IQVIA

IQVIA E360™ Analytics Workbench and Analytics Methods Library

IQVIA's E360™ Analytics Workbench provides a generalized framework for delivering sophisticated analytical methods that are portable across Real World Data sets.

It includes a rapidly growing pre-configured library of basic and advanced HEOR, Commercial and Machine-learning analytical methods along with an extensible framework for custom development.

With complex protocols and end points simulation, precise "what-if" analysis, incidence and prevalence analysis, and many other methods, Analytics Workbench has the right tool for the job at hand.

Analytics Workbench works on all E360™ loaded datasets: OMOP, LPD and native format, and on non-E360™ data.

E360™ Analytics Workbench to deliver on the promise of **"Any analytic method, and set of variables, any cohort, any dataset, anywhere".**

KEY FUNCTIONALITY INCLUDES:

- Fully supports data generated by E360™ Analytics Dataset Output from internal and external data sources

- Generate a variety of outputs from visualizations to tables

- Growing collection of Analytic Method categories

COPD: Job Quick Start

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Project   Method   Data Source   Data Exploration   Publishing   Summary

Data exploration of covariates: **InputList**

Category

All	31
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Disease Occurence	3
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Classical Statistical Applications	10
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Index and risk strata generation	1
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Granularity

All	31
Patient	18
Event	14

🔍 Select a method

You are applying some filters, which will affect your results. Clear filters

Data Exploration
Performs initial data exploration, covariance and correlation analysis on all dimensions. Calculates principle component dimensions (eigenvectors) for follow-on stages of analytical pipeline.
Granularity: Patient

Patient Characteristic Report
Build Patient Characteristic report of selected covariates and stratifications
Granularity: Patient

Incidence/Prevalence - Chronic Conditions
Calculate incidence and prevalence for a chronic condition within a cohort or entire database.
Granularity: Patient

Matrix Report
Build hierarchical matrix report of counts by selected covariates
Granularity: Any

Logistic Regression
Uses incremental logistic regression algorithms to produce and test predictive models for the risk of the final covariate based on all other covariates in the input data. Feature selection used to rank importance of covariates.
Granularity: Patient

MH Cohort Match
Uses optimised Mahalanobis algorithm to create matched cohort based on provided covariates against the final covariate as an exposure condition. Calculates metrics for closeness of match for the generated cohort against the source cohort.
Granularity: Patient

Propensity Score Match
Uses Propensity Score Matching algorithm to create matched cohort based on provided covariates against the final covariate as an exposure condition. Calculates metrics for closeness of match for the generated cohort against the source cohort.

Patients on Drug	**Co-Medication**	**Compliance**	**Persistence**	**Sources of Business**	**Line of Therapy**
Patient Count 281	Patient Count 281	Patient Count 281	Patient Count 281	Patient Count 281	Patient Count 281

The current methods library includes (but is not limited to):

Data Exploration:

DATA EXPLORATION

- Performs initial, simple descriptive data exploration, covariance and correlation analysis on all dimensions. The data exploration can be carried out on patient or event level data

PATIENT CHARACTERISTICS REPORT

- Allows you to build a typical 'Table 1'; a report providing distributions and summary statistics for selected covariates and stratifications

MATRIX REPORT

- **A generalized multi-dimensional matrix report analysis. The matrix report is defined by:**

  » An ordered list of covariates to use for column definitions

  » An ordered list of covariates to use for row definitions

  » A list of covariates and aggregation functions for the cells within the matrix

Variable		Full Cohort Count (Percent)	Gender=Female Count (Percent)	Gender=Male Count (Percent)	Age at Index Date=3 Count (Percent)	Age at Index Date=4 Count (Percent)	Age at Index Date=5 Count (Percent)
N		4504 (100%)	2521 (100%)	1983 (100%)	112 (100%)	1379 (100%)	1947 (100%)
Gender							
	Female	2521 (55.97%)	2521 (100.0%)	0	71 (63.39%)	814 (59.03%)	1106 (56.81%)
	Male	1983 (44.03%)	0	1983 (100.0%)	41 (36.61%)	565 (40.97%)	841 (43.19%)
Age at Index Date							
	3	112 (2.49%)	71 (2.82%)	41 (2.07%)	112 (100.0%)	0	0
	4	1379 (30.62%)	814 (32.29%)	565 (28.49%)	0	1379 (100.0%)	0
	5	1947 (43.23%)	1106 (43.87%)	841 (42.41%)	0	0	1947 (100.0%)
	6	829 (18.41%)	418 (16.58%)	411 (20.73%)	0	0	0
	7	180 (4.0%)	86 (3.41%)	94 (4.74%)	0	0	0
	8	57 (1.27%)	26 (1.03%)	31 (1.56%)	0	0	0
Payer Type							
	C	1998 (44.36%)	1114 (44.19%)	884 (44.58%)	44 (39.29%)	571 (41.41%)	929 (47.71%)
	CS	917 (20.36%)	523 (20.75%)	394 (19.87%)	20 (17.86%)	325 (23.57%)	389 (19.98%)
	M	70 (1.55%)	41 (1.63%)	29 (1.46%)	1 (0.89%)	5 (0.36%)	14 (0.72%)
	O	71 (1.58%)	42 (1.67%)	29 (1.46%)	0	2 (0.15%)	9 (0.46%)
	S	1444 (32.06%)	798 (31.65%)	646 (32.58%)	47 (41.96%)	476 (34.52%)	606 (31.12%)
	T	4 (0.09%)	3 (0.12%)	1 (0.05%)	0	0	0
Geographic Region							
	E	1185 (26.31%)	678 (26.89%)	507 (25.57%)	25 (22.32%)	336 (24.37%)	531 (27.27%)
	MW	1564 (34.72%)	828 (32.84%)	736 (37.12%)	35 (31.25%)	473 (34.3%)	633 (32.51%)
	S	1584 (35.17%)	928 (36.81%)	656 (33.08%)	47 (41.96%)	516 (37.42%)	719 (36.93%)
	W	171 (3.8%)	87 (3.45%)	84 (4.24%)	5 (4.46%)	54 (3.92%)	64 (3.29%)
Health Plan Type							
	-	659 (14.63%)	342 (13.57%)	317 (15.99%)	12 (10.71%)	191 (13.85%)	284 (14.59%)
	D	2 (0.04%)	2 (0.08%)	0	0	0	1 (0.05%)
	H	575 (12.77%)	342 (13.57%)	233 (11.75%)	10 (8.93%)	126 (9.14%)	225 (11.56%)
	I	47 (1.04%)	22 (0.87%)	25 (1.26%)	0	10 (0.73%)	13 (0.67%)
	P	2849 (63.25%)	1603 (63.59%)	1246 (62.83%)	84 (75.0%)	958 (69.47%)	1259 (64.66%)
	S	237 (5.26%)	130 (5.16%)	107 (5.4%)	4 (3.57%)	62 (4.5%)	96 (4.93%)
	U	135 (3.0%)	80 (3.17%)	55 (2.77%)	2 (1.79%)	32 (2.32%)	69 (3.54%)

Patient Characteristics

Disease Occurrence:

INCIDENCE AND PREVALENCE

- The incidence and prevalence method for chronic and acute conditions allows users to get a better understanding of the disease occurrence within a population of interest by reporting on new (incident) and existing (prevalent) cases. It can be set to calculate incidence/prevalence rates by time periods (months and/or years), age groups and strata within the cohort.

COVID-19 INCIDENCE REPORT

- Report showing weekly incidence of Coronavirus Disease (COVID-19) cases based on US claims data

Brand Analytics and Prescription Modelling:

PRESCRIPTION MODELLING

- The Prescription Modelling analytic method incorporates a complete set of individual analytics based on the ability to model and analyses patterns of prescription data.

- These analytics are:

  » **Patients on Drug** - Analysis of the number of patients / prescriptions drug usage over time. Different charts produced for active prescriptions and patients on treatments etc. Multiple nested stratifications available

  » **Persistence** - Analysis of how long patients stay on a drug. Different charts produced for alternative views of this data. Multiple nested stratifications available

  » **Compliance** - Analysis of how patients comply with dosage recommendations – produces ratio of the total days supplied for each medication against the total length of time on the medication (Medical Possession Ratio)

  » **Source of Business** - Analysis of the source of prescriptions – repeat prescriptions, new, switches from other drugs etc

  » **Comedication** - Analysis of frequently used combinations of drug for the cohort/condition

  » **Line of Therapy** - How patients move from one line of therapy / drug regimen to another

- In addition, optionally the following analytics can also be performed:

  » **Total Dosage Calculation** - Calculation of total dosage taken by patients

  » **Derived Data Set Generation** - The ability to build derived data sets from prescription data to enable follow-on analytics

Workspaces

All Datasets ▼ | Search within workspaces... | 🔍 | Create ▼

Sort by: Updated ⇅ ⇊ | Type: All ⇕ | Created By: All ⇕ | ♡

⊟ ≣ ▦ ☰

| 📄 Document ♡ ⋮ | 🕒 Visualisation ♡ ⋮ | 🕒 Visualisation ♡ ⋮ | 🕒 Visualisation ♡ ⋮ |

Project Manifest

📄 ProjectLog-Eliquis-Users...
TEXT DOCUMENT (.txt)

Project Manifest - Prescription modelling of
Eliquis Users_Event cohort.

👤 Robin Murray
+ 16-Sep-2020 ✎ 16-Sep-2020 ☐

Persistence Analysis

👤 Robin Murray
+ 16-Sep-2020 ✎ 16-Sep-2020 ☐

Compliance Analysis

👤 Robin Murray
+ 16-Sep-2020 ✎ 16-Sep-2020 ☐

Line of Therapy

👤 Robin Murray
+ 16-Sep-2020 ✎ 16-Sep-2020 ☐

| 🕒 Visualisation ♡ ⋮ | 🕒 Visualisation ♡ ⋮ | 🕒 Visualisation ♡ ⋮ | 📄 Document ♡ ⋮ |

Top Comedication Regimes

👤 Robin Murray
+ 16-Sep-2020 ✎ 16-Sep-2020 ☐

Source of Business

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+ 16-Sep-2020 ✎ 16-Sep-2020 ☐

Patients on Drug

👤 Robin Murray
+ 16-Sep-2020 ✎ 16-Sep-2020 ☐

Prescription Model

📊 Prescription-Model-Eliqu...
EXCEL DOCUMENT (.xlsx)

Prescription Model - Prescription modelling
of Eliquis Users_Event cohort.

👤 Robin Murray
+ 16-Sep-2020 ✎ 16-Sep-2020 ☐

📦 Commercial and Brand Analytics

LINE OF THERAPY

• Line of Treatment provides a detailed, longitudinal view of treatment patterns and progression for patients. Line of Treatment addresses the issue of which stage the patient is treated with the brand over the whole course of treatment.

MEDICATION COMPLIANCE

• Use the Medication Possession Ratio (MPR) to assess compliance for a medication. Visualizations are generated by patient count, percentage and compliance distributions.
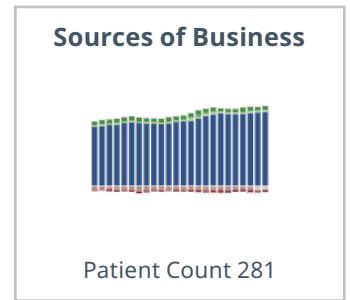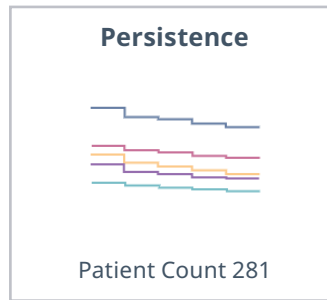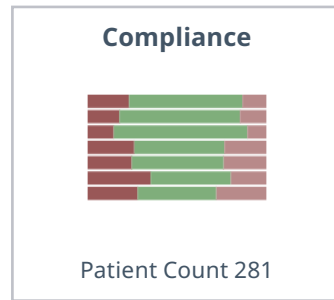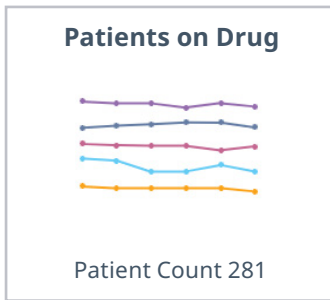
MEDICATION PERSISTENCE

• How long do new patients stay on a therapy after first prescription? Get a detailed view of treatment patterns and progression for patients within the defined market.

• Multiple visualizations of persistence data are generated:

  » Persistence, survivorship and episode duration distributions.

  » Stratified visualizations: nested strata, including geographic hierarchies enable interactive analysis of persistence by multiple strata.

  » Weekly or monthly time periods for persistence analysis.

SOURCE OF BUSINESS

• Enables interactive analysis of source-of-business data (e.g. New, Switch, Repeat transitions) for drugs across geographic locations and demographic strata. The method provides stratified visualizations, including geographic hierarchies.

Patients on Drug	**Compliance**	**Persistence**	**Sources of Business**
Patient Count 281	Patient Count 281	Patient Count 281	Patient Count 281

Classical Statistical Applications

CLASSICAL LOGISTIC REGRESSION

- Generate Odds Ratios to assess the association between a binary outcome (presence/absence, yes/no) and multiple predictors. The method also provides additional diagnostics and supportive visualizations to identify influential observations (Deviance and Pearson Residuals) and to assess potential multi-collinearity (Variance Inflation Factor)

MH COHORT MATCH

- Uses optimized Mahalanobis algorithm to create matched cohort based on provided covariates against the final covariate as an exposure condition. Calculates metrics for closeness of match for the generated cohort against the source cohort

PROPENSITY SCORE MATCH

- Uses Propensity Score Matching algorithm to create a matched cohort based on provided covariates against the final covariate exposure condition. Calculates metrics for closeness of match for the generated cohort against the source cohort

MATCHED COHORT STUDY (PSM)

- Uses Propensity Score Matching algorithm to create a matched cohort based on provided covariates against the final covariate as an exposure condition. Calculates metrics for closeness of match for the generated cohort against the source cohort. After creating balanced exposed and matched cohorts, calculates incidence risk rates for each cohort. Produces various charts, excel files and a consolidated word document templating the entire study

KAPLAN MEIER

- Produce Kaplan-Meier curves for an exposure of interest. Outputs can be optionally stratified by several exposures

COX PROPORTIONAL HAZARDS

- For data with one record per patient, one or more exposures defined by binary or categorical exposure column, outcome data column with supporting Kaplan Meier plots

CLASSICAL LINEAR REGRESSION

- The classical logistic regression method allows the investigation of the association between a binary outcome variable (dependent variable) and multiple predictor variables (also known as exposure or independent variables) that can be binary, categorical, or continuous. The method is particularly of interest for those who want to express this association in terms of Odds Ratios (OR)

- As the outcome is binary (measured success/failure, presence/absence, 0/1) the logistic regression model estimates the impact of each predictor variable on the OR of the observed event of interest

Variable	Odds Ratio (OR)	OR (95% CI)	Beta	SE	Wald	Wald (95% CI)	P-value
Intercept	0	(0.000 ; 0.000)	-9.251	0.209	-44.291	(-9.661 ; -8.842)	<0.001
Gender [Female] (ref Male)	0.503	(0.456 ; 0.554)	-0.687	0.05	-13.86	(-0.784 ; -0.590)	<0.001
Age_Group [36-64 years] (ref 18-35 years)	5.451	(3.707 ; 8.016)	1.696	0.197	8.62	(1.310 ; 2.081)	<0.001
Age_Group [>= 65 years] (ref 18-35 years)	13.7	(9.346 ; 20.081)	2.617	0.195	13.415	(2.235 ; 3.000)	<0.001

|			
MODEL FAMILY:	Binomial	LOG-LIKELIHOOD:	-14178.116
LINK FUNCTION:	logit	LOG-LIKELIHOOD (NULL MODEL):	-14618.718
NO. OBSERVATIONS:	3441135.000	-2 LOG-LIKELIHOOD:	28356.233
DF RESIDUALS:	3441126.000	PEARSON CHI-SQUARE:	3474790.439
DF MODELS:	8.000	PSEUDO R-SQUARE (MC FADDEN):	0.03
SCALE:	1.000	AIC:	28374.233
DEVIANCE:	28356.233	BIC:	-51765104.54
DATE:	Tue, 09 Jun 2020		
TIME:	14:16:39		

Genomics

GENOME-WIDE ASSOCIATION STUDY (GWAS)

Method used to correlate clinical and genomic data to identify associations between genetic variants and a particular disease.

Psoriasis with arthropathy GWAS

Manhattan Plot
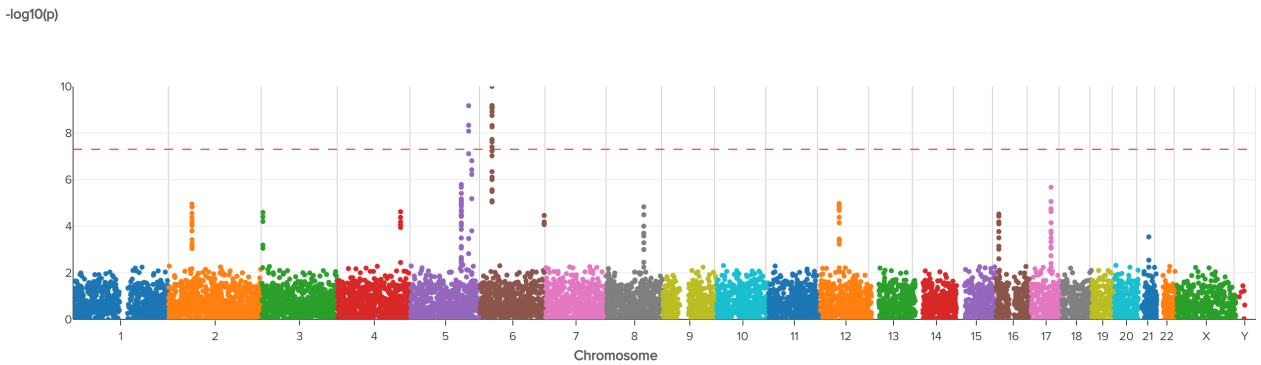
PHENOME-WIDE ASSOCIATION STUDY (PheWAS)

Method used to identify associations between genetic variants and clinical phenotypes. It is a study design in which the association between genetic variants is tested across a large number of different phenotypes.

95% confidence intervals for coefficient values variant p value < 0.01
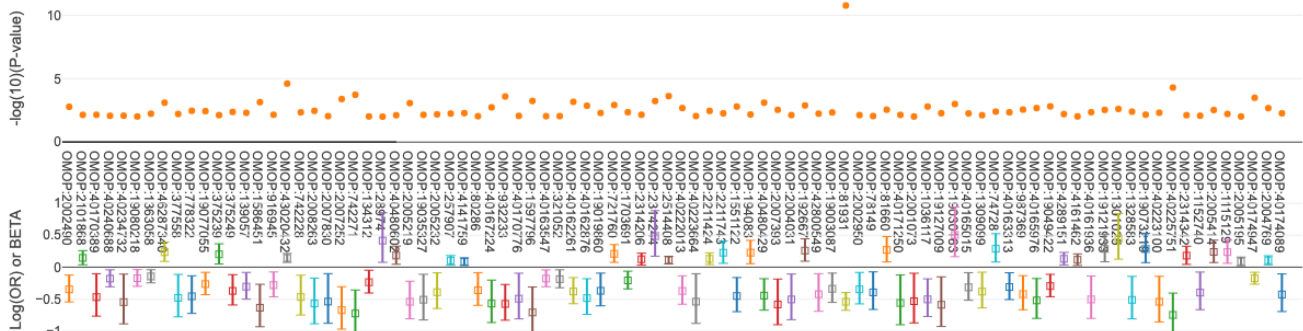
AI/ML Applications

UNDIAGNOSED PATIENTS

- Use machine learning algorithms to identify early diagnosis or potentially undiagnosed patients for an identified condition based on selected covariates

DIMENSIONAL SELECTION

- Which features matter most? Select the most important columns from the input data-frame and create a new data frame with just those columns

Index and risk strata generation

CHARLSON COMORBIDITY INDEX (CCI)

- Quantify the burden of disease by calculating the CCI based on the recorded comorbid conditions for the selected cohort

Conclusion

To achieve this level of dataset / data schema portability, analytic methods run against standardized analytical data files (typically tensor-based data with either 1 row-per-patient or 1-row-per patient-event vectors). The E360™ Analytics Dataset Tool is a powerful utility for generically producing such files from any loaded Real-World Dataset, but the data can be sourced from any system inside or outside of E360™.

The notion of executing an analytic **anywhere** refers to the federated analytics capabilities enabled by E360™ Analytics Workbench with the E360™ network execution model whereby analytic data set generation and analytic execution can be federated and distributed across a network.

To achieve **any analytic** E360™ Analytics Workbench incorporates an open and Extensible Methods Library this allows internal development, custom development and client-based development and integration of analytical methods. It provides the infrastructure for mobilizing an internal and external developer network for analytical methods.

E360™ Analytics Workbench provides an open environment for analytical method development and execution – not a black box.

This ability gives you access to all your RWD needs regardless of location in one platform.

IQVIA

CONTACT US

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