NEMSIS TAC Whitepaper

NEMSIS V3 Implementation Checklist for States and Territories

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Authors

Joshua Legler – NEMSIS Consultant
Monet Iheanacho – State Support
N. Clay Mann – NEMSIS P.I.

Overview

This checklist is for states that have not yet begun collecting NEMSIS V3 data or submitting it to the national EMS database. Upon completion of the checklist, a state will have successfully completed the transition to NEMSIS V3 and will be submitting data to the national EMS database.

Planning

☐ Create a project schedule for your go-live

Create a schedule for all remaining steps in this guide. Pad the schedule with extra time to allow for vendor development delays, testing, and bug fixes. On the schedule, identify dependencies; in other words, tasks that must be completed before certain other tasks can be done.

☐ Create an email list to communicate with agencies, software vendors, and other stakeholders regarding your go-live date

It's important to have a way to communicate with all agencies and vendors often. If they hear nothing from you while you work hard preparing for the implementation, they may assume nothing is happening. Take time out from your work to let them know what you're working on.

☐ Share your go-live schedule with agencies, software vendors, and other stakeholders

You could disseminate the schedule via email, on your website, and on your state page of the NEMSIS website.

☐ ### Help each agency create its go-live plan

Let agencies know which NEMSIS versions you will support. Ask each agency to set a target date for submitting data to the state, and ask what software they will use. Consider clustering the onboarding of agencies by software vendor to make vendor testing and communication more efficient. Set a target transition date for each agency. Spread out the dates so that you can manage your workload.

☐ ### Create a training plan and materials

Your training plan should include tasks to create training materials for agencies directly using your state system, which may include slide show presentations, recorded videos, and checklists. Agencies using other software will need to rely on their vendor for training about data entry, but you should provide them with training materials regarding state requirements and submission of data to the state. Create a way to keep track of frequently asked questions and issues that arise during implementation. Plan on revising your training materials periodically to address them.

☐ ### Participate in NEMSIS TAC V3 Implementation calls, public webinars, and one-on-one technical assistance sessions

NEMSIS TAC V3 Implementation Calls are held twice a month. State training sessions and public training sessions are also available. See nemsis.org -> Calls and Trainings for upcoming training dates and recordings of past trainings. You may also schedule a one-on-one call with NEMSIS TAC staff to discuss the transition.

☐ ### Select a state-level software product that is certified NEMSIS compliant

The purchasing process is important. Allow plenty of time for the RFP and contract execution. Make sure to only consider software products that are certified NEMSIS compliant as state-level systems at nemsis.org -> Technical Resources -> Compliant Software Testing Status. The NEMSIS TAC can also provide guidance about features to look for when evaluating potential software products.

State Resources and Requirements

☐ ### Build and publish your StateDataSet file

If you have already selected a state-level software product, check if your vendor can auto-generate your StateDataSet file for NEMSIS v3.4; if not, you can use the NEMSIS StateDataSet Builder. For NEMSIS v3.5, your vendor is required to auto-generate your StateDataSet file. Either way, you need to determine the content of your StateDataSet file. The components are listed below:

- ## Custom Elements

  Implement statewide custom elements only if absolutely necessary. The NEMSIS TAC may be able to help find standardized ways of collecting data that you are considering collecting through custom elements. If you define any custom elements, add extra time to your project schedule to allow vendors to implement them.

- ## State Collected Elements

  Consult your state law and administrative rules for possible requirements on building your list of state collected elements. Many states convene a workgroup of stakeholders. Advocate for the adoption of all national elements on your state list. Consider using the NEMSIS TAC's list of recommended state elements as a base for your state list.

- ## State Certification/Licensure Levels

  Identify the levels for which your state issues certifications or licenses to EMS providers as well as any other healthcare professional levels that your state allows to perform EMS care even if they are not licensed by the state EMS office (for example, registered nurses or physicians). If you have any levels that are not on the NEMSIS list, you will need to create custom elements; consult the NEMSIS TAC for assistance.

- ## Procedures Permitted by the State

  Determine the procedures that your state permits at each certification/licensure level. The list may be published in state law or rule. You may also use the NEMSIS Suggested List for procedures as a starting point.

- ## Medications Permitted by the State

  Determine the medications that your state permits at each certification/licensure level. The list may be published in state law or rule. You may also use the NEMSIS Suggested List for medications as a starting point.

- ## Protocols Permitted by the State

  Determine the protocols permitted by your state. If you don't have statewide protocols, you can permit all protocols.

- ## EMS Agencies

  From your EMS agency licensing system, build your list of EMS agencies. Each agency should have a unique state ID, an agency number, and a name. In many states, the unique state ID and agency number are the same.

- ## Facilities

  Acquire a list of hospitals from the office in your state that licenses hospitals. Consider including hospitals from neighboring states that your agencies may use; you can get their information from the other states' StateDataSet files. In addition to hospitals and freestanding emergency departments, you may include clinics, nursing homes, and many other types of locations.

☐ ### Publish your state validation rules in Schematron format

Your validation rules should be published in Schematron format so that agencies using other vendors can implement them correctly. It is not necessary to include rules in your Schematron file that are already enforced by the national XML Schema (XSD) or Schematron schemas. Create your Schematron files, test them, and send them to the NEMSIS TAC for publication in your state repository. You can have Schematron rules for agency demographic data as well as PCR data.

☐ ### Set up everything in your system to reflect what's in your StateDataSet file

Update your state system by configuring custom elements, certification/licensure levels, procedures, medications, protocols, agencies, and facilities. If your StateDataSet was auto-generated from your state system, this step has already been done.

☐ ### Publish the WSDL or URL of your NEMSIS-compliant web service for receiving data

Agency-level vendors need to know the URL for submitting data to your state. Ask your vendor to create a NEMSIS-compliant WSDL that includes the submission URL for your state system. Send it to the NEMSIS TAC for publishing.

☐ ### Develop a state data dictionary if necessary

The NEMSIS TAC recommends adopting the NEMSIS Data Dictionary without modification. Share the link to the data dictionary with stakeholders. If your state must make extensive modifications to standard NEMSIS elements, you may need to develop a state-specific data dictionary, which you can send to the NEMSIS TAC to publish in your state-specific repository.

Data Entry Form

☐ ### Configure your demographics and PCR data entry forms to contain all state-collected elements

Make sure that every element on the State Collected Elements list in your StateDataSet is available in your data entry forms. (Some elements, which are auto-generated, such as information about the software product that created a PCR., do not need to be shown in the data entry forms.) You may include additional data elements on your data entry form, but there should be a way of letting users know they are optional.

☐ ### Configure your printable PCR layout to contain at least all state-collected elements

At a minimum, make sure the printable form includes your state collected elements. You may also configure it to include all other NEMSIS elements.

☐ **Verify that your data entry form enforces all NEMSIS XML Schema (XSD) constraints**

Go through the NEMSIS Data Dictionary and test that your data entry form enforces the constraints outlined there. See below for common types of constraints to check.

☐ **Verify that your data entry form enforces mandatory NEMSIS elements**

Mandatory elements must be recorded on every record and cannot be left blank. Your system should highlight them if they are blank and should block records from being completed/finalized until they have been recorded. A quick way to get the list of mandatory elements is to go to nemsis.org -> Technical Resources -> National Requisite Elements. Open the documents for the NEMSIS version(s) you will support. Mandatory elements are highlighted with a green background in the “Nillable Values Allowed?” column.

☐ **Verify that your data entry form enforces date ranges and your system handles time zones correctly**

Try entering future dates; invalid dates (such as February 30th); and invalid times (such as 24:00). Your system should reject them. Make sure the date/times are being recorded in the correct time zone(s) for your state, including Daylight Saving Time.

☐ **Verify that your data entry form enforces min and max lengths on text elements**

For text elements, the NEMSIS data dictionary defines how short or long they can be. Test using text that is shorter or longer than what the data dictionary allows. Your system should enforce the constraints.

☐ **Verify that your data entry form enforces min and max values on integer elements**

For integer elements, the NEMSIS data dictionary defines their minimum and maximum values. Test by entering numbers outside of those ranges.

☐ **Verify that your data entry form enforces min, max, and number of digits on decimal elements**

For decimal elements, the NEMSIS data dictionary defines minimum and maximum values as well as how many digits can be after the decimal point. Test by entering numbers outside of those constraints.

☐ **Verify that your system supports city, county, and state codes correctly**

Elements regarding cities, counties, and state should be collected using codes, not text. (An exception is that cities in the ePayment section are collected as text.)

☐ **Verify that your data entry form enforces correct patterns for ZIP codes, phone numbers, email addresses, NPIs, VINs, etc.**

Some elements in the NEMSIS data dictionary are defined using patterns. For example, VINs must be exactly 17 characters; ZIP codes must be in the formats allowed in the US, Canada, or Mexico.

Data Validation

☐ **Deploy the current national and state Schematron schemas in your system**

Use an interface provided by your software or ask your vendor to deploy the current national and state Schematron schemas for all versions of NEMSIS that you will support.

☐ **Verify that your system performs NEMSIS XSD and Schematron validation on demographic data at the time of data entry**

The user should not be able to finalize changes to agency demographic data if they cause validation errors.

☐ **Verify that your system performs NEMSIS XSD and Schematron validation on PCRs at the time they are "finalized"**

XSD and Schematron validation should be performed at the time a PCR is being "finalized" and the user can respond, rather than sometime later.

☐ **Verify that your system shows XSD and Schematron validation messages to the user who created the PCR**

NEMSIS XSD and Schematron validation results should be shown to the user at the time of data entry when trying to finalize the PCR.

☐ **Verify that your system performs both national and state Schematron validation**

Your system should perform national and state Schematron validation on all direct-entry and imported data. Your system should perform only national Schematron validation on exports to the national EMS database.

☐ **Verify that your system prevents PCRs from being "finalized" if there are XSD or Schematron errors**

The user should not be able to finalize a PCR if it has XSD validation errors or national or state Schematron errors. Your system should allow finalization of a PCR if it only has Schematron warnings.

☐ Verify that your system returns Schematron validation messages in SVRL format for web services submissions

Work with the vendor of an agency-level system to submit intentionally invalid data to your state system via web services. The system should reject the data, and it should also return the Schematron validation results in a standard format called Schematron Validation Report Language (SVRL).

Web Services

☐ Verify that your system properly processes agency demographic updates submitted via web services.

Work with a vendor and an EMS agency to submit demographic data to your state system. Check the data in your state system. Then make some changes and resubmit the demographic data. Verify that your state system correctly processed added and removed objects and did not create duplicate objects as a result of the resubmission.

☐ Verify that agencies can submit PCR data to your state via web services.

Work with a software vendor and an EMS agency to test PCR data submission. Verify that your system accepts valid PCRs and rejects invalid PCRs. Verify that your system processes PCRs correctly and that they are available for viewing within your state system.

☐ Verify that if something is removed from an agency in a web services import, is it also removed in the export from your system.

Export demographic data for your test agency. Verify that it is consistent with the data that was imported.

☐ Verify that your system exports correct demographic information for each agency

Pay particular attention to the following elements. These lists should reflect the actual local agency configuration, not simply what the state permits. They may be slightly different for each agency based on local medical control:

- dConfiguration.07 EMS Agency Procedures
- dConfiguration.09 EMS Agency Medications
- dConfiguration.10 EMS Agency Protocols

Agency Transitions

☐ Contact each agency prior to its target go-live date

Use the target agency go-live dates from the planning phase to schedule your assistance to agencies. Contact each agency about three months prior to its target go-live date. Send the training materials and ask the agency to begin working on its agency demographic data.

☐ Receive and verify agency demographic data

Ensure that each agency submits agency demographic data via web services (or enters demographic data in the state system if they are using the state system directly) before you allow the agency to submit PCRs.

☐ Receive and verify PCR data

After an agency has completed demographic data, ensure that the agency submits PCR data via web services (or begins submitting PCRs in the state system if they are using the state system directly). For the first few weeks, closely watch the number and quality of the PCRs.

National EMS Database Submission

☐ If required, obtain approval from your institutional review board (IRB) to submit data to the national EMS database

If your state requires IRB approval before you can send data to the national EMS database, obtain approval.

☐ Sign a data use agreement for sending data to the national EMS database

The NEMSIS TAC has a standard DUA available for use. Usually, you will need to have it reviewed by your state's legal counsel. Get it signed and send it to the NEMSIS TAC. For DUA resources, go to nemsis.org -> Using EMS Data -> State Data Use Agreements. If your state has determined that it does not need a data use agreement, send a written statement indicating such to the NEMSIS TAC.

☐ Obtain data submission credentials from the NEMSIS TAC.

The NEMSIS TAC will create a web services account (including username and password) for submission to the national EMS database. The NEMSIS TAC will associate that account with the state data manager, who will receive notifications and reports. The NEMSIS TAC will send you the account credentials and the submission URLs for the onboarding and production web services.

☐ Provide the web services account information to your software vendor or person responsible for submitting the state data to the NEMSIS TAC.

Ask them to configure the software to send data to the national EMS database using that account.

☐ Test data submission to the National EMS Database

Work with your software vendor to send agency demographic data (national elements only) for an agency to the national EMS database onboarding environment. Find the submission results in your software. Check with NEMSIS TAC staff to verify it was received and accepted. Then perform the same test with some PCR data for the same agency. The national EMS database will perform the following validation:

- NEMSIS XML Schema (XSD)
- NEMSIS National Schematron rules
- NEMSIS extract-transform-load (ETL) rules

☐ Configure and verify automatic data submission to the National EMS Database for agency demographic data and patient care report data

Ask your vendor to turn on automated data submission to the national EMS database production environment. The initial submission of demographic data must be submitted at least 3 days prior to submitting PCRs for an agency. If your state system sends PCR data for an agency before the national database has received and processed the agency's demographic data, the national database will reject the PCR data and your system will need to resubmit it. After automatic data submission is turned on, verify that it is working correctly.

☐ Verify that your system notifies someone if a record is rejected by the National EMS Database or has warnings

Sometimes a data submission fails or is rejected. Your software should notify you when that happens.

Feedback

☐ Implement a way to get feedback from users and respond to it

It's important that users have an easy, automatic way to provide feedback about your system so that you can continually improve it. One approach is to build a "feedback box" into the software itself so that users can easily type in their feedback while using the system. Implement a routine for collecting and responding to feedback quickly.

Analytical Reporting

☐ ### Verify that your system generates accurate analytical reports

Make sure that all of the analytical reporting features in your state system actually work, and that the results are accurate.

☐ ### Set up analytical reports to monitor data system performance

The reports should run automatically on a regular basis. Here are some topics:

- Number of agencies updating demographic data
- Number/list of agencies reporting PCRs
- Number of PCRs submitted
- Timeliness of PCR submission
- Rejected data submissions (due to validation errors or system issues)
- Number of validation warnings per PCR
- Completeness of certain data elements, such as injury information, cardiac arrest and resuscitation information, stroke information, or vital signs
- Usage of analytical reporting features by users
- Performance of integration processes (such as integration with health information exchanges, trauma registries, crash databases, etc.)

☐ ### Set up analytical reports to monitor EMS clinical and operational performance

Use your data system to evaluate the delivery of EMS care in your state. Get ideas about what to measure from the National EMS Quality Alliance (NEMSQA) at nemsqa.org and from stakeholders within your state.

What to Expect from NEMSIS

After you begin submitting data to the national EMS database, you will have access to many tools that help you monitor and analyze your data:

- **Weekly NEMSIS Submission Summary:** You'll receive a weekly email summarizing your data submissions to the national EMS database. Click on the summary to be taken to an interactive report detailing your data submissions and any errors, warnings, or other problems. Drill down by agency or software product to pinpoint problems.

- **State EMS Data Cube:** In addition to a public-access data cube, the NEMSIS TAC provides you with a state-specific data cube that contains details not available to the public. Use the cube for ad-hoc analysis and exploration of your data. Access it at nemsis.org -> View Reports -> State Reports -> State EMS Data Cube.

- **Dashboards:** Several dashboards are available to track current issues in EMS, such as overdoses, STEMI, flu, mass casualty incidents, and motor vehicle crashes, as well as data quality topics. Access them at nemsis.org -> View Reports -> State Reports -> Version 3 Dashboards.

Please contact the NEMSIS TAC at any time for technical assistance with data collection, submission to the national EMS database, or analysis.