why clinical interoperability requires a single record, not a single system

athenahealth

Executive summary

A fundamental truth about medicine in 2018 is that providers need to see the whole picture of their patients to succeed in their care. And yet, lack of interoperability among systems and sites of care prevents this from occurring. As a result, care coordination remains one of the critical challenges for our healthcare system, impacting quality, cost, and satisfaction for patients, providers, and organizations.

Vendors and organizations have attempted to solve this challenge by investing massive amounts of time and money into implementing a single stand-alone enterprise software system across inpatient and outpatient settings. But the promise of a single-system solution falls short of meeting the needs of today's healthcare environment, in which patients seek care across an ever-widening array of settings.

A true longitudinal medical record requires information from across the continuum, including information from within the boundaries of the health systems' IT applications. However, it also must extend beyond health system boundaries, to include formal and casual affiliate providers, external labs, imaging centers, pharmacies, health information exchanges (HIEs), and drug registries — and, increasingly, self-reported patient data via browsers and personal devices. As researchers at UCSF's Center for Digital Health Innovation recently argued, "interoperability is a national priority precisely because no single vendor EHR system is comprehensive, and there must be interoperability across myriad data types, sources, authorized users, and use cases."[1]

"The promise of a single-system solution falls short of meeting the needs of today's healthcare environment, in which patients seek care across an ever-widening array of settings."

athenahealth is taking an ambitious, patient-centric approach to interoperability that enables collaboration across all care settings and organizational bounds. To realize this vision, we are continuing to develop a national, patient-centric network for our clients that is without precedent. This requires a unique combination of business model, technical architecture, and services that is differentiating within the current healthcare IT sector.

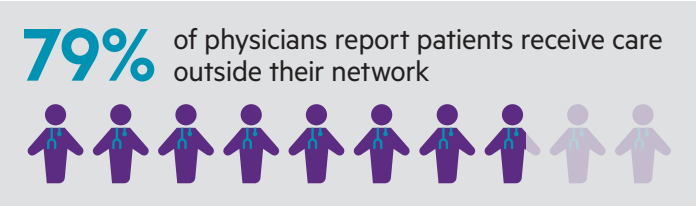
Across the healthcare industry and the U.S. government, there has been a push toward open data exchange across technology systems. Even the Centers for Medicare & Medicaid Services (CMS) has launched programs in 2018 that offer incentives for interoperability and penalties for data blocking.[2] Our ongoing work to advance clinical interoperability will enable more efficient and effective care delivery and organizational growth by:

- **Expanding data access across systems.** By building a national network that connects all providers, facilities, and relevant systems, we're giving providers industry-leading access to the data they need, regardless of the data source. In the process, we're creating a comprehensive, curated view of patient care.
- **Making data more useful for providers and organizations.** In addition to giving providers access to patient data, we also ensure that information is consumable, relevant, and impactful for providers and across organizations.
- **Empowering patients to be active participants.** By making it easier for patients and providers to collaborate, patients will be empowered to engage more actively in and contribute to the longitudinal view of their care.

This whitepaper lays out the current state of the industry for clinical interoperability; athenahealth's vision for the future; and how we're realizing this vision today and beyond.

The single-system approach: A false promise?

As healthcare has evolved and digitized, providers have struggled to maintain a comprehensive view of their patients' care. Some organizations have attempted to achieve this goal by implementing a single medical record system across their owned footprint. However, despite enormous investment, even the most successful organizations have fallen woefully short of this vision. And even if they achieved it within their organization, it wouldn't be enough: In a 2015 Epocrates survey, 79 percent of physicians reported that the majority of their patients also receive care outside their network.[3]



As we look at the root cause of many of the quality and satisfaction issues expressed by patients and providers, a consistent thread emerges: Lack of consistent, coordinated care across the entire patient journey, driving up costs while compromising quality.

Provider strategies that rely on the promise of a single system are attempting to solve the wrong problem. Organizations that follow this approach implement a single EHR vendor so that all providers have access to the same patient data within their health system. Instead, these organizations should be seeking a way to share patient data across all healthcare settings. As the delivery and consumption of healthcare evolve, a number of powerful forces are converging and conspiring against the single-system approach:

- **Care happens out of network.** Studies consistently show that, despite efforts by health systems to expand their owned footprints and keep care in network, a significant portion of care — more than 40 percent of referrals[4] — is consistently referred out of network.

- **Affiliated referral networks.** In any competitive market, health systems rely on receiving referrals from affiliated providers in their local area. athenahealth data shows that the average health system has 35 different affiliates and those affiliates use an average of five different EHR vendors among them.[5]
- **Explosive growth of convenient care.** The diffusion of care beyond traditional organizational bounds has been compounded by the explosive growth of convenient and retail care, which saw a 76 percent increase in visits between 2010 and 2015.[6]
- **Rise of HDHPs and consumerism.** The rise of high-deductible health plans (HDHPs) is empowering patients to shop for care and take their dollars to the lowest-cost, most convenient options with no regard for organizational bounds. The explosion of digital health technologies — including the ability to shop for appointments online through Google or Yelp — is fueling this movement and is only beginning to pick up steam.
- **Value-based care spurring new partnerships.** The shift to value-based care is stimulating the growth of community networks to effectively manage populations, requiring health systems to share data and coordinate care with a new array of community partners, including home health agencies, telehealth providers, community agencies, and departments of public health.[7]

In short, it is neither feasible nor economically tenable for an organization to "own" the full continuum for its patients, let alone to manage all care on a single software system.

The reality is that many organizations today employ a set of isolated systems that deliver a poor experience to both patients and providers. Clinical interoperability is the first step toward an integrated clinical experience in which providers can see all of the care that a patient has received. Achieving this state can close care gaps and eliminate redundant costs associated with unnecessary or duplicated care. The goal remains to create a unified longitudinal view of the patient's health data through which all members of the care team — doctors, nurses, patients, and caregivers — have access to the complete picture.

Achieving true clinical interoperability requires an approach that puts the patient, not the organization, at the center. Instead of trying to own and manage the continuum of care using a single system, organizations need to embrace open data exchange and adopt solutions that allow collaboration across systems and organizational bounds. The launch of new programs by the Centers for Medicare & Medicaid Services (CMS) highlighting government incentives for interoperability and penalties for data blocking is likely to accelerate this trend.[8] This requires vendors to be able and willing to connect and collaborate with any partner that will support providers and their patients in a better and more connected care experience.

With two EHRs, more meaningful data

Often, health systems will find themselves looking to consolidate multiple EHRs. At athenahealth, we worked with a multi-state health system to do the opposite: move all ambulatory medical groups from Cerner's EHR (and several others) to athenaClinicals, while keeping all inpatient settings in the health system on Cerner. Rather than reproduce all data in both EHR systems, we worked with the client to make sure the information surfaced in each care setting was meaningful to the providers using it, regardless of the EHR in which it originated.

1. **A holistic view of the patient.** We ensured clinicians had on-demand access to the full patient chart by building integrations to forward relevant data from athenaClinicals to Cerner's health information exchange (HIE), including any results transmitted through LabCorp and Quest Diagnostics integrations and those submitted by fax within the health system or from outside it.
2. **The right data for the right care setting.** We focused on smart data replication, rather than making all ambulatory and inpatient data available in both care settings, to give clinicians the information they need instead of overloading the patient chart with data that's not useful. That means alerting physicians when their patients are seen in an inpatient setting and making data like patient history and physical information available to clinicians in the hospital. We also made the ACOG prenatal form available in the hospital, surfacing it in expectant mothers' charts so that their obstetricians would have important information easily accessible when it came time for their delivery.

The athenahealth approach: Build a network to connect every clinical data source

At athenahealth, we believe that the only way to effectively achieve a unified longitudinal view of the patient's health data is to build connections to every data source that houses relevant patient information. We pull together information from all care settings to enable the presentation of patient information in a "single pane of glass" for physicians. As a result, physicians enjoy a superior experience, organizations have the visibility to maintain referrals within their local networks, and patients can be more engaged.

To achieve these goals, we are building a national network of healthcare that is advancing clinical interoperability by:

- **expanding data access across systems**
- **making data more useful to providers and organizations**
- **empowering patients to be active participants**

We lay out our goals for each of these themes in the sections below and highlight the milestones in achieving our vision in the timeline that follows.

A tradition of innovation

For 20 years, athenahealth has been focused on building a universally connected, national network that improves the delivery of healthcare.

2000
Offered the first single-instance, multi-tenant, cloud-based practice management and billing software, connecting all clients on the same network

2003
Leveraged HL7 standards to develop integrations with other EHRs to support revenue cycle management

2006
Integrated with health systems' enterprise master patient index and other hospital registration systems

2010
Integrated with health systems' ancillary systems, including labs and imaging

2012
Pioneered exchange of clinical data across community of care providers using state HIEs and community/health system HIEs

2013
Built global interfaces to national labs such as LabCorp, Quest Diagnostics, and BioReference

Proposed HIT Code of Conduct for data sharing and became founding member of CommonWell Health Alliance

2015
Introduced client self-service integration capabilities using API technologies

2016
Signed onto Carequality Interoperability Framework

Released athenaWell app, allowing care managers to share care plans with patients

2017
Enabled patient record sharing functionality to allow providers to send/receive records across EHRs

2018
Introduced comprehensive patient view across inpatient and outpatient settings in praxify

Recognized as most connected medical records vendor in CommonWell and Carequality networks, with 100% of athenaClinicals clients participating[9]

Joined Apple initiative to make health records available to patients

PLANNED
Will notify providers in ambulatory care setttings when patients are seen for inpatient/acute visits

Expanding data access across systems

To most effectively deliver high-quality care, health systems need to ensure their patients, providers, partners, data, and services are fully connected, and that providers have the most relevant and actionable information at their fingertips – regardless of the system in which that information originates. Providers need to be able to connect quickly and cost effectively to clinical systems to access and utilize essential information. EHR vendors can support these requirements today by providing plug-and-play connections to national networks, trading partners, and public health registries.

Care coordination across systems

Providers using athenaClinicals' patient record sharing functionality can easily access information across systems.[10]

Client adoption of...	CommonWell	Carequality
athenahealth	100%	100%
Epic	0%	95%
Cerner	30%	0%
eClinicalWorks	15%	15%

Choosing an EHR vendor with a national network is a powerful first step toward interoperability. There are also other industry-wide coalitions that can extend your connectivity even further, such as CommonWell and Carequality. However, many organizations that could take advantage of this connectivity fail to do so. KLAS Research analyzed nine major EHR vendors that have connected to CommonWell and Carequality and found that client adoption rates ranged from 1 percent of clients (GE Healthcare clients' adoption of Carequality) to 100 percent of clients (athenahealth clients' adoption of both CommonWell and Carequality). The EHR vendors that made it easiest for clients to participate in those coalitions had the highest adoption rates.[11]

What's the advantage of joining a network? By connecting to a national, single-instance, multi-tenant network, health systems can benefit from any global connection their vendor builds – through a single interface, all clients can connect to each outside entity. This architecture gives health systems access to a range of existing connections to hospitals, practices, labs, imaging centers, immunization and specialty registries, pharmacies, and more. Once connected to such a network, it's key that the vendor monitors clients' data exchange and ensures data is constantly flowing. As the network grows and more global connections are added, all clients benefit without doing any additional work. These benefits will only grow in importance as interoperability becomes increasingly crucial to delivering care.

The most valuable healthcare IT networks will be those that can assemble a universal patient record that supplements information from a provider's EHR with patient information drawn from claims, other EHRs, health app uploads, and patient-reported data entered across various IT systems. Once this is accomplished, arguments in favor of a single EHR system will be moot.

The most connected network in healthcare

athenahealth network connectivity has increased every year.[12]

How we're expanding data access across systems

At athenahealth, our ultimate goal is to maintain and update a universal patient record that supplements data entered into the athenaClinicals EHR with that of many other external sources.

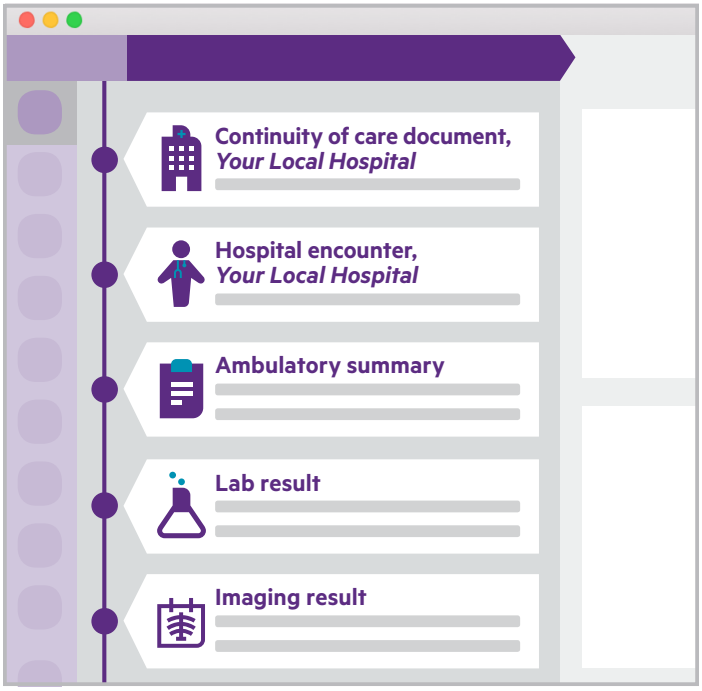
Network visit summary. We're expanding our intra-health system capabilities for athenaClinicals to provide greater visibility into the care patients receive in other settings. The network visit summary will alert providers when their patients are in an inpatient setting or have recently been discharged, giving them real-time awareness of hospital events. We will organize records related to an inpatient stay around episodes of care, so providers have the context needed to interpret acute records.

EHR-agnostic services. With the amount of insight our network and connectivity give us into nationwide patient care, we will start to develop new services that can be deployed on various EHRs. One example is a quality management service that will allow clients to quickly add custom quality measures, care pathways, and other clinical quality-based alerts to the point of care to aid clinical decision making. Organizations will be able to follow their patients wherever they receive care, ensuring any connected provider will have access to recommended guidelines. We'll be making this available as an EHR-agnostic service so that health systems can apply a consistent approach to quality not only across athenaClinicals users, but also eventually across different healthcare IT systems they may already use.

Making data more useful to providers and organizations

As we all know, access to information is not enough. As the amount and variety of patient data available to providers grow, it is critical that we make incoming data consumable and usable by care teams across care settings. For data to be useful, three criteria must be met:

1. Providers should be able to access all data related to a patient in a single view, regardless of where that data originated.
2. Patient data should be organized and prioritized in a manner that enables the provider to make informed decisions.
3. Organizations and entire care teams should have visibility across patient data to address care gaps at the population and patient levels.



To provide a complete picture of the patient, the patient chart timeline in athenaClinicals brings together records from athenaNet and beyond, including other inpatient EHR systems.

First, to gain a complete picture of their patients' care, providers need a single, chronological view that brings together patient records from various EHRs, faxes, payer claims data, vaccine registries, drug registries, labs, and other sources. By automatically delivering the relevant outside records, we can ensure providers have the right data at the right time without any additional work. This includes incorporating data that might not typically be available in the patient chart, such as the cost of the drug that a physician is about to prescribe to a patient or a report on that patient's prescription history for controlled substances.

How we're making data more useful

At athenahealth, we're connecting to outside entities to assemble a more complete picture of the patient and applying machine learning and artificial intelligence to make all that data easier to digest.

praxify gives clinicians mobile access to a comprehensive view of patient data inside and outside the hospital and helps them document faster using workflows that learn their needs based on past behavior. Early users can access data from both athenaClinicals and Cerner EHRs.

Inbound C-CDA data configuration capabilities in athenaClinicals will allow providers to choose which incoming data to display in the patient chart.

Patient chart timeline provides a chronological view of patient records in athenaClinicals that prioritizes the most important information, cutting back on clutter.

Real-time benefit check functionality gives providers an estimate of patients' out-of-pocket costs for a medication in the moment of care, before the prescription is filled.

Prescription drug monitoring will seek to pull reports from state databases indicating controlled substances prescribed to a patient in the past and surface them in the patient's chart.

Second, once all that data has been assembled, it needs to be organized and prioritized to meet providers' needs. Whether they're seeing patients in a practice or in an inpatient setting, clinicians should be able to see a consistent view of their patient's chart. Chronological patient timelines allow them to navigate the patient chart easily and to quickly find the data they need to deliver care. Applying machine learning and artificial intelligence can filter that information to make it even more relevant to a specific provider. (For example, a dermatologist may not need to see all past notes from a patient's orthopedist.) Over time, these technologies can be used to tailor workflows based on clinicians' behavior so that their view of the patient chart prioritizes the information they most frequently seek out. This kind of experience will reduce documentation time and allow clinicians to spend more time focused on and interacting with their patients.

Finally, care teams and organizations should have visibility across patient data in order to effectively address care gaps. Care teams need longitudinal visibility across each patient's care, while organizations need to identify gaps across entire populations so that they can conduct effective, efficient outreach to patients. Only a single-instance, cloud-based network can provide this kind of visibility into patient data.

For a truly productive experience, providers need more than just the tools to access and share data — they need the ability to seamlessly collaborate with the providers around them. By untethering patient information from its original EHR system and assembling the most relevant picture of the patient, we can empower any provider to be a member of the care team. With access to useful patient data in any care setting, care teams will be able to provide a better patient experience with less work and at the least cost.

Empowering patients to be active participants

As an industry, we need to acknowledge that patients should be the stewards of their own care and provide them the ability to easily capture their care history and communicate with providers and other members of their care team. We know that much of what affects patient health happens between visits, in different care settings, and increasingly on devices owned by the patient. Offering patients and caregivers convenient access to care and the ability to collaborate with their care teams not only increases patient engagement but also introduces a wealth of new data to the longitudinal view. Healthcare has already begun treating patients as consumers of care, and that trend toward consumerization is now extending to health records. While previous consumerization initiatives have not succeeded, the digitization of healthcare through Meaningful Use and the emergence of data exchange standards such as Fast Healthcare Interoperability Resources (FHIR) have made it easier to implement new systems that allow patients to capture their own information. Now, Apple is working with EHR providers, including athenahealth, to give patients access to their medical records on their iPhones.[13] As these trends converge, there will be opportunity to revolutionize the patient experience — as soon as this year.

One other trend driving significant patient empowerment is the rise of care management and the ability of the patient to interact with a wider care team. To support these developments, patients need easy-to-use, secure technology options, and care teams need the ability to incorporate their interactions with patients into the care plan they already rely upon. Patient mobile apps can allow patients and their caregivers to be active members of the care team, deepening collaboration between patients and providers. Using an app allows care managers and patients to communicate directly, share information from connected devices, and continue to evolve their care plan. In addition to putting a patient's care plan in their pocket, it enables organizations to scale the reach of a single care manager.

Our athenaWell app empowers patients to report their own progress easily, so care teams have a complete picture.

As patients add to the clinical data that care teams have access to, it becomes even more important to present that data in a consistent view that reduces work for providers and allows them to coordinate care more easily. A universal longitudinal patient chart should include both self-reported patient information and that which is recorded by the provider, and it should be accessible across systems to all members of a patient's care team.

Together, these advances – real-time patient access with device integration, shared care plans that the entire care team can update, and care team collaboration tools – will significantly increase collaboration between patients and providers and give patients a greater role in their care.

How we're empowering patients

We are investing both in creating consumer-grade patient experiences and in creating tools and services that better empower the patient as a member of their own care team.

Apple and athenahealth are giving patients access to their health records on their own mobile devices.

athenaWell syncs with Apple's Healthkit™ developer software,[14] which connects via Bluetooth to devices such as smart scales, blood sugar monitors, and blood pressure monitors, making it easier for patients to share health data with care teams.

Our planned care management service will aim to create a single, patient-centric care plan on which care teams can collaborate, regardless of the EHR or care management technology they're using.

Our roadmap: Opening the network to transform care

As an industry, we are on the cusp of realizing the benefits of the huge push to digitize healthcare data over the past 15 years. The evolution of healthcare has made it plain that those benefits will not be recognized by any closed system.

At athenahealth, we believe that only by continuing to open up our network and creating a universal longitudinal patient record can we achieve the promise of true clinical interoperability. Our network will continue to expand to include all of the players in the healthcare ecosystem — patients, providers, care management teams, labs, payers, and more — and assemble a single view of the patient chart that brings together data from disparate systems. The exchange of this data should be seamless, transparent, and useful for all. And we must include patients as active participants in our network by creating new, consumer-grade experiences that foster collaboration.

In support of these aims, athenahealth will continue to be a leader in opening its network through CommonWell, Carequality, and others; will continue to support FHIR and other standards; and will continue to provide deep integration with a range of supply partners that will reduce time required to support administrative operations and configuration. We will keep striving to reduce the workload for providers and staff; enable health systems to better understand and manage their patient populations; and arm providers to make care decisions that optimize organizational performance and individual health outcomes.

Through all of these efforts, we aim to improve the provider experience and transform patient care, regardless of the setting in which care is delivered or the system in which it is documented.

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