

NEMESIS V3 Performance Measure Service Technical Guide

Date

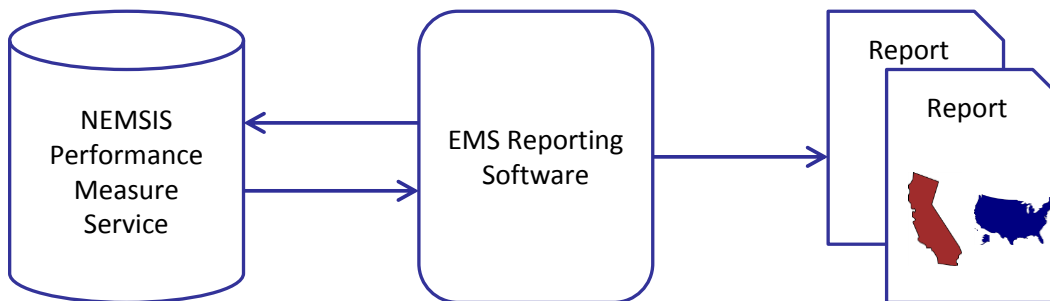
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Overview

This technical guide describes how software developers can use the NEMESIS V3 performance measure service. The web service, hosted by the NEMESIS TAC, provides a set of predefined, parameterized EMS performance measures that can be queried by software applications. The software applications can then incorporate the data in reports for their users for benchmarking and comparison. By utilizing the service, software applications can display national comparison data alongside customer-specific data.



The NEMESIS V3 performance measure web service implements EMS performance measures defined by the EMS Compass initiative. More information about EMS Compass is available at emscompass.org.

The June 2017 release of the NEMESIS V3 performance measure service is a public preview release. It is not feature-complete. The API is subject to change. It is not intended for production use. It is provided for testing and feedback by software developers.

Architecture

The NEMESIS V3 performance measure service is a SOAP web service. The WSDL is available here:

<https://cta.nemesis.org/PerformanceMeasureWs/endpoints/performancemeasurews.wsdl>

Note: cta.nemesis.org only accepts HTTPS connections, and it has been configured to only support TLS 1.2 and a very limited collection of cipher suites. As a result, some popular HTTPS clients are unable to connect to the server. In particular, Java versions below 1.8 are unable to connect using default settings. At the time of this writing, the latest version of SoapUI, a popular web services testing client, comes with a bundled Java 1.7 VM and is unable to connect to the cta.nemesis.org server. To work around this limitation, be sure you have installed Java 1.8. Then, force SoapUI to use the installed Java 1.8 by navigating to the SoapUI installation folder and renaming or deleting the “jre” folder.

Note: due to a bug, the WSDL lists a “localhost” address for the service endpoint URL. Until the bug is resolved, it is necessary to manually change the service endpoint URL to <https://cta.nemesis.org/ComplianceTestingWs/endpoints/>.

The web service includes three operations:

- **ListBenchmarks:** Lists the EMS Compass measures currently supported by the service
- **ListParameters:** Lists the parameters currently supported by the service, which can be used to filter the data returned by the service
- **BenchmarkRetrieval:** Provides national-level benchmark data for a requested performance measure and combination of parameters

Accessibility

The NEMESIS V3 performance measure service is publicly available. No authentication is required.

Performance Measures

The goal of the NEMESIS V3 performance measure service is to support all EMS Compass measures that can be calculated using NEMESIS V3 national elements. The June 2017 preview release supports one measure: [Trauma-01 Pain Assessment of Injured Patients](#).

To retrieve a list of measures supported by the service, use the ListBenchmarks request, as follows:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ws="http://ws.nemesis.org/">
  <soapenv:Header/>
  <soapenv:Body>
    <ws>ListBenchmarksRequest/>
  </soapenv:Body>
</soapenv:Envelope>
```

The service will return a message similar to the following:

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:ListBenchmarksResponse xmlns:ns2="http://ws.nemsis.org/">
      <ns2:Benchmark>
        <ns2:name>Trauma-01</ns2:name>
        <ns2:description>Pain Assessment of Injured Patients</ns2:description>
        <ns2:comments>Recognizing that pain is undertreated in injured patients, it is
          important to assess whether a patient is experiencing pain.</ns2:comments>
        <ns2:NumeratorDataType>xs:integer</ns2:NumeratorDataType>
        <ns2:DenominatorDataType>xs:integer</ns2:DenominatorDataType>
      </ns2:Benchmark>
    </ns2:ListBenchmarksResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Parameters

The goal of the NEMESIS V3 performance measure service is to support the following parameters to enable a client to filter benchmark data:

- Urbanicity (derived from eScene.19 Incident ZIP Code)
- Organization Status (dAgency.12)
- Organizational Type (dAgency.13)
- Census Region and Division (derived from submitting state)
- EMS Patient Contact Volume Per Year (dAgency.21 for the most recent past year in dAgency.15 Statistical Calendar Year)
- Year (derived from eTimes.03 Unit Notified by Dispatch Date/Time)
- Month (derived from eTimes.03 Unit Notified by Dispatch Date/Time)
- Level of Care (eResponse.15)

The June 2017 preview release supports the following parameters:

- Urbanicity (derived from eScene.19 Incident ZIP Code)
- Year (derived from eTimes.03 Unit Notified by Dispatch Date/Time)
- Month (derived from eTimes.03 Unit Notified by Dispatch Date/Time)

To retrieve a list of parameters supported by the service, including the potential values supported for each parameter, use the ListParameters request, as follows:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:ws="http://ws.nemsis.org/">
  <soapenv:Header/>
  <soapenv:Body>
    <ws:ListParametersRequest/>
  </soapenv:Body>
</soapenv:Envelope>
```

The service will return a message similar to the following:

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:ListParametersResponse xmlns:ns2="http://ws.nemsis.org/">
      <ns2:ParameterList>
        <ns2:Parameter>
          <ns2:id>ParUrbanicity</ns2:id>
          <ns2:value>
            <ns2:code>P01001</ns2:code>
            <ns2:description>Urban</ns2:description>
          </ns2:value>
          <ns2:value>
            <ns2:code>P01002</ns2:code>
            <ns2:description>Suburban</ns2:description>
          </ns2:value>
          ...
        </ns2:Parameter>
        <ns2:Parameter>
          <ns2:id>ParCalendarYear</ns2:id>
          <ns2:value>
            <ns2:code>2014</ns2:code>
            <ns2:description>2014</ns2:description>
          </ns2:value>
          <ns2:value>
            <ns2:code>2015</ns2:code>
            <ns2:description>2015</ns2:description>
          </ns2:value>
          ...
        </ns2:Parameter>
        <ns2:Parameter>
          <ns2:id>ParCalendarMonth</ns2:id>
          <ns2:value>
            <ns2:code>1</ns2:code>
            <ns2:description>January</ns2:description>
          </ns2:value>
          <ns2:value>
            <ns2:code>2</ns2:code>
            <ns2:description>February</ns2:description>
          </ns2:value>
          ...
        </ns2:Parameter>
      </ns2:ParameterList>
    </ns2:ListParametersResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

In future releases, Year and Month will be structured as a hierarchy rather than independent parameters.

Performance Measure Data

Performance measure data are calculated from NEMSIS V3 data in the national EMS database, using the definitions provided by EMS Compass.

To retrieve benchmark data for a particular performance measure, use the BenchmarkRetrieval request, as follows:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ws="http://ws.nemsis.org/"
  <soapenv:Header/>
  <soapenv:Body>
    <ws:BenchmarkRetrievalRequest>
      <ws:BenchmarkDetail>
        <ws:id>Trauma-01</ws:id>
      </ws:BenchmarkDetail>
    </ws:BenchmarkRetrievalRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

The service will return a message similar to the following, which contains the benchmark data in numerator/denominator form as defined by EMS Compass, along with some metadata:

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:BenchmarkRetrievalResponse xmlns:ns2="http://ws.nemsis.org/"
      <ns2:Database>
        <ns2:DatabaseUpdateDateTime>2017-03-17T12:00:08.007-06:00
        </ns2:DatabaseUpdateDateTime>
        <ns2:DatabaseRecords>1673388</ns2:DatabaseRecords>
      </ns2:Database>
      <ns2:BenchmarkRetrievalRequest>
        <ns2:id>Trauma-01</ns2:id>
      </ns2:BenchmarkRetrievalRequest>
      <ns2:NumeratorDataType>xs:integer</ns2:NumeratorDataType>
      <ns2:DenominatorDataType>xs:integer</ns2:DenominatorDataType>
      <ns2:RetrievedBenchmarkDetails>
        <ns2:NumberOfRecords>221734</ns2:NumberOfRecords>
        <ns2:numerator>104297</ns2:numerator>
        <ns2:denominator>221734</ns2:denominator>
      </ns2:RetrievedBenchmarkDetails>
    </ns2:BenchmarkRetrievalResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Using Parameters

To filter the data to a subset of records matching certain criteria, use the BenchmarkRetrieval request with any combination of <filter> elements. The following example requests benchmark data for the Trauma-01 measure, limited to urban responses in December 2016:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ws="http://ws.nemsis.org/"
  <soapenv:Header/>
  <soapenv:Body>
    <ws:BenchmarkRetrievalRequest>
      <ws:BenchmarkDetail>
        <ws:id>Trauma-01</ws:id>
        <ws:filter>
          <ws:id>ParUrbanicity</ws:id>
        </ws:filter>
      </ws:BenchmarkDetail>
    </ws:BenchmarkRetrievalRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

```

    <ws:code>P01001</ws:code>
  </ws:filter>
</ws:filter>
  <ws:id>ParCalendarYear</ws:id>
  <ws:code>2016</ws:code>
</ws:filter>
</ws:filter>
  <ws:id>ParCalendarMonth</ws:id>
  <ws:code>12</ws:code>
</ws:filter>
</ws:BenchmarkDetail>
</ws:BenchmarkRetrievalRequest>
</soapenv:Body>
</soapenv:Envelope>

```

The service will return a message similar to the following, which contains filtered benchmark data:

```

<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Header/>
  <SOAP-ENV:Body>
    <ns2:BenchmarkRetrievalResponse xmlns:ns2="http://ws.nemesis.org/">
      <ns2:Database>
        <ns2:DatabaseUpdateDateTime>2017-03-17T12:00:08.007-06:00
        </ns2:DatabaseUpdateDateTime>
        <ns2:DatabaseRecords>1673388</ns2:DatabaseRecords>
      </ns2:Database>
      <ns2:BenchmarkRetrievalRequest>
        <ns2:id>Trauma-01</ns2:id>
        <ns2:filter>
          <ns2:id>ParUrbanicity</ns2:id>
          <ns2:code>P01001</ns2:code>
        </ns2:filter>
        <ns2:filter>
          <ns2:id>ParCalendarYear</ns2:id>
          <ns2:code>2016</ns2:code>
        </ns2:filter>
        <ns2:filter>
          <ns2:id>ParCalendarMonth</ns2:id>
          <ns2:code>12</ns2:code>
        </ns2:filter>
      </ns2:BenchmarkRetrievalRequest>
      <ns2:NumeratorDataType>xs:integer</ns2:NumeratorDataType>
      <ns2:DenominatorDataType>xs:integer</ns2:DenominatorDataType>
      <ns2:RetrievedBenchmarkDetails>
        <ns2:NumberOfRecords>12361</ns2:NumberOfRecords>
        <ns2:numerator>5705</ns2:numerator>
        <ns2:denominator>12361</ns2:denominator>
      </ns2:RetrievedBenchmarkDetails>
    </ns2:BenchmarkRetrievalResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>

```

Metadata

In addition to numerator and denominator, the service returns metadata, including the following:

- **DatabaseUpdateDateTime:** Timestamp of the last refresh of the data in the database supporting the benchmarking service
- **DatabaseRecords:** Count of the patient care report records in the database supporting the benchmarking service
- **BenchmarkRetrievalRequest:** Client-provided benchmark and filtering criteria (echo back)
- Count of the states/territories whose records contributed to the result (not supported in the June 2017 preview release)
- Count of the EMS agencies whose records contributed to the result (not supported in the June 2017 preview release)
- **NumberOfRecords:** Count of the records that contributed to the result

Performance

The data for certain requests are pre-calculated whenever the database is updated. For these parameters, the service should return results instantaneously:

- Basic request (with no parameters)
- Each value of Urbanicity (not combined with any other parameters)
- Each value of Year (not combined with any other parameters)
- Each value of Month, combined with Year

For other requests (such as a combination of Urbanicity, Year, and Month), the data are not pre-calculated, and the service will take 20–30 seconds to return results. Performance will be improved in future releases. Still, it is recommended that developers utilize client-side caching or scheduled pre-retrieval of data to assure performance for customers.

Privacy

The service uses small-cell suppression. If a result would be calculated based on fewer than six records, it is not returned.

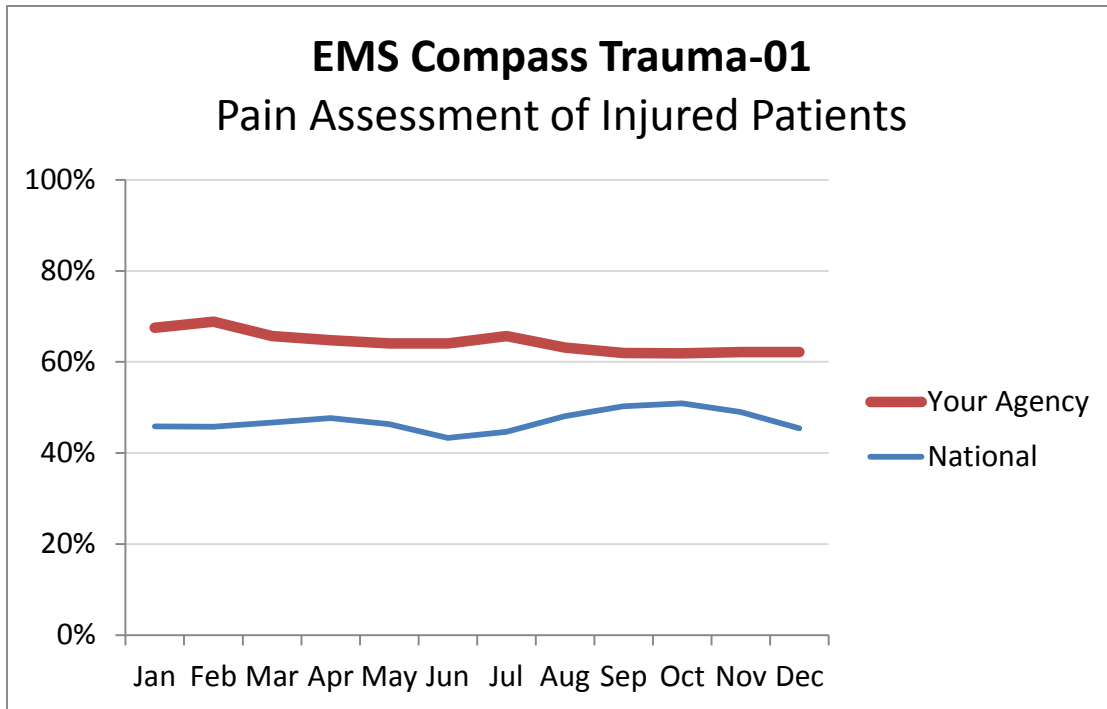
Future Capabilities

In future releases, the service will support the ability to retrieve multiple results in one transaction. For example, a client will be able to request results for each month of 2016, or for each value of urbanicity. Currently, a client must make a separate call to the service for each value.

In future releases, the service may support the ability to retrieve a full copy of all pre-calculated “cells” in the database using a single transaction. The client could maintain its own local copy of all data by periodically requesting the full data set from the service.

Example Application

An example application of the NEMSIS V3 performance measure service is to generate a chart that displays a customer’s data alongside national data for comparison:



In the above chart, the “National” data comes from the NEMSIS V3 Performance Measure Service, and the data for “Your Agency” comes from data stored by the software product generating the report.

Data Use Statement

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Conclusions

It is the hope of the NEMSIS Technical Assistance Center that the NEMSIS V3 performance measure service can become a key data source supporting efforts to implement performance measurement in EMS using the EMS Compass performance measures.

The purpose of the June 2017 preview release is to enable software developers to explore potential applications of the NEMSIS V3 performance measure service and provide feedback to the NEMSIS TAC regarding the design and implementation of the service.