Adding FHIR to Traditional EDI

Tibco and Smile CDR

Who We Are

I am Duncan Weatherston CEO of Smile CDR

Smile CDR Inc. and TIBCO help organization like governments, regional health exchanges, researchers, health systems, providers, payers and app developers build connected health solutions and products by leveraging our core expertise in health data and **HL7 FHIR and EDI**.

Our mission is to make it **easy** for health organizations of all sizes to deliver **interoperable** applications **quickly** and **cost effectively**.

Audience Poll

- Have you heard of FHIR?

- Have you implemented or know of any FHIR implementations?

FHIR Myths

I hear FHIR is

"Yet another messaging standard"

"Not ready for prime time"

"Will take a while to catch on"

"Will have regional flavours"

FHIR Realities

- FHIR is more than just messaging
  - Comprehensive and evolving data model
  - Powerful APIs
  - FHIR is designed to keep data flowing

FHIR Realities

- FHIR is ready for prime time
  - HAPI FHIR open source is downloaded >16,000 times monthly
  - Countries and regions now specify FHIR
  - Large scale projects are in production

February 11, 2019 - CMS and the Office of the National Coordinator have released long-awaited **proposed rules** governing interoperability, health data blocking, the use of APIs, and the expanding role of FHIR.

FHIR Realities

- FHIR is catching on quickly
  - Intuitive and easy to learn.. free of charge
  - Readily available workforce at inexpensive rates
  - Reusable code

1 ▓▓▓▓▓▓ 2,919
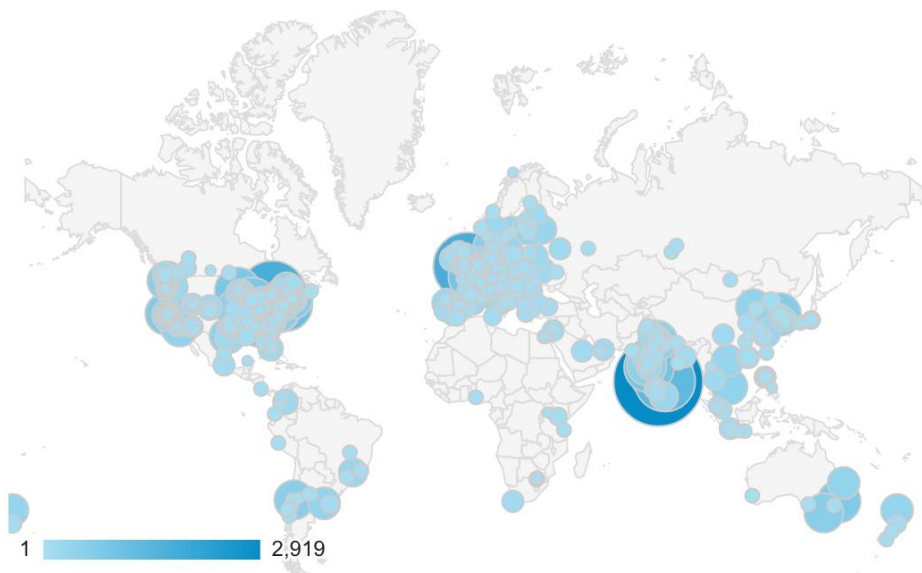
FHIR Realities

- FHIR is a single global standard
  - Highly collaborative
  - Community driven
  - Balloting process

Extending the Value of FHIR

There are a number of parallel projects that enhance FHIR value. Examples include:

- Smart on FHIR

- US Core / Argonaut

- Da Vinci

- CMS and Blue Button

Why adopt FHIR?

There are a number of reasons to extend your EDI approach to include FHIR:

- Open standard with broad community participation
- Increase the range of clinical interoperability options
- Improve time to market when developing applications
- Comply with regulations and policies
- Provide better healthcare solutions and services
- Manage costs of development and operations
- 80/20 Rule enables conformance without excessive constraint

FHIR Represents an Opportunity for Improvement

- There is a vast amount of information available in various formats and states that was collected for different purposes.
  - It can be used to make business processes, patient services and the bottom line better
- Using FHIR, you can get data into an accessible format that can be easily used to create applications and feed analytics
- Consumers are used to the types interactions they have with big search services like Google and Bing
  - Having a rapid and accurate FHIR service is essential to meeting user expectations
- AI is filled with promise for better tools, decision support, process management, these can be leveraged more easily with defined data

FHIR is an EDI Tool

- FHIR is a great way to exchange data electronically, something the EDI community has been doing for years
- It is a well defined standard with the profiles that are able to lock things down tightly
- Uses broadly established terminology such as ICD, SNOMED, LOINC and others
- Has transactions and messages formats that support single and bulk interactions

FHIR is Also a Data Model

- It is a comprehensive health data model that is contributed to and extended with each new version.
  - FHIR is comprised of many resource types (145 currently)
  - Each resource is a comprehensive model of a particular type of data that retains referential integrity to the rest of the data set through references
  - The data models are informed by the needs of the communities that use them, so they are comprehensive and well informed
  - FHIR is extensible. New elements can be create and used without breaking the standard

FHIR is an API

- It is a comprehensive API that allows developers to use the richness of the internet to achieve their goals
  - It supports a wide range of queries for data that return well structure JSON objects
    - Read, vread
    - Create, update, patch, transaction
    - Delete
    - Search, search-all,
    - History, history-type, history-all
    - Capabilities
  - The API can be extended to meet targeted performance or specialty requirements
  - Supports a number of great options such as GraphQL and streams

FHIR is a Suite of Services

- Terminology services
  - Use and manage code systems and code sets
  - Translate between terminologies
- Conformance services
  - Ensure alignment to the spec to facilitate interoperability
  - To be developed
- Knowledge repository
  - The ability to store and retrieve knowledge artifacts such as care plans, documentation templates, libraries and measures
- Measure processor
  - Measures for patients and providers

FHIR is Not a Panacea

- The fundamentals of data management have not changed
  - Extracting data from vast stores of information requires effort
  - The technologies that are needed to manage the sea of data is expensive
  - Maintaining the skills to manage the overall infrastructure can be challenging
- Mapping terminologies and internal standards can be time-consuming and costly
- Existing data sources may not support FHIR standards

Tools Can Help

- Managing big data volumes with distributed systems like the Mongo, Hadoop File System and others
  - Large volume reads and writes are a key benefit of NoSQL databases
  - There is broad expertise in these areas from vendors
- Improvements in performance of RDBMS technologies
  - The mainstream databases companies have high speed, high volume offerings that enable the management of large data sets
- Commodity pricing of processing in cloud service providers, scalability and more accessible programming methods to make use of them
  - Serverless and virtualized systems have greatly expanded the ability to affordably manage bursty data volumes

Web Technologies are Ubiquitous

- JSON has proven to be an adaptable mechanism to share data objects amongst various systems
- Web browsers have provided the platform independence
  - Applications can run on desktops and mobile devices
- RESTful APIs have provided a common approach for web developers to access both services and data
- The popularity of these approaches has created a larger pool of talented architects, designers and developers that can create applications with these tools

FHIR Servers

- Having a FHIR server is a great way to build out tools to engage your patients and improve their experience when receiving healthcare. This is because you can:
  - Give the patients access to their information easily and securely
  - Quickly create applications that support the participants in the care flow
  - Use only the parts of the system that you need, knowing that the other relationships are being thought of and addressed by a large community of healthcare participants from all walks of life
  - Get data from the places it lives into a common layer that can be presented as a continuum to the people that need it
  - Give the patients the ability to interact with the data, without breaking the trustworthiness of the data
  - Have quick response times and deep data

Improving Access to Information

- The following elements of a FHIR server help harmonize and make your existing data available:
  - Smart on FHIR and RESTful API
  - HL7v2 connectors
  - CCDA connectors
  - CSV connectors
  - BPM connectors
  - Consent management
  - EMPI connectors and services
  - Stream processing

Engaging Patients and Improving their Experience

Build apps and then improve them

- Use FHIR to:
  - Establish the data model and the API
  - Define the data for your user community
  - Test your assumptions with users
- Throw away apps that don't make things better because they are cheap and easy to build / replace
- Give the users access to more than just health records
- Provide the ability to take their data with them
- Enable them to communicate securely with trusted partners
- Get out of their way
- Give the people dealing with patients better tools and more information to work with

Enable Patients to Participate in their Ecosystem

- Improve the patient's understanding of their situation
  - Access to clinical data
  - Understanding of coverage decisions
  - Better tools for planning visits
  - Referral and provider registries
  - Access to online services that support their care and access to care
  - Give patients the tools to prepare for their encounters by reducing the number and frequency of forms, letting them know what they need ahead of time, showing them their history so they know what the person they are seeing knows
- Improve the encounters by making the providers tools more integrated with patient apps, more intuitive and less intrusive

Simplify the Environment

- A FHIR server helps you reduce the complexity of your information technology and and diminish the time to market for new clinical and patient services
    - Currently the information in health systems is stored in a bewildering array of technologies
    - immediately legacy systems in that they can not be easily migrated, large amounts of the information is stored in proprietary format with mapping to standards where convenient
    - The FHIR server is only standards based data. If you need to move your data you have access to all of it through the API , which means that anyone can understand it and make use of it

Make the Most of your Data

- Create your next application in the FHIR server safely knowing that your data is immediately reusable and available to other applications
  - Doesn't have to have a data model created, one already exists
  - Doesn't have to account for everything, someone else is worrying about that
  - Is available to other applications through a standard interface with freely available open source applications that can be used for simple case
  - The data is available to application developers using easily accessible tools and libraries

Work with the Community

- App gallery model within the FHIR community means that you can find other applications to deliver value
  - Use and extend your existing data with new applications
  - This means that when you need something you can find:
    - A broad array of open source to get started
    - Existing applications that may fill part or all of your needs
    - Tools to get your teams going quickly
    - Reusable elements from your solutions because the data model is always consistent
    - The ability to get and share data easily
    - Pre existing data model waiting to be used
    - The upshot is that your time to market for your business ideas is greatly reduced

Value Based Care

FHIR can help with data management in support of VBC

- Encounter history
- Care plans
- Claims data
- Diagnostic data
- Observations
- Medication

Da Vinci Project

- Data Exchange for Quality Measures

Value Based Care

- A real-time reporting application can be constructed using Smart on FHIR and made available to the teams and individuals responsible for the program at the hospital.
  - Construct reports directly from the FHIR data and maintain the reports as nuances change year to year.
    - Use features such as LiveBundles to maintain dashboard views of all your KPI's
  - The FHIR server receives pertinent information from all systems in the hospital that contain relevant information
    - Use connectors for HL7v2, X12, CDA, CSV
  - Identify your own predictors that can be used to reduce risk for patients and help meet VBC goals
    - Use local knowledge to create meaningful reports from FHIR

Patient Self-reporting and Compliance

Use FHIR to support the patient journey

- Patients can participate in their care through online and mobile apps
- Enable patients track and report therapy compliance
- Enable symptom reporting and communication to clinicians online
- Receive feedback into the same data pool that you are using for VBC analysis

Risk Adjustment

 FHIR provides a dynamic open source approach to electronic data enabling you to

- Track encounters and document conditions
- Map to effective coding for optimized risk scores
- Support new information types as they become commonly available
- Support multiple data sources through common feeds

Data Analytics and Machine Learning

Using a FHIR database enables combined approaches to reporting

- Clinical queries can be constructed using the FHIR API to retrieve targeted information
- Stream data from FHIR server to HFS or other big data stores
- The resulting record sets can be used by reporting tools such as Tibco SpotFire to generate interesting views and analysis

Use the clinical data from FHIR to create training data sets.

- The data pool in HFS can be used in conjunction with training data sets retrieved by FHIR clinical queries

Thank You