A blockchain-based solution for the drug and alcohol addiction crisis

I. Introduction

Around the world, nearly 110 million people suffer from alcoholism or drug addiction. The global annual death toll of drug and alcohol misuse is more than 3.3 million people. In the U.S., chronic substance abuse has reached epidemic proportions with 21 million Americans suffering from the condition. Drug and alcohol misuse is the leading cause of death for Americans under the age of 50.

In 2017, Hayver Corp. released the Hayver Recovery APP, a peer-to-peer drug and alcohol monitoring app. This app currently costs less than $50 per month and is in use in multiple states in the U.S. Hayver believes this app will improve the drug and alcohol treatment industry by using affordable, data-driven methods to improve recovery outcomes and reduce relapse.

Hayver is now poised to address the worldwide addiction problem at a deeper level. It is launching a cryptocurrency, the Duitcoin. The Duitcoin will be grounded in the shared values of the blockchain and recovery communities, including, decentralization, privacy, peer empowerment, and a commitment to making the world a better place for everyone. The Duitcoin will be used to incentivize and reward app users and others who engage in behaviors that promote addiction recovery. More than that, Hayver envisions that the Duitcoin will become the basis of a blended altruistic and commercial economy serving the special needs of addicted persons--people who are immersed in a culture of service and sharing and, at the same time, are vulnerable to an often-unscrupulous addiction treatment industry with extremely low rates of efficacy.

Inspired by those who have surmounted the overwhelming obstacles of addiction recovery, Hayver will brand the Duitcoin as a mark of heroic courage. To help make the challenges addicted persons face more relatable to the general population, Hayver will seek to liken the courage required for addiction recovery with the courage it often takes to live an ordinary life well. It takes courage to face any life -threatening chronic disease, not just addiction. It takes more courage to overcome the death of a loved one than many think they could ever possess. It often takes more courage than an average person can muster just to do the right thing.

The concept of rewarding people suffering from addiction and alcoholism with cryptocurrency may seem enabling and ultimately contrary to promoting healthy behaviors, even controversial. This is rooted in common societal misperception of a typical alcoholic and drug addict, which Hayver wishes to dispel. In reality, those suffering and dying from addiction and alcoholism are our fathers and mothers, brothers and sisters, sons and daughters. It affects everyone.

Factors that promote mental health and recovery include a stable living environment and proper employment. A stable living environment promotes emotional health. Employment enhances self-esteem, self-efficacy and is paid in monetary rewards. Employment promotes healthy recovery. Not rewarding people demonstrating healthy behaviors would be arguing for not paying alcoholics and addicts for employment. Stigma persists.

Hayver's near -term global mandate is to 1) brand the Duitcoin as an international universal relatable symbol as stated above consistent with appropriate consent on the potential privacy implications for a Member or Partner of being publicly associated with the use of the Hayver APP, 2) develop an open platform with published and fully documented APIs and 3) develop a multilingual Hayver Mobile App that runs on the platform. This multilingual App will be downloadable for free by anyone with a mobile device and will include a free Duitcoin wallet and a free wallet -to -wallet transfer service. The transfer service will then allow anyone with a Duitcoin in his or her wallet to enter another person's email address and either transfer the Duitcoin to the recipient's wallet (if they have already downloaded the Hayver Mobile App) or invite the recipient to download the Hayver Mobile App to receive Duitcoins.

For individuals who have already purchased a subscription to Hayver's Addiction Recovery Services or any other paid subscription services, the App will include the Duitcoin wallet and transfer functionality as part of a suite of features that come with the paid subscription. With the Hayver Addiction Recovery subscription services, an end user with addiction problems (the Member) invites about five to twenty individuals, whom, if they accept, become Partners in his Circle of Support. These Partners are the Member's peer monitors. The Member is required to check into the Hayver Mobile App every day to learn whether he or she is to be randomly drug tested that day. If so, every Partner receives notification. The App assigns a score (called an HRS) to the Member reflecting his or her compliance with monitoring and other assigned tasks. Based on the HRS, Duitcoins will be earned and placed in the Member's wallet. Partners will also earn Duitcoins by faithfully performing their monitoring tasks.

Hayver, with the help of its end users, will attempt to create at least six types of benefits for the Duitcoin:

- Reputational;

- Altruistic/gesture;

- Altruistic/philanthropic;

- Transactional;

- Stored (e.g., accrued Duitcoins that might be used to secure a loan); and

- Data.

Version 1.0 of Hayver's Mobile App and platform will focus on the Duitcoin's reputational and altruistic value and concentrate on building a large international user base equipped with Duitcoin wallets. During this initial phase, Hayver will encourage gesture transfers of Duitcoins between wallets, that is, the transfer of Duitcoins to communicate a sentiment as opposed to transferring economic value. End users in the general population will be encouraged to send a nominal sum's worth of Duitcoin as 1) an inspiration to others facing difficult circumstances or 2) a communication of admiration for another's courage. People in the recovery community already have in place a giving economy of traded favors and a reputation economy of earned (Alcohol Anonymous) chips. Hayver expects that Duitcoins will be incorporated into these already-existing economies. It anticipates that Duitcoins, in addition to being transferred as gestures of inspiration and esteem, will also be transferred as gestures of appreciation for favors rendered. An additional use of Duitcoins will be to transfer them philanthropically to pay for the aftercare monitoring services needed by people who cannot afford them.

Hayver will regulate Duitcoins that can be transferred as gestures of inspiration, esteem, and appreciation so that these giving economies will not be disrupted. Hayver will allow users to determine the quantity of Duitcoins they wish to donate philanthropically to people, whether or not they are Members, without means to pay for Hayver addiction treatment-related services.

Version 2.0 will contain the functionality needed to build transactional and stored value and to create an ethical commercial economy. Hayver will 1) connect networks of service providers such as sober living homes and reputable drug treatment centers to user communities and 2) seek out and incentivize global Enterprise Associates to develop apps and online services that will address the needs of Hayver's user base.   Prior to connecting to service providers that are health care providers regulated by 42 CFR Part 2, Hayver will assess appropriate functionalities for compliance with any applicable SAMSHA regulations.

Specifically, Hayver would like to see third parties and/or a Hayver affiliate develop:

- online stores selling discounted merchandise and accepting Duitcoins as payment;

- apps allowing Members to obtain housing, lodging, insurance, credit, and job opportunities; based on their HRS (Hayver Recovery Score)

- peer -to -peer marketplaces where persons in the recovery community and others can exchange goods and services for Duitcoins.

If a Member or Partner provides consent, App User Interaction data collected through the Hayver Mobile App will be scrubbed of all personal identifying information, as defined under applicable state and federal laws, and, to the extent permitted by applicable laws, deposited in a secure, de-identified behavioral data repository (DBDR). Members and Partners may opt-out of inclusion of data about their App usage in the DBDR at any time.

Hayver believes this DBDR could become the largest collection of behavioral data in the world relating to addiction and will be a formidable force in the world's battle against this insidious brain disease.

Hayver's data will have both altruistic and commercial value. All access to Hayver data must be paid for in Duitcoins unless fees are waived for philanthropic reasons. Duitcoin receipts will be shared with active Members and Partners whose data is included in the DBDR.

By unanimous vote of the Hayver Companies' shareholders, the Hayver Companies' articles of incorporation empower them to act in the interest of the public even if adverse to the private economic interests of shareholders. To this end, the Hayver Companies can then navigate an appropriate line between altruism and commercialism and promote the ideals of user agency, user privacy, fair distribution, open governance, and automated decentralization within its business culture.

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II. The stakes

Drug and alcohol addiction—indeed, addiction in general—is a problem so widespread and intractable that, for the most part, it seems beyond solving. Traditional approaches to the disease have proved to be prohibitively expensive and have failed on a grand scale.

III. The need for a new paradigm

1. The problem and its scope

As stated above, nearly 110 million people around the world suffer from alcoholism or drug addiction. The annual death toll of these diseases is more than 3.3 million people. Alcoholism and drug addictions afflict about 21 million Americans. Deaths in the U.S. resulting from alcohol and drug misuse total more than 130,000 each year.

Worldwide, only one in six persons with an addiction problem receives treatment. In the U.S., that number is one in ten. Among the minority of Americans who are treated in in-patient treatment centers, the relapse rates after one year, as reported by the centers themselves, is more than 75%. The average number of times that recovered drug addicts and alcoholics in the U.S. will go through in-patient treatment before achieving sobriety is 3.7 times.

The Staggering Facts

- 20.8 million Americans struggle with substance abuse disorder and only 10.4% get treatment*
- Alcohol misuse contribute to 88,000 deaths in the U.S. each year *
- In 2014, there were 47,055 drug overdose deaths in the U.S.*
- Worldwide, nearly 110 million persons suffer from alcoholism or drug addiction**
- In 2012, about 3.3 million global deaths were attributable to alcohol consumption**
- Globally, alcohol misuse was the fifth leading risk factor for premature death and disability in 2010**
- 29 million people worldwide suffer from drug abuse disorder, only 1 in 6 get treatment***
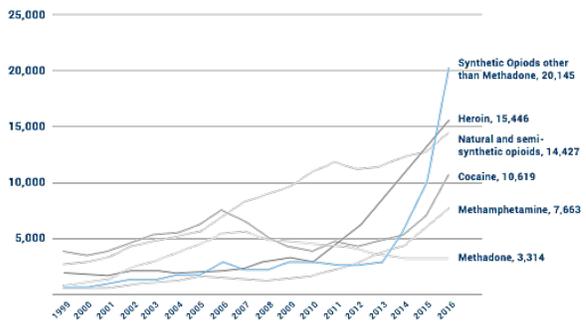
Sources: *The Surgeon General's Report on Alcohol, Drugs and Health, 2016
** WHO Global status report on alcohol and health, 2014
***UN World Drug report, 2016

Total U.S. Drug Deaths

More than 64,000 Americans died from drug overdoses in 2016 – 64,070
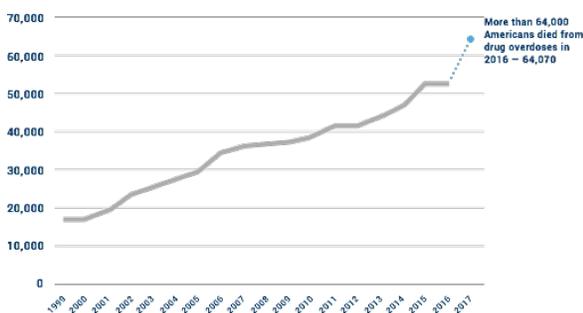
Total U.S. Drug Deaths* - More than 64,000 Americans died from drug overdoses in 2016, including illicit drugs and prescription opioids—nearly double in a decade. Source: CDC WONDER

Drugs Involved in U.S. Overdose Deaths, 2000 to 2016

Synthetic Opioids other than Methadone, 20,145
Heroin, 15,446
Natural and semi-synthetic opioids, 14,427
Cocaine, 10,619
Methamphetamine, 7,663
Methadone, 3,314

Drugs Involved in U.S. Overdose Deaths* - Among the more than 64,000 drug overdose deaths estimated in 2016, the sharpest increase occurred among deaths related to fentanyl and fentanyl analogs (synthetic opioids) with over 20,000 overdose deaths. Source: CDC WONDER

2. Historical impediments to a solution

Stigma

Nearly everywhere in the world, a debilitating moral stigma attaches to persons with drug and alcohol addictions. Stigma and the morality-based thinking that accompanies it have profoundly complicated recovery from the disease. Worldwide, only one in six persons with an addiction problem receives treatment. In the U.S., that number is one in ten. Members of the non-addicted public, while energized by medical conditions that may affect themselves, lack the political will and energy to rally for improved addiction treatment. Governmental response to the growing addiction crisis has been reluctant and anemic.

In many places in the world, morality-based thinking has impeded scientific thinking, thwarting an appropriate medical response. Ironically, the preeminence of moral thinking in the U.S. has produced a for-profit treatment industry that is rife with corruption. The U.S. addiction treatment industry, reflecting mainstream American cultural values, largely eschews science, placing all blame for failure on the moral shortcomings of its patients. This allocation of responsibility allows providers to thrive on low outcomes, multiplying their revenues through a revolving door profit model. The worst elements of the U.S. addiction treatment industry engage in patient trafficking, quackery, and rampant price gouging. As a whole, the industry is in the process of consolidating, bringing a host of additional problems to the fore.

Hayver is committed to using the symbol of the Duitcoin and the ideology of the blockchain community to overcome the stigma placed on addicted persons and to develop effective medical and behavioral treatments supported by efficacy data.

A lack of innovation and accountability

A societal misunderstanding about the nature of alcoholism and drug addiction has resulted in a failure of innovation. Individuals who fail to overcome addiction are assumed to have moral deficiencies. The onus of failure is put solely on the patient while professionals are excused from the need to improve treatment models and services.

Insidiousness of addiction

Everyone is aware that drugs and alcohol temporarily alter brain function. What fewer people realize is that long-term substance abuse alters the brain structurally (i.e., it is visible in a brain scan) and that this altered state persists for about 18 months after a person stops using or imbibing drugs or alcohol. During the time that the brain is altered, executive control, risk analysis, and decision-making are impaired. In other words, during recovery from addiction, a brain damaged person is trying to overcome an intensely-felt need for drugs or alcohol while lacking the cognitive ability to assert willpower.

Faulty expectations

According to the U.S. National Institute on Drug Addiction, addiction has "powerful disruptive effects on the brain and behavior. The chronic nature of the disease means that relapsing to drug abuse is not only possible but also likely, with symptom recurrence rates similar to those for other well-characterized chronic medical illnesses—such as diabetes, hypertension, and asthma."

The general public's expectation is that an addicted person who is motivated will succeed. Post-treatment relapse is viewed as a failure. Instead, the common expectation needs to be that treatment must be ongoing notwithstanding relapses and must continue for at least two years after a person stops using drugs or alcohol.

The high cost of many treatment options

In-patient treatment facilities

The average cost of treatment at a 28-day drug rehab facility in the U.S. is between $10,000 and $20,000. Many of the better facilities cost $30,000 or more. Patients with insurance typically pay a large percentage of the fees out of pocket. In the U.S., even after the passage of the Affordable Care Act, 40% of people suffering from addiction cite financial factors as a reason why they cannot receive treatment.

The out-of-pocket costs for in-patient treatment are just one of the costs incurred by persons with addictions and their families. Residential treatment requires time off from work and often a permanent loss of employment.

Recovery residences

Recovery residences (sometimes called sober living homes) are monitored environments where persons with addictions can live either after graduating from an in-patient treatment program or after finishing any needed medical detoxification. These homes are often reasonably priced with some very good ones costing as little as $1000 per month. For many, even reasonable prices are unaffordable. For others, separation from spouses and children for a year and a half (the recommended stay) is unbearable.

Post-treatment monitoring programs

The available data indicates that constant monitoring with random drug and alcohol screens has a marked effect on outcomes for people motivated to get better. For example, in populations that were monitored because of licensing requirements (including doctors, pilots, and others) the data shows that 5-year recovery rates for monitored groups are almost 10 times higher.

Monitoring Drives Recovery Rates Up

RECOVERY ABSTINENCE RATES

Based on physicians and other licensed professionals programs

Recovery Rate	Non- Monitored Public	Monitored Professionals
After 1 Year	24%	94%
After 5 Years	5%	78%

5% to 78% Over 1,500% improvement

William R. Miller (PH.D.), Scott T. Walters (M.A.), Melanie E. Bennett (Ph.D.), "How Effective Is Alcoholism Treatment in the United States?"
Robert L. Dupont (M.D.), A. Thomas McLellan (Ph.D.), Gary Carr (M.D.), Michael Gendel (M.D.), Gregory E. Skipper (M.D.), "How are addicted physicians treated? A national survey of physician health programs"
Robert L. DuPont, (M.D.), A. Thomas McLellan, (Ph.D.), William L. White, (M.A.), Lisa J. Merlo, (Ph.D.), Mark S. Gold, (M.D.), "Setting the standard for recovery: Physicians' Health Programs"

Notwithstanding compelling evidence that monitoring works, few in-patient treatment center graduates in the U.S. and in many other places in the world are monitored. A key reason for this has been the high cost of professional monitoring, both in terms of money and time commitment. A second reason has been the lack of a peer-to-peer monitoring application.

The Hayver Recovery App, released earlier this year in the U.S. and soon a multilingual mobile APP, delivers affordable peer-to-peer monitoring for less than $50 a month, including test kits. Now what is needed is education, the data necessary to make affordable long-term monitoring the standard of care for everyone, and international availability of the Hayver peer-to-peer monitoring solution.

The absence of a peer-to-peer support AND accountability model

The available data indicates that peer-to peer support groups aid in addiction recovery. Likewise, as discussed above, continuous monitoring has been shown to have marked effects on outcomes. Hayver has expanded peer-to-peer support model to include peer-to-peer monitoring. Hayver believes that support AND accountability, offered and enforced by a small, controlled group of trusted Partners, are two critical keys to better outcomes.

The cost and ethics of monetary incentives

The available data shows that monetary rewards to drug users reduce drug use. Both coupons for free merchandise and cash have been shown to be effective incentives. One problem with coupons and cash rewards is that they are expensive. An added problem is the moral objection many understandably have to paying people to refrain from illegal and/or reckless activities.

The absence of assessment tools in the home environment

Because of the high cost of in-patient treatment, many families try to solve addiction problems themselves—sometimes with the help of a doctor or professional counselor and sometimes without. Typically, the person suffering from addiction makes promises to become and remain sober. The family then agonizes over whether their loved one is living up to his or her bargain. Addicted persons usually are good at hiding use with breath mints and feigned sobriety. Drugs and alcohol are stashed outside where they cannot be easily found. Family members live on edge, always suspecting and rarely knowing. Often, they are afraid to demand a drug test, fearing that an overt lack of trust will hurt their loved one. When a drug test is requested, the person suffering from addiction can become belligerently defensive.

The fundamental problem with home care is that it may not be an appropriate venue for recovery. Families attempting home care must have home tools for assessing outcomes. If home care is not working, a higher level of care such as a recovery residence, intensified professional out-patient treatment, or an in-patient treatment facility is indicated.

The Hayver Recovery App is currently available for families in several states in the U.S. and its mobile app will be made available in certain additional countries following appropriate legal review. It is affordable; it also creates a structure for random drug and alcohol testing that minimizes confrontation. What is needed now is to make this tool available internationally and to educate families about its use.

Non-compliance with prescription drug regimes

Two types of drug therapy are used in the treatment of alcoholism and drug addiction. One is medication-assisted therapy, or MAT, which directly addresses the addiction problem. The second type of drug therapy treats mood disorders (such as depression and bipolar disease) that are often coincident with addiction.

One promising approach to the treatment of opioid addiction is Buprenorphine (Suboxone), the most widely used medication in MAT with millions of prescriptions written yearly. For MAT to be effective the patient must be compliant with the therapy. For this reason, urine screens for the presence of buprenorphine is standard of care therapy, though usually these screens are not random. The test kit provided through the Hayver Recovery App's includes a test for buprenorphine and help monitor the presence of buprenorphine while simultaneously providing the psychological deterrent and rewards for not using other mind-altering substances while on MAT therapy.

What is needed now, for users who choose it, is a more robust method of monitoring 1) MAT compliance and 2) related psychiatric drug treatment compliance.

A shortage of treatment efficacy data

Some treatment approaches work better than others. Some treatment facilities and recovery residences are more effective than others. There is a dearth of statistical evidence on both fronts.

The lack of data has left many addicted persons and their families vulnerable to aggressive marketing. The addiction business is booming and, as recent exposés have shown, some of it is fueled by greed and fraud.

Hayver's vision is that data collected from consenting Members and Parties will be de-identified (according to applicable law) and maintained in a de-identified behavioral data repository (DBDR). The DBDR will allow Hayver analysts and third-party researchers to use big data and AI techniques to continuously discover relevant correlations. The information obtained through these analyses will also help treatment providers to improve their services and point addicted persons and their families towards more effective treatment options.

IV. The Hayver solution

The current Hayver Recovery App

<u>Current functionality</u>

The Hayver Recovery App targets alcoholism and the growing opiate addiction crisis. The app also helps monitor people with other substance abuse issues including but not limited to: Barbiturates, Benzodiazepines, Amphetamines, MDMA (Ecstasy), Oxycontin, and Cocaine.

The Hayver Recovery App introduces a novel approach to the care of persons with addiction problems. Before using the program, the user suffering from addiction (the Member) sends invitations to trusted individuals who, upon acceptance, will be the Member's peer Partners. The Member and his or her Partners form a Circle of Support—typically about 5 to 20 persons. The Member interacts with the app by checking in daily. Upon check-in, the app will notify the Member and the Partners if the Member has been selected that day for random alcohol and drug testing. The Member uses a urine test cup and/or a breathalyzer supplied by Hayver (but manufactured and marketed by a third party) and records his or her test results (as verified by one of the Member's

Partners), triggering messages to all the Partners. These messages prompt Partners to log onto Hayver's secure dashboard where they monitor the Member's progress.

As the Member uses the app, the app tracks the Member's check-in rates, compliance with the testing schedule, and test results.

The Hayver Recovery App seeks to overcome multiple challenges facing the recovery community. To Hayver's knowledge, it is the first and only app in the world that provides:

- assessment tools for persons who are relying upon home care;

- encouragement to continue app use notwithstanding relapses;

- continuous, affordable peer-to-peer monitoring (accountability);

- peer-to-peer support;

- objective algorithmic scoring correlated to successful use of the app; and

- outcome measurement capabilities.

The HRS as a predictor of behavior outcomes

In medicine, a common way to appropriately categorize an illness is to assign it a grade or numeric value. By assigning a numeric value to the severity of a disease, physicians and researchers can then develop appropriate treatment plans and make predictions of anticipated outcomes based on those grades or values. The basic concept is that by assigning a numeric value to anything, it then can be more appropriately managed. In neonatology, the APGAR score, conceived by Virginia Apgar, MD, was assigned to all live human births and soon revolutionized immediate clinical treatment for newborns and dramatically improved health outcomes.

Drawing on medical science, Hayver seeks to research and develop a behavioral numeric value, the Hayver Recovery Score (HRS) to a Member with the intention of predicting outcomes of relapse and remission rates and, eventually, helping to develop appropriate treatment plans. Once developed, the Hayver Recovery App will assign the HRS based on the previous 24- hour behavior and daily cumulative behaviors for predictive purposes called the Hayver Recovery Score (HRS). It can be thought of like a credit score that helps a customer predict his own likelihood of repaying financial loans based on his recent and past credit behaviors. Based on the daily and cumulative use of a simple software app, the Hayver Member will develop a score between 50 and 150, with the mean score of 100 as a predictive value of future behaviors and outcomes. Actual ingestion of a substance is most often preceded by weeks or months of subtle behavioral changes in the individual, thus giving the Member, the Member's Partners, objective data to intervene appropriately to prevent long-term relapse back into chronic substance use.

The concept of a behavioral score created by the daily interaction of a software application for predictive and, eventually, therapeutic purposes is unique to behavioral medicine and further supports the continuing trend of using software applications to improve outcomes.

In the future, statistical analyses of behaviors and abstinence will be used to adjust the HRS appropriately to predict, for example, that those patients with a score of 100 to 110 have an x% of remaining abstinent in the next three months, whereas those with a score below between 90 and 100 have a y% chance of relapse in that time period.

Hayver will conduct the research necessary to develop the HRS consistent with applicable law and will, assess whether the features and functionalities of the HRS require prior approval by the FDA.

Highlights of the future Hayver Mobile App

<u>Multilingual functionality</u>

The Hayver Mobile App will be multilingual.

<u>Crypto-rewards for Members and their Circles of Support</u>

The Hayver Mobile App's inclusion of Duitcoin rewards will make it the world's first app to incentivize the drug and alcohol recovery community with cryptocurrency rewards. The Duitcoin will be marketed as a community coin, benefiting Members, Partners, and others who earn, spend, and accept Duitcoins. Hayver expects to overcome moral objections to rewarding addicted persons for compliance by educating the community about how incentivizing with cryptocurrency is practical and efficacious, thus distinguishing a health-based cryptocurrency from fiat currency.

Three inter-related metrics will be used to display rewards and the Hayver Recovery Score (HRS), once developed and launched, within the application: A daily reward in Duitcoin units, the Hayver Recovery Score (50-150), and the sum cumulative (Total Units) of the daily reward, i.e., 45 Total Units for approximately 45 days of checking in.

A daily reward in Duitcoin units will be earned by the user for clicking the "Check-In" button. Data-driven proprietary algorithms based on the Member's previous 24-hour use of the app will determine the HRS (once launched) based on captured behaviors that increase the chances of staying in recovery (e.g., checking in from a gym or from a 12-step meeting) or decrease the chances of staying in recovery (e.g., deleting Partners from the Member's Circle of Support). Thus far, algorithms have been written for 13 behavioral uses of the app with many more data points to be collected soon.

The cumulative rewards (Duitcoins) will be reflected in the app and, after a vesting period, they will display as "available" for transfer or for purchasing goods and services through the digital wallet.

<u>A general-use wallet</u>

The most basic Duitcoin economy will consist of Duitcoin transfers between people with wallets. Wallet transfers will not be limited to Member or their Partners. Anyone will be able to download the Hayver Mobile App for free and use the app wallet to transfer Duitcoins to other app wallets.

Purchasers of Duitcoins will be able to transfer their coins to a Hayver App wallet if they wish to do so.

Altruism functionality

The first Duitcoin economy will be a giving economy. Largely because of Alcoholics Anonymous, an altruistic ethic permeates the U.S. recovery culture. Individuals who are further along in recovery endeavor to advance their own healing process by assisting others. Very often, assistance is in the form of being a sponsor to someone or giving a ride to a person who has lost driving privileges. The transfer of money in these situations is frowned upon.

Drawing upon the U.S. recovery culture, Hayver's Version 1.0 software will include several mechanisms of giving. Safeguards will be put in place to ensure that Duitcoins enhance rather than disrupt the existing economy.

Tokens of inspiration and esteem

The Duitcoin represents courage. To reinforce this meaning, the Version 1.0 Hayver Mobile App will include a transfer mechanism so that users (both subscribers and non-paying) can send Duitcoins as a message of inspiration to a recipient facing difficult circumstances or as an expression of pride in a recipient who is facing challenges bravely. The transfer mechanism will send a nominal sum's worth of Duitcoins to the recipient's wallet along with a message relating to courage that the sender may select from a menu.

Tokens of gratitude

As stated above, favors are routinely granted by members in recovery to one another. The payment of money in these situations is discouraged; however, Hayver believes that Duitcoins tokens of appreciation would be welcomed.

Philanthropic tokens

Version 1.0 of the Hayver Mobile App will include a philanthropic transfer option where a user can send an email to a third party inviting him or her this help offering. If the third party accepts, the sender's Duitcoin wallet will be debited, up to a pre-approved amount, and the receiver may use the coins to purchase Hayver Monitoring Services.

Version 1.0 will also contain Duitcoin benefactor functionality whereby an individual can (either anonymously or in his or her name) authorize donations of Duitcoins earmarked to pay Hayver subscription fees.

Medication Assisted Treatment (MAT), Buprenorphine monitoring

The home drug testing kits (developed and marketed by a third-party manufacturer) supplied to the Members currently contain a urine screen for buprenorphine (Suboxone), a medication used in the treatment of opiate addiction. In the case of MAT, the Member and Partners are monitoring for the presence of the drug rather than absence.

V. Current state of the industry

Hayver's app implements peer-to-peer support and monitoring. Adding cryptocurrency rewards will be the first recovery app in the world offered to everyone giving Hayver its first-mover advantage and well as raising the barrier to entry for a similar product extremely high. Hayver expects that the inclusion of a successful crypto-rewards program will make the Hayver Companies the world leaders in peer-to-peer addiction apps.

VI. The Duitcoin

Launching a digital currency

Hayver's cryptographic coin is called the Duitcoin.

The Duitcoin's basic characteristics

Duitcoin is envisioned as a pure cryptocurrency and will be have a fixed supply of ten billion Duitcoins. The Duitcoin will be divisible to 18 decimal points.

How the Duitcoin will be implemented

Duitcoins will be issued as ERC-20/223 tokens on the public Ethereum blockchain network. This is the de-facto standard for publicly tradable blockchain applications tokens.

The ERC-20/223 token smart contract will be extended to prevent the transfer (e.g. a sale) of Duitcoins to other accounts by specific account types (e.g. recovery Members).

At this stage, the public Ethereum blockchain network is not yet ready to scale and host the volume of transactions and smart contract activity required to power the Hayver solution. This is due to the relatively low throughput of transactions available on the public network, as well as the fact that all smart contracts are replicated to all nodes in the public network. For this reason, the deployment to the public Ethereum network will be limited to the token contract(s), and contracts, or contract extensions enabling integration with a non-public chain (e.g. private / permissioned chain). The primary Hayver business logic smart contracts will be deployed in a Hayver private / permissioned chain.

The private blockchain will use the same blockchain software as the public Ethereum chain, albeit configured and optimized as a private network. The smart contracts will be fully functional Ethereum smart contracts that may be migrated to the public Ethereum blockchain when and if this becomes suitable for supporting the expected transaction throughput and capacity.

VII. System architecture

1. The Application Layer

The Application Layer is made up of all the user interface and other applications that need to interact with both the Hayver Open Platform and the outside world. A Hayver app may physically reside anywhere but the bulk of it will reside on web application servers and mobile devices.

The Hayver Mobile App

The Hayver Mobile App will act as a user's Duitcoin wallet. The mobile app will contain the individual's private key (stored in a hardware secured environment, using biometrics, where provided by the mobile phone manufacturer and/or mobile OS provider). The mobile app will show the balance of Duitcoins in the wallet (both spendable and not) and enable sending Duitcoins to other users as well as spending Duitcoins with Hayver Companies.

All Duitcoin transactions initiated and signed/sent from the Hayver Mobile App will be stored in the public Ethereum blockchain and will, therefore, be available for independent validation and inspection.

In case a user's mobile phone is lost, stolen, or replaced, a solution will be provided for private key recovery. A natural solution is to leverage the Member's Partners to assist in the key recovery process by vouching for the Member and attesting to the facts that the private key was stolen and that the new device belongs to the original Member. In this case, only when the Member's Partners confirm that the private key should be recovered (by signing and using their own private keys on their mobile phone devices), will the original private key wallet be installed on the new mobile device.

The Hayver Web Application

The Hayver Web Application provides Hayver app users with a portal for working through the support process. The portal will display the Duitcoins balance and provide opportunities for users to send and purchase Hayver services.

The web application will also provide a portal for third parties who wish to offer their products and services to Hayver Mobile App users. These participating third parties will also host their own private key / wallet securely stored on their own infrastructure.

Third-party apps

The Hayver Companies will actively recruit, cultivate and encourage the development of third-party applications that utilize the Hayver Open Platform.

2. The Hayver Open Platform

The Hayver Open Platform implements multiple layers to provide the services needed to securely expose the capabilities of the Hayver Open Platform to the Application Layer.

API Service Layer

The Hayver Service Layer provides a consistent and secure interface between all Hayver and Enterprise Associate (i.e., third-party) applications and the Hayver Open Platform. The Hayver Service Layer implements stateless URI-based RESTful services to handle all the needs of consuming applications and user interfaces, including security, administration, data access and events. The Service Layer is the edge-resident gateway from the outside world to the platform Service Layer.

Platform Service Layer

The Platform Service Layer is a private cloud application distributed across multiple datacenters. The Platform Service Layer's micro services architecture will use container and server less compute technology to provide highly scalable and powerful data, compute and aggregation services to the API Service Layer.

Data Layer

The Data Layer is a combination of relational and non-relational distributed data storage technologies that provides all the permanent and semi-permanent state needed by the platform Service Layer.

Private / Permissioned Blockchain Network

Some of the state and business logic available in the Hayver Open Platform will be managed by a private Ethereum blockchain network. There are a number of good reasons to initially implement the Hayver application's smart contract business logic privately:

- The heart of the Hayver blockchain solution is a set of smart contracts. A private blockchain will allow Hayver to develop the smart contracts and measure their behavior in a controlled environment.

    o Identity smart contracts will store member profiles with proofs / attestations of identity linked to the Hayver Mobile App blockchain wallet and transaction history)

    o Rewards smart contract(s) will provide rewards to recovering Members and Partners based on recorded, attributable behavioral improvements, where evidence of those improvements is captured and recorded on chain, verified by the smart contract where possible / feasible. Hayver will endeavor to obtain cryptographically signed data at source, enabling independent validation of proofs on chain, removing the need to trust Hayver's own server application as the source of behavioral data.

- With a private blockchain Hayver can manage the performance of internal Duitcoin transactions (between smart contacts). • The complete set of smart contracts will not be deployed directly to the public Ethereum blockchain initially, due to the lack of scalability on that platform (as well as exposure in terms of security). It is expected that, in the future, there will be a number of interchain technologies and products (e.g. Polkadot, Raiden, Plasma, Interledger, etc.) that will be able to connect the two blockchains.

If / when the public blockchain scales to the point where the transaction and data load required by the Hayver suite of smart contracts can be accommodated, then Hayver has every intention to migrate and deploy the smart contracts to the public Ethereum blockchain.

VIII. Coin sale

1. Coin generation event

The issuing entity for the coin sale will be Hayver Corp.

2. Total supply and sale and distribution of coins

The total number of authorized coins will be 10 billion coins.

Duitcoin Private Sale Opportunity

Duitcoins Allocation and Use of Proceeds

	TOTAL	PERCENTAGE
Early Adopters & Public*	3,000,000,000	30%
Stakeholders**	1,200,000,000	12%
Vendors and Advisory Fees	400,000,000	4%
Rewards and Network Partners	5,400,000,000	54%
TOTAL SUPPLY***	10,000,000,000	100%

*Only coins that are actually sold will be minted.
**30 months lockup with 10% release every 90 days.
***Total final supply will be reduced by the number of unsold coins in the coin's sales.
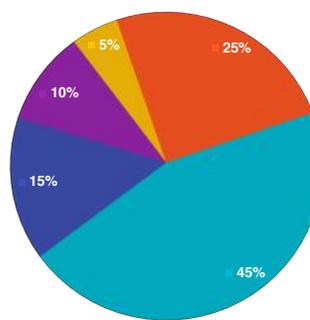
■R&D ■Sales & Marketing ■Admin & Operations ■Partnerships ■Legal & Advisory

*Only coins that are **actually sold** will be minted.

**Stakeholders coins will be subject to a lock-up period of 30 months. 10% of the total stakeholder allocation will be released from lock-up every quarter over a period of 10 quarters.

*** Total final supply, post token sales, will be **reduced** by the number of **unsold coins** in the early adopters and public sales.

IX. Roadmap to implementation

1. Phase I (immediately after the public coin sale)

Continuing to grow Hayver's user base with the current app

Sales of the current Hayver Recovery App have been accelerating and are expected to grow significantly while the development work of Phase I is being completed. The Hayver Recovery App is being marketed primarily in the U.S. B-to-C market through advertisements placed in recovery residences and drug treatment centers. The App is not currently offered through HIPAA covered entity providers and plans. But, as quickly as possible, Hayver will also begin to move both into the broader B-to-C market and to offer the App through covered entities. For those who have not had the benefit of professional treatment, the Hayver Recovery App will serve mostly to help families flag individuals who are using drugs or alcohol surreptitiously and require a higher level of care. Monitoring and/or incentives alone are not an adequate treatment for alcohol or drug addiction.

Hayver will immediately accept Duitcoins as payment for subscription to its currently-available Recovery App.

Develop and market a compelling graphic of the Duitcoin

Hayver will request submissions of a compelling graphic image of the Duitcoin as a representation of courage. As stated above, Hayver's goal is for the Duitcoin to play a significant role in transforming social attitudes about addiction and addiction recovery throughout the world.

Entering into contracts with Regional Supply Associates

Currently, Hayver Corp. supplies urine test cups to the users of its software in the U.S. The international availability of the enhanced multilingual Hayver Mobile App will require partnerships between Hayver and global Regional Supply Associates who will make testing supplies available in global markets. Contracts with Regional Supply Associates are expected to include the following terms:

- the Regional Supply Associate will be responsible for distributing a urine test cups (or other test equipment such as breathalyzers) in a defined regional area to Hayver's end users

Creating immediate demand for the Duitcoin

Even prior to the development of any new blockchain functionality, Hayver's business model includes multiple sources of revenue that can be leveraged to create an immediate demand for Duitcoins.

Currently, these revenue sources include:

- subscription fees for the Member's use of the Hayver Recovery App

To create immediate demand for the Duitcoin, the Hayver Companies will price all their offerings to app users in both fiat currency and Duitcoins, with a discount offered to all purchasers who pay with Duitcoins.

<u>Completing technological development (Version 1.0)</u>

This development will include the system architecture and the functionality needed to implement the objectives set forth in Phase 2 below. These minimally include:

- developing app wallets and wallet-to-wallet transfer mechanisms that will be incorporated in a free Hayver Mobile App;

- developing the blockchain functionality that will allow for the disbursement of Duitcoin rewards to Hayver Member subscribers' and Circle of Support Partners' wallets;

- developing altruism functionality;

- developing an open platform to include private blockchain technology and an API that, when ready, will be published and fully documented;

- developing the multilingual Hayver Mobile App;

- developing a cryptographic key Members may use to protect their identifiable information; and

- with the help of data scientists, developing the tools to evaluate efficacy.

2. Phase II (beginning after completion of the Hayver Mobile App Version 1)

<u>Stepped-up advertising of the app</u>

The availability of cryptocurrency rewards in an addiction recovery app is revolutionary. This functionality will be heavily advertised.

<u>Building brand value</u>

Hayver envisions a Duitcoin graphic that will help transform perceptions of addiction and addiction recovery in the way that the pink ribbon transformed perceptions of breast cancer recovery. The Susan G. Komen Foundation turned the shame and isolation of breast disfigurement into the pride of a community-empowered survivor. Hayver hopes—through the symbol of the Duitcoin—to turn the stigma and loneliness of addiction into the pride of a world-wide community struggling to overcome the disease.

Transitioning existing users to the enhanced Hayver mobile app

As soon as Hayver's Phase I development work has been completed and tested, Hayver Corp. will transition their existing Members and Partners to the new Hayver Mobile App.

Building on the recovery community's giving economy

As previously noted, the drug and alcohol addiction recovery community in the U.S. already has in place a giving economy. Persons with drug addiction problems need services such as rides to meetings. These needs are fulfilled by others with the expectation that no money will be paid.

Hayver seeks to enrich rather than disrupt this pre-existing economy and will be acutely sensitive to its special requirements. Hayver hopes to find a way to encourage giving without destroying the fundamental character of the gifts themselves. For example, to announce in advance that Hayver will reward givers who send tokens of inspiration, appreciation, and admiration might distort givers' motives. However, occasionally (and after the fact) to give givers tokens of Hayver's appreciation could enhance the giving culture rather than undermine it. Another appropriate way to encourage giving might be to allow transfers of a fraction of a Duitcoin for no charge.

Engagement with insurers in the U.S.

Hayver will begin advocating to U.S. insurance companies to add its Mobile Recovery App to its list of covered drug and alcohol treatment services.

Publishing and fully documenting APIs

As soon as is possible, Hayver will publish and fully document its API so that third parties will be able to integrate with Hayver's Open Platform.

3. Looking Ahead

Building Local User Groups, Regional User Communities, and Commercial Networks

The current Hayver Recovery App aggregates users into Circles of Support consisting of the Member and his or her Partners.

The Hayver Mobile App may contain tools for the aggregation of Circles of Support into Local User Groups of up to 150 local users. Local User Groups will be centered around Members' residences and will have access to social media tools.

The Hayver Open Platform may also facilitate the formation of Local User Groups into Regional User Communities of 5,000 or more local users and will create the infrastructure for Commercial Networks of merchants and service providers (Commercial Network Associates) to serve the needs of these Regional User Communities.

One of the most exciting potential Commercial Network Associates is third-party telemental service providers—mental health professionals who provide mental health services to patients over

the telephone. There is a crucial need in the addiction recovery community for mental health professionals with experience in addiction medicine. Communities without local addiction medicine practitioners need telephone access to them. In addition, communities need data (which the Hayver Open Platform can provide) about which practitioners are helpful and which are not. Hayver's exploration of this potential market will be cautious and any implementation will likely be incremental due to the range of regulatory requirements that will apply.

Bringing third-party Enterprise Associates on board

Hayver will be actively recruiting third-parties (Enterprise Associates) who wish to connect to the Hayver Open Platform and either integrate Duitcoin rewards into their own apps or provide apps and online services to Hayver end users.

New addiction vectors

Through Enterprise Associates or through its own development efforts, Hayver hopes to expand into new addiction vectors such as nicotine addiction and gambling addiction.

Steering a course towards a fully decentralized autonomous network

Hayver's long-term vision is to transition the global Duitcoin Ecosphere into a fully decentralized autonomous network.

X. The Duitcoin economy

The immediate economy

As soon as Duitcoins are in circulation, Hayver will accept them as payment for Hayver Recovery App subscription fees. Duitcoin rewards will be dispensed to Members and their peer support group, and the altruistic transfer mechanisms take place via Ethereum wallets.

Duitcoins will initially be transferred among end-users as:

- Tokens of inspiration and esteem;

- Tokens of appreciation;

- Philanthropic giving to pay for needy individuals' Hayver aftercare monitoring services.

Hayver anticipates that users will use Duitcoins in few ways:

- Members will be encouraged to pay for their subscriptions directly with Duitcoins in their wallets by offering discounts.

- All or part of a Member's subscription fee received in fiat currency will be converted by a money transfer agent into Duitcoins which will then remitted to Hayver.

- Reward recovering members and their peer support group for healthful behaviors based on outcomes.

- Peer sponsorships / bounties: Members can set goals for themselves or by peer support group and ask friends/family to fund outcome-based payments. People could purchase Duitcoin and put into a rewards pool that the Member could earn if they achieve certain outcomes.

- P2P Tips: Support groups and recovering members can tip each in small amounts as a 'kudos' and an expression of love.
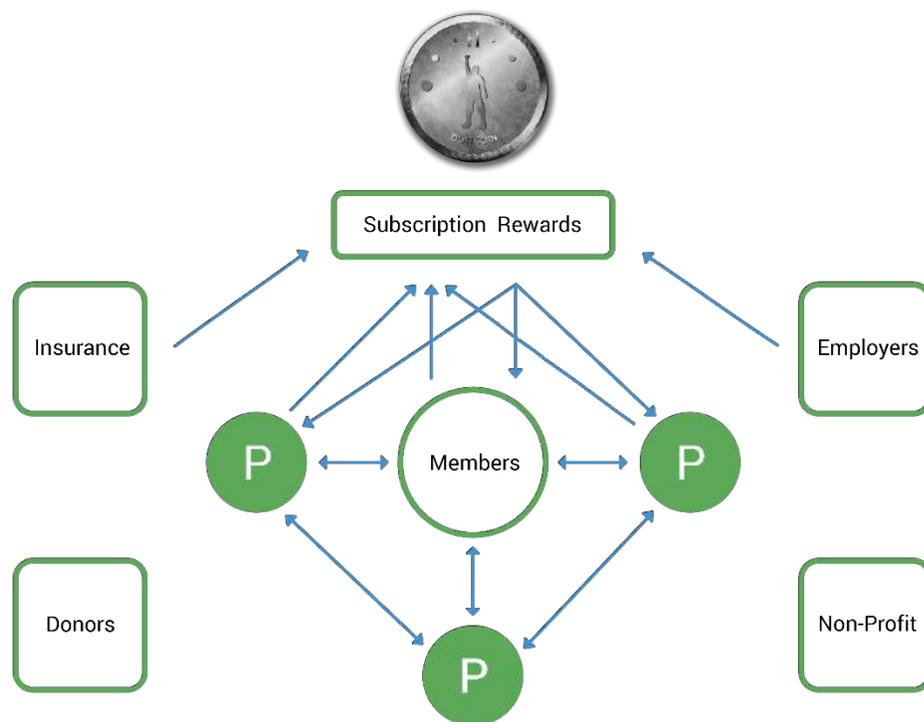
4. A data economy

The Duitcoin is itself a supplier of data. Its accretion and use will be one of the things that will be correlated to recovery outcomes. The Duitcoin is also means of incentivizing users who use will supply the data that will populate the de-identified behavioral data repository (DBDR). As previously stated, Hayver anticipates that, in time, the DBDR will become the largest collection of de-identified addiction behavioral data in the world. The data in this database could become the most valuable source of treatment efficacy data in existence.

5. A global Duitcoin Economy

Ultimately, Hayver hopes for the emergence of a global Duitcoin Ecosphere in which the Duitcoin will have thrived as a transaction currency because 1) people with addiction problems are managing their addictions more successfully and 2) Hayver, its third-party associates have engaged in a just and sustainable cryptocurrency-based business serving a vital purpose in the world.

Hayver believes that innovation in the treatment of alcoholism and drug addiction has been hampered by the strict boundaries that have separated for-profit and charitable enterprises. In the United States, strictly for-profit enterprises have viewed relapsing addiction sufferers as a gold mine and have resisted changes that might reduce profitability. Charitable enterprises have lacked the resources and scientific orientation that makes progress possible. The Hayver Companies are for-profit entities empowered by corporate articles to act in the public interest; they seek to maximize innovation by balancing the best of for-profit entrepreneurship with the social conscientiousness of a charitable enterprise.

The blockchain culture already provides a blueprint for combining entrepreneurial spirit with a concern for the wellbeing of the world.

XI. Leadership

Hayver Team

Mr. Hayut is a Co-Founder and CEO of Hayver Corp. and Hayver International. In 2011, he became the Founder and CEO of Xcite Health Corp., an electronic health record, practice management and billing company, which sold/transitioned its business to a major US digital health company in 2016. In 2002, he took over as CEO of Modern Medical Modalities Corp., which owned and managed outpatient radiology centers. Modern Medical Modalities was a publicly traded company in financial distress at time Mr. Hayut began his tenure there. Mr. Hayut turned the business around, quadrupled its revenues, and, in 2010, sold the business to RadNet, Inc., the largest outpatient radiology company in the U.S. From 1992 until joining Modern Medical Modalities, Mr. Hayut served as a corporate finance and investment banker with Thornhill Group and Joseph Charles and H.J. Meyers & Co. Mr. Hayut received his Bachelor's degrees in Business Administration and Economics from Hebrew University in Jerusalem, Israel.

Minesh Patel is the CTO of Hayver Corp. and is leading the platform development of the Hayver Recovery App. He served as CTO of Xcite Health Corp. from 2011-2016. Prior to that, he was the CTO and CFO of Modern Medical Modalities Corp. Mr. Patel was born and raised in Zimbabwe. He received his undergraduate degree from University of Memphis and an MBA from Georgia State University.

XII. Disclaimer

Nothing herein constitutes an offer to sell, or the solicitation of an offer to buy, any tokens, nor shall there be any offer, solicitation or sale of Duitcoins tokens in any jurisdiction in which such offer, solicitation or sale would be unlawful. You should carefully read and fully understand this whitepaper and any updates. Every potential token purchaser will be required to undergo an onboarding process that includes identity verification and certain other documentation, which you should read carefully and understand fully because you will be legally bound. Please make sure to consult with appropriate advisors and others. This white paper describes our current vision for the Hayver Open Platform. While we intend to attempt to realize this vision, please recognize that it is dependent on quite a number of factors and subject to quite a number of risks. It is entirely possible that the Hayver Open Platform will never be implemented or adopted, or that only a portion of our vision will be realized. We do not guarantee, represent or warrant any of the statements in this white paper, because they are based on our current beliefs, expectations and assumptions, about which there can be no assurance due to various anticipated and unanticipated events that may occur. Please know that we plan to work hard in seeking to achieve the vision laid out in this white paper, but that you cannot rely on any of it coming true. Blockchain, cryptocurrencies and other aspects of our technology and these markets are in their infancy and will be subject to many challenges, competition and a changing environment. We will try to update our community as things grow and change, but undertake no obligation to do so.

XIII. Conclusion

Through the Hayver Open Platform and a suite of addiction healthcare monitoring apps and services that build peer communities linked to networks of goods and services providers, the Hayver Companies and their third-party Associates will create local and regional healthcare economies then aggregate them into a global Duitcoin Ecosphere using a blockchain-based cryptocurrency called Duitcoin. An incentivized user base, the data produced through their engagement with apps running on the Hayver Open Platform, and a campaign to redefine recovering addicts as empowered members of a blockchain-based global community will ensure that all participants - addiction sufferers, their families and peer support groups - will ultimately benefit from this work.

The above, is a description of the business case for the App as well as some of its current and future features. That said, Hayver recognizes that the U.S. health care industry is subject to extensive regulation that will impact the design and implementation of the Hayver App and its specific intended features. Some of these laws and regulations are described below. Many of these laws and regulations carry the potential for substantial civil and criminal penalties. In addition, users may access the app from international locations, which may implicate international laws and regulations with different requirements than U.S. laws. All of these laws and regulations are subject to change, which may require Hayver to redesign the App or otherwise limit or forgo certain anticipated features. All features described herein are subject to pending legal review and may be discontinued, altered or never offered based on that review at any time. Hayver will consult with legal counsel to advise regarding the implications of these laws and regulations on an on-going basis and will endeavor to manage the associated risks, but there are no assurances that laws,

regulations, and policies as they exist today or in the future will not negatively impact the Hayver's App and its viability.

Data Privacy and Security
There are federal and state laws, regulations, and policies regarding the privacy and security of health care information, including but not limited to the Health Insurance Portability and Accountability Act ("HIPAA") and the Federal Trade Commission Act. These laws impose specific requirements and limitations on the use, disclosure, and security of health information by certain types of entities. These limitations include, for example, restrictions on the sale of certain types of health information and requirements relating to conducting research activities. There are also special protections and limitations for certain categories of sensitive information, including alcohol and substance abuse records and family history information (which is concerned genetic information). These protections and limitations may vary from state to state.

Health Care Fraud and Abuse Laws
There are federal and state laws, regulations, and policies regarding arrangements with parties who are in a position to refer patients for health care items and services. For example, the federal Anti-Kickback Statute is a criminal statute that prohibits the offer or exchange of anything of value to induce or reward referrals of items and services that are paid for by a federal health care program (e.g. Medicare, Medicaid, Tricare). Many states have anti-kickback laws that reach services covered by commercial payors and self-pay patients. Federal law also prohibits offering or providing remuneration to a Medicare or Medicaid beneficiary that the offeror knows or should know is likely to influence the beneficiary to obtain items or services from a particular provider or supplier.

Electronic Health Information Technology
Depending on future B-to-B deployments, the Hayver App may require some level of interoperability between and amongst disparate electronic health information technology systems. This interoperability may require cooperation among these systems, which may or may not be feasible based on existing contractual and intellectual property rights and limitations.

Food & Drug Laws
There are federal (and international) laws, regulations, and guidances that regulate certain digital health applications. Depending on the features and functionalities of the Hayver App, the App might constitute a "device" within the meaning of FDA regulation and may require additional review and approvals and may be subject to on-going oversight by the FDA.

State and Federal Consumer Protection Regulation
Even if the App is not regulated by the FDA, claims made by Hayver about the App's features and functionalities could be regulated by state and federal consumer protection laws. These laws, among other things, regulate whether a company has a sufficient and credible basis for making claims about what its product or service does. Hayver's statements about how its App performs and the benefits that Members and Partners can expect to see from using the App could be subject to state and federal scrutiny.

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