



## White Paper

# **Patient and doctor-centric health ecosystem in specialised medicine engineered on blockchain.**

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This version and its contents are current as of 03/19/2018 and supersedes all previous versions of this whitepaper or any public statements made about TrustedHealth and the TDH Token Sale and are subject to change. This English version is to be relied upon as the most accurate and updated as other language translations may have mistranslations and be outdated.

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# 1. The Mission

TrustedHealth is seeking to become a patient-led and doctor-guided cooperative ecosystem focused on life-threatening diseases. It's goal is to source the best methodologies for delivering improved health outcomes for patients, and ensuring that these are accessible to patients all over the world.

**We want to empower everyone, everywhere with knowledge and access to the best medical care in specialised medicine.**

# 2. The Founding partner

**Trustedoctor is already helping patients all around the world.**

Trustedoctor is an international community of compassionate individuals with the shared goal of helping patients and their families in their fight against life-threatening diseases using innovative technology. With PatientLink, a free digital medical record tool, patients can create a secure profile of their medical history or health condition and simply upload all their medical data so any doctor of their preference in any geographical location can read, access and analyse their medical data.

Trustedoctor has, already, created a virtual platform that addresses diseases such as brain and lung cancer, linking patients to world-leading specialists and allowing them to access the best medical care regardless of their location. Trustedoctor consists of 11 driven professionals, based all over the world, from the UK, to the USA Switzerland, Poland, South Africa and Slovenia, all on the mission to change healthcare for good. .

In just the fields of brain and lung cancer, Trustedoctor has already helped more than 200 patients from 25 countries, empowering them by providing them with access to the right specialists - without worrying about the barriers of geography, time and finances. In brain and lung cancer Trustedoctor has built a world-first, market-leading e-hospital,

populated with the right specialists and empowering patients by matching their specific needs with a doctor's' corresponding speciality.

Trustedoctor is trusted by 16 patient organisations around the world and entrusted by highly qualified and renowned medical specialists that want to help and share their knowledge with patients. Trustedoctor is funded by doctors and business angels and is committed to maintaining our independence in order to fulfil its mission. Trustedoctor is advised by the 50th biggest law firm in the UK - Browne Jacobson. Trustedoctor's main values are integrity, transparency and courage.

### **3. Abstract**

#### **Don't trade away your health.**

Health is our greatest asset. However, due to the world's fragmented healthcare system in specialised medicine, we are often forced to trade it away.

*"When we say that we are 'trading away' our health we are referring to the lack of trust in the existing healthcare industry and the models that define it. We are asking if the traditional institutions and models of healthcare are acting in the best interests of the patients." [Greg Jarzabek, CEO and Co-Founder, Trustedoctor and TrustedHealth]*

Many healthcare systems are slow and inefficient. They favour some and exclude others. There is a lack of transparency around the right specialists, the misdiagnosis rate is high and the best medical care isn't centralised in one place due to sub-specialisation. There is also limited physical access to some of the most proficient medical practitioners in the world.

#### **Everyone should be able to access specialist expertise, regardless of their location.**

There are also challenges around a lack of technology, or a lack of access to technology, poor communication, lack of standardisation, and case-relevant information exchange. In our view, these issues impact on patient-to-doctor, patient-to-patient

communication, the knowledge transfer between medical practitioners and better research for future treatment discoveries.

The challenges that every patient faces, and that are of the most pressing concern, in life threatening conditions are clear:

- Patients don't benefit from the expertise available around the world
- There is a rising demand for the unification of the healthcare experience, data and security.
- Every case could help others through coordinated research.

**TrustedHealth is being created to be an agent of this change.**

With TrustedHealth, patients, medical practitioners and the entire health ecosystem will be connected directly with one another. A direct link from a patient in one country to the right specialist in another, delivering the right diagnoses and the right patient care - this is the vision of TrustedHealth. Every step of the healthcare experience supported and made available to everyone through an integrated medical ecosystem of healthcare providers.

## **4. Executive summary**

**We can do better.**

If you or someone you care about has been diagnosed with a life-threatening disease would you not like to feel as if you could take immediate control over the situation? Wouldn't you like to gain access to the knowledge of world-leading specialists who understand the condition intimately? Wouldn't you want to have access to the entire healthcare ecosystem, from medical diagnostics, hospitals, and other trusted providers to the right treatment - all on time? Wouldn't you want for your case to be shared with other medical practitioners so they can crowd-research the condition and fight it more effectively?

At the moment, the system is more pointed towards profit and making ends meet than it is towards resolving problems that face patients and practitioners on a daily basis. There is a need to resolve this challenge, to create a solution that provides access to the best specialists, provides the right medical support, saves time, helps research the right medications and support, and eliminates the need to travel, especially when time is of the essence.

We want you to become a part of the TrustedHealth movement and help us to create the most impressive and accessible ecosystem of medical specialists in the world. A ecosystem designed to give back and share knowledge. With you, we hope to be able to select which complex diseases and specialists should become a priority, engage in research and fundamentally change how patients and doctors around the world interact with one another to achieve significantly better health outcomes.

**The TrustedHealth is you, it's me, it's every patient and caregiver** who faces the prospect of a complex disease. It will seek to be a patient-led and doctor-guided digital ecosystem that delivers better health outcomes for people suffering from cancer and other life-threatening conditions.

We hope to empower patients by enabling them to receive the right advice by linking them directly to world-leading specialists that match their specific needs. We aim to enable virtual consultations and gather big data so it can be used to further research into specific conditions.

This project and community is already well underway. It was inspired by the passing of the mother of one of our founders. Trusteddoctor, the founding partner of the TDH ecosystem, is already helping hundreds of people connect with the right specialists within the brain and lung cancer medical speciality, regardless of geographic location.

We are trying to break down the barriers of time, geography and reigniting trust in the medical profession as patients shall be able to reach the right specialists who are well

informed and in a simple and accessible way. Our service will be available to anyone in the world. We will promote and support a global virtual platform for specialised medicine that connects patients with doctors, enabling collaboration, insight and advice. Trustedoctor's patients gain access to a vast medical ecosystem for ease of access and right treatment delivery.

Trustedoctor project came about as a result of a two-year period of conceptualisation and development and its overarching goal is to solve global healthcare challenges, for everyone, forever.

*“This is for my mother, who fought fearlessly and gave me the strength to help others.”*

*[Greg Jarzabek, CEO and Co-Founder, Trustedoctor and TrustedHealth]*

## 5. Challenges

**Healthcare provision in specialised medicine is fragmented, all around the world.**

In our view, there are numerous challenges impacting on healthcare excellence, globally.

These include:

- It is fragmented
- There is limited access to the right medical care thanks to a shortage of specialists or a lack of medical investment. Some countries face more complex conditions than others, creating an unequal weight in medical care.
- There is a growing global wave of sub-specialties in healthcare which means that the right expertise isn't available everywhere.
- There is a lack of transparency around the right specialists and a lack of evidence-based evaluation metrics.
- There is a lack of collaboration and transfer of knowledge between medical practitioners, with the exception of Central Europe, US, Canada and Japan.
- There is increased patient awareness around misdiagnosis - the figures are staggering as around 20% of patients around the world are misdiagnosed, even more worryingly 44% of cancer patients are misdiagnosed. <sup>3,4</sup>

## **Improving efficiency through interoperability and standardisation.**

The quest for quality and efficiency in healthcare is about experience, dedication, quality, honesty and feedback. The experience of a patient, doctor, hospital or any other entity (pharma, insurance companies, research institutions, et al) is based on the quality determined by the simplicity, effectiveness, exactness and resolution of every task performed or piece of information analysed.

Numerous feedback loops are necessary - it is essential to ask questions, find solutions, analyse information and improve future outcomes. Current methods and practices are just too slow and too inefficient.

Patients dying from cancer cannot wait 10 years until the specialists find a solution. They cannot wait for approval from interest groups regulators and governments.

We also need to provide doctors and patients with a platform where they can be smarter and question their choices and their ideas. **We believe there is no improvement if we blindly follow the system.**

At the moment, **the lack of standardisation presents the biggest obstacle** in the interoperability of the system across the individual and the organisational level. It doesn't matter if this is on a local, regional or global scale, as each entity uses different platforms and most of the data is not yet digitised and accessible.

In our view this is impacting on medical research outcomes because there is:

- Limited access to population health data.
- Inconsistent rules and permissions for accessing patient data.
- Varying data standards which reduce interoperability as a consequence of non-compatibility between systems.
- Privacy and security such as confidentiality of protected health information and protecting personal data from hacking attacks.

- Fraud and abuse.
- Consumer engagement such in the form of disease and management and clinical outcomes.

## 6. Solution

### TrustedHealth overview and mission

TrustedHealth is being designed to be a decentralised patient and doctor-driven cooperative; focusing on life-threatening or rare diseases. It aims to be tailored to support the unification of healthcare to ensure the provision of the best medical care to everyone, everywhere. TrustedHealth is being designed to incorporate an ecosystem of healthcare related services led by the whole community of patients, world leading doctors and specialists, caretakers and all those interested in contributing to radically improved health outcomes.

The Four Pillars of the TrustedHealth Mission are:

- **To empower patients** by providing them with knowledge.
- **To help patients access expertise** from across the globe in a decentralised healthcare system that assures better treatment provision.
- **To support the unification of healthcare experiences** for better data collection and improved global research.
- **To support better data security** within healthcare industry.

### **Information and knowledge are key in unlocking the right decisions in healthcare.**

TrustedHealth is focused on bringing transparency and equality to healthcare. We will achieve this by supporting and funding projects that map world-leading specialists in life-threatening and rare conditions per country, thereby empowering patients as they can find the right specialists. We will be simultaneously creating a ecosystem of collaborating doctor specialists that are sharing knowledge and providing every patient with access to the right information before any health decisions are taken.

**A decentralised healthcare ecosystem is necessary to access and execute better treatment provision.**

While accessing the right medical knowledge is the first step in the fight, the second step is to be able to access the healthcare providers on time and in an easy and simple way. Therefore, a vertically integrated healthcare services ecosystem is vital for the execution of patient treatment and exceptional medical care provision.

The TrustedHealth ecosystem aims to be comprised of hospitals, healthcare centres, diagnostic labs, pharmacies, insurance organisations, research institutions, patient organisations and other relevant stakeholders that could benefit from the ecosystem.

**The TDH token: unfettered access to quality healthcare.**

TrustedHealth is set to introduce the TDH token with the ecosystem. Our aim is for the TDH token to be used as an access right coin, utility coin, engagement reward coin (for completing certain requisites) and payment method for transactions within the ecosystem. The TDH token will allow the holder to unlock additional services offered in the ecosystem and therefore request quality specialist care from within the ecosystem. As the ecosystem grows and new partners join, we hope they will begin accepting the TDH token on the day to day services.

**Establishing value for TDH token**

Trustedoctor will be integrated into the TrustedHealth platform, making Trustedoctor the first healthcare related service to join the TrustedHealth ecosystem. With Trustedoctor an already operational platform for cancer patients, it is hoped that Trustedoctor will drive mainstream adoption of TrustedHealth, establishing a fundamental value for the cryptocurrency used by patients and healthcare related entities. Patient organisations and other relevant entities we hope will adopt TrustedHealth and the TDH token. The idea is to grow the adoption of the TDH token with different utilities once each platform or entity joins.

**Blockchain – the road to recovery for an ecosystem that battles with a lack of standardisation.**

Healthcare quality improvements have always occurred as a consequence of a series of seemingly unrelated developments, including innovation in healthcare financing, care delivery and workforce diversity.

At the same time, diseases have provided the stimulus for much of the activity, and overcoming a disease has removed many barriers - overcoming yellow fever facilitated the construction of the Panama Canal in the early 1900s, and finding a cure for scurvy allowed mariners to make longer voyages of exploration.

Advances in health have impacted on people throughout the world and continued work into improving the quality of health must become an international effort of vital importance for all.

Learning from history, healthcare has always benefited from embracing change, incorporating it into the system and challenging diseases one at a time. Today, we believe blockchain is the change agent that can make all the difference in almost every field and detail of the system as a whole, drastically improving its simplicity, security and efficiency.

With blockchain, we will aim to turn healthcare into an interconnected ecosystem, where standardisation of processes, data and services propels its efficiency and where information is embedded in digital code. This code is stored in transparent, shared databases where they are securely protected from deletion, tampering, and revision. This kind of healthcare means that every agreement, every process, every task and every transaction would have a digital record and signature that could be identified, validated, stored and shared. Individuals, organisations, machines and algorithms would freely transact and interact with one another with little friction.

### **This is the immense potential of blockchain.**

Connecting world-leading specialists and hospitals can, in our view, only benefit from the knowledge, experience and infrastructure that resides around the world. Connected patient data can contribute to better outcomes for patients (everyone benefits from sharing information) and research organisations can benefit from access to data within a secure and independent plug & play system that is available to all participants.

### **Blockchain specific applications to enhance the TrustedHealth ecosystem.**

**Increased interoperability of** digital patient health records is required between systems to foster easier data sharing and better data research. Each party has a record linked to the original record that is registered to the blockchain. This way, everyone who has the appropriate role and responsibility can append information to the record avoiding issues such as inconsistent or duplicate records.

**Better control over data** both for doctors and patients thanks to data integrity and immutability. Each event on the blockchain has a unique hash corresponding to the contents of a record. This means users can verify if the contents of the record have been changed or not and only permissioned users may access record information.

**Better data security and storage (TDH Vault)** due to a peer-to-peer decentralised storage system holding shredded and encrypted data on dispersed servers connected with Ethereum blockchain. Users such as hospitals, clinics and others will have the opportunity to customise the storage of data according to geolocation regulatory requirements and through the use of smart contracts that showcase where the data is stored and by whom.

### **Governance by the TDH**

TDH Limited is a private company limited by shares and incorporated in Gibraltar in accordance with the Companies Act 2014 and with registration number 117041.

We have chosen to establish in Gibraltar given our understanding that the jurisdiction is crypto-friendly. TDH Limited will be issuing the TDH which will be usable on the TrustedHealth ecosystem. TrustedHealth OU is a wholly owned subsidiary of TDH Limited. TrustedHealth OU will own the TrustedHealth ecosystem.

On the 1st January 2018 the distributed ledger technology (DLT) framework came into effect. This means that firms in Gibraltar, that use DLT to store or transmit value belonging to others, now have to apply for a licence from the Gibraltar Financial Services Commission. Gibraltar is the first jurisdiction to introduce a DLT regulatory framework. Whilst this does not apply to ICOs, we understand that Her Majesty's Government of Gibraltar intends on publishing complementary Regulations for ICOs in the very near future. We are of the view that better governance will help token sales to continue to gain traction as an important funding model and we are therefore delighted to have established in Gibraltar.

Details of the directors can be found at companies house Gibraltar.

The function of the Director is to be responsible for the activities of the Company and to oversee the Company's activities on a day to day basis. The Director shall exercise his powers in accordance with the Company's articles of association (the "Articles") and his fiduciary duties to the Company. The Director is vested with all powers to perform all acts necessary or useful to manage and control the business of the Company. The Director shall hold office until he resigns or is disqualified in accordance with the Company's Articles. Subject to the provisions of the Articles, the Director shall have power, at any time, to appoint any person to be a Director either to fill a casual vacancy or as an addition to the existing Directors.

The TrustedHealth founders firmly believe that the TrustedHealth ecosystem will prosper if TrustedHealth guides its early steps and complements the future decentralised nature of its governance model. TrustedHealth OU is an independent

Estonia based legal entity with the overarching goal of promoting and fostering the use of the TrustedHealth Ecosystem, its technology and its ongoing development.

Since the TrustedHealth Ecosystem's success is dependant on the quality of service it provides to its main users (the patients), the TDH holders will retain a veto power over new service providers for a certain period of time, after which the governance power regarding service providers will transition to the hands of the patient user base.

TrustedHealth has already secured the onboarding of Trusteddoctor with its community of 50 doctor specialists in brain cancer and lung cancer and its database of more than 250 patients, and PatientLink a cloud based service to store, organise and share patient medical history is looking to upgrade its service infrastructure to a blockchain powered decentralised storage system.

## 7. Values

Our values and what we stand for.

**These are the values we believe in:**

- Respect for human life
- Transparency
- Honesty
- Privacy
- Evidence-based decision making
- Decentralisation
- Serving the greater good,
- Improving social welfare
- Building a better world
- Transforming healthcare
- Transforming patient trust and practitioner scope

**We don't believe in:**

- Inefficiency and bureaucracy
- Vested interest groups
- Inequality
- Profit-driven healthcare

## 8. Trustedoctor

The founding partner of the ecosystem.

**A verified concept that is already impacting on the fields of brain cancer and lung cancer.**

Trustedoctor Ltd is the founding partner of the TrustedHealth. Trustedoctor is the first global virtual platform in specialised medicine, breaking the barriers of time, geography and the fragmental health landscape. Trustedoctor's vision is to revolutionise access to leading expert knowledge by creating an online community of world-leading cancer specialists and connecting them to patients across the world.

Trustedoctor believes that everyone who experiences a life-threatening disease deserves control over their treatment. Trustedoctor gives patients a choice and a direct link to world-leading doctors and specialists, matching their specific needs with a doctor's' corresponding specialty and enabling interactive consultation on a virtual platform.

Trustedoctor has already developed a virtual platform for patient-to-doctor and doctor-to-doctor consultations in brain and lung cancer and is supported by 16 world-leading patient organisations, including The Brain Tumour Charity and Brainstrust. **Trustedoctor makes consultations come alive in a borderless virtual setting**, transcending time, geography and cost. It has already validated the concept and had patients from 25 different countries receiving medical validation of their diagnoses and treatment. Trustedoctor works with patient's organisations and world-leading specialists who can participate by invitation-only. The platform is set to grow across other diseases with the

goal of becoming a virtual platform that provides simple, credible and secure patient-to-doctor and doctor-to-doctor communication across all life-threatening and rare diseases.

As a transitional solution for other use cases Trustedoctor has created **PatientLink** - a stand-alone archiving system for medical data that puts patients in control of their medical records, digitally. Using this tool, patients can create, store and securely share their medical history with an easy “one-click” access for personally selected practitioners, or for one of Trustedoctor’s suggested list of specialists.

**Trustedoctor’s mission is aligned with TrustedHealth’s and is committed to:**

- Bringing transparency to specialised healthcare.
- Empowering patients to select, find and connect to the right specialists regardless of location.
- Fostering doctor-to-doctor collaboration.
- Promoting and improving the secure sharing of data and knowledge between doctors and patients to benefit research and patient outcomes.

**Some of the benefits that Trustedoctor delivers are:**

- A second opinion for patients who are in two minds or need a new perspective.
- A ecosystem of world-leading specialists in specific conditions made available to patients around the world, irrespective of location, over a all-in-one virtual communication platform that enhances patient-to-doctor and doctor-to-doctor communication.
- Patients have an immediate feel of control over their treatment. The Trustedoctor platform provides a choice and a direct link to world-leading specialists that are matched to match patient needs, enabling an interactive consultation over a virtual platform and saving both specialist and patient time and travel.
- Our vision is to be the leading platform in specialised medicine, the Facebook and LinkedIn for specialised healthcare.

- Trustedoctor believe that reaching the right specialists should be easy and available to everyone, everywhere.

Trustedoctor is socially responsible, would like to foster doctor-to-doctor collaboration, and is also included in **Trustedhealth mandate the goal of empowering patients who cannot afford care by giving them a part of our revenue.**

### **Vision - The Facebook and LinkedIn of specialised healthcare**

Trustedoctor's vision is to become a standalone, standardised platform in specialised healthcare for patient-to-doctor and doctor-to-doctor communication and collaboration, empowering all to deliver the best medical advice and research. An accessible, social, easy to use interface that inspires communication, collaboration and the sharing of insights and medical best practice.

Trustedoctor's goal is to expand its body of research and medical specialists into a further 20 conditions over the next two years while simultaneously on-boarding more than 450 additional specialists across other life-threatening diseases.

**Trustedoctor's vision is to unify doctor and patient communication on one platform in specialized medicine. This would involve the development of the following business pillars:**

- The value of the second opinion.
- Access to specialised medical support and clinical trials.
- Research, analysis, sharing of data across a virtual clinic.
- Access to healthcare, practitioners and patient-led support.
- Helping others achieve the best possible medical outcomes.

If Trustedoctor is successful in developing a community supporting this movement, it can contribute to better health outcomes to anyone, anywhere.

## **Achievements in brain cancer and first steps in lung cancer**

Brain cancer is one of the most complicated oncology fields and therefore the best to prove the concept, have impact and add value. The results speak for themselves:

- Within only 12 months Trustedoctor managed to create a reference point for brain cancer patients around the world with 50 leading specialists across six countries: Switzerland, Germany, Spain, France, UK, USA
- 250 users registered from across the globe just in brain and lung cancer
- The solution was presented to a worldwide ecosystem of doctors from leading hospitals and was met with approval and critical success
- Trustedoctor currently collaborates and co-operate in virtual clinic trials with six different clinics and hospitals.
  - Inselspital Bern
  - Hopital Prive Marseille
  - Cambridge NHS hospitals
  - Neurorehab clinic Switzerland
  - US hospital
- Trustedoctor became a finalist in the European Harvard Venture competition
- Trustedoctor became semifinalist of Astellas Prize competition - one out of 10 projects from 161 projects in oncology
- Trustedoctor are supported by 15 leading cancer charities

Find out more about our journey so far:

- Trial of Trustedoctor within Cambridge NHS hospital (<https://goo.gl/kJmWpY>)
- Patient story: Maike (<https://goo.gl/obGWN5>)
- Patient story: Kathleen (<https://goo.gl/grV5DD>)

## **Involvement in clinical trials**

Trustedoctor's platform is equipped with a clinical trial module so that any doctor can create research parameters and specific research groups. It currently is engaged in a

European-wide clinical trial for neuroscience that spans seven countries and 30 international centres.

### **How we are going to develop further diseases...**

TrustedHealth will work together with Trustedoctor to fund expansion across other life-threatening and rare diseases.

Every disease sees the development of a medical board that spearheads the onboarding of national key opinion leaders. Together we have already identified leaders across 20 diseases that we want to incorporate into the TrustedHealth ecosystem and we will consider other diseases that are put forward by our community and readers.

The cost is based on time, resources, and lead generation, but our end goal is to have a world map of leading specialists across every life-threatening disease. This way we can empower patients with knowledge before they make any important health decisions.

As we continue with the development of the platform, we are set to develop an algorithm that would recommend doctors and specialists to the ecosystem based on data and evidence around their work and expertise. We will move from reputation-based selection to a hybrid process that blends both reputation and evidence.

## **9. Ecosystem**

### **Purpose of the token based on Ethereum blockchain**

Our TDH tokens are an exchange mechanism within the TrustedHealth ecosystem and will be issued on the public Ethereum blockchain as ERC20 tokens. TDH tokens may be used for all transactions within the TrustedHealth ecosystem - a decentralised ecosystem built on top of the Ethereum blockchain. The ERC20 token interface allows for the deployment of a standard token that is compatible with the existing infrastructure of the Ethereum ecosystem, such as development tools, wallets, and exchanges.

**The main purpose of the TrustedHealth ecosystem is to provide the required infrastructure to connect patients to medical service providers like Trustedoctor** using one method of payment to ensure the process remains seamless and accessible.

The Ethereum blockchain is currently the most relevant programmable blockchain platform allowing for the deployment of smart contracts which we hope will form the main component of the TrustedHealth ecosystem. Ethereum's ability to securely store and run trustless smart contracts enables complex issuance rules for cryptocurrencies, digital financial contracts and automated incentive structures. These advanced features and the active ecosystem make Ethereum a natural fit for the creation of TDH tokens.

Ethereum smart contracts are programs run on a blockchain with unique attributes compared to other forms of software. The program itself is recorded on the blockchain, which gives it characteristics like permanence, censorship resistance and irreversibility. This means any line written in the smart contract will always be present and cannot be modified at a later stage.

As the number of users and service providers within the decentralised TrustedHealth ecosystem grow, a variety of new services can be expected. Service providers joining the service can use the services of other member organisations, combining offerings and solutions to develop new methodologies and practices that are currently not available or possible. The more service providers, the more options.

We envisage anything from centralised medical service providers like hospitals, clinics and diagnostic centres, to decentralised patient-to-patient or doctor-to-doctor communities, decentralised medical record keeping, web-based educational institutions, specialised AI (artificial intelligence) companies and other services aiming to improve positive outcomes in specialised medicine.

## **Tokenizing the specialised health industry**

The health industry is one of the largest sectors of our economy worth \$3 trillion in the United States alone.<sup>1</sup> With the TDH token we will tokenize all the health services, transactions and products within specialised medicine. TDH token will enable all users, patients, health service providers and other members of the medical community to operate, exchange and work together.

*“Global spending on health is expected to increase from US\$7.83 trillion in 2013 to \$18.28 (uncertainty interval 14.42–22.24) trillion in 2040 (in 2010 purchasing power parity-adjusted dollars). We expect per-capita health spending to increase annually by 2.7% (1.9–3.4) in high-income countries, 3.4% (2.4–4.2) in upper-middle-income countries, 3.0% (2.3–3.6) in lower-middle-income countries, and 2.4% (1.6–3.1) in low-income countries. Given the gaps in current health spending, these rates provide no evidence of increasing parity in health spending. In 1995 and 2015, low-income countries spent \$0.03 for every dollar spent in high-income countries, even after adjusting for purchasing power, and the same is projected for 2040. Most importantly, health spending in many low-income countries is expected to remain low. Estimates suggest that, by 2040, only one (3%) of 34 low-income countries and 36 (37%) of 98 middle-income countries will reach the Chatham House goal of 5% of gross domestic product consisting of government health spending.” [The Lancet. National spending on health by source for 184 countries between 2013 and 2040]*

## **Building a specialised medical economy – TrustedHealth Ecosystem**

There is a global move towards the consumerisation of healthcare. After 25 years of trusting online data to book a car or a hotel, today we believe there is a demand for an economy built around the decentralised global provision of the best medical care in specialised medicine. A globalised, local repository where knowledge can be unified, local barriers broken and access given to anyone, anywhere, while simultaneously building a cooperative of stakeholders contributing to better health outcomes for all.

**TrustedHealth has an innovative crypto-economic structure** intended to promote the use of our TDH token as a common healthcare payment method on the TrustedHealth ecosystem. This economic structure is designed to create a natural incentive for owners of other healthcare related services to adopt TrustedHealth and become partners in the TrustedHealth ecosystem.

TDH token is destined to be a multi-layer utility token within this economy that can not only be purchased, but also earned and used as a reward for participation in the development of the ecosystem and contributions to better health outcomes, especially through data upload for better research.

TDH token is just based on Ethereum blockchain that is currently the industry standard for issuing custom digital assets and smart contracts, but its utility is adjusted for the healthcare ecosystem within specialised medicine. TDH token's utility will grow with the entrance of new partners to the system and it has the opportunity to **disrupt one of the largest and most important industries in the world**: healthcare.

Given the ecosystem is open to healthcare-related stakeholders ranging from hospitals and labs, to patient organisations, there is a tremendous potential for the TDH token to be adopted and for the ecosystem to have a direct impact on quality of life when it comes down to finding the right specialists and being able to access healthcare-related services in a simple, transparent and secure way.

### **TDH token utility description**

Besides being the preferred method of payment for services within the TrustedHealth Ecosystem, TDH token can also be rewarded to early adopters, patients and service providers as the TrustedHealth Ecosystem of providers grows.

As and when, hopefully, more and more service providers like Trusteddoctor join our ecosystem, TDH tokens are set to become a personal key to a unique ecosystem for

specialised medicine stored on the user's Ethereum wallet. General token utilities are the following:

- Payment method across ecosystem
- Engagement reward coin (rewards of TDH Token for contributing to the ecosystem)
- Research coin (in order access research on the ecosystem users and providers will be required to hold in some cases transfer TDH tokens to the ecosystem)
- Storage coin (providers will be able to pay with our token for storing the data on blockchain)
- Providing a number of TDH tokens are held by an individual or provider they will be able to access premium services

Upon the deployment of the TrustedHealth ecosystem, the TrustedHealth will work with Trusteddoctor to integrate the TDH token, enabling:

- peer-to-peer payments (direct patient to doctor payment execution)
- lower fees than traditional means
- instant settlement
- increased security
- payment automation

Most importantly, the adoption of TDH token will enable Trusteddoctor to develop and provide new services and features that leverage the immutability and irreversibility of smart contracts and blockchain transactions, as well as services brought by new joining service providers. These services and features may include reward systems for patients and/or doctors, doctor reputation/evidence based selection systems, other provider selection system, research access and others.

### **payment method for the ecosystem**

In general, TDH token will be the payment method of choice for any health related services or products in specialised medicine within the ecosystem such as paying for specialist consultations, diagnostics, treatments and universal health insurance by 3<sup>rd</sup>

party licensed providers (providing, if applicable, the platform had suitable licence, as required). TDH token will be used to pay for the services available within the TrustedHealth ecosystem. Service providers will be paid with TDH token and the research labs will pay for data with the tokens. It should be noted that payments in Fiat currency will be permitted in certain instances.

## **Earnable TDH**

All users will earn coins by uploading and providing the data for research or their digital engagement in healthcare related activities such as: questionnaires or interviews. Selected world-leading doctors will earn coins though second opinions or their virtual private clinic interactions. Other healthcare providers, especially hospitals and clinics could earn coins through participation in the blockchain-supported data storage system.

## **Who would join the ecosystem?**

We plan to expand the platform in over several phases:

- The first step would be opening to doctors and specialists (this is already in use in Trusteddoctor)
- The second step would be private clinics, hospitals and patient organisations
- The third step would include testing labs
- The fourth step would be research labs
- The fifth step would expand the ecosystem to include 3rd party licensed providers (providing, if applicable, the platform had suitable licence, as required)
- The sixth step would finally include pharmacy distributors, educational facilities, community groups.

## **Who will hold the coins and why?**

### **Patients**

Patients who are registered users and active users of the TrustedHealth Ecosystem will play the main role in the evolution and growth of the TrustedHealth Ecosystem and the services it provides. By holding TDH token, patients will be able to:

- **Rate service providers** as well as approve new service providers that are then automatically accepted into the TrustedHealth ecosystem. Initially this governance rule power will be centralised in the hands of TrustedHealth, but it will then be gradually passed on to patient users as ecosystem adoption grows. **The goal of TrustedHealth is to create a ecosystem for specialised medicine** that revolves around the needs of the patient and the quality of the services it provides.
- **Have access to the anonymised uploaded research data** about the disease or any data they are interested in so that they can freely contribute to any new findings or discoveries.
- **Vote on the disease list** to be further developed within the ecosystem.
- **Have privileged access to other services** offered by partners in the ecosystem such as HealthPass services offered by Trusteddoctor and custom disease research and support.

### **Doctors**

By holding the coins, doctors will have access to the anonymised uploaded research data about the disease, or any data they are interested in, so that they can freely contribute to any new findings or discoveries. Active users earning and holding coins would have a privilege access to other services offered by partners in the ecosystem such as HealthPass services offered by Trusteddoctor and custom disease research and support.

### **Other partners, stakeholders**

The TrustedHealth Ecosystem welcomes any services that can bring value to specialised medicine patients. These services may include, but are not limited to, hospitals, clinics, pharmacies, diagnostic centres, patient organisations, insurances, hospice homes, patient care, educational facilities, community groups and more.

Joining the TrustedHealth Ecosystem as a homogenous service provider as opposed to one of the world-leading specialists featured on the website is subject to a one-time

onboarding membership fee payment. When becoming a member, **service providers receive TDH tokens as proof of membership, effectively becoming stakeholders in the ecosystem.** Furthermore, to provide their services to patients, the service providers must hold a certain number of TDH tokens on their registered Ethereum wallet account. The TrustedHealth initially will decide the inclusion of a providers into the ecosystem. In the future, there will be a decentralised algorithm judging the eligibility of health service providers based on excellence and customer service as voted by patients.

To reward new partners for early adoption, the number of TDH tokens received as proof of membership, and at the same time required to provide services within the ecosystem, is set to decrease with user base growth.

8% of the total TDH token supply will be reserved for new service provider memberships. This allocated reserve will be held at the limited discretion of TDH Limited.

Each joining partner will define the utility of the TDH token, thereby the usage and need of holding the coin shall expand in the future with every new partner.

## **10. HealthPass**

**HealthPass is a premium status access account stored on your Ethereum wallet.** A HealthPass registered Ethereum address allows you to access premium services within the TrustedHealth ecosystem of service providers such as direct contact numbers to diagnostic labs, researchers or personalised services.

**HealthPass owners will be on the priority list** and their access to some premium services may be for free or of subsidised value. For instance, Trusteddoctor, the first service provider to join TrustedHealth, will award HealthPass account access to Healthcontrol, personalised assistance and research for any disease, even if not listed on their platform.

**The HealthPass platform is expected to gain value** as the ecosystem of service providers within TrustedHealth grows. Any registered end user will automatically receive a basic account whereby the services can be purchased either by fiat currency or by using tokens as a payment method.

**Users of TrustedHealth can pledge to receive HealthPass status** by making regular payments to the HealthPass smart contract. The smart contract follows a predefined descending payment schedule (see chart below). Making regular payments throughout a four-year period span will grant users permanent HealthPass status.

**The HealthPass payment schedule forecasts a total payment of 12 x (4000+2000+1500+1000) = 102,000 TDH tokens** over a four-year (4) period. As the pricing of the TDH token may vary with TrustedHealth adoption, the TrustedHealth may decide to modify the payment schedule amounts to allow fair pricing.

**The HealthPass smart contract also keeps track of user payments** and stores any outstanding balance to cover the next payment. A user may choose to cancel the pledge at any time and receive the remaining funds back. Cancelling the pledge will result in the loss of the HealthPass status. A new pledge will restart the user's descending payment schedule. Because HealthPass is non-transferable, registration is subject to KYC (Know Your Customer) procedures.

## **11. Blockchain**

### **Blockchain transition: Anticipating the future.**

**Trustedoctor is already a well-established platform** used by hundreds of patients and doctors. It is developed on state-of-art technology and provides seamless patient-doctor communication. It is a scalable solution capable of hosting terabytes of data. For the communications around medical records Trustedoctor uses cloud services provided by Google and Amazon - infrastructure servers are hosted on Google cloud, AWS encrypts

and parses buckets of medical records. Trusteddoctor encryptor uses OpenSSL to provide AES-256 encryption. All of Trusteddoctor's encrypted values are signed using a message authentication code (MAC) so that their underlying value cannot be modified once encrypted. Medical records are stored on the no-SQLI database. Keys to the data are controlled by the platform where any doctor, with the consent of the patient, is granted access.

Although the Trusteddoctor platform is equipped to easily handle current platform functionalities, Trusteddoctor believe this is not enough. In order to achieve the goal set out Trusteddoctor are determined to be the best on every level of its mission, including technical advances.

By taking advantage of latest technological advancements we believe we can one day provide an autonomous medical service and consultancy to patients that would be fast, effective, reliable and cheap. It would simultaneously feed collected data into research, thereby increasing the chances of better health outcomes for patients.

**In essence, the fundamental strengths of a blockchain system lie in:**

- Data integrity
- Networked immutability
- Managing participant consensus and wisdom of crowds to improve healthcare outcomes
- Developing decentralised, auditable and trusted healthcare oracles
- Verifiable facts, data and evidence-driven care
- Correct economic incentives to benefit the patients
- New services and building a better market economy for healthcare

**The benefits of blockchain when applied to our ecosystem.**

Drawing on our collaboration with hospitals and clinics around the world, we are aware that the **data security** and uploaded **data interoperability** and **sharing** are of essence in any partnership.

As a digital medical record keeping system data is hashed onto the blockchain, it is considered a much more secure, scalable, tamper-proof alternative to current legacy models.

*Records on blockchain are secure and almost impossible to manipulate, auditable and easily accessible with public and private keys.*

Those with the right credentials could verify a record at any time, while the system would be easy to audit, more streamlined and much more effective. By storing medical records on a blockchain, it is possible to create a longitudinal health record covering every incident and update from childhood to old age. Every event or transaction is time-stamped and becomes part of a long chain or permanent record that can't be tampered with after the fact.

### **We plan on using blockchain for the following reasons:**

**Benefit 1 - Better security of medical data** thanks to a peer-to-peer decentralised storage system holding shredded and encrypted data on dispersed servers connected with Ethereum blockchain. The benefits coming from a reduced centralised server include:

- Make it more reliable, not all eggs in one basket
- Diminishes the privacy breaches by one single entity (who holds the data)
- Your encrypted files are spread across multiple nodes or hosts
- No single host holds any significant piece
- Decentralised distributed storage ecosystem
- Improves speed, reliability and availability
- All transactions are audited
- Tracked by smart contracts (no abuse of privacy), transparency assured· everything is time-stamped, delivering secure integrity of data
- Reduce the storage costs – far more affordable for hospitals

- Decentralised cloud is on average 10x less expensive than current cloud storage providers. Storing 1TB on SIA costs US\$2 per month, compared with US\$23 on Amazon S3

**Benefit 2 – Data storage customisation thanks to blockchain overlay** which allows for the easy adjustment of the storage to relevant national regulatory requirements and allows for ease of participation and the use of smart contracts to know where the data is stored and by whom. Geolocation of stored data is managed and defined in the algorithm which follows the regulatory rules of each ecosystem participant based on the country of origin and type of data.

**Benefit 3 - Increased interoperability of patient data records** between systems allowing for easy data sharing and common research.

**Medical records and patient information are crucial to the healthcare system around the world.**

Healthcare organisations, such as hospitals and insurance companies, need to share patient information to conduct their business. Medical records, however, present many challenges to the healthcare system. Current healthcare record systems are a mess of disconnected databases and medical history is fragmented and siloed, preventing doctors and patients from building a complete record of health. Records are often spread across different facilities and providers in incompatible databases. The vast majority of hospital systems still cannot easily or safely share their data.

**One of the most pressing problems with the current system is knowing whether the information that has been shared is accurate** and that it has not been tampered with. Interoperability issues continue to be a chief concern throughout the health industry. The lack of interoperability leads to high costs, it also makes these systems loaded with private patient information very vulnerable to security breaches or fraud or other cybercrime related activities.

*“Healthcare fraud is estimated to have cost around \$US30 billion over the past 20 years in the United States alone”.<sup>2</sup> [The Economist: Why Thieves Love America’s Healthcare System]*

Blockchain has all the ingredients required to solve healthcare IT’s problem of interoperability by securing the integrity, completeness and privacy of health records.

#### **Benefit 4 – Control of the data by patients and doctors**

In the blockchain environment, patients are able to maintain full access and control of their own data, providing access to the healthcare providers they’d like to share it with. This enables hospitals, insurance companies and labs to connect in real-time and share information instantly and seamlessly, in a secure way. This is ideal for medical research, facilitating the kind of longitudinal studies that can really help best understand illnesses.

Since data stored on blockchains can be shared securely with a pre-approved and trusted group of individuals, patients are assured that their data is being used properly and that there is complete transparency, accuracy and trust in the information across all of its users.

#### **Benefit 5 - Smart contracts will allow for rewarding of the data uploader and storage provider**

Our goal is to create a health ecosystem which truly belongs to the proper stakeholders: patients and doctors. It is not a new clearing house or “safe deposit box” for data. The blockchain implies a decentralised control mechanism in which all have an interest, but that no one exclusively owns. This is an architectural change that generalises past medical records and allows us to create an ecosystem beneficial for all participants. On one side, participants can, in exchange for rewards, provide their extra hard drive space for processing. On the other hand, participants providing relevant medical data are rewarded for their contributions whenever their data is used in research and by other ecosystem members.

### **The TDH Wallet**

One of the prerequisites of offering seamless cryptocurrency transactions between community members is to implement a cryptocurrency wallet. This wallet will act as an account-based interface for standard cryptocurrency interaction. Using this wallet, will be possible to deposit, withdraw or simply pay for the services offered on TrustedHealth Ecosystem.

**TDH Wallet will be used by all users of the TrustedHealth Ecosystem**, patients using the services, and doctors or other service providers (for example, Trustedoctor’s PatientLink) offering the health related services.

Each user will need to register a TrustedHealth Ecosystem Account which will allow participation in the community and trigger creation of user’s TDH Wallet. Registration will follow a simple KYC procedure to allow secure authentication and authorisation, similar to the ones used today in the banking mobile payment applications.

### **TDH Governance system**

TDH tokens will provide a governance function for the ecosystem token holders. Since the mission is to build a decentralised health ecosystem ecosystem, certain decisions will need to be taken during its lifetime. Although such motions are not defined as of

this moment, we might anticipate changes as the system evolves to adapt to changing needs and specifications.

For example a collaborative approach to:

- select the appropriate service providers who can join the ecosystem,
- selection or prioritisation of development of new diseases

Stakeholders will have the ability to put forward these pre-set motions by interacting with the respective smart contract. By sending TDH tokens to the contract, the stakeholder might put forward or object the wish to add, change, develop TrustedHealth Ecosystem functionality. To abstain means to oppose the wish to change, meaning no course of action is needed for stakeholders that do not wish for a change. Each stakeholder's influence is weighted by the number of TDH tokens held on the account used to make the transaction and not the amount transacted. The proposal is accepted by reaching supermajority consensus with a supermajority threshold set at a predetermined level (i.e. 60%).

## **Technical white paper - Trustedoctor blockchain digital medical record pilot**

We believe that a gradual approach is a key to success. We plan to make incremental steps in order to accomplish the envisioned goal.

### **TDH Vault – customised private storage on a public blockchain**

Today, data is probably the most valuable asset. Trustedoctor is extremely conscious of data security and so are their clients. When dealing with patient's personal information and medical records, data security is a delicate matter. Legislation enforces the appropriate use of medical data. Furthermore, hospitals and clinics demand the best storage solutions on the market.

Trustedoctor aims to meet these demands when it comes to data storage and security. Their storage system will run on a decentralised public blockchain network, data on the other hand, will be stored on private storage servers owned by hospitals and clinics.

### **Based on open-source code**

The TDH Vault will be based on open source software developed for project Storj.io.

Storj.io is blockchain-based, end-to-end encrypted, distributed object storage, where only the uploader has access to uploaded data. It uses peer-to-peer technology to enable fast, high availability and cheap storage service. The Storj users who provide storage and rent out their excess hard drive space in exchange for reward are called farmers. Users allocate a portion of their available hard drive space and specify a folder on their drive to store network data. Storj's system is designed in a way that each file is shredded, encrypted and stored on a distributed network of private computers. It is encrypted by uploader's key that is kept secret even to the Storj platform.

This space stores small encrypted shards of Storj users' files. This means that no farmer holds the entire file that a user uploaded, and because the file is encrypted it's unlikely that the farmer could read it anyway.

The first step of Trustehealth's mission is to create a blockchain environment for storing medical records and Storj is the ideal tool to achieving the first step towards this goal. Medical records will be securely stored on a peer-to-peer network and blockchain will serve as management layer assuring of data integrity and immutability.

Storj's system is designed in a way that each file is shredded, encrypted and stored on a distributed network of private computers. It is encrypted by uploader's key that is kept secret even to the Storj platform.

In order to fully comply with expected platform functionality an adapter layer for integration will need to be developed. An interface that will allow patients, data

uploaders, to securely share a data access key with a respective doctor or on the Trusteddoctor platform. Moreover, the interface will enable patients to easily anonymise parts of the data and share it with other Trustedhealth users or for medical research. This way we can ensure patients will receive the benefits of their engagement - TDH tokens for uploading data, for their data being processed and for engaging in the community.

## **Geopolitical storage customization**

A TDH Vault will offer healthcare specific functionalities to manage storage system and users. It will be customised in a way to enable choice around where information is stored and by whom. This way we will be able to create an ecosystem where each country's regulatory limitations can be adapted to any network of hospitals.

## **Benefits of the TDH Vault**

The TDH Vault will deliver technical benefits to hospitals and clinics. It will:

- Allows an easy way to become part of the ecosystem, such as a farmer (disc server holder) with a plug & play functionality
- Increased security
- Increased computing power for research
- Decreased costs of storage and security
- Allows data interoperability

Trustehealth can create a universal, interoperable, secure digital medical record, a system for medical data collection and analysis that can be further used as a tool for medical research.

## **PatientLink - Upgrade to decentralised storage for your personal medical records**

PatientLink was created by Trusteddoctor to provide a secure space to store, organise and share patient medical history. With the upgrade to a decentralised blockchain-

powered storage system, PatientLink will enter the TrustedHealth Ecosystem as an independent service provider.

Thanks to PatientLink adopting a blockchain based solution patients can store their medical records in a distributed cloud storage system while keeping control of their personal data. Storage space is provided free of charge to patients who choose to anonymise and share their stored medical data within the TrustedHealth Ecosystem.

***What's more, patients opting in the anonymised data sharing program are given free access to all anonymised data and may use it to conduct research into their condition on their own account.***

Anonymised data is also made available to service providers in exchange for TDH tokens, then distributed as payment to storage space providers.

### **TrustedHealth - core technology creation for the ecosystem**

- Blockchain data system for digital medical records piloted with Trusteddoctor
- TDH Wallet (a transaction system) that will enable the partners of ecosystem to adopt and use TDH tokens
- TDH Governance system that will provide future governance system within decentralised health network ecosystem.

After target completion, the TDH may decide to offer the TDH IP technology for use in other ecosystems beyond healthcare, for a fee.

### **Technical partners for technology creation**

TrustedHealth is investigating specific, recommended partners to deliver the blockchain technology. One of the partners we consider working with is Medius.

Medius (<https://www.medius.si/>) is a world class provider of custom enterprise applications, specialising in open source Java development and the deployment and

maintenance of tailor-made systems using the Agile Model Driven Development methodology. Founded in Slovenia in 2002, Medius offers services to customers in telecoms, public sector/e-government, lottery operators and other industry verticals.

Medius - Its development projects and capabilities include automated provisioning, EDI interoperability, online lotteries, big data, B2B e-commerce, resource management, document management and rapid application development platforms. The company is ISO:9001 certified for software development and has a AAA Gold credit-worthiness rating. Furthermore, company offers several cloud-based services, one of the most well-known is Medius CloudSE, a software emulation of Secure Elements in the cloud.

CloudSE exposes open API, that enables service providers to easily embed value added mobile services such as payment, ticketing, loyalty, stored value to their mobile applications and use them on the existing infrastructure of NFC validators.

Medius has demonstrated an ability to foster long term cooperation, client satisfaction, ability to execute and overall project success! Moreover, it is company's a strategic decision to focus on development of best of breed mobile payment and ticketing services. The Europe Cloud Award for best European cloud service in 2016 is a confirmation that our efforts have already been recognised by the domain experts.

## **Collaborations**

We will work with Ethereum developers in order to allow our systems to work seamlessly and securely. We will connect to other blockchains such as EOS or Factom for increased redundancy, security and business continuity.

## **12. Crowdsale incentives**

Through a contribution to our crowdsale initiative, users are contributing to better knowledge, transparency, understanding into life-threatening diseases, access to specialists around the world, and an ecosystem that surrounds it all. Participation

provides patients with an immediate feel of control over their treatment and makes the best medical care accessible for everyone, everywhere virtually and it is all supported by blockchain.

**All participants in the TDH Limited crowdsale** will receive the option to vote which diseases will be listed on the platform after the 15 already selected:

- Voting power depends on TDH tokens owned at time of voting
- Voting available only to contributing Ethereum wallet addresses

**Contributors above a certain amount of TDH Tokens**, will be awarded with permanent health access premium accounts (Healthpass and Healthpass+) and a tailormade assistance service for individual patients with any other condition provided by Trustedoctor (HealthControl and HealthControl+).

### **Background on HealthPass / Healthpass+:**

**Healthpass** is a premium status access account stored on your Ethereum wallet. A HealthPass registered Ethereum address allows access premium services within the TrustedHealth ecosystem of service providers. To achieve permanent HealthPass status, users will have to pledge 10,200 TDH tokens over four years.

**HealthPass+** is an extension of the HealthPass that will be **awarded only to certain contributors in the crowdsale event**. In contrast to HealthPass, HealthPass+ is not linked only to HealthPass owners, but applicable to immediate family members as covered under FMLA - spouse, and children, including adopted children and future children.

Because HealthPass is non-transferable, registration is subject to KYC procedures. However, going through the KYC process is not date restricted and can be completed at any time in the future.

## **Background on HealthControl / HealthControl+: Individual solutions would contribute to research and advancements in specialised healthcare**

Trustedoctor has already developed a ecosystem of specialists in the fields of brain and lung cancer that is available to patients today. In order to develop specialised health solutions for any disease, Trustedoctor will provide a tailormade assistance service for individual patients with any other condition using a solution called HealthControl. This way, research can be made available for the new conditions, making it possible for everybody to follow up once the path has been set for any disease.

**Healthcontrol (your personalised health assistance)** is a service that will be sold on the Trustedoctor platform for a price of US\$6,000. It is an extension of the services provided on the TD platform, as it gives the HealthControl holder a personal assistance group dedicated to researching your medical case and helping you find the best health specialists in the world for any single disease. It is a complimentary quality health insurance “Commitment to Outcome” for patients to find the right specialists and get access to them in any condition. In contrast to a single-use HealthControl solution purchased on the platform, HealthControl awarded during a crowdsale is valid for life, provides multiple uses, and comes with two-year’s of assistance along with a follow-up per disease. Depending on the contribution, HealthControl will be awarded to a single person or the immediate family. HealthControl delivers quality health insurance stored on your Ethereum wallet.

**HealthControl+** is an extension of HealthControl that will be **awarded to some contributors in our crowdsale event only**. In contrast to HealthControl, HealthControl+ is not linked only to HealthPass owners, but applicable also to immediate family members as covered under FMLA - spouse, and children, including adopted children and future children.

## **Contributions of 50 ETH:**

Same as all contributors, plus **permanent HealthPass** status and **HealthControl** as a bonus.

HealthPass status gives your Ethereum wallet **exclusive access to premium features** offered by service providers of the TrustedHealth Ecosystem.

- Access pass to premium services within the ecosystem
- Priority pass (jump the queue in the ecosystem)

HealthControl is a first premium service, awarded as a bonus to crowdsale contributors of 50 ETH:

- HealthControl gives you **an exclusive link to world-leading specialists** in your condition. It is a complementary quality health insurance “Commitment to Outcome” for patients to find the right specialists and gain access to them for any condition. It provides assistance and research into any disease, even if the condition is not listed on Trusteddoctor. Disease updates for two years are included.
- It is multiple-use. It covers you for multiple disease occurrences only for crowdsale contributors.
- Valid for life, only for crowdsale contributors

With the growth of TrustedHealth we will deliver more premium services for HealthPass holders.

## **Technical details:**

Ordering HealthPass and Healthcontrol will be possible by sending TDH tokens from your HealthPass registered Ethereum wallet account only.

Obtaining your HealthPass and Healthcontrol is subject to KYC. However, going through the KYC process is not date restricted and **can be completed at any time in the future.**

Your HealthPass is linked to your contribution address and personal detail (KYC).

Ethereum addresses contributing 100 TDH tokens or more will be awarded permanent HealthPass status. 1 Ethereum address = 1 HealthPass. 1 Ethereum address = 1 HealthPass. Multiple transactions from the same address will be summed up and awarded HealthPass status if the total exceeds the 50 TDH tokens threshold.

### **Contributors of 200 ETH**

Same as all contributors of 100 ETH but **Healthpass for the whole family** Healthpass+ and **Healthcontrol with** HealthControl+ as a bonus.

HealthPass+ is the same same service and Healthpass, but applicable to immediate family members as covered under FMLA - spouse, and children, including adopted children and future children. **Healthpass+ will be awarded to contributors in our crowdsale event only.**

**HealthControl+**, your personalised assistance and research tool into any condition **will be also awarded to contributors in our crowdsale event only.**

When you contribute 300 ETH, you can give HealthPass to someone, but you cannot transfer it at a later date.

## **13. The Issuance of TDH Tokens**

### **TDH Token Info**

Token name: **TDH**

Total tokens minted: **300M TDH**

Soft cap: **1,000 ETH**

Hard cap: **7,500 ETH**

Tokens on public offering: **150M TDH**

Price of TDH token: **0.00006 ETH**

Blockchain: **Ethereum (ERC-20)**

Currency Accepted: **ETH**

The Company can continue to raise funds via private agreements during the Token Sale.

\*Unsold tokens offered to the public will be locked for two years and reserved for community growth.

## **Bonuses**

<b>Tranches</b>	<b>Tokens in tranche</b>	<b>Token price (in ETH)</b>	<b>Total ETH in tranche</b>	<b>% total TDH tokens</b>	<b>Bonus</b>
1	22,000,000	\$0.000030	660	7.33%	100%
2	8,500,000	\$0.000040	340	2.83%	50%
3	10,833,333	\$0.000046	500	3.61%	30%
4	30,000,000	\$0.000050	1,500	10.00%	20%
5	25,666,667	\$0.000055	1,400	8.56%	10%
6	21,000,000	\$0.000057	1,200	7.00%	5%
7	17,000,000	\$0.000059	1,000	5.67%	2%
8	15,000,000	\$0.000060	900	5.00%	0%
<b>TOTAL</b>	<b>150,000,000</b>		<b>7,500</b>	<b>50.00%</b>	

## **TDH token distribution**

Crowdsale contributors: **50% (Total 150M TDH tokens)**

Team: **30% (total 90M TDH tokens)**

Company: **20% (Total 60M TDH tokens) (Bounty = 2% and it's part of the overall company pool)**

## **TrustedHealth funds allocation**

Development: **\$3M (40%)**

Marketing: **\$2.25M (30%)**

Operations: **\$2.25M (30%)**

With the money raised we will bring transparency to specialised medicine by bringing world-leading specialists into the ecosystem available to anyone anywhere. We plan to onboard doctor specialists across 15 diseases. On top of this, we will develop the transaction and governance system for the healthcare ecosystem and deliver a blockchain digital medical record project for the standardisation of specialised medicine and better research outcomes for all.

## **The TDH Token supply schedule**

**The crowdsale contributors:** TDH tokens will be distributed immediately upon contribution confirmation.

**Bounties:** TDH tokens will be distributed 1 month after the completion of the crowdsale.

**Company:** TDH tokens will be vested over 3 years period with monthly vesting schedule starting after the TGE initial distribution.

**Advisors:** TDH tokens will be vested over 1 year period with monthly vesting schedule starting after the TGE initial distribution.

**Team:** TDH tokens will be vested over 3 year period with monthly vesting schedule starting after the TGE initial distribution.

## TrustedHealth token sale contribution phases

### Private:

January 26th, 12:00 CET - February 4th, 2018 12:00 CET

Minimum contribution: 3 ETH

Maximum contribution: 350 ETH

### Presale:

March 20th, 12:00 CET - March 27th, 2018 12:00 CET

Minimum contribution: 1 ETH

Maximum contribution: 350 ETH

### Crowdsale:

March 27th, 12:00 CET - April 27th, 2018 12:00 CET

Minimum contribution: /

Maximum contribution: 350 ETH

## 14. Conclusion

### It's time for a better kind of healthcare.

This is the moment when the **best medical care** should be available to anyone anywhere.

This is the moment when **healthcare becomes decentralised**, standardised, effective and user-friendly. When specialised medicine is accessible to everyone, everywhere around the world.

This is the moment when **we break the barriers of healthcare fragmentation** and lack of transparency.

This is the moment when **every patient is empowered** to have access to the right specialists, empowered to know everything and find the right doctor. When they can navigate the complexities of a life-threatening disease and have a control over their treatment, regardless of their location.

This is the moment when **each of us can contribute to better research** with our own data or our own crowdsourcing analysis.

Blockchain is the tech security solution that can help healthcare democratise data by allowing digital information to be distributed beyond silos. Through a decentralised approach, it has the potential to secure data that can be accessed and engaged while helping us to deliver better health outcomes for all.

From simplifying healthcare payments to ensuring outcome-based incentives and the integrity of clinical trial data, TrustedHealth will work on the following four pillars:

### **EHR Interoperability**

Blockchain will enable secure and seamless access to e-health records. It will be controlled by patients and it will integrate health data from countless sources. Patients will create more of their own data and they will expect control over its use and access.

*“Instead of giving all my healthcare data to Google and Apple, I may instead put it in a decentralised ledger, where I can give access to various people at various times, and decide who uses it on what condition” [Rapke: Please add in context for quote]*

It would save time for both patients and doctors, and simplify management of patients on multiple drugs and with complex treatment.

### **Secure clinical trials**

Blockchain will provide secure access to EHR's and this will then deliver a census-level pool of medical data to clinical researchers who can then use this to further their research. Patients who have given consent could then share their data and, once de-identified, this data could help researchers gain population-level insight into treatments and outcomes. Blockchain can also track and audit clinical trial results as they are created, solving the problem around proving that clinical data is authentic.

## **Smart contracts and outcome-linked healthcare**

The current healthcare system is built on the pay-for-service model. The doctor prescribes a treatment at a set cost. Blockchain simplifies payments and the use of smart contracts can potentially encourage health outcomes by linking them to payments.

**By automating payments with smart contracts, blockchain has the potential to cut the billing and administration costs that suck up a significant share of healthcare funding.**

## **Bibliography**

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## RISK FACTORS

THIS SECTION ON RISK FACTORS IS NOT AND DOES NOT PURPORT TO BE A COMPLETE ENUMERATION OR EXPLANATION OF THE RISKS INVOLVED WITH THE PURCHASE OF TDH TOKEN. THERE MAY BE ADDITIONAL MATERIAL RISKS THAT THE DIRECTORS DO NOT CURRENTLY CONSIDER TO BE MATERIAL OR OF WHICH THE DIRECTORS ARE NOT AWARE. THE FOLLOWING THEREFORE HIGHLIGHTS CERTAIN RISKS TO WHICH THE COMPANY IS SUBJECT TO AND WHICH THE COMPANY WISHES TO ENCOURAGE PURCHASER TO DISCUSS WITH THEIR OWN PROFESSIONAL ADVISORS.

Prospective TDH Token purchasers should conduct such independent investigation and analysis regarding this Company, the TDH Token and all other relevant market and economic factors as they deem appropriate to fully evaluate the merits and risk of their purchase.

The Company and its Directors disclaim any responsibility to advise purchasers of TDH Token of the risk and considerations associated with the purchase of TDH Token as they exist at the date hereof or from time to time hereinafter.

Each prospective purchaser of any TDH Token must determine, based on his/her own independent review and such professional advice (including, without limitation, tax, accounting, credit, legal and regulatory advice) as it deems appropriate, that the purchase of TDH Token is appropriate and suitable for it, notwithstanding the clear and substantial risks inherent with the purchase of TDH Token.

You should consult with your own legal, regulatory, tax, business, investment, financial and accounting professional advisors to the extent that you deem it necessary, and make your own decisions including decisions regarding the suitability of this purchase based upon your own judgement and upon advice from such professional advisors as you deem necessary and not upon any view expressed by any party mentioned in this Whitepaper.

The purchaser of a TDH Token should be capable of evaluating the merits and risks of such a purchase and should have sufficient resources to be able to bear any losses (which may be equal to the whole purchased amount) that may result from such a purchase. Prospective purchasers of TDH Token should be aware that the value of TDH Token may go down as well as up and that they may not be able realise their purchase amount on the secondary market (if there is any).

### Forward looking statements

Certain statements in this whitepaper constitute “forward looking statements” that are used on the beliefs of the Directors and reflect their current expectations. When used in this whitepaper or in any of the Company’s material, the words “estimate”, “project”, “believe”, “anticipate”, “intend”, “expect”, “plan”, “predict”, “may”, “should”, “would”, “will”, the negative of these words or such other variations thereon or comparable terminology are intended to identify forward-looking statements. Such statements reflect the views of the Directors at the time the statements are made with respect to future events based on information available at that time, and are subject to risks and uncertainties that could cause actual results to differ materially from those contemplated in those forward-looking statements. The Directors assume no obligation to update or revise these statements to reflect current information, events, or circumstances, including changes in any risks or uncertainties that may impact them.

### Management Risk

If any of the directors or officers of the Company cease to participate in the operation of the Company, the operations, objectives and activities of the Company may be adversely affected.

### Liquidity of TDH Token

As at the date of this whitepaper, there is no active secondary market for the TDH Token. Whilst the Directors hope that the success of the Company will lead to a secondary market developing, there is no guarantee or assurance that a public market will ever develop. There is often no assurance that a purchaser of the TDH Token will be able to sell or dispose of the TDH Token.

## Changes in Applicable Law and Regulation

The Directors believe that it is possible that emergency intervention by certain Governments may take place in the future in respect of ICOs. Such intervention may be implemented on an “emergency” basis, subjecting market participants without notice to a set of regulations which in some cases may be unclear in scope and in application. The Gibraltar Financial Services Commission may deem the Token Sale to fall within the Financial Services (Distributed Ledger Technology) Regulations 2017.

Should any relevant laws or regulations change, the legal requirements to which the Company and the TDH Token may be subject could differ materially from current requirements. No assurance can be given that future legislation, administrative rulings or court decisions will not adversely affect the Company and the TDH Token.

The Company may be subject to a number of unusual risks, including contradictory legislation, incomplete, unclear and changing laws, ignorance or breaches of regulations on the part of other market participants, lack of established or effective avenues for legal redress, lack of standard practices and confidentiality customs characteristic of developed markets and lack of enforcement of existing regulations.

## Early Stage Companies

The Company is a start-up and has no operating history against which purchasers of the TDH Token may consider the appropriateness of purchasing the TDH Token.

Many risks and uncertainties affect start-up and early stage companies, which often have very limited operating history, profits or cash flow. There can be no assurance of the success of such enterprises. Their potential must be considered in light of the problems, expenses, difficulties, complications and delays frequently encountered in connection with new or developing businesses, including technology risks, unproven business models, untested plans, uncertain market acceptance, competition and lack of revenues and financing.

The technological fields and markets that many start-up and early stage companies address have undergone and are expected to continue to undergo rapid and significant change. Rapid technological developments may result in the technology of companies becoming obsolete, uneconomical or uncompetitive before any commercial success or financial return can be achieved. Numerous other risks may affect developing companies and ventures, including risks that products or services will be found to be ineffective, unreliable, unsafe or uncompetitive and risks that such companies' technologies, products or service will not achieve market acceptance or penetration. Market acceptance of new products, services or technologies depends on many factors and uncertainties and cannot be assured.

Start-up and early stage companies may compete with entities that have established businesses, relationships and positions in the market and that have much more substantial financial, business, technological, marketing and distribution assets, operations and resources. There can be no assurance that any developing company will be able to compete successfully with more established companies.

These companies may be overly dependent on the vision, skill and leadership of a single or limited number of executives. In a start-up business, the loss or disability of a key person(s) can result in significant financial hardship, in some cases the failure of the company. More than other businesses, start-ups are highly dependent on the skills and contributions of very few key employees

Any projections, forecasts, plans or other forward-looking statements are subject to numerous risks, uncertainties, changing circumstances and other factors that could cause actual results, performance, plans, prospects, operations and opportunities to differ materially from any forward-looking statements, including competition, inability to identify and do business with appropriate customers, existing and future law and regulations, liabilities under the securities laws, inability to hire, retain or qualify sufficient management and staff, general economic conditions, rapid technological change, cost overruns, delays in bringing products or services to market, marketing failures, difficulty in penetrating markets, delays or failures in developing anticipated capabilities, products or services, failure to obtain necessary regulatory approvals, insufficient funding, lack of availability of capital, rates of economic growth, levels of consumer and business spending, conditions in the technology and financial industries, dependence on strategic partners and business relationships, unproven business models, adverse developments affecting customers and end-users, fluctuations in securities markets and valuations, limited marketing, expansion risks, losses and costs, uncertain revenues and profitability, conditions in particular industries, accounting problems,

costs, delays and liabilities arising from legal proceedings, failure to obtain and maintain intellectual property or proprietary rights and management failures.

## Gibraltar

Gibraltar is a British Overseas Territory. It is part of the EU, having joined the European Economic Community with the United Kingdom in 1973 by virtue of Article 355(3) (ex Article 299(4)) which applies the treaty to "the European territories for whose external relations a Member State is responsible", a provision which in practice only applies to Gibraltar.

The UK voted to leave the EU on the 23rd June 2016. Article 50 has been triggered but no agreement has been made as to the relationship between the UK and the EU. It is not yet clear whether any agreement will include Gibraltar.

The Kingdom of Spain has not conceded its claim to sovereignty over Gibraltar. There can be no assurance or certainty as to the outcome of any future discussions on the question of Gibraltar's sovereignty, nor of how any change of sovereignty would affect the regulation and taxation of entities incorporated or operating in or from within Gibraltar.

The above could impact on the Company's ability to undertake business in or from within Gibraltar.

## Banking and custody arrangements

The Company's cash will be held by a bank. The Company acknowledges that any such deposits are not guaranteed by the bank and are exposed to losses incurred in the event of the insolvency or failure of the bank. The Company will take credit risk against any party which is holding its cash. The Company will therefore rank as a general unsecured creditor in the event of the insolvency or failure of the bank with which deposits or instruments have been placed.

## Regulatory Supervision

The Company and the TDH Token are not regulated by the Gibraltar Financial Services Commission or any other regulatory or supervisory authority. The Gibraltar Financial Services Commission does not vouch for the financial soundness of the Company, the TDH Token or for the correctness of any statements made, or opinions expressed with regards to it.

## Cybersecurity

Cybersecurity threats are present within the realms of cryptocurrencies. There is a risk of loss of funds, including a total loss, should an unauthorised intrusion or theft occur.

Whilst the Company has considered its cybersecurity, risks related to software weakness, human error, external attacks and others, continue to exist and pose a material risk to the Company and the value of the TDH Token.

Advances in cryptography, or technical advances such as the development of quantum computers, may present risks for crypto-currencies and the TrustedHealth ecosystem, which could result in the theft or loss of TDHs.

Hackers or other malicious or criminal groups or organizations may attempt to interfere with the Token Sale, the TrustedHealth ecosystem or the availability of TDHs in several ways including, but not limited to, denial of service attacks, Sybil attacks, mystification, phishing, attacks, smurfing, malware attacks, or consensus based attacks.

## Ethereum Network

The TDH Token is a part of the Ethereum network. If problems related to the Ethereum network normal functionality arise, this may affect the TDH Token functionality and may adversely affect the Company and the value of the TDH Token. Therefore, any malfunction, unplanned function or unexpected operation of the Ethereum protocol may cause the TrustedHealth ecosystem or TDHs to malfunction or operate in a way that is not expected. Ether, the native Ethereum Protocol account unit may itself lose value in a similar way to TDHs, and also in other ways. For more information on the Ethereum protocol, see <http://www.ethereum.org>. Any error in the smart contract may lead to the lose

As with other decentralized cryptographic tokens and crypto-currencies, the Ethereum blockchain used for the TrustedHealth ecosystem is vulnerable to mining attacks, including but not limited to, dual-expense attacks, powerful mining attacks, selfish mining attacks, and critical competition attacks. Any successful attack poses a risk to the TrustedHealth software and the expected performance and sequencing of Ethereum contract calculations. Despite the best efforts of the TrustedHealth team, the risk of known or new mining attacks exists.

Crypto-currencies and cryptographic tokens are a cutting-edge, untested technology. In addition to the risks stipulated above, there are other risks that the team cannot predict. Risks may also occur as unanticipated combinations or as changes in the risks stipulated herein.

**THE FOREGOING RISK FACTORS DO NOT PURPORT TO BE A COMPLETE EXPLANATION OF THE RISKS INVOLVED WITH THE COMPANY AND THE TDH TOKEN.**