# BitClaims

**BitClaims.io**
**Architecting a New Healthcare Environment and Deliverance from High Costs and Poor Services**

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**Abstract**

BitClaims is a full service blockchain-based tool that enables value-based Direct Primary Care (DPC). BitClaims is a blockchain-based smart contract enabled platform for patients and service providers (e.g. primary care physicians and general practitioners) to connect directly to schedule health services, render payments, and execute terms. BitClaims empowers patients to self-capitalize and crowdsource their healthcare plans. Patients and providers can contract primary and elective (cosmetic) care services via the blockchain, in a trustless, secure environment that provides a mathematical proof that funds are available and the terms of services are executed. This network provides value for service providers seeking to alleviate the pains associated with dealing under the scope and inefficiencies of third parties. The BitClaims infrastructure is designed to drill into the mechanics of each primary care physicians' zip code and demographics and assist in pricing out the tiers for the physician practice. The infrastructure aims to place downward pressure on the cost of care, while keeping quality high and incentivizing physicians to prioritize preventative and value-based care. BitClaims network seeks to both eliminate administrative inefficiencies related to currently-implemented physician compliance programs and increase value savings to health providers by reducing the need for recoupment actions and bulky overhead costs.

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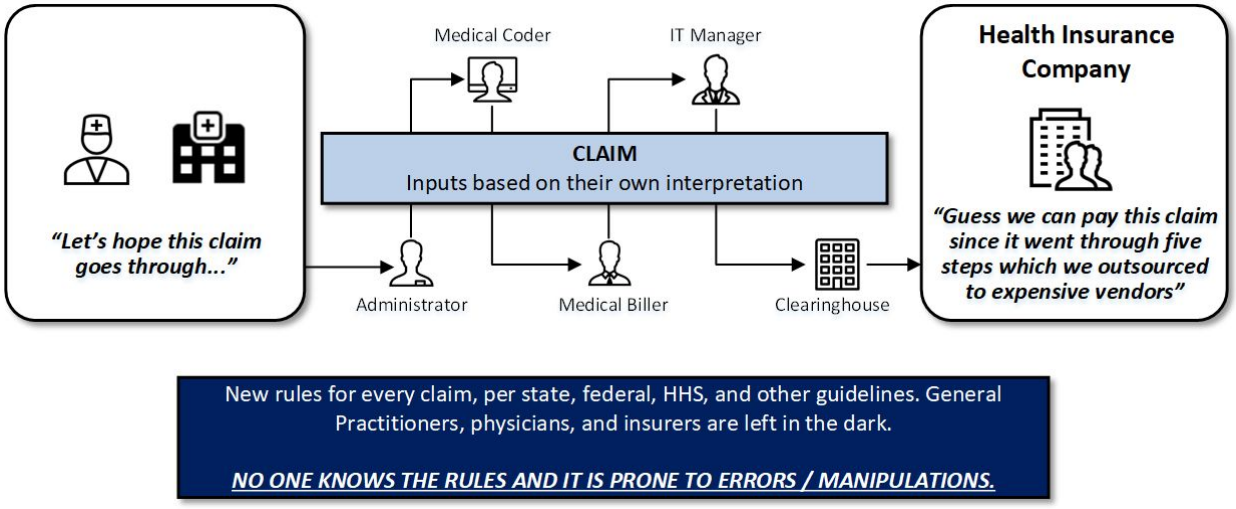
# The Current State of U.S. Healthcare

## A Three Trillion Dollar Cluster of Skewed Incentives




**Healthcare Claim Processing: An Unknown Rule Operating Environment**

It is no secret that the government is becoming increasingly aggressive in its enforcement against healthcare providers and regulations are becoming more complicated. The combination of these two forces means that many unknowing providers are being caught up in costly investigations of their practices. For this reason, it is important that providers, including medical practices, develop and operate systems to help them comply with governmental regulations and third party payer billing requirements. At the same time, providers often find themselves held hostage to third party payment methods that can take years to pay out, if at all. It is not uncommon for a provider to bill for a service rendered, even when the patient is covered, only to find out years down the road that compensation for said services cannot occur. Moreover, providers are often subject to price reductions not of their own making, but at the hands of third parties who dictate the terms for them. In addition, various auditors who conduct expensive recoupment actions due to inadvertent billing mistakes or fraud eat away at the integrity and intention of the healthcare system, making it difficult for providers to run practices efficiently and enable the best possible preventative care outcomes. Providers cannot always have transparency around all the terms of payment rendered for services and when. Imagine someone coming to you for a service, rendering the service upon request, and then not knowing when you are getting paid or for how much. This is the environment of the U.S. healthcare system for many providers.

## The U.S. Healthcare Insurance System is Lagging Behind Other Industries – It Must Embrace Emerging Technologies that Enable Value-Based Models

The U.S. healthcare insurance industry lags behind other industries, such as retail and telecommunications, in deploying emerging technologies, including digital records, online portals, cloud-based data solutions, and decentralized, distributed solutions to legacy challenges. The upcoming years will mark the arrival and the eventual adoption of these technologies.

Emerging technologies are remaking business operations and becoming integral parts of consumer's lives. As these technologies make their way into the health industry, organizations will need to hire new talent or to partner with enterprises stocked with these skills. The 3 trillion dollar U.S. healthcare ecosystem is set for disruption at the hands of these emerging technologies and the entrepreneurs that are wielding them.

## Focus on Value-Based Medicine (VBM) Models

The election of Donald J. Trump has ushered in a new era for the U.S. healthcare industry, which has already spent years adapting to the Affordable Care Act. A majority of consumers have concerns about the increasing lack of affordability of healthcare products and services. Despite clear policy differences, both the current and former administrations have recognized that consumers place a high priority on the cost of their care and the ability to access that care.

Despite the administration changes in Washington D.C., there has been a distinct shift in the medical community and beyond that to embrace a value-based medicine model. The healthcare community has accepted this shift as a move in the right direction as far as cost savings and quality of care go. VBM focuses upon the value received from a medical procedure. The final goals of VBM are improving quality of healthcare and using healthcare resources more efficiently. The shift to VBM marks a departure from Evidence Based Medicine (EBM). EBM model generally operates with fee-for-service reimbursement which pays providers based on quantity of services rather than quality.

Criticism of EBM includes its limited usefulness for individual patients, and how the model may represent a threat to the autonomy of the doctor/patient relationship, and that EBM does not adequately account for the needs of both patients and the health care system in order to provide patients with the best care at the lowest cost.

## Direct Primary Care Lowers Costs, Improves Quality, and Eliminates Inefficiencies

Over the past few years, creative new healthcare models have emerged as a result of the shift to a VBM model. Some of these include Accountable Care Organizations, Patient-centered medical homes, bundled payment arrangements, and Direct Primary Care (hereinafter, “DPC”).

DPC, specifically, is a model which goes to the heart of VBM’s goals of reducing costs and inefficiencies and improving access to and quality of care. DPC is a value-oriented health model that has emerged over the past few years as an alternative form of receiving healthcare services. With the goal of cost savings and reducing inefficiencies, DPC eliminates third-party (health insurance) (fee-for-service) billing and charges patients a periodic fee in exchange for their receipt of primary care (or other) services.

DPC is a model growing in popularity and is used by family physicians and other primary care specialties aimed at delivering high quality of care at an affordable price. The model emphasizes ongoing and preventive care services, and traditional insurance service providers and contractors are abandoned. Instead, a routine fee is paid to the DPC physician to reflect the ongoing patient relationship. The inexpensive recurring fee and satisfaction rates reported by both the patient and physician have commanded national media attention from news sources including The New York Times, Forbes, Time, and The Hill.

Because DPC encourages direct contact between the physician and patient, all of the inefficiencies and overhead associated with traditional government (Medicare, Medicaid) and commercial health insurance are removed. For example, when doctors in a traditional fee-for-service scenario render a service for a patient, a claim (i.e. bill requesting reimbursement) is created. Before this claim is received, vetted, and possibly paid (or not) by the insurer/payer, the claim must first be routed through medical coders, medical billers, and often more than one clearinghouse. While the BitClaims team is familiar with the legacy claims payment process and compliance requirements thereof, suffice it to say that these middlemen (vendors) are extremely costly and often result in a delayed payment received by the physician. Traditional health insurance fee for service plans and associated costs and overhead (i.e. billing related costs) account for billions of dollars of waste each year and mounting healthcare procedure costs and premiums incurred by patients.

The entire healthcare experience is redesigned around what patients really need, rather than the distraction of extraneous staff, coding rules, and billing requirements. Furthermore, with DPC patients now can control their healthcare experiences rather than an insurance company. Bureaucratic drag is eliminated and doctors can practice that which they trained to become. A true DPC model requires that the DPC physician opt out of Medicare. This allows the direct

care provider to see Medicare patients under private contract without running afoul of Medicare regulations and False Claims Act laws. DPC doctors are thus able to charge less for services due to the lack of coding and billing and associated business costs.

## Direct Primary Care Cost Figures

DPC practices may reduce costs by more than 40% due to the elimination of resources otherwise allocated to medical coders, billers, clearinghouses and other vendor fees and Billing Related Costs. This means lower price points for patients. Additionally, DPC physicians prefer DPC models because of their increased availability to patients, more time for each patient encounter (which results in improved quality), and lower overhead costs and less time spent on administrative billing and documentation issues.

Velocity of adoption of direct primary is increasing. Currently, out of the 41,000 primary care physicians nationwide, only 3% offer direct primary care in 2018. This is up from 2% of physicians in 2015. The most credible reason for the increase is due to new legislation being drafted and implemented. Primary care represents a $246 Billion dollar a year market in the US annually.

## Direct Primary Care vs. Concierge Medicine

DPC is similar to and thus has been compared to other models such as: concierge medicine, boutique health, membership medicine or retainer medicine. DPC and concierge are the most common terms.

Although both DPC and concierge models: have similar legal issues; focus upon ease of access to patients' primary care physicians; emphasize facilitation of appointments with top specialists; and focus upon coordinated care and putting an end to long wait times, for ex, there are differences between the two.

Concierge medicine and DPC present different models in terms of how they approach insurance. Concierge medicine and direct primary care often get confused, because both have a subscription fee. However, in concierge medicine, patients pay for luxury medical services and access, where in DPC is a patient-provider relationship, often with a lower 'subscription fee' (and thus more economically friendly to patients of all financial persuasions) in which the patient purchases primary care directly from the physician, without an insurer payer, and physicians typically also provide comprehensive care and preventive services.

# Direct Primary Care Legal Layer

## History of Direct Primary Care and Avoidance of Operating in the "Business of Insurance"

Early DPC practices had to face inquiries by state insurance commissioners. Essentially the argument by the state was that by offering full scope primary care to patients for a fixed monthly fee, too much risk was transferred to the physician. The concern is 'what would happen if too many patients required care on the same day and the care could not be delivered as promised?' In the late 1970s, the case of Huff v. St. Joseph's Mercy Hospital of Dubuque Corp., dealt with a similar challenge by the state. In Huff, the hospital offered patients a prepaid obstetrical plan where the hospital agreed to furnish all necessary OB and maternal hospital services for a period of time for the amount of $400 paid at least fifteen days prior to delivery. If the patients' charges were less than $400 or the patient did not admit into hospital, the patient would receive a full or partial refund.

The Court's opinion revolved around the definition of "insurance". The Court held these hospital/patient contracts were not "insurance" because "patients were not 'enrollees' as defined in statute and in view of fact that plan did not emphasize preventative comprehensive services, and prepaid obstetrical contracts were not "contracts of insurance" subject to regulation by Commissioner of Insurance, in view of fact that principal benefit or effect of plan was hospital care as opposed to minimal indemnity feature and in view of expressed provision in prepaid obstetrical contract for refund or additional charge depending on actual hospital expense incurred". See Huff v. St. Joseph's Mercy Hospital of Dubuque Corp., 261 N.W.2d 695 (Iowa 1978). A review of subsequent case history shows that there is a discernible 'lesson' to be extrapolated which may result in the avoidance of a zealous insurance commissioner's wrath.

## Direct Primary Care - Compliance Plans

Although there are other state courts and legislatures that saw early DPC arrangements as insurance, many physicians saw the value in such models and have been able to convince many states (and their ancillary insurance divisions) that such models are not, in fact, insurance. Over a number of years, various DPC practice associations, in conjunction with healthcare lawyers and state bar associations have developed "compliance plans" for DPC models. If DPC models follow the applicable compliance process, a DPC physician has an excellent chance at success if she ever has to defend against an aggressive state insurance commissioner. These steps are not required for operating a DPC practice, but a particularly risk-averse DPC physician should consider implementing same. Of further note, compliance plans for DPC practices can

also help said practices navigate federal issues such as those related to the Affordable Care Act and IRS/tax implications.

## Direct Primary Care - State Law

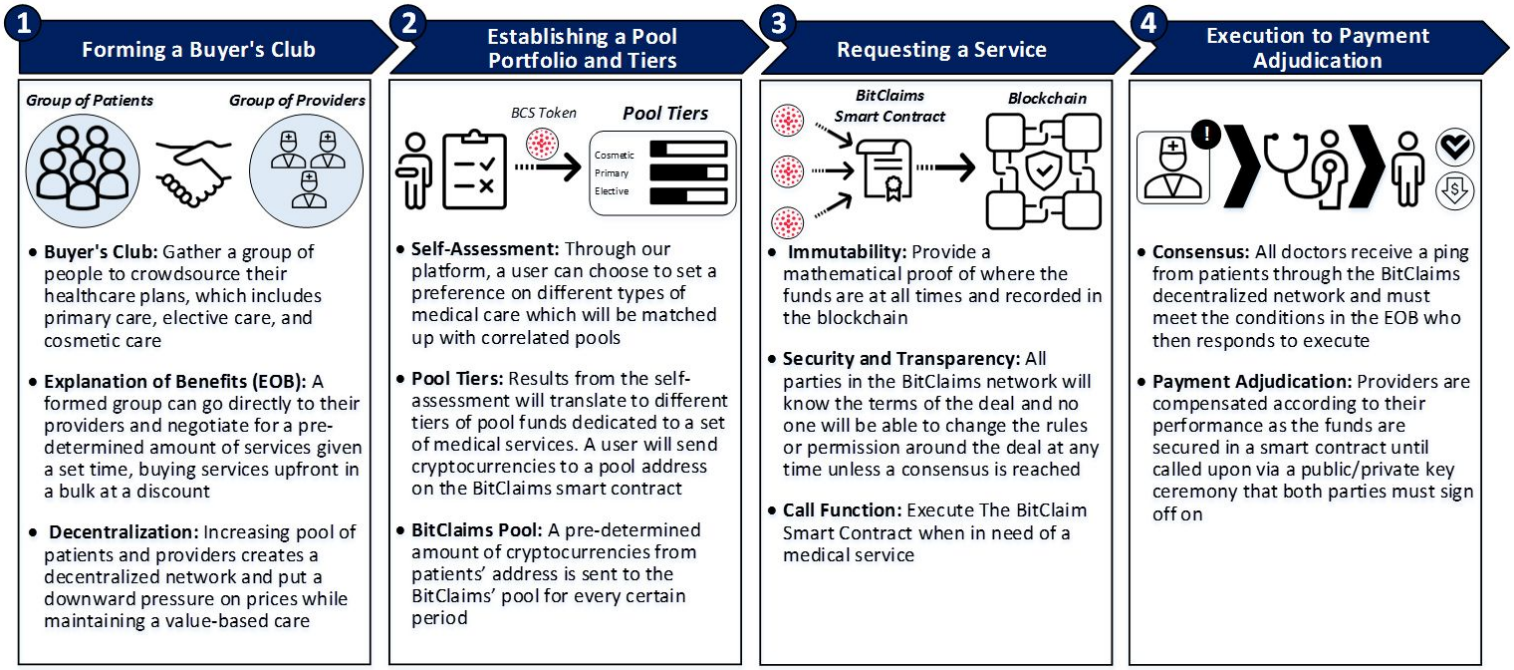
At this time, most state insurance commissioners have not enacted official stances as to DPC practices. However, 47 states have DPC practices operating in them. DPC legislation has been enacted in 17 states. In most of these 17 states, the legislation amounts to: requiring certain reporting requirements imposed on DPC practices; “not insurance” mandatory disclosures and; prohibitions on FFS billing. Most of these 17 states treat DPC practices favorably and do not “stop-up” DPC models in theory or practice.

## Direct Primary Care - Federal Law

The Affordable Care Act has a provision which relates to DPC practices whereby a DPC practice can participate in the insurance marketplace if it “meets criteria established by the secretary”. See ACA Section 10104. Federal Register notices have issued publications which assert a permissive/broad definition of DPC practices as “routine health care services, including screening, assessment, diagnosis, and treatment for the purpose of promotion of health, and detection and management of disease or injury.” This broad definition is an example of a permissive, encouraging attitude towards DPC models which have come to dominate the value-based medicine movement of cutting costs, improving access to care, and eliminating inefficiencies.

Finally, of note is that the IRS deems DPC practices to be “health plans”. The consequence here is that periodic fees are currently not deductible as a qualified health expense for health savings accounts. Various lobbying efforts are underway to further reach out and educate the IRS to change its treatment of DPC practices.

# Enter BitClaims - A Blockchain Platform Leveraging Time Series and Open Source Utilities




**BitClaims: Architecting a new environment of incentives for healthcare**

*A platform that empowers patients to create their own association healthcare co-ops.*

## Distributed

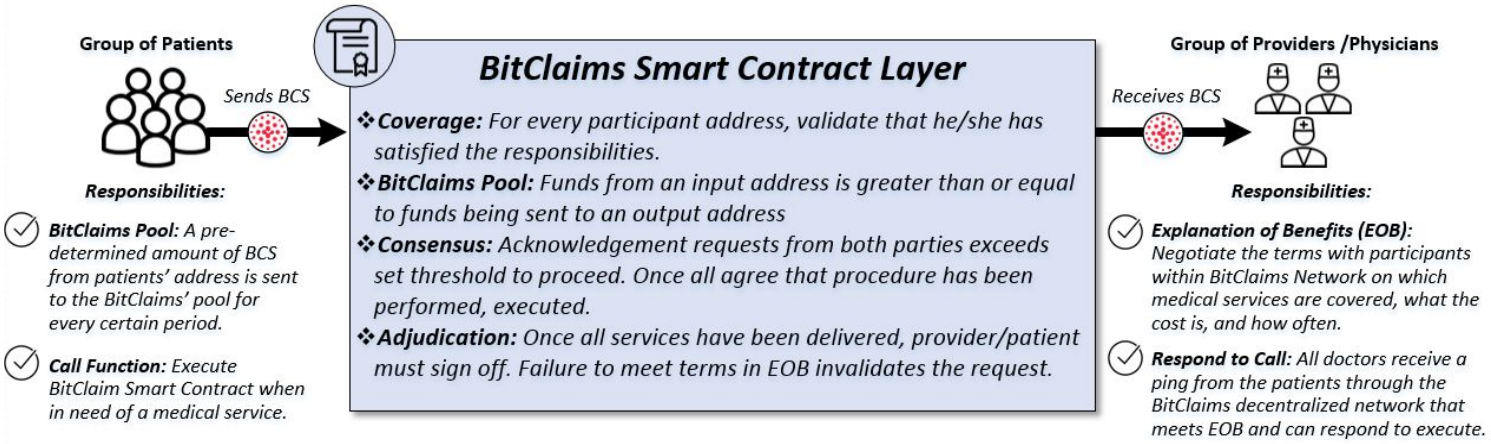
Pooling together a certain amount of funds upfront, with the rest coming in piecemeal manifests into existence an entirely new set of incentives, all mapped to preventative care. The average primary care preventive services cost the patient around $1800-$2800 a year. This means that if the association healthcare co-op can procure half (50%) of the $2800, meaning $1400 per person on a scale, then they would each only have to contribute an additional $116 out of pocket a month. A major benefit to this model is that if no services are rendered, or if some services are only partially rendered, then the monies put in can be used towards the next year's service costs, and or the patient can decide to take the built up money to another physician, provider, or receive a certain amount back.

## Crowdsource

Healthcare plans mapped to services can be crowdsourced by anyone. Associations, communities and co-ops can go directly to providers for desired medical services such as primary care, elective surgery and even cosmetic. The groups can buy services upfront in bulk at a discount in a predefined time. This enables a decentralized crowdsourcing network as the pool grows.

## Decentralized

All parties in the network will know the terms of the deal and no one will be able to change the rules or permission around the deal at any time. Everyone has to come to a predetermined consensus in order to payout funds held in the smart contract. In order to do so a predetermined call function from the patient side pings the smart contract. From there all parties in the smart contract, both patient and provider, are able to see which public key made the call and for how much. Coming to a consensus on if the funds should be released or not is determined by the set of terms that both parties define prior. In this scenario the consensus enables payment to be made, while the private key signatures from a coordination of patient and providers sign off on the transaction. The net result is the memorialized to the blockchain.



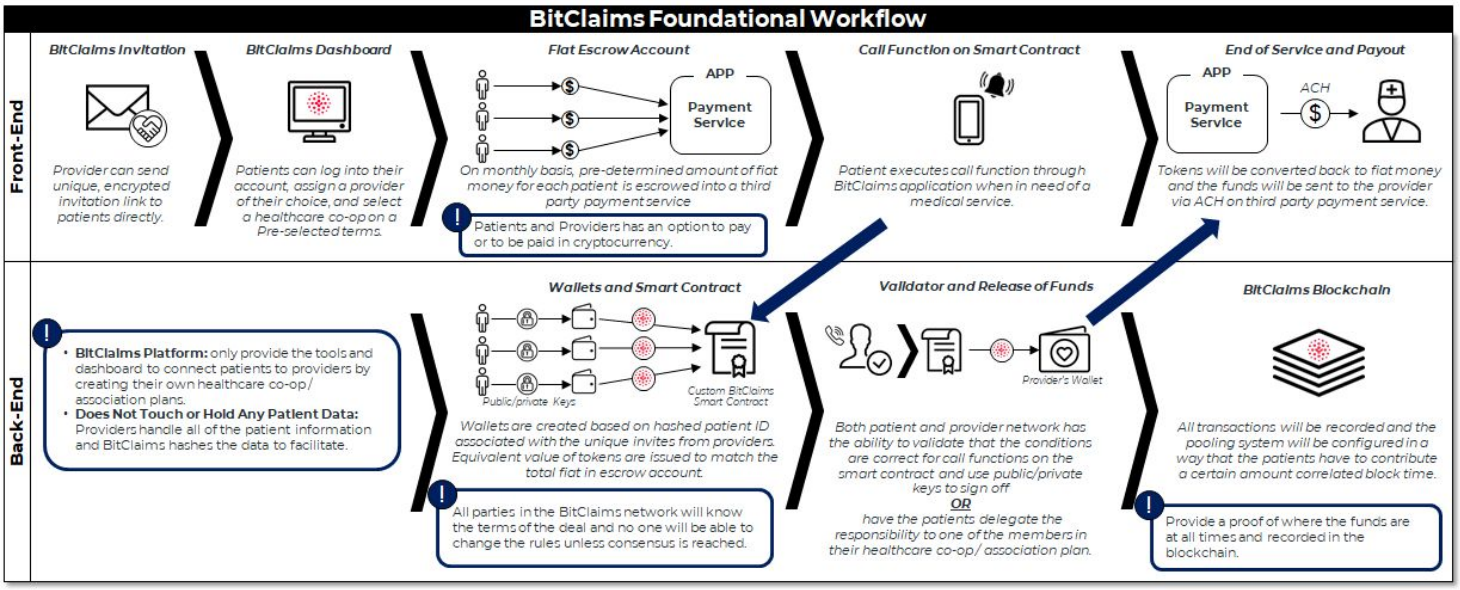

## New Environment of Incentives

Pooled money enters the platform and a mathematical proof is shown to prove that the money is on the blockchain and a public-private key ceremony releases funds. One member of the group is a patient and wants to make a call function on a smart contract. The call function will say that this patient wants X amount of services mapped to the contract that the patient has with the provider. Everyone in the smart contract will receive a notification from BitClaims platform. The call function is associated with the patient's public key and only the people in the network will know who that public key will be tied to so privacy is ensured. Then all participants with

public/private keys on the input side will respond to this ping to come to a consensus. Once consensus has reached to execute, predetermined amount of money will sweep directly into a provider's account.

# A Look into The BitClaims Architecture

### Process

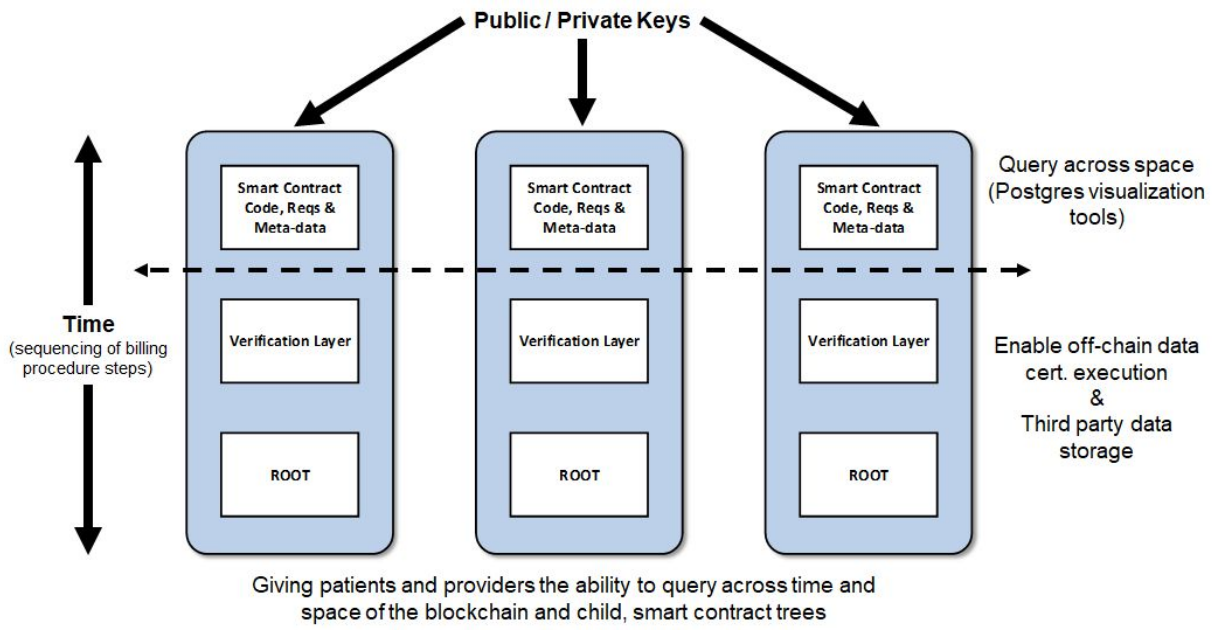



**BitClaims Foundational Workflow: Proof-of-Concept for Phase 1**

Primary care providers who are running a full BitClaims node can interact with the BitClaims API. This API provides robust querying functionality via Postgres in an easy to use dashboard that patients and providers can understand.

Once running, the patients and providers have a shared portal in which they can communicate. The anonymity of patients, their data, and which terms and conditions are met to who and by whom are kept completely anonymous. BitClaims seeks to streamline this complex sequencing of steps with an approach current office admins and a nominated association healthcare co-op head can understand.

## Time Series Approach to Blockchain Virtual Machine Queries



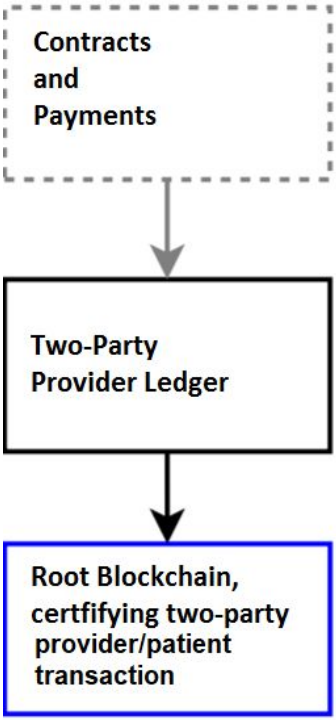

**Time Series Principle Utility**

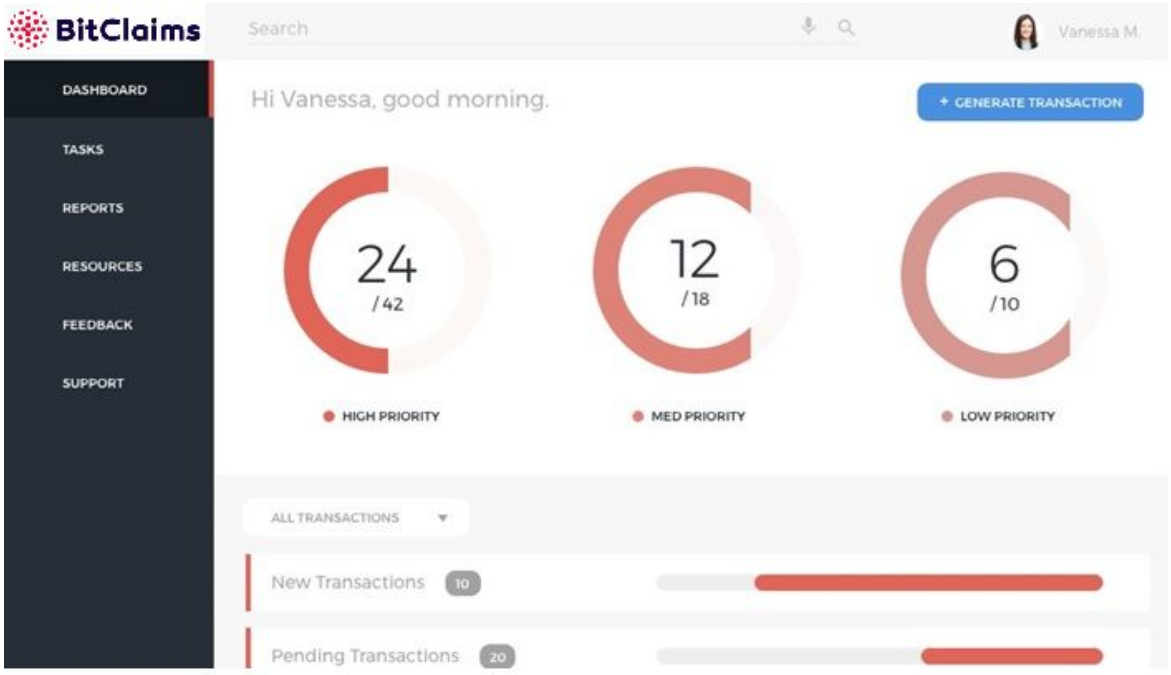
Due to the infancy of development regarding smart contracts, time series data workflows offer a new angle of approach to blockchain queries. For starters, time series data is largely immutable, correlating directly to the core tenants of an unalterable ledger (blockchain). New data writes occur independently and not as updates to existing rows. As new data arrives, it is correlated to existing time periods that data has been written to. Writes therefore are made primarily to recent time intervals. In a time series environment, data points that are written to the database are done so to the latest time activity and the data sources (smart contract metadata tags, smart contract protocols, call function requests). With this in mind, data queries are not constrained to one metric, and can instead select multiple metrics at the same time, or functions that call upon multiple metrics.

This methodology maps directly with the practices and processes involved around the sequencing of payment procurement in addition to several other use cases which BitClaims is aggregating for Phase 2 implementations. This methodology allows maximum scalability and robust query support for the highest level of integrity demanded by resource heavy users.

The primary care provider who must be regulatory compliant, runs a BitClaims node. This takes the form of a core blockchain being the unalterable ledger. The consensus model between patients and providers happens in conjunction with existing consensus models already running

on top of the blockchain network.  Authorizing the permission around the transaction fundamentally occurs here.



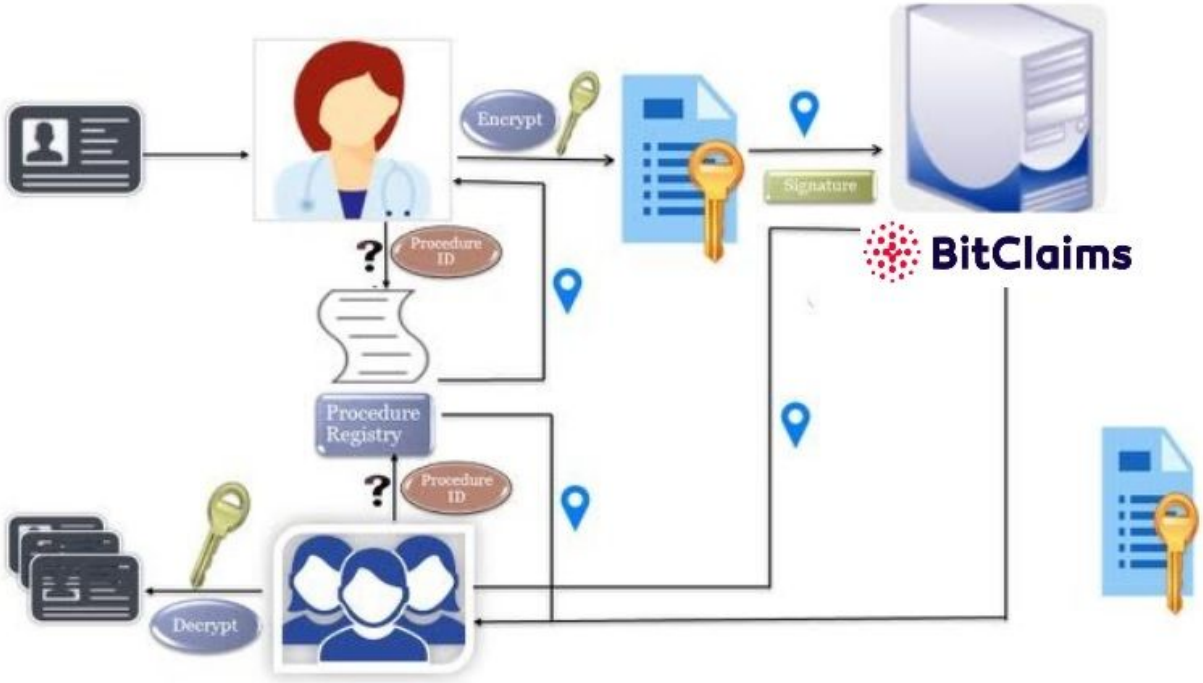



BitClaims Primary care providers can request the already validated cryptographic hash headers of a validated transaction on the blockchain. This occurs off chain and using public/private keys. The decentralized consensus via the blockchain protocols enables the request to happen being accepted or denied based on the network consensus. Upon consensus by the nodes on the blockchain, the transaction hits the root chain ledger.

The BitClaims Process consists of three main elements:

1. A grouping of contextually based smart contracts via specific procedure numbers tied to calls established by Medicare, industry or otherwise.
2. The BitClaim mechanism that rakes a percentage of daily revenue into a BitClaims custodial wallet which then sweeps to BitClaim token holders.
3. A front end portal that allows the environment to run smoothly between patients and providers directly.

BitClaims will only be validated and running on providers' machines who are compliant with healthcare regulations. BitClaims validates the compliance of said care providers through existing regulatory channels. Validated providers then only interact with other compliant nodes in the network. This way, when a provider records a transaction, the network can see it in the next block.



## The BitClaims App and Provider Interface

The front end of the BitClaims platform will allow patients and providers to create smart contracts for service terms, while keeping the nature, location and cause of said contract anonymous. The BitClaims app, of which providers and patients will interact with each other to validate the completion of a smart contract, will be an intranet portal able to interact with smart contracts directly. This allows the providers and patients the ability to spin up smart contracts directly, with pre-set rules understood by both parties that are unalterable via the smart contract code, at will and on a per service basis.  When the admin at a provider's office initiates the sequence for a procedure payment, they are guided via the portal to fill out the necessary private key associated with the procedure they are requesting the association healthcare co-op release funds for.

To simplify the process initially, BitClaims uses the already well established billing sequencing by the healthcare industry for a standardized set of claims requirements for the procedure in the client facing application. Once the admin completes this first step, the metrics are populated into the smart contract for that specific smart contract. BitClaims serves as the mediator that merely provides the client to connect both parties.

# Conclusion

### The Future of Incentives in Healthcare

This opens up the opportunity for a merit based ecosystem to evolve, while adhering to regulatory standards, and at the forefront providing superior quality care and service to patients at a much lower cost. BitClaims commits to developing best practices in the space.

Providers remain the exclusive holders of the patient data. BitClaims will not handle the storage of EHR's, or any variation thereof, in this context or form. For the BitClaims platform, it suits the providers to have access to the data they require, and no one else. With this approach, BitClaims keeps the benefits of a decentralized and distributed computing structure, while keeping the data integrity and compliance cooperation on the side of the providers and patients.

The failure to confront and mitigate risks can be devastating to a physician practice and can mean a slow, but consistent, leak of money. For physicians, repayment obligations for false claims are generally three times the amount of the claims plus $11,000 per claim. Extreme cases of fraud can also lead to criminal investigation and prosecution. Recently enacted healthcare reform legislation makes it easier to create a new environment of incentives for patients and providers to thrive in a value based, preventative care and service environment.

BitClaims will play an increasingly significant role in healthcare and bring beneficial disruption and new efficiencies to every patient and provider. It is vitally important that healthcare organizations and patients understand the core of blockchain technology to ensure they are ready for the changes the technology entails. The result will be a new generation of powerful, blockchain-based applications that will shape the next era of business in healthcare. For blockchain to full its potential in healthcare, it must be based on standards to ensure the compatibility and interoperability within the siloed health care system landscape.

# Bibliography


1. American Academy of Family Physicians [AAFP]. FAQ on Direct Primary Care. Available at AAFP, https://www.aafp.org/practice-management/payment/dpc/faq.html
2. Baror, R. Is Direct Primary Care the Future? [Publish Date Unavailable]. Federal Bar Association. Available at http://www.fedbar.org/Sections/Health-Law-Section/Health-Law-Checkup/Is-Direct-Primary-Care-the-Future.aspx
3. Belliveau, J. Healthcare Consumerism, Challenges Primary Care Business Models. April 06, 2017. Available at https://revcycleintelligence.com/news/healthcare-consumerism-challenges-primary-care-business-models
4. Brown MM, Sharma S., Value-based medicine: evidence-based medicine and beyond. Ocul Immunol Inflamm. 2003 Sep;11(3):157-70. [PubMed]
5. Cohen, M. Concierge Medicine v. Direct Primary Care: Legal Issues. April 21, 2013. Blog article available at https://michaelhcohen.com/2013/04/concierge-medicine-v-direct-primary-care-legal-issues/
6. Jong-Myon, Bae. Value-based medicine: concepts and application. Epidemiol Health. 2015; 37: e2015014. [PubMed]
7. Klein, G. Direct Primary Care: How You Can Use It to Advocate for Your Health. Oct 27, 2017. Blog article available at https://valuesbasedpa.com/direct-primary-care-how-you-can-use-it-to-advocate-for-your-health/
8. Pofeldt, E. The Rise of Direct Primary Care. Medical Economics, April 10, 2016.