Blue Button Overview

Peter L. Levin and Matt McCall

Co-Founders

August 2023

Your health data belongs to you, and you should have easy access to it.

With one click of the "Blue Button," an individual can download all the data that a healthcare organization has about them.

Blue Button empowers individuals to:

- Download and review their health data
- Easily share their health data with third parties
- Track their progress

Blue Button 2.0 helps payers and providers:

- Coordinate and manage care
- Standardize on data exchange
- Fuel business applications like utilization and predictive analytics

Blue Button is a Bipartisan Initiative

2010

"Today I can announce that for the first time ever, Veterans will be able to go to the VA website, click a simple "blue button," and download or print your personal health records so you have them when you need them and can share them with your doctors outside of the VA."

President Barack Obama
- Remarks at Disabled Veterans of America Conference, 8/10/10

2019

"Today's announcements represent a watershed moment toward fostering more innovation in America's healthcare systems."

Matt Lira, Special Assistant to President Trump
- Statement to The Hill on the Blue Button 2.0 Developer Conference, 8/12/19

2021

"We can leverage Blue Button to access health information no matter where it is, to allow Veterans and citizens to manage and use it as they see fit. By putting our Veterans first, we can make the VA the nexus of the best care everywhere."

President Joe Biden
- JoeBiden.com/Veterans, 2021

What began as a way for Veterans to download health data grew to include all Medicare beneficiaries and has now catalyzed a movement for private companies to provide similar access to health data.
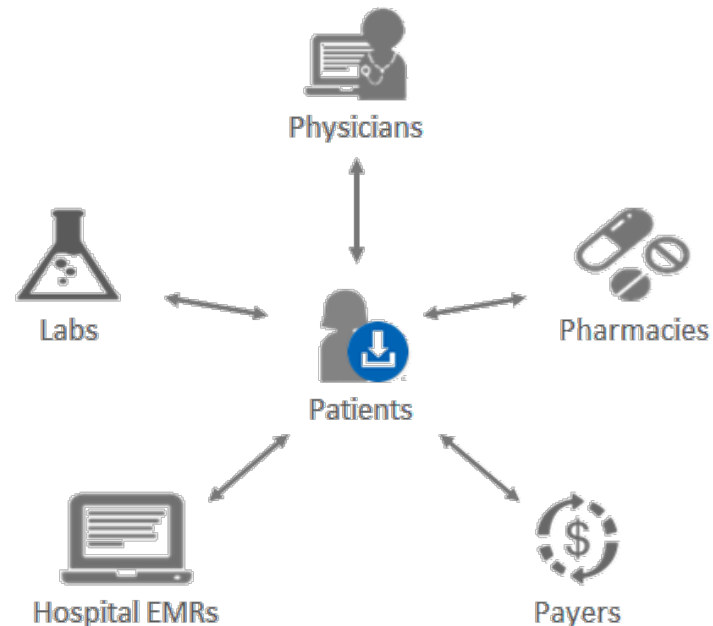
- 2010: VA introduces Blue Button for Veterans, with 580,617 downloads in the first year; the service also launches at CMS and DoD[1]

- 2012: The Office of the National Coordinator for Health IT (ONC) adopts Blue Button and begins industry advocacy[2]

- 2014: The nation's leading pharmacies commit to making customer information available by Blue Button[3]

- 2016: More than 3.5 million Veterans, service members, and Medicare beneficiaries access their personal health data;[4] President Obama signs the 21st Century Cures Act

- 2018: VA announces new health APIs to "power the next generation of Blue Button features";[5] CMS announces Blue Button 2.0 at HIMSS,[6] and USDS and CMS host BBDC; Microsoft, Oracle, Google, Salesforce, and IBM pledge to use the data standard Blue Button 2.0 is built on[7]

- 2019: As of Q3, 2.3 million Veterans downloaded their Blue Button records more than 35 million times; DoD crosses the 1 million user mark in October, with more than 75 million views

- 2021: CMS Interoperability and Patient Access Rule API enforcement began in July

[1] https://www.healthcareitnews.com/news/nurses-blue-button-are-highlighted-during-national-health-it-week
[2] https://www.healthit.gov/faq/didnt-blue-button-start-va-how-it-evolving
[3] https://obamawhitehouse.archives.gov/blog/2014/02/07/leading-pharmacies-and-retailers-join-blue-button-initiative
[4] https://medium.com/@ObamaWhiteHouse/your-data-in-your-hands-enabling-access-to-health-information-6fce6da976cb
[5] https://www.va.gov/opa/pressrel/pressrelease.cfm?id=5158
[6] https://www.cms.gov/newsroom/fact-sheets/trump-administration-announces-myhealthedata-initiative-himss18
[7] https://www.usds.gov/projects/blue-button-2

Blue Button 2.0

- CMS Administrator Seema Verma unveiled Blue Button 2.0 in March of 2018 at the Blue Button Developer Conference
  - This FHIR-enabled service provides secure, beneficiary-directed data transport; it will enable beneficiaries to connect their data to applications and uses open-source code that is available for all plans[1]
  - President Joe Biden welcomed the Trump administration's announcement of Blue Button 2.0 as "a good step forward"[2]
- In May 2020, CMS finalized the Interoperability and Patient Access Final Rule
  - Under this, health plans regulated by the rule must make patient data available through an open API
  - The scope and volume of the information provided includes adjudicated claims (including cost), encounters with capitated providers, enrollee cost sharing, provider remittances, and clinical data[1]
  - Health plan APIs are modeled after CMS's Blue Button 2.0 APIs; more than 2,000 developers – from more than 1,100 organizations – use synthetic data in the Blue Button 2.0 API sandbox; twenty-eight organizations have applications in production[3]
  - CMS began enforcement in July 2021

[1] CARIN Blue Button Framework and Common Payer Consumer Set; https://slideplayer.com/slide/16439165
[2] https://fortune.com/2018/03/19/joe-biden-cancer-moonshot-data-save-lives
[3] https://www.cms.gov/newsroom/press-releases/cms-advances-myhealthedata-new-pilot-support-clinicians

Blue Button and Blue Button 2.0

Amida

With Blue Button 2.0, an individual can:

- Interact with their health data in a developer-friendly, standards-based format (FHIR)

- Authorize third-party applications to establish an API connection and access their data

Additionally, institutions will be able to access *bulk* health data under CMS's Beneficiary Claims Data API (BCDA) and Data at the Point of Care (DPC) programs.
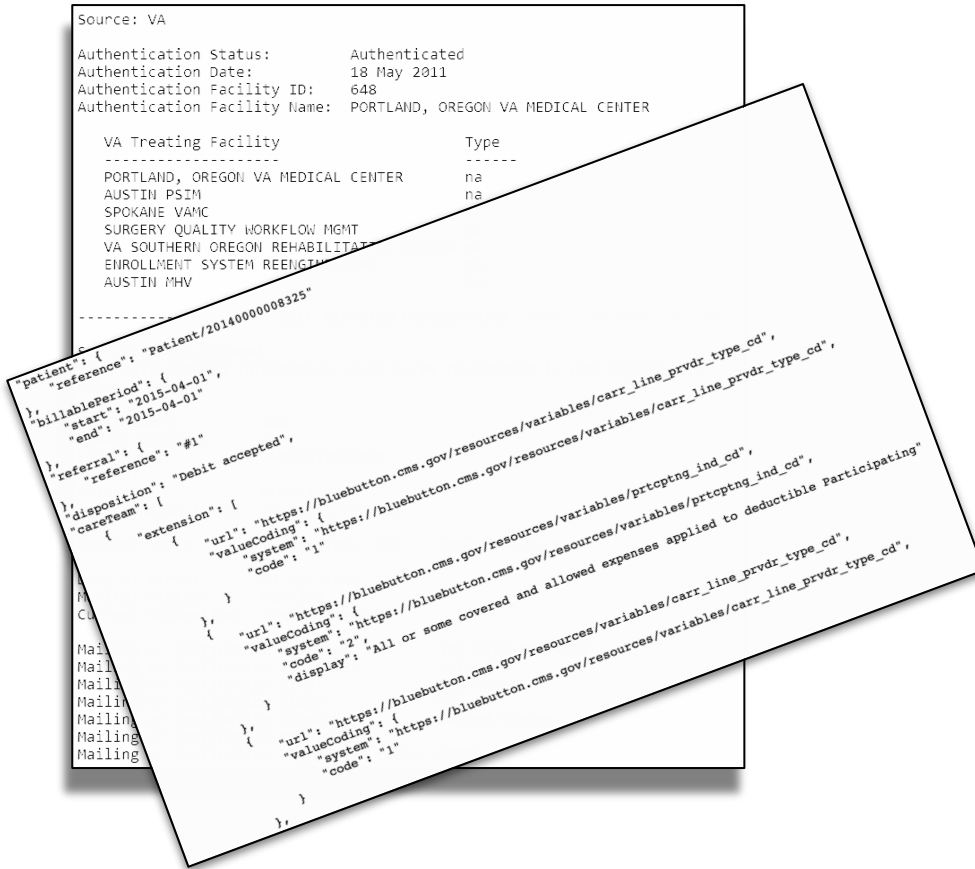
CMS APIs Based on Blue Button 2.0

Four APIs that offer access to claims data:

1. **Blue Button 2.0 API** — Permits Medicare beneficiaries to securely delegate access to their Medicare Parts A, B, and D data to third-party applications via a FHIR API

2. **Beneficiary Claims Data API (BCDA)** — Enables Accountable Care Organizations (ACOs) to retrieve bulk CMS claims data about beneficiaries in the bulk FHIR format

3. **Data at the Point of Care API (DPC)** — Allows clinicians bulk access to patient claims data (including previous diagnoses, past procedures, and medications, etc.) in bulk FHIR format

4. **Claims Data to Prescription Drug Plan Sponsors (AB2D)** — Lets Medicare Part D providers (PDPs) retrieve bulk Medicare Parts A and B claims data for their active beneficiaries
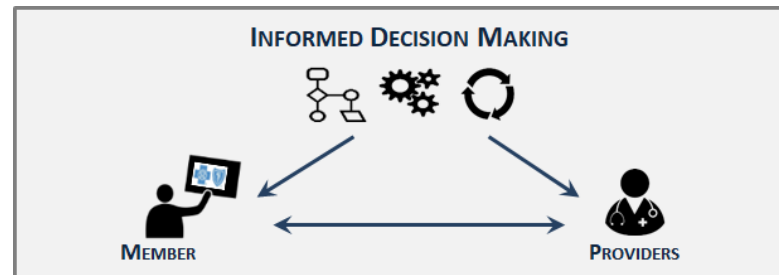
An Example Blue Button 2.0 Data Flow Architecture

How CMS transforms 837 claims into FHIR:

1. ANSI X12 837-formatted[1] claim files use the Common Working File (CWF) to check claims against beneficiary status[2]

2. Claims are aggregated weekly into the National Claims History (NCH)[3]

3. Chronic Condition Warehouse (CCW) appends beneficiary ID and additional code sets[4]

4. The Beneficiary FHIR Database (BFD) processes map the beneficiary data set to FHIR resources, which the Blue Button APIs expose
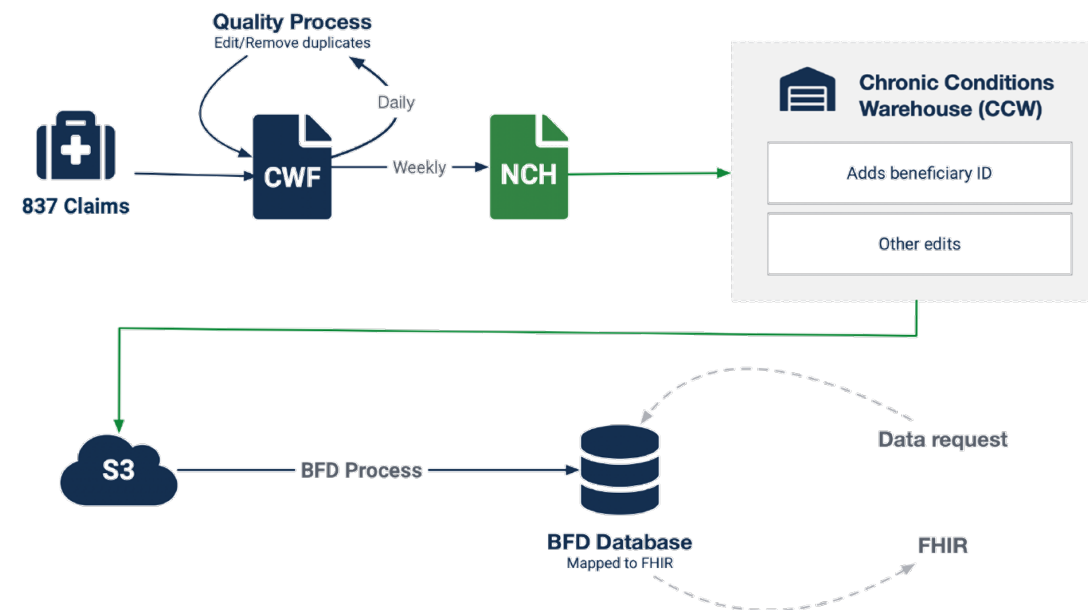
From Aneesh Chopra's presentation "Data Sharing and Interoperability: Payer-Provider Exchange in Successful Shared Accountability Models"

[1]ANSI ASC X12 format details available at: http://www.x12.org
[2]https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/clm104c27.pdf
[3]https://www.cms.gov/Research-Statistics-Data-and-Systems/CMS-Information-Technology/DataAdmin/index
[4]https://bluebutton.cms.gov/assets/ig/index.html

CMS - Blue Button 2.0 Data

All APIs offer access to the same types of data:

1. **Explanation of Benefits (EOB) —** Claim and adjudication details for an episode of care
   - Contains data for Medicare Parts A, B, and D
   - May contain diagnoses, procedures, and care team details
   - Contains parsable claim lines will yield additional data (such as medications)
2. **Coverage —** Beneficiary enrollment information[1]
3. **Patient —** Demographic and administrative information about the beneficiary

- CMS's Blue Button 2.0 API enables patient-facing applications to use beneficiary data
- The beneficiary authorizes an application to access the Blue Button 2.0 API on their behalf
- The application retrieves a beneficiary's data from the Blue Button 2.0 API and presents it to them in the application
- Sixty-eight Medicare Blue Button applications are currently registered[1]
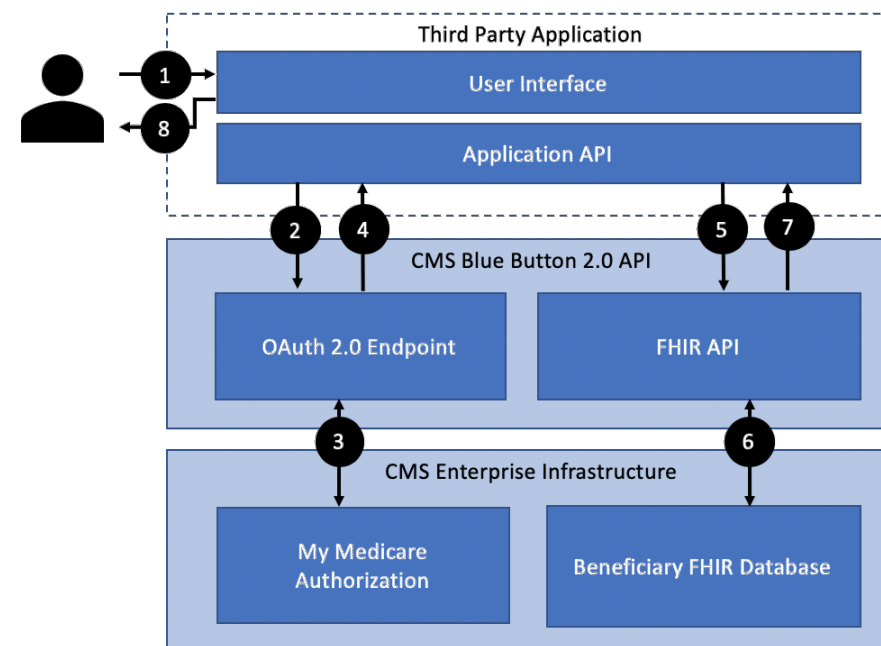
1 – CMS beneficiary logs into third party application (application has previously been approved for use by CMS).
2 – Beneficiary is redirected to CMS OAuth 2.0 endpoint and grants application access to their data.
3 - OAuth 2.0 endpoint relies on mymedicare.gov accounts for authorization.
4 – If approved, the application is now authorized to access that beneficiary's data.
5 – Application submits request to FHIR API for that beneficiary's resources (Explanation of Benefit, Coverage, or Patient).
6 – FHIR API gathers data from CMS enterprise infrastructure and formats it into FHIR resources.
7- FHIR API responds to application's request with beneficiary's FHIR resources.
8 - Third party application performs business logic on FHIR resources and presents them to the beneficiary.

Blue Button 2.0 API diagram
(in production at CMS)

[1]https://www.medicare.gov/manage-your-health/medicares-blue-button-blue-button-20/blue-button-apps

Example Use Case: Patient Intake for Case Management Leveraging Blue Button APIs
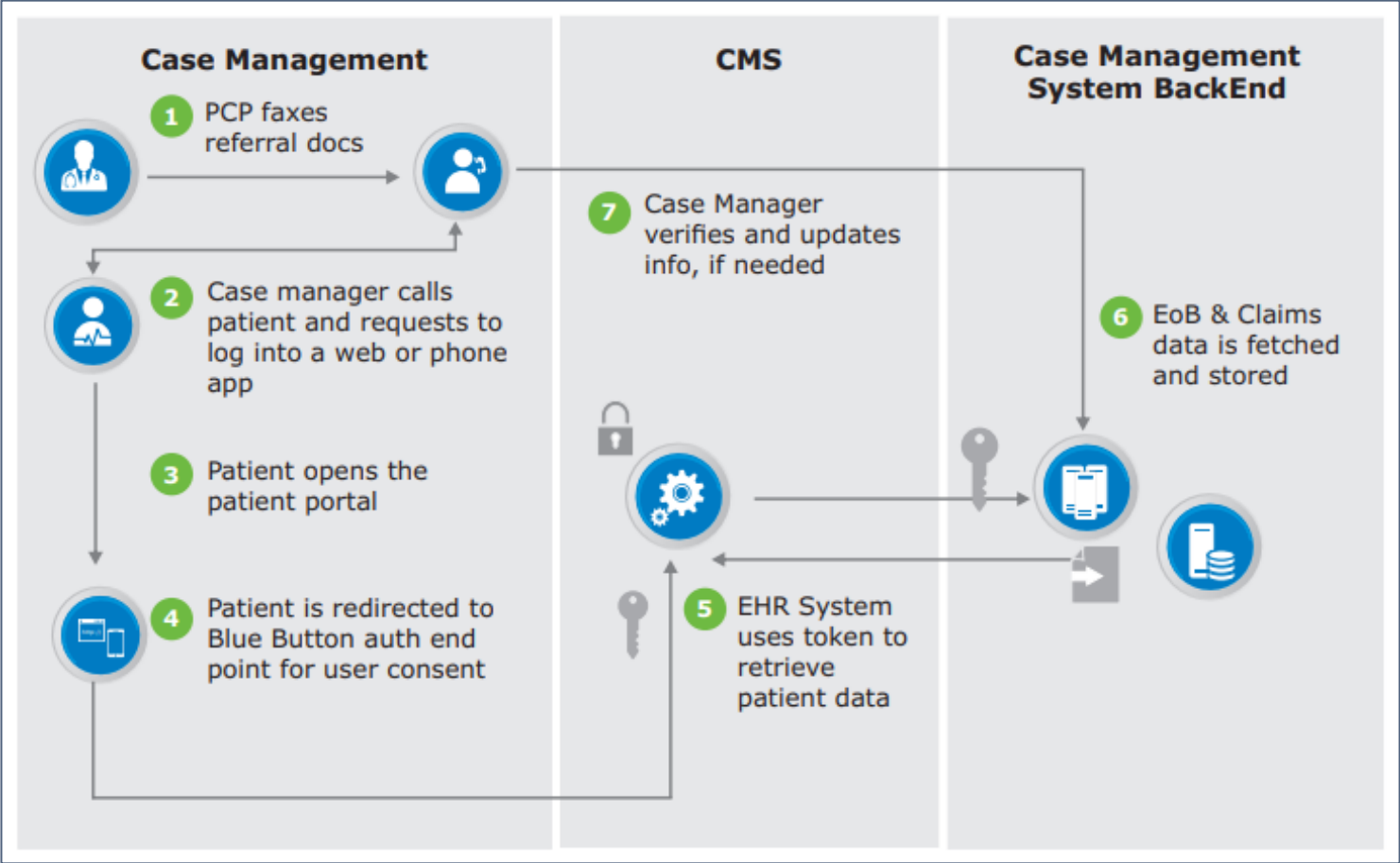
CMS - Blue Button 2.0 Bulk APIs

Data at the Point of Care (DPC)

- Medicare providers can access beneficiary data during a patient's treatment for a more complete medical record

- Providers are directly authorized to access the API

- Providers submit a list of patient identities to CMS prior to or during treatment; CMS uses the bulk FHIR specification to return the data for those patients

- Production pilot (invite only)[1]

Beneficiary Claims Data API (BCDA)

- Medicare ACOs can review the claims filed for their accountable populations

- Shared Savings ACOs are directly authorized to access the API

- The bulk FHIR specification returns claims data for all the ACO's beneficiaries

- In production

Claims Data to Prescription Drug Plan Sponsors (AB2D)

- Prescription drug sponsors receive secure Medicare parts A and B claims data for their plan enrollees

- PDPs are directly authorized to access the API after authentication

- The bulk FHIR specification returns claims data for all the PDP's beneficiaries

- In production

[1] The general public only has access to the sandbox. Those who have demonstrated proficiency with the sandbox can apply to the production pilot and obtain access to real data.

Standard RESTful APIs are not optimized for the retrieval of large sets of records.

Standard RESTful API Approach

- Returns the group resource and not other referenced resources
- Clients then make additional RESTful calls to retrieve needed resources
- Processes used to generate groups are commonly long running, up to 24 hours
- Payloads are large and cumbersome - average size of the list is 20K members

VS.

FHIR Bulk API Approach

- Allows retrieving all data in one call
- Allows for requesting changes since specified date/time
- Allows for limiting the data returned through resource types
- Easily manages large and small groups and long running transactions

From Aneesh Chopra's presentation "Data Sharing and Interoperability:
Payer-Provider Exchange in Successful Shared Accountability Models"

Blue Button and the Blues

Blue Cross Blue Shield Association is "committed to adopting CMS's Blue Button 2.0 standards to allow patients to securely access their health information in Medicare Advantage programs in consumer applications, such as third-party mobile apps, using the HL7 FHIR Application Programming Interface (API) format."

Additionally, the BCBS family is participating in two aligned data interoperability initiatives:

CARIN Alliance: The CARIN Alliance helps consumers and caregivers gain digital access to their health information via open APIs. Members of the BCBS family are participants in real-world testing of the Blue Button API data model. CARIN released an implementation guide into production in 2020.[2]	HL7 Da Vinci project: Promotes interoperability by providing the industry with candidate use cases, implementation guides, and reference implementations. Its use cases include medication reconciliation, insurance benefits discovery, and health record exchange. BCBSA and other member BCBS organizations are among the twenty founding members of the HL7 Da Vinci project.[3]

[1] https://www.bcbs.com/interoperability
[2] https://www.carinalliance.com/events/2019-blue-button-developers-conference
[3] http://hl7.org/fhir/us/carin-bb/history.html

The Common Payer Consumer Data Set (CPCDS):

- Provides a set of key health data that should be accessible and available for exchange

- Profiles the data elements as FHIR resources

- Specifies a minimum set of fields and extensions that must be present to ensure consistency in compliant queries

- Defines an implementation guide for created queries, with documentation[1]

- Maps the CPDS flat file format specification to the corresponding FHIR resources
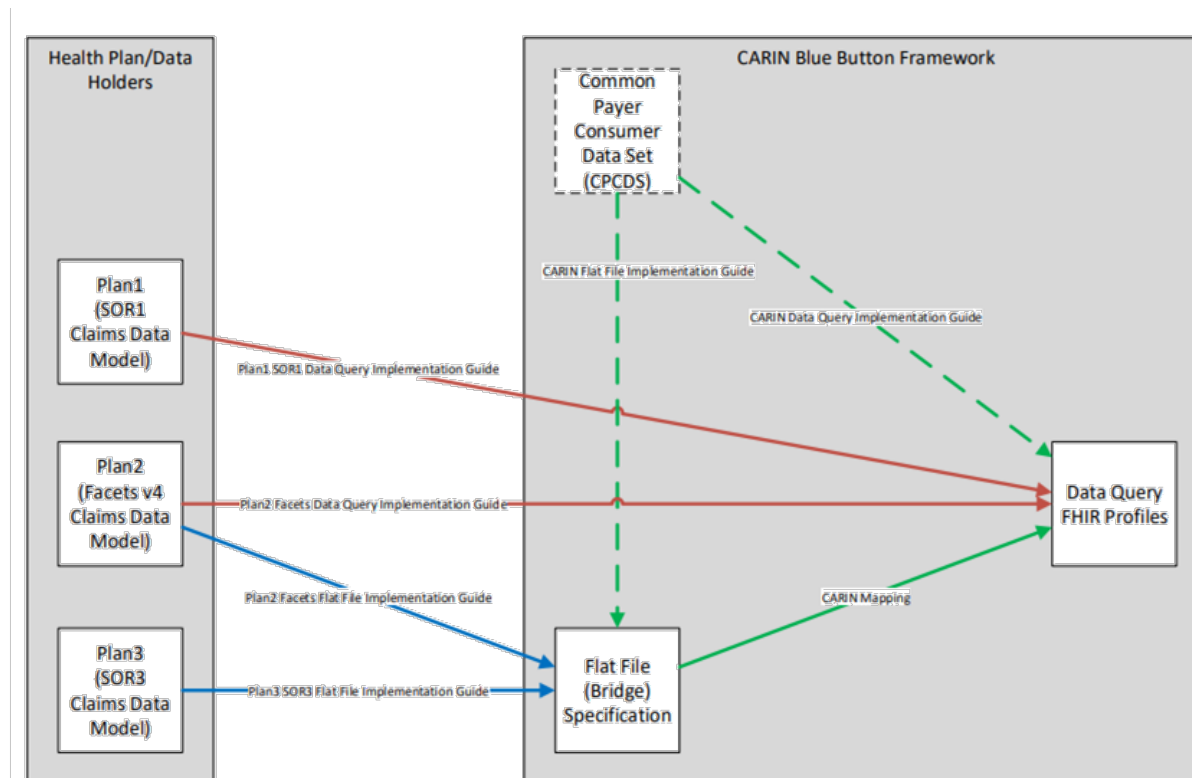
[1] Query Implementation Guide available at: http://hl7.org/fhir/us/carin-bb/STU1/
This entire slide is sourced from:
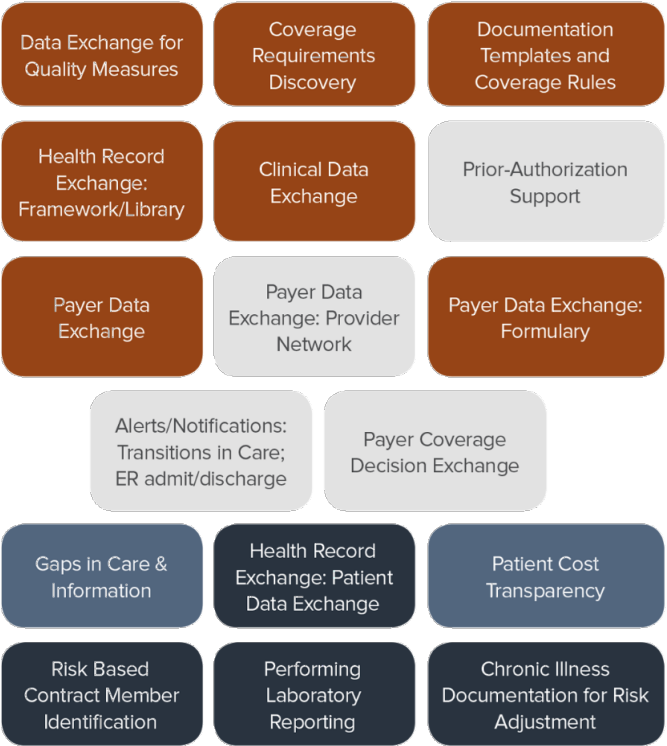https://www.carinalliance.com/wp-content/uploads/2019/07/CARIN-Blue-Button-Framework_071519.pptx
and https://confluence.hl7.org/pages/viewpage.action?pageId=81008633

Example use cases:

- Data Exchange for Quality Measures
  - Value-based care incentives increasingly require proof of thirty-day medication reconciliation post-discharge
- Coverage Requirements Discovery
  - With a FHIR-based API, providers can discover (in real-time) specific payer requirements that may affect whether the responsible payer will cover certain services or devices

2019 USE CASE INVENTORY & STATUS

Data Exchange for Quality Measures	Coverage Requirements Discovery	Documentation Templates and Coverage Rules
Health Record Exchange: Framework/Library	Clinical Data Exchange	Prior-Authorization Support
Payer Data Exchange	Payer Data Exchange: Provider Network	Payer Data Exchange: Formulary
	Alerts/Notifications: Transitions in Care; ER admit/discharge	Payer Coverage Decision Exchange
Gaps in Care & Information	Health Record Exchange: Patient Data Exchange	Patient Cost Transparency
Risk Based Contract Member Identification	Performing Laboratory Reporting	Chronic Illness Documentation for Risk Adjustment

Legend:
- In Ballot Process through HL7
- Targeted for September Ballot
- In Discovery targeted for HL7 January Ballot
- Use cases in discovery (some may be balloted in January 2020)

PROJECT PROCESS

Define requirements (technical, business and testing)
- → Create Implementation Guide
- → Create and test Reference Implementation (prove the guide works)
- → Pilot the solution
- → Deploy the solution

This entire slide is sourced from: http://www.hl7.org/about/davinci/use-cases.cfm

Using Data at the Point of Care

Amida and the University of Pittsburgh Medical Center (UPMC) built a proof-of-concept (PoC) to demonstrate CMS DPC data integrated into UPMC's healthcare operating system (hcOS) for use during patient care.

- The PoC shows patient data retrieved from the DPC sandbox and displayed in UPMC's hcOS Patient Viewer

- hcOS provides a platform and tools for developers in health care that can foster an ecosystem of third-party apps working on top of IT systems

- Data relies entirely on the FHIR specification

hcOS Patient Viewer

Patient Information

Download Everything

Name:	Beahan218, Diego316
Date of Birth:	2011-07-09
Gender:	male
Contact Information:	home phone: 1-158-603-9938 x09368
Address:	30186 Ima Cove,, , XXXXX

Identifiers:

System	Value
https://github.com/synthetichealth/synthea	64ba59bb-ece4-48b1-a704-3a6688025e6f
http://hl7.org/fhir/sid/us-ssn	999699478
http://hospital.smarthealthit.org	64ba59bb-ece4-48b1-a704-3a6688025e6f

hcOS Documents
By Type
By EHR Condition
By Provider

hcOS Images
CT Head 3
CT Chest 1

EHR Data
Immunization 20
Condition 2

Amida's Open-Source Blue Button Repositories

Amida maintains the following open-source Blue Button code repositories.

| Repository	Description
blue-button	Blue Button (e.g. CCDA, CMS Blue Button) to JSON Parser
blue-button-meta	Metadata about Blue Button format (CCDA) internal structures
blue-button-pim	Patient Identification and Matching based on Blue Button data
blue-button-model	Library that defines a JSON Blue Button health data model
blue-button-cms	Parser that generates JSON data from CMS files for blue-button
blue-button-xml	Parser that converts CCDA- or C32-based XML health data into JSON for blue-button
blue-button-hl7	Transforms HL7 messages into Blue Button data

Amida CMS FHIR API Implementation

Amida has successfully implemented a proof-of-concept integration with the following CMS APIs:

CMS FHIR API	CMS Status	Amida Status
BB2.0	Production	Pilot (CNSI)
DPC	Production pilot (CMS invitation only)[1]	Pilot (UPMC)
BCDA	Production	Evaluated
AB2D	Production	Pilot (Saraswati)

Opportunities

With CMS Blue Button 2.0 data, providers can:

- Offer benefits consistent with those that Medicare, Tricare, and VA users already enjoy

- Combine health system data (including IDN and payer) and CMS data into one portal to give patients with multiple providers (or multiple insurances) a more complete picture

- Allow members to use coverage data to help better select complementary insurance plans

- Leverage historical claims data for patient care using DPC

- Use BCDA and AB2D to retrieve "data parallel to" Claim and Claim Line Feed files in an API-first approach; this will improve ease of access to bulk beneficiary claims data and reduce manual intervention

- Analyze CMS data to identify gaps in patient records and gain greater insight into population health trends

Conclusions
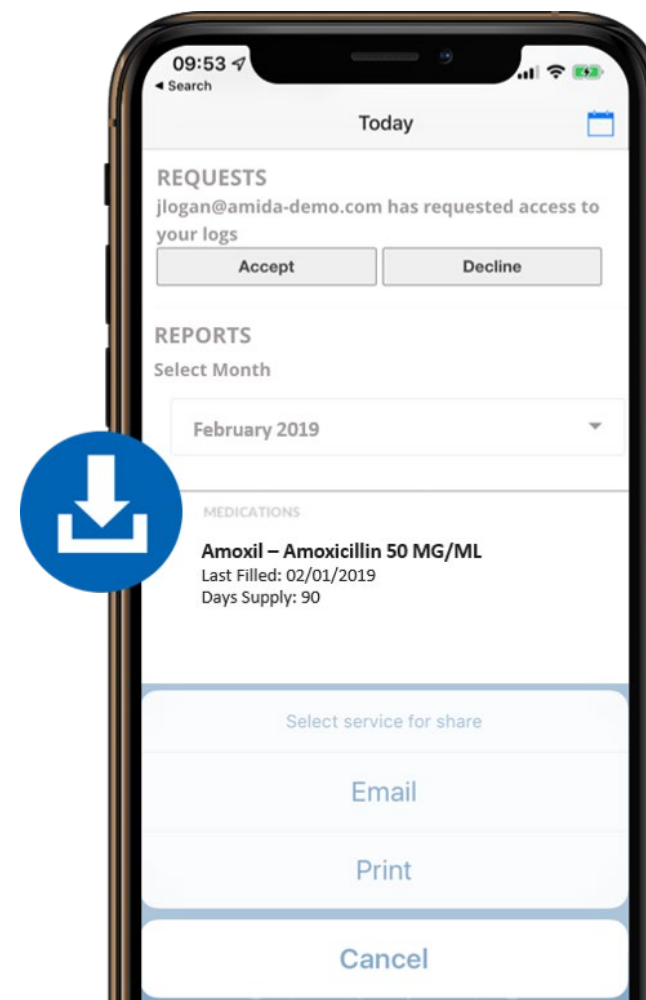
Blue Button 2.0 exchange initiatives enable providers and payers to:

- Improve quality of care, patient access, and risk adjustment, and reduce provider burden[1]

- Use industry-standard payloads (defined by CARIN) for payer data exchange

- Employ DaVinci's implementation guides, test scenarios, and synthetic data to streamline data exchange

- Use FHIR Bulk Data Access as a FHIR-compliant mechanism for the exchange of large quantities of data

[1]https://confluence.hl7.org/display/DVP/Da+Vinci+Implementation+Guide+Dashboard