**FHIR Landscape – April 19, 2019**

| Organization / Effort | Stakeholders | Relation to Interoperability Rule | FHIR IGs | FHIR  Release | Use Cases | FHIR RIs | % Done  IG/RI | Milestones /  Balloting | Adoption/Pilots | Testing |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [US Core v1.0.0](http://www.fhir.org/guides/argonaut/r2/) | Payer, provider, consumer | Define core resources for USA, resource overlap/alignment,  Interoperability with R3, R4 | [US Core](http://www.fhir.org/guides/argonaut/r2/) | DSTU2 | Patient & clinician access health data thru web & mobile app, accessing data across EHRs | No open source reference implementation, but software developed by members | 100% | Complete | 82% adoption across hospitals, 64% of clinicians[[1]](#footnote-1) | Varies by participant, Crucible, AEGIS Touchstone |
| [US Core STU2](http://hl7.org/fhir/us/core/STU2/) | Payer, provider, consumer | Interoperability with R2, R4 | [US Core](http://hl7.org/fhir/us/core/STU2/) | STU3 | Patient & clinician access health data thru web & mobile app, accessing data across EHRs | No open source reference implementation, but pilot software developed by members | 100% | Complete | Varies by participant, ONC Inferno |
| [US Core R4](https://github.com/argonautproject/R4) | Payer, provider, consumer | Define core resources for USA, meet USCDI requirements | [US Core](https://github.com/argonautproject/R4) | R4 | Patient & clinician access health data thru web & mobile app, accessing data across EHRs | No open source reference implementation, but software developed by members | 10% | March - launch  May - Dev plan Summer - Review IG  Sept – HL7 Connectathon  Winter - Publish IG | None – just getting started | Varies by participant |
| [SMART App Launch](http://www.hl7.org/fhir/smart-app-launch/) | Payer, provider, consumer | Authentication / authorization for patient mobile and web applications | [SMART App Launch](http://www.hl7.org/fhir/smart-app-launch/) | R4 | Authentication / authorization for patient mobile and web applications | [SMART on FHIR sandbox](https://launch.smarthealthit.org/), [several client libraries](http://docs.smarthealthit.org/clients/) | 100% | Complete | Hundreds of applications | Varies by app developer, usually using sandbox |
| [HL7 Argonaut Provider Directory](https://github.com/argonautproject/provider-directory) | Provider-consumer | Provider Directory | [Provider Directory](http://www.fhir.org/guides/argonaut/pd/) | STU3 | Lookup practitioner by demographics, within a region (city, state), and organizational relationships. Search for organization and facility by name and address. | No open source reference implementation, but pilot software developed by members | 100% | Complete. No plans to update to R4 | Pilot software developed by members | Varies by participant |
| [HL7 Argonaut Clinical Notes](https://github.com/argonautproject/clinicalnotes) | Provider-provider, provider-consumer | No direct relationship, but can provide clearer physician data to patient | [Clinical Notes](https://github.com/argonautproject/clinicalnotes) | STU3 | Guidance to create, use, and share Clinical Notes | No open source reference implementation, but pilot software developed by members | 100% | R3 Complete. Submitted for inclusion in R4 on Dec 2018 | Pilot software developed by members | Varies by participant |
| [HL7 Argonaut Questionnaire](https://github.com/argonautproject/questionnaire) | Payer-provider | No direct relationship | [Questionnaire](https://github.com/argonautproject/questionnaire) | STU3 | Creating and using basic FHIR Questionnaires for simple assessments | No open source reference implementation, but pilot software developed by members | 100% | Complete | Pilot software developed by members | Varies by participant |
| [HL7 Argonaut Scheduling](https://github.com/argonautproject/scheduling) | Provider-provider, provider-consumer | Consumer-facing functionality | [HL7 Argonaut Scheduling](http://www.fhir.org/guides/argonaut/scheduling/) | STU3 | Patient and provider access to provider's calendar and appointment requests | No open source reference implementation, but pilot software developed by members | 100% | Complete | Yes | Varies by participant |
| [HL7 Argonaut Bulk Data Access of Clinical Data](https://docs.google.com/presentation/d/14ZHmam9hwz6-SsCG1YqUIQnJ56bvSqEatebltgEVR6c/edit#slide=id.p) | Provider-provider,  Payer-provider | No direct relationship | [Bulk Data](https://github.com/smart-on-fhir/fhir-bulk-data-docs/blob/master/export.md),  [Bulk data 2](https://build.fhir.org/ig/HL7/bulk-data/) | STU3 | Synchronizing data across EHRs, population health, analytics, machine learning | Open source SMART on FHIR bulk data [server](https://github.com/smart-on-fhir/bulk-data-server) and [client](https://github.com/smart-on-fhir/sample-apps-stu3/tree/master/fhir-downloader),  Cerner bulk data server, [several others](https://github.com/smart-on-fhir/fhir-bulk-data-docs/blob/master/implementations.md) | 100%/100% | Complete | Cerner | Varies by participant |
| [HL7 Argonaut Clinical Data Subscriptions](https://github.com/argonautproject/subscriptions) | Provider-provider, provider-consumer | Provide notifications to patient on medical record changes. | None – just getting started | R4 | Push updates of medical record information to authorized recipients | None – just getting started | 0%/0% | April - launch  May – develop use cases  Aug - draft IG, publicly deployed reference implementation(s) that meet the draft spec  Sept – HL7 Connectathon  Dec - Publish IG | None – just getting started | TBD – push technology |
| HL7 Argonaut Provenance | Payer-provider,  Provider-provider | No direct relationship | None – not started yet | R4 | Anticipated to be part of USCDI | None – not started yet | 0%/0% | Not started yet | None – not started yet | Usually varies by participant |
| [HL7 Argonaut SMART web messaging and CDS Hooks (radiology ordering)](https://github.com/argonautproject/cds-hooks-for-pama) | Provider-provider | No direct relationship | None – just getting started | R4 | Support 2020 PAMA requirement for ordering advanced imaging services | None – just getting started | 0%/0% | No schedule yet | None – just getting started | Usually varies by participant |
| [CMS Blue Button 2.0](https://bluebutton.cms.gov/) | Payer-consumer | Claims & Encounters overlap and alignment. Patient profile and extensions different from US Core Patient. | [Blue Button 2.0](https://bluebutton.cms.gov/assets/ig/index.html) | STU3 | Patient access to their healthcare data | [CMS Blue Button 2.0 Sandbox](https://sandbox.bluebutton.cms.gov/) / [open source software](https://github.com/blue-button) | 100%/100% | Complete | 1,500 registered developers | Custom test framework |
| [CDS Hooks](https://cds-hooks.org/) | Provider | No direct relationship | [CDS Hooks](https://cds-hooks.org/#overview) | STU3 | Invoking decision support from within a clinician's  workflow | [CDS Hooks sandbox](http://sandbox.cds-hooks.org/) | 100%/100% | Iteration complete. Development continues. | Pilot with Epic, Cerner. CDS Hooks leveraged in several other IGs | Varies by participant, usually using sandbox |
| [CARIN Alliance](https://www.carinalliance.com/our-work/consumer-id-authentication/)  [Consumer ID & Authentication](https://www.carinalliance.com/our-work/consumer-id-authentication/) | Payer, provider, consumer | Patient matching, authentication | No IG envisioned | N/A | Matching patients across health care organizations | Open source framework for federating trusted Identity Assurance Level 2 (IAL2) certified credentials across health care organizations | NA/0% | Digital ID summit in June to discuss approach | None yet | To be determined |
| [CARIN Alliance](https://www.carinalliance.com/our-work/health-plan/)  [Health Plan](https://www.carinalliance.com/our-work/health-plan/) | Payer-consumer | Claims & Encounters overlap and alignment | [Health Plan](https://www.carinalliance.com/wp-content/uploads/2019/04/CARIN-Blue-Button-Framework_040119.pdf) | R4 | Set of resources that payers can display to consumers | Not yet | 80%/0% | Draft IG by end of April | No pilot yet, but lots of interest | To be determined |
| [CARIN Alliance / Blue Button 2.0](https://www.carinalliance.com/wp-content/uploads/2018/12/CARIN-Blue-Button-Framework_121018-clean.pdf) | Payer-consumer | Claims & Encounters overlap and alignment | CARIN Flat File,  CARIN Data Query | R4[[2]](#footnote-2) | Patient access to their healthcare data | Summer 2019 | 50%/50% | Reference implementation in Summer 2019 | None – in development | Custom test framework |
| [CARIN Alliance Real Time Prescription Benefit Check](https://carinalliance.com/real-time-pharmacy-benefit-check-rtpbc/) | Payer-consumer | Plan Coverage & Medical Formularies | In development - not yet public | R4 | Consumer access their out of pocket costs, therapeutic alternatives, benefit and formulary information | Not yet | 20%/0% | Summer 2019 - draft IG  Sept – HL7 connectathon  testing  IG by the end of 2019 | None yet | To be determined |
| [HL7 Da Vinci](https://build.fhir.org/ig/HL7/davinci-deqm/)  [Data Exchange for Quality Measures](https://build.fhir.org/ig/HL7/davinci-deqm/) | Payer-provider | No direct relationship | [Data Exchange for Quality Measures](https://build.fhir.org/ig/HL7/davinci-deqm/profiles.html#profiles) | STU3, R4 | [Support value-based care data exchange](https://build.fhir.org/ig/HL7/davinci-deqm/usecases.html) | [CQL Measure Processing Component](https://github.com/DBCG/cqf-ruler) | 70% | [In second ballot](http://www.hl7.org/fhir/us/davinci-deqm/history.cfml) | Pilot software developed by members | AEGIS Touchstone[[3]](#footnote-3), transitioning to Inferno |
| [HL7 Da Vinci Coverage Requirements Discovery](http://hl7.org/fhir/us/davinci-crd/2019May/) | Payer-provider | No direct relationship | [Coverage Requirements Discovery](http://hl7.org/fhir/us/davinci-crd/2019May/) | STU3, R4 | [Payers share coverage requirements with clinical systems](http://hl7.org/fhir/us/davinci-crd/2019May/usecases.html) | MITRE developing open source reference implementation under CMS DME eRX project | 80%/80% | [In second ballot reconciliation](https://confluence.hl7.org/display/DVP/Coverage+Requirements+Discovery) | Pilot software developed by members | AEGIS Touchstone |
| [HL7 Da Vinci Documentation Template and Rules](https://build.fhir.org/ig/HL7/davinci-dtr/) | Payer-provider | No direct relationship | [Documentation Template and Rules](https://build.fhir.org/ig/HL7/davinci-dtr/) | STU3, R4 | [Meeting documentation requirements when payer rules are executed in a provider context](https://build.fhir.org/ig/HL7/davinci-dtr/use_case.html) | No reference implementation, but pilot software developed by members | 50% | [May connectathon,](https://confluence.hl7.org/pages/viewpage.action?pageId=21857604)  [ballot in September](https://confluence.hl7.org/pages/viewpage.action?pageId=21857604) | Pilot software developed by members | AEGIS Touchstone |
| [HL7 Da Vinci Clinical Data Exchange](https://confluence.hl7.org/pages/viewpage.action?pageId=40738757) | Provider-provider, payer-provider,  provider-third party | Resource overlap and alignment | [Clinical Data Exchange Proposal](https://confluence.hl7.org/pages/viewpage.action?pageId=39158657) | R4 | Provider-provider, provider-payer, provider-third party clinical information exchange | No reference implementation, but pilot software being developed by members for connectathon | 50% | [May connectathon,](https://confluence.hl7.org/pages/viewpage.action?pageId=40738757)  [early ballot in July,](https://confluence.hl7.org/pages/viewpage.action?pageId=40738757)  [publish draft with final rule in Fall 2019](https://confluence.hl7.org/pages/viewpage.action?pageId=40738757) | Pilot software developed by members | AEGIS Touchstone |
| [HL7 Da Vinci Payer Data Exchange](https://confluence.hl7.org/pages/viewpage.action?pageId=40738760) | Payer-provider | No direct relationship | [Payer Data Exchange Proposal](https://confluence.hl7.org/pages/viewpage.action?pageId=39158184) | R4 | Exchange of payer data on specific patients for better patient care | No reference implementation, but pilot software being developed by members for connectathon | 50% | [May connectathon,](https://confluence.hl7.org/pages/viewpage.action?pageId=40738760)  [early ballot in July,](https://confluence.hl7.org/pages/viewpage.action?pageId=40738760)  [publish draft with final rule in Fall 2019](https://confluence.hl7.org/pages/viewpage.action?pageId=40738760) | Pilot software developed by members | AEGIS Touchstone |
| [HL7 Da Vinci Prior Authorization](https://confluence.hl7.org/display/FM/PSS+for+Prior-Authorization+Support) | Payer-provider | Resource overlap and alignment | [Prior Authorization Proposal](http://wiki.hl7.org/index.php?title=Da_Vinci_Prior_Authorization_FHIR_IG_Proposal) | R4 | Provider, at point of service, to request and receive immediate authorization | MITRE developing open source RI under ONC Interoperability Advisory project | 10%/10% | May connectathon,  early ballot in July,  publish draft with final rule in Fall 2019 | None yet | AEGIS Touchstone |
| [HL7 Da Vinci ADT](https://confluence.hl7.org/display/FM/PSS+for+Alerts) | Payer-payer, Payer-provider | ADT | [ADT Alert Proposal](https://confluence.hl7.org/display/FM/PSS+for+Alerts) | R4 | Transitions of care, ER admit/discharge, cross-enterprise data exchange | Not started yet | 0% | Start project in May, looking to complete in Fall 2019 | None – not started yet | TBD – push technology |
| [HL7 Da Vinci](https://confluence.hl7.org/display/FM/PSS+for+Risk+Based+Contract+Member+Identification)  [Risk-based Contract Member Identification](https://confluence.hl7.org/display/FM/PSS+for+Risk+Based+Contract+Member+Identification) | Payer-provider | No direct relationship | [Risk-based Contact Member Identification Proposal](https://confluence.hl7.org/display/FM/PSS+for+Risk+Based+Contract+Member+Identification) | R4 | Payers and provider exchange information that identifies members of patient population associated with particular risk-based contract | Not started yet | 0% | Sept – first ballot,  Jan, 2020 - publish | None – just getting started | AEGIS Touchstone |
| HL7 Da Vinci Lab Results | Payer-payer, Payer-provider | Lab Results | None – just getting started | R4 | Acquiring and sharing lab results | Not started yet | 0% | Lower priority than other Da Vinci efforts | None – just getting started | AEGIS Touchstone |
| [MITRE Standard Health Record](http://standardhealthrecord.org/) | Provider-patient | Resource overlap and alignment | [Breast Cancer](http://hl7.org/fhir/us/breastcancer/2018Sep/), [Occupational Data for Health](http://hl7.org/fhir/us/odh/2018Sep/), [Skin and Wound Assessment](https://cimi.hl7.org/submissions/september_2018/skinwoundig/fullcimi/site/index.html) | STU3 | High quality, computable source of patient information thru a single target for health data standardization | [Standard Health Record Reference Implementation](https://github.com/standardhealth) | 100% | Occupational Data for Health (STU1 balloted), others balloted for comment only | Several[[4]](#footnote-4) | Varies by participant,  targeting ONC Inferno |
| [MITRE mCODE](https://health.mitre.org/mcode/) | Provider-patient | Resource overlap and alignment | [mCODE](http://standardhealthrecord.org/guides/mcode/profiles.html),  [Data dictionary](http://standardhealthrecord.org/guides/mcode/mCODEDataDictionary.xlsx) | DSTU2[[5]](#footnote-5) | Minimal oncology data set | Flex, Compass | V0.9 is 90% done for early adopters | Not yet balloted, Release first stable version of mCODE by April 22,  Announcement of mCODE by ASCO |
| [ONC Validated Healthcare Directory](http://hl7.org/fhir/uv/vhdir/2018Jan/index.html) | Provider-consumer | Provider directory,  pharmacy directory | [Validated Healthcare Directory](http://hl7.org/fhir/uv/vhdir/2018Jan/index.html) | R4 (does not use USCore) | Find individual or organization, accessibility info, insurance plan participation | Telstra developed an R4-based implementation for pilot (not open source) | 80%/80% | Draft standard approval imminent | Piloting with Telstra in Australia | Postman |
| Post-acute Care Interoperability Working Group | Provider-provider, provider-consumer | Resource overlap and alignment | Data Element Library (DEL), others TBD | R4 | Transitions of care - hospital to SNF, SNF to ED,  Hospital to HHA,  medication lists | DEL FHIR sandbox, software developed by members | DEL: 20%/5%  Use case:  0%/0% | Demo use case at Sept 2019 HL7 Connect-a-thon | None - just getting started | Will vary by participant, ONC Inferno |
| Plan Coverage and Medical Formularies | Payer-consumer | Plan Coverage, Medical Formularies | In development | R4 | Patient access to medication coverages by payer | In development | 50%/10% | April: Draft IG  May: Draft RI | None yet, new development | Targeting ONC Inferno |
| [Poplin](http://projectpoplin.org/) | Payer-provider, provider-consumer | Claims data overlap and alignment | [Poplin Core, Eligibility,](https://github.com/MITA-Governance-Board/Poplin)  [Provider Screening](https://github.com/MITA-Governance-Board/Poplin) | STU3 | Medicaid enrollment/eligibility in multiple states, provider screening | West Virginia/Ohio multi-state enrollment/eligibility | 25%/25% | Transitioned to industry July 2018 at CMS direction | Effort has stalled pending CMS direction on Medicaid APIs | ThreadBear certification tool |
| [NIH All of Us](https://allofus.nih.gov/) | Patients | Patient data overlap and alignment | SMART, Argonaut | DSTU2 | Patient data donations to scientific research | No open source reference implementation | 100% | Added FitBit support January, 2019 | Active patient signup, integration with FitBit | Custom testing tool, ONC Inferno |
| [Apple](https://developer.apple.com/healthkit/) | Patients, providers | Patient data overlap and alignment | SMART, Argonaut | DSTU2 | Patient data access | No open source reference implementation | 100% | Complete | Hundreds of providers[[6]](#footnote-6) | Custom testing tool, ONC Inferno |
| [Project Gravity](https://www.hcinnovationgroup.com/population-health-management/social-determinants-of-health/news/21074500/gravity-project-building-consensus-around-coding-social-determinants-data-in-ehrs) | Patients, providers, payers | Patient data overlap and alignment | None – just getting started | R4 | Sharing social determinants of health data in EHR systems | To be determined | 0%/0% | May 2 - launch,  CY2019Q4 – terminology and coding recommendations  2020 – FHIR IG | None – just getting started | To be determined |

**Risks and Mitigation Strategies**

Risks associated with any FHIR initiative center around the ability for each effort to reach consensus, both within the organization as well as with overlapping areas of work being addressed by other FHIR-based development organizations. Mitigation strategies involve interacting with other FHIR-based development organizations, sharing each other’s efforts, and actively working to resolve differences as they arise.

The CARIN/Blue Button team has identified a risk on the timing of the final R4 release for US Core and the corresponding deadline of January 1, 2020 for the Interoperability Rule. The mitigation strategy to address this risk is to refer to DSTU2 resources within US Core as necessary to meet the deadline.

1. <https://www.hcinnovationgroup.com/interoperability-hie/news/13030762/new-onc-analysis-reveals-progress-on-fhir-adoption-implementation> [↑](#footnote-ref-1)
2. May reference some DSTU2-based elements in USCore to meet CMS/ONC NRPM rule deadline of January 1, 2020. [↑](#footnote-ref-2)
3. Da Vinci has a contract with AEGIS. [↑](#footnote-ref-3)
4. Dana Farber Cancer Institute, MD Anderson Cancer Center, Brigham and Women’s Hospital, St. Elizabeth Healthcare, St Joseph Mercy Ann Arbor, Intermountain Healthcare, MMCORC, ThedaCare, COZE Health. Several others in pursuit. [↑](#footnote-ref-4)
5. Version supported by most pilot partners. [↑](#footnote-ref-5)
6. <https://support.apple.com/en-us/HT208647> [↑](#footnote-ref-6)