

COMMONWEALTH OF VIRGINIA



Information Technology Resource Management (ITRM)

ENTERPRISE ARCHITECTURE

**EMERGENCY MEDICAL SERVICES (EMS) DATA
STANDARD**

Virginia Information Technologies Agency (VITA)

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1 Publication Version Control

The following table contains a history of revisions to this publication.

Version	Date	Revision Description	Contact
1.0	8/20/2015	Initial Document	Paul Sharpe

Identifying Changes in This Document

- See the latest entry in the revision table above
- Vertical lines in the left margin indicate the paragraph has changes or additions. Specific changes in wording are noted using italics and underlines; with italics only indicating new/added language and italics that is underlined indicating language that has changed.

The following examples demonstrate how the reader may identify updates and changes:

Example with No Change – The text is the same. The text is the same.

Example with Revision – The text is the same. *A wording change, update or clarification is made in this text.*

Example of New Text – *This text is new.*

2 Reviews

- VITA's Commonwealth Data Governance (CDG) staff prepared the first draft of this publication based on information provided by the Virginia Department of Health's Office of Emergency Medical Services (VDH/OEMS).

3 Definitions

The terms used in this Business Narrative comply with the adopted definitions maintained in the Commonwealth of Virginia's Information Technology Resource Management (ITRM) Glossary. The ITRM Glossary can be accessed at http://vita.virginia.gov/uploadedFiles/VITA_Main_Public/Library/PSGs/PSG_Sections/COV_ITRM_Glossary.pdf

4 Background

The Virginia Department of Health's Office of Emergency Medical Services (VDH/OEMS) is mandated by the *Code of Virginia* § 32.1-116.1 to collect a minimum dataset on each emergency medical services (EMS) response that occurs within the Commonwealth. The *Code of Virginia* requires the minimum dataset include response and clinical information. In 2014 this mandate resulted in over 860,000 records for patients being transported to hospitals, nearly 150,000 patients receiving assessment and/or treatment not resulting in transport to a hospital, and another 250,000 EMS responses that did not result in a patient.

The original intent of the EMS Registry was to collect the incidence, severity and cause of trauma and integrate the information available from other state agencies on trauma and improve the delivery of prehospital and hospital emergency medical services. The EMS Registry has evolved to a point of that it is used to support other VDH/OEMS mandates to perform system and patient care performance improvement using decision support statistics.

Within the *Code of Virginia*, this database is known as the Virginia EMS Registry. To our over 600 hundred EMS agencies and 116 hospitals, the system is known as the Virginia Pre Hospital Information Bridge (VPHIB). Launched in January of 2011, VPHIB moved EMS data collection in Virginia from 540,000 records per year to 1.2 million. It moved us from receiving flat file data transfers or CDs and floppy diskettes being mailed to the VDH/OEMS. Many EMS agencies were resistant to the VDH/OEMS discontinuing the use of paper scantron forms and #2 pencils in 2006.

Prior to 2011, the EMS dataset contained 63 EMS data elements that typically were received six months to three years after the EMS incident occurred, if at all.

Since 2011, the VDH/OEMS has implemented the National Highway Traffic Safety Administration's (NHTSA) version 2 (v2) national EMS data standard. Virginia has been contributing a national subset of our state dataset to the national EMS database on a monthly basis. The v2 dataset was the first nationally accepted dataset, but fell short of integrating with other health care data standards.

Beginning on July 1, 2015, Virginia became one of the early adopters of the new version 3 (v3) national EMS data standard. V3, in addition to being technically superior to v2, also incorporates the use of ICD-10 diagnosis codes, SNOMED procedure codes, and RXNorm medication codes.¹ Many other data elements have also been normalized to other well-accepted data standards.

¹ Adopted by the Commonwealth of Virginia 10/20/2011

Virginia's EMS data collection program now includes many features to help EMS agencies eliminate disparate business processes through a modular and scalable application. In addition to being a data repository other features now available statewide are ad-hoc and data cube reporting tools, quality assurance tools, an electronic medical record system, certification and training tracking, billing module, computer aided dispatch, inventory, and other features.

5 Scope

The Virginia EMS data standard implements the national EMS data standard set by NHTSA's Office of Emergency Medical Service's National Emergency Medical Services Information System (NEMSIS) program on the state level. The VDH/OEMS has met and exceeded the national EMS data standard for data elements, technical format, and data quality standards. Over 50,000 emergency medical technicians, paramedics, nurses, doctors, and support staff utilize the VPHIB system.

The Virginia EMS data standard will be used to collect 1.2 million EMS responses and the patient care delivered on those responses. The data standard and technical format will be used to collect data by call takers in 9-1-1 centers and transferred into each EMS Emergency Medical Record (EMR), and in some locations the active EMR will alert receiving hospitals of inbound patients by displaying key response elements on video monitors in emergency departments. The EMS EMR can be provided to hospitals by printing the report, integrating an online PDF form that can be transferred into the hospitals EMR system, or a complete transfer of the data itself into the hospital's EMR with programming designed to convert our XML files to HL7's pipe delimited format.

6 Governance

Code of Virginia § 32.1-116.1 states that all licensed emergency medical services agencies shall participate in the Virginia EMS Registry by making available to the Commissioner or his designees the minimum data set in the format prescribed by the Board or any other format which contain equivalent information and meets any technical specifications of the Board. The minimum data set shall include, but not be limited to, the type of medical emergency or nature of the call, the response time, the treatment provided and other items as prescribed by the Board.

Each licensed emergency medical services agency shall, upon request, disclose the prehospital care report to law-enforcement officials (i) when the patient is the victim of a crime or (ii) when the patient is in the custody of the law-enforcement officials and has received emergency medical services or has refused emergency medical services.

The Commissioner may delegate the responsibility for collection of this data to the Office of Emergency Medical Services personnel or individuals under contract to the Office. The Advisory Board shall assist in the design, implementation, subsequent revisions, and analyses of the data from the Virginia EMS Registry.

NHTSA's Office of Emergency Medical Services is the federal entity that serves as the lead agency for the national EMS data standard. NHTSA contracts with the University of Utah to

manage and coordinate the National EMS Information System's (NEMSIS) Technical Assistance Center (TAC). The NEMSIS TAC works with stakeholders to create and maintain the standards. The NEMSIS TAC is also responsible for presenting the national EMS data standard for Health Level Seven (HL7) certification.

The key stakeholder group that has worked with the NEMSIS TAC to develop the national EMS data standard is the National Association of State EMS Officials (NASEMSO) Data Managers Council (DMC). The VDH/OEMS staff responsible for Virginia data standard has completed two of three years serving as the Chairman of the DMC. The DMC has reviewed and drafted every data element, code set list, quality rule, medical device integration, and technical formatting to assist the NEMSIS TAC with a draft EMS dataset that is practical for use by individual prehospital providers, EMS agencies, and all states and territories.

The NEMSIS project also has an advisory board called the NEMSIS Steering Committee. The NEMSIS steering committee is comprised of two National Association of EMS Physicians representatives, a community paramedicine representative, an EMS software company representative, a state data manager, a state EMS director, and a NHTSA representative. Virginia currently holds the state data manager position on the NEMSIS Steering Committee.

In Virginia, the State Board of Health (BOH) promulgates the Virginia EMS data standard. Prior to the version 3 Virginia EMS data standard being presented to the BOH, VDH/OEMS staffs spent four years working on the national, state, and local level developing, educating, and performing needs gathering for the new standard.

A concerted effort was made by VDH/OEMS staff to be active in the development of the national standard in an effort to both make the national standard reflect Virginia's practice and to learn the national standard to new depths so this knowledge can be passed on to our stakeholders.

VDH/OEMS developed a draft Virginia data dictionary and minimum dataset early in the process and disseminated these resources early in an effort to raise awareness and receive feedback. Stakeholder feedback was incorporated into the draft document as feasible. Once in final form, two public comment periods were utilized to gather final feedback from all levels of stakeholders and other interested parties. A Wiki page was dedicated to posting proposed documents and collecting feedback. Initially, stakeholders were given a 60-day period to review and provide comment and a second 30 day public comment period was utilized to solicit comments on the revisions made based on the first comment period.

Prior to being presented to the BOH the revised EMS data standard was presented to the Emergency Medical Services Advisory Board (EMS Advisory Board) for endorsement. The EMS Advisory Board is a 28-person board representing all regions of the state and representatives from the major EMS system stakeholders. Appointments to the EMS Advisory Board are made by the Governor and the mission of the Board is to advise the Office of EMS and the State Board of Health on all matters related to EMS. The revised minimum dataset was unanimously approved by the EMS Advisory Board.

7 Components

The Virginia EMS Data Standard consist of the following guidance documents:

1. VPHIB v3 Data Dictionary
<http://oemssupport.kayako.com/Knowledgebase/List/Index/36/data-dictionary--element-lists>
2. VPHIB v3 Validation Rules
<http://oemssupport.kayako.com/Knowledgebase/List/Index/37/data-quality-vav3>
3. VPHIB v3 Schematron File
<http://oemssupport.kayako.com/Knowledgebase/List/Index/42/schematron--state-dataset-file>
4. VPHIB v3 List of Data Elements & Values
<http://oemssupport.kayako.com/Knowledgebase/Article/View/196/36/vphib-v3-list-of-data-elements--values-rev-5115>
5. VPHIB v3 Medication List
<http://oemssupport.kayako.com/Knowledgebase/Article/View/186/0/vphib-v3-medication-list-v320-rev-5115>
6. VPHIB v3 Procedure List
<http://oemssupport.kayako.com/index.php?/Knowledgebase/Article/View/169>
7. VPHIB Hospital List and Codes
<http://oemssupport.kayako.com/Knowledgebase/Article/View/20/41/hospital-list-and-codes-vav3-rev-10414>
8. VPHIB v3 Cause of Injury List
<http://oemssupport.kayako.com/Knowledgebase/Article/View/183/41/vphib-v3-cause-of-injury-list-v320-rev-5115>
9. VPHIB v3 Incident Location Type
<http://oemssupport.kayako.com/Knowledgebase/Article/View/184/41/vphib-v3-incident-location-type-list-v320-rev-5115>
10. VPHIB v3 Primary and Associated Symptoms List
<http://oemssupport.kayako.com/Knowledgebase/Article/View/182/41/vphib-v3-primary--associated-symptoms-list-v320-rev-5115>
11. VPHIB v3 Protocol List
<http://oemssupport.kayako.com/Knowledgebase/Article/View/185/41/vphib-v3-protocol-list-v320-rev-5115>
12. VPHIB v3 Provider Impression List
<http://oemssupport.kayako.com/Knowledgebase/List/Index/41/vav3-accepted-values-lists>
13. VPHIB/VSTR Change Management Tool:
<http://oemssupport.kayako.com/Knowledgebase/List/Index/49/stuff-vphib-staff-uses>

8 Authority

The following section references the statutory authority granted by the *Code of Virginia* to the VDH/OEMS for establishing the EMS minimum dataset and technical specifications. The section references the statutory authority of the Secretary of Technology to adopt the EMS data standard. The section also cites provisions in statute relating to the role of the Secretary of Technology, the Chief Information Officer of the Commonwealth (CIO), and VITA in the development, review and adoption of Commonwealth data standards.

The State Board of Health

§ 32.1-116.1. Prehospital Patient Care Reporting Procedure <http://law.lis.virginia.gov/vacode/32.1-116.1>

§ 32.1-111.3 Statewide Emergency Medical Services Plan <http://law.lis.virginia.gov/vacode/32.1-111.3>

§ 2.2-3705.5
<http://law.lis.virginia.gov/vacode/2.2-3705.5>

EMS Regulations

12VAC5-31-530 - Preparation of maintenance of records and reports.

12VAV5-31-560 - Patient Care Records (includes minimum dataset)

12VAC5-31-1140 - Provision of patient care reports

http://www.vdh.virginia.gov/OEMS/Files_Page/regulation/2012EMSRegulations.pdf

The Secretary of Technology

§ 2.2-225. Position established; Agencies for which responsible; additional powers (As Amended)

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+2.2-225>

The Chief Information Officer of the Commonwealth (CIO)

§ 2.2-2007. Powers of the CIO (As Amended)

<http://lis.virginia.gov/cgi-bin/legp604.exe?000+cod+2.2-2007>

The Virginia Information Technologies Agency

§ 2.2-2010. Additional powers of VITA (As Amended)

<http://lis.virginia.gov/cgi-bin/legp604.exe?000+cod+2.2-2010>

9 Overview

The Virginia EMS data standard correctly builds upon the national EMS data standard. The standard uses XML format to collect, store, and transfer data as required. Schematron is utilized as the validation language for making assertions about the presence or absence in patterns in the XML. A component of the national EMS data standards requires that all EMS software programs be capable of consuming Schematron files.

Virginia extends the national Schematron File (as designed by the national standard) to include as many of our validation rules that can be handled by Schematron technology. This lessens the burden to software vendors and Virginia EMS agencies with manually implementing data quality rules. Schematron is only used for “machine-to-machine” data transfers. VPHIB also has a robust upfront validation tool to assist with correcting errors at the point of data entry. Our upfront validations are posted in a national library and can be downloaded by approximately 80 percent of our EMS agencies.

Unlike the existing v2 standard, now being phased out, a better emphasis to utilize health industry standards has been incorporated into the v3 standard. ICD-10 is being used for provider impression (diagnosis), symptoms, cause of injury, and incident location type. RxNorm is being used for medications administered, patient medications, and medication allergies. SNOMED Clinical Terms are being used for procedures performed. A variety of other national standards are being used for geographic elements and other elements in the standard.

The national standard is also, for the first time, applying for HL7 certification. To date, a subset of the data elements were utilized to achieve HL7 approval for our first CDA. A second CDA is currently in the balloting process. The second CDA is a more comprehensive group of elements designed to capture all the potential elements that need to be transferred from EMS to hospitals at the time of patient transfer.

The national data standard includes a total of 578 elements designed to cover most aspects of EMS operations. The Virginia minimum dataset includes 230 of these elements, but as few as 30 could be required for a record depending upon the scenario. VPHIB will collect all 578 elements, but only our 230 have quality measures in place. The dataset covers multiple areas including:

- 11 Demographic groups
- 27 patient encounter groups including:
 - Airway (assessment and clinical management of a patient's respiratory system)
 - Arrest (cardiac arrest) (recognition and clinical management specific to a person in cardiac arrest.)
 - Crew (the staffing of an EMS unit by individual name and certification.)
 - Custom Configuration (standard format used to extend the national dataset.)
 - Custom Results (standard format to extend an individual data element.)
 - Device (medical device integration)
 - Dispatch (9-1-1 call center information)
 - Disposition (the outcome of the EMS incident.)
 - Exam (the physical assessment of patients)
 - History (patients past medical/surgical history, current medications, and allergies.)
 - Injury (assessment elements specific to injuries.)
 - Labs (lab results from point of care testing or integration of hospital lab results.)
 - Medications (documenting medication administration by EMS providers.)
 - Narrative (format for documenting a patient narrative within the health record.)
 - Other (file attachments, signatures, and provider information.)
 - Outcome (elements that can be populated from the hospital's medical record system or manually entered to provide feedback to EMS.)
 - Patient (patient demographic information.)
 - Payment (billing elements.)
 - Procedures (medical procedures performed by EMS providers.)
 - Protocols (elements to collect the patient care protocol used by the EMS provider.)
 - Record (collects record number and software used information.)
 - Response (collects the type of service requested, time delay elements, EMS agency name and number, and primary role of the unit.)

- Scene (collects geographic elements and other resources dedicated to the incident.)
- Situation (collects information on the type of complaint, time duration, provider's suspected diagnosis etc.)
- State
- Times (time elements are collected through the incident.)
- Vitals (collects vital sign information.)

The NEMESIS Data Dictionary can be found on-line at http://www.nemesis.org/media/nemesis_v3/release-3.4.0/DataDictionary/PDFHTML/DEMEMS/index.html

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10 Compliance

The VDH/OEMS, through the State Board of Health, has adopted the EMS data standard for all EMS agencies that are licensed by the VDH/OEMS. The dataset and its technical standards must be followed by all EMS providers and EMS agencies. The technical requirements for submission are contained in several resource documents such of the VPHIB Data Dictionary, the list of fields and elements, and the various accepted lists.

Each EMT, paramedic, nurse, or doctor participating in prehospital care must utilize and submit the minimum dataset for each response and/or patient encounter. Ground EMS units, air medical units, and first response units must submit the minimum data set on a schedule prescribed by the VDH/OEMS

Each agency that these providers operate under must submit the records to the state EMS database. There are a robust set of validation rules the imported record is run against. These validation include fatal/close call rules that are critical to the record. For non-closed records there are weighted scores assigned to each data element, EMS agencies receive feedback directly at the time of record transfer. VPHIB staffs also provide a monthly compliance report and monthly data quality dashboard.

For agencies that fall below the minimum data quality standard, they receive an individual agency data quality for with guidance on how to correct frequent errors. When an EMS agency has had three consecutive months of not submitting or three months of low quality score they are issued a correction order. Correction orders are the first step in progressive enforcement.