Module 3
Variable Mapping Utility
Variable Mapping

• The Variable Mapping utility provides sites the ability to map electronic health record (EHR) variables to standardized MPOG concepts.

• This process of standardizing terms across multiple EHRs and across multiple sites allows for common data elements to be used for research or quality improvement purposes.

Example of using variable mapping to organize variables across sites

Site A: “Handoff Performed in PACU”
Site B: “PACU Handoff”
Site C: “PACU Handover Complete”

MPOG Concept:
“Compliance- PACU/ICU Handoff of Care Performed, Report Given”

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Variable Mapping

• Once a variable is mapped, source data from the local EHR will always map to the corresponding MPOG concept automatically unless mapping is modified.

• The MPOG Variable Mapping utility simplifies the mapping process by allowing MPOG clinical reviewers to select data variables (source concepts) and match them to corresponding MPOG concepts
Variable Mapping

• **Important Note:** Institutional data needs to be pulled into the MPOG database before mapping can begin.

• Typically, sites begin mapping with a small amount of data (one day to one week) and then load more data after mapping is started.

• Usually sites will automate the process of applying mappings after one month of data is loaded and mapped in the database.

• Automatic updates are typically scheduled to occur each night.
Pre-Mapping

• For new **Epic** sites, a select amount of variables will map automatically prior to beginning manual mapping.

• Your site technical team will be asked to run a script to complete the pre-mapping.

• Once the script is run, pre-mapped variables will show as ‘green’ in the variable mapping utility.
Using the Variable Mapper

• Open the MPOG Suite and select “Variable Mapping”
The ‘Variable Mapping’ utility should open and look similar to the image below. The left side of the utility will list your institution (AIMS) variables and the right side will list MPOG concepts available to map to.

You will also notice four fields within the MPOG Configuration that allow you to filter by category. These include Mapping Type, Organization, Display Mode, and Search Filter.
• **Mapping Type:** This is a general mapping category that can be further filtered to subcategories

• **Organization:** This field will be populated with your institutional name.

• **Display Mode:** This feature allows you to filter by ‘All Variables,’ ‘Unmapped Variables,’ or ‘Mapped Variables.’

• **Search Filter:** This function allows you to search for a specific AIMS variable.

*There may be additional sites in the dropdown menu for multi-site institutions in which you are assigned (i.e. Henry Ford Detroit, Henry Ford West Bloomfield). For institutions with multiple sites, it is recommended that mapping is completed under the Merged Organization.*
• To utilize the category filter option, click on the ‘Mapping Type’ field. A dropdown menu will appear and you may select from the various options.

• Select from the desired category from the ‘Mapping Type’ dropdown menu, as shown below.
In the example below, we have selected the Mapping Type ‘Race.’

Once ‘Race’ has been selected from the dropdown menu, you will notice a variety of race related variables populate the window as shown below. You may notice lines of existing variables on the left side of the screen if variables have been populated or mapped by the MPOG Coordinating Center technical team or premapping has been completed.
• Click the ‘Race’ variable you wish to map. Once the row has been selected, it will turn blue and a corresponding “guess” MPOG concept will appear in the ‘Description’ field on the right side. If several options appear, you can click on one of the bold terms above the MPOG concept window to narrow the search. If the desired concept does not appear, use the search filter on the right side to modify your search.

• In this example, we have selected ‘American Indian/Alaska Native.’
• Click the MPOG Variable you wish to map to. This will highlight it in blue.

• Click “Map”. Your variable is now mapped to an MPOG Concept and will turn green. You can also map by double clicking the MPOG concept. The “Mapped As” column will be updated to reflect this change.

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• You may also filter by ‘Display Mode’ to visualize ‘All Variables,’ ‘Unmapped Variables Only,’ or ‘Mapped Variables’ to focus mapping efforts. By selecting from the dropdown menu, only the variables within the selected category will appear.
Additional Functions within Variable Mapping

Examine

• The ‘Examine’ function allows you to view the Epic variable in greater detail by values from different cases this variable has been documented. This is beneficial when you desire additional context related to the variable you wish to map.
Examine

• Highlight the variable row you wish to examine and click “Examine”.
• A window will open containing detailed information related to the selected variable.
Unmap

• The ‘Unmap’ feature allows you to unmap incorrectly mapped variables at any time. Simply select and highlight the variable in the MPOG side, and click ‘Unmap’. The variable will then turn white.
Exclude

• The ‘Exclude’ function allows you to exclude selected variables from mapping.

• The Coordinating Center will advise you on which variables are appropriate for exclusion.

• Extreme caution must be applied when excluding variables from mapping, especially within the ‘Administration Route’ mapping type, as ALL data associated with ‘route’ will be excluded.

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Exclude

• Highlight the variable(s) you wish to exclude from mapping and click “Exclude”
• Excluded variables will turn pink.
## Category Exclusion Rules

<table>
<thead>
<tr>
<th>Can Exclude</th>
<th>Do Not Exclude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration Type</td>
<td>Administration Route</td>
</tr>
<tr>
<td>Observation Type</td>
<td>Units of Administration</td>
</tr>
<tr>
<td>Observation Type Detail</td>
<td>Room Type</td>
</tr>
<tr>
<td>Lab Type</td>
<td>Procedure Type</td>
</tr>
</tbody>
</table>

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Auto Search

• While auto search is ON, the variable name that is selected on the left hand side will auto populate in the search filter on the right side. Clicking the auto search button will turn this function OFF and will not auto populate the search filter.
Auto Select

- After mapping a variable on the left hand side, having auto select ON will automatically jump to the next variable. To turn this function OFF, click the “auto select” button.
Export

• You can export all variables and their mappings to an excel spreadsheet through the export button.
Tips for Mapping Success

• Focus on mapping variables with high row counts (‘Times Used’).
• Once you have mapped the majority of high row count variables, you can begin to focus your attention to mapping the lower row count variables that may be relevant for anesthesia research or quality purposes.

<table>
<thead>
<tr>
<th>ID</th>
<th>Org</th>
<th>Name</th>
<th>Times Used</th>
<th>Mapped As</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600000310</td>
<td>University of Heart Rate Source</td>
<td>14,656 Unknown Concept</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40677</td>
<td>University of Perfus</td>
<td>Stockert Air Needle</td>
<td>13,003</td>
<td>Unknown Concept</td>
</tr>
<tr>
<td>40676</td>
<td>University of Perfus</td>
<td>Stockert Air Needle</td>
<td>13,003</td>
<td>Unknown Concept</td>
</tr>
<tr>
<td>40686</td>
<td>University of Perfus</td>
<td>Stockert CP RPM</td>
<td>13,003</td>
<td>Unknown Concept</td>
</tr>
<tr>
<td>40690</td>
<td>University of Perfus</td>
<td>Stockert LV Vent(n)</td>
<td>13,002</td>
<td>Unknown Concept</td>
</tr>
<tr>
<td>40695</td>
<td>University of Perfus</td>
<td>Stockert Pump Sui</td>
<td>13,002</td>
<td>Unknown Concept</td>
</tr>
<tr>
<td>40689</td>
<td>University of Perfus</td>
<td>Stockert LV Vent R</td>
<td>13,002</td>
<td>Unknown Concept</td>
</tr>
<tr>
<td>40694</td>
<td>University of Perfus</td>
<td>Stockert Pump Sui</td>
<td>13,002</td>
<td>Unknown Concept</td>
</tr>
<tr>
<td>16011780</td>
<td>University of BP Method</td>
<td>10,304 Unknown Concept</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3040103232</td>
<td>University of Pulse Oximetry Type</td>
<td>9,689 Unknown Concept</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• Utilizing the MPOG Concept Browser utility will facilitate efficient identification of corresponding MPOG concepts. Please reference Module 2: Concept Browser for more information.
Groups to Map First

• **DO NOT EXCLUDE IN ANY OF THESE CATEGORIES**
  • Race
  • Gender
  • Ethnicity
  • Procedure Service
  • Admission Type
  • Staff Type
Groups to Map Last

• **Lab Type**
  • Map variables that are important to surgical/anesthesia care i.e. Hgb/Hct/Creatinine/Troponin/Glucose. Focus on mapping labs that MPOG has concepts for and exclude the rest

• **Administration Type**
  • This category includes IN’s and OUT’s such as fluids, medications, blood products, EBL and urine output.
  • Exclude “volume (mL)” medication variables.
  • **Exclude all physiologic and gas flow variables from this mapping group**
Groups to Map Last

• **Administration Route**
  • Do Not Exclude in this category – map unspecified concepts to “Other”

• **Units of Measurement Administration**
  • Do not exclude in this category – leave those variables without a corresponding MPOG concept unmapped

• **Observation Detail Type**
  • These are observation Details. Map Observation Type first.

• **Observation Type (procedure notes)**
## Variable Type Mapping Guide - EPIC Sites Only

<table>
<thead>
<tr>
<th>Variable Type</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEV-* variables</td>
<td>Timed Event Notes</td>
<td>Most reliable when looking for timing of events (i.e. intubation/extubation)</td>
</tr>
<tr>
<td>EAP/HLX-* variables</td>
<td>Procedure Note Documentation</td>
<td>Provides the details associated with a procedure: size, number of attempts etc. Observed time is not always populated. If no time associated with EAP/HLX note, map related LEV note as well.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Variable Type</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLO-* variables</td>
<td>Data from flowsheet</td>
<td>Data from flowsheet. LDA documentation corresponding to placement, removal etc. Usually duplicate doc</td>
</tr>
<tr>
<td>CT-* variables</td>
<td>Case Tracking Variables</td>
<td>Exclude these if multiple variables show for event times. *If you do not have an LEV variable for a certain concept you will need to include the CT variable.</td>
</tr>
<tr>
<td>AT-* variables</td>
<td>Attestations</td>
<td>Exclude or leave unmapped</td>
</tr>
</tbody>
</table>
Airway Variable Mapping

- ETT/LMA/Intubation/Extubation, regional and neuraxial
- Map LEV/HLX/EAP variables
  - Exclude FLO variables associated with these concepts if both an HLX/EAP and LEV variable exists.
- If duplicate variables exist for critical times such as anesthesia start/end, surgery start/end, In room times, etc.- can exclude the CT variables as these come from nursing. If there are only nursing (CT) variables, keep them and map (Phase I, Phase II in/out times, etc.). Bottom line: Anesthesia documentation is preferred but adopt nursing documentation if anesthesia documentation is not available for critical times/events.
How Mapping Translates to MPOG Case Viewer

The ‘type’ of MPOG concept you map to an AIMS variable will determine where the data within that variable will display in Case Viewer.

- Those mapped to ‘Physiologic’ and ‘Intraop Note’ type concepts will populate in the **Chart** section of case viewer
- Those mapped to ‘Preop’ type concepts will populate in the **H&P** section of case viewer
- Those mapped to ‘Outcomes’ type concepts will populate in the **Outcomes** section of case viewer