

NCHS NVSS FHIR API Natality Test Plan Jurisdiction <-> NCHS

<Date-of-Test-Event>

This test plan includes updated URLs that were introduced in v1.7.0 of the NVSS FHIR APIs

The goals for testing the NCHS NVSS FHIR API for Natality include creating a FHIR Birth Record, testing submission of a FHIR Birth Record from jurisdictions to NCHS, and return of acknowledgement and error response messages from the NCHS API to jurisdictions. During this phase of testing, only submission to the backup NCHS API will be tested. These tests will focus on the most recent version published BFDR FHIR IG STU 2.0.0 (<https://build.fhir.org/ig/HL7/fhir-bfdr/> for the format of the birth record itself and the [FHIR messaging IG 2.0.0](#) for supporting the business processes of submitting the record and retrieving responses. For the FHIR record producing test case, jurisdictions will create a FHIR Birth Record on their local system with predefined values. Jurisdictions will validate the record using Canary. For the second test case, jurisdictions will initiate the test by sending a FHIR Birth Record Submission Message to the FHIR API and retrieve responses using the same API. The following test scenarios will support progressive testing of FHIR Natality Message processing capabilities.

NVSS API Instructions

Before using the NVSS API, the following steps should be completed (please allow a few weeks to complete these steps). If you already have access to the NVSS API for mortality, you do not need to request access again.:

1. Jurisdiction representative requests an account on the SAMS production server at <https://sams.cdc.gov/>. An existing account may be used, however keep in mind that the username and password for the account will likely need to be made available to jurisdiction testers, so a new account may be preferred. Account requests should be sent to nvssmodernization@cdc.gov.
2. NCHS approves account and associates account with the SAMS API Gateway, providing connectivity to the API.
3. NCHS provides jurisdiction with appropriate OAuth Client ID and Client Secret
4. Jurisdiction activates the System Account associated with their SAMS account:
 - a. Log into SAMS account at <https://sams.cdc.gov/>
 - b. On the left-hand menu click "My Profile"
 - c. On the new left-hand menu click "Manage My System Account"
 - d. Make note of "User Name", which will start with "SYS-"; that's the username to use for OAuth
 - e. Set a new System Account password by filling in the "New Password" and "Confirm New Password" fields and clicking "Submit"; this is the password to use for OAuth

5. NCHS provides jurisdiction with the OAuth token URL and the API Gateway URL for making connections; the URLs will have the following format:

OAuth token URL: <https://apigw.cdc.gov/auth/oauth/v2/token>

API Gateway URL: <https://apigw.cdc.gov/OSELS/NCHS/NVSSFHIRAPI/<JurisdictionID>>

(where <JurisdictionID> is the appropriate two letter jurisdiction code, e.g., UT for Utah)

6. Once the jurisdiction has set up the System Account it can be tested by requesting an OAuth token, which will be used for interacting with the NVSS FHIR API. Using a tool that supports sending https requests, like curl (a command line tool, see <https://curl.se/>) or postman (a small application, see <https://learning.postman.com/docs/getting-started/introduction/>) send the following request:

```
curl --request POST
      --url https://apigw.cdc.gov/auth/oauth/v2/token
      --header "Content-Type: application/x-www-form-urlencoded"
      --data grant_type=password
      --data client_id=<OAuth-client-id>
      --data client_secret=<OAuth-client-secret>
      --data scope="openid profile email"
      --data username="<SAMS-system-account-username>"
      --data password="<SAMS-system-account-password>"
```

A response containing an OAuth token should be received that looks as follows:

```
{
  "access_token": "<access-token>",
  "token_type": "Bearer",
  "expires_in": 3600,
  "refresh_token": "<refresh-token>",
  "scope": "profile email"
}
```

7. Once an OAuth token is retrieved it can be tested by sending a GET request to the FHIR API endpoint:

```
curl --request GET
      --header 'Authorization: Bearer <access-token>'
      --url https://apigw.cdc.gov/OSELS/NCHS/NVSSFHIRAPI/MA/Bundles
```

Assuming there are no return messages yet, a response should be seen that looks as follows:

```
{
  "resourceType": "Bundle",
  "type": "searchset",
  "timestamp": "2022-06-24T17:48:54.486992-04:00" }
```

Complete documentation on the API can be found on GitHub:

<https://github.com/nightingaleproject/Reference-NCHS-API#readme>

STEVE API Onboarding Steps

The STEVE API is not currently part of the Natality Test Plan.

BFDR .NET Library Target Versions

[BFDR v1.0.0-preview.12](#)

[BFDR.Messaging v1.0.0-preview.12](#)

BDFR IG Target Version

[BDFR STU 2.0.0](#)

VRFM Target Version

[Vital Records FHIR Messaging IG](#)

Tests

Testing is broken up into three tiers. During a testing event each participating jurisdiction can participate in one or more tiers as time allows and as appropriate for their testing goals. Tier 0 focuses on creating a valid FHIR Birth Record. Tier 1 focuses on “happy path” testing of basic message exchange functionality: submitting a Birth Record directly to NCHS and handling the expected subsequent message exchanges. Tier 2 introduces advanced message exchanges including updates and void messages.

Tier 0: Creating a valid FHIR Birth Record

Test 1: Creating a Birth Record and validating with Canary

The jurisdiction will test individual FHIR messages, each containing a birth record, using the Canary testing tool. Three record submission messages will be tested:

1. Romero test case
2. Zalbanaiz test case
3. Monroe UNKNOWN test case

To test a birth record and submission message in Canary use the following steps:

- Use the hosted [Canary Testing Tool with BFDR Support](#) or run the Canary testing tool; instructions can be found in the [Canary README](#) document.
- Navigate to the Canary BFDR “Record Testing” “Connectathon FHIR BFDR Birth Records (Producing)” test.
- Select the correct test case for the record you’ll be testing.

- Complete “Step 1” in Canary: Set the certificate number and jurisdiction of the record you’ll be testing.
- Complete “Step 2” in Canary: Enter the Connectathon test data displayed by Canary into your system to generate a FHIR Birth Record using the BFDR library.
- Complete “Step 3” in Canary: Paste the FHIR Record into the input box at the bottom of the page, submit it, and click “Calculate”. Canary will then display successes/errors for how each field of your FHIR Record matches the test record’s fields.
- Navigate to the Canary BFDR “Message Testing” “Connectathon FHIR BFDR Birth Messages (Producing)” test and choose a test record.
- Complete “Step 4” in Canary: Wrap your FHIR record in a Submission Message using your code that uses the BFDR Messaging library.
- Complete “Step 5”: Select “Submission Message” in Canary and input your generated record Submission Message into Canary (either via copy & paste, uploading from a file, or POST the record to Canary). Click “Calculate” and, again, Canary will display all successes and failures of matching by-field. This time, it will also validate message-related fields.
- Review the results and address any issues identified; note that some categories of issues may not be possible to address for your jurisdiction.

For each record submission message, the following criteria will indicate success:

- Message loaded into Canary and Canary reports no incorrect properties (to the extent possible for your jurisdiction)

Tier 1: Happy path testing directly with NCHS backup API endpoint

This tier focuses on “happy path” testing of basic functionality: submitting a FHIR Birth Record Submission Message directly to NCHS and handling the expected subsequent message exchange. Note that during this testing records are not being tested by NCHS to ensure that they contain the correct content. This testing should be performed separately by the jurisdiction using the [Canary](#) Connectathon test in Tier 0.

Test 1: Submission of individual FHIR messages

The jurisdiction will send individual FHIR messages, each containing a birth record, directly to NCHS via the NCHS NVSS FHIR API. NCHS will reply with an acknowledgement message for each submission. Two individual records will be submitted:

1. Romero test case
2. Zalbanaiz test case

To test the Birth Record Submission:

- Use your SAMS credentials to request an authentication token to the NVSS FHIR API, see SAMS instructions above
- Create your request in either Postman or on the command line using the following criteria
 - Request Type: POST
 - Endpoint: ex. <https://apigw.cdc.gov/OSELS/NCHS/NVSSFHIRAPI/MA/Bundle/BFDR-BIRTH/v2.0>
 - Body: one of the .json Birth Record Submission Messages you created in Tier 0
 - Authentication: The token requested in the previous step
- Submit your request to the test endpoint
- After you receive a 204 “No Content” http response from the NVSS FHIR API, create your GET request in Postman or on the command line using the following criteria
 - Request Type: GET
 - Endpoint: ex. https://apigw.cdc.gov/OSELS/NCHS/NVSSFHIRAPI/MA/Bundle/BFDR-BIRTH/BFDR_STU2_0
 - Authentication: The same auth token used in the previous step
- Submit your request to the test endpoint
- Confirm you received an Acknowledgement with a reference to the submitted Birth Message Id

For each test record, the following criteria will indicate success:

- The Birth Record Submission Message is received by the NVSS API and a 204 “No Content” http status response is sent back to the jurisdiction.
- An Ack is returned to jurisdiction and references the original message.
- A demographics coding message is returned to the jurisdiction and reference the original message.

To test Acknowledgements:

- Create an acknowledgement message for the demographics coding message.
- Send the acknowledgement to the NVSS API
https://apigw.cdc.gov/OSELS/NCHS/NVSSFHIRAPI/MA/Bundle/BFDR-BIRTH/BFDR_STU2_0

Acknowledgement success criteria:

- The Acknowledgement Message is received by the NVSS API and a 204 “No Content” http status response is sent back to the jurisdiction.

Tier 2: Advanced BFDR FHIR Messaging Interoperability

Test 1: handling of an error response message

The jurisdiction will send an invalid FHIR submission message to NCHS via the FHIR API and NCHS will reply with the appropriate error message.

To test triggering an extraction error from NCHS:

- Use Record #1, the Romero test case from Test 1 of Tier 1

- Remove the birthdate data from the record. Be sure to remove the patient child's "birthDate" json component completely from the FHIR json.
- Submit the modified Birth Submission message to the NVSS FHIR API endpoint
https://apigw.cdc.gov/OSELS/NCHS/NVSSFHIRAPI/MA/Bundle/BFDR-BIRTH/BFDR_STU2_0

The following criteria will indicate success:

- Submission message is received by NCHS and returns a 204 "No Content" http state response
- After a few minutes, a GET request response should include an Extraction Error Message from NCHS with the message "*--Internal error encountered. Please Validate your submission using CANARY before sending it to NCHS.*"

Test 2: submit a BirthRecordUpdateMessage

The jurisdiction will send a FHIR Birth Record Update Message to NCHS via the FHIR API and NCHS will reply with an acknowledgement.

The record to submit an update for will be the Romero Test Case from Tier 0 above. The updated record will update the mother's race and ethnicity from:

- race = "White"
- ethnicity = "Mexican"

to

- race = "Vietnamese"
- ethnicity = "Not Hispanic or Latino"

Wrap the updated record in a FHIR BirthRecordUpdateMessage and submit to the NVSS FHIR API endpoint
https://apigw.cdc.gov/OSELS/NCHS/NVSSFHIRAPI/MA/Bundle/BFDR-BIRTH/BFDR_STU2_0

The following criteria will indicate success:

- The update message is received by NCHS and a valid record is extracted
- The update ack is returned to the jurisdiction and references the update message
- A demographic coded response is received and reflects the updated race and ethnicity data.

To test Acknowledgements:

- Create an acknowledgement message for the demographics coding message.
- Send the acknowledgement to the NVSS API
https://apigw.cdc.gov/OSELS/NCHS/NVSSFHIRAPI/MA/Bundle/BFDR-BIRTH/BFDR_STU2_0

Acknowledgement success criteria:

- The Acknowledgement Message is received by the NVSS API and a 204 "No Content" http status response is sent back to the jurisdiction.

Test 3: submit a BirthRecordVoidMessage

The jurisdiction will send a FHIR Birth Record Void Message to NCHS via the FHIR API and NCHS will reply with an acknowledgement.

The record to submit a void for will be the Romero Test Case from Tier 0 above.

Create a FHIR BirthRecordVoidMessage for the Romero Birth Record and submit to the NVSS FHIR API.

The following criteria will indicate success:

- The void message is received by NCHS and a valid record is extracted
- The void ack is returned to the jurisdiction and references the void message