How the new “FHIR” standard will ignite interoperability

FHIR, a new, web-based technology interoperability standard, has the potential to usher in a new era of health care based on information sharing at the data level.

“True interoperability, not just exchange.” That’s how National Coordinator for Health Information Technology Karen DeSalvo recently stated the federal government’s new strategic goal for the American health care system.

True interoperability, DeSalvo said, will power fundamental changes in population health management, enable the industry to shift from fee-for-service to a value-based care delivery model and ensure that “health data is available for consumers, for our doctors, for everyone, when and where it matters the most.”

How do you get to true interoperability? One new approach with a lot of momentum behind it is Fast Healthcare Interoperability Resources (FHIR), a new, web-based technology interoperability standard, sponsored by Health Level-7 (HL7). While previous options focused on exchanging documents to coordinate care among different providers, FHIR takes a data-level accessibility approach using Application Programming Interfaces (APIs) to send and receive detailed pieces of clinical information among disparate systems. The new FHIR standard creates an ecosystem of interoperability with plug-and-play capabilities that will help advance the quality and coordination of care, increase efficiency and reduce costs to improve population health outcomes.

Meet FHIR, the new interoperability standard

Health care systems in the United States relied heavily on HL7v2 (and to a lesser extent, HL7v3) to move from an environment in which patient information was virtually unsharable in the 1990s to one in which exchange has become the norm. By 2014, about 75 percent of U.S. non-federal acute care hospitals were exchanging data with outside providers.

This was a big achievement. The earlier HL7 standards were complex and health care-specific. “In order to perform interoperability of documents and patient summary records, there were more than 5,000 pages of specification to work with,” said George Morris, vice president of software engineering at Transcend Insights, who has more than 25 years of industry experience. “That’s a real, huge challenge for implementers.”
The FHIR work group wanted to address the complexity and unwieldiness of those standards by using Web technologies common in other industries. “Our goal is to drive down the costs of exchanging data, to set the health care information free so that people can solve real-world health care problems more easily and cheaply,” said Grahame Grieve, FHIR lead, at the 2014 Healthcare Information and Management System Society Annual Conference in Orlando.

That approach is articulated in The FHIR Manifesto, which lists six key strategies:
1. Focus on implementers
2. Keep common scenarios simple
3. Leverage existing technologies
4. Provide human readability
5. Make content freely available
6. Support multiple paradigms and architectures

While previous strategies focused on document and message exchange, FHIR takes a more atomistic approach to enable systems to interoperate. FHIR’s fundamental unit is the resource, which is defined as a small, logically discrete unit of exchange, of interest to health care, representing the smallest unit of transaction, existing with a known identity and location, with defined behavior and meaning.

There are about 100 resources in the current DSTU 2 (version 1.02), grouped into six categories: infrastructure, identification, clinical, conformance, financial and workflow. The image below provides a flavor of the resources and categories included in v1.0.2 (see Figure 1).

Resources have attributes. For example, the patient resource includes attributes such as a unique identifier, a name, whether or not the patient is active, and other descriptors that are relevant to healthcare. Resources can also be grouped together on the basis of a common property into compartments. So, for instance, you can request to see all conditions associated with a patient with a single URL.

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**George Morris**  
Vice President, Software Engineering  
Transcend Insights

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"Figure 1. FHIR Resource Categories"
The payoff: true interoperability made simple

To illustrate FHIR’s strengths, Morris uses the example of a doctor who wishes to view a patient’s most recent A1C lab result. Using current exchange processes, the physician’s system may send a request to the document source system using a Simple Object Access Protocol (SOAP) web service call. The source system responds with a list of all documents for that patient, requiring the requesting system to identify which documents it actually needs, and then retrieve them from the source. At this point, the physician’s system then has to parse each of the retrieved documents for the Logical Observation Identifiers Names and Codes (LOINC) code for the lab result it is looking for. “There are three major steps,” Morris pointed out, “and each requires specialized coding skills unique to healthcare. The processing time can take tens of seconds or worse, require manual intervention between those steps.”

In contrast, using FHIR requires only a single URL (see Figure 2). “First, I specify which patient I want, then I specify which code I’m looking for, and then I specify the sort order and how many results I want,” Morris said. “It’s all contained in one URL, not a series of multiple SOAP calls that are fairly complex. It is simple and very readable. Another clear benefit is this search process is typically faster and produces more specific results.”

Morris added: “We’ve gone from a document-centric system down to an atomic system that’s really about the constituent pieces which makes it easier to share information in a more timely fashion.”

Dr. Thomas Van Gilder, chief medical officer at Transcend Insights and a practicing physician, said the benefits of FHIR don’t end with the technologists. Clinicians will experience them as well. The electronic health records at his practice and the hospitals in the area didn’t exchange data, which meant that if he was seeing patient a day after she was discharged, he would have no way of knowing what had occurred in the hospital.

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**FHIR | Doctor Wants Latest A1C Lab Result**

https://hl.transcendinsights.com/fhir/Observation/_search?patient.identifier=urn:oid:1.2.3.4|MRN123&code=http://%2F%2Floinc.org|4548-4&_sort:desc=date&_count=1

<table>
<thead>
<tr>
<th>Patient ID</th>
<th>Lab Result</th>
<th>Sort Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>One step, one URL</td>
<td>Returns just the data requested</td>
<td></td>
</tr>
<tr>
<td>No SOAP message</td>
<td>Uses mainstream coding skills</td>
<td></td>
</tr>
<tr>
<td>No parsing multiple documents</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2. Example of a FHIR URL
"I'd have to rely on a note from the hospitalist, which often didn't exist, or on paper records – assuming the patient had them," he said. "What we want is a system in which those steps are not necessary and there is no difficulty sharing information. Where all of the relevant information is available to me to take care of the patient right then, not to encumber the healthcare system or clinic with more clicks or more visits to different portals or different sources of information."

**FHIR and population health**

FHIR holds significant promise for population health management. Transcend Insight’s HealthLogix™ platform, for instance, uses interoperability tools as a foundation for its advanced population health and patient care tool set. "If you just have population tools, or care tools, but you don’t have the interoperability piece, it's not really going to give you what you need," Morris said.

"There are four big pillars to population health management," he said. “Everyone agrees that you have to be able to identify patients, and acquire, aggregate and normalize their data. You have to analyze that data to stratify your patients into cohorts. ... You need to be able to manage, to engage the provider and the patients directly. And finally, you need that data to report quality and outcome measures for reimbursement – and to improve your business. FHIR supports all of those.”

As shown, FHIR makes it easier to acquire, aggregate and normalize data. It also makes it easier to stratify and group patients based on commonalities. Being data focused, as opposed to document-centric, means that you can integrate non-health care applications into population management, thus improving patient engagement. “Maybe you schedule an Uber ride for your patients to ensure they don’t miss the appointment,” Morris added.

In the end, what will make FHIR mainstream is the way it lowers barriers to entry. Programmers won’t have to be healthcare specialists to develop apps. The time and expense necessary to implement new resources will diminish, making life better for implementers. And patients and providers will enjoy a much better experience with better and more timely access to their health information.

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**About Transcend Insights**

Transcend Insights® is redefining how population health is managed, measured and implemented by providing The Platform for Population Wellness. Our HealthLogix™ technology platform and unified solution suite helps health systems, care teams and patients transition from episodic to proactive care for long-term wellness. Our partners leverage Transcend Insights’ enterprise solutions to analyze 7 billion clinical data points on 14.9 million patients every day. Through October of 2015, we helped our partners close more than 3.9 million gaps in care. By providing solutions and insights that support a more proactive, person-centric approach to care, we are powering a better care experience, giving people the freedom to make confident decisions, and helping to improve the health and wellness of populations.

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