes. She becomes very anxious, so then the personal assistant gives her a proper explanation and provides the latest information and best practices about the disease and invites Ava to schedule a conversation through Pandora Community with a 30-year-old teacher from Australia who has been battling diabetes since she was 21. Pandora also schedules a virtual appointment with an ophthalmologist to get details on the next steps.
With all of this, Ava is much better informed about possible future effects and the best steps to follow in her treatment. She decides to purchase Pandora X to get a much better follow-up of her conditions and treatments. She now schedules frequent scans, and her personal assistant updates her on any new information regarding the disease.
Ava herself is now in a position to help other users manage their health in the same field, with trustworthy information and collaboration between all involved.

This then responds to the first, third and fifth conclusions from our investigation. We are changing the perspective of health from an isolated individual matter to a collaborative project involving dif-

ferent agents. Pandora users are well-informed about their health and care, being guided through the process not only by professionals, but by lay contacts who have similar experience. This enables patients to make better use of information, reducing the effects of disinformation, and this in turn minimizes dangerous action and the negative ripple effect.

So now we are in 2070, 50 years from our first phase: ONE WORLD

This stage all starts with a tattoo, but not just an ordinary one. This tattoo contains a nano-chip that monitors an individual's state of health, and at the same time can react before problems arise, by basing its functional algorithm on years of data gathering from Health-on-the-Go and Pandora. In more detail, how would this work for a new user?

Let's take the example of Tim, a German University Master's course student based in Madrid. To activate the nano-chip he would just have to open his phone camera to scan his tattoo and he will receive a detailed picture of his current state of health. First, though, the user has to register for these services. In the app a pop-up appears, asking if you Tim is ready to activate the chip (allowing the user freedom of choice). If he engages, he will first need to agree on the terms and conditions, after which the user is asked to name someone with whom s/he is willing to share their data. This step ensures more security for the user and eliminates the need for third parties to manage custo-mer data. The user has to make a clear decision (and can change it at any time) on who will have access to their health data. The last step provides a range of colors from which users can choose to customize their interface, enhancing their experience.

After completing these steps, the application will record the responses and generate a personalized dashboard: and we have all the Vitals and health-related information.

- Tim's Vitals are based on real-time monitoring of his current status, historical and past health data or examinations. The combination of these last two phases helps get a clearer and more accurate assessment. As a consequence, the data will be transmitted directly to his personal doctor, to add a reaction to the whole experience.

- Human consent and inputs have to be present at all times, making the user feel in charge, and creating total trust and transparency with the technology. The reactions derive from the data that health systems collect related to the demographics and behaviors, so as to understand symptoms. This should help stakeholders take corrective action in time, based on the medical evaluation of the data as a whole.

- The system takes account of global user information to detect and control the risk of a pandemic spreading before it reaches a critical point. All these features create a well inter-linked healthcare system, able to track everyone's data easily.

One World comprises these main aspects:

- Prevention – It tracks users' health all day and every day, to make sure they remain in the best possible condition, and detects and controls symptoms before a user even feels them

- Collaboration – Data is shared so as to establish a certain 'community' to find faster cures, and common grounds in users' health.
- Interconnectivity between human conditions (genetic structures)
- Reactivity - It focuses on providing immediate medical assistance with prior acceptance by each user and health professional.

Reactivity is a truly innovative value, creating a collaborative health project that reacts instantly to people's symptoms and behaviors in order to keep ahead of the risk of pandemics.

The main benefits of the One World project are:

- **Automated symptoms check and remedies[7]:** for instance, the dashboard in the system alerts the user as soon as symptoms in the population reach a certain threshold. This would be an advantage in a pandemic-like situation, to see how everyone's symptoms are progressing.
- **New developments on users' existing diseases:** for instance, there is constant backup, with updates on users' problems and health.
- **Reactive health system laying great importance on security:** relying on blockchain technology, for example, to control information leakage. Users can nominate the persons with whom to share data, ensuring a high level of safety and security, and boosting confidence.

This was how we visualized the future of the healthcare system. We believe these findings are as relevant for general medicine as for any other area. We expect to see great technological developments in the coming years, that will improve people's overall health.

Discussion

Informatics and biological technologies are going to change our approach to medicine markedly, affecting methods for diagnosis and care, and disease predictions. Artificial intelligence (AI) already serves as a model in increasing numbers of tasks, including understanding and managing social dynamics and screening for many diseases[7]. AI is already used in models for predicting behaviors, including intuition and dynamics in our most refined system - the neural system.

An integrated network, usable on a large scale, with good connectivity and forecasting systems, will make all the difference[8]. Alternative algorithms on the same network will answer a question in no time at all, requiring limited human resources – an important consideration in countries where these resources and limited and scantily trained.

Any bug in the system is much less of a risk than with any other strategy, possibly leading to diagnostic and therapeutic difficulties, calling for biotechnologies that will not always be available.

Clearly in the short-term AI and robotics are not likely to overturn the order of things in today's highly consolidated system, despite the difficulties[9]. But in the medium and long term we can expect automation and dependence on assessments based on pre-constituted algorithms to prevail. It is also likely, however, that these systems will end up 'manipulating' our mind and actions, completely

changing our methods and our way of being. Looking at the speed of these changes, quite probably epochal changes in how we work, and think will be seen in a very short time.

One might ask, therefore, how the doctor-patient relationship[5] – a fundamental pairing in medicine today - will shift, and to what extent the technical revolution and AI will change today's rules. The patient's relationship with the doctor may become much less personal, but with the advantage of prompt answers and no need to leave home.

In some countries the current pandemic has brought to light a distance and lack of connection between the various parties[10] – the family doctor, who the patient relies on, hospitals and emergency departments. Right now, the lack of organization of the mechanism for consultation, leaving gaps in the relationships, has resulted either in patients treating themselves – meaning they are admitted to hospital late – or they crowd the emergency departments indiscriminately, creating disorder.

Clearly all this must be planned differently. Our aim was to forecast the reactions to a healthcare emergency in the next 50 years, basing the predictions on these concepts. The first step must be total, far-reaching remodeling of the whole system.

Appropriately customized technology must modify the first step in the system[8]. The family doctor - a general practitioner - is pivotal, but this part of the system has shown disarming gaps and must be replaced by an intelligent robotic consulting system to slim down the basic tests for health problems, screening and follow-up. With well-designed algorithms patients will reach their doctor personally only when they have combinations of pathologies requiring specific 'human' intervention to establish the diagnostic path and therapy[7].

As we said before, the doctor-patient relationship will change[5], but in most situations a consultation will be possible in real time, without having to waste time waiting, especially in view of the drop in the numbers of general practitioners in recent years.

Another bottleneck is diagnosis[8]. Patients will be able to do a lot themselves at home, using what are known as 'apps'. These would offer increasingly specific programs covering a range of situations. In addition, hospitals need to be moved closer to the patients[11], establishing access hubs which would use speedy, non-invasive, automatic methods for diagnostic examinations, X-rays, etc.

Then we come to the hospitals themselves. These need to be well organized, accepting patients only for real necessity or emergencies[9]. They must be dynamic structures, adapting themselves to needs as they arise, and managing them on a mixed basis, with health workers using robotic and automatic technologies[9].

The current emergency due to COVID will have the merit, at least, of speeding up the conversion to a more advanced system. Of course, however, they must draw on the experience of these years and waste no time designing and setting up a more advanced and appropriate system. This will, of course, call for adequate financial resources.

Conflict of Interest
The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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