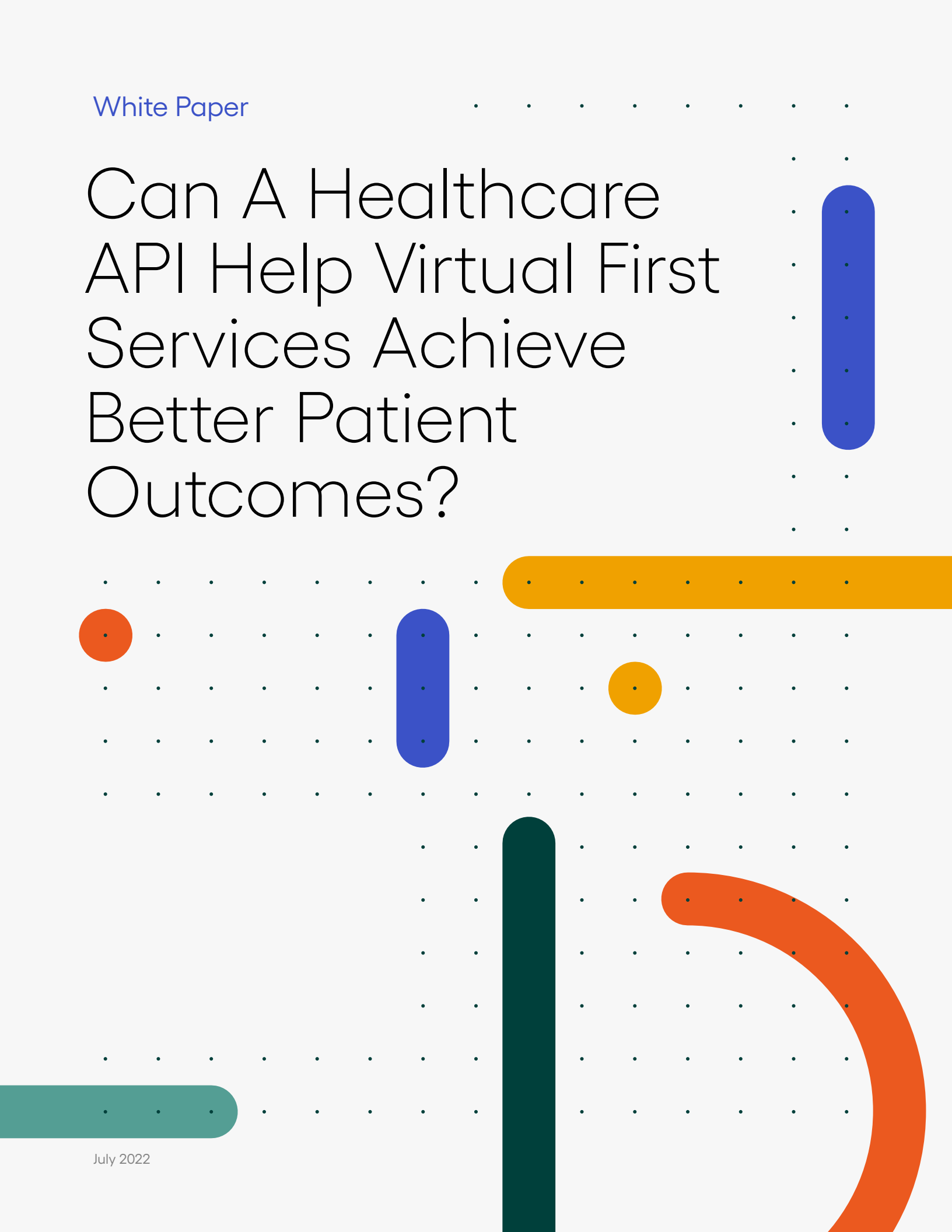


# Can A Healthcare API Help Virtual First Services Achieve Better Patient Outcomes?





## Executive Summary

This white paper discusses:

- How patient data helps virtual first services achieve better care outcomes.
- Why APIs are important, and why they matter.
- How virtual first services are using healthcare APIs to improve outcomes today.

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Unless you're treating a newborn, all your patients have one thing in common: years of past medical history.

Does prior medical history make a difference when providing care? You bet! Expensive new procedures are frequently used to find answers that historical patient data already contains.

Better access to data can improve efficiency and care. But how realistic is it to search for the details of an -otomy or -oscopy from 10 years ago? Could you imagine getting useful medical data from your patients' current and former providers? Tapping into a lifetime of health records sounds like the stuff of science fiction - but it's happening now.

Virtual first services can access vast quantities of data on their patients through healthcare application programming interfaces, or APIs. Encounter data, diagnoses, providers, symptoms, vital signs - these data points, used in intelligent ways, can enable providers to better understand the risk, gaps of care, and beyond, of large numbers of patients under care.

The most advanced API platforms can locate patient data from across the country; standardize it so that it's easy to leverage; and surface the most relevant insights. This information helps treatment providers track, quantify, and improve care outcomes.

In fact, it's possible for providers to narrowly follow specific aspects of a patient's care - or coordinate a patient's entire care journey - with incredible speed and scope, using an API.



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Aggregated, ongoing patient information provided by an API can immediately improve the treatment workflow of any healthcare organization. Healthcare APIs make it easier to transition stakeholders away from legacy healthcare delivery. Seamless access to patient data makes it simpler for new clients to sign up for a virtual first service. Ongoing intake of patient data helps virtual first services predict and respond to issues quickly.

Studies also show that a strong patient-doctor relationship, in which the caregiver is familiar with a patient's health history, is the strongest indicator of quality care and patient satisfaction. This relationship outweighs the impact of cost, convenience, or digital accessibility on care effectiveness.<sup>1</sup>

Together, these data applications will help your virtual first organization improve care quality and care documentation across the entire healthcare experience. Virtual first providers with access to medical history ultimately exercise increased control over patient outcomes by maintaining the most comprehensive possible overview of their health.

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# What Are APIs, and How Are They Used in Healthcare?

Health tech companies may identify as virtual care, remote patient monitoring, or telehealth organizations. It's crucial for all these groups to know the following digital health concepts.

## Application Programming Interfaces (APIs)

Application programming interfaces, or APIs, are very widespread today. They're a standardized set of commands that allow different applications to connect and securely exchange data.

For example, when a social media app wants to post a message to your LinkedIn account, it uses LinkedIn's API to send the contents of that message to LinkedIn's servers. It's faster and more error-proof than getting an app to load LinkedIn's whole website.

In healthcare, APIs are used for many purposes. Electronic medical record (EMR) app marketplaces have imaging tools, staff schedulers, research platforms, communication modules, and more. These apps either extend their functionality into the EMR, or pull data from the EMR, by using the EMR's API.

APIs can serve more complex functions as well. A telehealth platform will start a video call by connecting to a video conference tool like Zoom, using Zoom's API to launch a Zoom call inside their own platform. APIs can add functionality above and beyond what you'd expect from a standalone virtual first platform.

With APIs, benefits can be realized with minimal testing; these software add-ons are largely prebuilt and preconnected. They're an exciting way to add world-class capabilities to healthcare tools.

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## Types of Patient Data

Healthcare providers generally must share any patient data following an authorized request.<sup>2</sup> Patient data includes information like clinical notes, discharge summaries, vital signs, medications, and more.

**Fax machines** and manual methods of data sharing are widely used, but frowned upon by most 21st century users. They make data hard to synchronize and create headaches for patients and providers alike. Some providers default to faxes as a familiar way to share data in a HIPAA-compliant manner, and while medical practices store records electronically, they frequently lack the know-how or trust to digitally transfer those records. Unfortunately, that keeps faxes going. Even “public health departments have made clear they don’t accept certain information by email,” STAT News shared, “forcing Lemonaid, a [virtual first] startup, to acquire a fax machine.”<sup>3</sup>

**C-CDA** is an older standard, and the most common format for sharing digital health records. Some of the challenges in using C-CDA for advanced applications are that it’s generally read-only, and that there’s no way to selectively intake data without converting the format. It’s slowly being phased out - recent nationwide programs require both providers and insurers to share FHIR-based records.<sup>4</sup> Even the iPhone’s personal health record can’t take C-CDA input.<sup>5</sup>

**FHIR** (pronounced “fire”) is the newest major patient data standard. FHIR has several advantages over previous interoperability efforts, and FHIR’s regulatory support is unmatched. It allows developers to process data using modern languages like JSON; it permits flexible data sharing instead of rigid read-only formatting; and it is the only standard that allows true bi-directional interplay between EMRs. FHIR makes it easier for patients to move their health data, and for organizations to use that data at scale.



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## Interoperability

APIs are leading to interoperability, a long-sought healthcare goal. Interoperability means that care coordination and record sharing are preserved no matter where a patient gets care, or where their health data is generated.

“Interoperability’s assistance in building something new is akin to when Plaid opened up banking data to groups like Venmo, Mint and Robinhood and a sort of *Hunger Games of FinTech* innovation sequence took place — a FinTech Renaissance that championed the consumer. Interoperability promises us in healthcare what Apple did so well in technology — it strengthens the pull with each newly connected service, device or solution.”

– Troy Bannister, CEO of Particle Health<sup>7</sup>

Modern interoperability has progressed in distinct stages, culminating in the networked possibilities of today. First came 1:1 digital integrations, such as connecting hospitals to specific databases. That was followed by a nationwide push for the “meaningful use”, or substantive adoption of, electronic health records. Around the same time, HIEs and other databases which collect that electronic health information appeared. Finally, EMR companies and other vendors worked to develop bidirectional sharing capability - where data is passed, received, and synced up - through both proprietary methods and the use of the open source FHIR data format.

The surge in pandemic-driven health tech development has accelerated the growth of a lasting, organic interoperability infrastructure driven by provider demand. As a result of these many technical and policy changes, healthcare APIs can offer virtual care platforms a way to easily connect to these newly-accessible stores of invaluable patient data.

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## Health Information Exchanges/Health Information Networks (HIEs/HINs)

These national non-profit networks-of-networks either store medical records, or point to where medical records exist. Nearly all Americans have medical records in these databases. They're a key part of interoperability infrastructure.

Anyone can query these networks, but providers and EMRs only respond to a narrow set of requests. Due to the amount of sensitive information they contain, it's prohibitively difficult for most organizations to search them effectively. However, healthcare APIs which specialize in data access can query these networks on behalf of treatment providers.

### The Current State of Health Information Networks

Some regions rely on HINs that may, or may not, eventually share information with national HIEs. New York alone has seven different HINs that providers can connect to. Particle's industry-leading network puts these different sources together. It has access to over 90% of EHRs, finds records for about 90% of patients, and finds an average of over 100 C-CDA records per search.

## Patient Profiles

No two patients are alike, even if they're managing the same chronic condition. To move away from one-size-fits-all treatment, healthcare researchers have developed patient profiles, which identify subgroups or archetypes for chronically ill patients based on the characteristics they do share. Patient profiles are thought to “combine the advantages of maintaining a certain level of standardization with the benefits of increased individualisation and patient participation”.<sup>6</sup>

With sufficient data, patients can be mapped to a patient profile that indicates the trajectory of their condition, and their care needs. Patient profiles help providers identify relevant shared characteristics in vulnerable populations. Today, virtual first clinics and value-based care organizations use this concept to efficiently make care decisions.



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# Why APIs Now?

As of April 2021, new anti-information blocking rules require all healthcare providers to rapidly exchange patient records, in machine-readable formats, upon request.<sup>8</sup> Patients or their doctors may request this information. Now, after years of developing the infrastructure for data exchange, healthcare APIs can access enough data to match their full potential.

Instead of encouraging providers to share information without a legal mandate, HHS is scheduled to strictly enforce information sharing in 2022. They're pairing info blocking rules with penalties of up to \$1 million per violation.<sup>9</sup> They've even opened an online rule reporting form to the public.<sup>10</sup> The vigorous government response against info blocking ensures individual and network access to patient data is being taken seriously.

A healthcare API can find patient data by:

- Turning a patient's demographic information into a format that's compatible with national HIE networks;
- Querying the the right health information networks and EMRs - regional and national databases - for a demographic match;
- Downloading and returning the patient's information from EMRs and other endpoints listed in those databases.

When a healthcare API delivers consistent access to trustworthy records, it allows for the development of results-oriented workflows. Essentially, patient data enables care providers to proactively address care outcomes.

Virtual first services have to think strategically about ways to drive behavioral change with patients who don't always appear in person. Putting patient data at the forefront of virtual first care turns these tele-challenges into tele-strengths.

The pandemic-fueled explosion of telehealth services has shown that the virtual first care model is here to stay. But pandemic-era rules exemptions are going away, and now virtual first services will need to integrate into the larger health system to grow. With enough medical history on hand, even a brand new healthcare organization can effectively manage a patient's whole healthcare experience.

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## Data Depth and Breadth

A healthcare API can turn external EHRs from black boxes into helpful tools that allow robust patient monitoring. Virtual care teams can pull together updates on vitals, labs, and social determinants of health over time.

Healthcare APIs will find data that corresponds to the USCDI, a standardized set of data elements like patient names and medication lists which are the baseline standard for what different health tech tools and data formats generally have to support.

### **Encounter information that providers currently get from APIs can include:**

- Lab tests
- Diagnoses
- Imaging results
- Immunizations
- Allergy lists
- Medication lists
- Treatment plans
- Discharge summaries
- Biometrics  
(e.g. BMI, weight, temperature at visit, blood pressure)

### **On a representative sample of 700 patients that Particle found data for:**

- 99% had observation data available  
(e.g. labs, biometrics, social history, SDOH)
- 99% had encounter information available  
(e.g. hospital visit, surgery, office visit notes)
- 97% had condition/problem list history available
- 96% had medication list information  
(e.g. previously administered or currently taking)
- 80% had immunization history recorded
- 71% had allergy information available

Most API data comes from the mid-2000s and beyond, although Particle has also captured data going back decades.

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# Outcomes-Driven API Applications in Virtual First Services

## Aligning Care to A Patient Profile

Chronic condition management no longer requires sorting through extensive, irrelevant data. Instead, virtual first services can use a healthcare API to strategically pull condition-specific data sets that matter to their organization, and align care plans in clinically-recommended ways from the start.

Care teams can design comprehensive patient profiles by thoughtfully choosing the biomarkers, diagnoses, and medications that are most important to have a handle on. These profiles have consistently been shown to predict care outcomes and utilization for a variety of chronic conditions ranging from home care needs to heart disease severity.<sup>11,12</sup>

- **Choose the Right Data** - A service that offers diabetes management can extract updated A1C values, GFR levels, age, and BMI out of years of medical records; a service that enables cardiovascular care can chart blood pressure, ejection fraction, cholesterol, and HDL/LDL content on an ongoing basis.
- **Reduce Redundant Labs** - Getting laboratory results over time can indicate the progress of a condition, instead of requiring organizations to start testing from scratch. By reducing costly duplicative care, outcomes improve in several ways. Less time is wasted, less money is spent on services, and patient satisfaction increases.
- **See the Whole Picture** - A holistic care record provides better insight than a one-time snapshot. Ingesting patient data allows providers to get a picture of disease progression over time, leading to better treatment decisions.



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## Quickly and Accurately Identifying Patients In Need

With API connectivity, virtual first services can find and focus on patients that require services, before they end up in the ER. This way, if someone on your platform is trending in the wrong direction, you'll be able to act on it in real time. With a healthcare data API, every connected lab and pharmacy becomes part of your network.

Having a 360° overview of patient health helps healthcare providers make connections from isolated encounters. Continued monitoring with a healthcare data API lets your organization keep a central role in the health of your patients, by staying on top of new developments in their lives.

### Reduce Readmissions

If a patient is discharged from acute inpatient care, or if they've suddenly increased their use of health services, you won't have to learn about it weeks later. A healthcare API can return discharge summaries and care plans after a hospital admission. Looking for patient data helps providers deliver relevant, effective care that keeps patients safe at home after their hospital stay.

Care teams have been able to identify vulnerable patients in subtler ways too, like by directing resources to patients with the highest risk profile.<sup>13</sup>

### Close Care Gaps

Virtual care startups can even use patient data to specialize in a single use case. If a former smoker has gone too long without a lung cancer screening, you can easily highlight this important checkup. If a high BMI adolescent has gone too long without an appointment for obesity management, you can make that connection too. One preventive care management startup, for instance, simply uses an API to detect and alert patients that are in need of their annual wellness visit.



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# Managing Data Uniformly and Efficiently

Relying on a healthcare API as a primary data source simplifies the process of collecting patient data.

Managing multiple data sources can become prohibitively complicated and expensive for a healthcare organization to maintain. Different data sources can require IT teams and clinicians to spend a prohibitive amount of time cleaning data.

## Standardize Data Inputs

Plenty of providers will share similar-looking C-CDA documents. However, each provider organization has a different standard for how and where they'll list elements like conditions and patient notes. In contrast, a good healthcare API will remove duplicate entries and share information from various sources in a uniform way. For networked data to be usable with minimal human intervention, virtual first organizations will need the information they collect to be as uniform as possible.

## Make Outcomes Measurable

Documenting outcomes is almost as important for any organization as the work itself. Specific value-based care measurements, like federally-recognized HEDIS and RAF scores, rely on accurate data. But human error, like forgetting to input information, has been known to negatively impact these scores.<sup>14</sup> Maximizing insights from clinical data helps care organizations identify improvements and provide personalized, accurate treatment.

## Access Data Easily

Data needs to be delivered reliably to count. It shouldn't matter which HIE your patient's records are stored in; for example, Particle enables care organizations to pull records from all databases through a single API connection. There are other APIs that offer similar functionality, though they require organizations to maintain multiple API connections. Other historic engineering barriers to interoperability, like returning updated data back to networks, can now also be handled by select API platforms.

When a healthcare API delivers high quality data to an organization consistently, the thinking goes, then care teams can build dependable solutions without bending over backwards to accommodate the format that data comes in.

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## Accelerating Comprehensive Patient Onboarding

Healthcare APIs lead to a fast, digitally-native onboarding experience. They efficiently aggregate a patient's scattered healthcare information with minimal effort.

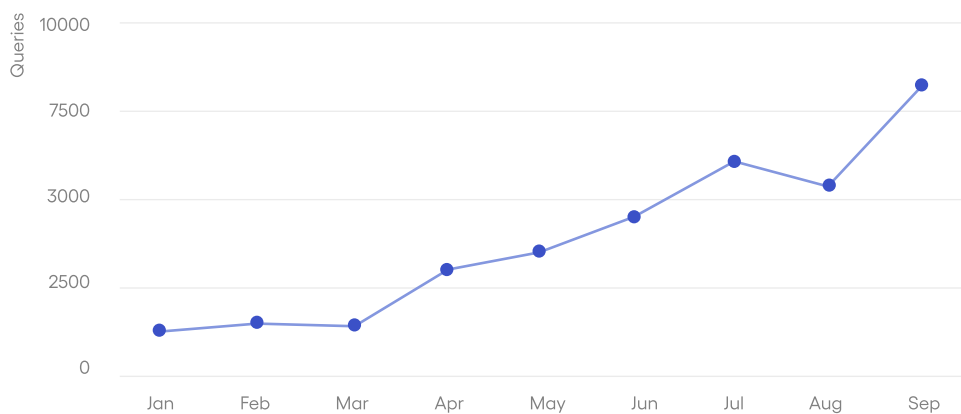
“The more compelling the first impression [virtual first] tools create, the likelier patients and physicians are to engage with them.” writes the *Harvard Business Review*, encouraging an instant onboarding experience.<sup>15</sup>

A clinician can review the patient's data manually before their first visit, assisting with chart review. This clinical data gives virtual first organizations a head start on care planning. It lets doctors strategize how to treat the patient before their visit.

Providers won't need to guess which medications the patient is on, and how long they've been on them. They'll spend less visit time reviewing history, and will come pre-prepared with better care recommendations. If imaging or lab work is needed, organizations may even be able to schedule it in advance.

Onboarding is an in-demand way to integrate API use in a healthcare organization. It's a popular way to get started because providers and back office staff recognize the value of data for new patients. The graph below shows a typical 300% increase of API queries over 6 months at a real healthcare system that increasingly relied on a healthcare API for patient intake.

### Healthcare System Onboarding Query Demand



An expanding network of healthcare providers used a healthcare API to find externally hosted records during the new patient intake process. Over 8 months, they rolled the healthcare API out to all of their locations.

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## Coordinating Care Through Return Platform Visits

Stickiness is a very desirable trait for digital platforms; a sticky product is one that users like to use and can't easily replace.<sup>16</sup> Getting updates on patient data will make your platform sticky for:

### Care Teams

Getting providers to really embrace a platform is no easy feat. They're focused on care, so they need a tool that's too good to ignore. Fortunately, patient data is valuable enough to draw their attention.

Deloitte's 2020 provider survey found that 76% of physicians believe they should play a prominent role in limiting unnecessary tests, but that they don't yet have the tools to do so effectively.<sup>17</sup> When it comes to care coordination, your business objectives, outcomes, and clinician's desires are aligned.

From reducing administrative work, to prompting conversations about care, data from the right API opens up plenty of opportunities for providers to spend their time more effectively with patients.<sup>18</sup> Since studies show that lack of time is the main factor keeping doctors from having empathetic interactions with patients; that longer visits are connected to better outcomes;<sup>19</sup> and that attempts at empathy are rated highly by patients,<sup>20</sup> administrative efficiency results in better care.

### Patient End Users and Caregivers

A December 2021 EY study found the two most common traits - by far - that consumers believed were important in digital first platforms.

One trait is reduced wait times - important to 48% of patients. That's followed closely by convenience - important to 46% of patients.<sup>21</sup> Pre-populated patient data positions your platform to deliver what consumers rate as high-quality care.

Impress patients, delight caregivers, and drive return visits to your platform by offering an accessible portal with pre-filled medical histories. Well-designed data sharing can be as much of a source of truth for patients as it is for healthcare providers, encouraging patients to take ownership of their care.

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### Backoffice Staff

Virtual first platforms may deliver value and drive costs down, but doing so is only half the battle. You'll also need to document the results better care quality and coordination purposes.

The more action that takes place on your platform, the more data you'll have to measure outcomes. Virtual care platforms that precisely study encounters will optimize their treatment plans, and do a better job of providing care.

Additionally, the trend towards value-based care (in other words, reimbursements based on care effectiveness) is tricky to navigate, but incredibly rewarding for organizations that understand it. The right data can help accurately assess and treat the patient. Documenting value-based care is a pipe dream for many smaller providers; having access to full patient data makes this opportunity possible.

Healthcare has seen perfectly functional tools come and go because those tools couldn't find traction with their busy and demanding audience - healthcare providers.

Importing data into your platform with a healthcare API protects you from operating a "ghost town" of great tools that don't get used. If you've built a great platform, patient data will help it reach widespread adoption.



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## Powering Evidence-Based Analysis

APIs deliver properly categorized data to use for population management. Manual analysis, machine learning, and AI can all work with API-powered patient data to:

- Find emerging conditions by combing through a patient's record for relevant health indicators.

A single isolated health record may not indicate much - but several related biomarkers may show if a person is at risk of a condition in advance. Researchers have used EHR data to predict conditions like Long COVID with surprising accuracy; startups can do the same.<sup>22</sup>

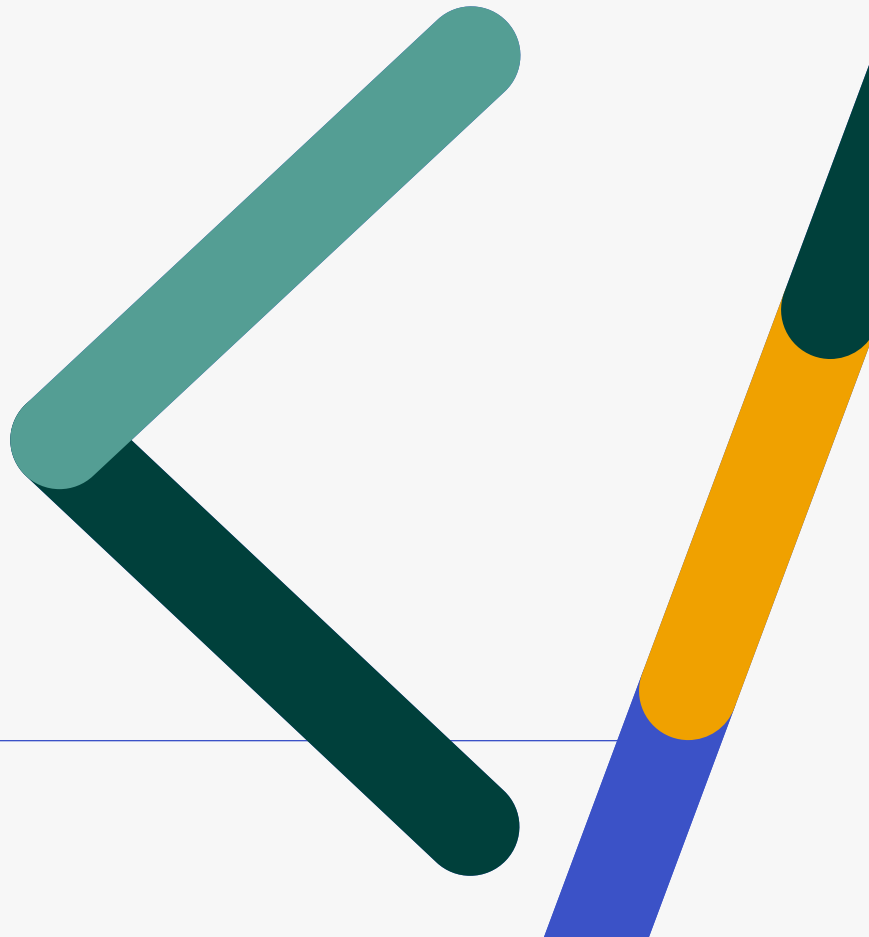
- Make better care recommendations, charting what works and what doesn't.

Virtual care platforms that examine their data can have robust conversations with providers. Telehealth giant Headspace, for example, uses patient data to "enable collaborative, measurement-based mental healthcare".<sup>23</sup>

- Be first in line to connect to new partners, including those payors and benefits platforms that are working towards interoperability through APIs. Integrating an API in a virtual care platform will lower the barriers to adopting new projects, tools and technologies.

- Particle has helped providers interpret data points that indicate:

- Triage priority for new patients
- A wide range of cancer risk biomarkers
- Potential allergies
- Drug interactions
- Diabetes progression
- Kidney health monitoring
- Genetic conditions to test for
- SDOH data that could interfere with care



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# Conclusions

**Connecting to a healthcare API is one of the first things that virtual care platforms should do.** A healthcare API can help inform the design of virtual first platforms and improve the efficacy of their care teams.

Over the past few years, regulatory and technological changes have made patient data, and ways to access it, exponentially more accessible. This readily-accessible patient data is at the core of virtual first platform advantages like care coordination, personalized service, continued optimization, and value-based care.

Services that aim to improve care outcomes are driven by high volumes of clean patient data at every step of the way. Onboarding, regular check-ins, and innovative services depend on a developer-friendly, data-rich API. Every virtual first organization should make healthcare API decisions now to take advantage of the recent explosion in data availability.

To find out more about how Particle Health can help your virtual first organization work with patient data, visit Particle's website or reach out to speak with a Particle expert.



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White Paper

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## About Particle Health

Particle is shaping the new standard for healthcare data exchange with a user-friendly API platform. We create intuitive experiences for developers, build scalable infrastructure that product teams love, and collaborate with innovative leaders launching data-driven healthcare solutions. Particle's API helps healthcare providers access data from over 70,000 health systems through a single integration — and FHIR-enabled medical records for over 270 million patients via a single query.

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