Discovery Data Service

Technical Specification
FHIR Care Connect API

Version	Date	Amendment history	Authors
1.0	02/12/2019	First version	Darren Sheavills
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1 Purpose of this document

This document specifies the technical details for accessing and using the Discovery Data Service FHIR® Care Connect API, for the use by interoperability system suppliers developing integrations against the service.

2 Discovery Data Service

The Discovery Data Service (DDS) is an NHS owned service that provides low cost access to personal health and care data from combined primary, secondary, unscheduled and community health care data sets (https://discoverydataservice.org/Content/Overview.htm)

All data that is published or subscribed to and from DDS is governed by strict information governance rules and underpinned by Data Sharing Agreements, Sharing Flows and Subscriber Extract Projects (https://discoverydataservice.org/Content/Governance.htm)

DDS receives data from multiple source publishing systems in multiple formats and normalises the data into a common structure based on national care record standards.

DDS makes the data available to multiple subscribers in standardised formats, one of the common formats being FHIR®.

3 Care Connect FHIR Profiles

The Discovery Data Service supports the INTEROPen community and work done by NHS Digital to standardise interop across system suppliers within the NHS.

Discovery supports the exchange of health records using the nationally curated INTEROPen FHIR resources.

The INTEROPen vision is to create a library of nationally defined HL7® FHIR® resources and interaction patterns that implementers can adopt to simplify integration and interoperability within UK health and social care.

Discovery will continue to support and provide access to the latest adopted FHIR resources, and the current implemented version is *STU3*.

Discovery is following the specification for the Care Connect FHIR profiles as specified on the INTEROPen sponsored FHIR web site https://fhir.hl7.org.uk/

4 Data Sets

The Discovery Data Service provides access to the current data sets.

	EMIS Web		SystmOne		Vision	Adastra	Cerner Millennium				Rio
Data sets	Primary care GP	Primary care community	Primary care GP	Primary care community	Primary care GP	Out of hours	A&E	Inpatient	Outpatient	ADT feed	Community
Allergies	✓	✓	✓	✓	✓	–	✓	✓	✓	✗	✗
Appointments	✓	✓	✓	✓	✗	–	–	–	✓	✓	⧖
Care episodes	✓	⧖	✓	✓	✓	✓	✓	✓	✓	✓	⧖
Diagnoses	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	⧖
Documents	✗	✗	✗	✗	✗	✗	⧖	⧖	⧖	⧖	✗
Encounters/consultations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⧖
Family history	✓	✓	✓	✓	✓	–	✓	✓	✓	✗	✗
Follow ups/diary recall	✓	✓	✓	✓	✗	–	–	–	–	–	✗
Free text	⧖	⧖	✗	✗	✗	✓	✓	✓	✓	✗	✗
Immunisations	✓	✓	✓	✓	✓	–	✓	✓	✓	✗	✗
Inpatient activity	–	–	–	–	–	–	✓	✓	–	✓	⧖
Medication	✓	✓	✓	✓	✓	✓[1]	✗	✗	✗	✗	–
Non-scheduled activity	–	–	–	–	–	✓	✓	–	–	✓	–
Observations[2]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗
Outpatient activity	–	–	–	–	–	–	–	–	✓	✓	⧖
Patient demographics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⧖
Problems	✓	✓	✓	✓	✓	–	✓	✓	✓	✗	✗
Procedures	✓	✓	✓	✓	✓	–	✓	✓	✓	✗	–
Questions & answers	–	–	–	–	–	✓	–	–	–	–	–
Referrals	✓	✓	✓	✓	✓	–	–	–	–	✗	⧖
Templates	✗	✗	✗	✗	✗	–	✗	✗	✗	✗	✗
Test orders	✗	✗	✗	✗	✗	–	✓	✓	✓	✗	–
Test results/ Pathology results	✓	✓	✓	✓	✓	–	✓	✓	✓	✗	–

All data requests for information hosted with DDS is linked to a project data set.

The project data set is linked to a data sharing agreement from the publishing organisations.

A project data set also governs and limits the type and nature of the data required by the subscribing system.

For example, a diabetes system would request only diabetes data from DDS and therefore the data would be linked and filtered by a pre-authored diabetes data set, containing record type definitions (i.e. Conditions, Medication, Allergies, Diabetes related Observations etc), and value set definitions (i.e. the national diabetes code set).

5 Discovery and FHIR

A common standard interop standard supported by DDS is FHIR®.

DDS can consume and produce FHIR records between integrated and connected systems.

The current supported version of FHIR within Discovery is FHIR Care Connect STU3.

The following FHIR STU3 Care Connect resources are supported by DDS.

- Appointment
- AllergyIntolerance
- Condition
- DiagnosticReport
- Encounter
- EpisodeOfCare
- FamilyMemberHistory
- Immunization
- Location
- MedicationStatement
- Observation
- Organization
- Patient
- Practitioner
- PractitionerRole
- Procedure
- ProcedureRequest
- ReferralRequest
- RelatedPerson

6 FHIR and REST API

A standard interoperability method for making FHIR resources accessible between systems is REST(ful) APIs.

A RESTful API is an application program interface (API) that uses HTTP requests to GET, PUT, POST and DELETE data.

DDS supports PUT, POST and DELETE to send FHIR data to Discovery.

For the scope of this specification, only the retrieval of FHIR data is described (GET/POST).

DDS hosts REST APIs on the AWS API Gateway.

DDS data is hosted within Amazon Web Services (AWS).

The Amazon API Gateway is a fully managed service for creating, publishing, maintaining, monitoring, and securing APIs at scale.

API Gateway handles all the tasks involved in accepting and processing up to hundreds of thousands of concurrent API calls, including traffic management, CORS support, authorization and access control, throttling, monitoring, and API version management.

7 Discovery "$getstructuredrecord" REST API

DDS implements a single REST API method and FHIR operation named **/$getstructuredrecord** for retrieving a patient's record in structured format.

/$getstructuredrecord is a POST HTTPS method request, secured by certificates.

The reason it is POST and not GET, is that it allows for request parameters to be passed into the **/$getstructuredrecord** call.

/$getstructuredrecord conforms to the FHIR request operation standards as specified by GP and Care Connect for retrieving a patient's record in structured format.

The request parameters also follow the GP and Care Connect standards by using the FHIR **Parameters** resource in the payload request body for identifying the patient and the types of FHIR resources requested.

https://developer.nhs.uk/apis/gpconnect-1-4-1/accessrecord_structured_development_retrieve_patient_record.html#fhir-absolute-request

The production version of the /$getstructuredrecord request is secured by AWS Identity and Access Management (IAM) for request authorization, and API keys for additional security.

The demo, test and development versions of the /$getstructuredrecord call have authorization switched off for ease of implementation.

Additional production level security controls include role based access, virtual private cloud configurations and security groups for IP and port level restrictions.

This is a development guide document and the documentation for securing the APIs and the use of authorization techniques can be found in the production release document.

The use of HTTPS is automatically used to encrypt the transport.

Access to the DDS **/$getstructuredrecord** API can be made using any REST client application such as Postman (https://www.getpostman.com/) or online REST clients like reqbin (https://reqbin.com/)

DDS also provides a web application for testing the /$getstructuredrecord API, and for viewing the associated structured health records in an HTML viewer. This is described in the next section.

The request parameter for the /$getstructuredrecord API call is documented on the GP Connect developer.nhs.uk API Hub web site in the Payload request body section.

https://developer.nhs.uk/apis/gpconnect-1-4-1/accessrecord_structured_development_retrieve_patient_record.html#fhir-absolute-request

Example 1 request parameter - showing how referrals can be limited by date range.


```
{
 "meta": {
  "profile": [
   "https://fhir.hl7.org.uk/STU3/OperationDefinition/CareConnect-GetStructuredRecord-Operation-1"
  ]
 },
 "resourceType": "Parameters",
 "parameter": [
  {
   "name": "patientNHSNumber",
   "valueIdentifier": {
    "system": "https://fhir.hl7.org.uk/Id/nhs-number",
    "value": "5558549483"
   }
  },
  {
   "name": "includeReferrals",
         "part": [
    {
     "name": "referralsSearchPeriod",
     "valuePeriod": {
      "start": "2019-01-25",
      "end": "2019-06-25"
     }
    }
   ]
  }
 ]
}
```


Example 2 request parameter – showing how to return all FHIR resources for the patient with the specified NHS Number.


```
{
 "meta": {
  "profile": [
   "https://fhir.hl7.org.uk/STU3/OperationDefinition/CareConnect-GetStructuredRecord-Operation-1"
  ]
 },
 "resourceType": "Parameters",
 "parameter": [
  {
   "name": "patientNHSNumber",
   "valueIdentifier": {
    "system": "https://fhir.hl7.org.uk/Id/nhs-number",
    "value": "5558549483"
   }
 ]
}
```

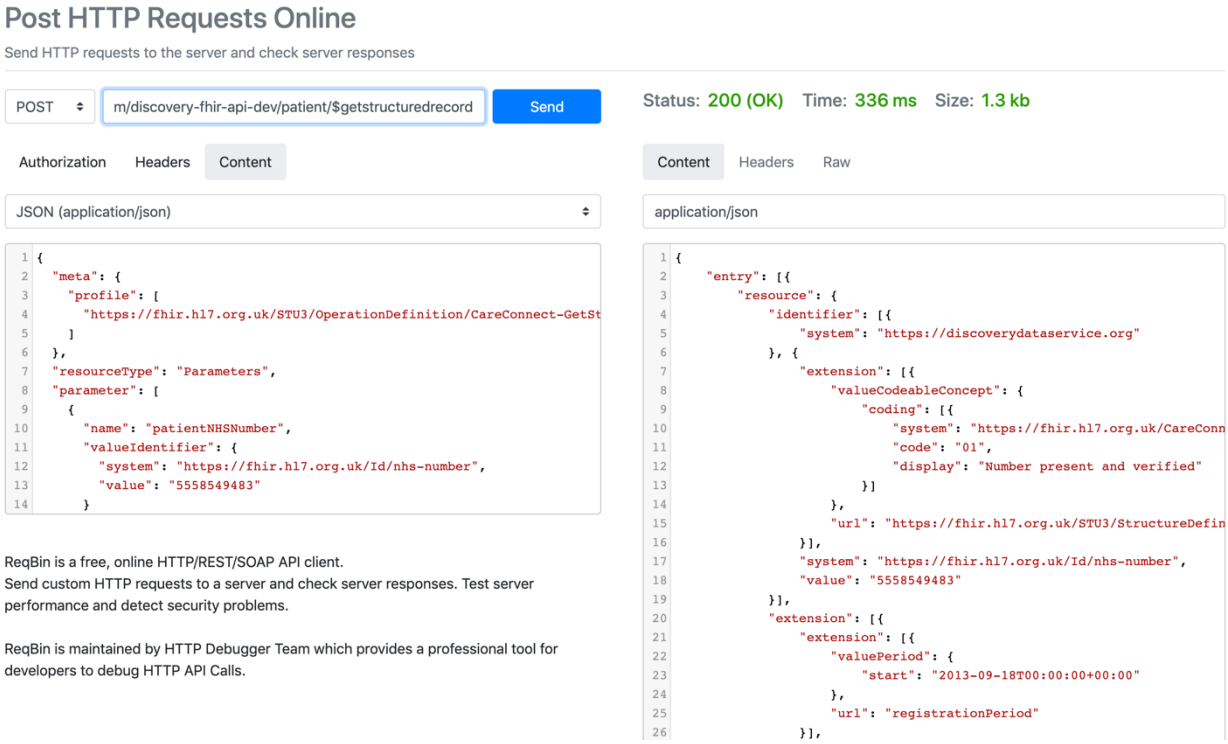
8 Testing "$getstructuredrecord" REST API using REST clients

If using Reqbin.

1. Set API HTTP method to POST.
2. Use the Discovery AWS API Gateway URL

https://rqy8l5vl8l.execute-api.eu-west-2.amazonaws.com/discovery-fhir-api-dev/patient/$getstructuredrecord

1. Switch Authorization to No Auth for development.
2. Set Content: JSON (application/json)
3. Enter the /$getstructuredrecord request params into Content body
4. Click SEND
5. Should get 200 (OK) STATUS with Content delivered as Care Connect STU3 bundle

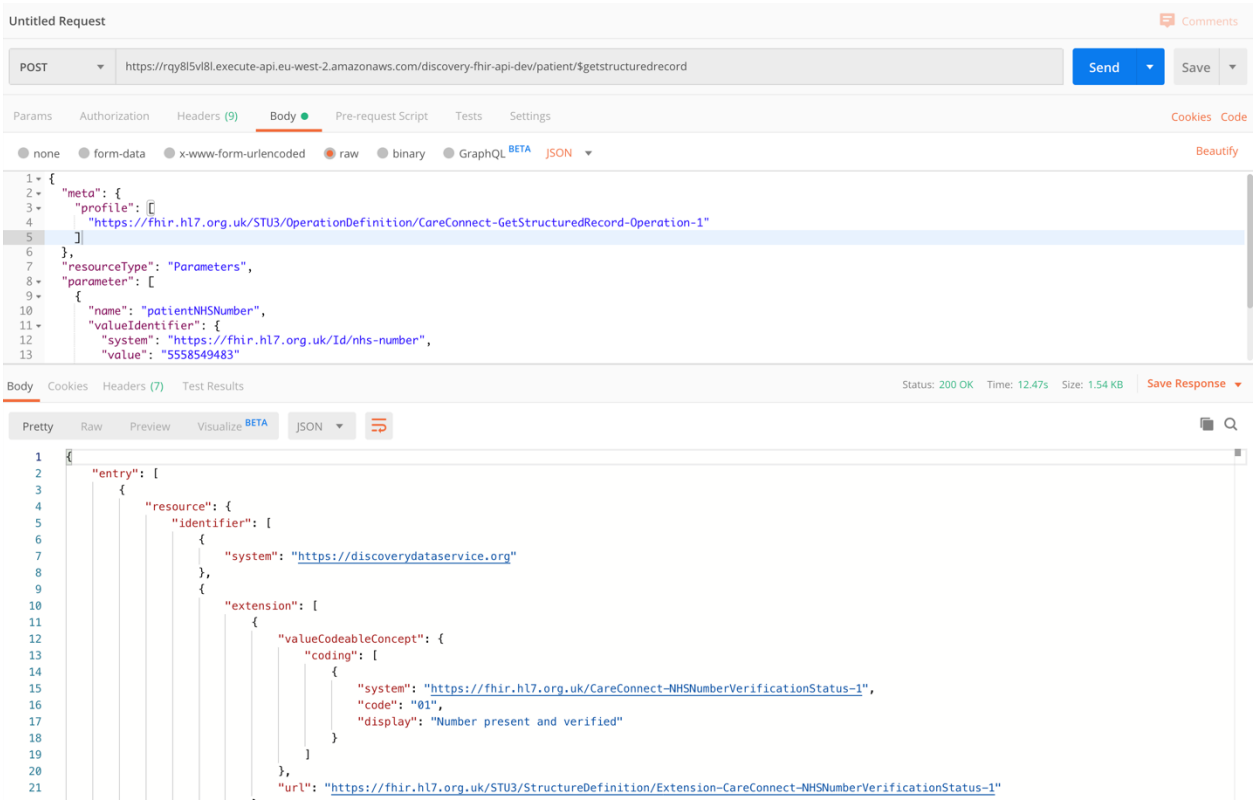


If using Postman.

1. Set API HTTP method to POST.
2. Use the Discovery AWS API Gateway URL

https://rqy8l5vl8l.execute-api.eu-west-2.amazonaws.com/discovery-fhir-api-dev/patient/$getstructuredrecord

1. Switch Authorization to No Auth for development.
2. Set Body: raw
3. Enter the /$getstructuredrecord request params into body tab
4. Click SEND
5. Should get 200 (OK) STATUS with Content delivered as Care Connect STU3 bundle



The following API response codes are supported.

HTTP status	Description
200	Successful operation
404	Resource not found
410	Resource deleted

9 Using the Discovery FHIR API and record viewer web portal

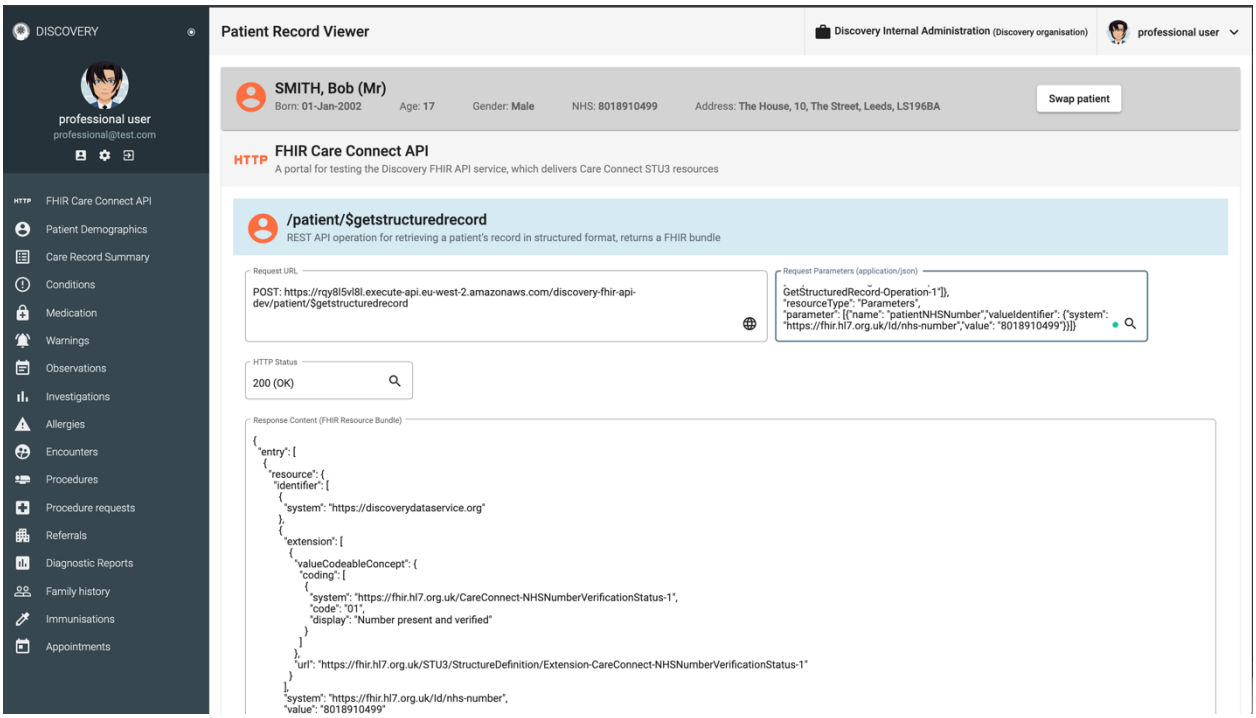
Discovery provides a web app for testing the FHIR Care Connect **/$getstructuredrecord** API

https://devgateway.discoverydataservice.net/record-viewer/

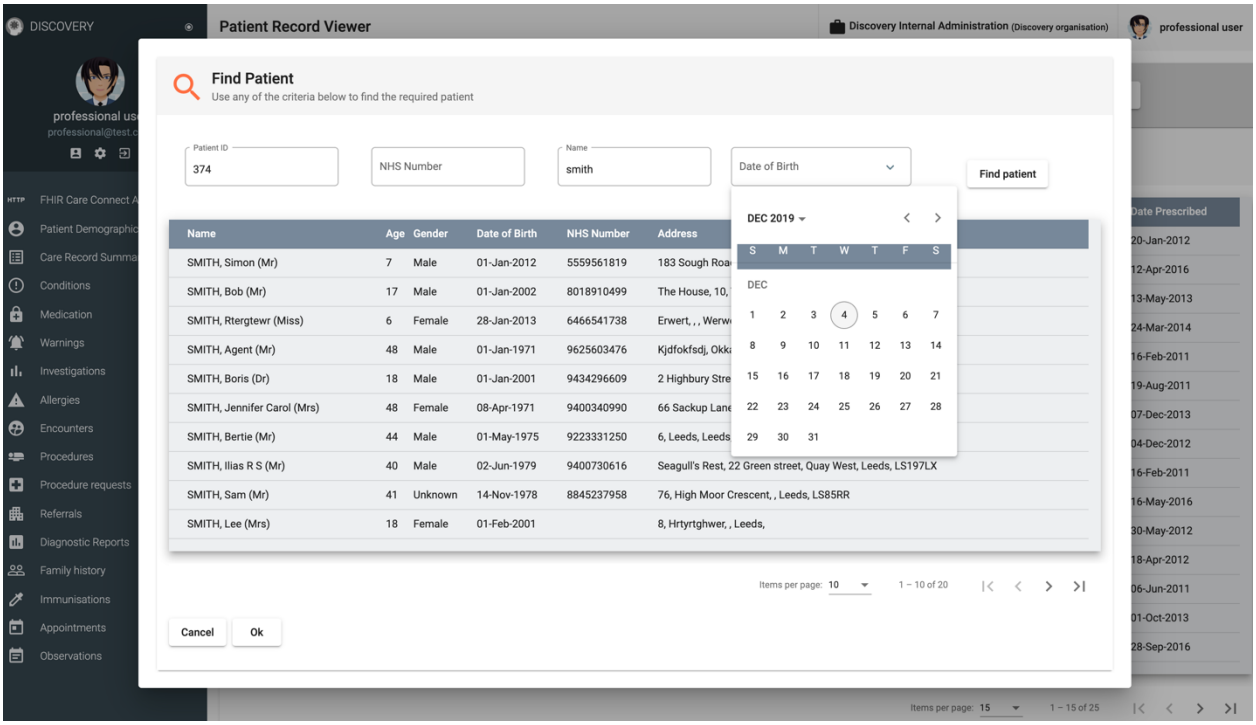
The application requires a user account for login.

Please apply to the LHS team for a user account (https://learning-health.co.uk/)

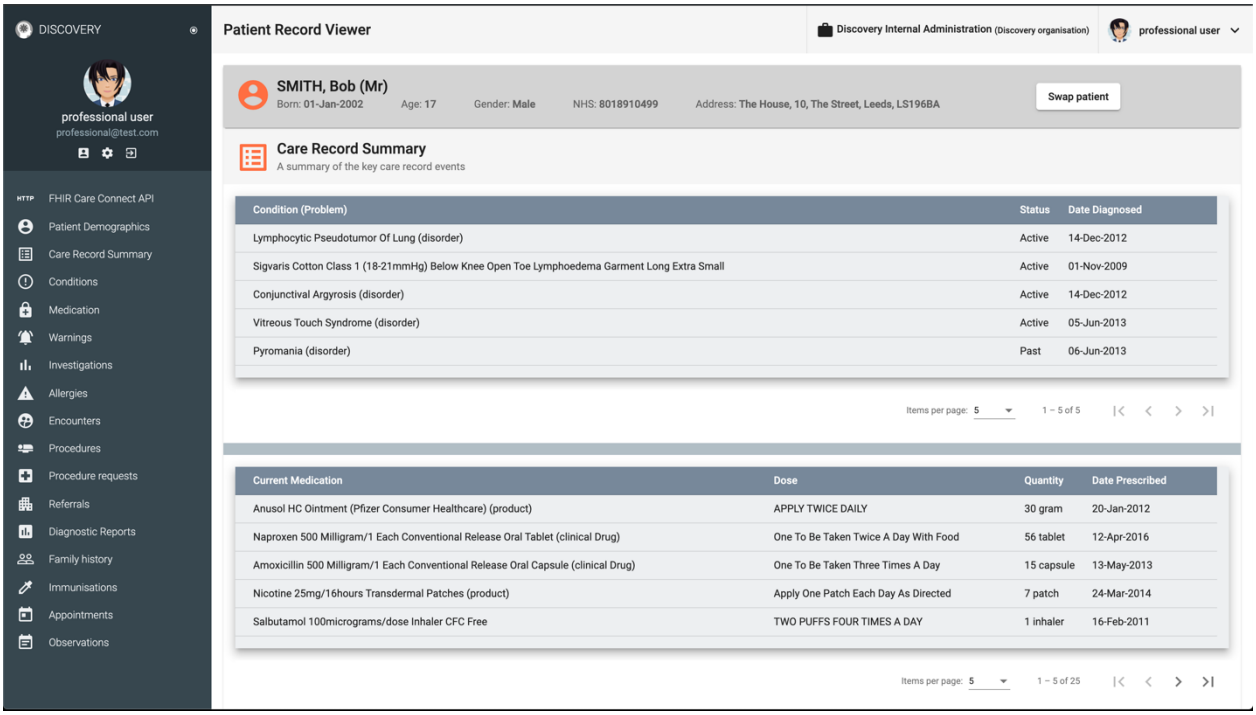
The web application provides a module for testing the /$getstructuredrecord call.

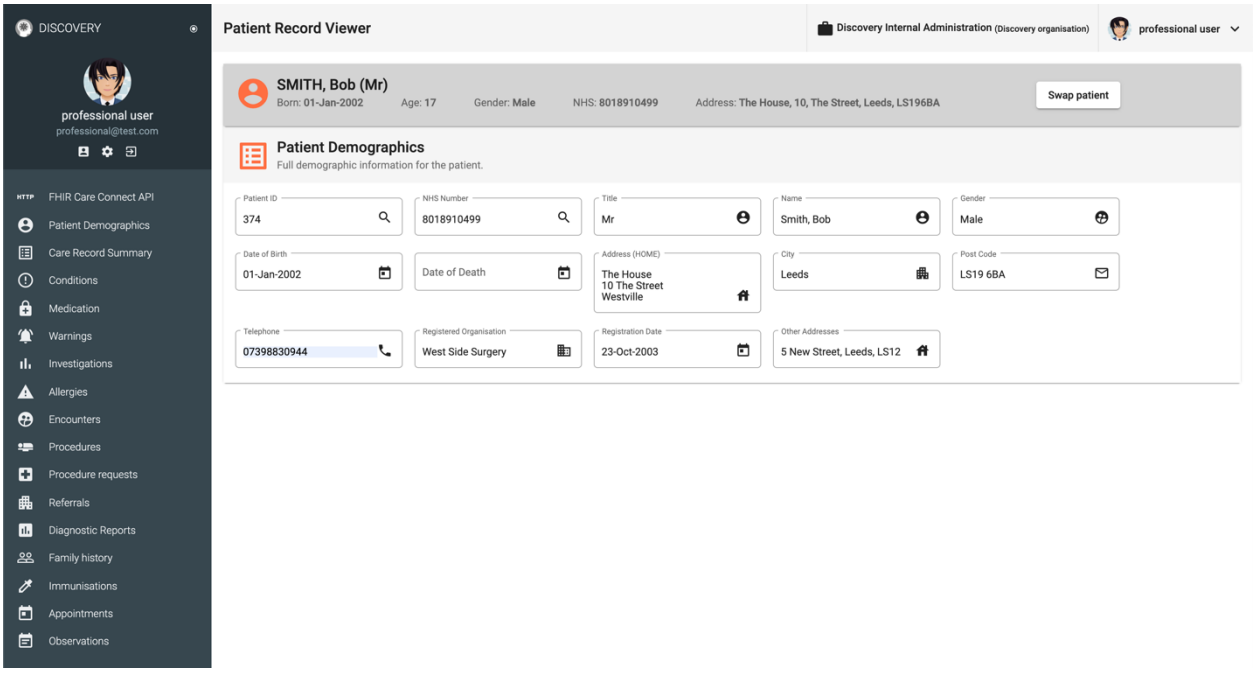


A module is also provided for finding patients to test the **/$getstructuredrecord** API.



There are further modules available for testing the content of the FHIR response bundles against the care record structured views.





10 FHIR resource content

All FHIR resources returned by the **/$getstructuredrecord** REST API method are wrapped in a **FHIR bundle**, which is a container for a collection of resources.

An example of resources wrapped in a bundle:


```
{
 "resourceType": "Bundle",
 "type": "collection",
 "meta": {
  "profile": [
   "https://fhir.hl7.org.uk/STU3/StructureDefinition/CareConnect-StructuredRecord-Bundle-1"
  ]
 },
 "entry": [
  {
   "resource": {
    "resourceType": "Patient",
    "id": "04603d77-1a4e-4d63-b246-d7504f8bd833",
    "meta": {
     "versionId": "1469448000000",
     "profile": [
      "https://fhir.hl7.org.uk/STU3/StructureDefinition/CareConnect-Patient-1"
     ]
    }

    .......

  {
   "resource": {
    "resourceType": "MedicationStatement",
    "id": "6bff710a-0bdc-4c9b-b98b-40db0a107edc",
    "meta": {
     "profile": [
      "https://fhir.hl7.org.uk/STU3/StructureDefinition/CareConnect-MedicationStatement-1"
     ]
    }

    .......
```


Further specifications for programming against FHIR Care Connect resources, and the extensions used within the resources can be found at

https://fhir.hl7.org.uk/

Please contact Learning Health Solutions Ltd, for any questions or advise on the use of this technical specification.

https://learning-health.co.uk/