170.315(g) (10)
SmartOnFHIR API Documentation

Version	v.1.2
Last Updated	05/29/2025

Revision History

Revision	Date	Comment
v1.0	03/03/2025	Initial revision
v1.1	03/11/2025	Added g(7) and g(9) endpoints
v1.2	05/29/2025	Added US Profile and Data Elements Mapping

1. Product Name and Version

CarbyOs EHR v3.0

2. Introduction

In this documentation we will list all the steps required to access protected health information based on the documentation of an open API. The API makes health information broadly available using FHIR®, a set of clinical interoperability resources under the umbrella of the HL7 standards organization. FHIR is based on common web standards that can be reached through a RESTful protocol in which each FHIR resource has a known URL. This document describes OAuth 2.0 for client applications to authorize, authenticate, and integrate with FHIR-based data systems.

We follow Smart-On-FHIR authentication (OAuth2) and authorization (Ref. http://hl7.org/fhir/smart-app-launch/toc.html)

3. FHIR Endpoints

Note: Production and Test Server endpoints are subject to change.

Production Endpoint

FHIR Base Url :

- https://api-gateway.production.awscarbonhealth.com/hapi-fhir

Authentication Server Url:

- https://api-gateway.production.awscarbonhealth.com/fhir-smart-auth

Test Server Endpoint

FHIR Base Url:

- https://api-gateway.alpha.awscarbonhealth.com/hapi-fhir

Authentication Server Url:

- https://api-gateway.alpha.awscarbonhealth.com/fhir-smart-auth

4. Types of Smart-On-FHIR Applications

- **Standalone App:** SMART on FHIR confidential client with a patient context, refresh token, and OpenID Connect (OIDC) identity token.
- **EHR Embedded app:** Demonstrate the ability to perform an EHR launch to a SMART on FHIR
- **Smart Backend Services App (Multi-patient authorization and API):** These are server-to-server backend applications e.g. Export clinical data for multiple patients in a group. This app is system level app without any UI.

5. Types of Authentications Supported

- **Symmetric ("client secret") authentication** (HL7.FHIR.UV.SMART-APP-LAUNCH\Example App Launch for Symmetric Client Auth - FHIR v4.0.1)
- **Asymmetric ("private key JWT") authentication** (HL7.FHIR.UV.SMART-APP-LAUNCH\Example App Launch for Asymmetric Client Auth - FHIR v4.0.1)
- **Public Clients** (HL7.FHIR.UV.SMART-APP-LAUNCH\Example App Launch for Public Client - FHIR v4.0.1)

6. Steps for Smart App Launch

Client APP Registration

Before a SMART app can run against an EHR, the app must be registered with that EHR's authorization service. We are using OAuth 2.0 Client Registration.

Client App Request process

Third-party application must sign the API Subscription Agreement with following details

- The app name
- The necessary APIs / Scopes
- Any redirect URIs
- Launch URL (optional)

- URL to JWK Set (Only for apps supporting asymmetric client authentication).

The application is created by the EHR admin after confirming the app's registration parameters and communicates a client_id to the app.

- FHIR APIs (of any supported version) listed within the USCDI v3 core data set will be supported
- Only reads data from FHIR server

Retrieve .well-known/smart-configuration

In order to obtain launch context and request authorization to access FHIR resources, the app discovers the EHR FHIR server's SMART configuration metadata, including OAuth authorization_endpoint and token_endpoint URLs.

FHIR server makes SMART configuration available from well-known endpoint. You can get Authorization end point and token endpoint.

Request

GET	<FHIRBaseUrl>/fhir/.well-known/smart-configuration

```
Unset
{
  "authorization_endpoint":"<AuthServerURL>/oauth2/authorize",
  "token_endpoint":"<AuthServerURL>/oauth2/token",
  "introspection_endpoint":"<AuthServerURL>/oauth2/introspect",
  "revocation_endpoint":"<AuthServerURL>/oauth2/revoke",
  "capabilities":[
    "launch-ehr",
    "launch-standalone",
    "client-public",
    "client-confidential-asymmetric",
    "client-confidential-symmetric",
    "sso-openid-connect",
    "context-banner",
    "context-style",
    "context-ehr-patient",
    "context-ehr-encounter",
    "context-standalone-patient",
    "context-standalone-encounter",
    "permission-offline",
```

```
      "permission-patient",
      "permission-user",
      "permission-v1",
      "permission-v2",
      "authorize-post"
    ],
    "grant_types_supported":[
      "client_credentials",
      "authorization_code",
      "refresh_token"
    ],
    "code_challenge_methods_supported":[
      "S256"
    ],
    "issuer":"<AuthServerURL>",
    "jwks_uri":"<AuthServerURL>/oauth2/jwks",
    "token_endpoint_auth_methods_supported": [
      "client_secret_basic",
      "private_key_jwt"
    ],
    "token_endpoint_auth_signing_alg_values_supported": [
      "RS384",
      "ES384"
    ],
    "scopes_supported": [
      "openid",
      "profile",
      "launch",
      "launch/patient",
      "patient/*.*",
      "user/*.*",
      "system/*.rs",
      "fhirUser",
      "offline_access"
    ],
    "response_types_supported": [
      "code",
      "code id_token",
      "id_token",
      "refresh_token"
    ]
  }
```


Response Codes:

200	Ok
401	Unauthorized

400	Bad Request
500	Internal Server Error

Obtain authorization code

The app supplies the following parameters to the EHR's "authorize" endpoint.

Parameters		
`response_type`	required	Fixed value: `code`
`client_id`	required	The client`s identifier.
`redirect_uri`	required	Must match one of the client's pre-registered redirect URIs.
`launch`	conditional	When using the EHR Launch flow, this must match the launch value received from the EHR. Omitted when using the Standalone Launch.
`scope`	required	Must describe the access that the app needs, including scopes like `patient/*.rs`, `openid` and `fhirUser` (if app needs authenticated patient identity) and either: • a `launch` value indicating that the app wants to receive already-established launch context details from the EHR • a set of launch context requirements in the form `launch/patient`, which asks the EHR to establish context on your behalf. Please refer to the scopes supported in the table below
`state`	required	An opaque value used by the client to maintain state between the request and callback. The authorization server includes this value when redirecting the user-agent back to the client. The parameter SHALL be used for preventing cross-site request forgery or session fixation attacks. The app SHALL use an unpredictable value for the state parameter with at least 122 bits of entropy (e.g., a properly configured random uuid is suitable).
`aud`	required	URL of the EHR resource server from which the app wishes to retrieve FHIR data. This parameter prevents leaking a genuine bearer token to a counterfeit resource

		server. (Note that in the case of an `EHR launch` flow, this `aud` value is the same as the launch's iss value.) Note that the aud parameter is semantically equivalent to the resource parameter defined in RFC8707. SMART's `aud` parameter predates RFC8707 and we have decided not to rename it for reasons of backwards compatibility. We might consider renaming SMART's `aud` parameter in the future if implementer feedback indicates that alignment would be valuable. For the current release, servers SHALL support the aud parameter and MAY support a resource parameter as a synonym for `aud`.

Scopes Supported	
`patient/*.r` `patient/*.read`	Permission to read and search any resource for the current patient (see notes on wildcard scopes below).
`user/*.r` `user/*.read`	Permission to read and write all resources that the current user can access (see notes on wildcard scopes below).
`openid`	Permission to retrieve information about the current logged-in user. Scope Grants
`fhirUser`	
`launch`	Permission to obtain launch context when app is launched from an EHR.
`launch/patient`	When launching outside the EHR, ask for a patient to be selected at launch time.
`offline_access`	Request a refresh_token that can be used to obtain a new access token to replace an expired one, even after the end-user no longer is online after the access token expires.

Here's an example of an authorization request using HTTP GET. You will replace the `[redirect_uri]`, `[client_id]`, `[launch_token]`, `[scopes]`, `[state]`, `[code_challenge]`, and `[audience]` placeholders with your own values.

Request

```
Unset
https://<AuthServerURL>/oauth2/authorize?
      response_type=code&
      client_id=[client_id]&
      redirect_uri=[redirect_uri]&
      launch=[launch_token]&
```

```
scope=[scopes]&
state=[state]&
aud=[audience]
```

For example:

```
Unset
https://[FHIRBaseURL]/oauth2/authorize?response_type=code&client_id=SAMPLE_CONFIDENTIAL_CLIENT_
ID&redirect_uri=https%3A%2F%2Finferno.healthit.gov%2Finferno%2Foauth2%2Fstatic%2Fredirect&scope=l
aunch%2Fpatient+openid+fhirUser+offline_access+patient%2FMedication.read+patient%2FAllergyIntoleran
ce.read+patient%2FCarePlan.read+patient%2FCareTeam.read+patient%2FCondition.read+patient%2FDevic
e.read+patient%2FDiagnosticReport.read+patient%2FDocumentReference.read+patient%2FEncounter.read
+patient%2FGoal.read+patient%2FImmunization.read+patient%2FLocation.read+patient%2FMedicationRe
quest.read+patient%2FObservation.read+patient%2FOrganization.read+patient%2FPatient.read+patient%
2FPractitioner.read+patient%2FProcedure.read+patient%2FProvenance.read+patient%2FPractitionerRole.r
ead&state=26a45e37-7445-4e4a-b8fb24144eccbdc4&aud=https%3A%2F%2Finferno.healthit.gov%2Freference-server%2Fr4
```

Response

The EHR's authorization server reviews the request from your application. If approved, the authorization server redirects the browser to the redirect URL supplied in the initial request and appends the following querystring parameter.

- `code`: This parameter contains the authorization code generated by EHR, which will be exchanged for the access token in the next step.
- `state`: The exact value received from the client.

Here is how redirect URL will look like

- **Location**: https://app/after-auth?code=123abc&state=98wrghuwuogerg97

```
Unset
https://inferno.healthit.gov/inferno/oauth2/static/redirect?code=SAMP
LE_CODE.bGF1bmNoL3BhdGllbnQgb3BlbmlkIGZoaXJVc2VyIG9mZmxpb
mVfYWNjZXNzIHBhdGllbnQvTWVkaWNhdGlvbi5yZWFkIHBhdGllbnQvQWxsZXJneUludG
9sZXJhbmNlLnJlYWQgcGF0aWVudC9DYXJlUGxhbi5yZWF
kIHBhdGllbnQvQ2FyZVRlYW0ucmVhZCBwYXRpZW50L0NvbmRpdGlvbi5yZWFkIHBhdGll
bnQvRGV2aWNlLnJlYWQgcGF0aWVudC9EaWFnbm9zdG
ljUmVwb3J0LnJlYWQgcGF0aWVudC9Eb2N1bWVudFJlZmVyZW5jZS5yZWFkIHBhdGllbnQ
vRW5jb3VudGVyLnJlYWQgcGF0aWVudC9Hb2FsLnJlYW
QgcGF0aWVudC9JbW11bml6YXRpb24ucmVhZCBwYXRpZW50L0xvY2F0aW9uLnJlYWQgcGF
0aWVudC9NZWRpY2F0aW9uUmVxdWVzdC5yZWFkI
HBhdGllbnQvT2JzZXJ2YXRpb24ucmVhZCBwYXRpZW50L09yZ2FuaXphdGlvbi5yZWFkIH
BhdGllbnQvUGF0aWVudC5yZWFkIHBhdGllbnQvUHJhY3R
pdGlvbmVyLnJlYWQgcGF0aWVudC9Qcm9jZWR1cmUucmVhZCBwYXRpZW50L1Byb3ZlbmFu
Y2UucmVhZCBwYXRpZW50L1ByYWN0aXRpb25lclJv
bGUucmVhZCA=.ODU=&state=26a45e37-7445-4e4a-b8fb-24144eccbdc4
```

After receiving the authorization code, your application trades the code for a JSON object containing an access token and contextual information by sending an HTTP POST to the token endpoint using a Content-Type header with value of "application/x-www-form-urlencoded".

Response Codes: JSON response is returned from the FHIR Server along with the code

200	Ok
401	Unauthorized
400	Bad Request
500	Internal Server Error

Obtain access token

For public apps, authentication is not required because a client with no secret cannot prove its identity when it issues a call. (The end-to-end system can still be secure because the client comes from a known, https protected endpoint specified and enforced by the redirect uri.)

For **confidential apps**, authentication is required. Confidential clients SHOULD use Asymmetric Authentication if available, and MAY use Symmetric Authentication.

There are two different requests to get access token based on authentication type. In case of Symmetric (“client secret”) authentication app issues an HTTP POST to the EHR authorization server’s token endpoint URL using content-type application/x-www-form-urlencoded.

In case of Asymmetric authentication app, generate a client authentication assertion and prepare arguments for POST to token API:

Request

Parameters		
`grant_type`	required	Fixed value: `authorization_code` for symmetric and `client_credentials` for asymmetric
`code`	required	Code that the app received from the authorization server
`redirect_uri`	required	The same `redirect_uri` used in the initial authorization request
`client_id`	conditional	Required for public apps. Omit for confidential apps.
`client_assertion_type`	conditional	Required for asymmetric authentication. set to `urn:ietf:params:oauth:client-assertion-type:jwt-bearer`
`client_assertion`	conditional	Required for asymmetric authentication. set to a JWT signed with your dynamic client’s private key
`scope`	conditional	`system/*.read` for backend services type of application (bulk operations)

Symmetric Authentication Request

- https://<AuthServerURL>/oauth2/token

Payload

```
Unset
grant_type=authorization_code&code=SAMPLE_CODE.bGF1bmNoL3BhdGllbnQgb3BlbmlkIGZoaXJVc2VyIG9mZmxpbmVfYWNjZXNzIHBhdGllbn
```

```
QvTWVkaWNhdGlvbi5yZWFkIHBhdGllbnQvQWxsZXJneUludG9sZXJhbmNlLnJlYWQgcGF
0aWVudC9DYXJlUGxhbi5yZWFkIHBhdGllbnQvQ2FyZVRlY
W0ucmVhZCBwYXRpZW50L0NvbmRpdGlvbi5yZWFkIHBhdGllbnQvRGV2aWNlLnJlYWQgcG
F0aWVudC9EaWFnbm9zdGljUmVwb3J0LnJlYWQgcGF
0aWVudC9Eb2N1bWVudFJlZmVyZW5jZS5yZWFkIHBhdGllbnQvRW5jb3VudGVyLnJlYWQg
cGF0aWVudC9Hb2FsLnJlYWQgcGF0aWVudC9JbW11b
ml6YXRpb24ucmVhZCBwYXRpZW50L0xvY2F0aW9uLnJlYWQgcGF0aWVudC9NZWRpY2F0aW
9uUmVxdWVzdC5yZWFkIHBhdGllbnQvT2JzZXJ2YXR
pb24ucmVhZCBwYXRpZW50L09yZ2FuaXphdGlvbi5yZWFkIHBhdGllbnQvUGF0aWVudC5y
ZWFkIHBhdGllbnQvUHJhY3RpdGlvbmVyLnJlYWQgcGF0
aWVudC9Qcm9jZWR1cmUucmVhZCBwYXRpZW50L1Byb3ZlbmFuY2UucmVhZCBwYXRpZW50L
1ByYWN0aXRpb25lclJvbGUucmVhZCA%3D.ODU%
3D&redirect_uri=https%3A%2F%2Finferno.healthit.gov%2Finferno%2Foauth2
%2Fstatic%2Fredirect
```

In case of Asymmetric authentication following is a request

Unset

```
client_assertion=eyJ0eXAiOiJKV1QiLCJhbGciOiJFUzM4NCIsImtpZCI6IjRiNDlh
NzM5ZDFlYjExNWIzMjI1ZjRjZjliZWI2ZDFiIn0.eyJpc3MiOiJleUpoYkdja
U9pSklVekkxTmlJc0luUjVjQ0k2SWtwWFZDSXNJbXRwWkNJNkluSmxaMmx6ZEhKaGRHbH
ZiaTEwYjJ0bGJpSjkuZXlKcWQydHpYM1Z5YkNJNkltaDBk
SEE2THk4eE1DNHhOUzR5TlRJdU56TXZhVzVtWlhKdWJ5OHVkMlZzYkMxcmJtOTNiaTlxZ
DJ0ekxtcHpiMjRpTENKaFkyTmxjM05VYjJ0bGJuTkZlSEJwY
21WSmJpSTZNVFVzSW1saGRDSTZNVFU1TnpReE16RTVOWDAucTR2NE1zYzc0a041MDZLVF
owcV9taW55YXBKdzBnd2xUNk1fdWlMNzNTNCIsInN
1YiI6ImV5SmhiR2NpT2lKSVV6STFOaUlzSW5SNWNDSTZJa3BYVkNJc0ltdHBaQ0k2SW5K
bFoybHpkSEpoZEdsdmJpMTBiMnRsYmlKOS5leUpxZDJ0el
gzVnliQ0k2SW1oMGRIQTZMeTh4TUM0eE5TNHlOVEl1TnpNdmFXNW1aWEp1Ynk4dWQyVnN
iQzFyYm05M2JpOXFkMnR6TG1wemIyNGlMQ0po
WTJObGMzTlViMnRsYm5ORmVIQnBjbVZKYmlJNk1UVXNJbWxoZENJNk1UVTVOelF4TXpFN
U5YMC5xNHY0TXNjNzRrTjUwNktUWjBxX21pbnlhcEp
3MGd3bFQ2TV91aUw3M1M0IiwiYXVkIjoiaHR0cHM6Ly9pbmZlcm5vLmhlYWx0aGl0Lmdv
di9yZWZlcmVuY2Utc2VydmVyL29hdXRoL2J1bGstdG9r
ZW4iLCJleHAiOjE2NTMxMDY4ODgsImp0aSI6ImZmZjA5YjIxMjhiOWRmNmU3MGU5MWQ2Z
DUwMGQxMmFmYmU2YWE4N2FhMjJlZjVhMjc5YjZ
hNTI0YzA0NmM1ZWEifQ.tlx7jIu9wn7QdHHdWyUMf9otY0r7eX62LuVF3kZOsjjw-CP-g
lqdbDtOKiu-
BQ9doduW4zyk3fs6k48XpAEQLsSXajfEJeDy9uj-
```

```
WdSmpAHEC0xYHQSzajekdwlDSBRA&client_assertion_type=urn%3Aietf%3Aparam
s%3Aoauth%3Aclient-assertion-type%3Ajwt-
bearer&grant_type=client_credentials&scope=system%2F%2A.read
```

Response

The EHR authorization server SHALL return a JSON object that includes an access token or a message indicating that the authorization request has been denied. The JSON structure includes the following parameters:

Parameters		
`access_token`	required	The access token issued by the authorization server
`token_type`	required	Fixed value: `Bearer`
`expires_in`	recommended	Lifetime in seconds of the access token, after which the token SHALL NOT be accepted by the resource server
`scope`	required	Scope of access authorized. Note that this can be different from the scopes requested by the app.
`id_token`	optional	Authenticated user identity and user details, if requested
`refresh_token`	optional	Token that can be used to obtain a new access token, using the same or a subset of the original authorization grants

Sample response

Unset

```
{
      "access_token": "3e934471-1dbf-4a69-8e1f-227f9fd65428",
      "refresh_token": "31c4476d-6e9d-41a3-a272-065d05c3599d",
      "patient": "85",
      "scope": "launch/patient openid fhirUser offline_access
      patient/*.read ",
      "need_patient_banner": false,
      "id_token":
      "eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiJ9.eyJzdWIiOiJkYjExNzk1Ny02M
      DU4LTRhODYtYTcxMi0yMDU2NDU5ZDUxMzgiLCJhdWQiOiJTQU1QTEVfQ
      09ORklERU5USUFMX0NMSUVOVF9JRCIsImlzcyI6Imh0dHBzOi8vaW5mZXJuby5o
      ZWFsdGhpdC5nb3YvcmVmZXJlbmNlLXNlcnZlci9yNCIsImV4cCI6
```

```
        MTY4NDU3OTc5NywiaWF0IjoxNjUzMDQzNzk3LCJmaGlyVXNlciI6Imh0dHBzOi8
        vaW5mZXJuby5oZWFsdGhpdC5nb3YvcmVmZXJlbmNlLXNlcnZlci9
        yNC9QYXRpZW50Lzg1In0.R1oMsXCTXMKiM1ohCxh3LkgXrgfBebNIaC_jam9sBO
        wYCCw7K4TLUBmVzKIGb3_-
        5wZtqyTTqO6bRwsituXSefoS1QwI14wLGpk-fOsr6M4uSXW5An4WUy8858j3aa5
        Qkcf0pw4QP3-
        rlmVJoHuN_In4ULn5bpRQJkllEQ2ySPj3pkoWWMwfij5p7nNfvwgkE2QOCM4Q-o
        unE6oLyYZJp_OGvVhkREu8jO77m3Tgsji_jbX7g4-
        deuwB4F9EHUfpjfhM3TB1GIoQ7cgJFhHOs9mTCcpT0aYYQkmCJGRx1R5jI-I56p
        4_63IkU2BRau-INII3Zvcnsz5ajpvU46eIwg",
        "smart_style_url": "<FHIRBaseUrl>/smart-style-url",
        "token_type": "bearer",
        "expires_in": 3600
}
```


Response Codes: JSON response is returned from the FHIR Server along with the code

200	Ok
401	Unauthorized
400	Bad Request
500	Internal Server Error

At this point, the authorization flow is complete.

FHIR Requests

Definitions

Parameter Types:

Query Parameter	Value will be provided as query parameter with specified key Ex: *https://url/hapi-fhir/fhir/Patient?_id=**<patientid>***
Path Parameter	Value will be provided as path parameter in the url Ex: *https://url/hapi-fhir/fhir/Patient/**<patientid>***

Response Types:

Single Resource	Single bundle resource will be provided as response: Ex: Unset `{ "resourceType": "Patient", "id": "b3d6acc5-09c0-4757-b882-9a106e1252de", "extension": [ { "url": "http://hl7.org/fhir/us/core/StructureDefinition/us-core-race", "extension": [ .... ] } ] }`
Search Set	Response will be the result of a search. Unset `{ "resourceType": "Bundle",`

```
  "id": "4cd2b0f9-c93d-4849-97fc-c71e5d53129a",
  "meta": {
    "lastUpdated": "2025-03-01T15:22:04.037+00:00"
  },
  "type": "searchset",
  "total": 1,
  "link": [
    {
      "relation": "self",
      "url":
"https://api-gateway.alpha.awscarbonhealth.com/hapi-fhir
/fhir/Patient?_id=b3d6acc5-09c0-4757-b882-9a106e1252de"
    }
  ],
  "entry": [
    {
      "fullUrl":
"https://api-gateway.alpha.awscarbonhealth.com/hapi-fhir
/fhir/Patient/b3d6acc5-09c0-4757-b882-9a106e1252de",
      "resource": {
        "resourceType": "Patient",
        "id": "b3d6acc5-09c0-4757-b882-9a106e1252de",
        "extension": [
          ...
        ]
      }
     ]
    }
  ]
}
```

USCDIv3 Data Class

USCDI v3 Data Class	Endpoint & FHIR Data Element	US Core 6.1.0 Profile
Patient Demographics/Information	Patient	US Core Patient
Allergies and Intolerances	AllergyIntolerance	US Core AllergyIntolerance
Assessment and Plan of Treatment	CarePlan	US Core CarePlan
Care Team Members	CareTeam	US Core CareTeam Profile
Problems, Health Concerns, Encounter Diagnosis	Condition	US Core Condition Encounter Diagnosis Profile US Core Condition Problems and Health Concerns Profile
Health Insurance Information	Coverage	US Core Coverage Profile
Unique Device Identifier(s) for a Patient's Implantable Device(s)	Device	US Core Implantable Device Profile
Clinical Notes, Laboratory, Diagnostic Imaging	DiagnosticReport	US Core DiagnosticReport Profile for Report and Note Exchange US Core DiagnosticReport Profile for Laboratory Results Reporting
Clinical Notes	DocumentReference	US Core DocumentReference Profile
Encounter Information	Encounter	US Core Encounter Profile
Goals	Goal	US Core Goal Profile
Immunizations	Immunization	US Core Immunization Profile
Facility Information	Location	US Core Location Profile
Medications	MedicationDispense, MedicationRequest	US Core MedicationDispense Profile

USCDI v3 Data Class	Endpoint & FHIR Data Element	US Core 6.1.0 Profile
		US Core MedicationRequest Profile
Vital Signs, Laboratory, Clinical Tests, Health Status Assessments, Diagnostic Imaging	Observation	US Core Laboratory Result Observation Profile US Core Observation Pregnancy Status Profile US Core Observation Pregnancy Intent Profile US Core Observation Occupation Profile US Core Smoking Status Observation Profile US Core Observation Sexual Orientation Profile US Core Observation Screening Assessment Profile US Core Observation Clinical Result Profile US Core Vital Signs Profile • US Core Pediatric BMI for Age Observation Profile • US Core Pediatric Head Occipital Frontal Circumference Percentile Profile • US Core Body Weight Profile • US Core Blood Pressure Profile • US Core Head Circumference Profile • US Core Body Height Profile • US Core BMI Profile • US Core Respiratory Rate Profile • US Core Heart Rate Profile • US Core Body

USCDI v3 Data Class	Endpoint & FHIR Data Element	US Core 6.1.0 Profile
		• Temperature Profile • US Core Pediatric Weight for Height Observation Profile • US Core Pulse Oximetry Profile
Provenance	Provenance, Organization, Practitioner	US Core Provenance Profile US Core Organization Profile US Core Practitioner Profile
Procedures	Procedure	US Core Procedure Profile
Patient Demographics	RelatedPerson	US Core RelatedPerson Profile
Various (Lab, Imaging, Procedures)	ServiceRequest	US Core ServiceRequest Profile
Laboratory	Specimen	US Core Specimen Profile

FHIR Data Elements & Endpoints

Patient

Description	Retrieves a patient
Profile	US Core Patient Profile
Path	<FhirBaseUrl>/fhir/Patient

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Patient"
id	string	Unique identifier for the patient
active	boolean	Whether this patient record is active
identifier	Identifier	Business identifiers (MRN and internal ID)
identifier.use	code	usual | official | temp | secondary
identifier.type	CodeableConcept	Type of identifier (MR or PI)
identifier.system	uri	Namespace for the identifier
identifier.value	string	The value that is unique
name	HumanName	Name(s) of the patient
name.use	code	usual | official | temp | nickname | anonymous | old
name.family	string	Family name
name.given	string	Given names
name.suffix	string	Parts that come after the name

US Core 6.1.0 Field	Data Type	Short Description
name.period	Period	Time period when name was/is in use
telecom	ContactPoint	Contact details for the patient
telecom.system	code	phone | fax | email | pager | url | sms | other
telecom.use	code	home | work | temp | old | mobile
telecom.value	string	The actual contact point details
gender	code	male | female | other | unknown
birthDate	date	The date of birth for the patient
deceased[x]	boolean | dateTime	Indicates if patient is deceased
address	Address	Addresses for the patient
address.use	code	home | work | temp | old
address.line	string	Street name, number, direction
address.city	string	Name of city
address.state	string	Sub-unit of country
address.postalCode	string	Postal code
address.period	Period	Time period when address was/is in use
communication	BackboneElement	Language communication capabilities
communication.language	CodeableConcept	Language used to communicate
extension	Extension	Additional content defined by implementations

US Core 6.1.0 Field	Data Type	Short Description
extension:us-core-race	Extension	Categories of race
extension:us-core-ethnicity	Extension	Categories of ethnicity
extension:us-core-birthsex	Extension	Birth sex
extension:us-core-sex	Extension	Biological sex
extension:us-core-genderIdentity	Extension	Gender identity
extension:us-core-tribal-affiliation	Extension	Tribal affiliation

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	_id	The id of the patient	Search Set
Query	identifier	Identifiers such as MRN. Also can be used with an identifier code system. Ex: *?identifier={system|code}*	Search Set
Query	name	Search with any part of the name	Search Set
Query	birthdate+name	Search with specified birth date (yyyy-mm-dd) and name	Search Set
Query	gender+name	Search with specified birth date (yyyy-mm-dd) and name	Search Set
Query	given+family+birthdate+gender	Search with specified given name, family name, birth date (yyyy-mm-dd) and gender	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the patient	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Allergy Intolerance

Description	Retrieves allergies / adverse reactions for a patient
Profile	US Core AllergyIntolerance Profile
Path	<FhirBaseUrl>/fhir/AllergyIntolerance

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "AllergyIntolerance"
id	string	Unique identifier for the allergy
clinicalStatus	CodeableConcept	Whether allergy is active
clinicalStatus.coding	Coding	Code for clinical status
clinicalStatus.coding.code	code	active | inactive | unknown
clinicalStatus.coding.system	uri	Terminology system for status
clinicalStatus.coding.display	string	Display text for status
verificationStatus	CodeableConcept	Assertion about certainty
verificationStatus.coding	Coding	Code for verification
verificationStatus.coding.code	code	Always "confirmed"
verificationStatus.coding.system	uri	Terminology system
verificationStatus.coding.display	string	Always "Confirmed"
code	CodeableConcept	Code for the allergy substance
code.coding	Coding	RxNorm code
code.coding.code	code	RxNorm identifier
code.coding.system	uri	"RXNORM"
code.coding.display	string	RxNorm name
patient	Reference(Patient)	Who has the allergy
reaction	BackboneElement	Adverse reaction details

US Core 6.1.0 Field	Data Type	Short Description
reaction.manifestation	CodeableConcept	Clinical symptoms
reaction.manifestation.coding	Coding	SNOMED CT code
reaction.manifestation.coding.code	code	SNOMED code or "UNK"
reaction.manifestation.coding.system	uri	SNOMED or NullFlavor system
reaction.manifestation.coding.display	string	Reaction text

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient	The id of the patient	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the Allergy intolerance document	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Care Plan

Description	Retrieves assessment and plan of treatment for a patient
Profile	US Core CarePlan Profile
Path	<FhirBaseUrl>/fhir/CarePlan

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "CarePlan"
id	string	Unique identifier for the care plan
identifier	Identifier	Business identifier for the care plan
status	code	Indicates whether the plan is draft, active, suspended, etc.
intent	code	Indicates the level of authority/intentionality
category	CodeableConcept	Type of plan (e.g., assess-plan, sdoh)
subject	Reference(Patient)	Who the care plan is for
text	Narrative	Human-readable summary of the care plan
text.status	code	generated
text.div	xhtml	Limited xhtml content

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient+category	All care plans for specified patient id and category	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the care plan document	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Care Teams

Description	Retrieves persons who participate in patient's care
Profile	US Core CareTeam Profile
Path	<FhirBaseUrl>/fhir/CareTeam

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "CareTeam"
id	string	Unique identifier for the care team
identifier	Identifier	Business identifier for the care team
status	code	Indicates whether the team is active
subject	Reference(Patient)	Who the care team is for
participant	BackboneElement	Members of the team
participant.role	CodeableConcept	Role on the team
participant.member	Reference	Who is involved

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient+status	All members of care team for patients of an identified status	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the care team resource	Single

POST **/_search**

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Conditions

Description	Retrieves problems, health concerns and encounter diagnosis
Profile	US Core Condition Encounter Diagnosis Profile US Core Condition Problems and Health Concerns Profile
Path	<FhirBaseUrl>/fhir/Condition

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Condition"
id	string	Unique identifier for the condition
meta	Meta	Metadata about the resource
meta.lastUpdated	instant	When the resource version last changed
identifier	Identifier	Business identifier for condition
identifier.system	uri	Namespace for identifier
identifier.value	string	The value that is unique
clinicalStatus	CodeableConcept	active | inactive status
clinicalStatus.coding	Coding	Code for clinical status
clinicalStatus.coding.code	code	active | inactive
clinicalStatus.coding.system	uri	Terminology system
verificationStatus	CodeableConcept	Verification state
verificationStatus.coding	Coding	Code for verification
verificationStatus.coding.code	code	Always "confirmed"
verificationStatus.coding.system	uri	Terminology system
category	CodeableConcept	Category of condition
category.coding	Coding	Category code

US Core 6.1.0 Field	Data Type	Short Description
category.coding.code	code	encounter-diagnosis | problem-list-item | health-concern | sdoh
category.coding.system	uri	Category system
code	CodeableConcept	Identification of the condition
code.coding	Coding	Diagnosis code
code.coding.code	code	ICD-10 or SNOMED code
code.coding.system	uri	ICD-10-CM or SNOMED CT
code.coding.display	string	Display name
subject	Reference(Patient)	Who has the condition
encounter	Reference(Encounter)	Encounter when condition first asserted
onset[x]	dateTime	Estimated onset date
abatement[x]	dateTime	When condition resolved
recordedDate	dateTime	Date condition was first recorded
extension	Extension	Additional content

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient+status	Search all conditions for given patient id	Search Set
Query	patient+category	All conditions with given patient id and category	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the condition resource	Single

POST **/_search**

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Categories

Category Name	Long Name
encounter-diagnosis	http://terminology.hl7.org/CodeSystem/condition-category|encounter-diagnosis
problem-list-item	http://terminology.hl7.org/CodeSystem/condition-category|problem-list-item
health-concern	http://terminology.hl7.org/CodeSystem/condition-category|health-concern

Coverages

Description	Retrieves coverage informations for patient
Profile	US Core Coverage Profile
Path	<FhirBaseUrl>/fhir/Coverage

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Coverage"
id	string	Unique identifier for the coverage
identifier	Identifier	Business identifier for the coverage
identifier.type	CodeableConcept	Type of identifier (e.g., MB for member)
status	code	active | cancelled | draft | entered-in-error
type	CodeableConcept	Type of coverage (HMO, PPO, etc.)
subscriberId	string	ID assigned to the subscriber
beneficiary	Reference(Patient)	Who the coverage is for
relationship	CodeableConcept	Beneficiary relationship to subscriber
period	Period	Coverage period
period.start	date	Coverage start date
period.end	date	Coverage end date
payor	Reference(Organization)	Who pays for the coverage
class	BackboneElement	Additional coverage classifiers
class.type	CodeableConcept	Type of class (group, plan, etc.)
class.value	string	Value associated with the type

US Core 6.1.0 Field	Data Type	Short Description
class.name	string	Human readable description of the class

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient	All coverages for patient with given id	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the coverage resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Implantable Devices

Description	Retrieves implantable devices for a patient
Profile	US Core Implantable Device Profile
Path	<FhirBaseUrl>/fhir/Device

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Device"
id	string	Unique identifier for the device
udiCarrier	BackboneElement	Unique Device Identifier information
udiCarrier.deviceIdentifier	string	Mandatory fixed portion of UDI
udiCarrier.carrierHRF	string	UDI Human Readable Form
distinctIdentifier	string	Distinct identification string
manufactureDate	dateTime	Date when the device was made
expirationDate	dateTime	Date when device expires
lotNumber	string	Lot number of manufacture
serialNumber	string	Serial number assigned by manufacturer
type	CodeableConcept	What kind of device this is
patient	Reference(Patient)	Patient to whom device is affixed

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient	Search all implantable devices for given patient id	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the device resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Diagnostic Reports

Description	Retrieves diagnostic reports for patient
Profile	US Core DiagnosticReport Profile for Report and Note Exchange US Core DiagnosticReport Profile for Laboratory Results Reporting
Path	<FhirBaseUrl>/fhir/DiagnosticReport

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "DiagnosticReport"
id	string	Unique identifier for the report
meta	Meta	Metadata about the resource
meta.lastUpdated	instant	When the resource version last changed
status	code	The status of the diagnostic report
category	CodeableConcept	Service category (LAB, Radiology, etc.)
code	CodeableConcept	Name/code for this diagnostic report
subject	Reference(Patient)	The subject of the report
encounter	Reference(Encounter)	Health care event related to report
effective[x]	dateTime/Period	Clinically relevant time for report
issued	instant	DateTime report made available
performer	Reference	Who is responsible for the report
result	Reference(Observation)	Observations that are part of report
media	BackboneElement	Key images associated with report

US Core 6.1.0 Field	Data Type	Short Description
media.comment	string	Comment about the image
media.link	Reference	Reference to the image source
conclusion	string	Clinical conclusion of report
conclusionCode	CodeableConcept	Coded conclusion
presentedForm	Attachment	Entire report as issued

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient	Search all diagnostic reports for given patient id	Search Set
Query	patient+category	Search all diagnostic reports for a patient from a particular category	Search Set
Query	patient+code	Search all diagnostic reports for a patient from a particular code	Search Set
Query	patient+category+date	Search all diagnostic reports for a patient from a particular category and for a specific date	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the diagnostic report resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Document Reference

Description	Retrieves patient documents, including clinical notes
Profile	US Core DocumentReference Profile
Path	<FhirBaseUrl>/fhir/DocumentReference

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "DocumentReference"
id	string	Unique identifier for the document reference
identifier	Identifier	Business identifier for the document
status	code	Current status of the document reference
type	CodeableConcept	Precise type of document with LOINC code
category	CodeableConcept	High-level kind of document
subject	Reference(Patient)	Who document is about
date	instant	When document was created
author	Reference	Who wrote the document
custodian	Reference	Organization maintaining the document
content	BackboneElement	Document content
content.attachment	Attachment	Document content data
content.attachment.contentType	string	MIME type of content
content.attachment.data	base64Binary	Base64 encoded data
content.format	Coding	Format of the document
context	BackboneElement	Clinical context
context.encounter	Reference(Encounter)	Associated encounter

US Core 6.1.0 Field	Data Type	Short Description
context.period	Period	Time of service documented

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	_id	Search for document reference id	Search Set
Query	patient	Search all document references for given patient id	Search Set
Query	patient+category	Search all document references for a patient from a particular category	Search Set
Query	patient+type	Search all document references for a patient from a particular document reference type	Search Set
Query	patient+category+date	Search all document references for a patient from a particular category and for a specific date	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the document reference resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

GET /$get-patient-ccda

Type	Parameter	Description	Response Type
Query	patient+date	Gets ccda document for given patient and given date range: *Ex: $get-patient-ccda?patientId=6e8eb32c-dc38-49f3-a88f-56a8fadaeb3f&date=ge2020-11-29&date=le2025-12-31*	Single

Encounter

Description	Retrieves basic encounter information for a patient
Profile	US Core Encounter Profile
Path	<FhirBaseUrl>/fhir/Encounter

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Encounter"
id	string	Unique identifier for the encounter
meta	Meta	Metadata about the resource
meta.lastUpdated	instant	When the resource version last changed
identifier	Identifier	Business identifier for the encounter
status	code	Current status of the encounter
class	Coding	Classification of patient encounter
type	CodeableConcept	Specific type of encounter
subject	Reference(Patient)	The patient present at the encounter
participant	BackboneElement	List of participants involved
participant.type	CodeableConcept	Role of participant
participant.individual	Reference	Person involved in the encounter
participant.period	Period	Period of participation
period	Period	Start and end time of the encounter
reasonReference	Reference(Condition)	Reason the encounter takes place

US Core 6.1.0 Field	Data Type	Short Description
location	BackboneElement	List of locations where patient was
location.location	Reference(Location)	Location the encounter takes place
serviceProvider	Reference(Organization)	Organization responsible for encounter
hospitalization	BackboneElement	Details about admission
hospitalization.dischargeDisposition	CodeableConcept	Category of patient's discharge

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	_id	Search for encounter id	Search Set
Query	patient	Search all encounters for given patient id	Search Set
Query	patient+date	Search all encounters for a patient from a particular date	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the encounter resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Goal

Description	Retrieves goals for a patient
Profile	US Core Goal Profile
Path	<FhirBaseUrl>/fhir/Goal

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Goal"
id	string	Unique identifier for the goal
lifecycleStatus	code	Indicates the status of the goal
description	CodeableConcept	Human-readable description of the goal
subject	Reference(Patient)	Who this goal is intended for
target	BackboneElement	Target outcome for the goal
target.dueDate	date	Reach goal on or before

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient	Search all goals for given patient id	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the encounter resource	Single

POST /_search

Content Type	Description	Response Type

application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Immunization

Description	Retrieves immunizations for a patient
Profile	US Core Immunization Profile
Path	<FhirBaseUrl>/fhir/Immunization

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Immunization"
id	string	Unique identifier for the immunization
status	code	Immunization event status (always "completed")
statusReason	CodeableConcept	Reason for current status (unsupported)
vaccineCode	CodeableConcept	Vaccine product administered
vaccineCode.coding	Coding	CVX code for vaccine
vaccineCode.coding.code	string	CVX vaccine identifier
vaccineCode.coding.system	string	CVX system ("CVX")
vaccineCode.coding.display	string	Vaccine long description
patient	Reference(Patient)	Who received vaccine
encounter	Reference(Encounter)	Encounter immunization was performed
occurrenceDateTime	dateTime	Vaccine administration date
primarySource	boolean	Information from person who administered vaccine
location	Reference(Location)	Service delivery location

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient	Search all immunizations for given patient id	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the immunization resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Location

Description	Retrieves Location Information
Profile	US Core Location Profile
Path	<FhirBaseUrl>/fhir/Location

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Location"
id	string	Unique identifier for the location
identifier	Identifier	Business identifier for location
identifier.system	uri	Identifier system namespace
identifier.value	string	Location ID value
status	code	Operational status (always "active")
name	string	Name of the location
type	CodeableConcept	Type of function performed
type.coding	Coding	Code for location type
type.coding.code	string	"General Practice"
type.coding.system	uri	"http://terminology.hl7.org/CodeSystem/service-type"
telecom	ContactPoint	Contact details of location
telecom.system	code	phone or fax
telecom.use	code	Purpose of contact point (work)
telecom.value	string	Actual contact point details
address	Address	Physical location
address.line	string	Street name, number, direction
address.city	string	Name of city

US Core 6.1.0 Field	Data Type	Short Description
address.state	string	Sub-unit of country
address.postalCode	string	Postal code
managingOrganization	Reference(Organization)	Organization responsible for location

Endpoints

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the location resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Medical Dispense

Description	Retrieves dispense statuses for medications that have been prescribed to a particular patient
Profile	US Core MedicationDispense Profile
Path	<FhirBaseUrl>/fhir/MedicalDispense

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "MedicationRequest"
id	string	Medication dispense ID
subject	Reference(Patient)	Patient reference
context	Reference(Encounter)	Associated encounter
type	CodeableConcept	Dispense type (first fill, etc.)
dosageInstruction	Dosage	Dosing instructions
medicationCodeableConcept	CodeableConcept	Medication dispensed
status	code	Dispense status
quantity	SimpleQuantity	Amount dispensed
whenHandedOver	dateTime	When given to patient
performer.actor	Reference	Who dispensed
authorizingPrescription	Reference	Link to prescription
medicationCodeableConcept	CodeableConcept	Medication dispensed
status	code	Dispense status
quantity	SimpleQuantity	Amount dispensed
daysSupply	SimpleQuantity	Days medication will last

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient	Search all medical dispenses for given patient id	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the medical dispense resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Medication Request

Description	Retrieves medications that have been prescribed to a particular patient
Profile	US Core MedicationRequest Profile
Path	<FhirBaseUrl>/fhir/MedicationRequest

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "MedicationRequest"
id	string	Medication request ID
category	CodeableConcept	Request category (outpatient)
reported	boolean	Whether patient reported
encounter	Reference(Encounter)	Associated encounter
dosageInstruction.text	string	Patient instructions
extension	Extension	Medication adherence (unsupported)
medicationCodeableConcept	CodeableConcept	Medication code
dosageInstruction.doseAndRate.doseQuantity	SimpleQuantity	Medication dose
dosageInstruction.doseAndRate.doseQuantity.unit	string	Dose units
dosageInstruction.timing	Timing	How often to take
reasonCode	CodeableConcept	Reason for medication
requester	Reference(Practitioner)	Who prescribed
authoredOn	dateTime	When written
status	code	Prescription status
intent	code	Order type
dispenseRequest.numberOfRepeatsAllowed	unsignedInt	Number of refills

US Core 6.1.0 Field	Data Type	Short Description
dispenseRequest.quantity	SimpleQuantity	Amount to dispense

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient+intent	Search all medication request for given patient id and intent	Search Set
Query	patient+intent+status	Search all medication request for given patient id, intent and status	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the medication request resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Observation

Description	Retrieves observations for a particular patient
Profile	US Core Laboratory Result Observation Profile US Core Observation Pregnancy Status Profile US Core Observation Pregnancy Intent Profile US Core Observation Occupation Profile US Core Respiratory Rate Profile US Core Heart Rate Profile US Core Body Temperature Profile US Core Pediatric Weight for Height Observation Profile US Core Pulse Oximetry Profile US Core Smoking Status Observation Profile US Core Observation Sexual Orientation Profile US Core Head Circumference Profile US Core Body Height Profile US Core BMI Profile US Core Observation Screening Assessment Profile US Core Blood Pressure Profile US Core Observation Clinical Result Profile US Core Pediatric BMI for Age Observation Profile US Core Pediatric Head Occipital Frontal Circumference Percentile Profile US Core Body Weight Profile
Path	<FhirBaseUrl>/fhir/Observation

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Observation"
id	string	Unique identifier for the observation
status	code	registered | preliminary | final | amended
category	CodeableConcept	Classification of observation type
category.coding	Coding	Category code
category.coding.system	uri	Category system
category.coding.code	code	vital-signs | laboratory | imaging | survey | sdoh
code	CodeableConcept	Type of observation (LOINC)
code.coding	Coding	Observation code

US Core 6.1.0 Field	Data Type	Short Description
code.coding.system	uri	LOINC or local system
code.coding.code	code	LOINC or local code
code.coding.display	string	Code display name
subject	Reference(Patient)	Who observation is about
encounter	Reference(Encounter)	Healthcare event context
effective[x]	dateTime	Clinically relevant time
value[x]	Quantity/CodeableConcept/string	Actual result
component	BackboneElement	Component results
component.code	CodeableConcept	Component type
component.value[x]	Quantity/CodeableConcept	Component value
specimen	Reference(Specimen)	Specimen used
bodySite	CodeableConcept	Anatomical location
note	Annotation	Comments about result
partOf	Reference	Part of larger event

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient+code	Search all observations for given patient id and code	Search Set
Query	patient+category	Search all observations for given patient id and particular category	Search Set
Query	patient+category+date	Search all observations for given patient id and particular category on specific date	Search Set

GET /<id>

Type	Parameter	Description	Response Type

Path	id	The id of the observation resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Procedure

Description	Retrieves procedures performed on a particular patient
Profile	US Core Procedure Profile
Path	<FhirBaseUrl>/fhir/Procedure

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Procedure"
id	string	Unique identifier for the procedure
basedOn	Reference(ServiceRequest)	Request that procedure fulfills
status	code	Event status (always "completed")
code	CodeableConcept	Identification of the procedure
code.coding	Coding	CPT code for procedure
code.coding.code	string	CPT procedure code
code.coding.system	string	Code system ("CPT")
subject	Reference(Patient)	Who the procedure was performed on
encounter	Reference(Encounter)	Encounter created as part of
performedDateTime	dateTime	When the procedure was performed
reasonCode	CodeableConcept	Coded reason procedure performed (unsupported)

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	patient	Search all procedures performed on a particular patient	Search Set

Query	patient+date	Search all procedures performed on a particular patient on a specific date.	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the procedure resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Service Request

Description	Retrieves procedure or test request for a particular patient
Profile	US Core ServiceRequest Profile
Path	<FhirBaseUrl>/fhir/ServiceRequest

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "ServiceRequest"
id	string	Unique identifier for the service request
intent	code	Whether request is proposal, plan, or order (always "order")
status	code	Status of the request (always "completed")
category	CodeableConcept	Classification of service (surgical procedure only)
category.coding	Coding	SNOMED code for category
category.coding.code	string	"387713003"
category.coding.system	string	"http://snomed.info/sct"
category.coding.display	string	"Surgical procedure (procedure)"
code	CodeableConcept	What is being requested
code.coding	Coding	CPT code for procedure
code.coding.code	string	CPT procedure code
code.coding.system	string	"CPT"
subject	Reference(Patient)	Individual the service is ordered for
encounter	Reference(Encounter)	Encounter during which request was created
occurrence[x]	Period	When service should occur

US Core 6.1.0 Field	Data Type	Short Description
occurrencePeriod.start	dateTime	Start of occurrence period
authoredOn	dateTime	When request was signed
requester	Reference	Who/what is requesting service
reasonCode	CodeableConcept	Explanation/reason for service (unsupported)

Endpoints

GET /

Type	Parameter	Description	Response Type
Query	_id	Search with given service request document id	Search Set
Query	patient	Search all service requests for a particular patient	Search Set
Query	patient+category	Search all service requests for a patient with specific category	Search Set
Query	patient+code	Search all service requests for a patient with specific procedure or test code	Search Set
Query	patient+category+ authored	Search all service requests for a patient with specific category authored on given date criteria	Search Set

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the procedure resource	Single

POST /_search

Content Type	Description	Response Type
application/x-www-form-urlencoded	Send query parameters as form input	Search Set

Organization

Description	Retrieves organization
Profile	US Core Organization Profile
Path	<FhirBaseUrl>/fhir/Organization

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Organization"
id	string	Unique identifier for the organization
identifier	Identifier	Business identifiers
identifier.system	uri	Identifier namespace (NPI or NAIC)
identifier.value	string	The value that is unique
identifier.extension	Extension	Unknown extension when NPI missing
active	boolean	Whether the organization's record is in active use
name	string	Name used for the organization
telecom	ContactPoint	Contact details (Practice only)
telecom.system	code	phone
telecom.value	string	The actual contact point details
telecom.extension	Extension	Unknown extension when phone missing
address	Address	An address for the organization (Practice only)
address.line	string	Street name, number, direction
address.city	string	Name of city
address.state	string	Sub-unit of country

US Core 6.1.0 Field	Data Type	Short Description
address.postalCode	string	Postal code
address.country	string	Country (always "US")

Endpoints

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the organization resource	Single

Practitioner

Description	Retrieves practitioner
Profile	US Core Practitioner Profile
Path	<FhirBaseUrl>/fhir/Practitioner

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Practitioner"
id	string	Unique identifier for the practitioner
identifier	Identifier	Business identifiers
identifier.system	uri	Identifier namespace (NPI or Carbon)
identifier.value	string	The value that is unique
active	boolean	Whether this practitioner's record is in active use
name	HumanName	The name(s) associated with the practitioner
name.family	string	Family name (often called 'Surname')
name.given	string	Given names (not always 'first')
name.prefix	string	Parts that come before the name
telecom	ContactPoint	Contact details for the practitioner
telecom.system	code	phone | fax | email | pager | url | sms | other
telecom.use	code	home | work | temp | old | mobile
telecom.value	string	The actual contact point details

US Core 6.1.0 Field	Data Type	Short Description
telecom.extension	Extension	US Core Direct extension for email
address	Address	Address(es) of the practitioner
address.line	string	Street name, number, direction & P.O. Box
address.city	string	Name of city, town etc.
address.state	string	Sub-unit of country
address.postalCode	string	Postal code for area
address.country	string	Country (always "US")

Endpoints

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the practitioner resource	Single

Provenance

Description	Retrieves provenance information
Profile	US Core Provenance Profile
Path	<FhirBaseUrl>/fhir/Provenance

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Provenance"
id	string	Unique identifier with resource-specific prefix
target	Reference	Resource(s) this provenance is about
recorded	instant	When the provenance was recorded
agent	BackboneElement	Actor(s) involved (author and transmitter)
agent.type	CodeableConcept	Type of agent participation
agent.type.coding	Coding	Code for agent type
agent.type.coding.system	uri	System for agent type code
agent.type.coding.code	code	"author" or "transmitter"
agent.type.coding.display	string	Display text for agent type
agent.who	Reference(Organization)	Identity of agent (Carbon Health)
agent.onBehalfOf	Reference(Organization)	Organization agent is representing

Endpoints

GET **/<id>**

Type	Parameter	Description	Response Type
Path	id	The id of the provenance resource	Single

Related Person

Description	Retrieves provenance information
Profile	US Core RelatedPerson Profile
Path	<FhirBaseUrl>/fhir/RelatedPerson

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "RelatedPerson"
id	string	Unique identifier for the related person
meta	Meta	Metadata about the resource
meta.lastUpdated	instant	When the resource version last changed
active	boolean	Whether this related person record is in active use
patient	Reference(Patient)	The patient this person is related to
relationship	CodeableConcept	The nature of the relationship
relationship.coding	Coding	Code defining the relationship
relationship.coding.system	uri	Identity of the terminology system
relationship.coding.code	code	Symbol in syntax defined by the system
name	HumanName	A name associated with the person
name.family	string	Family name (often called 'Surname')
name.given	string	Given names (not always 'first')
telecom	ContactPoint	Contact details for the person
telecom.system	code	phone | email
telecom.value	string	The actual contact point details

US Core 6.1.0 Field	Data Type	Short Description
address	Address	Address where the person can be contacted
address.line	string	Street name, number, direction
address.city	string	Name of city
address.state	string	Sub-unit of country
address.postalCode	string	Postal code
address.country	string	Country (always "US")

Endpoints

GET **/<id>**

Type	Parameter	Description	Response Type
Path	id	The id of the related person resource	Single

Specimen

Description	Retrieves specimen information
Profile	US Core Specimen Profile
Path	<FhirBaseUrl>/fhir/Specimen

Data Elements

US Core 6.1.0 Field	Data Type	Short Description
resourceType	String	Always "Specimen"
id	string	Unique identifier for the specimen
type	CodeableConcept	Kind of material (always unsupported)
subject	Reference(Patient)	Patient specimen came from

Endpoints

GET /<id>

Type	Parameter	Description	Response Type
Path	id	The id of the related specimen resource	Single

Profile audience and scope

This profile is intended to be used by developers of apps that need to access user identity information or other FHIR resources by requesting authorization from OAuth 2.0 compliant authorization servers.

The profile defines a method through which an app requests authorization to access a FHIR resource, and then uses that authorization to retrieve the resource. Synchronization of patient context is not addressed; for use cases that require context synchronization (e.g., learning about when the in context patient changes within an EHR session) In other words, if the patient chart is changed during the session, the application will not inherently be updated.

Security and Privacy Considerations

App Protection

The app is responsible for protecting itself from potential misbehaving or malicious values passed to its redirect URL (e.g., values injected with executable code, such as SQL) and for protecting authorization codes, access tokens, and refresh tokens from unauthorized access and use. The app developer must be aware of potential threats, such as malicious apps running on the same platform, counterfeit authorization servers, and counterfeit resource servers, and implement countermeasures to help protect both the app itself and any sensitive information it may hold. For background, see the OAuth 2.0 Threat Model and Security Considerations.

Specific requirements are:

- Apps SHALL ensure that sensitive information (authentication secrets, authorization codes, tokens) is transmitted ONLY to authenticated servers, over TLS-secured channels.
- Apps SHALL generate an unpredictable state parameter for each user session; SHALL include state with all authorization requests; and SHALL validate the state value for any request sent to its redirect URL.
- An app SHALL NOT execute untrusted user-supplied inputs as code.
- App SHALL NOT forward values passed back to its redirect URL to any other arbitrary or userprovided URL (a practice known as an “open redirector”).

- An app SHALL NOT store bearer tokens in cookies that are transmitted as clear text.
- Apps SHOULD persist tokens and other sensitive data in app-specific storage locations only, and SHOULD NOT persist them in system-wide-discoverable locations.

Terms of Use

1. TERMS ACCEPTANCE AND REPRESENTATION
   - **Accepting the Terms**: These Terms of Use ("Terms") govern your access to and use of the Certified CarbonHealth API, documentation, services, etc. By accessing or using the Certified CarbonHealth APIs, you agree to be bound by these Terms. “Certified CarbonHealth API” means the API provided by CarbonHealth to allow authorized access to query our Client(s) Electronic Health Record system. You represent and warrant that you are at least 18 years of age and that you possess the legal right and ability to agree to these Terms and to use the Certified CarbonHealth APIs in accordance with these Terms.
   - **Entity Representation**: If you are using the Certified CarbonHealth API on behalf of a legal entity (i.e. a Clinical software services company), you represent that you have proper authority to act on behalf of and bind the entity to these Terms, and by accepting, you accept on behalf of the entity (and all references to “you” in the Terms refer to the entity).
2. REPRESENTATIONS AND RESPONSIBILITIES
   - **Compliance**: You agree to be financially responsible for your use of the Certified CarbonHealth APIs and to comply with your responsibilities and obligations as stated in these Terms. You agree to comply at all times with all applicable laws, rules and regulations relating to the use of the Certified CarbonHealth APIs. You hereby grant CarbonHealth the right to monitor and periodically audit in a reasonable manner your use of the Certified CarbonHealth APIs, your App and other activities related to your obligations under these Terms.
   - **Virus Warranty**: You warrant that your Apps will not contain any viruses or other malicious computer instructions, devices, or techniques that can or were designed to threaten, infect, damage, disable, or shut down the CarbonHealth APIs, any technology, software, solution, equipment or any computer system.
3. GENERAL
   - **Changes**: CarbyOs EHR may, in its sole and absolute discretion, make changes, modifications or updates to the Certified CarbonHealth API (including without limitation changes to the capabilities and tech specs), without notice to you.

- **Global Availability**: CarbyOs EHR makes no representations that the Certified CarbonHealth APIs are appropriate or available for use in locations outside of the United States, and access to them from such territories is at your own risk. Those who choose to access the Certified CarbonHealth APIs from locations outside of the United States do so at their own initiative and are responsible for compliance with applicable local laws.
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- **Term and Termination**: Either you or CARBONHEALTH may terminate your right to use the Certified CARBONHEALTH APIs at any time, with or without cause, upon notice. CARBONHEALTH also reserves the right to disable your API access in a production environment at any time, with or without cause. CARBONHEALTH reserves the right to disable access to the CARBONHEALTH APIs if your App poses any security, privacy, or patient safety risks. The provisions concerning Indemnification, Waiver, Release and Limitation of Liability, and General shall survive any termination of these Terms.
- **Governing Law**: These Terms are governed by US federal law or the laws of the State of California.

4. Application developer affirmations to Certified API Developers regarding the ability of their applications to secure a refresh token, a client secret, or both, must be treated in a good faith manner