

NEMSIS V3 Demographic (Agency) Data Guide

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Overview

Agency demographic data are information about an EMS agency and its configuration and resources, such as medications carried, vehicles, personnel, facilities served, etc. Agency demographic data are contained in the NEMSIS data set called “DEMDataSet.” Agency demographic data are important at the national level because they support the categorization of EMS events by agency attributes such as level of service and ownership type for performance measurement and benchmarking.

In NEMSIS V3, “Collect Data” systems at the local agency level send agency demographic data to “Receive and Process” systems at the state level. In turn, the state-level systems send some agency demographic data (“national elements”) to the national EMS database.

This document describes requirements regarding what demographic data to send and the frequency with which to send it, both from an agency to a state and from a state to the national EMS database.

This document also provides guidance to developers and administrators of "Receive and Process" systems regarding the processing of agency demographic data updates received from "Collect Data" systems. The following topics are addressed:

- Determining which data elements to process when receiving updates
- Identifying new, updated, and deleted object instances and handling them appropriately

When to Collect Demographic Data

"Collect Data" systems SHOULD require the completion of national- and state-required agency demographic data at the time of software set-up, prior to allowing new patient care reports (PCRs) to be created. Many PCR data elements rely upon demographic data.

"Receive and Process" systems SHOULD reject PCR data if they do not have demographic data for the agency submitting the PCRs. The national EMS database rejects PCRs data if it does not have demographic data for the agency submitting the PCRs.

When to Send Demographic Data

Initially

"Collect Data" systems SHOULD send agency demographic data to state systems before sending any PCR data for an agency.

"Receive and Process" systems sending data to the national EMS database MUST send agency demographic data at least 72 hours prior to sending any PCR data for an agency.

As Updated

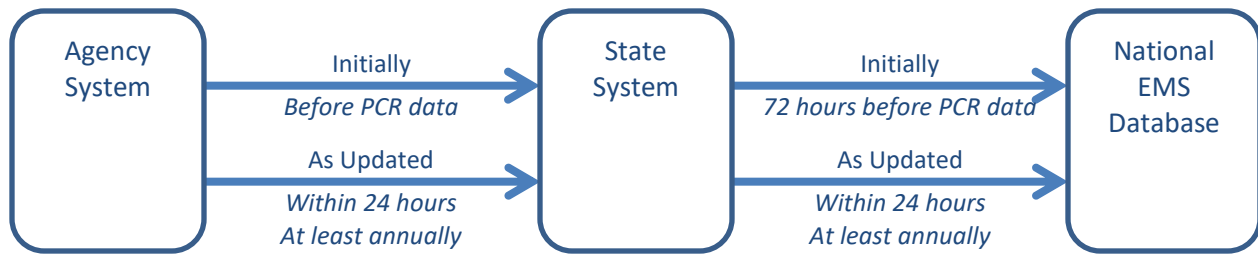
When the value of any national element changes in an agency's demographic data in a "Collect Data" system, the system SHOULD send updated agency demographic data to the state system within 24 hours. In addition, a "Collect Data" system SHOULD be capable of sending updated agency demographic data when triggered by changes in the value of any state-required element.

When the value of any national element changes in an agency's demographic data in a "Receive and Process" system sending data to the national EMS database, the system MUST send updated agency demographic data to the national EMS database within 24 hours.

A system is not required to send demographic data more frequently than daily, but it may do so. If a system is not capable of monitoring national demographic data elements for changes, it may simply send updated demographic data on a scheduled basis, regardless of whether data have changed.

Annually

The minimum allowable frequency of demographic data updates is annually.



What Demographic Data to Send

“Collect Data” systems MUST be capable of sending the agency demographic data elements requested or required by a state. “Collect Data” systems SHOULD give administrators the ability to configure which data elements to send.

“Receive and Process” systems sending data to the national EMS database MUST send only the “national elements” as defined in the NEMSIS Data Dictionary.

Prior to NEMSIS 3.5, the NEMSIS DEMDataSet included some data elements that contained information about the state (rather than the agency). Those elements were removed from DEMDataSet in version 3.5 and are instead collected via StateDataSet.

Processing Demographic Data

The remainder of this guide provides recommendations for “Receive and Process” systems to effectively implement the processing of demographic data received from other systems.

Authoritative Source / System of Record

In compliance testing, “Receive and Process” systems MUST demonstrate the ability to receive and process data for all NEMSIS data elements and send national elements to the national EMS database. However, states may have various business requirements regarding the processing of incoming demographic data.

The information about objects, attributes, and relationships in agency demographic data usually comes from a mixture of sources. For example, the state may be the “authoritative source,” or “system of record,” regarding the ID and name of an agency, while the agency may be the source of information regarding the agency’s statistical year information. As a result, states may require their systems to selectively process information received from agency systems. For example, when processing demographic data received from an agency system, the state system may be configured to ignore the data value contained in dAgency.03 EMS Agency Name, because the state is the licenser of the agency and has regulatory authority over agency name changes.

Each state should identify the authoritative source of each type of object, attribute, and relationship in demographic data and work with the developer of its state data system to implement a system configuration that meets the state’s business needs.

See Appendix A: Authoritative Source, p. 9, for recommendations regarding the authoritative source of specific objects, attributes, and relationships in agency demographic data.

Identifying New, Updated, and Deleted Information

The NEMESIS 3.5 standard (and above) defines universally unique identifiers (UUIDs) as identification keys for objects in demographic data. “Receive and Process” systems can use the UUIDs to aid in the tracking of new, updated, and deleted objects in demographic data. See the NEMESIS V3 UUID Guide for more information.

“Receive and Process” systems may consider the following options for handling updated demographic data. The illustrations below will use medical devices (dDevice.DeviceGroup) as an example but are applicable to other objects in demographic data.

Delete + Insert (or Deactivate + Insert)

The simplest approach to handling updated demographic data is to simply discard or deactivate all previously-received data (by deleting it or marking it inactive in the database) and insert the newly received data.

When submission #1 is received, the receiving system inserts all data into the database. When submission #2 is received, the receiving system first deletes or deactivates existing records and then inserts new records for the newly received data.

Submission #1

UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
...099d	10101	Defib1	AED	Acme	LS100	1/1/2016
...4db4	10102	Defib2	AED	Acme	LS100	6/1/2016
...f458	10103	Defib3	AED	Acme	LS100	9/1/2016

“Receive and Process” System After Submission #1

Key	UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
1	...099d	<u>10101</u>	<u>Defib1</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>1/1/2016</u>
2	...4db4	<u>10102</u>	<u>Defib2</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>6/1/2016</u>
3	...f458	<u>10103</u>	<u>Defib3</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>9/1/2016</u>

Submission #2

UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
...4db4	10102	Defib2	AED	Acme Inc.	LS100	6/1/2016
...f458	10103	Defib3	AED	Acme	LS100	9/1/2016
...4cad	10104	Defib4	AED	Acme	LS100	12/1/2016

“Receive and Process” System After Submission #2

Key	UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
1	...099d	10101	Defib1	AED	Acme	LS100	1/1/2016
2	...4db4	10102	Defib2	AED	Acme	LS100	6/1/2016
3	...f458	10103	Defib3	AED	Acme	LS100	9/1/2016
4	<u>...4db4</u>	<u>10102</u>	<u>Defib2</u>	<u>AED</u>	<u>Acme Inc.</u>	<u>LS100</u>	<u>6/1/2016</u>

5	<u>...f458</u>	10103	<u>Defib3</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>9/1/2016</u>
6	<u>...4cad</u>	10104	<u>Defib4</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>12/1/2016</u>

Pros

- Simple
- Minimizes data storage requirements if records are deleted rather than deactivated
- Guaranteed to represent current status

Cons

- Loses history if records are deleted rather than deactivated
- Loses referential integrity if records are deleted rather than deactivated

Delete + Insert + Update

This approach identifies objects by their keys. The receiving system uses UUIDs as the keys for incoming data. UUIDs are 32-digit hexadecimal numbers; in the examples in this guide, UUIDs have been truncated for illustration purposes.

Submission #1 is simply inserted into the database as new records. For submission #2, the receiving system uses the key (UUID) to uniquely identify each object. The system finds the device with UUID ...4db4 in the database but finds that some previously-received data does not match the new incoming data, so the system performs an update. The system finds the device with UUID ...f458 in the database and recognizes that none of its data have changed. The system does not find the device with UUID ...4cad in the database, so it inserts a new record. The system deletes or de-activates any records in the database for which there is no object in the incoming data; as a result, the system deletes or de-activates the record for the device with UUID ...099d, because it does not exist in submission #2.

Submission #1

UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
...099d	10101	Defib1	AED	Acme	LS100	1/1/2016
...4db4	10102	Defib2	AED	Acme	LS100	6/1/2016
...f458	10103	Defib3	AED	Acme	LS100	9/1/2016

“Receive and Process” System After Submission #1

Key	UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
1	...099d	10101	Defib1	AED	Acme	LS100	1/1/2016
2	...4db4	10102	Defib2	AED	Acme	LS100	6/1/2016
3	...f458	10103	Defib3	AED	Acme	LS100	9/1/2016

Submission #2

UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
...4db4	10102	Defib2	AED	Acme Inc.	LS100	6/1/2016
...f458	10103	Defib3	AED	Acme	LS100	9/1/2016
...4cad	10104	Defib4	AED	Acme	LS100	12/1/2016

“Receive and Process” System After Submission #2

Key	UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
1	...099d	10101	Defib1	AED	Acme	LS100	Jan 1 2016
2	...4db4	10102	Defib2	AED	Acme Inc.	LS100	Jun 1 2016
3	...f458	10103	Defib3	AED	Acme	LS100	Sep 1 2016
4	...4cad	10104	Defib4	AED	Acme	LS100	Dec 1 2016

Pros

- Minimizes database storage requirements
- Prevents duplicates

Cons

- Loses history
- Receiving system must compare data within each element to determine whether an update is needed

Versioning

This approach uses data warehousing “slowly changing dimension” concepts to maintain a historically consistent snapshot of demographic data. In other words, a system implementing this approach can know what an agency’s demographic data looked like at any given point in the past.

This approach, like the Delete + Insert + Update approach, uses UUIDs as keys to identify objects in the incoming data.

The database has some additional columns: “From,” to track the date on which a record became active, and “To,” the date on which a record became inactive. (For convenience, most designs also include a third column containing a flag that indicates whether the record is currently active.)

In this approach, every change to an object triggers the insertion of a new record to represent the new version of that object.

Submission #1 is inserted into the database. For submission #2, the receiving system uses the key (UUID) to uniquely identify each object. The system finds the device with UUID ...4db4 in the database but finds that some previously-received data does not match the new incoming data, so the system updates the existing record by setting the “To” date to the date on which submission #2 was received; then the system inserts a new record to represent the new version of the device with UUID ...4db4, setting the “From” date to the date on which submission #2 was received. The system finds the device with UUID ...f458 in the database and recognizes that none of its data have changed. The system does not find the device with UUID ...4cad in the database, so it inserts a new record, setting the “From” date to the date on which submission #2 was received. Finally, the system updates any records in the database for which there is no object in the incoming data, by setting the “To” date to the date on which submission #2 was received.

Submission #1

UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
...099d	10101	Defib1	AED	Acme	LS100	1/1/2016
...4db4	10102	Defib2	AED	Acme	LS100	6/1/2016
...f458	10103	Defib3	AED	Acme	LS100	9/1/2016

“Receive and Process” System After Submission #1

Key	UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date	From	To
1	...099d	<u>10101</u>	<u>Defib1</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>1/1/2016</u>		
2	...4db4	<u>10102</u>	<u>Defib2</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>6/1/2016</u>		
3	...f458	<u>10103</u>	<u>Defib3</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>9/1/2016</u>		

Submission #2

UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date
...4db4	10102	Defib2	AED	Acme Inc.	LS100	6/1/2016
...f458	10103	Defib3	AED	Acme	LS100	9/1/2016
...4cad	10104	Defib4	AED	Acme	LS100	12/1/2016

“Receive and Process” System After Submission #2

Key	UUID	dDevice.01 Serial #	dDevice.02 Name or ID	dDevice.03 Type	dDevice.04 Manuf.	dDevice.05 Model #	dDevice.06 Pur. Date	From	To
1	...099d	10101	Defib1	AED	Acme	LS100	1/1/2016		9/27/2016
2	...4db4	10102	Defib2	AED	Acme	LS100	6/1/2016		9/27/2016
3	...f458	10103	Defib3	AED	Acme	LS100	9/1/2016		
4	<u>...4db4</u>	<u>10102</u>	<u>Defib2</u>	<u>AED</u>	<u>Acme Inc.</u>	<u>LS100</u>	<u>6/1/2016</u>	<u>9/27/2016</u>	
5	<u>...4cad</u>	<u>10104</u>	<u>Defib4</u>	<u>AED</u>	<u>Acme</u>	<u>LS100</u>	<u>12/1/2016</u>	<u>9/27/2016</u>	

Pros

- Preserves history fully

Cons

- Requires more database storage
- Preserves historically incorrect data (unless “punch-through” updates are employed)
- If records are supplemented with state-provided data, the system must “pull forward” that information when inserting each new record.
- Receiving system must compare data within each element to determine whether an insert is needed for a new version of an object

Enforcing Unique Identifiers

In version 3.5 and above, the NEMESIS XML Schema (XSD) for DEMDataSet includes UUIDs as mandatory attributes on all objects in demographic data and enforces a standard format for UUIDs. The national Schematron schema for DEMDataSet enforces the uniqueness of UUIDs within an agency demographic report. “Receive and Process” systems can rely on the guarantee that UUIDs will be both present and unique within an agency in demographic data.

Other Considerations

Initially, it may seem simple to recommend any of the above approaches for a “Receive and Process” system to handle updated demographic data. However, since there are various authoritative sources for the information contained in an agency’s demographic data, many systems are integrated with other data sources. When processing NEMSIS demographic data updates, a system may need to not only store the records it receives but also ensure that the records are connected meaningfully to other data.

For example, a state system may provide user accounts to personnel. A person directly accessing the state system may expect to be able to access records or run analytical reports for PCRs on which the person was a crew member. In order to support such needs, a state system must not only properly process incoming demographic data to record the fact that a person works for an agency, but also identify the relationship between the demographic data and the crew member data on a PCR, as well as the relationship between the demographic data and a user account in the state system. And, the system must maintain information about those relationships as data change over time with new updates received through either NEMSIS demographic data submissions or other means.

Conclusions

The handling of updated demographic by “Receive and Process” systems is complex, due to the number of sources from which demographic data are obtained. By adopting techniques described in this guide, developers of “Receive and Process” systems can ensure that their systems support state-level business requirements and maintain data integrity. They can also ensure that their systems send accurate demographic data to the national EMS database.

Appendix A: Authoritative Source

Wherever the agency is the authoritative source of data for an object, attribute, or relationship in demographic data, and the state requires the data, the state system SHOULD accept the data from the agency's system in NEMESIS V3 DEMDataSet format via NEMESIS V3 web services.

For each object, attribute, or relationship not noted in this appendix, the state should determine whether the state or the agency is the authoritative source of the data. The determination will vary by state, depending on regulatory structure. If the state determines that it is the authoritative source, the state system should ignore incoming data for that object, attribute, or relationship. If the state determines that the agency is the authoritative source, and the state requires the data, the state system should process incoming data for that object, attribute, or relationship.

DEMDataSet

dCustomConfiguration

dCustomConfiguration.CustomGroup

Receiving: If @CustomElementID matches the @CustomElementID of a custom element defined by the state, ignore. Otherwise, process content as an agency-specific custom element configuration.

Sending: If @CustomElementID matches the @CustomElementID of a custom element defined by the state, send state-defined data for the custom element configuration. Otherwise, send data as received.

DemographicReport

dAgency

The combination of dAgency.01 EMS Agency Unique State ID, dAgency.02 EMS Agency Number, and dAgency.04 EMS Agency State serves as the unique key for an agency.

dContact

dConfiguration

dLocation

dVehicle

dPersonnel

Receiving: If the state regulates EMS personnel certification/licensure, the state should determine which elements are state-regulated, and the state system should ignore submitted data for those elements. The agency is usually the authoritative source of information regarding the relationship between an agency and personnel (i.e., the fact that a person works for the agency) and data about the person's employment within the agency. The state system should process data about a person's agency employment as agency-specific information related to that person.

Sending: Send state-defined data for data elements that are state-regulated. Send other data as received.

dDevice

dFacility

dFacilityGroup

dFacility.FacilityGroup

Receiving: If dFacility.01 Type of Facility, dFacility.03 Facility Location Code, and dFacility.09 Facility State match a facility defined by the state, process the relationship (the fact that the agency serves the facility) and ignore all other data. Otherwise, process content as an agency-specific facility.

Sending: If the agency serves a facility defined by the state, send state-defined data for the facility. Otherwise, send data as received.

dCustomResults

Receiving: If dCustomResults.02 Custom Element ID Referenced matches the @CustomElementID of a custom element defined by the state, process content as state-level custom element results. Otherwise, process content as agency-specific custom element results.

Sending: Send data as received.