



Connect Virginia
Advancing Virginia's Health Care

**VIRGINIA'S
NEWBORN SCREENING
DATA EXCHANGE
ONBOARDING GUIDE**
Participants and Participant Vendors

Version 2.0

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VIRGINIA'S NEWBORN SCREENING DATA EXCHANGE INTRODUCTION

ConnectVirginia is the statewide Health Information Exchange (HIE) for Virginia. The primary function of the HIE is to provide a secure pathway for transporting and exchanging health related data between hospitals and providers and State agencies like the Virginia Department of Health (VDH) and the Department of General Services, Division of Consolidated Laboratory Services (DCLS). Currently, ConnectVirginia supports electronic data exchange with hospitals and ambulatory providers who send immunization (VIIS), cancer registry, syndromic surveillance and electronic lab reporting (ELR) data from VDH.

ConnectVirginia and DCLS are working to expand their capabilities to include the secure exchange of Newborn Screening data. These new capabilities support the electronic, secure and standards based exchange of NBS lab orders and results using nationally adopted health vocabularies, such as LOINC, SNOMED and ICD-10 coding, and HL7 2.5.1 message specifications for the Lab Order Guide (PHII) and Lab Results Interface (LRI).

Although dried-spot cards will still be used for specimen collection and physically delivered to DCLS, the lab intends for hospitals/birthing facilities to begin transmitting their electronic orders via ConnectVirginia's Public Health Reporting Pathway (PHRP). This is the same pathway that is used to send Meaningful Use messages to VDH.

Prospective participants must go through an onboarding and validation process and obtain approval from DCLS prior to participating in Virginia's NBS Data Exchange program. More information about Virginia's NBS Data Exchange program can be found at:

<http://www.dgs.virginia.gov/division-of-consolidated-laboratory-services/resources/nbs-data-exchange/>

Questions should be emailed to DCLS_MSG_SPPT@dgs.virginia.gov.

VIRGINIA'S NEWBORN SCREENING DATA EXCHANGE PROCESS

To onboard to Virginia's NBS Data Exchange program, Participants must follow and successfully complete the steps below.

Step 1 – Complete Onboarding Package

- Obtain an OID to identify your Facility and Sending Application. An OID is a unique identifier that is assigned to an organization and/or the sending application (for example: 2.16.840.1.113883.3.9). To obtain a Facility and/or Sending Application OID, go to: <http://www.hl7.org/oid/index.cfm>. Currently HL7 charges \$100 per OID for non-members.
- Identify the type of transport you wish to set up (HTTPS or SFTP) for the data exchange.
- Complete the "Participant Form" (Exhibit A) and email it to DCLS_MSG_SPPT@dgs.virginia.gov.

- If the Participant **is NOT partnering with OZ Systems**, a Data Exchange Agreement must be signed and submitted. Please download ConnectVirginia's Newborn Screening Data Exchange Agreement from http://www.dgs.virginia.gov/globalassets/document-center/dcls-forms/nbs/3_nbs_dataexchange_agreement---final.pdf
Read, sign and email the agreement to DCLS_MSG_SPPT@dgs.virginia.gov.
- If the Participant **is partnering with OZ Systems**, a Data Exchange Agreement is **NOT** required by the Participant. A signed Master agreement has been completed by OZ Systems on behalf of all their customers.
- DCLS_MSG_SPPT will review the onboarding packet and return an executed copy of the Newborn Screening Data Exchange Agreement to the Participant (if applicable) and forward the onboarding documents to ConnectVirginia for processing.
- Once successfully onboarded, the Participant can move on to Step 2.

Step 2 – Establish Message Transport (HTTPS vs SFTP)

Participants can select either **HTTPS or SFTP** as their message transport for data exchange between the Hospitals and DCLS.

- If the Participant chooses **HTTPS as the method of transport**, the process below is followed:
 1. ConnectVirginia will create an HTTPS account for the Participant using the information provided on the "Participant Form." This includes:
 - a. Your organization's/participant's Facility OID (vendor hubs should have their own OID)
 - b. A valid domain name for the environment from which the connection will be made. Domain name must end in a valid internet extension such as .com or .net.
 - c. Preferred file format for the SSL client certificate - .pem or .p12
 - d. Contact information for the appropriate technical resource(s)
 2. Via secure email, ConnectVirginia will provide the Participant with the TEST and PROD endpoints for exchanging NBS lab orders.
 3. ConnectVirginia will issue credentials that will enable connection to the TEST and PROD endpoints by the Participant.
 4. ConnectVirginia will issue a client SSL certificate for authentication and authorization. This certificate must be provided as part of the HTTPS POST request to ConnectVirginia on every transaction.
 5. DCLS will issue a client certificate for encrypting the payload in the message.
 6. Participants must include the following custom headers with their message to ensure proper routing and delivery:

- **MEDfx-custom-oid:** OID identifying the sending organization. This OID must be acquired by the participant or participant's vendor and provided to ConnectVirginia during the application process.
 - **MEDfx-transaction-id:** Unique identifier provided by the submitting entity to identify the transaction for audit and response purposes. Each request provided to ConnectVirginia must contain a unique identifier within the scope of the organization making the request.
 - **MEDfx-phr-type:** Indicates the type of newborn screening message being submitted. Valid Report Types for the *MEDfx-phr-type* header are:
 - ✓ **NBSORDERS** – Newborn Screening Orders
 - ✓ **NBRESULTS** – Newborn Screening Results
7. Participants need to ensure their firewall allows a connection to the Public Health Reporting Pathway which uses port 13000.
8. ConnectVirginia forwards ACKS and NACKS from DCLS indicating successful (or unsuccessful) HL7 message processing.
- a. If you receive an ACK, you have connected successfully with a properly formatted HL7 message.
 - b. If you receive a NACK, you have connected successfully, but your HL7 message is not formatted correctly per the DCLS specs.
 - c. If you do not receive an ACK or NACK, check the err directory for any other errors.
- If the Participant chooses [SFTP as the method of transport](#), the process below is followed:
 1. ConnectVirginia will use the information provided on the "Participant Form" to create a Username and Password and the TEST Hostname and Port for the SFTP connection and will send this information to the Participant via secure email.
 2. NBS messages exchanged via SFTP must include the following custom headers to ensure proper routing and delivery:
 - **MEDfx-custom-oid:** OID identifying the sending organization. This OID must be acquired by the participant or participant's vendor and provided to ConnectVirginia during the application process.
 - **MEDfx-transaction-id:** Unique identifier provided by the submitting entity to identify the transaction for audit and response purposes. Each request provided to ConnectVirginia must contain a unique identifier within the scope of the organization making the request.
 - **MEDfx-phr-type:** Indicates the type of newborn screening message being submitted. Valid Report Types for the *MEDfx-phr-type* header are:
 - ✓ **NBSORDERS** – Newborn Screening Orders
 - ✓ **NBRESULTS** – Newborn Screening Results

3. When connecting to the SFTP server, each Participant will be presented with 3 directories that are specific to their Facility:
 - **In** – input directory - where you drop your HL7 files.
 - **Out** – output directory – for responses (ACKS/NACKS) from DCLS
 - **Err** – error directory – for other errors
4. SFTP transport uses port 22– be sure your firewall allows this connection.
5. The Participant’s filename must be formatted as follows: **{phr-type}~{transaction-id}.extension**
 - The extension of the file name CANNOT be .out or .err
 - File extensions like: .hl7, .txt or .in are preferred.
 - Example filenames include:
 - ✓ **NBSORDERS~B4E1682D-BDB8-401B-9005-5A78FAB33FAA.txt**
 - ✓ **NBRESULTS~AA3719193.HL7**
6. ConnectVirginia forwards ACKS and NACKS from DCLS indicating successful (or unsuccessful) HL7 message processing – these will be in the **Out** directory.
7. Check the **Out** directory:
 - a. If you receive an ACK, you have connected successfully with a properly formatted HL7 message.
 - b. If you receive a NACK, you have connected successfully, but your HL7 message is not formatted correctly per the DCLS specs.
 - c. If you do not receive an ACK or NACK, check the Err directory for any other errors.

Step 3 – Connectivity Testing

- After **Step 2** is complete, the Participant will send an email to DCLS_MSG_SPPT@dgs.virginia.gov and request a date/time to schedule a basic connectivity test (Hello World). Note this test can be scheduled at any time following the successful enrollment in the NBS Data Exchange program.
- DCLS MSG SPPT will reach out to ConnectVirginia to schedule a testing window and coordinate this with the Participant.
- Using the method of Transport (HTTPS or SFTP) selected in **Step 2**, the Participant will send a .txt file (Hello World message) through ConnectVirginia to the Test endpoint at DCLS.
- Upon the successful completion of Connectivity Testing, the Participant will move on to **Step 4**.

Step 4 – Basic Lab Order Message Validation

- Participant emails a copy of their Test Lab Order message (.txt file) to DCLS_MSG_SPPT@dgs.virginia.gov

- DCLS_MSG_SPPT will review the message content, HL7 structure and the appropriate use of health coded vocabularies.
- Any finding will be communicated in writing to the Participant and if needed, a conference call will be scheduled. Participant will correct any deficiencies and email a corrected message. This process will be repeated until all defects are corrected and the Participant is approved to move on to **Step 5**.
- Once the initial structural and content validation process is successfully completed, the Participant will be provided with a set of Test cases to follow in **Steps 5 and 6**.

Step 5 – Test Encryption for Lab Order Message

- Participants will generate a Test Lab Order message from their Test environment based on a Test Case provided by DCLS_MSG_SPPT.
- Participant will encrypt the test message and send through ConnectVirginia to the DCLS TEST endpoint.
- DCLS will decrypt the test message and perform structural and content validation.
- If the decryption process fails, DCLS will work with the Participant to resolve any issues.
- Participant will be asked to resubmit a new encrypted Test message through ConnectVirginia to the DCLS Test endpoint.
- If DCLS is successful in decrypting the message, the Participant will be moved into the last phase of testing for the Lab Order message.

Step 6 – Lab Order Message Validation

- Participant will generate a series of Test Lab Order messages generated from their Test environment based on the Test Cases provided by DCLS_MSG_SPPT.
- Participant will encrypt the test message and send through ConnectVirginia to the DCLS TEST endpoint.
- DCLS will decrypt the Test Lab Order message and perform structural and content validation.
- An ACK will be returned to the Participant acknowledging that the message was successfully received at the DCLS endpoint.
- Participants will receive a NACK when they have successfully sent a message to the DCLS TEST endpoint; however, the message contains errors and fails structural and/or content validation.
- If an ACK or NACK is not received following a transmission to the Test endpoint, Participants using SFTP should check the Err directory. Participants using HTTPS can email DCLS_MSG_SPPT@dgs.virignia.gov to request assistance in troubleshooting.
- DCLS will parse and load messages successfully received into the Laboratory Information Management System (LIMS) test environment.
- This process will be repeated until all Test Cases are passed and defects are resolved.

- DCLS will obtain PROD sign-off from all parties including the Participant, ConnectVirginia, VDH Message Support and DCLS_MSG_SPPT and coordinate a date to move the Participant's transmissions for the Lab Order message from TEST to PROD and the Participant status to "In Production."

Step 7 – Basic Lab Result Message Validation

- DCLS emails a copy of their Test Lab Results message (.txt file) to the participant's email address.
- Participant should review the message content, HL7 structure and the appropriate use of health coded vocabularies.
- Any finding will be communicated in writing to the DCLS_MSG_SPPT and if needed, a conference call will be scheduled. DCLS will correct any deficiencies and email a corrected message. This process will be repeated until all defects are corrected and the Participant is approved to move on to **Step 8**.
- Once the initial structural and content validation process is successfully completed, the Participant will be provided with a set of Test cases to follow in **Steps 8 and 9**.

Step 8 – Test Encryption for Lab Result Message

- DCLS will generate a Test Lab Results message based on the Test Case provided by DCLS_MSG_SPPT.
- DCLS will encrypt the test message and send through ConnectVirginia to the participant's TEST endpoint.
- Participant will decrypt the test message and perform structural and content validation.
- If the decryption process fails, DCLS will work with the Participant to resolve any issues.
- DCLS will resubmit a new encrypted Test message through ConnectVirginia to the participant's Test endpoint.
- If participant is successful in decrypting the message, then Participant will be moved into the last phase of testing for the Lab Result message.

Step 9 – Lab Result Message Validation

- DCLS will generate a series of Test Lab Results messages generated from the Test environment based on the Test Cases provided by DCLS_MSG_SPPT.
- DCLS will encrypt the test message and send through ConnectVirginia to the participant's TEST endpoint.
- Participant will decrypt the Test Lab Result message and perform structural and content validation.
- An ACK will be returned to DCLS acknowledging that the message was successfully received at the Participant's endpoint.
- Participants will send a NACK when they have successfully received a message to the Participant's TEST endpoint; however, the message contains errors and fails structural and/or content validation.
- If an ACK or NACK is not received following a transmission to the Test endpoint, DCLS will work with the Participant in troubleshooting.

- Participant will parse and load messages successfully received into the Participant's test environment.
- This process will be repeated until all Test Cases are passed and defects are resolved.
- DCLS will obtain PROD sign-off from all parties including the Participant, ConnectVirginia, VDH Message Support and DCLS_MSG_SPPT and coordinate a date to move the Participant's transmissions for the Lab Result message from TEST to PROD and the Participant status to "In Production."

NOTE: *The Onboarding process occurs at the Facility/Participant level. Hospitals belonging to larger groups such as iNOVA, HCA and Bon Secours will need to complete a separate Participant Form for each Facility within the group. Each Facility will then be required to go through the process outlined above in Steps 1-6 in order to participate in Virginia's NBS Data Exchange program.*

FREQUENTLY ASKED QUESTIONS

1. **Who do I contact in case I have problems connecting?** support@connectvirginia.org
2. **Great, I have successfully connected....what's next?** You'll need to complete the content and structural validation Step. After this Step has been completed, you will get a PROD hostname/port. If you have any problems with your newborn screening transporting service connection, contact support@connectvirginia.org during regular business hours (M-F 9-5 EST).
3. **This is my first time attempting to log in with credentials but I'm getting a time out error. What is the cause and resolution?** This error usually occurs when you are attempting to access from an IP addresses that firewall permissions have not been established for. Please send support@connectvirginia.org all of the public IP addresses of the server(s) SFTP messages will be sent from.
4. **Do I need an SSL Certificate?** Yes, ConnectVirginia will issue certificates for TEST/PROD once you provide your OID, a domain name and your preferred format (.pem or .p12).
5. **What is an OID and where can I get one?** An OID is a unique identifier for your organization – it looks something like this: 2.16.840.1.113883.3.9 Your organization may already have one, if not, you can register for one here: <http://www.hl7.org/oid/index.cfm>. Currently HL7 charges \$100 per OID to non-members.
6. **Why do I need a domain name?** We tie your SSL certificate to your domain name to verify your identity when you submit data. Your domain name **MUST** end in an internet extension such as abchospital.com or provider.net.
7. **How do I create custom headers?** Header fields are colon-separated name-value pairs in clear-text string format, terminated by a carriage return (CR) and line feed (LF) character sequence. How you accomplish this depends upon your software. The most common error is forgetting the colon.
8. **I've installed my certificates, what do I need to do next?** If you have a test message with the customized headers ready, you can test your connectivity by sending a message to the test endpoint. Please notify us at DCLS_MSG_SPPT@dgs.virginia.gov before sending a test message. You can also test connectivity using telnet or an internet browser. If telnet does not work, you most likely have a firewall issue.
9. **How do I test connectivity with a browser?** Import the P12 file into in either **Chrome** or **Firefox** and browse to the test endpoint. You might get a certificate warning, but you can click proceed. At that point you should get the following error: *Exception: Custom Transaction Id argument from message header is NULL. Expecting 'MEDfx-transaction-id' header.* If you get that error, you successfully connected to our server.
10. **How will I know if I have connected successfully?** If you receive an ACK, you have connected successfully with a properly formatted HL7 message. If you receive a NACK, you have connected successfully, but your message (in the body) is not formatted correctly per the HL7 2.5.1 specifications for the NBS lab orders (LOI) and results (LRI).

FREQUENTLY ASKED QUESTIONS

11. **What's up with this HTTPS 500 error?** This most often means that your certificates are not installed correctly or that your headers are not formatted correctly.
12. **What if I have questions about the HL7 message content or any of the implementation documentation?** Contact DCLS_MSG_SPPT@dgs.virginia.gov Participants and Participant's vendors should already be working with this group to validate the structure and test data in the message.
13. **Can I test my headers before I send a message through?** Httpbin.org/post lets you send an HTTP Post request and returns your request so you can verify it is properly formatted.
14. **Do you have examples of Test messages?** Yes. Contact DCLS_MSG_SPPT@dgs.virginia.gov and request copies.
15. **Do you have examples of Test Cases?** Yes. Contact DCLS_MSG_SPPT@dgs.virginia.gov and request copies.
16. **What if I have questions about the HL7 message content documentation?** Use your DCLS contacts for questions. You should already be working with them on validating your message structure using test data sent to them via email.
17. **What is the OID for the Sending/Receiving Facility for the DCLS laboratory?**
VA PHL Richmond^2.16.840.1.114222.4.1.9977^ISO
18. **What is the OID for the Sending/Receiving Application for the DCLS laboratory?**
VA StarLIMsv10 Prod^2.16.840.1.114222.4.3.3.2.2.4^ISO

OTHER RESOURCES

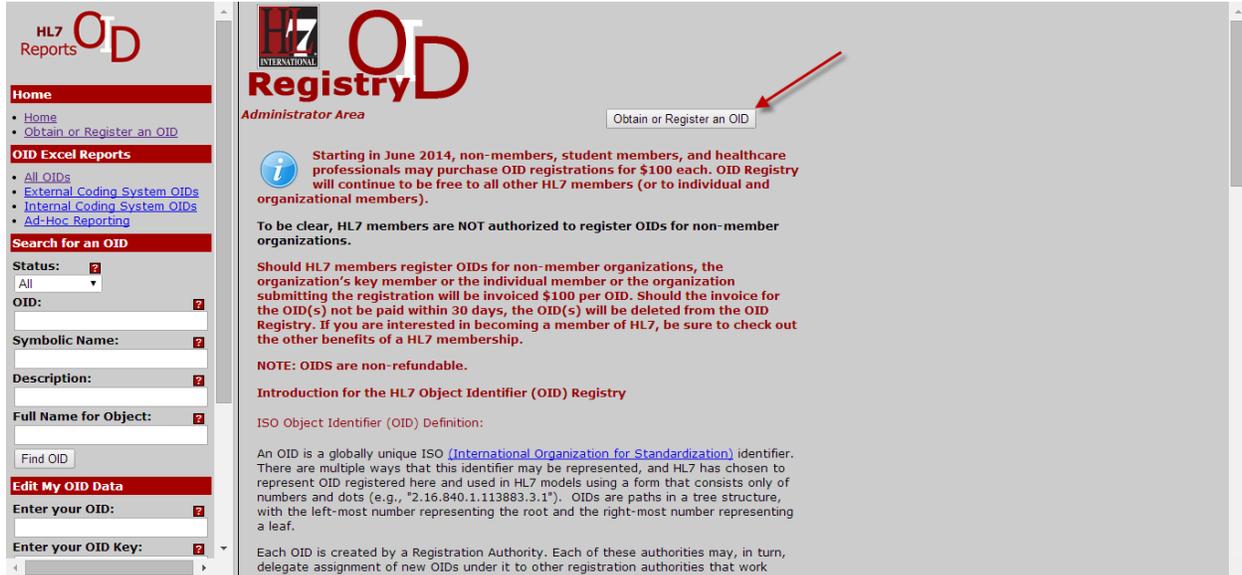
Still have questions? Also included in this Guide are FAQ sheets for both types of transport, as well as a guide with instructions for registering an HL7 OID. Other questions about transport/connectivity can be sent to support@connectvirginia.org.

Questions about participation, HL7 data standards and message structure and health coded vocabularies like LOINC and SNOMED should be directed to DCLS_MSG_SPPT@dgs.virginia.gov.

INSTRUCTIONS FOR OID APPLICATION

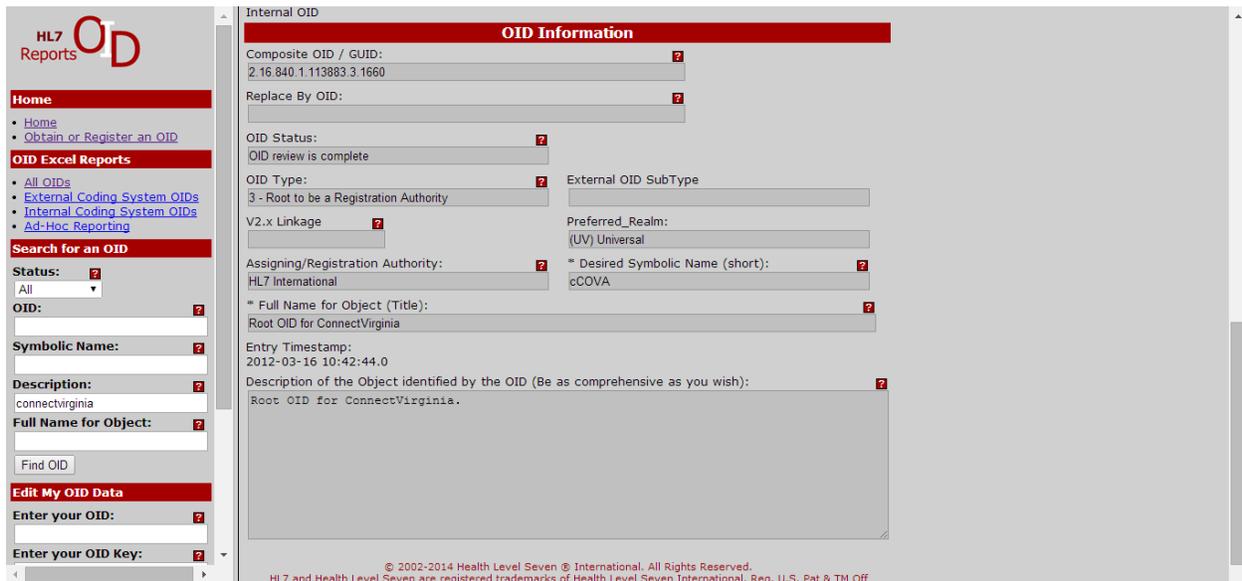
OID Instructions - <http://www.hl7.org/oid/index.cfm>

It takes about one business day to receive your OID via email*



You must purchase a coupon for an OID and create a user account in the next steps. Follow the on screen instructions for Submitter Information, Contact Information, and Responsible Body Portions.

Register for an Internal OID



- The OID Type should be 3 - Root to be a Registration Authority (this will allow you to create sub OIDs if you need other OIDs for different parts of your organization)
- The External OID Sub Type and V2.x Linkage fields can remain blank
- Preferred Realm should be (UV) Universal
- Desired Symbolic Name – a short version of a name, something to identify you i.e. COVA or ConnectVirginia..
- Full name – the complete name of your Organization – i.e. ConnectVirginia HIE, Inc.
- Description can be “Root OID for [Your Organization]”

****It takes about one business day to receive the email with your OID****



Newborn Screening Participant Form – Exhibit A

Participant Information

Name of Hospital/Provider _____

Address _____

City _____ State _____ Zip Code _____

Participant Type:

- Hospital
- Physician
- Service Provider (i.e. OZ Systems)



Participant - Technical Point of Contact

Primary Contact _____

Phone _____ Email _____

Secondary Contact _____

Phone _____ Email _____

Participant - Nursery Point of Contact

Primary Contact _____

Phone _____ Email _____

Secondary Contact _____

Phone _____ Email _____

Participant - Lab Point of Contact

Primary Contact _____

Phone _____ Email _____

Secondary Contact _____

Phone _____ Email _____



Information Required for Data Exchange

- 1. Facility Name (Participant): _____
- 2. Facility OID (For Participant): _____
- 3. DCLS-assigned Submitter Code: _____
(Same as currently entered on NBS Dried Bloodspot Card)
- 4. Does your organization intend to use OZ systems as the third-party service provider for NBS Data Exchange with DCLS?
 Yes
 No

IF your answer to #4 was YES, please skip to #9. You do not need to fill out #5-8 as those data elements will be provided by your designated third-party service provider.

- 5. Sending Application Name: _____
- 6. Sending Application OID: _____
- 7. Transport supported for Data Exchange (*Select one*):
 SFTP (please enter IP address of server uploading SFTP messages to ConnectVirginia) _____
 HTTPS (please enter Domain name connecting to ConnectVirginia) _____
- 8. Preferred format for SSL certificate:
 .pem
 .p12
 Other (please specify) _____
- 9. Can electronically send and/or receive (*Select all that apply*):
 NBS Orders (NBSORDERS)
 NBS Results (NBRESULTS)
- 10. From the sending application, can generate a bar coded label displaying **ALL** fields currently on the NBS Dried Bloodspot Card?
 Yes
 No

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Newborn Screening Participant Form Instructions

Instructions for Participants [using a third-party service provider](#)

1. Please fill out all fields on the first page of the Participant Form.
2. Fill out all fields on the second page except #5-8. These data elements will be provided by the designated third-party service provider. They are:
 - o Sending Application Name
 - o Sending Application OID
 - o Type of data exchange transport
 - o Preferred format for SSL certificate
3. Your completed form may be emailed to DCLS_MSG_SPPT@dgs.virginia.gov.

Instructions for Participants [not using a third-party service provider](#)

1. Please fill out **ALL** fields on the Participant Form.
2. Your completed form may be emailed to DCLS_MSG_SPPT@dgs.virginia.gov.

Diagram and Overview of Newborn Screening Data Exchange Architecture and Integration with ConnectVirginia

