National Health Services Directory

Developer Guide

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1 Introduction

This quick reference guide is intended to assist developers in integrating with the National Health Services Directory (NHSD) FHIR APIs. This guide should be used in conjunction with information provided on the:

- Developer and Integration Hub and
- NHSD FHIR Implementation Guides (IGs), which are further outlined in this document
  - Inbound: https://build.fhir.nhsd.healthdirect.org.au/ingestion/index.html
  - Outbound: https://build.fhir.nhsd.healthdirect.org.au/v4/index.html

Except where otherwise indicated, the content of this document pertains to the data model and APIs of the NHSD.

1.1 The NHSD FHIR data model

The NHSD FHIR data model (refer to *Figure 1*) is underpinned by the Australian FHIR Provider Directory (FHIR AU-PD) model, a key foundation for health sector interoperability.

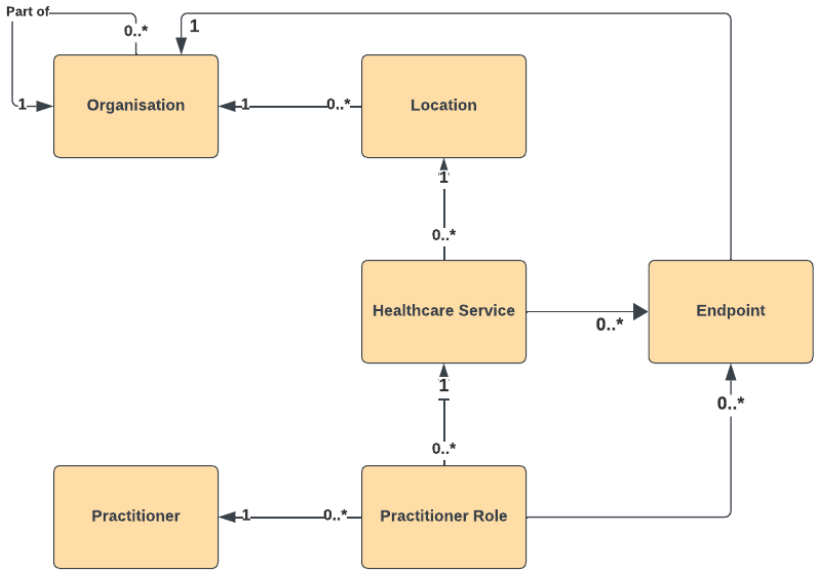

Figure 1: FHIR data model

2 The NHSD APIs

The NHSD provide APIs that allow integration partners to access and share information with the NHSD. These are the *Authorisation API*, which is used to obtain the necessary access tokens, and the *FHIR APIs,* which are used to interact with the NHSD data. These APIs are discussed in further detail below.

2.1 Authorisation API

Integrators must be authorised to access the FHIR APIs.

An access token can be generated via the *Authorisation API* using the credentials provided by the NHSD Team. Each credential access is granted with a default basic monthly quota based on the projected usage of the APIs.

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2.2 FHIR APIs

NHSD FHIR R4 APIs supports the following FHIR resources:

- **Organisation:** An Organisation can be represented as a single practice or as a larger institution, agency or an association. The NHSD FHIR data model supports multi-level Organisation structures, which is often required for more complex organisations such as hospitals.
- **Location:** An Organisation must have at least one Location, which provides address or coverage information for the Healthcare Service. The Location also provides context for how the service is delivered, whether this is at a physical location, provided as services in the home or virtually (e.g. Telehealth).
- **Healthcare Service:** The Healthcare Service entity is at the core of the NHSD's data architecture. Healthcare services are delivered at a Location by an Organisation. In a provider directory this allows the association of secure messaging endpoints with the healthcare service and thus a channel for delivery to that service.
- **Practitioner Role:** A Healthcare Service is delivered by a Practitioner Role, which can be filled by a specific Practitioner who is working in that role at a point in time. The Practitioner provides details of an individual who delivers services in one or more Practitioner Roles.
- **Practitioner:** A Practitioner is the individual person that is delivering the health-related service at a Healthcare Service under at least one Practitioner Role.
- **Endpoint:** A Healthcare Service or a Practitioner Role may have secure messaging endpoints. The endpoint addresses ensure secure electronic messages (such as discharge summaries and referrals) are delivered to the correct services.

2.3 Environments and testing

The NHSD currently supports two environments for integrators to access – one for testing purposes (Integrator Test Environment) and one for production (Production Environment).

NHSD environment availability:

Environment	Availability
Integrator Test Environment	Monday to Sunday 8am to 10pm Australian Eastern Standard Time (AEST)
Production Environment	24/7 Australian Eastern Standard Time (AEST)

Access will need to be authorised for both the Integrator Test Environment and Production Environment. It is required that prospective integration partners gain access to the Integrator Test Environment, to familiarise themselves with the available data and API functionality, which will assist with discovery and solution design phases. Evidence of successful completion of testing is required before Production access will be granted.

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3 The NHSD FHIR Implementation Guides

There are two NHSD FHIR IGs available which cover in detail the inbound and outbound capabilities.

1. Inbound FHIR service: enable the publishing of information to the NHSD and
2. Outbound FHIR services: enable integrators to consume information from the NHSD.

The NHSD FHIR IGs are based on FHIR, Release 4 (v4.0.1) [HL7FHIR4], and extends the Australian Provider Directory Profiles Implementation Guide [HL7AUPD].

3.1 Inbound FHIR API Implementation Guide

The primary aim of this implementation guide is to support health integrators publishing information to the NHSD through the FHIR Data Acquisition Hub (DAH).

The Inbound IG is accessible here: https://build.fhir.nhsd.healthdirect.org.au/ingestion/index.html

3.1.1 Data Acquisition Hub (DAH) overview

To publish information into the NHSD in FHIR standard format, Integration partners utilise the DAH, which functions as a RESTful API interface. All NHSD FHIR resources are supported by the DAH. Refer to *Figure 2* below which provides an overview of the DAH integration process.

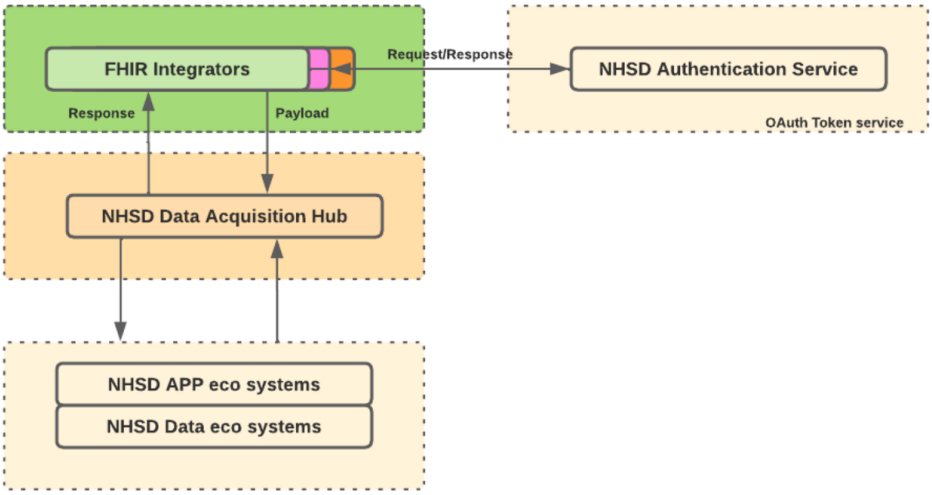

Figure 2: Data Acquisition Hub integration overview

- **Authentication:** The DAH requires an OAuth token to be included in the Authorisation header of requests made by integration partners. This token authenticates the partner's access to the DAH.
- **Payload Format:** Data intended for publication must be formatted as a FHIR bundle payload. It is recommended to limit the number of matched resources per bundle to 30. Prior to transmission, the payload must undergo compression using gzip and then be Base64 encoded.

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- **Payload Validation**: Upon receipt, the DAH API validates the payloads it receives (refer to Section 4 Status codes). If data is determined to be invalid, the API ceases further processing of the payloads.
- **Querying Processing Status:** Integration partners have the capability to query the processing status of each published bundle by utilising the trace ID provided by the API. In response, the API provides a processing status response containing resource-specific statuses.

To learn more about the DAH, refer:
https://build.fhir.nhsd.healthdirect.org.au/ingestion/dataAcquisition.html.

3.2 Outbound FHIR API Implementation Guide

The primary aim of this implementation guide is to support integrators to consume information from the NHSD through the FHIR interface. The NHSD offers two different methods to integration partners for consuming data: the NHSD FHIR API and the NHSD FHIR Bulk Export Service. The NHSD Team can advise further on which method is appropriate, depending on the needs of the integration partner and how the data is going to be used.

The Outbound IG includes details of both access methodologies and is accessible here:
https://build.fhir.nhsd.healthdirect.org.au/v4/index.html.

A summary of each of these FHIR interface offerings is provided below.

3.2.1 FHIR API Service overview

The NHSD FHIR API can be used to integrate a range of clinical systems and applications with NHSD to enable end users to search for data that is currently "active" in the NHSD. The API does not return any FHIR resources that have been inactivated or archived by the NHSD.

This API is a RESTful API and supports a range of query parameters (refer to Postman collection below) across all of the NHSD supported FHIR resources.

For example:

- Find a general practice or urgent care service in a specified location
- Find a service or practitioner by name
- Find services that are "open now"
- Find services or practitioners by a specified identifier
- Find secure messaging endpoints for a service or practitioner
- Find practitioners associated with a service

3.2.1.1 Count and paging

The _count search parameter returns the number of requested resources per page as requested by the client, by default, the count is 10 but the maximum limit can be set to 30.

The page parameter is used to retrieve the resources starting from a particular page and can be used along with _count.

Example Request - GET [base]/HealthcareService?_format=json&page=1&_count=10

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3.2.2 FHIR Bulk Export Service overview

The NHSD also provides a FHIR Bulk Export Service, offering integration partners bulk datasets in the FHIR format, supplemented with notification of change (delta) extracts at whatever frequency is required (e.g., daily, weekly, etc). To access FHIR Bulk, follow the steps:

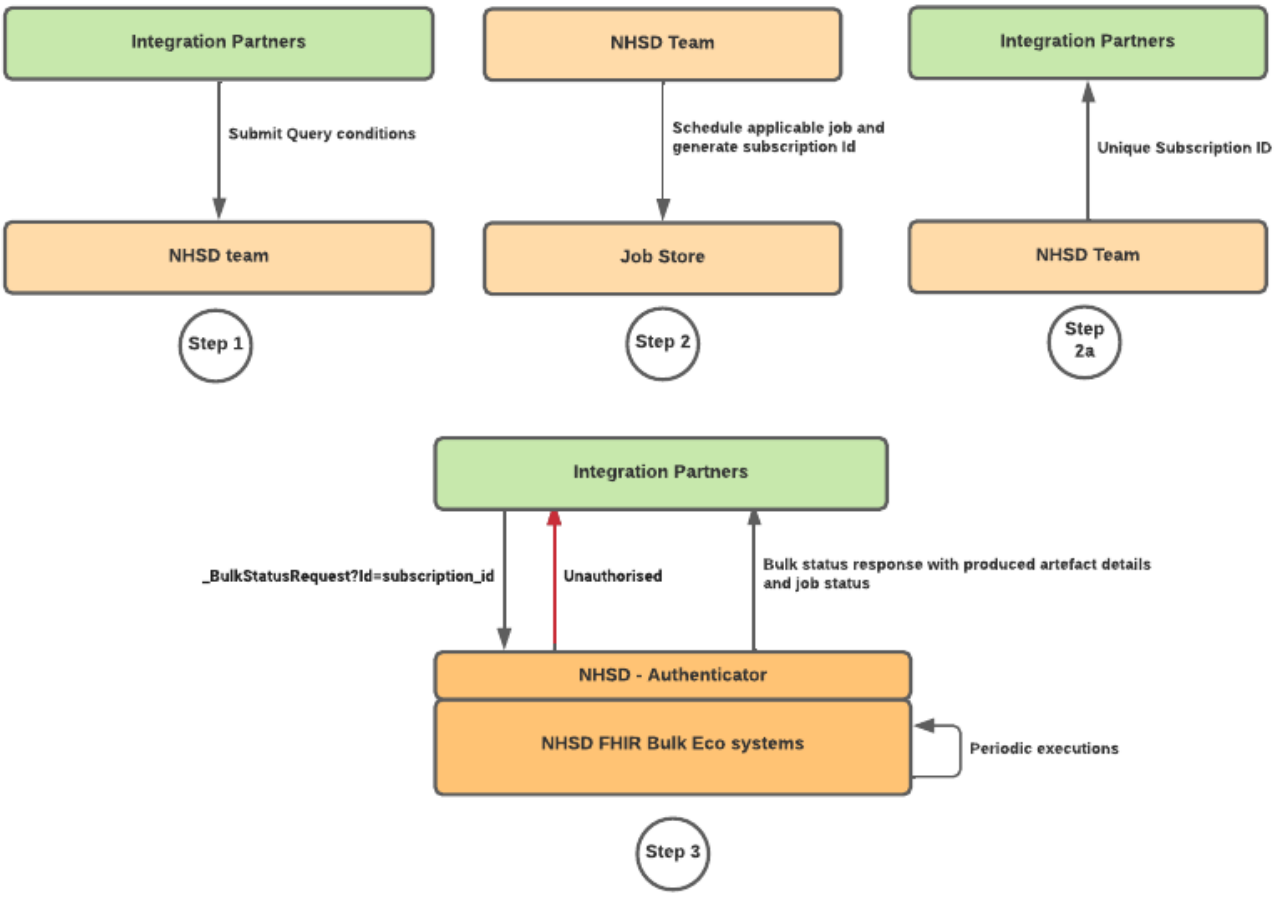

Figure 3: FHIR Bulk integration overview

Step 1:

- **Submit requests:** Integrators must submit the request with details required, such as the dataset.

Step 2 and 2a:

- **Schedule Job:** NHSD will then schedule the job based on the integrators request and share the subscription Id along with credential details to generate OAuth token and access the artefacts.
- **Bulk status:** Integrators can use Bulk status URL to access extracts for a given subscription. This URL requires OAuth token to be part of the header along with subscription Id in request.

Step 3:

- **Bulk status payload:** Depending on the availability of the artefacts, response payload will include the signed URL to extracted artefacts. These signed URLs are valid for 8hrs and using these URLs, integrators can access NHSD resources.

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- **Periodic artefacts:** Based on the integrators defined frequency, the system will produce the artefacts periodically and integrators can align to the defined frequency to fetch the artefacts.

The FHIR Bulk Export includes data that are of 'active', 'inactive' and 'archived' status so that integration partners can stay fully synchronised with all the latest changes in the directory.

3.2.2.1 Integrator configuration options

The NHSD Team will discuss with Integration partners to confirm what specific configuration options they need. These configurations are unique to each integration partner and determine the frequency and range of data that will be made available.

Standard FHIR Bulk Export configuration options are outlined in the table below.

Query Condition	Default configurations
Full export frequency	Default - once every 3 months OR once only
Delta export frequency	Default – daily (9pm)
FHIR Entities (determined via licence agreement)	Default: • Healthcare service • Location • Organisation • Practitioner • Practitioner Role • Endpoint
Other data restrictions	E.g. Restrict data to QLD region only

To learn more about FHIR Bulk Export, refer
https://build.fhir.nhsd.healthdirect.org.au/v4/bulkexports.html

4 Status codes

NHSD use industry standard HTTP codes to indicate the outcome of an API request. The common HTTP errors you may see include:

- 200 OK: The request has succeeded.
- 202 Accepted: The request has been accepted for processing.
- 400 Bad Request: The server could not understand the request due to invalid syntax.
- 401 Unauthorised: Authentication is required and has failed or has not been provided.
- 403 Forbidden: The client does not have access rights to the content.
- 404 Not Found: The requested resource is not available.
- 500 Internal Server Error: A generic error occurred on the server.
- 503 Service Unavailable: The server is not ready to handle the request.
- 504 Bad Gateway: The server was acting as a gateway or proxy and did not receive a timely response from the upstream server.

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5 Referenced resources

_Include option provide the ability to return the complete payload of the referenced resources within the bundle. This feature helps avoid the need for additional API calls to fetch these referenced resources separately.

Supported Entities: The NHSD supports the include option for Healthcare Service and Practitioner Role, enabling integrators to retrieve comprehensive information related to these entities directly within the bundle, streamlining the data retrieval process.

- _include option for Healthcare Service
  - _include=HealthcareService:organization
  - _include=HealthcareService:location
  - _include=HealthcareService:endpoint

- _include option for Practitioner Role
  - _include=PractitionerRole:practitioner
  - _include=PractitionerRole:endpoint
  - _include=PractitionerRole:service
  - _include=PractitionerRole:location
  - _include=PractitionerRole:organization

6 The NHSD Postman collection

The NHSD Postman collection is provided in JSON format, which contains sample HTTP URLs to access the NHSD FHIR resources. The Postman collection is grouped by the following resources:

- IAM (for authorisation)
- Organisation
- Healthcare Service
- Location
- Practitioner Role
- Practitioner
- Endpoint

To access and import the Postman collection:

1. Go to the Developer and Integration Hub and download the Postman collection.
2. Import the collection into your workspace.
3. Add the following environment variables under the root of the Postman collection (refer to *Figure 4*Figure 44)
   - url

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- apiKey
- client_secret

4. client_idToken Values (Access & Refresh) for session can be generated using the Authorisation API (defined as part of IAM).

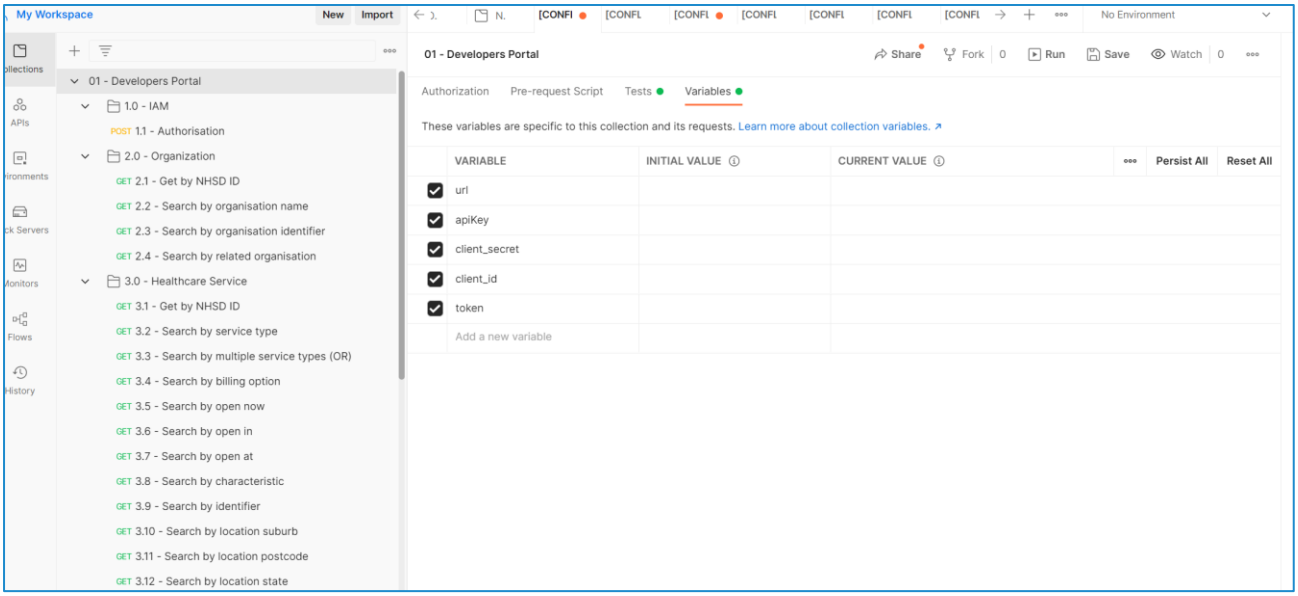

Figure 44: Postman collection variables set-up

Note: The example requests provided below are intended only as guidance for using the NHSD FHIR APIs. The examples mentioned below are specific to the Integrator Test Environment and therefore may be different to the Production Environment. The examples are accurate at the time of generating this document version but may be subject to change.

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6.1 IAM

API	URL	HTTP Action	Detailed Action
Authorisation	{environment url}/oauth/token	POST	To retrieve the Authorization tokens - Access & Refresh

6.2 Organisation API

API	URL	HTTP Action	Detailed Action
Get by NHSD ID	{environment url}/Organization/:id	GET	Search Organisation details by the NHSD Organisation identifier. Example Request - {environment url}/Organization/60d05521-2c92-41c4-8743-8bd1ca34d426
Search by organisation name	{environment url}/Organization?name = [Value]	GET	Search Organization details by the name of the organization. Example Request - {environment url}/Organization?name=786 Test Medical Centre
Search by organisation identifier	{environment url}/Organization?identifier = nhsd:/reference/common/organisationIdentifierType/ [Value]	GET	Search Organization details by organization identifier. Example Request - {environment url}/Organization?identifier=nhsd:/reference/common/organisationIdentifierType/abn|70442033624

6.3 Healthcare Service API

API	URL	HTTP Action	Detailed Action
Get by NHSD ID	{environment url}/HealthcareService/:id	GET	Search Healthcare Service details by the NHSD service location identifier. Example Request - {environment url}/HealthcareService/10d6717a-a225-4ae5-8f4c-590118ca018f

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API	URL	HTTP Action	Detailed Action
Search by service type	{environment url}/HealthcareService?service-type = [Value]	GET	Search Healthcare Service details by service type, defined by SNOMED CT AU standard code. Reference set - Healthcare Service Types SNOMED-CT Example Request - {environment url}/HealthcareService?service-type = 1223091000168105
Search by multiple service types (OR)	{environment url}/HealthcareService?service-type = [Value1,Value2,..]	GET	Search Healthcare Service details for multiple service types in one request. E.g. General practice service OR Pharmacy service. Example Request - {environment url}/HealthcareService?service-type = nhsd:/reference/taxonomies/snomed-servicetype|1238861000168104,nhsd:/reference/taxonomies/snomed-servicetype|1241801000168105
Search by service provision code (billing option)	{environment url}/HealthcareService?serviceProvisionCode = [Value]	GET	Search Healthcare Services by the billing type option it supports, e.g. Bulk Billing Only. Reference set - Service Provision Codes Example Request - {environment url}/HealthcareService?serviceProvisionCode = =http://hl7.org.au/fhir/CodeSystem/service-provision-conditions|BBO
Search by open now	{environment url}/HealthcareService?openNow = [Value]	GET	Search Healthcare Services that are open at the time of search execution. Only TRUE is supported. Example Request - {environment url}/HealthcareService?openNow = true
Search by open in	{environment url}/HealthcareService?openIn = [Value]	GET	Search Healthcare Service by time of Future Status from now in minutes. E.g. Find Healthcare Services that are open in 30 mins from now.

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API	URL	HTTP Action	Detailed Action
			Example Request - {environment url}/HealthcareService?openIn = 30
Search by open at	{environment url}/HealthcareService?openAt = [Value]	GET	To get status of the Healthcare service at any time in the future. E.g. Find Healthcare Services that are open at 8:00pm on 25 December 2024. Example Request - {environment url}/HealthcareService?openAt =2024-12-25T13:47:43.000+10:00
Search by characteristic	{environment url}/HealthcareService?characteristic = [Value]	GET	Search Healthcare service details by Characteristics - Facility, Funding Source, Referral Information, Offering. Reference Sets: 1. Facilities - https://build.fhir.nhsd.healthdirect.org.au/v4/ValueSet-valueset-au-nhsd-facility.html 2. Funding Source - https://build.fhir.nhsd.healthdirect.org.au/v4/ValueSet-valueset-au-nhsd-fundingSource.html 3. Referral Information - https://build.fhir.nhsd.healthdirect.org.au/v4/ValueSet-valueset-au-nhsd-referralInformation.html 4. Offering - https://build.fhir.nhsd.healthdirect.org.au/v4/ValueSet-valueset-au-nhsd-offering.html Example Request - {environment url}/HealthcareService?characteristic=http://fhir.nhsd.com.au/CodeSystem/rc-facility|wheelchairAccess
Search by identifier	{environment url}/HealthcareService?identifier = [Value]	GET	Search Healthcare Service details by Provider location service identifier type. Example Request - {environment

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API	URL	HTTP Action	Detailed Action
			url}/HealthcareService?identifier=nhsd:/reference/common/providerLocationServiceIdentifierType/healthLink|healthLink|eve42514
Search physical services by location suburb	{environment url}/HealthcareService?location.physicalType={Value}&location.address-city=[Value]&_include=HealthcareService:location	GET	Search Healthcare service details for physical service by location suburb. Reference Set: physicalType - Physical Type Example Request - {environment url}/HealthcareService?location.physicalType=si&location.address-city=BENDIGO&_include=HealthcareService:location
Search by location postcode	{environment url}/HealthcareService?location.physicalType=[Value]&location.address-postalcode=[Value]&_include=HealthcareService:location	GET	Search Healthcare Service details for physical service by location postcode. Reference Set: physicalType - Physical Type Example Request - {environment url}/HealthcareService?location.physicalType=si&location.address-postalcode=3585&_include=HealthcareService:location
Search by location state	{environment url}/HealthcareService?location.physicalType=[Value]&location.address-state=[Value]&_include=HealthcareService:location	GET	Search Healthcare service details for physical service by location - Australian state or territory. Reference Sets: physicalType - Physical Type state – State/Territory Example Request - {environment url}/HealthcareService?location.physicalType=si&location.address-state=VIC&_include=HealthcareService:location

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API	URL	HTTP Action	Detailed Action
Search by location proximity	{environment url}/HealthcareService?location.physicalType=[Value]&location.near=[Value]	GET	Search Healthcare service details for physical service by location proximity Reference Set physicalType -- Physical Type Example Request - {environment url}/HealthcareService?location.physicalType=si&location.near=-27.4237155914306641:153.035675048828125
Search by location proximity within a specified distance	{environment url}/HealthcareService?location.physicalType=[Value]&location.near=[Value]&location.near-distance=[Value]	GET	Search Healthcare service details for physical service by location proximity within a specified distance. Reference Set physicalType -- Physical Type Example Request - {environment url}/HealthcareService?location.physicalType=si&location.near=-27.4237155914306641:153.035675048828125&location.near-distance=100|http://unitsofmeasure.org|m
Search by coverage area postcode	{environment url}/HealthcareService?location.physicalType=[Value]&coverageArea.address-postalcode=[Value]	GET	Search for virtual healthcare service by coverage area postcode. Reference Set: physicalType -- Physical Type Example Request – {environment url}/v4/HealthcareService?location.physicalType=virtual&coverageArea.address-postalcode=3568

6.4 Practitioner Role API

API	URL	HTTP Action	Detailed Action
Get by NHSD ID	{environment url}/PractitionerRole/:id	GET	Search Practitioner Role details by the NHSD Practitioner Role identifier.

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API	URL	HTTP Action	Detailed Action
			Example Request - {environment url}/PractitionerRole/b60a7a44-3db7-42c0-81bc-acc483bc29f2
Search by identifier	{environment url}/PractitionerRole?identifier = [Value]	GET	Search Practitioner Role details by an identifier, e.g. Medicare Provider Number. Example Request - {environment url}/PractitionerRole?identifier = http://ns.electronichealth.net.au/id/medicare-provider-number|034238AJ

6.5 Practitioner API

API	URL	HTTP Action	Detailed Action
Get by NHSD ID	{environment url}/Practitioner/:id	GET	Search Practitioner details by the NHSD Practitioner identifier. Example Request - {environment url}/Practitioner/390d88a5-79b3-4228-86dd-bc272bd5e8bb
Search by name	{environment url}/Practitioner?name = [Value]	GET	Search Practitioner details by name. Example Request - {environment url}/Practitioner?name = Audrey Josephine Hayes
Search by identifier	{environment url}/Practitioner?identifier = [Value]	GET	Search Practitioner details by identifiers. Example Request - {environment url}/Practitioner?identifier = http://hl7.org.au/id/ahpra-registration-number|MED0000991161

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7 Technical support

If you are experiencing issues that require technical support, please complete the Technical Support Request form. The form should be used for technical issues or support requests including (but not limited to) the areas below:

Search Functionality:

- Queries about using the search function effectively and help constructing search queries.
- Queries about error codes you are seeing (refer to Section 4 Status codes).
- Queries about unexpected/incorrect API results or you are not seeing the data you expect to see in the API response.

Integrator Credentials/Access issues:

- Queries/issues with using the credentials provided by NHSD or with accessing our products.

Publishing data to the NHSD:

- If you are receiving an error message when you try to publish data to the NHSD via the Publish URL provided.
- If you have successfully posted data to the Publish URL but the Status URL is still showing ERROR on posted resources.

Technical Specifications/documentation:

- Queries or feedback regarding the IGs or other technical documentation

For all other requests, including data related queries or feedback and suggestions, please contact the NHSD via nhsd@healthdirect.org.au.

8 Acronyms and abbreviations

Abbreviation/Acronym	Full name
API	Application Programming Interface
AU-PD	Australian FHIR Provider Directory
DAH	Data Acquisition Hub
FHIR	Fast Healthcare Interoperability Resources
HTTP	Hypertext Transfer Protocol
HL7	Health Level Seven
IAM	Identity and Access Management
IG	Implementation Guide
JSON	JavaScript Object Notation
NHSD	National Health Services Directory
R4	Release 4
URL	Uniform Resource Locator

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