



Pantas and Ting

Sutardja Center

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RYNM

A data-centered disease management tool to help patients in developing countries like China

Abstract

Rynm is poised to be the first and only data-centered mobile healthcare tool for patients in the vast Chinese healthcare market, projected by McKinsey to reach \$1 trillion dollars in five years. Currently most other Chinese medical service tools focus on the immediate physicians and hospital adoption through a fee for service or lead generation model. As researchers who believe strongly in the power of data and who also have strong empathy for Chinese patients with chronic disease, we envision a tool that can benefit hundreds of millions of people, rich or poor, rural or urban while constructing the foundation where new medical discoveries and products can be made.

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Introduction

Chinese healthcare needs are growing at unprecedented rate. The population is aging rapidly due to the one-child policy implemented in the 1980s and the public healthcare system has always been playing the catching-up game. To make the matter worse, for the majority of Chinese, healthcare experience is crudely impersonal and many left with more questions than answers after seeing the doctor briefly for five minutes after traversing through a maze of hospital system. Doctors often fail to explain treatment rationale and frequently make mistakes in an extremely high pressure low-income setting. Drugs prescribed by the doctors then further failed to be examined by professional pharmacists. There have been many recent reports of patients' skepticism towards the doctors that culminated in direct physical violence. National Ministry of Health statistics indicate a 70% increase to 17,000 violent incidents aimed at hospitals and their staff in a given year. We, therefore, want to build a tool that directly addresses this skepticism and provides patients a tool with accurate and intuitive information, engaging community, and a personalized solution for chronic disease management. Our design would heavily focus on data collection and community data presentation that cater to Chinese patients' educational and cultural backgrounds.

While U.S.-based services such as Patientslikeme and CureTogether have been widely acknowledged for their potential in pharmaceutical and academic research, the realm of possibility from a data perspective is significantly bigger in China. Not only are Chinese patients' skepticisms towards the healthcare system make them more inclined to seek outside information independently, they are also a lot less conservative in terms sharing private medical data. The sheer number of potential users from the 520M smartphone owners in China also makes it possible to obtain extremely valuable data points for rare diseases. Furthermore, smartphone penetration in urban, as well as, rural China allows for the first time an opportunity to do cohort analysis across drastically different social-economic and developmental patient population, which could lead to more efficient drug development and discovery.

We will be targeting public skepticism and informational dearth by initially incorporating a proprietary drug-drug interaction checker, which is currently nonexistent for Chinese patients. We would leverage this to further invite the patients to track their medical history and participate in relevant patient communities with direct data visualizations. We will provide information on the most up-to-date treatment options and drug developments. On the backend, we would construct a database to collect demographical, medical, behavioral, and prognosis data. This report gives an overview of our market and user research combined with testing and validation through different case studies.

Section I: User Study

We did our user studies across 16 different hospitals and 3 pharmacies in Shanghai. The government classifies hospitals based on their resource and research capability into 3 tiers with the primary tier being the best.

The List of Hospitals and Pharmacies

- 16 Hospitals (Patients, Family Members, Doctors, Administrators)
 - 8 Primary Tier General Hospitals
 - (Ruijing, Ruijing N, Huashan N, Shanghai Intnl, No.1, No.9, Renji, Tongji)
 - 2 Primary Tier Chinese Traditional Medicine Hospitals
 - (Yueyang, Longhua)
 - 1 Primary Tier Children's Hospital
 - (SCMC)
 - 2 Secondary Tier General Hospitals
 - (Pudong South, Putuo Central)
 - 1 Secondary Tier Woman & Children's Hospital
 - (Pudong Woman & Children's)
 - 2 Tertiary Tier General Hospitals
 - (Ganquan, Dahua)
- 3 Pharmacies (Patients, CEO)

Patient Trust

We found significant gap in terms of perceived quality between top tier hospitals versus lower tier hospitals. We also discovered that trust level of the physicians correspond with their government-assigned rankings. Patients often rely on friends' recommendations for decisions on treatment, medications or physician choice. Once patients decide on a specific doctor, they tend to entrust that doctor with all medical decisions

Patient Skepticism

We found that interviewees were not sure if the doctors have their best interests in mind. We witnessed patient family members who blocked hospital entrances claiming the hospital ER did not start treating the patient after a delay of 3 hours, which allegedly resulted in the patients' death. Over 17,000 violent attacks or physical disputes happened in a recent year.

Patient Decision-making Process

As there is no primary doctor, patients only see a doctor when a condition is symptomatic. Most patients then go to Primary Tier hospitals due to the perceived quality and the small cost difference. For chronic diseases, many have seen multiple doctors for the same condition. Second or even third diagnoses are common, as patients can get an appointment quickly at a cheaper price.

Patient Data

Patients do not have an easy way to aggregate their own data across different time periods and hospitals. Most hospitals still utilize handwritten reports but medical billings are done electronically. Hospitals/pharmacies are unwilling to share data on a unified platform due to concerns of competition and cost.

Summary

While Chinese patients are skeptical towards the healthcare system in terms of interest-alignment, they still very much depend on it. A way to mediate this conflict is through 2nd diagnosis or opinion by going to hospitals of higher tiers or doctors with higher government-designated rankings. Patients rarely question the medical decisions their chosen doctors make.

Section II: Testing and Validation

Case Studies

1.1. Developmental Dysplasia of the Hip

We met a pediatric patient diagnosed with subluxatable Developmental Dysplasia of the Hip (DDH) at 4 months old. Patient was then put on Pavlik harness for 1 month with no improvement. There was insufficient evidence under current guideline for follow-up but spica cast was suggested. Patient families have seen 2 doctors who gave different treatment solutions. The younger one called for spica cast while the older doctor prescribed the conservative treatment on Pavlik harness for another 3 months. We presented our RYNM guideline findings, but the patient family was very concerned about risk of osteonecrosis under spica cast. Our guideline system did not identify error in either of the initial 2 doctor prescription, but we helped the patient family decide to seek out another expert that eventually drove their treatment decision.

1.2. Atrial Fibrillation

We had a 65-year old patient with previous ischemic stroke history diagnosed with acute-onset atrial fibrillation in a local secondary-tier hospital visit. The latest U.S. and Chinese guidelines both suggested for chronic anticoagulation after restoration of sinus rhythm (grade 1A – most important). However, the patient was told to take 100mg aspirin upon discharge, which is explicitly not recommended under current guidelines. We expressed our reservation to the patient due to this guideline contradiction. We identified the error and advised patient to seek 2nd opinion on anticoagulation such as the new oral anticoagulant drugs (NOACs). Patient then sought a 2nd opinion with a leading atrial fibrillation expert. The expert confirmed the necessity of taking NOACs given the stroke and bleeding risks. Here we successfully prevented a major error that could have caused debilitating strokes. Without board certification, Chinese doctors often lack the up-to-date information and groundbreaking research/drugs, such as NOACs that were recently approved by FDA (FDA 2010/CFDA 2013).

1.3. Hypertension and Atherosclerosis

Hypertension patient was recently diagnosed with atherosclerosis and was prescribed 1 statin drug in addition to 3 current blood pressure medications. Our Drug-drug Interaction checker found potential for serious interactions (Simvastatin+Nifedipine). We identified this error and the patient plans to bring up the topic to the physician at the next visit.

Summary

Our product could add tremendous value to patients in developing nations where medical errors can happen even at the top level. However, as shared decision making is not common, our product's biggest value is to facilitate patients to make their medical decisions. Throughout the testing process, patients were willing to disclose enormous amount of data, as patients delegates us to their familiar "2nd opinion" role.

Section III: Future Plans

We plan to do further prototyping and testing in the less-developed regions in China. We are actively recruit people to join our technical team and will be meeting with some investors who can connect us with Shanghai Jinqiao government for collaboration.



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