Non-Epic Clinical Onboarding Guide

Contents

Minimum Data Requirements

Minimum Data Requirements can be found on our website.

Minimum Timeframe Requirements

These are the minimum time frame requirements for participation in MPOG.

- Flowsheet and physiologic data
  - 4 hours before anesthesia start through 6 hours after anesthesia end
    - We can have documentation outside this window sometimes or the documentation is a subset of that window.
- Labs
  - 365 days before through 365 days after the Date of Service (DOS).

Patient Information

- Full name*
- Date of birth*
- Social security number*
- Medical record number*
- Gender
  - Can include Sex at Birth, Legal Sex, Gender Identity

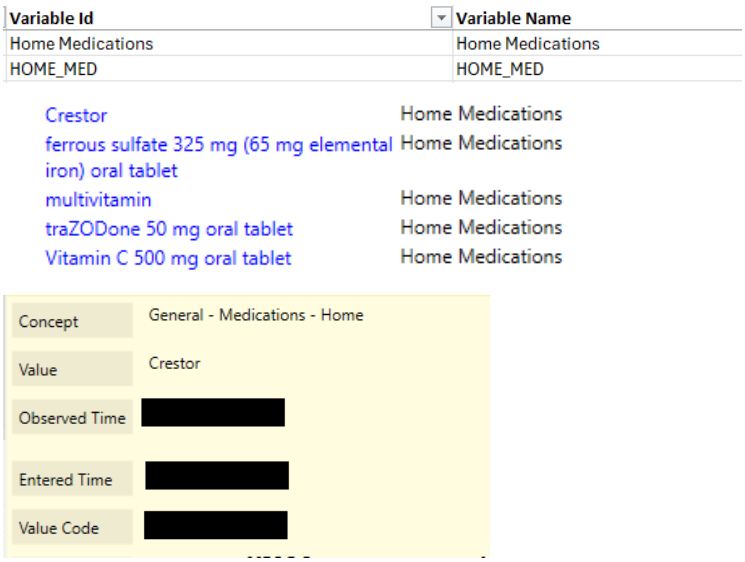
*These identifiers are needed for PHI scrubbing and the Blinded Record Index (also referred to as Privacy Preserving Record Linkage). This data is stored on the local database only and is not accessible by MPOG or sent to the MPOG Coordinating Center.

Basic Case Information

- Admission type
  - This is determined by how the case was scheduled. We have developed a specification for an optional supplemental extract for ADT (Admission/Discharge/Transfer) data that can be used to show admission status changes.
- Age at time of operation
- Facility and operating room type
- Primary procedure text
- Primary diagnosis text

Preoperative Documentation†

- ASA status
- Height – Within 30 days prior to procedure
- Weight – Within 30 days prior to procedure
- Basic comorbidities (cardiac, pulmonary, endocrine, renal, hepatic, immunologic) entered into preoperative H&P‡
    - H&P time frame is determined by the specifics of the site's extract. For example, Epic likes to carry forward old diagnoses and preop information so it can be quite old. Otherwise, it is whatever tied directly to that case.
- Physiologic data
    - There should be separate variables for Systolic Blood Pressure, Diastolic Blood Pressure, Heart Rate/Pulse, Temperature, Temperature Route, etc.
- Home medications
    - This can be one Variable ID and one Variable Name instead of multiple. The medication name, dose, and frequency should be included in the Value of the variable.
        - Home medications can be bucketed into one variable ID and name to help decrease the need to map monthly
        -
    - The home medications should be in the Observation Type mapping type.
    - Here is an example of how it looks at one of our non-Epic sites:



Variable Id	Variable Name
Home Medications	Home Medications
HOME_MED	HOME_MED

Crestor	Home Medications
ferrous sulfate 325 mg (65 mg elemental iron) oral tablet	Home Medications
multivitamin	Home Medications
traZODone 50 mg oral tablet	Home Medications
Vitamin C 500 mg oral tablet	Home Medications

Concept	General - Medications - Home
Value	Crestor
Observed Time	[redacted]
Entered Time	[redacted]
Value Code	[redacted]

†This list is the minimum requirement, but it is strongly encouraged that institutions contribute more data elements.

‡This is required for all Blue Cross Blue Shield participating sites

Intraoperative Documentation

- Case times
  - Anesthesia Start/Anesthesia End
  - Procedure Start/Procedure End
  - Incision time
  - PACU In/PACU Out
    - Include Phase II and Phase III as applicable
- Fluid inputs and outputs
  - Fluids should include the documented start and end times
- Medication administrations
- Observational and procedure notes
  - Examples include tourniquet up, bypass start, intubation notes
- Point of care labs
- Staff tracking
- Sign-in/outs for anesthesia attendings
- Vital signs
  - machine captured minute-by-minute
  - manually entered
- Train of Four

Postoperative Documentation

- Physiologic data
  - Separate Invasive and Non-Invasive Blood Pressure
  - Separate systolic blood pressure and Diastolic blood pressure
- In hospital all-cause mortality

Outcomes

- In-hospital mortality
  - The data we get is more accurately described as deaths the hospital knows about. This is typically deaths during hospital stay, but one or two hospitals actually have access to a death registry and include those as well.
- Postoperative Nausea and/or Vomiting (PONV)

Charge Capture & Administration

- Hospital discharge billing codes
- Professional fee anesthesia billing codes
- Primary payer
- Timeframe to be included:
    - There is no cap on these procedures, though given it is professional fee, it is nearly always limited to procedures done on a single day.
- Discharge diagnoses
    - There is no cap on these diagnoses. Once we get the billing for hospital discharge, it is everything documented on that stay.

Labs

- All labs resulted +/- 365 days from the date of procedure
    - This can be extended if the patient has another case.

Other Data Elements to Include

Every anesthesiology information system has a different set of data elements; therefore, it would be impossible to categorize a complete list of data elements. The following list includes data elements that are commonly used in Anesthesia, MPOG Research, and MPOG QI Measures.

Patient Information

- Race and Ethnicity (Where applicable by law)
- Gender
    - Sex Assigned at Birth
    - Legal Sex
    - Gender Identity
    - Sexual Orientation
- Smoking/Tobacco Use Status
- Last Menstrual Period
- Past Medical History
- Past Surgical History
- Previous Problems with Anesthesia
- Patient Status: inpatient, outpatient

Time Documentation

Each variable should have associated documentation times. There are two times that are typically associated with the variables: Entered Time and Observed Time.

- Entered Time: The time that the variable was documented.
- Observed Time: The time that the procedure/event/care was performed (not necessarily the same as when it was documented).
    - If observed time is not documented, MPOG will default to using the time the note was documented (entered time).

Preoperative Data

- Review of Systems
- History and Physical
- Preop Notes
- Preop Events
- Anesthesia Plan
- History of substance use (including tobacco, marijuana, alcohol, drugs, vape)
- Emergency status – This can be stored as a separate field or always with the ASA status. This variable should be in Observation Type.
- Preop documentation (including nursing notes)

Intraoperative Data

- Physiologic data
    - Systolic Blood Pressure (invasive, non-invasive, continuous non-invasive)
    - Diastolic Blood Pressure (invasive, non-invasive, continuous non-invasive)
    - Heart Rate/Pulse
        - From EKG
        - From SpO2
    - Respirations
    - Temperature
    - Temperature Route/Source
    - Oxygen Saturation (SpO2)
    - Train of Four
    - Perfusion
    - Pain
- Inhalational Agents administered
    - Sevoflurane, Desflurane, Isoflurane, Nitrous
        - Inspired %, Expired %, flows
    - Oxygen
    - Air
- Ventilator data
    - PEEP
    - Tidal Volume actual
    - Tidal Volume set
    - Peak Pressure
    - Pressure Control
    - Ventilator Mode
    - Respiratory Rate Set
    - Respiratory rate Limit
    - Respiratory Rate Actual
    - Ventilator I:E Ratio
    - Ventilator I:E Ratio I-Component
    - Ventilator I:E Ratio E-Component
    -
- Intraoperative Provider Handoff (Attending to Attending, CRNA to CRNA, Resident to Resident, AA to AA, etc.) You do not need to separate intraop handoff documentation based on the role giving or receiving handoff.
- Intraoperative Events

Postoperative Data

- PACU Notes
- PACU Events
    - PACU In/Out times
    - Phase I, Phase II, Phase III times
    - Transfer to floor times
- Postoperative Physiologic data
- Postoperative Handoff (to PACU, ICU, etc.)
- Postoperative Destination (ICU, PACU, etc.)

Events

Events (Intubation, Extubation, Line Placement, etc.) are usually under the Observation Type mapping type. The event details (i.e. ETT size, ETT tube type) are usually under the Observation Detail Type mapping type.

- Airway (ETT, LMA, tracheostomy)
    - Intubation
    - ETT Size
    - Extubation/removal time
    - LMA Placement
    - LMA size
    - LMA Removal time
- Blocks
    - Spinal
    - Epidural
    - Labor epidural
    - Neuraxial Block
    - Regional Block
    - Paresthesia
    - Combined Spinal/CSE
    - Block Type
    - Needle Size (gauge)
    - Block Location
    - Technique
- OB notes
    - Frequency of contractions
    - Duration of contractions
    - Delivery of newborn
    - Delivery of placenta
    - Fetal Heart Rate
    - Apgar Score
    - Uterine Incision

- Arterial Line Placement
    - Arterial Line Insertion
    - Arterial Line location
    - Catheter size
- Cardiopulmonary Bypass
    - Start
    - End/Stop
    - Bypass Circuit Pump
    - Arterial Cannula insertion
    - Arterial Cannula removal
    - Circulatory Arrest Start
    - Blood Pressure Lowered Therapy
    - Systemic Cooling
    - Cardioplegia Stop
    - Aortic Clamp On
    - Aortic Clamp Off
    - Ice On Head
    - Ice Off Head

Medications

These variables should be in the Administration Type (Inputs/Outputs/Meds) mapping type. These medications are typically given in the hospital and do not include home medications. This should include medications administered during preop, intraop, and postop.

- Insulin
- Antibiotics
- Antiemetics
- Anesthesia Medications
- Steroids
- IV Fluids
- Pain medications
- Vasopressors
- Inotropes
- Anti-hypertensives

Medication Details

- Routes
- Start and end times for infusions/IV fluids

Intake and Output

These variables should be in the Administration Type (Inputs/Outputs/Meds) mapping type.

Intake

- Transfusion of blood products
    - Packed Red Blood Cells (PRBCs)
    - Plasma
    - Cell Saver
    - Platelets
    - Whole Blood
    - Autologous/homologous

Output

- Estimated blood loss (EBL)
- Emesis amount
- Urine

Outcomes

These variables should be under the Observation Type mapping type. Outcomes include but are not limited to:

- Postoperative Nausea and Vomiting (PONV)
- Reintubation
- Difficult intubation
- Cardiac arrest
- Postoperative Hypothermia
- Dysrhythmia
- Dental Injury
- Failed/Inadequate block
- Failed/Inadequate neuraxial technique
- Laryngospasm

Staff

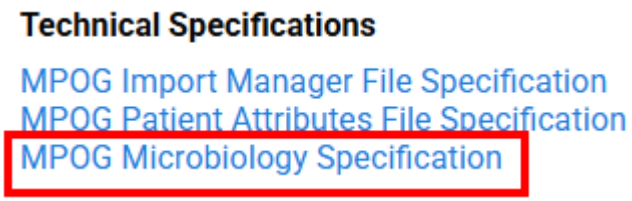
All anesthesia providers are required to have a sign out time. Anesthesia End can be assigned as the sign out time of one was not documented.

- Anesthesiologist (Attending, Secondary)
- CRNA
- Student Registered Nurse Anesthetist (SRNA)
- Anesthesia Assistant
- Anesthesia Resident
- Anesthesia Technician
- Anesthesia Fellow
- Anesthesia Clinical Monitoring Technician
- Anesthesia Medical Student
- Surgical Attending/Proceduralist (primary)
- Surgical Attending/Proceduralist (secondary)
- Surgical Resident
- Surgical Resident on Anesthesia Rotation
- First Assistant
- Scrub
- Circulating Nurse
- Preop Nurse
- Postop Nurse
- Nurse
- Observer
- Student
- Perfusionist
- Perfusion Student

Optional/Supplemental Data Extracts

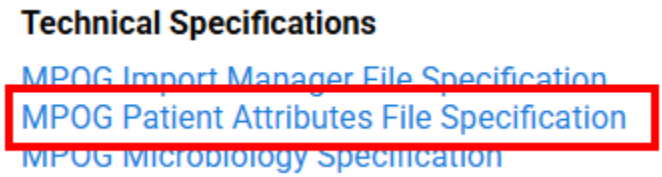
Microbiology

The Microbiology Labs module contains additional specimen, organism, and antibiotic susceptibility data that does not fit into the Labs File. If your site is interested in submitting this data, the file specification can be found on our Website on the Downloads page. Contact the MPOG Help Desk (support@mpog.zendesk.com) for more information.



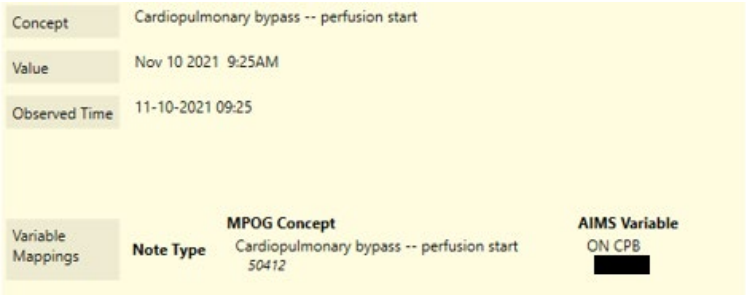
Patient Attributes

Submitting the Patient Attributes data is optional and entirely up to your team if you want to participate. The intent of collecting this information is to assess potential healthcare disparities as many researchers have been interested in this data for Research and Quality Improvement. If your site is interested in submitting this data, the file specification can be found on our Website on the Downloads page. Contact the MPOG Help Desk (support@mpog.zendesk.com) for more information.

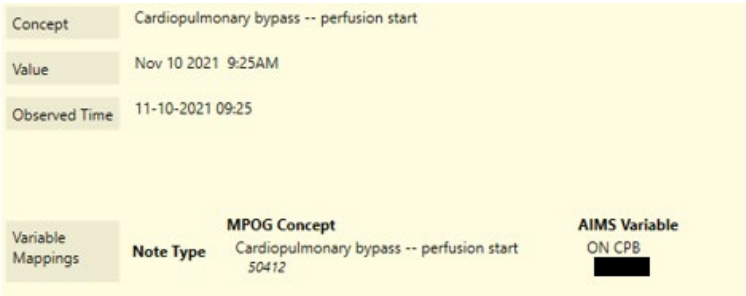


Variable Basics – Any EHR

- **AIMS Variable/Variable** = This comes from the extract and reflects the documentation from the EHR. Similar documentation will be grouped together into one variable (i.e. Non-Invasive Systolic Blood Pressure, Invasive Systolic Blood Pressure, Non-Invasive Diastolic Blood Pressure, etc.). Each variable has a distinct Variable ID and a Variable Name.
- **Value** = text description, usually matches what is documented in the EHR. This is typically either text or numeric values.
    - For example, this variable is for cardiopulmonary bypass start (AIMS Variable name: ON CPB). The value has a date and time but should say Cardiopulmonary bypass start or something similar. The time of bypass start is indicated as the Observed Time.



How it should look:



- **Observed time** = time the procedure/event/care was performed (not necessarily the same as when it was documented). If observed time is not documented, MPOG will default to using the time the note was documented (entered time).
- **Entered time** = Time the variable was documented
- **MPOG Concept** = What MPOG concept the variable is mapped to during Variable Mapping*.
    *Requires.meeting.with.MPOG.Clinical.Onboarding.team¡
- **Variable IDs** should be distinct and unique for different variables. Home medications can be bucketed into one variable ID/variable name, but all others must be unique.
- **Blood pressure** should have separate variables for systolic blood pressure and diastolic blood pressure. They should also be separated according to the type of blood pressure taken (invasive, non-invasive, continuous non-invasive) For example, Variable ID: 1234, Variable Name: Non-invasive Systolic Blood Pressure. Physiologic variables should be under Observation Type.
- **Regional block notes** (single-shot, patient identified, etc.) should be stored as Observation Detail Type under the peripheral nerve block variable

Storing Variables in Modules

Module	Data Included
Cases	Date of Service Operating Room Admission Type Surgical Service Procedure Text Diagnosis Text Organizations (to determine which MPOG_MAS database to use)
Diagnoses	Hospital Discharge Diagnosis and Professional Fee Diagnosis Codes
Hospital Mortality	Date of Death (in hospital only)
Labs	Formal Labs and Point-of-care Labs
Patients	Patient Name MRN Gender Ethnicity Race
Payers	Insurance and other payer data
PeriopAdministrations	Fluids and Medications
PeriopObservations	Preoperative Notes Intraoperative Notes Monitor Data
Procedures	Professional Fee Procedure Codes Hospital Discharge Procedure Codes
StaffTracking	Staff sign ins/outs and role (e.g. Attending)

Appendix A - Common Issues Encountered

Any EHR

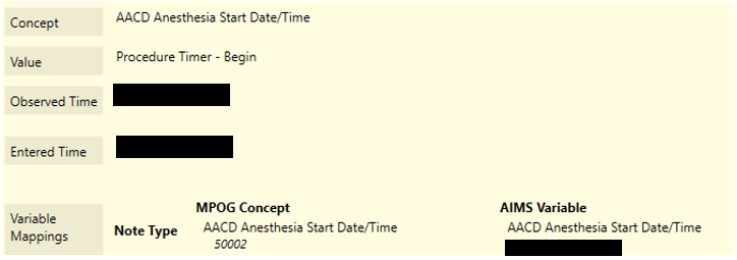
- **Issue**: What do I do when the file is too big to import? Should I split it into multiple files?
    - **Resolution**: You cannot "split" files. All that does is overwrite data since the system assumes the date you are importing is complete. You will need to re-extract the affected dates in smaller ranges, keeping individual files under 2GB in size.
- **Issue**: My Institution changed the name of a location, and the data is not coming over to our local MPOG App Suite. How do I fix it?
    - **Resolution**: This is fairly common; your local technical support can enable the "new" location on the database and the data will start flowing as normal. If the location is not enabled, the data will slowly start disappearing as more 30/90/365 extracts are processed. Contact the MPOG Helpdesk (support@mpog.zendesk.com) for instructions on how to enable locations.
        - When a location is enabled, it may take 24-48 hours for the system to process that data. You will not see the new data until after it has been processed.
        - **Note**: Do NOT enable locations without first contacting MPOG.

Cerner

- **Issue**: Height and/or weight are missing from banner in Case Viewer but are visible in the H&P section.
    - **Resolution**: Remove the units of measurement from the height and weight values. It should be numeric only, if there is additional text, it won't capture it correctly.
- **Issue**: Height and/or weight are mapped but are not showing up in Data Diagnostics.
    - **Resolution**: Remove the units of measurement from the height and weight values. It should be numeric only, if there is additional text, it won't capture it correctly.

MetaVision

- Labor Epidurals did not have anesthesia start and anesthesia end documented. Site had to create a "pseudo" event pair to indicate anesthesia start and anesthesia end. Site used the MetaVision Labor Timer for Anesthesia Start and Anesthesia End for these cases.



- Site did not have explicit Surgery Start and Surgery End times for endoscopy cases, but do have Scope In and Scope Out. Site mapped the Scope In/Out events to AACD Procedure Start/Finish Date Time (MPOG Concept IDs: 50006/50007).

CompuRecord

- CompuRecord allows providers to document similar data in different places. Some notes that we expect to see as parent/child notes can show up as separate parent notes (i.e. art lines, intubations, etc.).

Appendix B – Q&A Cerner Sites

One of our Active Cerner sites met with one of our interested Cerner sites and discussed the process of joining MPOG. Identifying information has been removed. Even though this discussion was between two Cerner sites, it can be used as a reference for other EHRs as well.

Q1: What was the initial challenge faced by the team with MPOG's data requirements?

A1: The team was overwhelmed by the 100 data fields and struggled to adjust their thinking to handle MPOG's requirement for all 10,000 data fields. They found it challenging to comprehend and integrate all the requested fields.

Q2: How does MPOG handle data from different institutions with varying definitions?

A2: MPOG uses concepts to standardize fields from different institutions and a mapping process called 'variable mapping' to align different terminologies. For example, "provider" might be "clinician."

Q3: What infrastructure setup was required for the project?

A3: The team needed to set up servers to store data locally, which took about six months. The IT Support Person played a crucial role in pulling data from various databases and writing the necessary code, supported by an analyst with clinical experience.

Q4: What role did the Clinical Data Analyst play in the project?

A4: The analyst, who was also a nurse, was instrumental in interpreting clinician needs into technical requirements and assisting with the data mapping process.

Q5: How does MPOG ensure data validation before submission?

A5: MPOG requires local data validation before sending it to their central storage. They provide a suite of applications for this validation process, which must be done monthly by a dedicated person, such as a research nurse.

Q6: What is the process for determining which anesthesia and related data to extract?

A6: The team needs to understand MPOG's data requirements and decide what data to pull from their systems through a back-and-forth communication process.

Q7: What qualifications are essential for a developer working on this project?

A7: The developer should have experience with ETL, scripting, and possibly Cerner. They will need to rely heavily on IT for access and guidance.

Q8: How did the IT Support Person handle the technical aspects of the project?

A8: The IT Support Person handled the programming side, using Python and SQL, and relied on support from the IT team to understand Cerner's schemas and navigate the data model.

Q9: How important is IT support for the project's success?

A9: IT support is crucial for navigating Cerner's extensive and complex data model. The developer will need guidance to find specific data fields and ensure accurate data extraction.

Q10: What is the expected timeline for completing the project?

A10: The project is expected to take one and a half to two years. This timeline should be communicated to leadership to secure necessary funding and support.

Q11: What ongoing support does MPOG provide?

A11: MPOG provides ongoing support through their Technical Support, Clinical Informatics Specialists, and Quality Improvement Specialists, who help with onboarding, technical setup, and troubleshooting.

Q12: What was the overall experience of the team with MPOG's requirements and processes?

A12: The team found the process challenging but manageable with the right support. They emphasized the importance of initial guidance, ongoing IT support, and the detailed nature of the work involved.

Appendix C - MPOG Technical Guides

Technical Guides

- MPOG Import Manager File Specification
- MPOG Import Manager Playbook
- MPOG App Suite User Guides
- MPOG App Suite Frequently Asked Questions

Supplemental Extract Specifications

- Patient Attributes File Specification
- Microbiology File Specification

Additional Technical Tools

- Available on our website at https://mpog.org/downloads/

Glossary

AIMS – Anesthesia Information Management System

AIMS Variables – These are the variables that are found in the site's EHR. The variable names are assigned in the extract.

Blinded Record Index (BRI) – A system that matches clinical patient records against DMF patient records by merging datasets across sites without PHI. It uses a hashing algorithm that is encrypted and cannot be decrypted. Also referred to as Privacy Preserving Record Linkage (PPRL).

Entered time – time the variable was documented

MPOG Concept – What MPOG concept the variable is mapped to during Variable Mapping

Observed time – time the procedure/event/care was performed (not necessarily the same as when it was documented). If observed time is not documented, MPOG will default to using the time the note was documented (entered time).

Privacy Preserving Record Linkage (PPRL) – A system that matches clinical patient records against DMF patient records by merging datasets across sites without PHI. It uses a hashing algorithm that is encrypted and cannot be decrypted. Previously referred to as Blinded Record Index (BRI).