Getting Started:
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:

- MPOG Concept: “Compliance- PACU/ICU Handoff of Care Performed, Report Given”
- Site A: “Handoff Performed in PACU”
- Site B: “PACU Handoff”
- Site C: “PACU Handover Complete”

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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.

• Once a variable is mapped, it will automatically be mapped to that concept when additional information is imported.
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 six fields within the MPOG Variable Mapping application that allow you to filter by category. These include Mapping Type, Instance, Organization, Display Mode, Concept Type, and Search Filter.
Variable Mapping Fields

- **Mapping Type**: This is a general mapping category that can be further filtered to subcategories.

- **Instance**: This field will be populated with your default database instance (for sites that have more than one IM database).

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

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

*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 All Assigned Organizations (Merged).*
Variable Mapping Fields

- **Concept Type**: This function allows you to sort the variables that have been mapped to an MPOG concept by concept type: Physiologic Observations, Preoperative Observations, Outcome Observations, and Intraoperative Events, Interventions, and Observations.
  - Default setting is ‘All’ concept types. When looking at unmapped, skipped, or excluded variables, the concept type should be set to ‘All’ in order to see the variables.

- **Search Filter**: This function allows you to search for a specific AIMS variable.
  - Can search by original variable ID using prefix “ID” (example “ID:1448”)
  - Can search by the concept ID/name fields by using prefix “mapped:” (example “mapped:propofol”)
• 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 below. You may notice variables on the left side of the screen already appear green (mapped) if 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 auto-searched 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.
You may also filter by ‘Display Mode’ to sort the variables and help to focus mapping efforts. The categories are ‘All Variables,’ ‘Pre-Mapped Variables Only,’ ‘Mapped Variables Only,’ ‘Unmapped Variables Only,’ ‘Excluded Variables Only,’ and ‘Skipped Variables Only.’ By selecting from the dropdown menu, only the variables within the selected category will appear.
Excluding Variables

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

• The Exclude function is only available in specific mapping types.
  • Administration Type (Inputs/Outputs/Meds)
  • Observation Type (Events/Physiologic/Outcomes)
  • Observation Type Detail (Event Details)
  • Lab Type
• Highlight the variable(s) you wish to exclude from mapping and click ‘Exclude’

• Excluded variables will turn pink.
Skipping Variables

• The ‘Skip’ function allows you to skip a variable that you are purposefully leaving unmapped.

• Select the variable on the left and click on ‘Skip’

• The variable row will turn yellow

• Examples of variables to be marked ‘Skipped’
  • Variables that MPOG does not have a concept for
  • Variables that you have reviewed and determined that they do not need to be mapped at this time
  • Peripheral IV placement/assessment
Unmap

• The ‘Unmap’ feature allows you to unmap incorrectly mapped variables at any time.
• Simply select and highlight the variable on the left side and click ‘Unmap’.
• The variable will then turn white.
Mapping Multiple Variables

• You may have multiple variables that you wish to map to the same concept.
  • You can either click on the variable on the left side and drag to highlight multiple rows or hold down ctrl and click on the variables to multi-select
• Then select the concept you wish to map the variables to and click ‘Map’
• You can also do this for multiple variables that you wish to Exclude, Skip, or Unmap
Groups to Map First

- Race
- Gender
- Ethnicity
- Procedure Service
- Admission Type
- Staff Type
Groups to Map Next

• **Lab Type**
  - 1st--Map labs that are important to surgical/anesthesia care (Hgb, Hct, Creatinine, Glucose, Troponin, potassium)
  - 2nd--map microbiology and virology labs that we have concepts for (i.e. coronavirus, COVID Antibody testing, blood cultures, wound cultures, etc.)
  - 3rd--map remaining labs that we have concepts for (i.e. WBC, blood gases). If we do not have a concept for a variable, it is okay to leave it unmapped or skipped.

• **Administration Type (Inputs/Outputs/Meds)**
  - 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” or leave unmapped

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

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

• *Observation Type (Events/Physiologic/Outcomes)*
Additional Functions within Variable Mapping

- Examine
- Export History
- Premappings
- Auto Search
- Auto Select
- Export
- Import
Examine

- The ‘Examine’ function allows you to view the institution (AIMS) variable in greater detail. Associated values, times, and field details can assist in choosing the best MPOG concept for mapping.
- Highlight the variable row you wish to examine and click “Examine”.
  - A window will open containing detailed information related to the selected variable and a sample case list.
  - MRNs are also available so the user can open an example case in the electronic health record for additional context for any variable in question.

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Mapping History

• This function will pull the mapping logs to show which user completed each mapping and when that mapping was completed. It will be exported to your computer as an Excel file.
Epic Sites Only: Pre-Mapped Variables

- Epic sites use similar AIMS IDs (variable IDs), which can be mapped to the same concept.
- Once per year, MPOG will review the common Epic AIMS IDs and update the pre-mapping for these variables.
- **New sites:** Pre-mapping is applied before the site begins variable mapping.
- **Existing sites:** Can review the latest update to pre-mappings and adopt as appropriate for their site
  - Click on the ‘Pre-mappings’ button at the bottom middle of the Variable Mapping tool to either accept or reject recommended mappings.
  - Choose the ‘Pre-Mappings Only’ Display Mode to review those variables that have already been pre-mapped.
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
Import

- At times, MPOG may ask you to export and send your variable mapping spreadsheet for mapping review/updates.
- MPOG can make the mapping updates on your spreadsheet and send it back to you.
- In order for the updates to be complete, you’ll need to save it to your computer or shared location, open Variable Mapping from the MPOG App Suite, and click on ‘Import’ in the top right corner. Select this file and then review and accept (or reject) the mapping changes.
  - Choose the ‘Recommended’ setting the next time that you transfer to update your data at MPOG Central (see ‘Monthly Upload – Transfer to MPOG Central’).
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.
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.

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<thead>
<tr>
<th>ID</th>
<th>Org</th>
<th>Name</th>
<th>Times Used</th>
<th>Mapped As</th>
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• Utilizing the **MPOG Concept Browser** utility will facilitate efficient identification of corresponding MPOG concepts. Please reference the **Module: Getting Started-Concept Browser** for more information.
Additional Mapping Tips

Review these modules on the MPOG website for additional tips.

- Variable Mapping Tips - Epic Sites
- Variable Mapping Tips - Non-Epic sites
- Mapping Search Terms