Creating Custom Element Best Practices

Purpose: The goal of this document is to assist state/territory data managers when considering requesting a custom element, value, or group from their ePCR vendor by providing recommendations and best practices. This document is to be used in harmony with the existing NEMSIS v3 Custom Element Guide. It is not intended to supersede or replace currently successful state/territory practices.

What is the difference between a custom value, custom element and custom group?

What is a custom value?

This is when a new description and code is added to an existing NEMSIS element. An example is when "Gown", "Face Shield", and "Isolation Coveralls" were added to the existing element eOther.03 - Personal Protective Equipment Used. *(See Figure 1)* This extended the allowed values list and added additional codes that can be utilized. See the NEMSIS v3 Custom Element Guide under the "Extending an Existing NEMSIS Element" section. **Best practice would not** mix data types such as a date/time value within an element not formatted to collect date/time.

Impact to ePCR Software: The existing field within the software had additional values added for selection by the field clinicians.

Impact to EMS DataSet or DEM DataSet: An additional custom configuration section is added in the custom configuration sections to allow reporting of the custom codes. **NOTE**: The custom codes for each new description are associated with an existing NEMSIS code.

Impact to Vendor: This may vary depending on vendor. During compliance testing, all vendors must demonstrate the ability to add values to an existing element.

Impact to EMS Agencies: The new value will appear in the associated dropdown list and should have minimal impact on the field clinician. There could be some cost associated with the software change depending on the ePCR vendor. The ePCR vendor should provide an implementation timeline.

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Figure 1: Custom Values Added to eOther.03 - Personal Protective Equipment Used

What is a custom element?

This is when a whole new element is created to report something NEMSIS does not have a current element for. For example: when "Recent Exposure to Infectious Disease" was needed, a new element eHistory.903 - Recent Exposure to Infections Disease was created. *(See Figure 2)* Please refer to the NEMSIS V3 Custom Element Guide section, "Creating a Stand-alone Custom Element" for technical specifications.

Impact to ePCR Software: A new field was created to allow the field clinician to collect the information with "Yes", "No", and "Unknown" as options.

Impact to EMS DataSet or DEM DataSet: An additional custom configuration section was added to allow reporting of the custom element. **NOTE**: the "Recent Exposure to Infectious Disease" custom element utilized existing NEMSIS code values for Yes/No/Unknown values, and Pertinent Negatives were associated with the custom element. Custom elements can be set up as a data type such as binary, date/time, integer/number, or text/string, or have a list of descriptions/codes.

Impact to Vendor: Programming effort may be required to create and push the new data element out to the field software product, including where to place the field in data entry and print report forms, and support for analytical reporting. The time required for programming/development varies by ePCR vendor.

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Impact to EMS Agencies: The impact may include associated costs by ePCR vendor to add new fields, providing necessary training for the changes, and potential increase in time on task for documentation. The ePCR vendor should provide an implementation timeline to the EMS Agencies that will meet the 90-day guidelines for a new custom element within ePCR software requested by the state.

Figure 2: New Custom Element

What is a custom group?

A custom group is developed when multiple custom elements are put together within a specific group to paint a complete picture of the data being collected. Each of the elements within the custom group would need to go through the new custom element process and then be grouped together within the custom configuration section utilizing the (d|e)CustomConfiguration.09 – Custom Data Element Grouping ID with a single custom group ID. *(See Figure 3)*. There is an excellent example in the NEMSIS V3 Custom Element Guide in the "Creating a Group of Custom Elements" starting on page 12. A custom group is only necessary when creating a group of correlated elements that can repeat and that cannot be fit into an existing group such as eVitals.VitalGroup.

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Impact to ePCR Software: Multiple new fields were created to allow the field clinicians to collect the information with possible varying types of data input such as dates, Yes/No/Unknown, and lists to choose from.

Impact to EMS DataSet or DEM DataSet: Multiple custom configurations were added in the custom configuration to allow reporting of the custom elements. One of the custom elements must be designated as the parent/key element to tie the other custom elements to.

Impact to Vendor: Programming effort may be required to create and push the new data fields out to the field software product, including where to place the field in data entry and print report forms, and support for analytical reporting. The time required for programming/development varies by ePCR vendor.

Impact to EMS Agencies: The impact may include associated costs by ePCR vendor to add new fields, providing necessary training for the changes, and potential increase in time on task for documentation. The ePCR vendor should provide an implementation timeline to the EMS Agencies that will meet the 90-day guidelines for a new custom element within ePCR software requested by the state.

Figure 3: New Custom Group

How do I know what/if customization is necessary?

1. Does NEMSIS already collect this element with all of the appropriate allowed values on the list? - **NO CUSTOM REPORTING NEEDED**
2. Is it an extension to an element that utilizes a set of codes such as ICD-10, SNOMED CT or RxNorm codes where an additional code will fulfill the data collection requirement? - **NO CUSTOM REPORTING NEEDED**
3. Is there something similar being collected within the NEMSIS Data Dictionary for your current NEMSIS version but the current allowed values listed for the element do not satisfy the data needed? – **ADD** a custom value to an existing NEMSIS element
4. Is there a custom element developed by another state that would satisfy the data needed? – **ADOPT** an existing custom element from another state or ePCR vendor
5. Is there a custom element developed but additional values are needed to satisfy the data needed? – **ADOPT** the existing custom element from another state or ePCR vendor and **ADD** the needed custom value(s)
6. Is this something completely new that hasn't been collected in NEMSIS or by another stakeholder before? – **CREATE** a new NEMSIS custom element or custom element group

Please see the Custom Element Flowchart and Checklist

Creating Custom Element Best Practices Flowchart   Creating Custom Element Best Practices Checklist

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It is recommended that the state data manager discuss custom element needs for your state/territory as much as possible to ascertain the necessity of customization and to have an opportunity to hear ideas on moving forward with customization. Some opportunities for discussion are the NEMSIS TAC v3 Implementation Calls and NASEMSO Data Managers Council meetings where other stakeholders can share the best practices of customization within state data collection. Also, consider discussing the customization needs with the NEMSIS TAC State Support team, and with your primary state vendor. If one state/territory needs a custom element or value, there may be others that need the information collected as well.

How to get a custom value ADDED to an existing element

If an existing custom value is found within the National Custom Element Library:

- Let your state vendor, EMS agencies, and your State Support team at the NEMSIS TAC know which custom value that already exists in the national custom element library will be added to your State DataSet.
- The custom value and code must be added to your State DataSet by the ePCR vendor utilizing the custom configuration section.
- The updated State DataSet should then be sent to the NEMSIS TAC to update the state repository and the state page on the NEMSIS website and allow field vendors to download the new State DataSet.
- The custom value should be added to the ePCR software utilized by the state and by the agencies collecting the new custom values.

> The National Custom Element Library is an interface to view the custom element configurations published by states in their State DataSets, plus custom elements that have been published as "national custom elements" and the CMS ET3 custom elements. When a state adds a custom element configuration to its State DataSet, the configuration shows up in the National Custom Element Library. It does not imply endorsement by the NEMSIS TAC.

If a new custom value is not in the National Custom Element Library, the process is the same with the added step of working with your state vendor to develop the new custom value. It is strongly encouraged to discuss the new custom value with others that may have the same or similar data collection needs.

- Let your ePCR vendor, EMS agencies, and your State Support team at the NEMSIS TAC know you want to implement a NEW custom value.
- Work with your ePCR vendor to develop the new custom value for the existing element:
  - To which element does the new value belong?
  - What value needs to be added?
  - What EXISTING value from the NEMSIS list will be associated with the new custom value? *(See Figure 4)*. **NOTE**: for eOther.03 – Personal Protective Equipment Used, all of the new codes (4503025, 4503027, 4503029) were associated with the existing NEMSIS code of 4503019 "Other". This is also referred to as "mapping" to an existing value when the data are transmitted.

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Figure 4: Added Custom Values to An Existing NEMSIS Element

- The new custom value and code must be added to your State DataSet by the ePCR vendor utilizing the custom configuration section.
- The new State DataSet should then be sent to the NEMSIS TAC to update the state repository and the state page on the NEMSIS website and to allow the field vendors within your state to download the new State DataSet.
- The new custom description should then be added to the software utilized by the state and by the agencies collecting the new custom values.

How to get a custom element ADDED

If there is an existing custom element in the National Custom Element Library:

- Let your ePCR vendor, your EMS agencies, and your State Support team at the NEMSIS TAC know which custom element that already exists in the national custom element library will be added to your State DataSet.
- The custom element must be added to your State DataSet by the ePCR vendor utilizing the custom configuration section.
- The updated State DataSet should then be sent to the NEMSIS TAC to update the state repository and the state page on the NEMSIS website to allow the field vendors within your state to download the new State DataSet.
- The custom element should then be added to the software utilized by the state and by the agencies collecting the new custom element.

If there is an existing custom element in the National Custom Element Library but it needs additional values added that make it useable for your state's needs:

- Let your ePCR vendor, your EMS agencies, and your State Support team at the NEMSIS TAC know which custom element meets your needs if the additional values are added.
- If the new values to the existing custom element do not change the existing custom element in use, work with your ePCR vendor, your agencies and your State Support at the NEMSIS TAC to get those values added. **NOTE**: Not all custom values in a custom element must be made available in your state if the values do not meet state requirements, e.g., the extended values within eOther.03 – Personal Protective Equipment Used may not all be allowed for use, only applicable values would be added as allowed values.
- The custom element must be added to your State DataSet by the ePCR vendor utilizing the custom configuration section.

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- The updated State DataSet should then be sent to the NEMSIS TAC to update the state repository and the state page on the NEMSIS website to allow the ePCR vendors within your state to download the new State DataSet.
- The custom element should then be added to the software utilized by the state and by the agencies collecting the new custom element.

If there is no element in the custom library:

- Check with your ePCR vendor and the NEMSIS TAC State Support team to see if there is an element in development or being utilized by anyone that meets your requirements. This may have already been accomplished if the need has been brought up on a NASEMSO Data Managers call or NEMSIS v3 Implementation Call with state data managers and ePCR vendors.
- The following information should be known to allow the ePCR vendors to update the State DataSet and to allow the development of a new custom element:
  - Custom Element ID – a unique key value used to identify the custom element
  - Data Element Title – What will it be named? This is the title of the element that ePCR software should show in the data entry interface.
  - NEMSIS Element – Which NEMSIS element does this new custom element expand on, such as eMedications or a NEMSIS group element such as eMedications.MedicationsGroup?
  - Data Element Definition – How will this element be used? This is additional information that ePCR software should show to a user if they request help understanding the data element.
  - Data Type – Is this binary (audio, image or video data), date/time, integer/number, text/string (any value can be entered), boolean (true/false), or Other?
  - Recurrence – Can this element be present more than once relative to the NEMSIS element that it expands on?
  - Data Usage Type – Mandatory (must be present in all ePCR without the use of "Not Recorded"/ "Not Applicable"/"Not Reporting"), Required (must be present in all ePCR but **CAN** use "Not Recorded"/ "Not Applicable"/"Not Reporting"), Recommended (not required and **CAN** use "Not Recorded"/ "Not Applicable"/"Not Reporting"), Optional (not required but if collected it **CANNOT** use "Not Recorded"/ "Not Applicable"/"Not Reporting")? **NOTE:** This information sets forth your state's expectations regarding the usage of the element but does not automatically apply any validation. You will need to create state Schematron rules to enforce the expected usage of the element.
  - Potential Values – What values can be used, which tie back to the data type? The provider using the ePCR program would see the custom value description, and the ePCR software would transmit the associated value when submitting data to your state system.
  - Do you want to allow any of the existing NOT values (example: 7701001 "Not Applicable")? **NOTE:** This information sets forth your state's expectations regarding the use of NOT values but does not automatically apply any validation. You will need to create state Schematron rules to enforce the expected use of NOT values.

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- o Do you want to allow any of the existing NEMSIS pertinent negatives (example: 8801023 "Unable to Complete", or 8801029 "Approximate")? **NOTE:** This information sets forth your state's expectations regarding the use of pertinent negatives but does not automatically apply any validation. You will need to create state Schematron rules to enforce the expected use of pertinent negatives.
- o Custom Data Element Grouping ID - If the custom element is part of a stand-alone repeating group of custom elements, this is the Custom Element ID of the custom element that serves as the "anchor" or "parent" element of the group.
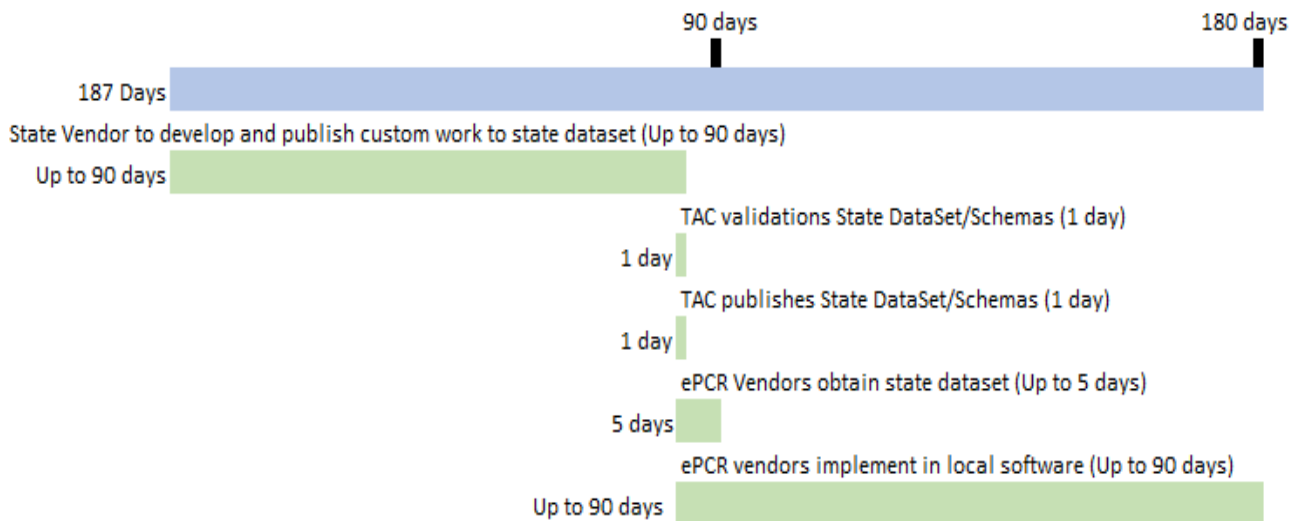
Custom Element Development Process and Timeline

ePCR Vendor Development Recommended Timeline

Once the State Data Manager (SDM) has submitted the necessary information to the State Vendor the timeline begins

Please clearly define and communicate timeline expectations with all partners

Task 1: Development of custom value/element

Process	Who	Timeline	What Should Happen	Days to Completion
Need for custom value/element determined	State Data Manager	N/A	Talk with State vendor, ePCR vendors, NEMSIS TAC, Other Data Managers	N/A
Work with State vendor to establish custom value(s)/element(s) requirements	State Data Manager	N/A	Determine best solution; gather necessary information for element creation	N/A

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Process	Who	Timeline	What Should Happen	Days to Completion
State vendor is ready to publish State DataSet; Schematron changes would be required if rules apply to custom element	State vendor	Starts from completed requirements submitted to Vendor from State Data Manager	State vendor completes State DataSet and EMS/DEM DataSet Schematron if required	Up to 90 days NOTE: A significant alteration to the definition of the element or significant change to the requirement by the state may cause this clock to reset
Notify EMS Agencies of pending changes; Notify other ePCR vendors throughout the state of pending changes	State Data Manager	Might occur simultaneously while working with State vendor	Notification sent out	N/A
Submit updated resources to NEMSIS TAC with list of changes	State Data Manager	Upon Receipt	Submitted file reviewed for structural validation	Variable; may not be immediately if state isn't ready to deploy updates
NEMSIS TAC to update resources on state page website	NEMSIS TAC	Upon Receipt	Validated file and list of changes posted to state page on NEMSIS.org website	1-2 business days
ePCR vendors obtain updated resources	ePCR vendors	Once published to state resources page	Have most current version of State DataSet	5 business days
EMS Agency/ePCR vendors implement in local software	ePCR vendors	Required programming	User Interface has additional values or element for providers to utilize	Up to 90 days
EMS Agency/Clinician utilize custom value(s)/element(s)	EMS Agency/Clinician		Custom fields used	Up to 90 days
QA/QI of custom fields	State Data Managers	After the customization has been implemented	Determined by State Data Managers (May include monitoring data by vendor, verify correct implementation)	N/A

The ability to put in custom elements allows the data collection to be specific to state needs but it should be done with great care and consideration to the data collection burden on the EMS Clinicians.

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