



HealPoint

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Abstract

The healthcare sector has opened up huge opportunities for the implementation of blockchain technology. Many healthcare providers, representatives of pharmaceutical industry get involved in the research and development of distributed ledger applications.

HealPoint is an Ethereum based virtual on-demand telemedicine platform, allowing healthcare practitioners to provide second opinion diagnosis and lead consumer focused care outside of the hospital and clinic setting.

Telehealth/Telemedicine and Second Opinion Market Overview

Telehealth is the receipt of health related information, care, or other remote clinical services using telecommunication technologies. It is the real-time service which uses telecommunication and information technology to provide clinical health care from a distance. Related to telehealth is telemedicine, which uses services that provide two-way communications between patient and health care provider through email, smart phones, video conference, wireless tools and other forms of telecommunications technology.

The Expanding Telemedicine Market and the Continued Potential for Growth

In the year 2016, the global telemedicine market was estimated to be worth around USD 572 million and is expected to reach 1.5 billion by the year 2021. Based on the forecast, there is a huge expectation for growth in the telemedicine market thanks to its potential to revolutionize healthcare by



allowing instant delivery of health care at any time, to and from anywhere in the world. Some of the factors that drive the continued growth of the telemedicine market are: constant technological innovation, an increase in remote patient monitoring, and the rising need of treatments that require constant-follow up appointments.

Globally, the telemedicine market is expected to be a fast growing market in nearly every major region of the world.

The North American and European telemedicine markets remain the most developed and the largest in terms of revenue. The Asia Pacific telemedicine market is expected to be one of the fastest growing telemedicine markets in the near future for a number of reasons including increasing and aging populations, increasing international research collaborations, and rising health awareness among people.

The Middle Eastern and African telemedicine market is also expected to expand due to an increasing number of chronic diseases and a growing effort to improve access to health care services. The Latin American telemedicine market is forecasted to grow as the region moves toward a mindset addressing health and wellness while trying to solve rising health care expenditure.

Benefits of Telemedicine

In almost every country there is a growing population of elderly patients and a continued prevalence of chronic diseases. These reasons make a need for finding new ways to reduce the cost of health care services, increase access to health care services, and improve patient outcomes. Telemedicine provides a solution to these problems by using remote patient monitoring, which utilizes devices to remotely collect and direct information to a remote diagnostic



testing facility for interpretation and possible future treatment. Not only do patients benefit from telemedicine by having better access to health care services, but health care providers also benefit by having access to patient data with increased frequency and accuracy.

Patients seem to be embracing the use of telemedicine technologies and this is supported by statistics. According to TrendWatch studies of the American Hospital Association, the use of telehealth services show that:

- 72 % of U.S. consumers would feel comfortable using telehealth services;
- 75 % of patients prioritize access to distant care over the need for human interactions with their healthcare providers;
- 70 % of patients are comfortable communicating with their doctors and health care specialists via text, chat, email or video, apps instead of meeting them in person;
- 30 % of patients already use internet to run the diagnostic research, check for medical advice

The Perception of Telemedicine by the Insurance Industry in the US

Currently, there are 26 states that have “parity” laws that require private insurers to reimburse health care providers for services delivered through telemedicine. There are 10 more states considering legislation to do the same. These laws generally say that private payers can't take the patient's location into account when deciding to cover a video visit, making it possible for covered patients to be at home or work during the encounter.



Medicare regulations cover a range of “telehealth” services, such as the use of telecommunications and information technology (IT) to provide access to health assessment, diagnosis, intervention, consultation, supervision and information across distance.

Medicaid views telemedicine as a cost-effective alternative to more traditional health care services. The federal Medicaid program encourages states to use the flexibility inherent in federal law to create innovative payment methodologies for services that incorporate telemedicine technology.

Usage of Second Opinions on Medical Conditions and Diagnoses

Second opinions are a potentially attractive approach to reducing diagnostic errors in medicine, thought to occur in 10% to 15% of cases. Provided that the second opinion is of equal or better quality than the first, a second opinion should reduce diagnostic errors.

According to the study by Mayo Foundation for Medical Education and Research “Patient-Initiated Second Opinions: Systematic Review of Characteristics and Impact on Diagnosis, Treatment, and Satisfaction” 10% to 62% of second opinions yield a major change in the diagnosis, treatment, or prognosis.

In research conducted by Johns Hopkins, over the past 25 years diagnostic errors accounted for nearly 29% of insurance claims at a cost of almost \$40 billion, and more often resulted in death.

Patients seek a second medical opinion when their diagnosis is uncertain or when the treatment choices they face are complicated, unpleasant, or involve risks. Surveys have found that 1 in 6 patients who saw a doctor in the past year



sought a second opinion, as did over half of the patients who are cancer survivors.

Second opinion is a reasonable idea, especially when a patient faces a serious medical condition that can be life-changing. One of the benefits of a second opinion is that it allows the patient to become a more educated healthcare consumer. The patient has an opportunity to become better equipped to make informed decisions by gaining more knowledge about his or her condition, seeking and evaluating the many options related to the medical diagnosis and its treatment. Additionally, by seeking a second opinion the patient can have more confidence that the diagnosis and treatment is appropriate, especially when knowing that a second physician agrees with the first one.



HealPoint Platform Overview

HealPoint is the online second opinion platform that allows users to become telemedicine patients and get a second opinion for their diagnosis from hundreds of doctors around the world.

An artificial intelligence algorithm will calculate and evaluate the probability of the diagnosis and match the patient with a doctor in a chosen country who can prescribe the treatment plan if applicable.

Using the HealPoint platform doctors can consult patients about an injury, diagnose an illness, or write a prescription without actually seeing the patient in-person.

The HealPoint system will deliver the second opinion diagnosis to the patient in the form of a General Doctor Consensus (GDC). The GDC will be achieved through the analysis of summaries provided by doctors participating in the evaluation and the Impact Index (II), which is assigned to each doctor as a percentage based on the impact of diagnosis contributed to any previous GDC. The II will be dynamically adjusted with every subsequent participation in the patient evaluation.

In order to determine the impact index Projection method will be used.

The basic idea of this algorithm is that the more the degree of the decision matrix Y_k approaching the ideal decision Y_* , the bigger the weight of kth expert. That is to say, the larger the value of the projection of the decision matrix Y_k on the ideal decision Y_* , the bigger the weight of kth expert. The problem is how to obtain the ideal decision



According to the individual decision

$$Y_k = \left(y_{ij}^{(k)} \right)_{m \times n}$$

we can get the average decision of

$$Y_k \ (k \in T)$$

as follows:

$$Y^* = \left(y_{ij}^* \right)_{m \times n} = A_1 \begin{bmatrix} u_1 & u_2 & \cdots & u_n \\ y_{11}^* & y_{12}^* & \cdots & y_{1n}^* \\ y_{21}^* & y_{22}^* & \cdots & y_{2n}^* \\ \vdots & \vdots & \vdots & \vdots \\ y_{m1}^* & y_{m2}^* & \cdots & y_{mn}^* \end{bmatrix}$$

where

$$Y^* = \frac{1}{t} \sum_{k=1}^t Y_k, \text{ and } y_{ij}^* = \frac{1}{t} \sum_{k=1}^t y_{ij}^{(k)} \ (i \in M, j \in N).$$

In this sense, the more the dimension Y is closer to the Y_* the better the decision Y_k .

In order to measure the decision level of each expert, we can calculate the projection of each individual decision matrix $Y_k \ (k \in T)$ on ideal decision Y_*

The system will provide a visualization of the patient's gathered medical information so that the doctor will be able to easily evaluate the patient's condition within a much shorter period than the industry standard.



Patient #302

40 - 50 years ♂ 5' 11" 185 lbs BMI 25.1

Billing
Balance Due: 25.00 HLP
Wallet Balance: 275 HLP
Effective Date: 2017-08-10

Notes

Disclosures

Vitals

Appointments

Medical Problems

Allergies

Medications

Surgeries

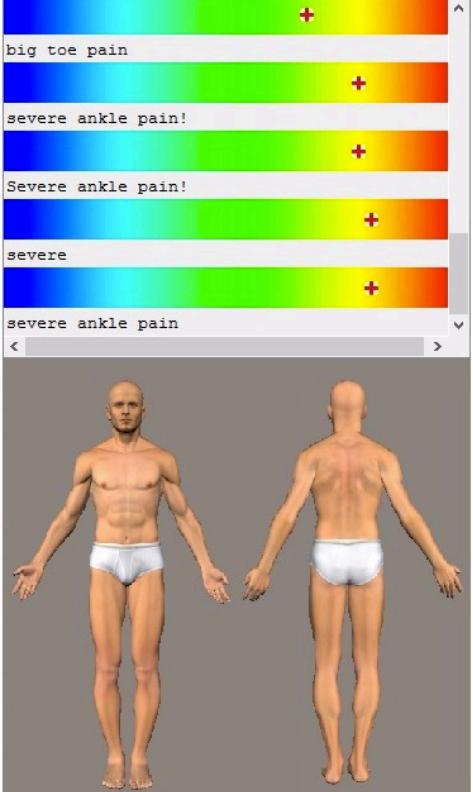
MRI

X-ray

Immunization

Prescriptions

big toe pain
severe ankle pain!
Severe ankle pain!
severe
severe ankle pain



A key factor of the health care platform is the compensation model where doctors will be able to receive payment even if they do not get to treat the patient. The earnings are the result of active usage of the platform, monitoring of the patient requests, and providing a second opinion in a timely manner.

Patients usage

HealPoint is a platform that will empower patients by enabling them to receive a second opinion in a matter of hours from doctors around the world.

Patients will access the service via any internet-enabled device, choose from a suggested list of health concerns/ diseases and provide symptom and health history information through a process called the online evaluation interview, which will be aimed at gathering relevant information. After patient creates a diagnosis request, the system will aggregate this data into a clinical profile.

Doctors will later use this profile in conjunction with a built-in clinical decision support to make a diagnosis and treatment recommendation, including a prescription if clinically appropriate.

Patients will be able to submit their symptom description, past medical conditions, vital signs, family history, medical examination and diagnostic test results including laboratory tests and image studies. Once the diagnosis request is submitted, a patient profile will be distributed to the network of qualifying doctors for evaluation. Patients will have an option to restrict certain geographical regions from providing diagnosis or treatment plan suggestions. After patients receive a second opinion report, they can choose a doctor to consult on a further treatment plan and prescription.

Patients will be offered two types of services:

1. Non-member Service:

- The user can submit a request for second opinion without becoming a member by just sending the medical information for evaluation.



- With this service the user will pay a fixed fee for a tier 1 GDC, which is generated by predefined amount of doctor submissions.
- The patient can expand to the GDC tier 2, where every other doctor's involvement will be paid separately
- After the patient receives a final GDC, he or she has the option to pay for the storage of his or her profile.
- The patient will also be offered to upgrade to the Membership service.

2. Membership Service:

- Members will be entitled to the free storage of their patient profile and GDC.
- The second opinion request as well as the increase in the pool of doctors will be offered at a price 30% lower than for non-member users.



1

Non-member Service

- ✓ The user can submit a request for second opinion without becoming a member by just sending the medical information for evaluation.
With this service the user will pay a fixed fee for a tier 1 GDC, which is generated by predefined amount of doctor submissions.
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2

Membership Service

- ✓ Members will be entitled to the free storage of their patient profile and GDC. The second opinion request as well as the increase in the pool of doctors will be offered at a price 30% lower than for non-member users.

Doctors usage

In order to register as a practicing doctor with HealPoint, doctors will need to provide the necessary information including proof of the licensing to practice medicine in a certain country/state.

A certified team at HealPoint will manually review and validate the submitted information.

In order to decrease the possibility of fraudulent applications, each doctor will be asked to make a security deposit in ether (ETH) value tokens, which will be bound with a smart contract. Upon validation of the doctor's identity and



license to practice medicine the initial amount deposited will be returned to the doctor's account. Applicants will lose their deposit if their identity as a practicing doctor is not validated.

Doctors will have a choice to receive their deposit back in ETH or convert it to healpoints (HLP). Doctors who choose to have the money deposited to their account in the form of HLP will receive an extra 5% of HLP on the condition that they will keep the HLP until their first payout.

Doctors will be incentivized to provide evaluations by earning points that can be exchanged to healpoints after accumulating a certain amount.

GDC will be partly utilizing the concept in Ethereum introduced by Vitalik Buterin, called SchellingCoin.

SchellingCoin basically works as follows: N parties all put into the system the value of a given datum (eg. the ETH/USD price), the values are sorted, and everyone between the 25th and 75th percentile gets one token as a reward. Everyone has the incentive to provide the answer that everyone else will provide, and the only value that a large number of players can realistically agree on is the obvious default: the truth.

Before implementing SchellingCoin itself, there is one other contract that we will need to create: a sorting function. The way to calculate the median of a list of numbers and determine who is in a particular percentile range is to sort the list, so we will need a generalized function to do that.

The main idea behind the Schelling coin protocol is that everyone "votes" on a particular value (in our case it will be medical diagnosis), and everyone who submitted a vote (estimate) receives a compensation. The median is taken to be the "true value". In order to increase security, each round is done via a two-



step commitment protocol: in the first phase, everyone selects a value P which is the value they will be voting for, and submits

$H = \text{sha3}([\text{msg.sender}, P])$ to the contract, and in the second phase everyone submits the P that they selected and the contract accepts only those values that match the previously provided hash. Rewarding and evaluation is then done at the end.

Based on this, doctor will respond to the patient's request and provide his or her medical opinion regarding the medical condition on a diagnosis submission form. In the next round doctor will be shown the medical suggestions from other evaluating doctors to provide a numeric evaluation to these suggestions. After a certain number of doctors provide their diagnoses and evaluation, a GDC will be generated.

Every evaluation that coincides with the consensus will be rewarded, and the doctor that resides in the country selected by the patient will continue working with the patient on his treatment plan if chosen so by patient. Even if the doctor who provided an evaluation has not been chosen as the treating doctor, he or she will be paid based on how close his or her diagnosis was to the general consensus. The compensation mechanism for doctors will be based on the proximity of their evaluation to the general consensus and time of response. Doctors will receive extra healpoints for evaluating patients within the first hour of second opinion request submission.

For a patient's evaluation, the doctor will receive the patient's record summary with a visualized pain chart, history of medical conditions, and supporting data including laboratory tests, scans, etc.

The HealPoint platform allows doctors to recruit new patients while getting rewarded for providing a second opinion. After the doctor and patient decide



to work together on a treatment plan, they can negotiate payment structure and keep using the HealPoint system and HLTs as a method of payment. HealPoint will not charge the patient and doctor for discussing treatment options after they have chosen to work with each other.

Security and Compliance

Unlike most of the telemedicine portals, systems, applications, and hospitals, HealPoint will never generate or store patient records.

In order to use the system, patient will never be required to provide his/her:

- Real name (we will encourage patients to use alphanumeric nicknames)
- Address (city, state, country of residence will never be asked)
- Exact age (only age range will be asked and used)
- Documents proving identity (no passports, IDs, SSN etc. will ever be required to register)

In order to create a patient profile, the user will need to provide gender, age range, and medical concerns with supporting medical examination results if necessary.

The HealPoint platform will minimize the risk of generating profiles containing Personally Identifiable Information (PII). PII is any data that could potentially identify a specific individual. Any information that can be used to distinguish one person from another and can be used for de-anonymizing anonymous data can be considered PII.



HealPoint will have technical infrastructure to protect our users, and we will make sure that none of the sensitive data will ever be collected, used or stored.

After receiving a GDC, the patient can disclose any required information necessary for the prescription or treatment plan using direct communication with the doctor outside of HealPoint infrastructure, via preferred channels, and further use HealPoint only to make payments.

To store patient profiles and GDC, HealPoint will be adopting best security practises based on HIPAA compliance checklist, address PCI, EU data protection laws and other regulations.



Business Model and growth

Healpoint will charge a commission on transactions and monthly subscriptions for memberships being executed on the platform. As the community expands the transaction volume will increase.

Healpoint believes that the system has a high potential for immediate growth and return on investment due to the high demand of second opinion services. Studies show as many as 20% of patients seek second medical opinions. Most health plans do not cover second opinions, and even if coverage is available under the specific health plan, most insurance companies will require procedure codes to process reimbursements.

Currently the median cost for a second opinion varies from \$550 to \$980. Healpoint will provide much more than a second opinion. We will generate a Consensus diagnosis that will be impacted by a group of doctors around the world instead of just 1-2 doctors.

This is an unprecedented service that apart from being cost effective (the approximate cost of getting GDC is expected to be around \$300), will empower patients with better tools to make informed decisions concerning their health, wellbeing, and treatment options, and help them connect with experienced doctors abroad.

Time is of the essence when it comes to treatment, so another crucial point is turnaround time. Most online second opinion services process second opinion requests within 5-10 business days, while HealPoint is aimed at decreasing the time frame to a matter of hours after submission.



This gives opportunities to patients:

- Who have an unclear diagnosis
- Who have been told they have a rare or life-threatening condition
- Who have several medical problems
- Who have been recommended a treatment that is risky, controversial, or experimental
- Who have a choice of treatments or medical tests that vary widely in cost
- Who are not responding to a specified treatment as expected
- Who have lost confidence in their medical care provider
- Who have a health plan that requires a second opinion

HealPoint will also offer patient recruiting opportunities for doctors, in addition to its compensation mechanisms.

According to studies conducted by CarrotHealth and Zipnosis, virtual care has a measurable, positive impact on patient acquisition, thereby producing significant financial returns for health systems that use this care delivery channel.

Of the 974 virtual care users who started a virtual visit, 242 had at least 1 in-person visit within 12 months of their virtual encounter, producing a conversion rate of 24.8%.



The findings of this study are consistent with data from the Advisory Board Company, which found an average annual revenue per patient of \$3,095, based on meta analysis of their population risk management platform.

Potential

According to the American Telemedicine Association (ATA), more than 83 percent of executives surveyed plan to invest in telehealth this year.

The ATA recently released findings from the 2017 Telemedicine Executive Leadership Survey. The study reveals that telemedicine executives are overwhelmingly optimistic about the future of the telehealth industry, and are planning near-term investments to keep pace with the rapid transformation and growth of the industry.

Key findings include:

- 83% of respondents claimed they are likely to invest in telehealth this year
- 88% of respondents plan to invest in technology related to telehealth this year
- 98% of leaders feel telehealth services create a competitive advantage over other organizations that do not offer it
- 84% of respondents believe offering telehealth services strongly expand an organization's coverage and reach
- Respondents noted reimbursement and licensure as top barriers to increased telemedicine adoption
- Close to half of respondents believe increasing consumer demand will be the key trend that will propel the growth of the telehealth market in the next 3 years



- Patient-centered healthcare and EHR interoperability are industry advancements a majority of respondents are most excited about

98% of survey respondents believe telehealth services create a competitive advantage. The report was based on the answers by 171 respondents in executive leadership positions representing telehealth service providers, healthcare practices, and hospital systems.

Competitive Landscape

The arrival of blockchain technology opens new opportunities for the healthcare industry in terms of security. While blockchain is widely known for powering bitcoin, its core technology is a tool set to store secure data in a distributed, encrypted ledger and control the access rights.

Rather than having one central administrator that acts as a guard to data, there is one shared ledger that is spread across a network of synchronized, replicated databases visible to anyone who has access. This allows unprecedented security advantages. Hacking one block in the chain is not possible without having to hack every other block in the chain.

This makes blockchain incredibly appealing to the entire span of the healthcare industry that needs to securely access a patient's EHR.

Currently most of the healthcare platforms and applications have been utilizing the security component of blockchain and reworking the way data and EHR are stored, transferred, and accessed.

Using blockchain powered EHR's, patients manage multi-institutional, life time medical records .



Currently, we discovered no other company utilizing blockchain technology for telemedicine and second opinion needs. On the horizon of the second opinion market is a startup called GrandRound.com, also known as ConsultingMD. The company gathers the patient's medical records, test results, and images in one file, and matches the patient with the right specialist—sometimes with the help of an algorithm. The startup says it delivers a consultation within 48 hours—more or less what competitors promise, including medical centers such as Johns Hopkins, Cleveland Clinic, JRival WorldCare, Partners HealthCare and MD Anderson, who also offer second opinion services. HealPoint will revolutionize the service by giving the patient a broad estimation of their wellbeing and providing a consensus diagnosis rather than opinion of one particular doctor.



Roadmap

2014 - Doctor/patient interface for pain tracking, lab tests, x-ray submission was created for BlueCross BlueShield Venture Partners

November 2016 - New HealPoint platform concept was born, utilizing Ethereum shell coin mechanics and smart contracts

January 2017 - HealPoint team members consolidated, supported by external advisors

May 2017 - White Paper outlined, Started preparations for Crowdsale

August - October 2017 - Approximate time for Initial Coin Offering (ICO) campaign (to be clarified in the coming days)

January 2018 - Showcase of the initial prototype

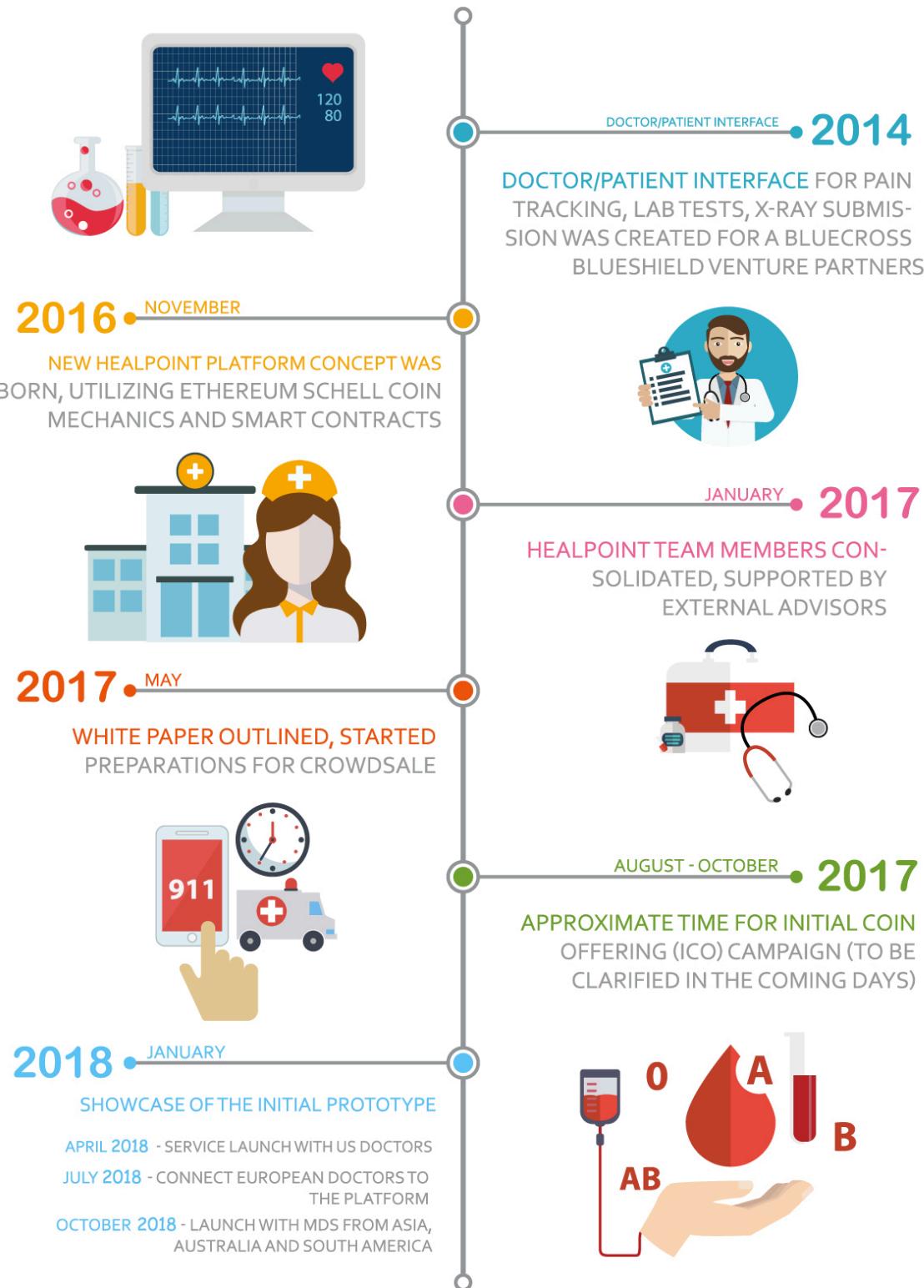
April 2018 - Service launch with US doctors

July 2018 - Connect European doctors to the platform

October 2018 - Launch with MDs from Asia, Australia and South America



TIMELINE



Token distribution. Crowdsale

Healpoints (HLP) will be distributed in the form of crowdsale.

Crowdfunding participants will be able to acquire HLP by pledging a defined amount of ETH into the token sale smart contract.

The crowdsale will start in Q3-Q4 of 2017 and will continue for 30 days. Two million tokens will be issued and 1 200 000 in total will be distributed during our initial coin offering in exchange for the ETH committed. The contributions during the first 2 hours of the crowdsale, known as "Power Hours", will be rewarded with a 10% bonus.

On the following days contributors who pledge 600 ETH or more will be rewarded with a 15% bonus.



The crowdsale will be capped at \$8.5 million USD in the equivalent amount of ether.

After the target is reached the crowdsale will be stopped. The total amount of tokens issued will be 2,000,000, which will be distributed among contributors once the crowdsale is over. At the close of the Contribution Campaign, 10% of



funds raised will be released in order to finish development of the initial prototype that will include a complete doctor-patient interaction interface and expansion of the development team.

Total Supply: 2,000,000

Sold during Crowdsale Campaign - 60%

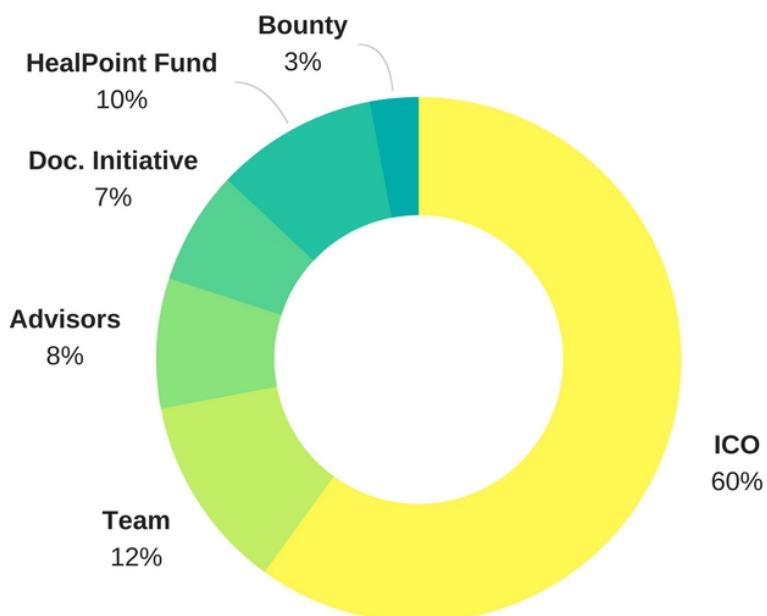
Incentive for Doctors Signing Up during 1st Year - 7%

Advisory board - 8%

Early Team Members - 12%

HealPoint Fund - 10 % (These tokens will be held in a multi-signature wallet.)

Bounty Campaign - 3%



All funds will be received and held in a multi-signature wallet.



The core team won't be able to sell their tokens until 5 months after HealPoint is fully launched.

For further information regarding the token sale, please contact

support@healpoint.io



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