MPOG DataDirect:
QI and Advanced Approaches

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MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

QI Use Case:

Are the point of care hemoglobin values significantly different from those sent to the lab?

POC vs Lab Hemoglobin

- Approach:
  - Use DataDirect exclusively
  - Find cases where there were more than one hemoglobin lab value within 10 minutes of each other.

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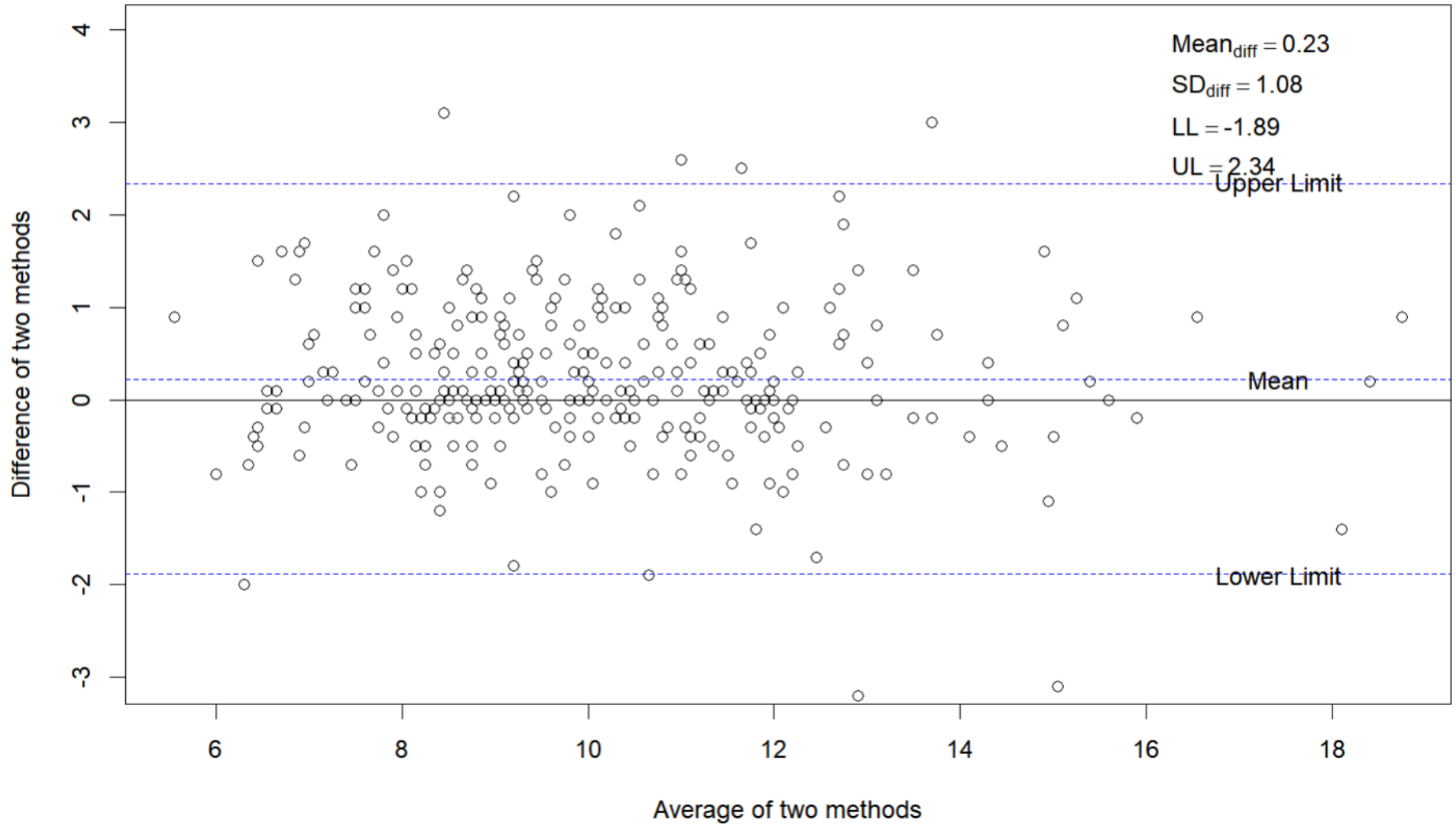
- Approach:
  - Use DataDirect exclusively
  - Find cases where there were more than one hemoglobin lab value within 10 minutes of each other.
  - Sleuthing: **Use 'same minute' data for other blood gas data points** (pO2, etc) to determine which we POC Hgb
    - "As our lab system cannot easily differentiate point of care values from central lab values, those hemoglobin values with an
      - **exact timestamp match to a blood gas measurement of arterial PaO2 were considered as point of care values**. Those hemoglobin values
      - **without an exact timestamp match were considered as central lab run values.**
      - Then, only matched samples within 10 minutes of each other where there was exactly one point of care value and exactly one central lab value were used."

Bland-Altman plot generated from this data

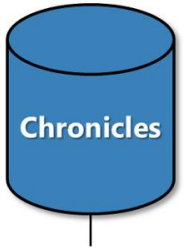
POC vs Lab Hemoglobin



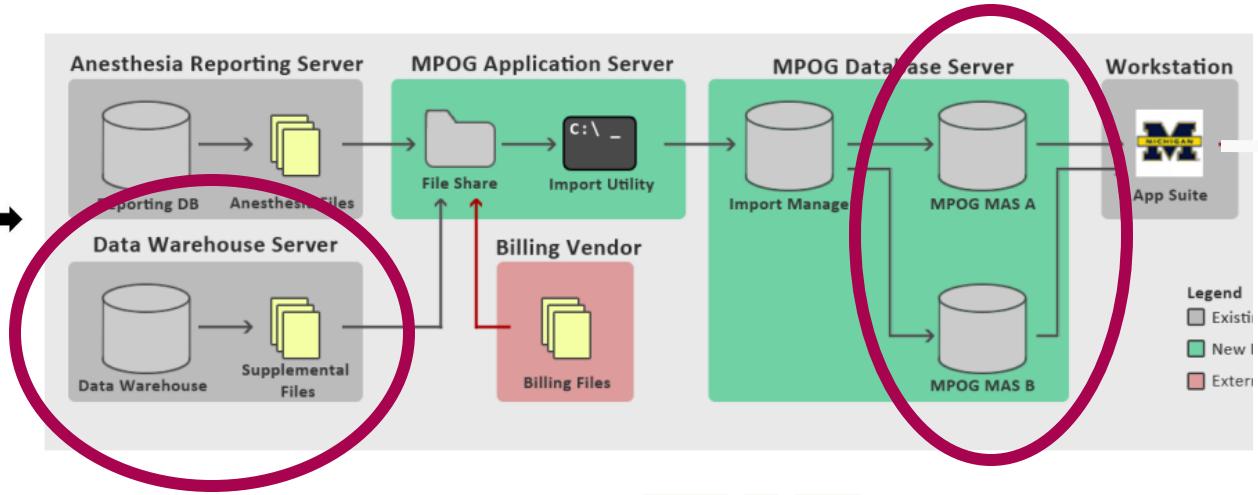
MPOG DataDirect: Limitations and Workarounds

- An AWESOME tool for
  - cohort identification
  - rapid extraction of data for QI questions
  - rapid delivery of data for projects
- But only if
  - … if the filter you need is available in DataDirect
  - … making use of data entirely available in the MPOG data extract
  - … that data is mapped AND available as a “Report Column” in DataDirect
  - … if less than 100,000 cases
  - … if less than 1,000,000 rows in the secondary tables (e.g., physiologic data)

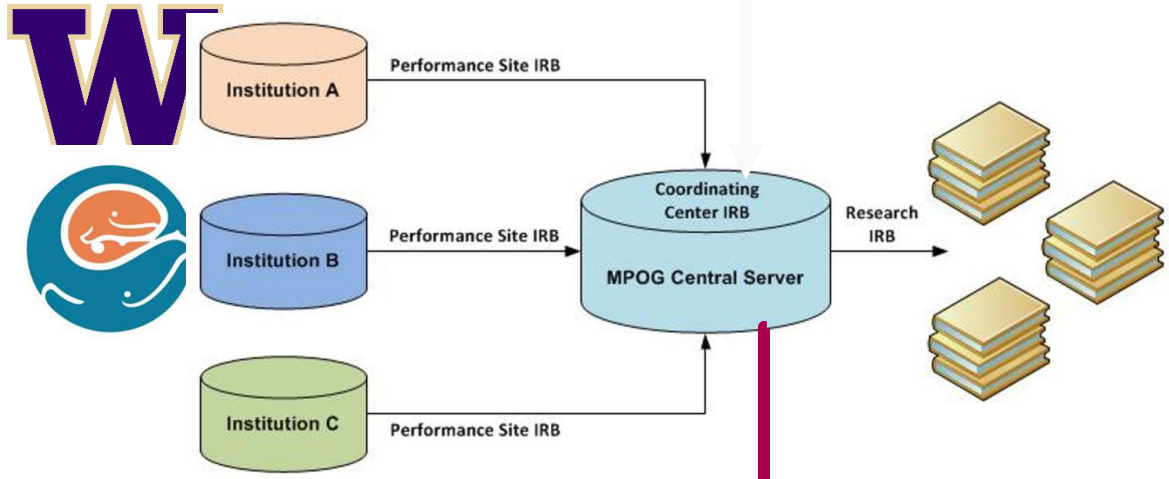
Real time



Hierarchical database with real-time data



ASPIRE Reports to Individual Providers

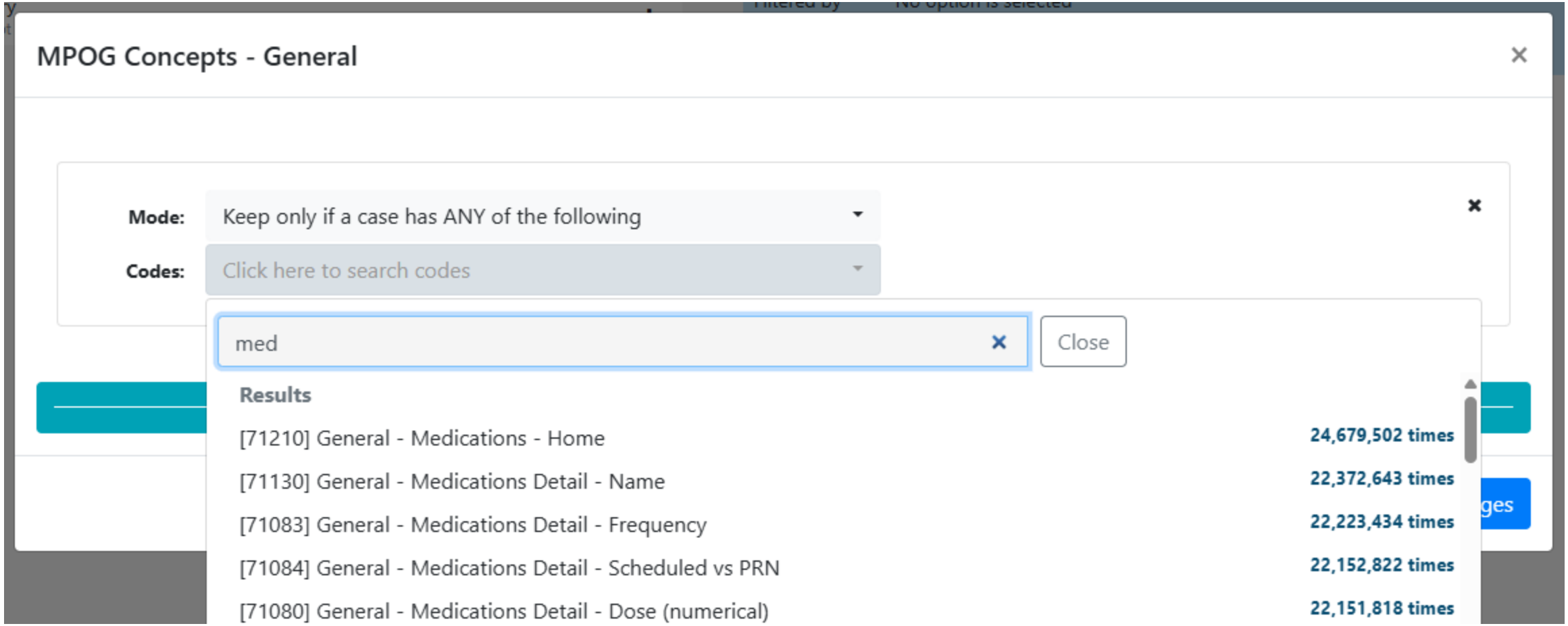


Advanced Use Case:

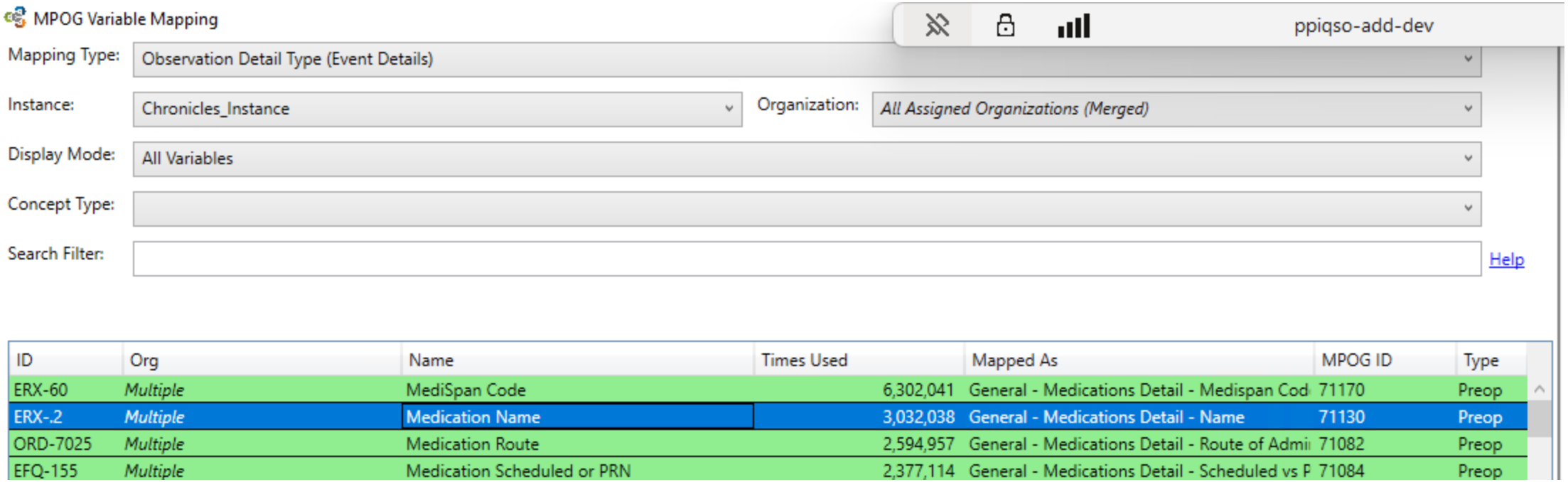
What is the incidence, demographic pattern, and airway management strategies associated with patients presenting for surgery taking a GLP1-RA (e.g. how many get an RSI for elective surgery)?

GLP1-RA

- Home medications are a mappable concept in MPOG, but not filterable by the value



- Approach
  - Leverage the powerful MPOG phenotypes for induction approach (e.g. RSI) which are NOT stored in the local copy of the MPOG database
  - SQL query against our local MPOG database to identify those on GLP1 receptor agonists
  - Join and compare cases with GLP1-RA listed vs not




```
USE MPOG_MAS_IM_SCH;
---SELECT TOP 1000 * FROM AIMS_PreopDetails

SELECT DISTINCT aic.MPOG_Patient_ID, aic.MPOG_Case_ID, apd.AIMS_Value_Text, aic.AIMS_Actual_Procedure_Text
FROM AIMS_PreopDetails apd
JOIN AIMS_Preop ap ON ap.MPOG_Preop_Note_ID = apd.MPOG_Preop_Note_ID
JOIN AIMS_IntraopCaseInfo aic ON aic.MPOG_Case_ID = ap.MPOG_Case_ID
WHERE apd.AIMS_Preop_Detail_Concept_ID = 'ERX-.2'
  AND (apd.AIMS_Value_Text LIKE '%dulaglutide%'
       OR apd.AIMS_Value_Text LIKE '%exenatide extended release%'
       OR apd.AIMS_Value_Text LIKE '%exenatide%'
       OR apd.AIMS_Value_Text LIKE '%semaglutide%'
        OR apd.AIMS_Value_Text LIKE '%Lixisenatide%'
      OR apd.AIMS_Value_Text LIKE '%semaglutide%'
       OR apd.AIMS_Value_Text LIKE '%liraglutide%')
```

* - The final query used included brand names as well.

SQL Server Management Studio

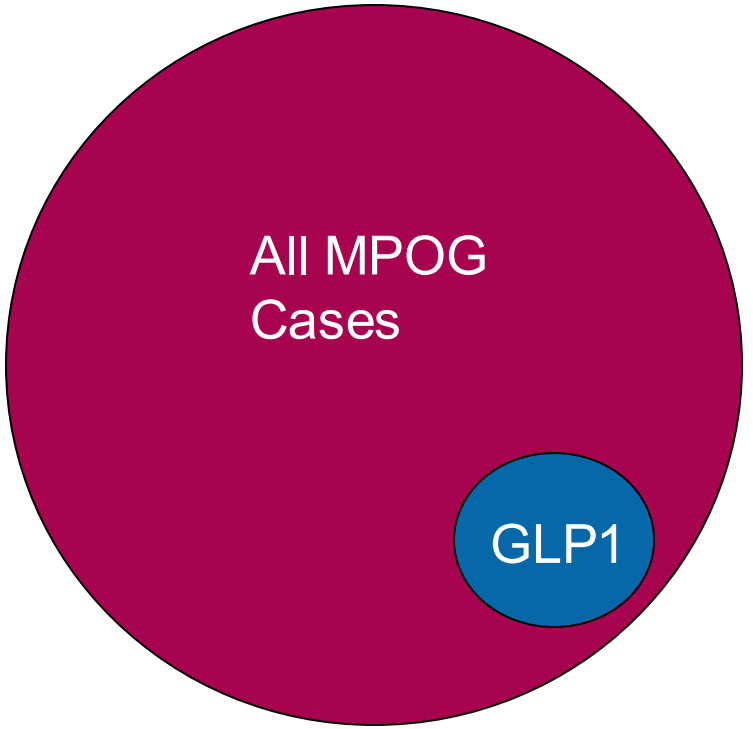
100 %

Results | Messages

	AIMS_Value_Text	AIMS_Actual_Procedure_Text
1	LIRAGLUTIDE (WEIGHT LOSS) 3 MG/0.5 ML (18 MG/3 M...	ARTHROSCOPY KNEE (Left Knee); LIMITED SYNOVECTOMY, PLI...
2	LIRAGLUTIDE (WEIGHT LOSS) 3 MG/0.5 ML (18 MG/3 M...	ARTHROSCOPY KNEE (Right Knee); SYNOVECTOMY (Right); CH...
3	liraglutide injection	EGD W/ BIOPSY (Esophagus); COLONOSCOPY W/ BIOPSY
4	liraglutide injection	ENDOSCOPY SLEEP (Throat); MICROLARYNGOSCOPY/BRONCH...
5	liraglutide injection	IR BIOPSY KIDNEY
6	liraglutide injection	MYRINGOTOMY W/ TYMPANOSTOMY TUBES (Bilateral: Ear); TON...
7	liraglutide injection	REMOVAL FOREIGN BODY AIRWAY (N/A Bronchus)
8	liraglutide injection	REPAIR SOFT TISSUE FACE MINOR; excision keloids from bilateral ...
9	liraglutide SUBQ injection PEN	EGD W/ BIOPSY (Esophagus)
10	liraglutide SUBQ injection PEN	ENDOSCOPY SLEEP (Throat); ADENOIDECTOMY (Throat); TONSI...
11	liraglutide SUBQ injection PEN	IR BIOPSY LIVER
12	liraglutide SUBQ injection PEN	IR LUMBAR PUNCTURE
13	liraglutide SUBQ injection PEN	IR LUMBAR PUNCTURE THERAPEUTIC
14	liraglutide SUBQ injection PEN	IR LUMBAR PUNCTURE; BONE MARROW PROCEDURE
15	liraglutide SUBQ injection PEN	LENGTHENING TENDON LOWER EXTREMITY--Lengthening Achill...
16	liraglutide SUBQ injection PEN	REMOVAL OF SUBCUTANEOUS FOREIGN BODY OF RIGHT CHE...
17	liraglutide SUBQ injection PEN	TONSILLECTOMY & ADENOIDECTOMY (Throat)

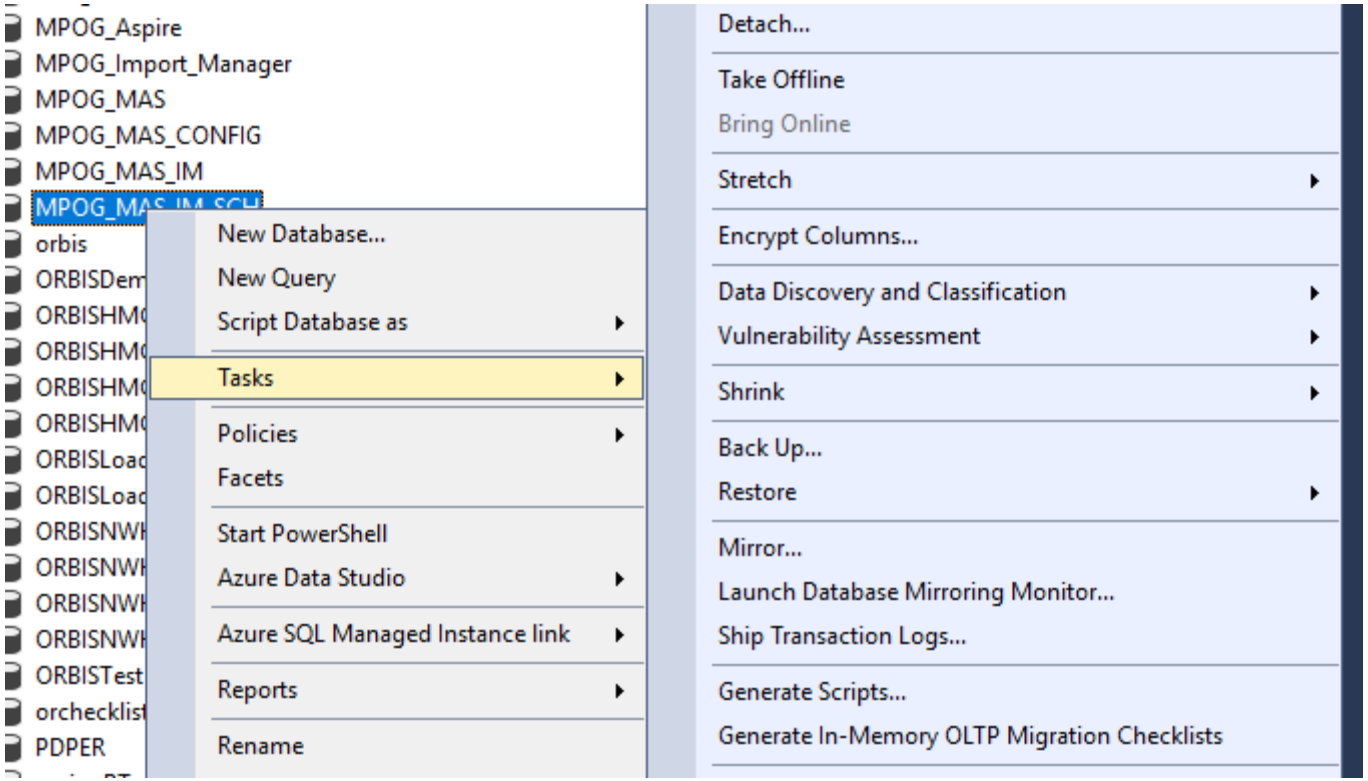
GLP1-RA

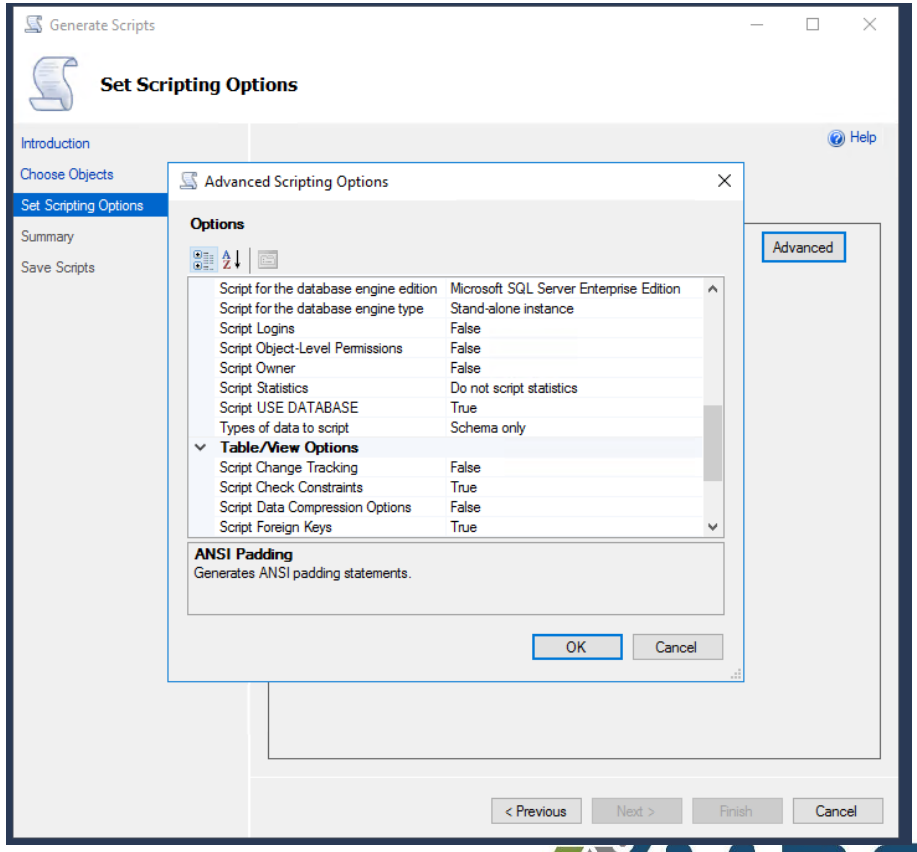
- Minimum necessary problem
  - Can’t filter in DataDirect on a manually identified set of MPOG Case IDs
  - As the honest broker for the project, we used DataDirect to iteratively pull this data for our entire case list of patients (100,000 case row limit) within the timeframe of interest



How did you write that beautiful SQL?

- I didn’t. Claude did. Trick: download the MPOG schema to use as context for the LLM





How did you write that beautiful SQL?

VO using this data model identify all cases with an obsevation detail (event detail) of ID ERX-2 (MPOG ID 71160) that contains and of the following drug generic names Dulaglutide (Trulicity) (weekly) Exenatide extended release (Bydureon bcise) (weekly) Exenatide (Byetta) (twice daily) Semaglutide (Ozempic) (weekly) Liraglutide (Victoza, Saxenda) (daily)

Here is the SQL query to identify all cases with an observation detail ID of ERX-2 (MPOG ID 71160) that contains any of the specified drug generic names:

```sql
SELECT DISTINCT aiod.MPOG_Observation_ID, aic.MPOG_Case_ID
FROM AIMS_UncategorizedObservationDetails aiod
JOIN AIMS_UncategorizedObservations aio ON aio.MPOG_Observation_ID = aiod.MPOG_Obser
JOIN AIMS_IntraopCaseInfo aic ON aic.MPOG_Case_ID = aio.MPOG_Case_ID
WHERE aiod.MPOG_Observation_Detail_ID = 71160
  AND aiod.Obs_Detail_Value LIKE '%Dulaglutide%'
  OR aiod.Obs_Detail_Value LIKE '%Exenatide extended release%'
  OR aiod.Obs_Detail_Value LIKE '%Exenatide%'
  OR aiod.Obs_Detail_Value LIKE '%Semaglutide%'
  OR aiod.Obs_Detail_Value LIKE '%Liraglutide%'
```

This SQL query was, of course, buggy to start with. Had to iterate with the LLM and hand edit in places. But provided a quick and comprehensive starting point for writing the query.

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Table 1. Baseline Characteristics by GLP-1 RA Use

	level	FALSE	TRUE	p	test
n		175503	4686		
AgeInYears_Value (median [IQR])		55.00 [38.00, 68.00]	56.00 [38.00, 68.00]	0.836	nonnorm
Sex_Value (%)	Female	88899 (50.7)	2419 (51.6)	0.196	
	Male	86604 (49.3)	2267 (48.4)		
Race_Value (%)	American Indian or Alaska Native	3390 (1.9)	98 (2.1)	0.033	
	Asian or Pacific Islander	15704 (8.9)	432 (9.2)		
	Bi or Multi Racial	1 (0.0)	0 (0.0)		
	Black, not of hispanic origin	11588 (6.6)	332 (7.1)		
	Hispanic, black	278 (0.2)	10 (0.2)		
	Hispanic, white	11295 (6.4)	351 (7.5)		
	Unknown race	8288 (4.7)	198 (4.2)		
	White, not of hispanic origin	124959 (71.2)	3265 (69.7)		
BodyMassIndex_Value (median [IQR])		27.27 [23.55, 31.99]	27.03 [23.51, 31.79]	0.050	nonnorm
WhoObesityClassification_Value (%)	Missing	2827 (1.6)	78 (1.7)	0.015	
	Normal Weight	54443 (31.0)	1523 (32.5)		
	Obese Class I	31518 (18.0)	883 (18.8)		
	Obese Class II	14913 (8.5)	382 (8.2)		
	Obese Class III	12230 (7.0)	273 (5.8)		
	Pre-obese	54043 (30.8)	1405 (30.0)		
	Underweight	5529 (3.2)	142 (3.0)		
DiabetesDx (%)	FALSE	155563 (88.6)	4123 (88.0)	0.172	
	TRUE	19940 (11.4)	563 (12.0)		

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Sex_Value (%)	Female	88899 (50.7)	2419 (51.6)	0.196	
	Male	86604 (49.3)	2267 (48.4)		
InductionTypeClassification_Value (%)	IV Induction	170087 (96.9)	4562 (97.4)	0.150	
	Mask Induction	4424 (2.5)	97 (2.1)		
	Rapid Sequence Induction	992 (0.6)	27 (0.6)		
AirwayTypeClassification_Value (%)	ETT	79910 (74.3)	2225 (74.0)	0.489	
	In Situ	1798 (1.7)	57 (1.9)		
	LMA	22389 (20.8)	634 (21.1)		
	Mask	1 (0.0)	0 (0.0)		
	Tracheostomy	832 (0.8)	29 (1.0)		
	Unknown	2662 (2.5)	62 (2.1)		
ComplicationAHRQPulmonaryAll_Value (%)	No	148256 (84.5)	4278 (91.3)	<0.001	
	Unknown, diagnoses unavailable	12649 (7.2)	2 (0.0)		
	Yes (AHRQ definition)	90 (0.1)	3 (0.1)		
	Yes (Both AHRQ and MPOG definition)	1576 (0.9)	54 (1.2)		
	Yes (MPOG definition)	12932 (7.4)	349 (7.4)		
	Underweight	5529 (3.2)	142 (3.0)		
DiabetesDx (%)	FALSE	155563 (88.6)	4123 (88.0)	0.172	
	TRUE	19940 (11.4)	563 (12.0)		

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Advanced Use Case:

Does primary language of care influence rates of premedication, parental presence on induction, and on ratings of difficulty of induction?

Language and Induction Strategy

- Approach
  - Use DataDirect for primary extraction of demographic/case characteristics (premedication)
  - Use the MPOG Application Suite to join to MRN
  - Use MPOG local SQL query for unmapped data elements (induction difficulty, parental presence)
  - Use enterprise data warehouse for language of care

Language and Induction Strategy

Results

Table 1: Differences in Induction by Primary Language

	Parental Presence		Difficult Induction		Premedication	
	Yes (%)	p-value	Yes (%)	p-value	Yes (%)	p-value
English	10373 (66.6)		1280 (9.51)		232 (1.6)	
Spanish	625 (58)	**<0.001***	99 (10.8)	0.084	92 (8.5)	0.5
Other	469 (62)	**0.010***	77 (11.7)	**0.009***	51 (6.7)	0.41

Of note, percent population is the number in the affirmative for a given variable in a language group over the total in a language group

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Thank You