



Data Review: Case Validation



Case Validation Overview

- Case validation is used along with Data Diagnostics (see Module: Data Review – Data Diagnostics) to ensure data accuracy
- Ensures that the data extracted into MPOG matches the original EHR documentation utilizing the MPOG Case Validation application
- Allows for detection of data issues at an individual case level that may not be visible using data diagnostics
- Series of standard questions are used to validate case information

Case Validation Overview

- A variety of cases should be sampled
 - For example, if your institution has cardiac surgery, orthopedic surgery, obstetrics/gynecologic surgery, vascular surgery, and transplant surgery, then you should review a case for every service
- Emergent cases should be validated as the data for an emergent case may not always extract in the same way a scheduled case does.
- After a few months, you may see trends in issues with mapping.

Case Validation Overview

- Based upon initial review and with help from an MPOG Informatics Specialist, you will decide how to select future cases for review.
- For example, you may find that there is a trend in issues with mapping for cardiac procedures. In this case, you will want to place emphasis on reviewing cardiac cases for a few months until the data issue is resolved.

Requirements

- All sites are required to validate a minimum of 5 cases per month prior to uploading to MPOG Central each month
- All historical data should be validated with a minimum of 5 case validations completed per month of data
- MPOG requires review of at least 5 cases per month of data for 12 months prior to initial MPOG Central upload

Accessing Case Validation



Case Validation App

- The left side of window displays 4 options for how you can select and open a case.
- The right side of the window displays the number of cases that have been reviewed historically for each month.
- Green indicates that the required number of cases per month have been reviewed.

Month	Cases
2022-05	0 / 5
2022-04	5 / 5
2022-03	5 / 5
2022-02	5 / 5
2022-01	5 / 5
2021-12	5 / 5
2021-11	1 / 5
2021-10	5 / 5
2021-09	10 / 5
2021-08	10 / 5
2021-07	10 / 5
2021-06	10 / 5
2021-05	11 / 5

Pick a Case for Review

- 4 Options
 - Pick case by MRN and date
 - Pick case by MPOG case ID
 - Pick random unreviewed case
 - Pick already reviewed case

Year-Month	Review Count
2022-05	0 / 5
2022-04	5 / 5
2022-03	5 / 5
2022-02	5 / 5
2022-01	5 / 5
2021-12	5 / 5
2021-11	1 / 5
2021-10	5 / 5
2021-09	10 / 5
2021-08	10 / 5
2021-07	10 / 5
2021-06	10 / 5
2021-05	11 / 5

Pick a Case for Review: Select by MRN and Date

- Click the dial next to “Pick case by MRN and date.” Both MRN and Date of Operation are required for this type of case selection method. Click “Validate Case”
 - Date is displayed in MM/DD/YYYY format
- The Case Validation screen should display. You would typically verify that the patient MRN & Date of Operation are the same as the case you were initially trying to select and then begin case validation.

Date	Count
2022-05	0 / 5
2022-04	5 / 5
2022-03	5 / 5
2022-02	5 / 5
2022-01	5 / 5
2021-12	5 / 5
2021-11	1 / 5
2021-10	5 / 5
2021-09	10 / 5
2021-08	10 / 5
2021-07	10 / 5
2021-06	10 / 5
2021-05	11 / 5

Pick a Case for Review: Select by Case ID

- Click the dial next to “Pick case by case ID.” Enter MPOG Case ID. Click “Verify Case”
- The Case Validation screen should display. Typically, you would verify that the MPOG Case ID is the same as the case you were initially trying to select and then begin case validation.

Case Validation

Pick case by MRN and date

Patient MRN

Date of Operation

Pick case by case ID

MPOG Case ID

Pick random unreviewed case

Time Period 0 / 5

Service Type

Location

Pick already reviewed case

Reviewed Cases

Validate Case

Review Saved Validation

2022-05	0 / 5
2022-04	5 / 5
2022-03	5 / 5
2022-02	5 / 5
2022-01	5 / 5
2021-12	5 / 5
2021-11	1 / 5
2021-10	5 / 5
2021-09	10 / 5
2021-08	10 / 5
2021-07	10 / 5
2021-06	10 / 5
2021-05	11 / 5

Pick a Case for Review: Pick random unreviewed case

- Click the dial next to “Pick random unreviewed case.”

Case Validation

Pick case by MRN and date

Patient MRN

Date of Operation

Pick case by case ID

MPOG Case ID

Pick random unreviewed case

Time Period 0 / 5

Service Type

Location

Pick already reviewed case

Reviewed Cases

Validate Case

Review Saved Validation

2022-05	0 / 5
2022-04	5 / 5
2022-03	5 / 5
2022-02	5 / 5
2022-01	5 / 5
2021-12	5 / 5
2021-11	1 / 5
2021-10	5 / 5
2021-09	10 / 5
2021-08	10 / 5
2021-07	10 / 5
2021-06	10 / 5
2021-05	11 / 5

Pick a Case for Review: Pick random unreviewed case

- Choose the date range
- The Time Period is in MM/DD/YYYY format. Even though it only shows the 1st day of the month, it reflects the entire month shown.
 - For example, 05/01/2022 represents cases from May 1, 2022-May 31, 2022

Case Validation

Pick case by MRN and date

Patient MRN

Date of Operation

Pick case by case ID

MPOG Case ID

Pick random unreviewed case

Time Period	05/01/2022	0 / 5
Service Type	05/01/2022	0 / 5
Location	04/01/2022	5 / 5
	03/01/2022	5 / 5
	02/01/2022	5 / 5
	01/01/2022	5 / 5
	12/01/2021	5 / 5
	11/01/2021	1 / 5
	10/01/2021	5 / 5
	09/01/2021	10 / 5
	08/01/2021	10 / 5
	07/01/2021	10 / 5
	06/01/2021	10 / 5
	05/01/2021	11 / 5
	04/01/2021	10 / 5
	03/01/2021	10 / 5

Pick already reviewed

Reviewed Cases

Validate Case

2022-05	0 / 5
2022-04	5 / 5
2022-03	5 / 5
2022-02	5 / 5
2022-01	5 / 5
2021-12	5 / 5
2021-11	1 / 5
2021-10	5 / 5
2021-09	10 / 5
2021-08	10 / 5
2021-07	10 / 5
2021-06	10 / 5
2021-05	11 / 5

Review Saved Validation

Pick a Case for Review: Pick random unreviewed case

- Select a surgical service from the dropdown menu
- MPOG recommends selecting cases from different service types each month to validate all variables are reflecting local documentation.

Case Validation

Pick case by MRN and date

Patient MRN:

Date of Operation: 5/6/2022

Pick case by case ID

MPOG Case ID: 00000000-0000-0000-0000-000000000000

Pick random unreviewed case

Time Period: 05/01/2022 (0 / 5)

Service Type: (Any)

Location: (Any)

Pick already reviewed

Reviewed Cases

Validate Case

Service Type	Reviewed	Total
(Any)	0	1422
Cardiac	0	35
Colorectal	0	3
Dentistry	0	4
General	0	24
Medical - cardiology	0	60
Medical - gastroenterology	0	67
Medical - hematology/oncology	0	18
Medical - pulmonology	0	3
Neurosurgery	0	42
Obstetrics	0	1
Obstetrics / Gynecology	0	69
Ophthalmology	0	155
Oral / Maxillofacial	0	17
Orthopedics	0	95
Otolaryngology	0	107
Pediatric Cardiac Surgery	0	13
Pediatric Gastroenterology	0	20

Month	Reviewed	Total
2022-05	0	5
2022-04	5	5
2022-03	5	5
2022-02	5	5
2022-01	5	5
2021-12	5	5
2021-11	1	5
2021-10	5	5
2021-09	10	5

Pick a Case for Review: Pick random unreviewed case

- Optional: select a location from the dropdown menu
 - This will allow you to validate cases at different locations based on your location mapping and will be especially helpful for institutions that have more than one site on the same instance of Import Manager.
 - Location Mapping must be completed before this filter is available (see Module: Getting Started - Location Mapping).
- Select “Validate Case” at the bottom of the screen

Date	Reviewed	Total
2022-05	0	5
2022-04	5	5
2022-03	5	5
2022-02	5	5
2022-01	5	5
2021-12	5	5
2021-11	1	5
2021-10	5	5
2021-09	10	5
2021-08	10	5
2021-07	10	5

Location	Reviewed	Total
University of Michigan Health System	0	1421
Ambulatory Care	0	408
Briarwood Medical Group	0	6
Brighton Health Center	0	125
East Ann Arbor Health and Geriatrics Center	0	139
Kellogg Eye Center	0	138
Livonia Health Center	0	0
Ann Arbor - Main	0	1013
C. S. Mott Children's Hospital	0	281
Comprehensive Cancer Center ORs	0	0
Frankel Cardiovascular Center	0	127
University Hospital	0	546
Von Voigtlander Women's Hospital	0	59

Pick a Case for Review: Picking an Already Reviewed Case

- Click the dial next to “Pick an already reviewed case.”
- Select a case from the dropdown menu. The date of operation and procedure type will display.
- Select “Validate Case” at the bottom of the screen.
- The Case Validation screen should display. At this point, you would verify that the case selected matches the case type that displays in the validator and begin case validation.

The screenshot shows the 'Case Validation' window with the following sections:

- Pick case by MRN and date:** Includes fields for Patient MRN and Date of Operation (5/6/2022).
- Pick case by case ID:** Includes a field for MPOG Case ID with a red border around the value 00000000-0000-0000-0000-000000000000.
- Pick random unreviewed case:** Includes fields for Time Period (05/01/2022), Service Type (Any), and Location.
- Pick already reviewed case:** This option is selected. It features a dropdown menu showing a list of reviewed cases.

The reviewed cases list includes:

- 01/12/2015 LEFT HARDWARE REMOVAL TIBIA OR FIBULA
- 01/13/2015 LAPAROSCOPIC TOTAL COLECTOMY WITH ENDORECTAL PULL THROUGH
- 01/19/2015 MIDLINE BRONCHOSCOPY - RIGI
MIDLINE TRACHEOSTOM
MIDLINE BRONCHOSCOPY - FLEXIBLE
- 01/19/2015 RIGHT URETEROSCOPY WITH LASER LITHOTRIPS
RIGHT CYSTOSCOPY WITH URETERAL STENT PLACEMENT
- 01/22/2015 MIDLINE MYELOMENINGOCELE REPAIR
MIDLINE MYELOMENINGOCELE REPAIR
- 02/05/2015 BILATERAL BRONCHOSCOPY - FLEXIBLE
- 02/11/2015 LEFT WIRE LOCALIZATION BREAST BIOPSY
- 02/18/2015 RIGHT L AND D BREAST

On the right side of the window, there is a summary table:

Year	Count
2022-05	0 / 5
2022-04	5 / 5
2022-03	5 / 5
2022-02	5 / 5
2022-01	5 / 5
2021-12	5 / 5
2021-11	1 / 5
2021-10	5 / 5
2021-09	10 / 5
2021-08	10 / 5
2021-07	10 / 5
2021-06	10 / 5
2021-05	11 / 5

Case Validation

- Select a case using one of the previously described options
- The Case Validation questionnaire will display. For this training, PHI has been removed.

Case Lookup Information

Patient MRN: [REDACTED]

Date of Operation: [REDACTED]

MPOG Case ID: [REDACTED]

Questions for Validation

Case Information *No Time Restriction*

Was the patient's name [REDACTED] Correct Incorrect

Was the patient's age at the time of operation 32 years? Correct Incorrect

Is the admission type correctly mapped as 'Inpatient'? Correct Incorrect

Was the ASA physical status of the patient 'ASA 2E'? Correct Incorrect

Is the following procedure description correct?
UNKNOWN C-SECTION Correct Incorrect

Was this procedure performed in procedure room 'LD-OR 03'? Correct Incorrect

Are the following tags correct for procedure room 'LD-OR 03'?
Facility type - Acute care hospital
Facility Type - Children's Hospital
OB-GYN - Obstetric operating room Correct Incorrect

Is the primary procedure service correctly mapped as 'Obstetrics / Gynecology'? Correct Incorrect

Did this patient receive regional or neuraxial anesthesia (with or without general anesthesia)? Correct Incorrect

Preop *From 4 Hours Before Anesthesia Start to Anesthesia Start*

Was this patient transferred to the OR from a location other than preop? Correct Incorrect

Perioperative Times *From 4 Hours Before Anesthesia Start to Anesthesia End + 6 Hours*

Was anesthesia start at [REDACTED] Correct Incorrect

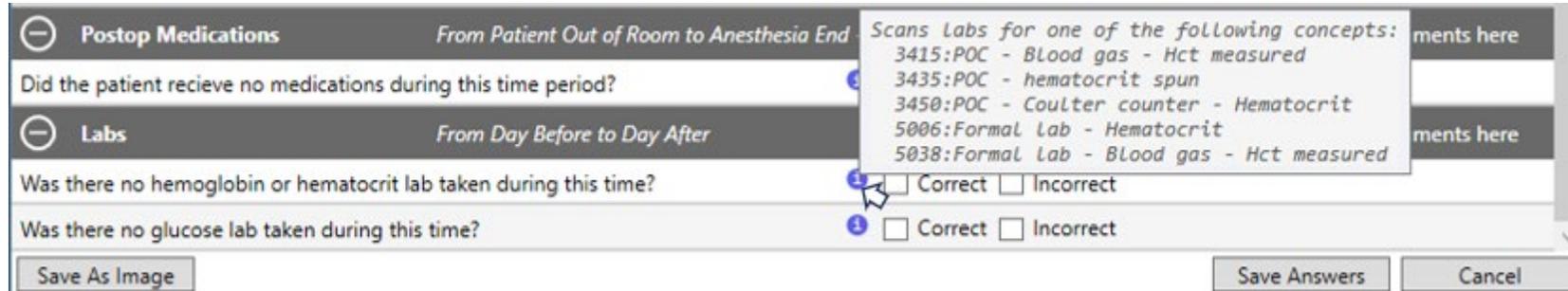
Was surgical incision at [REDACTED] Correct Incorrect

Was Phase I Recovery Room In Date/Time at [REDACTED] Correct Incorrect

Was anesthesia end at [REDACTED] Correct Incorrect

Case Validation

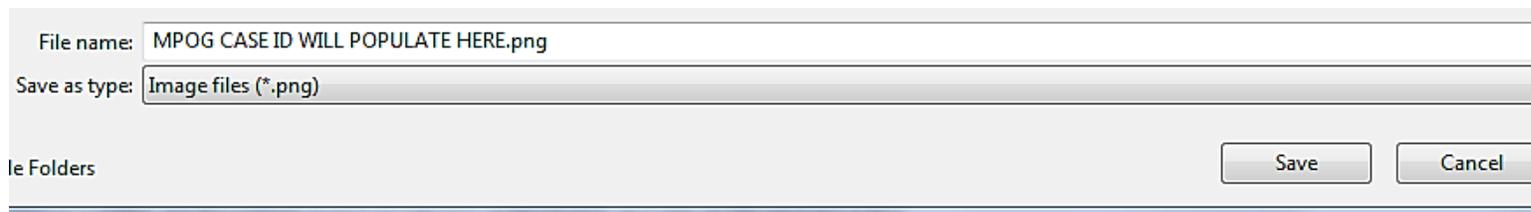
- Tooltips are available by hovering over the . Tooltips provide more information regarding which concepts the question uses
 - The Labs section looks for hematocrit and glucose results only.



The screenshot displays a user interface for case validation. It features two main sections: 'Postop Medications' and 'Labs'. The 'Labs' section is expanded, showing two questions: 'Was there no hemoglobin or hematocrit lab taken during this time?' and 'Was there no glucose lab taken during this time?'. A tooltip is visible over the first question, listing the following concepts: 3415:POC - Blood gas - Hct measured, 3435:POC - hematocrit spun, 3450:POC - Coulter counter - Hematocrit, 5006:Formal Lab - Hematocrit, and 5038:Formal Lab - Blood gas - Hct measured. The interface includes 'Save As Image', 'Save Answers', and 'Cancel' buttons.

Case Validation

- You must answer every question with ‘Correct’ or ‘Incorrect’ unless there is no data in which case the row for the question is highlighted in red.
- Compare questions against EHR. Please add comments as needed to explain any discrepancies.
- For issues that need follow- up from the site technical team or coordinating center, the “Save As Image” button is available to save a screenshot of the case. **PHI will automatically be eliminated from the screenshot.**
- A window will display asking you to save the image. The MPOG Case ID will automatically populate the File Name. Choose a file location where you will be able to access again. Click ‘Save’



Case Validation

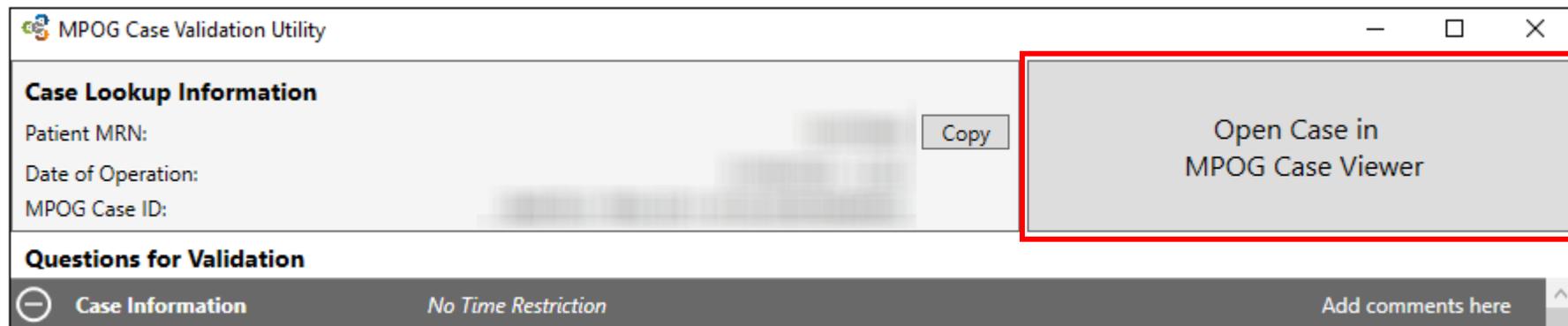
- May need 3-4 programs open at a time to verify the data in the MPOG case validator “matches” the information present in the hospital Anesthesia Information Management System (AIMS)
- It is recommended reviewers have 2 monitors/screens available for use
- Most likely will need intra-op record open on one screen and the MPOG case validator on the other
- The source of truth varies per institution depending on the electronic documenting system

Case Validation

- For example: At the University of Michigan Health System, multiple systems are used for case validation:
 - Centricity contains the Intra-op record, Anesthesia H&P, Case details.
 - Epic: Inpatient record, used for validation preop medications and admission status
 - Carelink: Previous EHR used for validating cases pre-dating Epic implementation.

Case Validation

- It may be useful to open the Case Viewer within the MPOG Suite to assist in the case review.
- To access from the Case Validation Utility screen, click on the 'Open Case in MPOG Case Viewer' tab at the top right hand of the screen. For further details on the Case Viewer, refer to the module Data Review: Case Viewer.



Case Validation

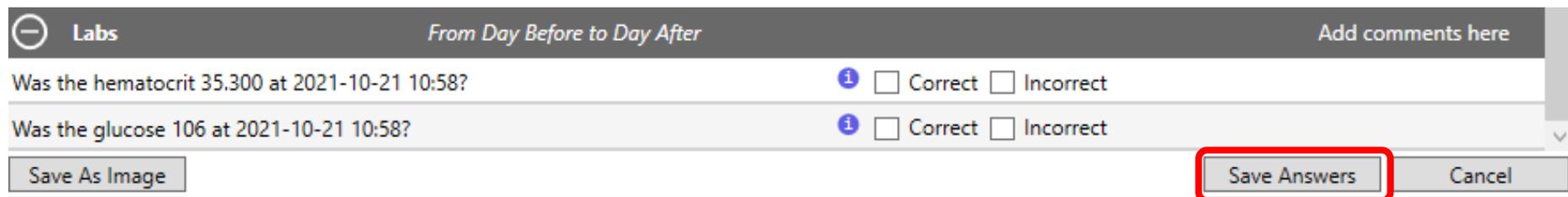
- If a case is missing information in the MPOG database for any reason, the case validator will highlight the row for that question in red and will gray out the correct/incorrect checkboxes.
- If multiple cases seem to be missing the same type of data, note the MPOG case IDs. This can indicate an extract issue or a documentation issue- discuss with the MPOG Informatics Specialist to identify next steps. See example below.

Is the admission type correctly mapped as 'Inpatient'?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was the ASA physical status of the patient 'NOT FOUND'?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Is the following procedure description correct? ESOPHAGOGASTRODUODENOSCOPY WITH FOREIGN BODY REMOVAL	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was this procedure performed in procedure room 'M-PR 01'?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are the following tags correct for procedure room 'M-PR 01'?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Facility type - Acute care hospital	
Other - Mixed use operating room	
Other - Pediatric	
Service specific room - Endoscopy	
Is the primary procedure service correctly mapped as 'Medical - gastroenterology'?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Preop <i>No Time Restriction</i> Add comments here	
<i>Nothing found</i>	
Perioperative Times <i>No Time Restriction</i> Add comments here	
Was anesthesia start at 'NOT FOUND'?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Was surgical incision at 'NOT FOUND'?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Was the patient transferred somewhere other than the recovery room?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was anesthesia end at 'NOT FOUND'?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Intraop Staff <i>No Time Restriction</i> Add comments here	



Case Validation

- After all questions are answered for the selected case, click the “Save Answers” button in the bottom right corner of the screen.
- Once the case has been submitted, there is no way to go back and make changes to the form.
- Once the case is open, you must complete it as the information will not be saved if the case is closed before submitting.



The screenshot shows a user interface for case validation. At the top, there is a header bar with a minus sign icon, the word "Labs", the text "From Day Before to Day After", and "Add comments here". Below the header, there are two rows of questions, each with an information icon (i) and two checkboxes labeled "Correct" and "Incorrect". The first question is "Was the hematocrit 35.300 at 2021-10-21 10:58?". The second question is "Was the glucose 106 at 2021-10-21 10:58?". At the bottom of the form, there are three buttons: "Save As Image", "Save Answers" (which is highlighted with a red rectangle), and "Cancel".

Case Validation

This will automatically save and update the monthly count for cases reviewed in the 'Overall Progress' section as seen below.

Pick a case for review

Use the following options to pick a case to review

Pick case by MRN and date

Patient MRN

Date of Operation

Pick case by case ID

MPOG Case ID

Pick random unreviewed case

Overall Progress

2016-03	0 / 20
2016-02	20 / 20
2016-01	21 / 20
2015-12	20 / 20
2015-11	20 / 20
2015-10	20 / 20
2015-09	20 / 20
2015-08	20 / 20

Case Validation

- To review a summary of past case validations, use the “Review Saved Validation” button. First, click the month that you want to see. Then, click “Review Saved Validation

Month	Count
2022-05	0 / 5
2022-04	5 / 5
2022-03	5 / 5
2022-02	5 / 5
2022-01	5 / 5
2021-12	5 / 5
2021-11	1 / 5
2021-10	5 / 5
2021-09	10 / 5
2021-08	10 / 5
2021-07	10 / 5
2021-06	10 / 5
2021-05	11 / 5

- This screen will appear with a summary of the case validation questions and counts of the number of cases that month that had the question answered “No” and the number of cases with comments. A column is available to show who reviewed the case as well.

The screenshot displays a software window titled "Validation for the month of 04-2019". It is divided into two main sections. The left section provides a summary of validation questions, and the right section provides a detailed log of individual responses.

Question	No / Missing	Comment
Patient Name		
Procedure Name	1	1
Random Fluid Dose	1	
Room Tags	6	
Staff Present: Attending		
Staff Present: CRNA	1	1
Staff Present: Resident		
Surgical Service Mapping		
Time: Anes End	1	
Time: Anes Start	1	
Time: Medication Given (First)	1	1
Time: Medication Given (Last)	1	
Time: Surgical Incision	1	

Date Reviewed	Question	Response	Comment	Reviewer	MPOG Case ID
05-16-2019 12:17	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			
05-16-2019 12:28	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			
05-16-2019 12:32	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			
05-16-2019 12:54	Was there 1 anesthesiology CRNA(s) that signed into this case?	No	2		
05-16-2019 01:14	Was there 0 anesthesiology CRNA(s) that signed into this case?	Yes			
05-16-2019 01:17	Was there 2 anesthesiology CRNA(s) that signed into this case?	Yes			
05-16-2019 01:20	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			
06-10-2019 03:18	Was there 0 anesthesiology CRNA(s) that signed into this case?	Yes			
06-10-2019 03:30	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			
06-10-2019 03:41	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			

Validation for the month of 04-2019

Hide passing questions

Question	No / Missing	Comment	Date Reviewed	Question	Response	Comment	Reviewer	MPOG Case ID
Patient Name			05-16-2019 12:17	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			c3ed06f2-1761-ef
			05-16-2019 12:28	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			f5ec06f2-1761-e9
			05-16-2019 12:32	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			4f4c774e-ef55-e9
Procedure Name	1	1	05-16-2019 12:54	Was there 1 anesthesiology CRNA(s) that signed into this case?	No	2		95db38bb-015d-r
Random Fluid Dose	1		05-16-2019 01:14	Was there 0 anesthesiology CRNA(s) that signed into this case?	Yes			f72d86fa-b861-e5
			05-16-2019 01:17	Was there 2 anesthesiology CRNA(s) that signed into this case?	Yes			a14c774e-ef55-e5
Room Tags	6		05-16-2019 01:20	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			c072d09a-a665-e
Staff Present: Attending			06-10-2019 03:18	Was there 0 anesthesiology CRNA(s) that signed into this case?	Yes			b664923e-cb68-e
Staff Present: CRNA	1	1	06-10-2019 03:30	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			dec79878-b856-e
Staff Present: Resident			06-10-2019 03:41	Was there 1 anesthesiology CRNA(s) that signed into this case?	Yes			a24b774e-ef55-ef
Surgical Service Mapping								
Time: Anes End	1							
Time: Anes Start	1							
Time: Medication Given (First)	1	1						
Time: Medication Given (Last)	1							
Time: Surgical Incision	1							

Hide passing questions

- Clicking on a question will bring up more information on the case validation answers for each case.
- You can use this screen to find cases with “No” answers for further review. To hide the “Yes” answers, click “Hide passing questions.”
- Double-click on any MPOG Case ID to open the case in Case Viewer.
- Look for trends in issues, such as date of the case. This can be helpful when identifying issues with the data.

Case Validation Tips

- If you are validating a case on a patient who is older than 90 years old, answer 'Correct' to the question 'Was the patient's age at the time of operation 90 years?'
 - MPOG cuts age off at 90 years old to decrease the chance that the patient could be identified, since most of the patients are younger than 90.
- The questions under the labs section are looking for only hemoglobin, hematocrit, and glucose labs from the day before through the day after the procedure. It will not look at any other labs during this time frame.

Case Validation Tips

- Why does the date and time of operation show up as 01/01/0000 - 00:00?
 - The data for this case has not yet finished handoff. You can either choose another case to validate or save the MPOG Case ID and try to validate the case again in a few days after handoff is complete. Check Import Manager Assistant to assess the handoff queue (see Module: Data Review – IM Assistant).
- If you are validating a case that does not have an incision time (i.e., Labor epidural), you will see ‘Was surgical incision NOT FOUND’ and the line highlighted in red. This is expected and you can skip the question.
 - If you expect to see an incision time and it is highlighted red, it may not have completed handoff. Review Import Manager Assistant to verify if handoff is complete.
 - If handoff is complete, review Import Manager Assistant for missing days and contact your local Technical Support person to help troubleshoot. Contact the MPOG help desk (support@mpog.zendesk.com) if further assistance is needed

Case Validation Tips

- How does MPOG determine if a medication is a bolus or an infusion?
 - This is determined by site documentation, but the medications that MPOG typically expects to see as boluses or infusions are listed in the table below.
 - If an end time is not populated, infusion dose will continue until the start time of the next administration for the same medication. If an end time is not populated and there is not an additional administration, the infusion will continue until anesthesia end time. If the infusion start time is after anesthesia end, the end time will default to 5 minutes after infusion start.

Bolus	Infusion
Medications given via the following routes: SQ, PO, IM, ID	Any medications administered via IV infusion (i.e., heparin, insulin, propofol)
Medications given via IV push (i.e., versed, fentanyl, labetalol, morphine, ondansetron, rocuronium)	Typically documented with start/end times with rate (ie: ml/hr, mg/kg/min)
Antibiotics (including vancomycin and other antibiotics that are given over a longer period of time may be considered boluses)	