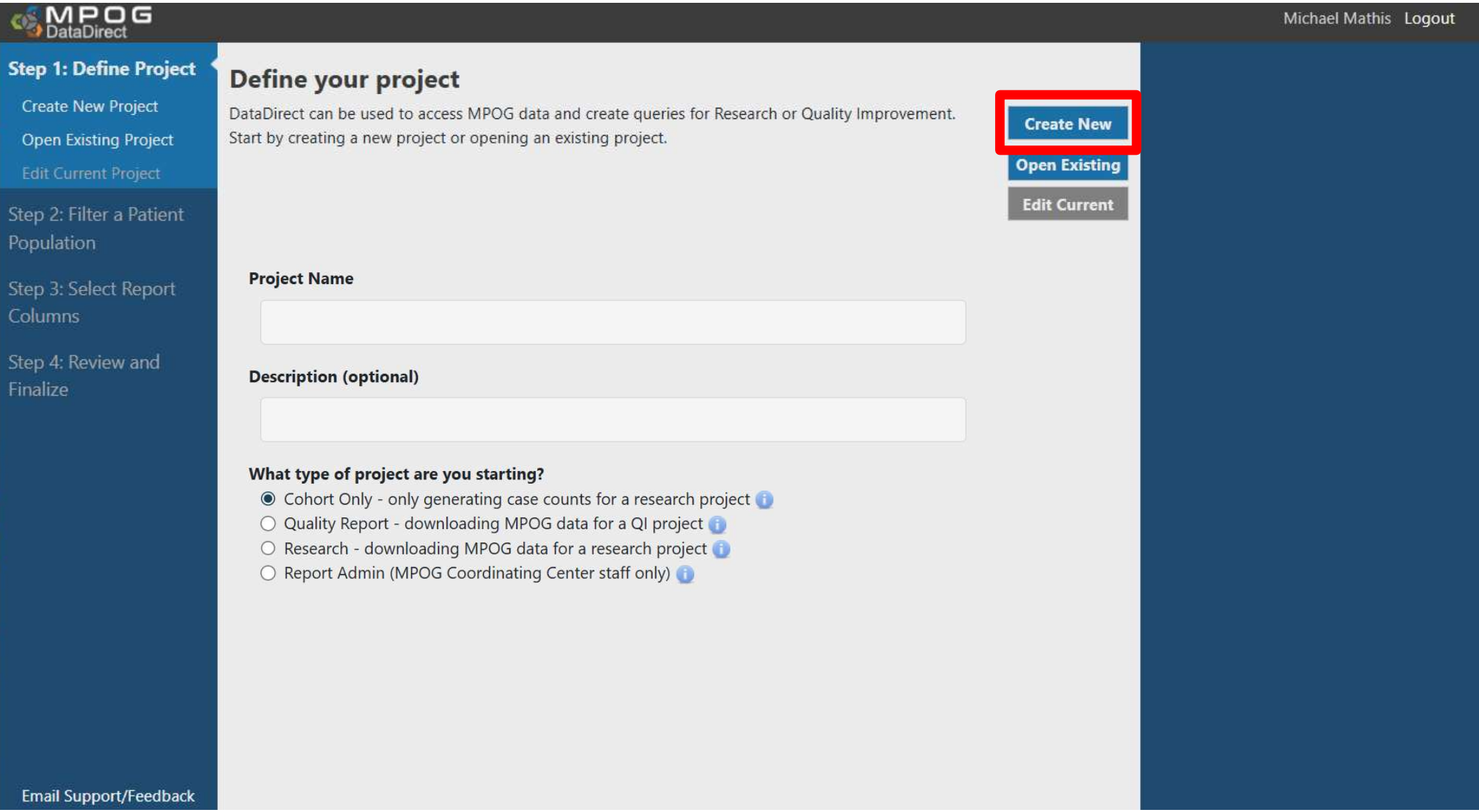
MPOG DataDirect:
Updates & Use-Cases for Research and QI

Michael Mathis, MD

Research Director, MPOG

Associate Professor, Michigan Medicine

MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP


MPOG DataDirect
Michael Mathis Logout
Step 1: Define Project
Create New Project
Open Existing Project
Edit Current Project
Step 2: Filter a Patient Population
Step 3: Select Report Columns
Step 4: Review and Finalize
Email Support/Feedback
Define your project
DataDirect can be used to access MPOG data and create queries for Research or Quality Improvement.
Start by creating a new project or opening an existing project.
Create New
Open Existing
Edit Current
Project Name
Description (optional)
What type of project are you starting?
Cohort Only - only generating case counts for a research project
Quality Report - downloading MPOG data for a QI project
Research - downloading MPOG data for a research project
Report Admin (MPOG Coordinating Center staff only)

DataDirect Query Modes

	Access Requirements	Scope	Goal
Cohort Only	Login	Multicenter (counts)	Determine if question is answerable
Quality Report	Local QI Approval	Single Center	Local QI
Research	Local IRB Approval	Single Center	Publications / Grants
(Multicenter Research)	*PCRC Approval*	*Multicenter*	*Publications / Grants*

MPOG

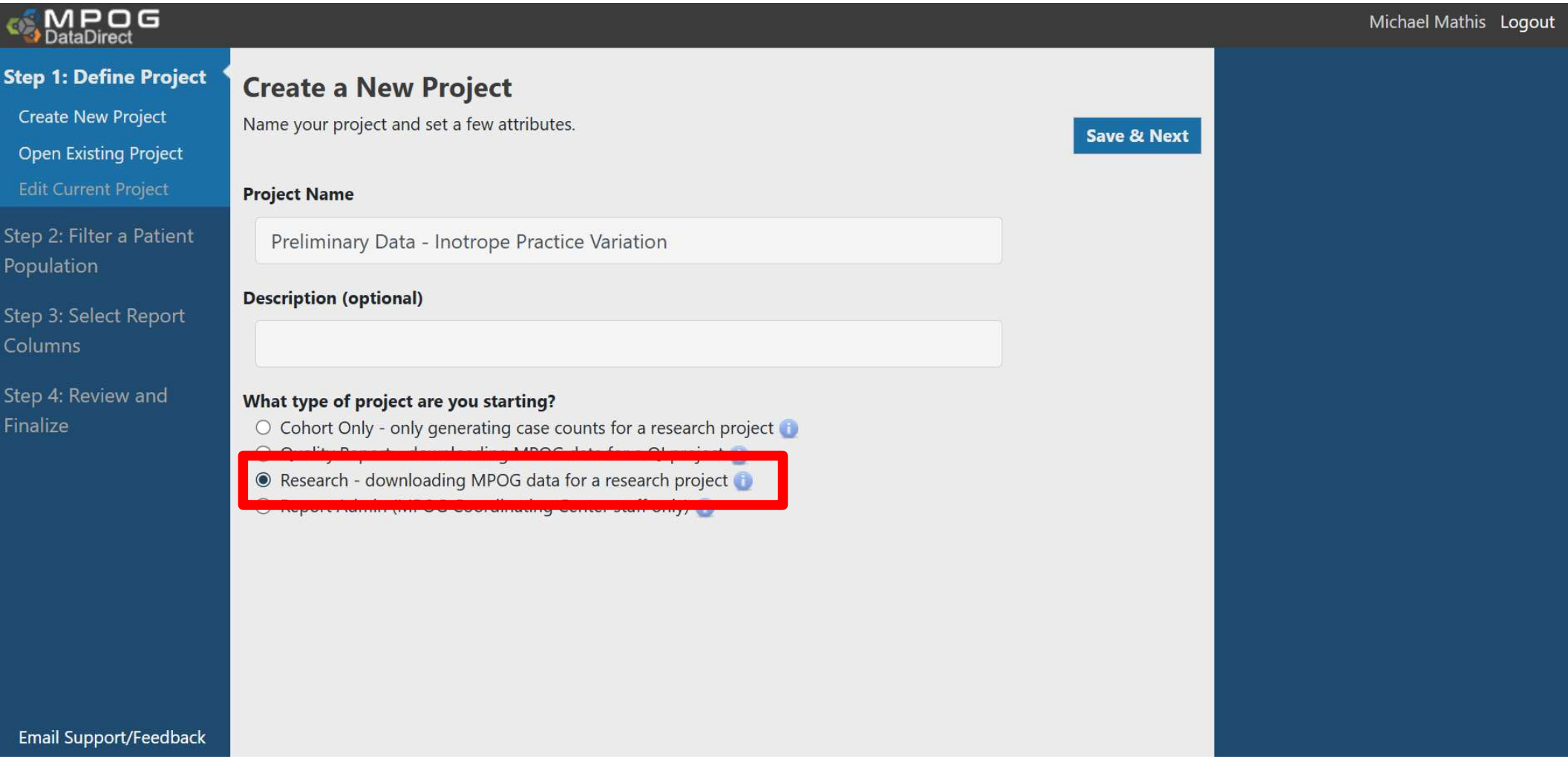
DataDirect – Enhancements Coming Soon…

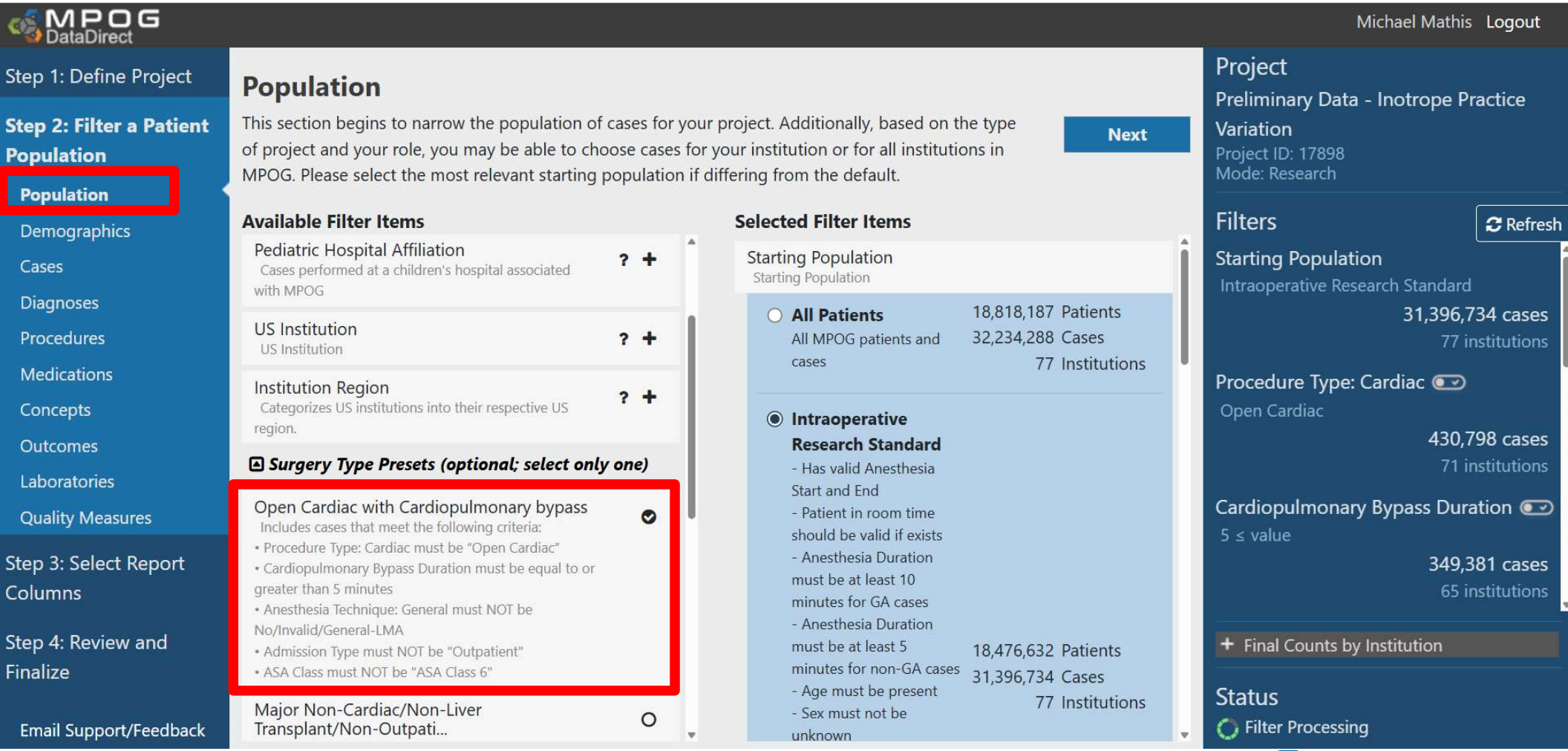
- **Research**
  - ***Automated creation*** of research data query specification

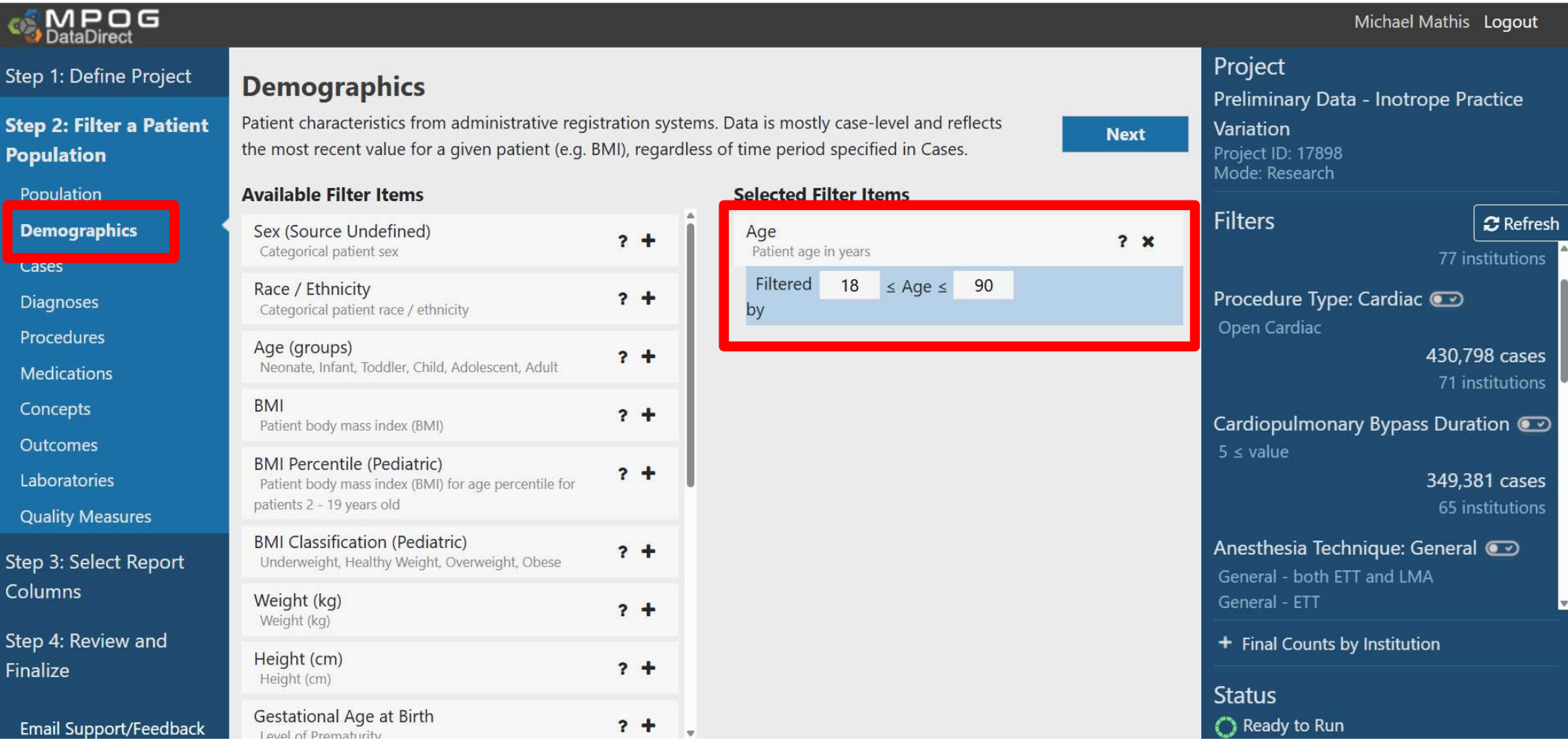
- **Quality Improvement**
  - ***Measure Case Report*** → DataDirect

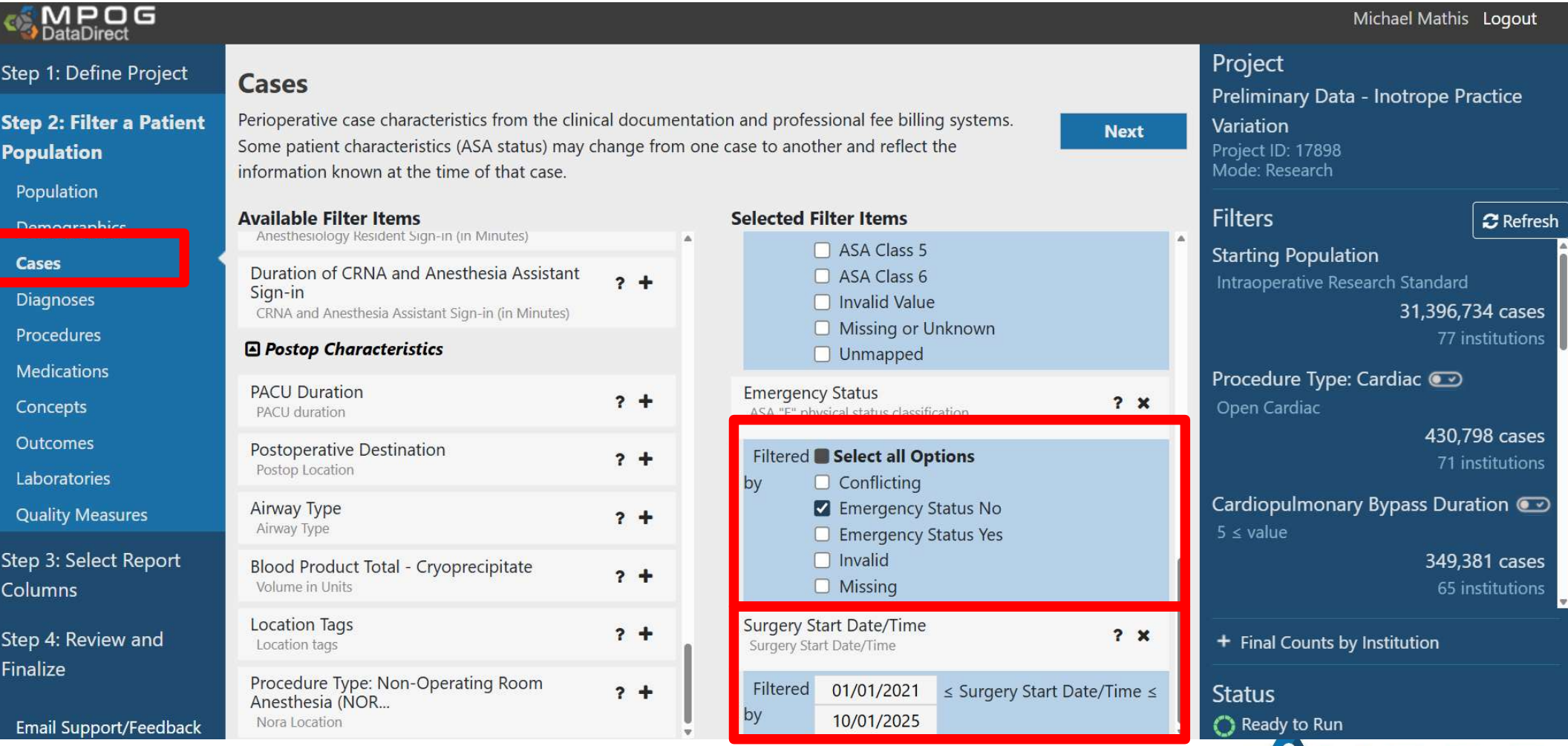
Example Use Case:

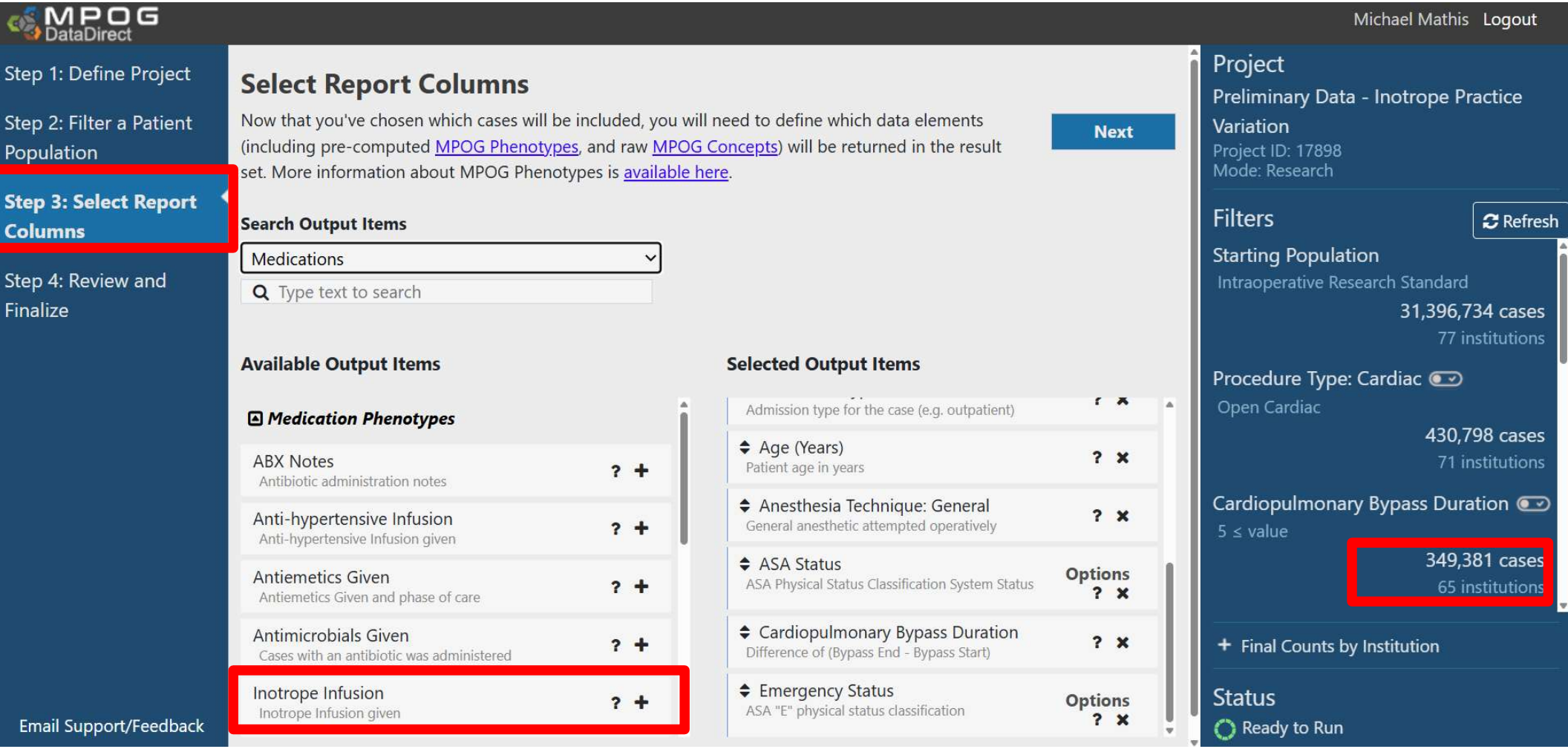
Generate **single-center preliminary data** for a multicenter research proposal describing **inotrope infusion practice variation** for adult cardiac surgical patients.

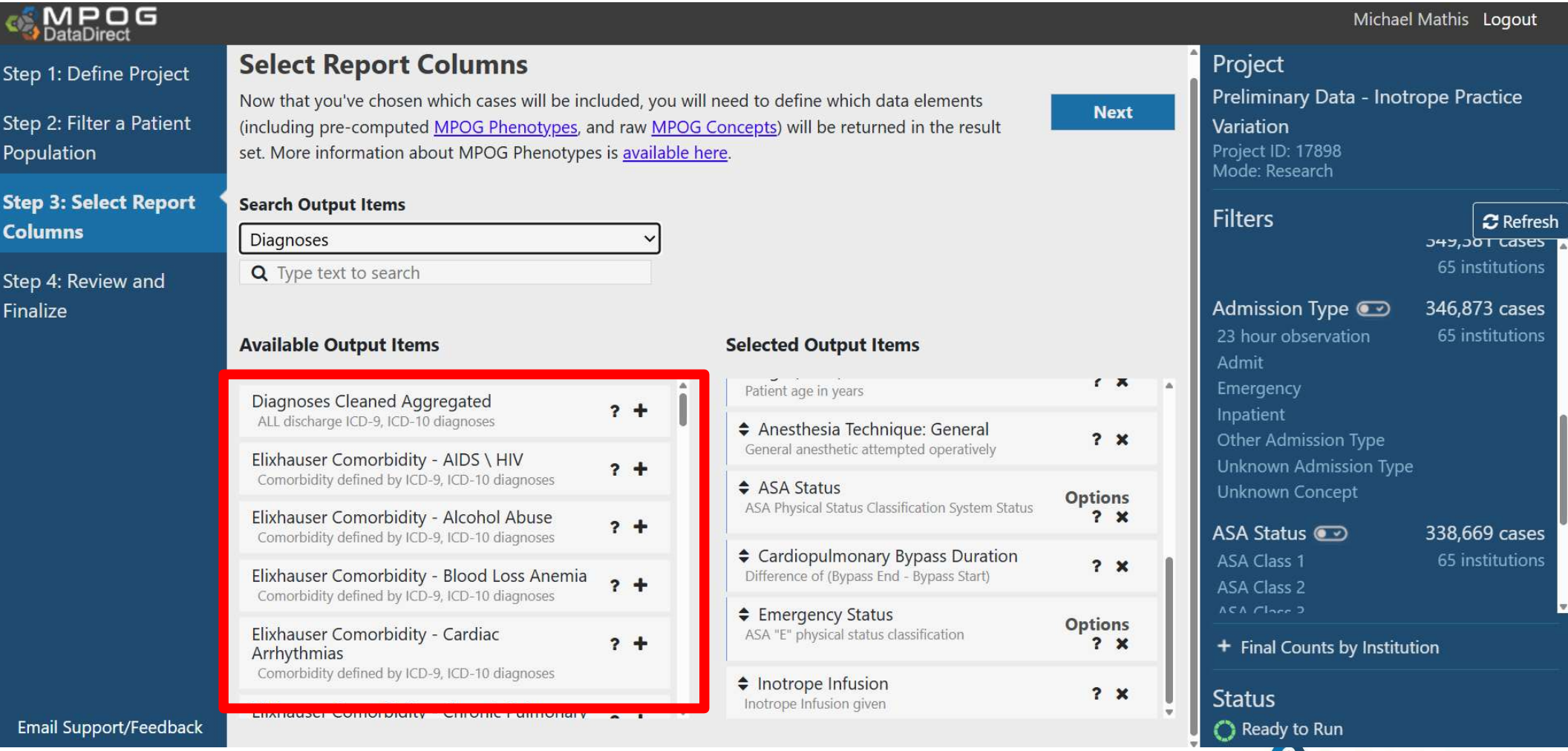

MPOG DataDirect
Michael Mathis Logout
Step 1: Define Project
Create New Project
Open Existing Project
Edit Current Project
Step 2: Filter a Patient Population
Step 3: Select Report Columns
Step 4: Review and Finalize
Email Support/Feedback
Create a New Project
Name your project and set a few attributes.
Save & Next
Project Name
Preliminary Data - Inotrope Practice Variation
Description (optional)
What type of project are you starting?
Cohort Only - only generating case counts for a research project
Research - downloading MPOG data for a research project

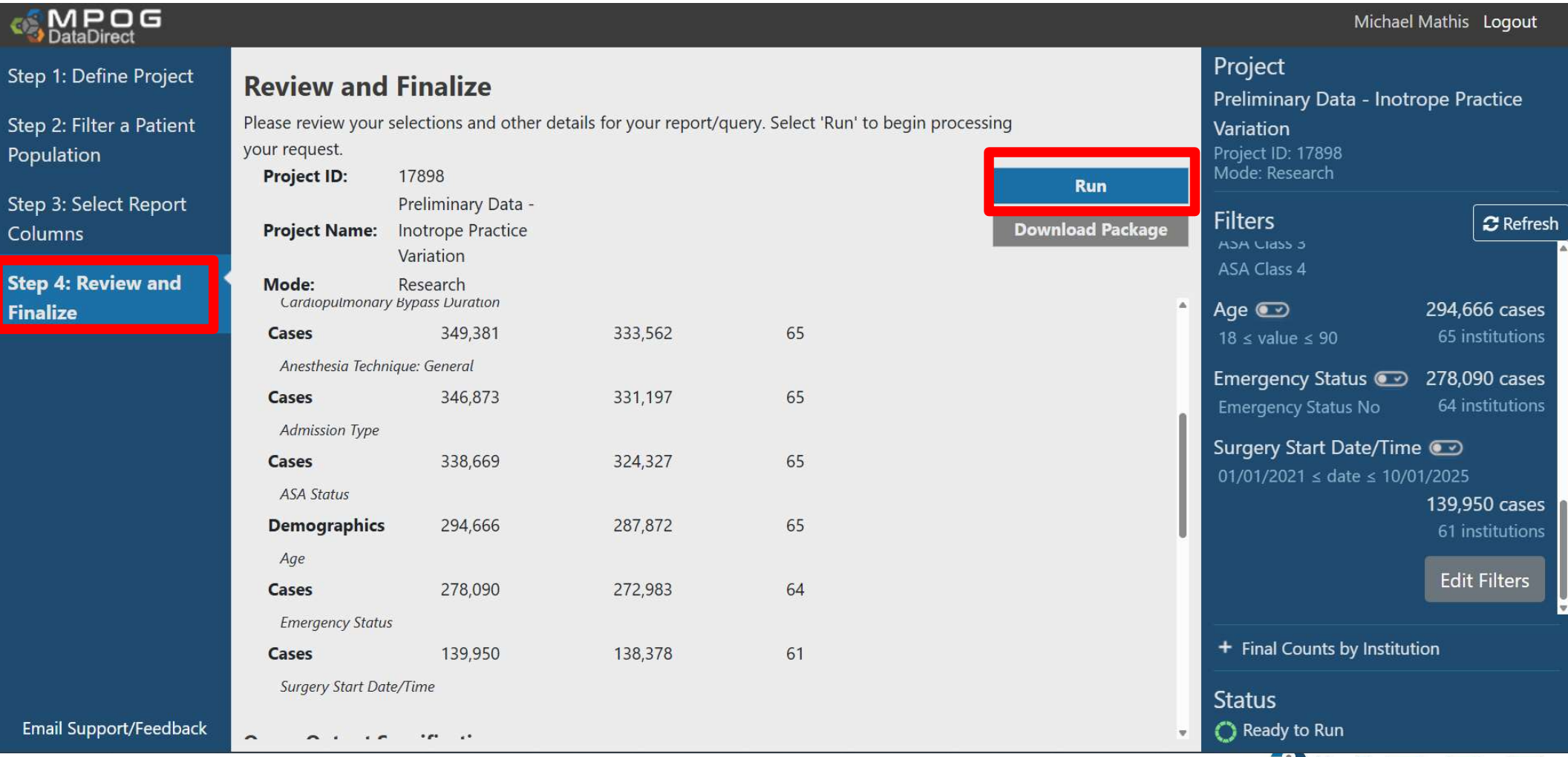

MPOG DataDirect
Michael Mathis Logout
Step 1: Define Project
Step 2: Filter a Patient Population
Population
Demographics
Cases
Diagnoses
Procedures
Medications
Concepts
Outcomes
Laboratories
Quality Measures
Step 3: Select Report Columns
Step 4: Review and Finalize
Email Support/Feedback
Population
This section begins to narrow the population of cases for your project. Additionally, based on the type of project and your role, you may be able to choose cases for your institution or for all institutions in MPOG. Please select the most relevant starting population if differing from the default.
Next
Available Filter Items
Pediatric Hospital Affiliation
Cases performed at a children's hospital associated with MPOG
US Institution
US Institution
Institution Region
Categorizes US institutions into their respective US region.
Surgery Type Presets (optional; select only one)
Open Cardiac with Cardiopulmonary bypass
Includes cases that meet the following criteria:
• Procedure Type: Cardiac must be "Open Cardiac"
• Cardiopulmonary Bypass Duration must be equal to or greater than 5 minutes
• Anesthesia Technique: General must NOT be No/Invalid/General-LMA
• Admission Type must NOT be "Outpatient"
• ASA Class must NOT be "ASA Class 6"
Major Non-Cardiac/Non-Liver Transplant/Non-Outpati...
Selected Filter Items
Starting Population
Starting Population
All Patients
All MPOG patients and cases
18,818,187 Patients
32,234,288 Cases
77 Institutions
Intraoperative Research Standard
- Has valid Anesthesia Start and End
- Patient in room time should be valid if exists
- Anesthesia Duration must be at least 10 minutes for GA cases
- Anesthesia Duration must be at least 5 minutes for non-GA cases
- Age must be present
- Sex must not be unknown
18,476,632 Patients
31,396,734 Cases
77 Institutions
Project
Preliminary Data - Inotrope Practice Variation
Project ID: 17898
Mode: Research
Filters
Refresh
Starting Population
Intraoperative Research Standard
31,396,734 cases
77 institutions
Procedure Type: Cardiac
Open Cardiac
430,798 cases
71 institutions
Cardiopulmonary Bypass Duration
5 ≤ value
349,381 cases
65 institutions
Final Counts by Institution
Status
Filter Processing


MPOG DataDirect
Michael Mathis Logout
Step 1: Define Project
Step 2: Filter a Patient Population
Population
Demographics
Cases
Diagnoses
Procedures
Medications
Concepts
Outcomes
Laboratories
Quality Measures
Step 3: Select Report Columns
Step 4: Review and Finalize
Email Support/Feedback
Demographics
Patient characteristics from administrative registration systems. Data is mostly case-level and reflects the most recent value for a given patient (e.g. BMI), regardless of time period specified in Cases.
Next
Available Filter Items
Sex (Source Undefined)
Categorical patient sex
Race / Ethnicity
Categorical patient race / ethnicity
Age (groups)
Neonate, Infant, Toddler, Child, Adolescent, Adult
BMI
Patient body mass index (BMI)
BMI Percentile (Pediatric)
Patient body mass index (BMI) for age percentile for patients 2 - 19 years old
BMI Classification (Pediatric)
Underweight, Healthy Weight, Overweight, Obese
Weight (kg)
Weight (kg)
Height (cm)
Height (cm)
Gestational Age at Birth
Selected Filter Items
Age
Patient age in years
Filtered by
18
≤ Age ≤
90
Project
Preliminary Data - Inotrope Practice Variation
Project ID: 17898
Mode: Research
Filters
Refresh
77 institutions
Procedure Type: Cardiac
Open Cardiac
430,798 cases
71 institutions
Cardiopulmonary Bypass Duration
5 ≤ value
349,381 cases
65 institutions
Anesthesia Technique: General
General - both ETT and LMA
General - ETT
Final Counts by Institution
Status
Ready to Run


MPOG DataDirect
Michael Mathis Logout
Step 1: Define Project
Step 2: Filter a Patient Population
Population
Demographics
Cases
Diagnoses
Procedures
Medications
Concepts
Outcomes
Laboratories
Quality Measures
Step 3: Select Report Columns
Step 4: Review and Finalize
Email Support/Feedback
Cases
Perioperative case characteristics from the clinical documentation and professional fee billing systems. Some patient characteristics (ASA status) may change from one case to another and reflect the information known at the time of that case.
Next
Available Filter Items
Anesthesiology Resident Sign-in (in Minutes)
Duration of CRNA and Anesthesia Assistant Sign-in
CRNA and Anesthesia Assistant Sign-in (in Minutes)
Postop Characteristics
PACU Duration
PACU duration
Postoperative Destination
Postop Location
Airway Type
Airway Type
Blood Product Total - Cryoprecipitate
Volume in Units
Location Tags
Location tags
Procedure Type: Non-Operating Room Anesthesia (NOR...
Nora Location
Selected Filter Items
ASA Class 5
ASA Class 6
Invalid Value
Missing or Unknown
Unmapped
Emergency Status
Filtered by
Select all Options
Conflicting
Emergency Status No
Emergency Status Yes
Invalid
Missing
Surgery Start Date/Time
Surgery Start Date/Time
Filtered by
01/01/2021
≤ Surgery Start Date/Time ≤
10/01/2025
Project
Preliminary Data - Inotrope Practice Variation
Project ID: 17898
Mode: Research
Filters
Refresh
Starting Population
Intraoperative Research Standard
31,396,734 cases
77 institutions
Procedure Type: Cardiac
Open Cardiac
430,798 cases
71 institutions
Cardiopulmonary Bypass Duration
5 ≤ value
349,381 cases
65 institutions
Final Counts by Institution
Status
Ready to Run


MPOG DataDirect
Michael Mathis Logout
Step 1: Define Project
Step 2: Filter a Patient Population
Step 3: Select Report Columns
Step 4: Review and Finalize
Email Support/Feedback
Select Report Columns
Now that you've chosen which cases will be included, you will need to define which data elements (including pre-computed MPOG Phenotypes, and raw MPOG Concepts) will be returned in the result set. More information about MPOG Phenotypes is available here.
Next
Search Output Items
Medications
Type text to search
Available Output Items
Medication Phenotypes
ABX Notes
Antibiotic administration notes
Anti-hypertensive Infusion
Anti-hypertensive Infusion given
Antiemetics Given
Antiemetics Given and phase of care
Antimicrobials Given
Cases with an antibiotic was administered
Inotrope Infusion
Inotrope Infusion given
Selected Output Items
Admission type for the case (e.g. outpatient)
Age (Years)
Patient age in years
Anesthesia Technique: General
General anesthetic attempted operatively
ASA Status
ASA Physical Status Classification System Status
Options
Cardiopulmonary Bypass Duration
Difference of (Bypass End - Bypass Start)
Emergency Status
ASA "E" physical status classification
Options
Project
Preliminary Data - Inotrope Practice Variation
Project ID: 17898
Mode: Research
Filters
Refresh
Starting Population
Intraoperative Research Standard
31,396,734 cases
77 institutions
Procedure Type: Cardiac
Open Cardiac
430,798 cases
71 institutions
Cardiopulmonary Bypass Duration
5 ≤ value
349,381 cases
65 institutions
Final Counts by Institution
Status
Ready to Run


MPOG DataDirect
Michael Mathis Logout
Step 1: Define Project
Step 2: Filter a Patient Population
Step 3: Select Report Columns
Step 4: Review and Finalize
Email Support/Feedback
Select Report Columns
Now that you've chosen which cases will be included, you will need to define which data elements (including pre-computed MPOG Phenotypes, and raw MPOG Concepts) will be returned in the result set. More information about MPOG Phenotypes is available here.
Next
Search Output Items
Diagnoses
Type text to search
Available Output Items
Diagnoses Cleaned Aggregated
ALL discharge ICD-9, ICD-10 diagnoses
Elixhauser Comorbidity - AIDS \ HIV
Comorbidity defined by ICD-9, ICD-10 diagnoses
Elixhauser Comorbidity - Alcohol Abuse
Comorbidity defined by ICD-9, ICD-10 diagnoses
Elixhauser Comorbidity - Blood Loss Anemia
Comorbidity defined by ICD-9, ICD-10 diagnoses
Elixhauser Comorbidity - Cardiac Arrhythmias
Comorbidity defined by ICD-9, ICD-10 diagnoses
Selected Output Items
Patient age in years
Anesthesia Technique: General
General anesthetic attempted operatively
ASA Status
ASA Physical Status Classification System Status
Options
Cardiopulmonary Bypass Duration
Difference of (Bypass End - Bypass Start)
Emergency Status
ASA "E" physical status classification
Options
Inotrope Infusion
Inotrope Infusion given
Project
Preliminary Data - Inotrope Practice Variation
Project ID: 17898
Mode: Research
Filters
Refresh
65 institutions
Admission Type
346,873 cases
65 institutions
23 hour observation
Admit
Emergency
Inpatient
Other Admission Type
Unknown Admission Type
Unknown Concept
ASA Status
338,669 cases
65 institutions
ASA Class 1
ASA Class 2
Final Counts by Institution
Status
Ready to Run


MPOG DataDirect
Michael Mathis Logout
Step 1: Define Project
Step 2: Filter a Patient Population
Step 3: Select Report Columns
Step 4: Review and Finalize
Email Support/Feedback
Review and Finalize
Please review your selections and other details for your report/query. Select 'Run' to begin processing your request.
Project ID: 17898
Project Name: Preliminary Data - Inotrope Practice Variation
Mode: Research
Run
Download Package
Cardiopulmonary Bypass Duration
Cases 349,381 333,562 65
Anesthesia Technique: General
Cases 346,873 331,197 65
Admission Type
Cases 338,669 324,327 65
ASA Status
Demographics 294,666 287,872 65
Age
Cases 278,090 272,983 64
Emergency Status
Cases 139,950 138,378 61
Surgery Start Date/Time
Project
Preliminary Data - Inotrope Practice Variation
Project ID: 17898
Mode: Research
Filters
Refresh
ASA Class 3
ASA Class 4
Age 294,666 cases
18 ≤ value ≤ 90 65 institutions
Emergency Status 278,090 cases
Emergency Status No 64 institutions
Surgery Start Date/Time
01/01/2021 ≤ date ≤ 10/01/2025
139,950 cases
61 institutions
Edit Filters
+ Final Counts by Institution
Status
Ready to Run

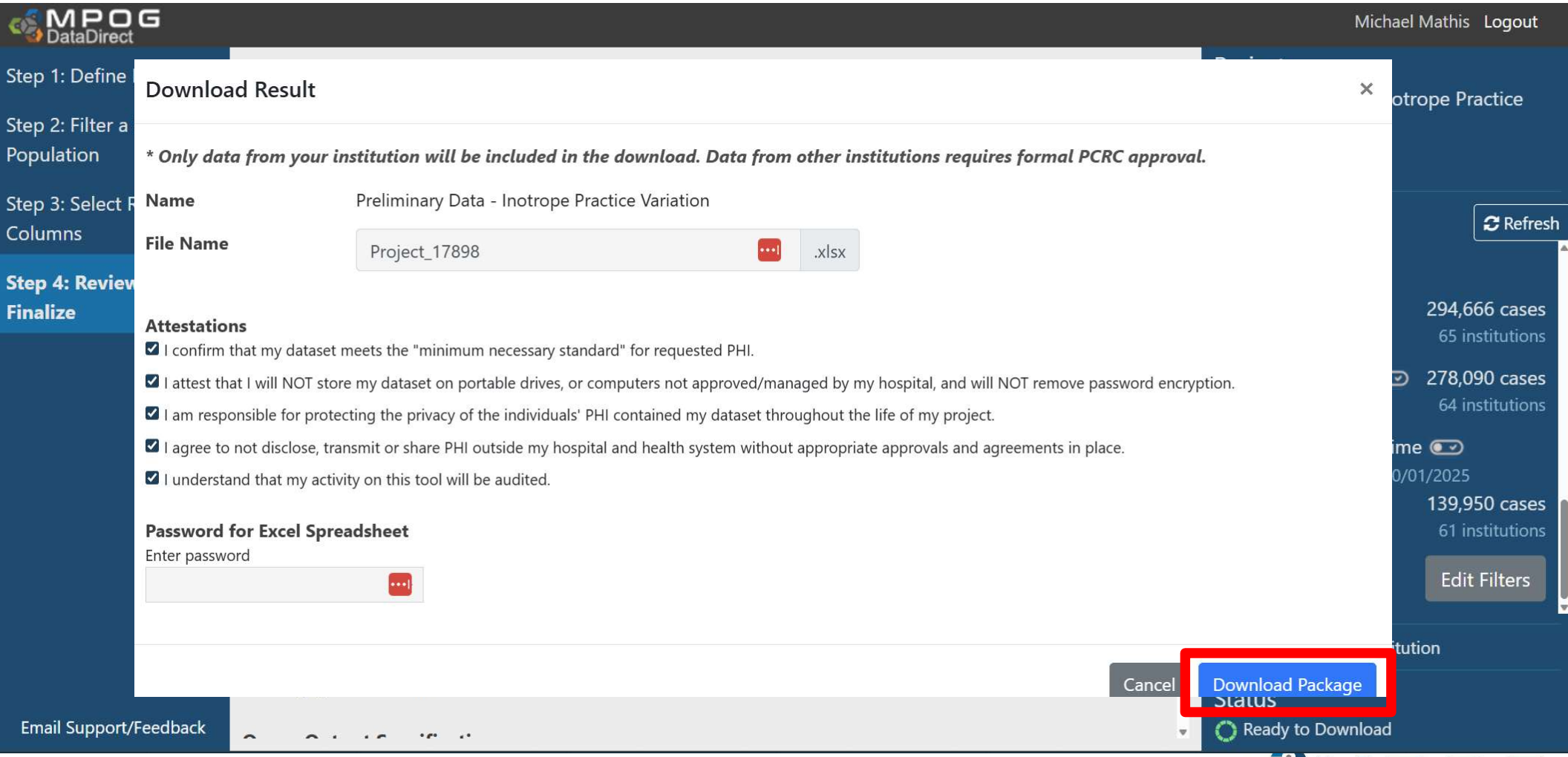

MPOG DataDirect
Michael Mathis Logout
Step 1: Define
Step 2: Filter a Population
Step 3: Select Columns
Step 4: Review Finalize
Email Support/Feedback
otrope Practice
Refresh
294,666 cases
65 institutions
278,090 cases
64 institutions
ime
0/01/2025
139,950 cases
61 institutions
Edit Filters
tution
Status
Ready to Download
Download Result
* Only data from your institution will be included in the download. Data from other institutions requires formal PCRC approval.
Name
Preliminary Data - Inotrope Practice Variation
File Name
Project_17898
.xlsx
Attestations
I confirm that my dataset meets the "minimum necessary standard" for requested PHI.
I attest that I will NOT store my dataset on portable drives, or computers not approved/managed by my hospital, and will NOT remove password encryption.
I am responsible for protecting the privacy of the individuals' PHI contained my dataset throughout the life of my project.
I agree to not disclose, transmit or share PHI outside my hospital and health system without appropriate approvals and agreements in place.
I understand that my activity on this tool will be audited.
Password for Excel Spreadsheet
Enter password
Cancel
Download Package

Table1. Sample Charactersitics

Measure	Level	Full Sample (n=51085) N	%Nmiss	%	Mean	Stde	
Age		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Height_cm		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Weight_kg		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
BMI		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Bypass_Duration		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Anesthesia_Duration		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Preop_EGFR_rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Preop_Hemoglobin_rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Preop_Platelets_rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Preop_INR_rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Preop_Albumin_rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Preop_Creatinine_rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Crystalloid_Adminstered__ml__rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Colloid_Administered__ml__rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
PRBC_Administered__ml__rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
FFP_Administered__ml__rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Platelets_Administered__ml__rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Cryoprecipitate__rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Urine_Output_rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X
Baseline_MAP_rc		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X

Table XX. Characteristics of Full Cohort and Bivariate Analyses of Patients Receiving versus Not Receiving Intraoperative Inotrope Infusions

		Full cohort (n=51,085)	Received inotropes (n=27,033)	Did not receive inotropes (n=24,052)	Standardized differences
		N (%)			
Patient Level Characteristics					
Age, years					
	18-50	6171 (12.1)	3152 (11.7)	3019 (12.6)	0.12
	51-60	10354 (20.3)	5199 (19.2)	5155 (21.4)	
	61-70	17127 (33.5)	8819 (32.6)	8308 (34.5)	
	71-80	14097 (27.6)	7851 (29.0)	6246 (26.0)	
	>80	3336 (6.5)	2012 (7.4)	1324 (5.5)	
Sex	Female	16027 (31.4)	8620 (31.9)	7407 (30.8)	0.02
	Male	34987 (68.5)	18377 (68.0)	16610 (69.1)	
	Unknown	71 (0.1)	36 (0.1)	35 (0.2)	
Race / ethnicity	Black, not of Hispanic origin	3197 (6.3)	2132 (7.9)	1065 (4.4)	0.15
	Hispanic	392 (0.8)	208 (0.8)	184 (0.8)	
	Other	1947 (3.8)	1092 (4.0)	855 (3.6)	
	Unknown	6454 (12.6)	3406 (12.6)	3048 (12.7)	
	White, not of Hispanic origin	39095 (76.5)	20195 (74.7)	18900 (78.6)	
Body mass index, kg/m^2					
	Underweight (<17.5)	602 (1.2)	373 (1.4)	229 (1.0)	0.07
	Normal weight (17.5-24.9)	12540 (24.6)	6733 (24.9)	5807 (24.2)	
	Pre-obesity (25.0-29.9)	18708 (36.6)	9612 (35.6)	9096 (37.8)	
	Obesity Class I (30.0-34.9)	11519 (22.6)	6034 (22.3)	5485 (22.8)	
	Obesity Class II (35.0-39.9)	4957 (9.7)	2710 (10.0)	2247 (9.3)	
	Obesity Class III (>=40.0)	2749 (5.4)	1568 (5.8)	1181 (4.9)	
Preoperative eGFR, mL/min/1.73 m^2					
	>=90	10457 (24.2)	4686 (21.2)	5771 (27.4)	0.27
	60-89	21433 (49.6)	10518 (47.5)	10915 (51.7)	
	30-59	9466 (21.9)	5611 (25.3)	3855 (18.3)	
	<30	1899 (4.4)	1343 (6.1)	556 (2.6)	
Preoperative hemoglobin, g/dL					
	Normal (male >13.0 g/dL, female >12.0 g/dL)	28577 (66.2)	13231 (59.7)	15346 (73.1)	0.31
	Mild Anemia (male 11.0-12.9 g/dL, female 11.0-11.9 g/dL)	10902 (25.3)	6355 (28.7)	4547 (21.7)	

End Result

- Demonstrated feasibility of performing multicenter study
- Understood data missingness, distributions of UMich data → informed multicenter analysis
- Identified invalid inotrope data (invalid doses / ambiguous units) which informed design of the exposure variable
- Generated preliminary estimate of inotrope use prevalence, useful for power analysis
- Added time to writing PCRC proposal, but **shortened time** to publication

Thank You