Meeting Report

mHealth: an ecosystem full of opportunities—Conference summary of mHealth Summit 2014

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During December 7-10, 2014, the Annual mHealth Summit took place at the Gaylord National Resort and Convention Center on the bank of the Potomac River in Washington, DC. This summit is the largest annual conference dedicated to the mHealth field in the world. There are several thousand participants each year, and more importantly, these participants are not only from the healthcare field but also from pharmaceutical companies, telecommunication companies, governments, non-profit organizations, universities, research institutions, insurance companies, and other areas. It is an important annual conference that almost all the mHealth-related stakeholders in the field will attend. As a speaker at this year's conference, I also attended the meeting. In addition to giving a talk, I also made some notes during meeting breaks for domestic readers who did not attend the meeting, and I hope this information will bring you some inspiration (*Figures 1*,*2*).

The prospect: a vast market

The nature of mHealth is evolving from simple applications and wearable devices into a complete ecosystem, which plays an increasingly important role. Based on the summary by Qualcomm CEO Derek Aberle, this ecosystem has three main characteristics: first, revolutionary technology; second, value, in the ability to ensure and reinforce patient safety and healthcare quality; third, and most importantly, affordability. It seems that products of the PC era can also satisfy these three points, but they cannot. Derek especially emphasized that with the arrival of the mobile internet, the speed at which we obtain information and get help has evolved from the original "count by days" into "count by seconds", and in the future, it will become real-time. This type of expanding speed and coverage range is impossible for PC products to achieve. Furthermore, mobile internet has greatly lowered the cost of healthcare and has made affordability possible. This affordability is realized mainly through improving efficiency to lower cost, instead of reducing healthcare quality to control the cost. On the contrary, using mHealth to improve quality, reinforce patient safety, and reduce risk is consistent with healthcare principles. Have you ever had the feeling of "get more by paying less"? Yes, good products seem to have all these features. Of course, there are challenges as well, which I will discuss at the very end.

Apart from the abovementioned three characteristics, obtaining valuable data for analysis to provide more accurate guidance for clinical practice, research, and patient education is another great advantage of mHealth. When Rob Havasy, the vice president of Personal Connected Health Alliance (PCHA), talked about the interactive operation of mHealth, he described it in terms of three layers: the equipment layer, system layer, and data layer. Obtaining data, especially "meaningful data", through mHealth has important significance for healthcare development. Interestingly, mHealth Summit also organized a special event for startups this year, and many themes of the startups in mHealth field are also related to healthcare data mining. Then, what are meaningful data? How can data analysis better help physicians and patients? I will address this question in section 3.

Last, mHealth is also a communication tool, which can assist and promote communication. This communication can be real-time and very efficient. According to a concept described by Ms. Janet Schijns, the vice president of Verizon Global Business Development, this communication can

Figure 1 The spotlight session and keynote speech.

Figure 2 Beautiful scene at the national harbor.

be online for 24 hours a day and never offline. At any time and any location, anyone can obtain real-time help through mHealth, and patients have high loyalty to this interaction that can instantly provide valuable information. However, this type of communication, especially communication between physicians and patients, needs to give attention to risk-aversion. In the US, no physician is allowed to suggest a diagnosis or provide a prescription after simple communication without seeing the patient. Such an action seriously violates the safety principles of healthcare and also violates the Health Insurance Portability and Accountability Act (HIPAA), placing both the physician and the patient in a high-risk situation. In the US, some physicians do directly communicate with patients about their disease through certain platforms, but this type of communication is limited to simple disease consultation. The physician can provide a simple analysis of a patient's disease, but in the end, the physician will still suggest that the patient go to a hospital or clinic for an examination as soon as possible, instead of directly giving a diagnosis or prescription online. In addition, the physician must protect the patient's privacy during communication, and the patient's private information must not be disclosed.

Transformation: from point to plane

As mentioned in section 1, mHealth is evolving from some simple applications and wearable devices into a complete ecosystem—this impression is my greatest feeling from participating in this conference. I remember when I attended previous conferences, people mostly talked about single apps, but starting from last year, few people talked about apps. I even wrote an article at that time to discuss this phenomenon: the softening and hardening tendencies of apps. App softening is when an app merges with hospital information system (HIS) and becomes the extension of a hospital information system. App hardening is when an app merges with hardware to manage, store, and analyze the data collected by the hardware (sensors). A standalone app, which cannot be connected to a healthcare system, has become very difficult to support as a service or business model.

However, apps will not die, they still exist, and they are the points that constitute the "plane"; then, what is the "plane"? I will introduce two terms here: one is "connected health". The Chinese translation for this, in general, is not accurate; it is translated as either "hulian health" or "lianjiexing health". The head of the Center for Connected Health, Joseph Kvedar, also calls it "cHealth", which I think is a well-chosen term. Another term is "coordinated care", some people also call it "integrated care", and its Chinese translation is "xietong healthcare". We can say that connected health and coordinated care is the "plane" that the US health field is trying to build through mHealth.

Connected Health is not a new concept, and it has a very close kinship with telehealth (i.e., telemedicine), that is, to use a network to monitor and manage chronic disease patients through connectable distant equipment, such as to monitor blood pressure, heart rate, and body weight and to manage quitting smoking and drinking as well as other unhealthy habits. However, there is a slight difference compared with telehealth. Connected Health also emphasizes "self-care", that is, self-care management. Patients can receive health information sent by physicians or other medical staff, and then, by studying and following the instructions, they can manage their own health or disease to

lower the risk of disease onset and to reduce the probability of readmission to hospitals. It seems that Connected Health places more emphasis on technology and equipment, and professionals also seem to have noticed that. Therefore, the VP of PCHA Rob Havasy also spoke clearly during the opening ceremony: "Connected health is to connect people, not devices!"

Coordinated Care is relatively new. It looks more like an integrated industrial pipeline, including prevention, diagnosis, treatment, first aid, rehabilitation, signs monitoring, follow-up, and other services, and it involves many stakeholders as well, including hospitals, pharmaceutical companies, insurance companies, physicians, pharmacists, nurses, patients themselves, and patient family members. Coordinated Care tries to meet many objectives, including medical availability, affordable healthcare, patient safety, medical quality and efficiency, and customer satisfaction, all at once through a system integration approach. Will people who prefer personalized medicine be dismayed after reading to this point? Where is the promised personalized medicine? Actually, the two do not contradict each other; the difference is only at the stage and level of service, and personalized medicine is not necessary for minor ailments. The closed "Home-Hospital-Home" service loop, which this "omnipotent pipeline" tries to build, looks beautiful, but it involves too many interests of all parties, and the demands of each party are also very different, so the difficulty of implementation is easy to imagine. Under these circumstances, I am afraid that the market-driven faction will have to give way to the regulatory ability of "big government". The VP of PCHA, Rob Havasy, also mentioned that "healthcare has a dramatic difference from other industries: it has greater value, but it is also more complicated; it requires the government to reach out and make a perfect top-down design". A vivid example arose in this meeting. The Minister of Health of Croatia, Sinisa Varga, said that Croatia had already implemented the closed "hospital-community-home-person" service loop, which included the links involved in the loop. Electronic appointment, electronic medical records, electronic prescription, online payment, insurance intervention, patient education, self-testing, and home monitoring have all been implemented in the PC end and mobile end. Jealous? However, the total population of Croatia is 4 million, equivalent to half the population of Hangzhou city. "Give me half Hangzhou, and I will give you the future of healthcare". Can this be a new slogan for the development of Hangzhou's healthcare?

With the background of skyrocketing healthcare costs, a seriously aging population, increasing chronic diseases, dispersed geographical living locations, and the lack of physicians and nurses, the US government and communities are forced to look for innovation opportunities (as Tiantian Li said: innovation is never forced) to increase quality and lower risk. To increase the efficiency and lower the cost has become a consensus goal. How can we make this beautiful dream come true? It seems that Connected Health and Coordinated Care have the potential to become the last hope, or one of the last hopes. Therefore, it is not difficult to understand why the mHealth industry is so popular in the US. Everyone is talking about it, and everyone wants to be involved. There are many startups, investors spend huge amounts of money, and in the end, only the fittest will survive. The few winners will then provide people with safe, reliable, accessible, and affordable healthcare with the help of the technology and products from mHealth. The points will be connected to make a plane and eventually form a complete mHealth ecosystem.

In contrast, under the influence of American experiences, the Chinese mHealth industry is also attracting interest. However, China and the US have different systems, different market environments, and different medical needs, and the medical payment system is even more different. Chinese healthcare is still at a stage of maintaining basic healthcare service, and the Chinese mHealth industry is still at a stage of concept tryout and market cultivation. Under these conditions, both entrepreneurs and investors should maintain a more rational and more open mind. We are still individual points without connection and collaboration, not to mention the "plane"; there is still a long way to go.

Products: data-driven

For the designs of mHealth products, everyone has his/her own opinions. Everyone puts his/her own ideas and skills into the products, just like the Eight Immortals crossing the sea, and everyone uses his/her own special prowess. However they all share one principle: data-driven operation. These data are not normal data but meaningful data. What is "meaningful"? Qualcomm defines the following data as having "meaning":

(I) Electronic medical record/electronic health record data (EMR/EHR);
(II) Examination data (e.g., biochemical lab tests, medical device examinations);
(III) Prescription data;

(IV) Insurance claims data.

Why are genetic data not included? Is it too early?

The abovementioned data are "core data". In combination with "auxiliary data", monitored by the patients themselves and collected through wearable devices, such as heart rate, blood pressure, blood oxygen, and body weight, they will primarily outline a "data profile" of the patients. Then, these five groups of people including physicians, nurses, health instructors, pharmacists, and family members will start to work for the patient in the legendary "patient-centered" approach. Its essence is to be "patient data-centered". Through the seamless transmission of "core data-auxiliary data", we can build a healthcare service that is patient-centered and covers the whole life cycle. Regarding the "auxiliary data" generated by wearable devices, Samsung Global Health VP-David Rhew brought us good news: Samsung opened developer platforms including SAMI and SimBand, trying to open interfaces and surpass Apple Health Kit and Google Fit in data integration and analysis ability.

However, obtaining data is only the first step. Data mining and analysis are still required. Data-driven analysis can identify the information most important for patients to know (data-driven information), thus not only providing personalized information that is suitable for the patients but also avoiding the information homogenization problem. At the same time, it can also avoid data privacy and safety issues, which everyone dreads in the US.

One of the difficulties of healthcare is that it is very difficult to standardize. Although data are important, a human after all is not a machine, and the user's experiences and feelings are also very important. For example, Harry Reynolds, the head of Health Industry Transformation at IBM, proposed that mHealth products need to satisfy the patient demand, "Engage me on my terms" (I call the shots on my property). What an insubordinate demand. However, what can you say? It is patient-centered.

Joseph Kvedar, the head of the Center for Connected Health, proposed to add social elements to mHealth products, such as ranking, virtual currency, virtual medals, or charitable donation, to stimulate patients' stickiness and dependence on mHealth products. However, this argument was quickly opposed by Ms. Janet Schijns, Verizon Global Business Development VP. Janet agreed that mHealth products encountered a high drop-out rate and other problems in the management of chronic diseases, but she did not think there was a need to use the proposed social elements method to stimulate patients because the greatest incentive is the in-depth understanding of personalized data of each patient and the provision of a real-time, safe, and truly valuable service to patients with the help of data-driven analysis. I personally agree with Janet's argument, which is not willful, but humane.

However I agree with the other idea Joseph proposed, which is to combine some services that are closely related to daily life with mHealth products. For example, the service could push a weather forecast along with a health reminder. This idea reminds me of a communication with the Deputy Minister of the Ministry of Health of Kenya. The Deputy Minister said that when they push AIDS prevention and safe motherhood information, they also added other "services that are highly related to daily life". I was thinking at that time whether it was a weather forecast. However, in Africa, the weather is mainly divided into dry and rainy seasons throughout the year, and the temperature does not have much significance. Later, the Deputy Minister told me the information in question was local vegetable prices. Thus, mHealth management in Kenya is likely to be like this: "To prevent AIDS, use condoms. Cowpea, eighty five cents per pound".

Interestingly, the design of Google Glass also relies on data-driven analysis for its application prospects. Some time ago, there were many debates about Google Glass. However, in fact, Google Glass has enormous application value in the mHealth field. On March 29, 2014, Ding Xiang Yuan and the First Hospital of Hangzhou collaborated to complete the first Google Glass-assisted open reduction and internal fixation fracture surgery in China. However, its images were over-exposed, its lens could not zoom, and its field was skewed. These issues left us with substantial regrets and affected the live broadcast of the surgery and teaching. The technology was not suitable for looking at medical images or photos either. However, Google Glass still has extensive application prospects in emergency rooms, ambulances, doctors' rounds, and telemedicine. Its core is to access the HIS system, to gain access to the patient EMR interface, and to facilitate the recording of disease history by physicians through video and voices. Therefore, the physicians can check patient data in real time or conduct telecommunications with patients and provide consultation.

Challenges: not technology

Speaking of challenge, both the VP of Walgreens, Harry Leider, and the head of the Center for Connected Health, Joseph Kvedar, threw a wet blanket on it. Joseph thinks

that the mHealth field is already very crazy; market expectations are too high and very irrational. He said, "Do you think that Apple, Samsung, and Aetna are successful in the mHealth field? They are not. Healthcare is special; it won't rapidly become a huge market from nothing. It's just because this is healthcare, it is not a taxi, it is not Didi Taxi, it is not dianping.com, and it is not Taobao.com and Tmall.com…". Harry thinks that not only are entrepreneurs and investors hot-headed about mHealth, but patients also have excessively high and unrealistic expectations of mHealth.

In addition to the overheated market, how to obtain EMR data and how to process and use these data are also huge challenges, even in the US. Although the Blue Button plan, which claims to allow patients to download personal EMR data independently, is managed by the government, it seems to not be widely accepted by physicians and patients, and it is only used by a handful of users. In the session when I gave my talk, many companies, investors, and industry groups and bodies were present. People talked about the "Blue Button plan" during the discussion. Even before I could express my envy, people already began to complain that few people were actually using "Blue Button" in the US, and thus, it was impossible to collect an individual patient's EMR.

In addition, the protection of patient privacy is a concern. The head of HealthMap, John Brownstein, analyzed the outbreak of global epidemic diseases by fetching all types of large data and published his academic articles in the best journal of the field, "The New England Journal of Medicine". One of the papers analyzed the outbreak of influenza A H7N9. John said that he first found a case report in China, but it was not from an official channel, you understand… "However, do you know how I found out?" John asked and then brought up a screenshot of Sina microblogging, which showed a disease record in Chinese from a hospital, and the audiences were all in an uproar. John said that he really did not understand how a Chinese physician could dare to post a patient's disease history on public social media.

The absence of government oversight of apps is also among the challenges people discussed. Especially in the case of apps for weight loss, dieting, weight management, exercise, and sleep monitoring, people do not know whether the knowledge in them is right or wrong, or whether it is based on medical evidence. However, in my opinion, the situation is acceptable in the US. In China's app store, under the category of Medicine and Health, there are multitudes of apps for antagonism and mutual restraint between foods, naming, name tests, remedies for good kidneys, prostate massage, etc., enough to leave people speechless.

Finally, there is an ultimate challenge. The people who really need to use mHealth technology and products are not the people who already pay attention to disease and health but the people who do not pay attention to disease and health. How can we persuade people who do not pay attention to their health to use mHealth? How can we provide a patient education for these people instead of simple stimulation? All these questions are unanswered, and enormous effort is needed to explore interactions with these people.

End

Thank you for reading to the end. I believe you already have a basic understanding of the mHealth industry both in China and abroad, although my notes are not exhaustive. However, please remember the essence of the meeting: "patient-centered". The core of healthcare is to ensure patient safety and service quality. Increasing quality, increasing efficiency, lowering the risk, lowering the cost—mHealth can do it and can do a good job.

I firmly believe.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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