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In this report, we seek to understand how health and life insurers might leverage blockchain to strengthen key elements of an insurer's value proposition. Based on a crowdsourcing exercise, we propose six operational and consumer use cases for how blockchain might be applied by insurers in the coming years. On the following pages, we present these case studies and break each into the following four sections, ending with implications to both the health and life insurance industries:



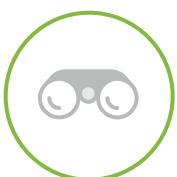
The problem



Why blockchain?



Feasibility



Implications



Seeking crowd wisdom for blockchain use cases

Speculation and enthusiasm are mounting about the potential to take blockchain technology beyond its origin as the public ledger for cryptocurrency transactions and repurpose it to transform the broader financial services industry and other segments of the economy. Health and life insurers are among the many players scrambling to determine how blockchain could be adapted to improve the way they maintain records, execute transactions, and interact with stakeholders. Key questions center on whether blockchain's unique attributes could help insurers cut costs, manage risk, improve customer service, grow their business and, ultimately, bolster the bottom line. (See "Blockchain for beginners" in the appendix for the basics on this technology.)

Deloitte's Center for Health Solutions and Center for Financial Services recently partnered on a crowdsourcing research project to look into how health and life insurers might leverage blockchain and related technologies to strengthen key elements of an insurer's value proposition—from applications to administration, underwriting to alternative payment models, claims management to fraud mitigation, cyber security to data privacy. Members of the blockchain development community collaborated with insurance industry specialists on an online platform provided by Wikistrat. The crowd included 17 academics, 11 authors, and leaders in the blockchain technology, cybersecurity, finance, futurism, health insurance, and life insurance fields. The crowd's mission was to brainstorm how this emerging technology could be applied by insurers in the next five to 10 years to improve current standard operating procedures and systems while enhancing the customer experience.

We focused on health and life insurance because of their mutual concern with the medical history, personal characteristics, and ongoing wellness of policyholders. However, based on our research, other types of insurers offering coverage with medical components may also benefit from blockchain's adoption, including disability, dental, workers' compensation, and long-term care.

So, what did we find? Forty-three analysts generated 44 use cases during the four-day crowdsourcing exercise, before voting on the likelihood of each use case being realized and its expected level of impact. Following a review by Deloitte's blockchain and insurance specialists, the list was narrowed to those cases that appeared to be the most realistic and promising; this was followed by a deeper dive into the finalists among a smaller group of experts from the crowd.

One major use case dominated the discussion — how blockchain could facilitate the creation of a more comprehensive, secure, and **interoperable** repository of health information.

The other remaining use cases often depended upon blockchain-based health data collection and policy execution, leveraging the technology to:

- **Streamline back-office operations** to provide more cost-effective underwriting, pricing, and claims functions as well as enable value-based care strategies.
- Improve capabilities to **deter and detect fraud** by providers, claimants, or applicants.
- Upgrade the reliability of **provider directories** for health plans.
- Simplify and shorten the **insurance application process** and make it more customer friendly.
- Support the formation and growth of **online insurance exchanges and alternative forms of insurance**, such as peer-to-peer coverage groups.
- Facilitate near-real-time **health status monitoring and more dynamic pricing** and interactive services by insurers.

In this paper, we examine the implications of these use cases in terms of how blockchain could directly and indirectly improve an insurer's basic processes and business models. Each blockchain application our expert crowd generated and Deloitte's technology and insurance specialists analyzed was mapped against critical considerations including an assessment of the problem to be solved, the elements that might make blockchain a better and/or cheaper alternative to current practices, and how practical and realistic the proposed blockchain solution might be.

The use cases address improvements in insurance company operational functions as well as dealings with providers, intermediaries, and policyholders, thereby improving the customer experience, enhancing product value, and laying the groundwork for greater consumer choice in the market. The end game is to decrease costs, improve operational effectiveness, and strengthen relationships with the insured.

Although other industries—such as banking and payments—may have a head start on blockchain development, this disruptive innovation is already actively being explored as a potential catalyst for change by a growing number of companies across the insurance industry. The combined interest of health and life insurers in improving accessibility and reliability of medical data could drive momentum to make these use cases a reality—to the benefit of all lines within insurance that use such information.

While it is still early in the blockchain adoption curve and additional use cases likely will take shape over time (e.g., assisting members in tracking health savings account spending and in health expense tax reporting), the applications explored here provide a starting point to help health and life insurers integrate blockchain into their systems and processes before competitors beat them to the punch.



Operational considerations: Enabling strategic and operational priorities while cutting costs

Moving towards interoperable, comprehensive health records



The problem

Blockchain's ability to bring decentralized entities together while enhancing data security uniquely positions it to help solve one of the most vexing problems in health care today—sharing sensitive medical information among insurers, providers, patients, and other stakeholders. This use case also is foundational for many other possible blockchain applications in the health and life insurance markets.

Patient health care records today are fragmented across a multitude of organizations, resulting in siloed and incomplete patient information at the point of care and an inability to track patients in real time, which is needed to realize the promise of coordinated care. According to an American Hospital Association 2015 survey, only 18 percent of hospital providers often use electronic patient information from outside sources.¹ Thirty-six percent of hospital providers rarely or never use outside electronic patient information.²

While the Centers for Medicare and Medicaid Services and Office of the National Coordinator for Health Information Technology are encouraging interoperability through value-based payment and

delivery reform and bipartisan policies such as the Medicare Access and CHIP Reauthorization Act (MACRA), providers often point to workflow issues and electronic health record (EHR) vendor costs and capabilities as barriers to sharing data. As health insurer involvement in activities such as disease management, care coordination, and population health increase, the importance of exchanging information with providers will increase as well.

Indeed, the secure exchange of health information is already a priority of some health insurers, as demonstrated by those who have invested in interoperability companies. Lack of interoperability can impact the quality and cost of patient care if diagnostic tests are repeated, medications are prescribed that may interact negatively with other prescriptions, and relevant clinical information is unavailable when needed, resulting in incorrect diagnoses and treatment plans. It also can result in poor patient outcomes and high costs if health plans and providers lose track of patients when they return home and develop conditions (which might have been addressed through a doctor visit) that turn into hospital readmissions.



Why blockchain?

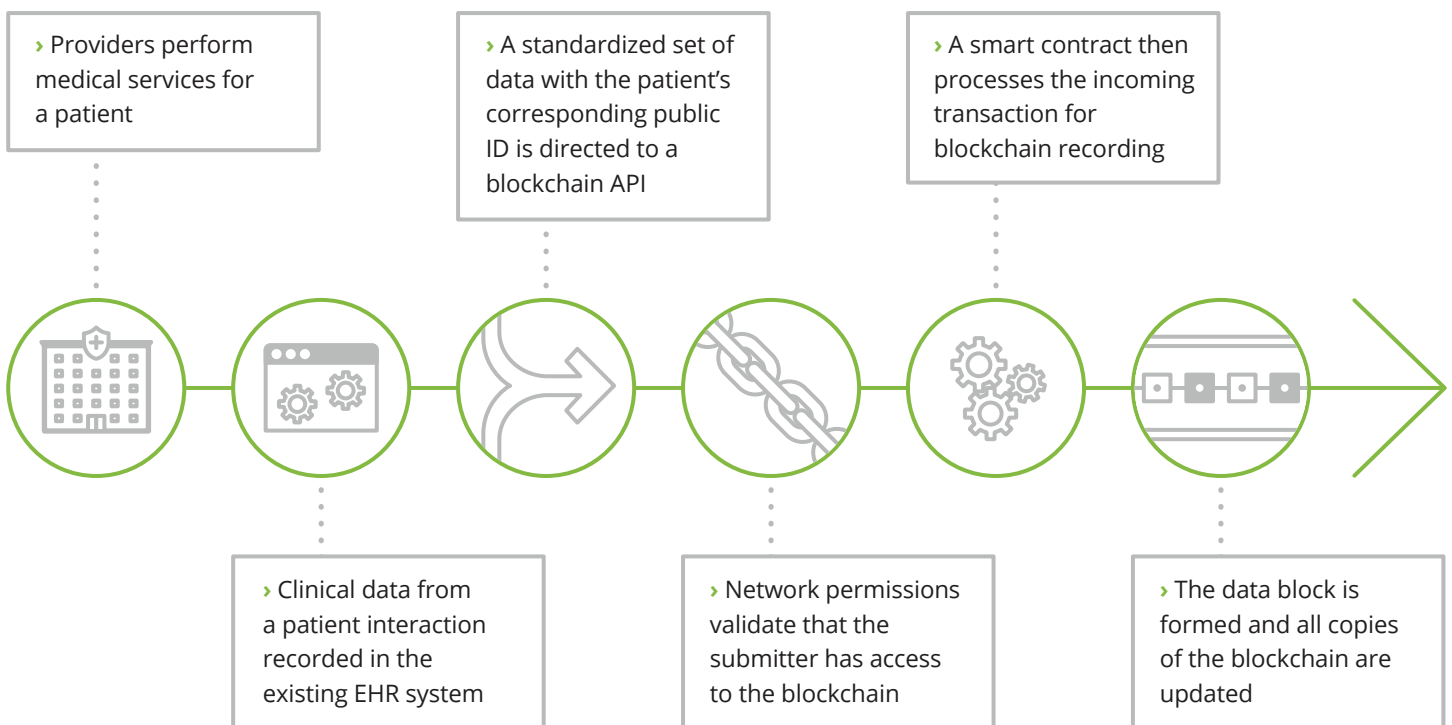
Blockchain's added security and ability to establish trust between entities are two reasons why it can help solve the interoperability problem better than today's existing technologies. As shown in Figure 1, an interoperable and comprehensive health record on the blockchain would most likely be pulled directly from existing EHRs in hospitals and physician offices. Today's health records are typically stored within a single provider system. With blockchain, providers could either select which information to upload to a shared blockchain when a patient event occurs or continuously upload to the blockchain.

Patient-generated data could also be added to the blockchain. Previously agreed-to data standards would be applied to data entering the blockchain through smart contracts (decentralized applications that automatically execute actions based on blockchain activity), resulting in readable and consistent data from all sources. Trust issues

between entities could be resolved through blockchain's automated data verification. No intermediary is needed and blockchain users do not have to communicate. Participants would have control over who accesses the data, which would be tamper-resistant once inside the blockchain.

Concerns around privacy and security are major obstacles to sharing data. Health care organizations worry about the Health Insurance Portability and Accountability Act (HIPAA) and related regulations. While breaches are a valid concern, data sharing (when done with the proper precautions and consents) is not a violation of HIPAA. Blockchain can provide a more secure environment to store and access data. For example, to ensure information on the blockchain is shared only with authorized users, patients can grant access to their information to physicians, insurers, and others by providing private keys to unlock the data to these select entities.

Figure 1. Potential roadmap for adding medical data to the blockchain



Source: Blockchain: A Comprehensive Look at Blockchain Applied to Healthcare, Article Two—Information Exchange and the Need for Trustless Collaboration, Deloitte.



Feasibility

From a technology perspective, blockchains will need to address the potentially large volume of transactions that would occur over the network, as well as the amount of data that could be stored on each block. In a bitcoin blockchain that processes 200,000 transactions per day, for instance, each block can take approximately 10 minutes to validate.³ However, as blockchain technology matures, standards are put in place, and hardware performance improves, these technical issues will likely be addressed or at least mitigated.

Some of today's interoperability challenges will remain with the integration of blockchain. Determining a set data standard will still need to be established, though progress is occurring through the Fast Healthcare Interoperability Resources standards framework and government involvement. Questions such as who will pay for and maintain the blockchain persist. And while blockchain may be more secure than current technologies, it is not foolproof. However, the benefits of establishing an interoperable, comprehensive health record, both in the short and long term, should push stakeholders to explore this technology and may impact how health information exchanges operate in the future.

Health insurance-specific potential implications



Life insurance-specific potential implications

- ▶ Leverage the information on the blockchain to help members manage their health and provide wellness rewards.
- ▶ Using analytics and navigators, assist members in deciding what insurance plan would best meet their current health needs.
- ▶ Identify and close patient care gaps.
- ▶ Gain greater understanding of value-based care arrangements when a patient's entire episode of care can be accurately reviewed across providers.

- ▶ In combination with automated underwriting, reduce the need for consumers applying for life insurance to see a physician or, in some cases, take additional lab tests.
- ▶ Reward members who engage in healthy behaviors such as exercise (e.g., data from an exercise tracker could be uploaded to the blockchain and the insurance company could access it, with a smart contract triggering the appropriate incentive).
- ▶ Reprice policies or provide other financial or non-financial rewards based on current health information.
- ▶ Automatically process new business, claims, in-force transactions, disclosures, agent information, and other transactions.

Supporting administrative and strategic imperatives with smart contracts



The problem

Information is an insurance company's lifeblood. Properly acquiring, processing, sharing, securing, and using that information to make decisions in a timely manner is crucial—but some of today's transactions may take days (or weeks) to locate and process. Many insurers are using claims systems that were originally built more than 30 years ago. Maintaining these outdated technologies increases costs for insurers and may hamper their efforts to adopt new value-based payment strategies that will change the way insurers approach network development, provider contracting, and payments. Also, the imperative for insurers to cost-effectively maintain their administrative infrastructure is becoming more public and important. For example, in the wake of the Affordable Care Act, health insurers are required to meet an acceptable medical loss ratio (MLR) representing the proportion of their revenues paid out in claims versus those swallowed up by administrative expense.



Why blockchain?

The many millions of transactions and data exchanges between an insurance company and its customers, providers, vendors, employers, auditors, and regulators should become much easier to access and view securely with blockchain, saving time and resources. Blockchain could automatically collect records of agreements, transactions, and other valuable information sets, then link together the information and act on the data using smart contracts.

Back-office functions

Back-office administrative processes such as underwriting, pricing, and claims processing may become faster and easier by using smart contracts' rules-based systems and automatic verification of terms and conditions. In the case of claims processing, as soon as services are rendered by a provider and the patient's updated medical record is uploaded to and verified by the blockchain, smart

contracts can initiate payment to the provider. This reduces the need to file and review each claim. Application review is another example: The blockchain could verify the applicant's information by comparing it to data on the applicant's health record blockchain (with approval from the applicant). If the information is correct, then, using smart contracts, the blockchain could automatically trigger an ID card, new member information, etc. Even routine records maintenance such as address changes or beneficiary updates—often challenging if the information being updated requires human interaction and systems verification—could take place far more quickly and easily when blockchain allows automated documentation and verification.

Finally, both health and life insurance are heavily regulated industries and would benefit from the increased transparency into organizational transactions and other activities. Pulling data together quickly from disparate sources could improve regulatory reporting efforts such as the Medical Loss Ratio (MLR), and the accessibility of blockchain's distributed ledger could make that kind of reporting much faster and easier.

Value-based care strategies

Developing a network of quality providers is imperative in a value-based environment. Shared information on the blockchain could help insurers determine which providers to seek out and contract with, as well as verify that contracted providers are meeting their obligations. Drafting complex, value-based contracts is a manual, time-intensive process, as is determining payment, which may require retrospective reconciliation. Smart contracts could automate these processes and decrease the time and resources needed to execute the terms and conditions. And because smart contracts are decentralized and cannot be changed, all parties can be confident that terms will be consistently executed. Furthermore, blockchains could make the full payment record available to all to see and review.

The many millions of transactions and data exchanges between an insurance company and its stakeholders should become much easier to access and view securely with blockchain, saving time and resources.



Feasibility

As with any IT implementation, there are challenges to incorporate blockchain into an insurer's back-office operations. For instance, implementing new technology requires that users understand and operate it effectively, which means ongoing training. In addition, blockchain will only be as good as the data put into it—that information needs to be accurate and properly formatted. Combining the same types of information from different sources—health care providers, financial institutions and, of course,

policyholders—usually results in the need for data reformatting and manual migration. Start-up, integration, and migration costs should be considered, along with resources to hire and train staff to manage the systems. The benefits, however—streamlined processes, increased security, and cost reduction as blockchain technology becomes more sophisticated—should make these operational and financial challenges worth the effort.

Health insurance-specific potential implications



Life insurance-specific potential implications

Back-office functions

- ▶ Process customer transactions more quickly, improving application decisions, renewals, claims payments, and information updates.
- ▶ Lower overhead costs by increasing speed and efficiency of automated tasks and processes.
- ▶ Repurpose staff resources to non-blockchain-enabled roles.
- ▶ Bolster security for personally identifiable health information.
- ▶ Potentially use smart contracts to verify visits and procedures.
- ▶ Reduce prior authorization calls and paperwork because needed information would be available and smart contracts could verify the prior authorization automatically.

Value-based care strategies

- ▶ Decrease time and resources needed to draft contracts and reconcile and execute payments.
- ▶ Provide more comprehensive and efficient quality reporting due, in part, to access to an interoperable health record.
- ▶ Increase access to data for risk adjustment.
- ▶ Access more utilization and spending information for risk-sharing arrangements.
- ▶ Understand whether providers are certified as medical homes.

Back-office functions

- ▶ Hasten processing of coverage applications.
- ▶ Lower overhead costs via increased speed and efficiency of automated tasks and processes.
- ▶ Improve access to comprehensive medical information.
- ▶ Increase reliability of medical data.
- ▶ Bolster security of personally identifiable health information.
- ▶ Enable automated validation of life events to trigger policy execution through smart contracts.

Detecting fraud more effectively



Why blockchain?

When fraudulent information is submitted to a life or health insurer via false claims, falsified applications, or other channels, blockchain's smart contracts can help determine if the submission is indeed valid. Blockchain cannot verify all types of data (e.g., whether the claim was up-coded), but it can validate the submitter and the completeness of the information (e.g., billing code and date are included in the claim). For example, a health insurer could link a claim submission to a patient's interoperable health record on the blockchain to verify that the patient was actually seen for the appropriate condition. A life insurer could compare elements of an applicant's health record—whether the person had been treated for cancer, or whether the person is a smoker—to public or employment records to verify that the information the applicant provided is correct. Once confirmed, the claim would be paid. If not confirmed, the claim either would not be paid or at least trigger further investigation.



The problem

Fraud is estimated to cost the insurance industry more than \$80 billion annually.⁴ Health insurance fraud ranges from providers submitting claims for services never rendered to up-coding services to receive higher payments. Plan members can commit fraud by failing to report other types of health insurance coverage that would cover the billed services or filing claims on behalf of ineligible members/dependents (e.g., keeping an ex-wife on an insurance plan after a divorce). Life insurance fraud typically occurs during the application process—applicants withhold key medical information such as a history of diabetes or a heart condition, for example. To decrease costs, life and health insurers both look to protect themselves, their shareholders, and their policyholders from fraud.

Blockchain's ability to easily and securely pull together different data sources at any point in a transaction and enable data analysis increases insurers' ability to detect, identify, and mitigate fraudulent activity. In health insurance, for instance, certain providers may have intentionally billed multiple insurance companies incorrectly; however, each insurer may have had only limited instances of the activity and, therefore, not enough data to understand if the bills were honest mistakes or actual fraud. Once all the payers' information is combined, trends are easier to detect and fraud is exposed. By adding analytics to blockchain, organizations can study their own data and that of the broader market to build models that automatically detect systemic waste, fraud, and abuse—and they can share their findings with other payers.



Feasibility

Linking to external blockchains and using them to verify transactions would require close collaboration among organizations including health insurers, government agencies, financial institutions, and health care providers. This kind of collaboration could take time and resources to develop and maintain.

Health insurance-specific potential implications	Life insurance-specific potential implications
<ul style="list-style-type: none">▶ Identify and reduce fraudulent claims and applications more quickly, without manual processing time and resources.▶ Enable greater fraud detection and analysis by more securely linking separate data sources.	<ul style="list-style-type: none">▶ Help insurers prevent fraudulent applications by those withholding key information about events, illnesses, or medications.▶ Help reduce fraudulent claims more quickly by leveraging more data sources, without manual processing.

Improving provider directory accuracy



The problem

Blockchain could provide an elegant solution to one of the most frustrating issues for health insurance members—confirming which of their providers are in-network. According to a 2007 consumer survey from Forrester, the provider directory is the most-used function on health insurers’ websites,⁵ but it is too often filled with incorrect and out-of-date information. For example, in 2014, California regulators reviewed two of the state’s health plans and found that 18.2 percent of providers in one plan and 12.5 percent in the other had wrong addresses, while 8.8 percent and 12.8 percent, respectively, did not accept the insurance plan.⁶ Other inaccuracies include languages spoken, hospital affiliations, whether physicians are accepting new patients, and phone numbers. Incorrect or outdated information can make it difficult for members to contact their provider, have potential impacts on their care when language issues arise, or generate unexpected costs when their provider is not in-network.

Health insurers often rely on providers to update their directory information and may receive information from different, conflicting sources; both situations make it difficult to keep the directory current and accurate—and to make sure they are correctly billing providers and patients. In addition, insurers are under increased government scrutiny to publish accurate directories or honor those that are listed, even when inaccurate. Plans in Medicare Advantage and federal exchanges, for example, may be fined for listing incorrect information.⁷ Regulators are also examining directories to make sure insurers are meeting network adequacy requirements—if too many providers decide to stop participating in an insurance plan, the plan must add providers to its networks, potentially raising costs.⁸

Blockchain could provide an elegant solution to one of the most frustrating issues for health insurance members—confirming which of their providers are in-network.





Why blockchain?

Blockchain-based provider directories could leverage the technology's decentralized consensus protocols to allow providers and insurers to update listings more quickly and easily. If a provider changes networks or someone finds a mistake, they can initiate a correction, which can be automatically accepted or rejected by smart contracts based on other information in the blockchain (e.g., a recently rejected claim). Health plans will be able to keep track of all provider updates and will know which information is most current. Providers, who currently have to maintain multiple directories,

would only have to update their information in one place (e.g., a government-sponsored blockchain).

If provider directory blockchains could be linked to other data such as physician disciplinary actions (e.g., probation and/or suspended or revoked licenses) and physician death notices, the provider directory data would be even more useful and accurate. Network adequacy managers could also be alerted to these changes and make necessary updates to the provider network.



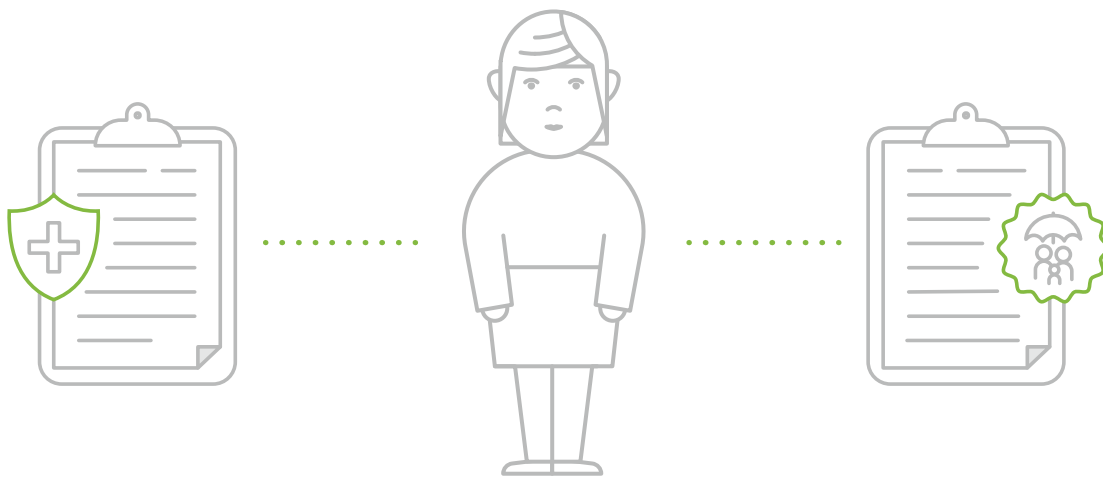
Feasibility

Challenges specific to provider directories—such as verifying the accurate identification of physicians accepting different insurance plans at different sites of care under the same ID number—would still need to be addressed.

Health insurance-specific potential implications	Life insurance-specific potential implications
<ul style="list-style-type: none"> ▶ More easily and accurately find in-network providers, leading to increased member satisfaction and, possibly, retention. ▶ Reduce expenses related to fielding member questions and reconciling provider bills. ▶ Avoid government fines for out-of-date information posted on insurer websites. ▶ Ensure network adequacy requirements are met. 	<ul style="list-style-type: none"> ▶ More easily and effectively manage the network of providers conducting medical tests for life insurance applications.

Consumer considerations: Improving customer experience while enhancing policy value

Simplifying the application process by making it more client-centric



The problem

The life insurance application process can be difficult and time consuming when it comes to gathering past health information and requiring new medical tests for underwriting and pricing. Indeed, a 2014 study by LIMRA, a life insurance research association, revealed that 70 percent of those who purchased coverage through their employer (group life, in which there is little-to-no individual underwriting involved) said they were happy with the process and even described it as “comfortable.” However, a more recent LIMRA report suggested those who try to buy individually underwritten life insurance policies on their own are far less pleased with the experience—in fact, many described it as intimidating.⁹ Individual applicants are, therefore, more likely to pass on a policy; in part because they perceive “no current benefit” for enduring such a complicated and often uncomfortable purchasing process.

These kinds of customer experience challenges have been stunting life insurance sales growth, resulting in a large segment of the US population being under- and/or uninsured (with nearly one third of Americans believing they need more life insurance, according to LIMRA¹⁰). Carriers, meanwhile, are in perpetual pursuit of a “silver bullet” to attract new business.

Shopping for health insurance can also be complicated and challenging for consumers. One survey of organizations assisting individuals looking to buy coverage reported that 74 percent of those they worked with needed help understanding basic health insurance concepts.¹¹ Furthermore, accessing health information is notoriously difficult, and has been named among the biggest obstacles in providing effective health care today.¹²



Why blockchain?

Providing an easier-to-access, more comprehensive set of medical records on a blockchain could infuse comfort and peace of mind into what, for many, is now an intrusive and often discouraging application process. Beyond the benefits of operational efficiency and cost savings cited earlier, a blockchain-facilitated, interoperable health data repository can potentially become a lynchpin for insurers to enhance customer experience and strengthen relationships. Such a transformation could help grow the overall pie of insured consumers by convincing a higher percentage of prospects to start and complete a faster, more user-friendly application process, ultimately increasing the ranks of those with life insurance and improving the experience of those shopping for health insurance.

With the entirety of a consumer's medical and wellness records consolidated in a series of blockchains, the life insurance underwriting and application process could be whittled down from an

average 45 days to near-real-time. Health insurers could obtain secured, verified patient information far more easily, making the addition of new policyholder information to the ranks of an insurer's records much faster and easier, while lessening the burden on the consumer to collect and provide detailed sensitive information.

This could help lower the uninsured population. Deloitte's work on life insurance underwriting—tapping existing sources of electronic data—suggests that the likelihood of prospects buying a policy once they apply increases from about 70 percent to nearly 90 percent as the underwriting and application process gets closer to real time. And this percentage doesn't even consider shoppers who might be more likely to submit an application if they don't need to take additional medical tests and the process is faster and relatively painless, as well as those who might buy coverage because blockchain is accepted as a more secure digital lockbox for private health information.

In addition, moving to a blockchain-based system may allow more carriers to directly own the client relationship while supporting a wider variety of consumer-driven purchase options. Indeed, blockchain's ability to validate and execute transactions without an institutional intermediary may make consumers more likely to seek emerging arrangements to buy individual life insurance, such as:

Online insurance markets

Blockchain could be deployed to accelerate the development of web-based portals for life coverage, combining centralized customer records, advanced analytics, telematic transmission of wellness information, and third-party data to dynamically profile and recommend insurance products best suited to each consumer. Prospects could more easily shop for individual coverage on their own via these virtual exchanges by providing access to their blockchain-protected medical and wellness histories, or allow an online insurance navigator access to their blockchain to assess policy options among a variety of carriers. Given blockchain's capability to automatically execute coverage terms and conditions through smart contracts, increasingly data-driven, technology-savvy, "do it yourself" shoppers could more easily compare and purchase insurance on their own, while perhaps seeing lower premium costs due to the elimination of brokerage services. Blockchain could increase the security and even the usability of health insurance exchanges by enabling sensitive information to be entered, accessed, and processed quickly and efficiently.

Peer-to-peer exchanges

Blockchain could support the formation of more alternative risk transfer vehicles, such as peer-to-peer (P2P) or crowdfunded insurance exchanges. These emerging, mutual-risk-pooling arrangements are actually a throwback to the insurance industry's original business model. However, blockchain may help these new grassroots online arrangements unite a broader segment of consumers that seek standard or customized insurance products by more reliably and transparently recording and storing medical information, activities, and transactions, and by using smart contracts to enforce and automatically fulfill obligations when prearranged conditions are met. Moreover, blockchain's encoded rule sets allow decentralized transaction execution, supporting a more cost-effective and efficient insurance process.



Feasibility

Making blockchain a viable and value-added component of the health and life insurance application process will require consumer and provider education, and investments and cooperation among the numerous stakeholders involved in generating, collecting, and leveraging health information for insurance and non-insurance purposes. Moreover, blockchain and smart contract integration is just one piece of a much larger puzzle to build streamlined application systems and more formidable online insurance exchanges and P2P entities. From a purely record-keeping, data security, and contract execution perspective, however, blockchain has the potential to provide a significant upgrade for insurers from current transactional capabilities.

Health insurance-specific potential implications	Life insurance-specific potential implications
<ul style="list-style-type: none">▶ Diminish complexity and discomfort in the current application process.▶ Bolster data security and alleviate privacy concerns.	<ul style="list-style-type: none">▶ Diminish complexity and discomfort in the current application process.▶ Help compress the average 45-day application and underwriting timeline to near-real-time.▶ Encourage a higher percentage of prospects to begin and complete the application process.▶ Decrease costs by limiting time and required tests, while opening the door to disintermediation in distribution.▶ Bolster data security and alleviate privacy concerns.▶ Improve prospects for online navigators and/or P2P insurance exchanges.

Facilitating a dynamic insurer/client relationship



Why blockchain?

EHRs securely stored on a smart-contract-administered blockchain could be the foundation for integrating a wide variety of wellness-related behaviors into the insurer/client dynamic. In this sense, blockchain could be used not only as a secure repository for past medical history to allow for faster underwriting and pricing, it could also store near-real-time data about the policyholder's lifestyle and fitness via telematic devices monitoring their everyday activities. In this way, life insurers could continuously reassess a person's risk profile and adjust the cost of coverage accordingly with incentives such as premium adjustments, discounts for exercise or diet achievements, or even gamification-driven competition. Health insurers, in turn, could use such telematics data to support wellness programs and trigger discounts on premiums.

Blockchain's architecture positions it to more effectively integrate the rapidly growing number and types of health and wellness information sources than a more traditional, widely dispersed, and often siloed digital infrastructure. An interoperable blockchain medical record could be securely updated with diversified, lifestyle-related data points in near-real-time, thereby driving more frequent risk reassessments and enabling dynamic life insurance premium pricing (Figure 2). Life insurers could potentially harness such ongoing data to incentivize risk-reducing behavior on an individualized basis, thereby encouraging consumers to make more informed, healthier lifestyle choices by aligning with and offering promotions for relevant vendors (gyms, nutrition facilities, spas, etc.). Carriers also might be better able to offer unbundled, flexible, tailored policies.



The problem

Establishing strong insurer/client relationships has been problematic, given the dearth of touchpoints in the life insurance product lifecycle and the sometimes difficult and stressful interactions surrounding health insurance claims. Term life insurance, in particular, tends to be a static, one-dimensional product—when the policyholder dies, it pays out, or when the term expires, it lapses—otherwise there is little interaction once the sale is closed except for periodic premium payments. With no regulatory requirements compelling its purchase and little incentive other than providing death benefits, term life insurers remain hard-pressed to drive sales growth. In fact, to those who are younger and healthier, life insurance (and perhaps even health insurance) may appear to be low-return, high-cost products that offer little relevance in a policyholder's daily life.

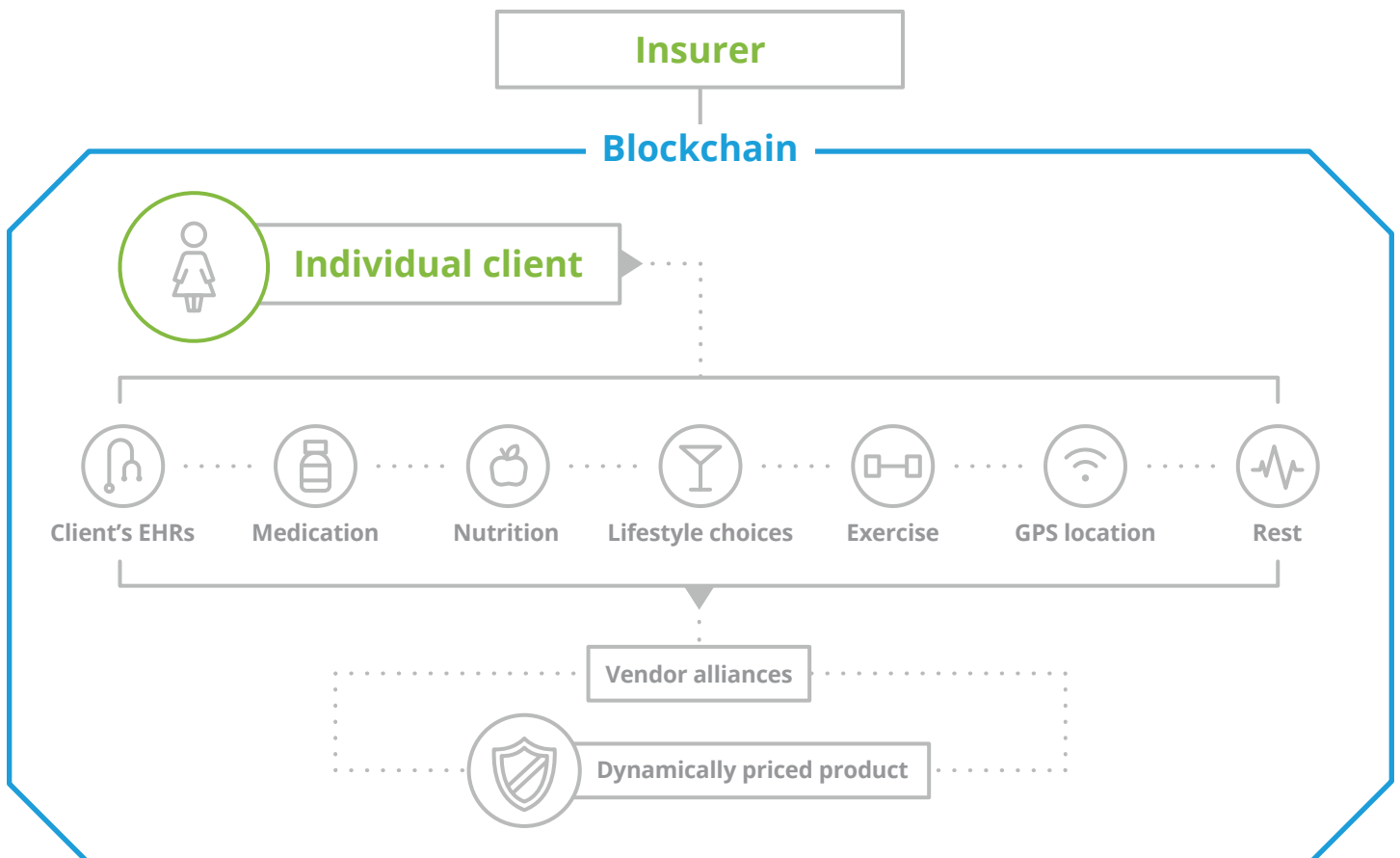
Last but not least, such real-time data collection could be tied into health insurance smart contracts to remind policyholders to take medications and schedule checkups. Data collection could also trigger contact from a wellness coach or medical care provider if changes in heart rate, blood pressure, or other factors set off alarms.

The blockchain-facilitated data repository, in tandem with advanced analytics and real-time data sources, can potentially make owning life and health insurance a more integral part of a policyholder’s lifestyle. For traditional term life insurance, in particular, a policy could be transformed from a product focused on the inevitability of death to one emphasizing the path towards a healthier, longer-lasting “policy for life.”

Similarly, instead of interacting with their health insurance only when paying premiums or addressing illness or injury, consumers could develop a positive relationship with their carrier. If exercise and staying active results in immediate and tangible benefits—such as discounts on premiums or reduced deductibles—consumers could associate health insurance with wellness and benefits instead of illness and medical expenses. In turn, insurers could benefit from developing a healthier, more risk-averse book of business.

Looking at the bigger picture, leveraging blockchain and smart contracts to underpin ongoing, interactive, value-added client relationships could encourage more individuals to purchase coverage and stick with their insurer once they do (particularly if points generated in rewards programs are at risk if a policyholder changes carriers).

Figure 2. Blockchain facilitates dynamic pricing and lifestyle benefits



Source: Deloitte Center for Financial Services.



Feasibility

While the addition of real-time information may help minimize arbitrary pricing decisions and set the stage for a more engaged client relationship, this cannot be accomplished by blockchain alone. Granular lifestyle data points—whether uploaded manually or collected automatically via sensors tied to the Internet of Things (IoT)—will need to be seamlessly harnessed and stored in the blockchain and turned into effective customer insights and incentives. In addition, the prospect of 24/7 monitoring and penalizing those who do not maintain healthier lifestyles could prompt some consumers to reject such offerings altogether, while insurers could face new regulatory constraints to protect the interests of users and non-users alike.

Health insurance-specific potential implications	Life insurance-specific potential implications
<ul style="list-style-type: none"> ▶ Facilitate insurer wellness programs. ▶ Establish a more secure data repository for medical and wellness information. ▶ Trigger alerts to take prescriptions or make regular doctor visits or diagnostic tests. ▶ Promote healthier lifestyles, driving down medical loss costs. ▶ Enable insurers to learn more about their policyholders. 	<ul style="list-style-type: none"> ▶ Facilitate continuous underwriting and pricing assessments. ▶ Establish less arbitrary, more up-to-date risk pooling. ▶ Enable services geared towards lowering risk and improving lifestyles and longevity. ▶ Promote sales growth and strengthen policyholder loyalty. ▶ Allow for more personalization and individualized coverage. ▶ Enable insurers to learn more about their policyholders.

Leveraging blockchain and smart contracts to underpin ongoing, interactive, value-added client relationships could encourage more individuals to purchase coverage and stick with their insurer once they do.

What should insurers be doing about blockchain?

Blockchain could be the catalyst of a profound restructuring in how health and life insurers access and leverage medical data and other information. It can reduce friction in the health care system by eliminating duplicative administrative processes among insurers and providers, such as the need for multiple patient or provider IDs. In addition, blockchain can help insurers lay the foundation for an entirely new relationship with policyholders—one that is interactive, multifaceted, and of greater value to both parties. Ultimately, integrating blockchain applications could give a boost to an insurer's bottom line by saving money, increasing sales, and improving retention.

A recent report by Deloitte and the World Economic Forum examined how blockchain's distributed ledger technology could impact the future of financial services, including insurance. While cautioning that blockchain is "not a panacea, and should instead be viewed as one of many technologies that will form the foundation" of the industry's "next-gen infrastructure," the authors asserted that blockchain will "redraw processes and call into question orthodoxies that are foundational to today's business models." The report also noted that realizing blockchain's full potential will "require deep collaboration between incumbents, innovators, and regulators."¹³

The expert participants and analysts taking part in Deloitte's crowdsourcing exercise drew similar conclusions. They foresee a confluence of trends that underscore the urgency with which insurers should be developing blockchain technology:

- ▶ Insurers face intensifying pressure to reduce administrative costs, an area where blockchain might make a big impact by modernizing fragmented legacy IT systems, improving efficiency, and bolstering competitiveness.
- ▶ The insurance industry's aging workforce necessitates pursuing increased automation, which can be enabled by blockchain capabilities.
- ▶ New systems, processes, security protocols, and business models are needed to respond to rising customer expectations for tailored services, heightened privacy, innovative products, added value, and competitive pricing from their insurers.

Based on our crowdsourcing exercise and analysis, health and life insurers should consider a number of factors when looking to launch blockchain and position themselves to be among the early beneficiaries of potential use cases. Among them:

- ▶ Existing IT departments may not have the manpower or expertise to get blockchain off the drawing board and into the field. Therefore, insurers should identify and perhaps even invest in potential technology partners on blockchain's cutting edge, as well as consider engaging with outside experts in blockchain development.
- ▶ To realize blockchain's full potential as a business transformation opportunity, insurers will need to leverage a number of other technologies in tandem, including advanced analytics, artificial intelligence, and IoT, as well as collaborate with a wide range of stakeholders.
- ▶ Individual insurers and the industry as a whole should proactively work with broader health care consortiums to make sure the development of standards facilitating blockchain-enabled interoperable data repositories meets their own long-term commercial interests.
- ▶ Insurers should strategize, experiment, and develop proofs of concept to leverage blockchain to create next-generation products and services featuring more interactive relationships with their policyholders, while future-proofing against encroachment from other industry sectors and non-traditional competitors.

Health and life insurers should be bold when it comes to blockchain. The greatest opportunities may extend beyond making incremental improvements in current business models to harnessing blockchain's unique attributes to create entirely new types of interactive policies and launch innovative services that add value and grow the business.

Appendix: Blockchain for beginners

Blockchain, the technology underlying the crypto currency bitcoin, is a distributed ledger where multiple parties can see and add information transparently and securely. It is distributed in that identical copies of the blockchain are kept on multiple computers owned by different entities (in a public blockchain).¹⁴ Data is exchanged, verified, and stored in fixed structures called blocks, and each copy of the blockchain independently validates new blocks before adding them to the chain. For a visual depiction of blockchain in action visit

www.deloitte.com/us/blockchain-in-action.

To maliciously alter a blockchain, a hacker would need to change the block that the data is on, as well as all the blocks that are connected to it. In addition, every other copy of the blockchain would also need to accept the change, or be changed by the hacker—a much more difficult endeavor than targeting a single location. Thus, a blockchain network is more secure and can reduce fraud.¹⁵

Blockchains are also unique in that they can independently verify information. Some types of blockchains allow decentralized applications, known as smart contracts, to be built to automatically execute actions based on blockchain activity. Predetermined parameters are defined, and when an event occurs on the blockchain that meets the parameters, next steps are triggered. For instance, if a patient is seen by a physician, and the visit is confirmed by data entered into the blockchain, then a smart contract can initiate automated payment to the provider. Smart contracts cannot be altered and are inscribed within the blockchain, ensuring that they can be trusted. This lessens the need for traditional intermediaries such as banks, insurers, or clearinghouses to broker relationships between parties that do not know each other.

Finally, blockchains can be public (anyone can add to and participate in the consensus process to validate data), limited to certain parties (in a consortium), or completely private (requires permission stipulating the ability to view, add, and participate in the consensus process), providing a variety of options for users.

Examples of blockchain use cases being piloted today (beyond bitcoin)

Global payments	Trade finance	Automated compliance
Enables the near-real-time, point-to-point transfer of funds between financial institutions, removing friction and accelerating settlement.	Enables real-time, multiparty tracking and management of letters of credit, as well as faster automated settlement to facilitate commerce domestically and internationally.	Provides faster and more accurate reporting by automating compliance processes that draw on immutable data sources.

Source: World Economic Forum/Deloitte, "The Future of Financial Infrastructure: An ambitious look at how blockchain can help reshape financial services," August 2016.

For more information on blockchain:

- ▶ "Beyond Bitcoin: Blockchain is coming to disrupt your industry," Deloitte University Press¹⁶
- ▶ "Blockchain: Enigma. Paradox. Opportunity," Deloitte, LLP¹⁷

Endnotes

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