Rapid Cycle Research T2D:

Cohort Identification and Characteristics Query

Work Plan:
RCRDIAB_AHR_WP001_NSD_V01

MODIFICATION HISTORY

Date	Version	Description

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I.QUERY METADATA

Query Name	**RCRDIAB_AHR_WP001_NSD_V01**
Tool	☒AHR ☐PMP1
Priority	☐Low ☒Normal ☐High ☐Urgent
Due Date:	**January 22, 2019**
Purpose of use	☒ HRESH (Health Research)
Level of PHI Disclosure:	☐ Limited Data Set ☒ Aggregate ☐ De-identified ☐ PHI
Description	This query was requested by the diabetes RCR and approved by PCORI and PCRF for Network-wide dissemination in order to better characterize the PCORnet population. The query will identify a cohort of patients based on different computable phenotypes developed by the RCR study team and will characterize them based on medications and comorbidities of interest. The query content and logic was developed by the RCR study team. Requester: Diabetes RCR and PCORnet Coordinating Center Recipients: DMs that have been approved on Data Curation Cycle 5 AND are PCORnet 2.0 members will receive this query. See Query Tracker: https://pcornet.imeetcentral.com/p/aQAAAAAC5cuA • Please note: This query is being issued to *all* PCORnet DataMarts, not only those participating in the Diabetes RCR project. Planned Use: PCORnet Network and DataMart-level data will be shared with the requester (diabetes RCR study team). Only PCORnet-level aggregated data may be presented or published on public-facing websites (e.g. PCORnet.org), in a manuscript, or marketing materials describing this cohort of interest in PCORnet. Responding to this query is acknowledgement that your data can be aggregated into a PCORnet-level report for public-facing venues. CC may reuse Network and CRN level aggregate data for internal planning and to inform potential funding and research opportunities. Program Package Contents: The Work Plan and 5 folders serving to organize program inputs and outputs. The program folder structure is described in Section III of the work plan. Instructions to execute the master.sas program are located in Section IV of the work plan. General instructions: The query should be executed against the most recent 'research ready' approved CDM tables. Output: This program package requires 1 SAS program (*master.sas*) to be run by each site and will generate 5 CSV files, 1 SAS transport file (.cpt) and 2 log files to be returned to the RCR T2D study team. SITES SHOULD ONLY RETURN THE FOLDER LABELED 'dmoutput'. DataMarts should choose to either (1) return output; (2) hold the query and enter a note as to why the query is on hold; or (3) reject the query and enter a note as to why the query is rejected. Follow internal governance/policy for returning query output to CC. Technical questions, contact drnoc@pcornet.org Medical terminology code list questions, contact drnoc@pcornet.org

II. PURPOSE AND SCOPE

This query analyzes data from PCORnet Common Data Model (CDM) v4.1 compliant tables: DEMOGRAPHIC, DIAGNOSIS, ENCOUNTER, LAB_RESULT_CM, PRESCRIBING, and PROCEDURES. Output tables will be produced by running SAS program against static local DataMarts. The query provides

- Counts for the entire cohort for different computable phenotypes
- Counts for the entire cohort broken out be age groups, race, and gender
- Aggregated counts on the cohort's characteristics bucketed into diabetes medication groups (e.g., utilization, comorbidities, and other non-diabetes medications).

These tables consist of de-identified counts. Tables returned to the RCR T2D study team will contain "BT" for any counts less than 11 except statistics.

III. PROGRAM PACKAGE FILE STRUCTURE

Each request package distributed by PCORnet's DRN OC contains several sub-folders to organize program inputs and outputs. The subfolders must reside within an outer folder labeled with the query name designated in the DRN Query Tool, e.g. RCRDIAB_AHR_WP001_NSD_V01:

- *dmtable*: folder containing output generated by the request that should be saved locally but not returned. Output may be subsequently used locally or to facilitate follow-up queries.
- *dmlocal*: folder containing the outputs from the master SAS program.
- sasprograms: folder containing the master SAS program that must be edited and then executed locally.
- *infolder*: folder containing all input and lookup files needed to execute request. Input files are created for each request; the contents of this folder should not be edited. This folder includes macros folder with SAS programs too.
- *dmoutput*: folder containing output files needed to be returned.

IV. RESPONDING TO THE QUERY PACKAGE

1) Go to the DataMart Client and open the query package. Extract the contents and save them locally.
2) Open the sasprograms folder and open the SAS file '*master.sas*' using SAS 9.3+.
3) Modify the directory paths as follows. For reasons of compatibility and standardization, directory paths must meet the following criteria:

   - DO use forward slashes (e.g. /) which are always compatible on both UNIX and WINDOWS.
   - DO use end of path separators (e.g. /xyz/ and not /xyz) which are assumed by many programs.
   - DO use beginning of path separators (e.g. /xyz) on UNIX.
   - DO NOT use beginning of path separators on WINDOWS (e.g. P:/xyz not /P:/xyz).
   - DO NOT surround directory paths with quotes (e.g. /xyz/ not "/xyz/").

   a) After *%let qpath=,* enter root directory where the query package are located.
   b) After *%let indata=,* enter the main directory where the PCORnet CDM are stored.

4) Save and run '*master*'.
5) Check the log file for warnings and errors. Errors will not be accepted. Email to drnoc@pcornet.org to determine if warnings are acceptable.
6) Zip the contents of the *dmoutput* folder and return the file via the DataMart Client.

V. FILES INCLUDED IN QUERY REQUEST

The following files will be included in the RCRDIAB_AHR_WP001_NSD_V01.zip file distributed with the query request.

RCRDIAB_AHR_WP001_NSD_V01_work plan.pdf

Folder	File name	File description
sasprograms	master.sas	SAS program to run the query
infolder	code_reference.cpt	SAS transport file with 10 input SAS datasets including 10 SAS datasets: parkinsons_flag_med, part1_case_dx, part1_case_loinc, part2_comorb_dx, part2_comorb_loinc, part2_comorb_px, rcr_t2d_meds, rcrt2d_med_rxnorm, serious_mental_illness_med, t1908_peripheral_artery_icd10pcs
infolder/macros	master_part1.sas master_part2.sas define_concepts.sas	SAS programs to generate result outputs

VI. OUTPUT FILES

The *master.sas* program in the *sasprograms* folder will need to be edited to point to the correct data and folder structures, as described in the above instructions in Section IV. The programs are not to be altered in any way except as described above. Please review your output to confirm that the layout and contents conform to the layouts in this work plan and the results you would expect. SITES SHOULD ONLY RETURN THE FOLDER LABELED '***dmoutput***'.

Files Returned to the DRN OC (*dmoutput* folder)

File name/File Format	File description
CSV files	[DATAMARTID]_RCR_T2D_PART_2_v13_0_count_break_out_all_cases.csv [DATAMARTID]_ RCR_T2D_PART_2_v13_0_mult_med_combo_flag_count.csv [DATAMARTID]_ RCR_T2D_PART_2_v13_0_other_combo_flag_count.csv [DATAMARTID]_RCR_T2D_PART_2_v13_0_result.csv [DATAMARTID]_RCR_T2D_run_time.csv

File name/File Format	File description
rcr_t2d_summary.cpt	This SAS transport file (similar to a Zip file) contains the 7 SAS datasets, which is to be returned to the Coordinating Center, as follows. [DATAMARTID]_result.sas7bdat [DATAMARTID]_mult_med_combo_cnt.sas7bdat [DATAMARTID]_other_combo_cnt.sas7bdat [DATAMARTID]_cnt_by_cases.sas7bdat [DATAMARTID]_cnt_by_cases_race.sas7bdat [DATAMARTID]_cnt_by_cases_age.sas7bdat [DATAMARTID]_cnt_by_cases_sex.sas7bdat
[DATAMARTID]_RCR_T2D_PART_1_v6_0.log	The SAS log file for the master_part1.sas program and this log file does not include any reference to the DataMart's directory path information.
[DATAMARTID]_RCR_T2D_PART_2_v13_0.log	The SAS log file for the master_part2.sas program and this log file does not include any reference to the DataMart's directory path information.

Files Not Returned to the DRN OC (*dmlocal* and *dmtable* folders)

Folder	Numer of Files in the folder
dmlocal	17 files: 2 csv files and 14 SAS dataset files
dmtable	109 SAS dataset files

VII. TABLE SHELLS

[DATAMARTID]_RCR_T2D_PART_2_v13_0_Count_break_out_all_cases.csv

cnt			
Sum			
case_type			
1	2	3	
	Cnt		
	Sum		
	case_type		
	1	2	3
RACE			
Black			
Missing			

Other			
White			
	Cnt		
	Sum		
	case_type		
	1	2	3
AGE_GROUP			
Age 18-29			
Age 30-39			
Age 40-49			
Age 50-59			
Age 60-69			
Age 70-79			
Age 80-89			
Age 90+			
	cnt		
	Sum		
	case_type		
	1	2	3
SEX			
F			
M			

[DATAMARTID]_RCR_T2D_PART_2_v13_0_MULT_MED_COMBO_FLAG_COUNT.csv

type	CNT
GLP1+SULGEN2+SGLT2	
GLP1+OTHER+SULGEN2	
GLP1+METFORMIN+SGLT2	
GLP1+TZD+SULGEN2	
DPP4+OTHER+SULGEN2	
DPP4+TZD+SULGEN2	
DPP4+GLP1+SULGEN2	
ANYINSULIN+SULGEN2+SGLT2	
ANYINSULIN+OTHER+SULGEN2	
ANYINSULIN+TZD+SULGEN2	
ANYINSULIN+GLP1+SULGEN2	
ANYINSULIN+GLP1+SULGEN2+SGLT2	
ANYINSULIN+DPP4+SGLT2	
ANYINSULIN+DPP4+SULGEN2	

ANYINSULIN+DPP4+OTHER	
ANYINSULIN+DPP4+TZD	
ANYINSULIN+DPP4+GLP1	
ANYINSULIN+DPP4+GLP1+SULGEN2	

Each site may have less of more multi combo meds other that listed above

[DATAMARTID]_RCR_T2D_PART_2_v13_0_OTHER_COMBO_FLAG_COUNT.csv

CNT	Type
	SULGEN2+SGLT2
	METFORMIN+SGLT2
	TZD+SULGEN2
	TZD+METFORMIN
	GLP1+SGLT2
	GLP1+TZD
	DPP4+SGLT2
	DPP4+SULGEN2
	DPP4+TZD
	DPP4+GLP1
	ANYINSULIN+SGLT2
	ANYINSULIN+TZD
	ANYINSULIN+GLP1
	ANYINSULIN+DPP4

Each site may have less of more multi combo meds other that listed above

[DATAMARTID]_RCR_T2D_PART_2_v13_0_result.csv

		ANYINSULIN_FLAG	DPP4_FLAG	GLP1_FLAG	GLP1_METFORMIN_F	METFORMIN_ANYINS	METFORMIN_DPP4_F	METFORMIN_FLAG	METFORMIN_SULGEN	MULT_MED_COMBO_F	NO_MED_FLAG	OTHER_COMBO_FLAG	OTHER_FLAG	SGLT2_FLAG	SULGEN2_ANYINSUL	SULGEN2_FLAG	SULGEN2_GLP1_FLAG	TZD_FLAG
N patients																		
N patients remain on drug at 12 months																		
N patients remain on METFORMIN from -730 to -90																		
N patients remain on SULGEN2 from -730 to -90																		
N patients remain on DPP4 from -730 to -90																		
N patients remain on GLP1 from -730 to -90																		
N patients remain on ANYINSULIN from -730 to -90																		
Age	Median																	
	IQR																	
Male																		
Female																		
Sex_Other																		
Sex_Missing																		
White																		
Black																		
Other																		
Missing																		
Hispanic/ Latino																		
Calendar year of cohort entry 2012																		
Calendar year of cohort entry 2013																		

Calendar year of cohort entry 2014																		
Calendar year of cohort entry 2015																		
Calendar year of cohort entry 2016																		
Calendar year of cohort entry 2017																		
Hospitalization N																		
Emergency Department visits	Median																	
	IQR																	
Outpatient visits	Median																	
	IQR																	
Systolic Blood Pressure	Median																	
	IQR																	
Diastolic Blood Pressure	Median																	
	IQR																	
N with Measure available																		
BMI	Median																	
	IQR																	
N with Measure available																		
HBA1C	Median																	
	IQR																	
N with Measure available																		
LDL Cholesterol	Median																	
	IQR																	
N with Measure available																		
Serum Creatinine	Median																	

	IQR																	
eGFR	Median																	
	IQR																	
N with Measure available																		
ACE / ARBs																		
Antihypertensives																		
Antiarrhythmics/ Digoxin and inotropes																		
Anticoagulants and Platelet inhibitors																		
Lipid lowering drugs																		
Nitrates																		
Aspirin																		
Loop Diuretics																		
Antipsychotics																		
Non Selective Alpha Blockers																		
Peripheral Vasodilators																		
Oral Glucocorticoids																		
Bone Resorption Inhibitors																		
Beta-Blockers																		
Calcium Channel Blockers																		
Thiazide Diuretics																		
Hypertension																		
Hyperlipidemia																		
Cancer																		
Liver disease																		
Pulmonary hypertension/ Embolism																		
Heart failure																		
Retinopathy																		
Stoke/ TIA																		
Carotid disease																		
Obstructive coronary disease																		

Peripheral Artery disease																	
Cardiac Valve Disease																	
Cardiac Arrhythmia/ Atrial fibrillation																	
Smoking-related illness / COPD/ Oxygen use																	
Serious Mental illness																	
Depression																	
Parkinsons																	

[DATAMARTID]**_RCR_T2D_run_time.csv**

PROGRAMS	START_TIME	END_TIME	PROCESSING_TIME
RCR_T2D			

rcr_t2d_summary.cpt contains the following files:

[DATAMARTID]_cnt_by_cases.sas7bdat

Summary: Patient count by cases. Source file for [DATAMARTID]_RCR_T2D_PART_2_v13_0_Count_break_out_all_cases.csv		
Variable	**Type**	**Length**
CNT	Numeric	8
CASE_TYPE	Numeric	8

[DATAMARTID]_cnt_by_cases_age.sas7bdat

Summary: Patient count by cases and age group. Source file for [DATAMARTID]_RCR_T2D_PART_2_v13_0_Count_break_out_all_cases.csv		
Variable	**Type**	**Length**
CNT	Numeric	8
AGE_GROUP	Character	9
CASE_TYPE	Numeric	8

[DATAMARTID]_cnt_by_cases_race.sas7bdat

Summary: Patient count by cases and race. Source file for [DATAMARTID]_RCR_T2D_PART_2_v13_0_Count_break_out_all_cases.csv		
Variable	**Type**	**Length**

CNT	Numeric	8
RACE	Character	7
CASE_TYPE	Numeric	8

[DATAMARTID]_cnt_by_cases_sex.sas7bdat

Summary: Patient count by cases and sex. Source file for [DATAMARTID]_RCR_T2D_PART_2_v13_0_Count_break_out_all_cases.csv		
Variable	**Type**	**Length**
CNT	Numeric	8
SEX	Character	2
CASE_TYPE	Numeric	8

[DATAMARTID]_mult_med_combo_cnt.sas7bdat

Summary: Frequency of combination medication case type. Source file for [DATAMARTID]_RCR_T2D_PART_2_v13_0_MULT_MED_COMBO_FLAG_COUNT.csv		
Variable	**Type**	**Length**
CNT	Numeric	8
CASE_TYPE	Character	71

c6tul_other_combo_cnt.sas7bdat

Summary: Frequency of other combination medication case type. Source file for [DATAMARTID]_RCR_T2D_PART_2_v13_0_OTHER_COMBO_FLAG_COUNT.csv		
Variable	**Description**	**Values**
CNT	Numeric	8
CASE_TYPE	Character	71

c6tul_result.sas7bdat

Summary: Final result file. Source file for [DATAMARTID]_RCR_T2D_PART_2_v13_0_result.csv		
Variable	**Description**	**Values**
MEDS_FLAG	Character	25
TYPE	Character	1
PAGE	Numeric	8
TABLE	Numeric	8
PATID_N	Numeric	8
REMAIN_ON_DRUG_SUM	Numeric	8
METFORMIN_730_SUM	Numeric	8
SULGEN2_730_SUM	Numeric	8

DPP4_730_SUM	Numeric	8
GLP1_730_SUM	Numeric	8
ANYINSULIN_730_SUM	Numeric	8
AGE__MEDIAN	Numeric	8
AGE__QRANGE	Numeric	8
MALE_SUM	Numeric	8
FEMALE_SUM	Numeric	8
SEX_OTHER_SUM	Numeric	8
SEX_MISSING_SUM	Numeric	8
WHITE_SUM	Numeric	8
BLACK_SUM	Numeric	8
OTHER_SUM	Numeric	8
UNKNOWN_SUM	Numeric	8
HISPANIC_LATINO_SUM	Numeric	8
COHORT_ENTRY_2012_SUM	Numeric	8
COHORT_ENTRY_2013_SUM	Numeric	8
COHORT_ENTRY_2014_SUM	Numeric	8
COHORT_ENTRY_2015_SUM	Numeric	8
COHORT_ENTRY_2016_SUM	Numeric	8
COHORT_ENTRY_2017_SUM	Numeric	8
HOSPITALIZATION_SUM	Numeric	8
NUM_ED_VISITS_MEDIAN	Numeric	8
NUM_ED_VISITS_QRANGE	Numeric	8
NUM_OUTPATIENT_VISITS_MEDIAN	Numeric	8
NUM_OUTPATIENT_VISITS_QRANGE	Numeric	8
SYSTOLIC_BP_MEDIAN	Numeric	8
SYSTOLIC_BP_QRANGE	Numeric	8
DIASTOLIC_BP_MEDIAN	Numeric	8
DIASTOLIC_BP_QRANGE	Numeric	8
BP_N_SUM	Numeric	8
BMI_MEDIAN	Numeric	8
BMI_QRANGE	Numeric	8
BMI_N_SUM	Numeric	8
A1C_MEDIAN	Numeric	8
A1C_QRANGE	Numeric	8
A1C_N_SUM	Numeric	8
LDL_MEDIAN	Numeric	8
LDL_QRANGE	Numeric	8
LDL_N_SUM	Numeric	8

CREATININE_MEDIAN	Numeric	8
CREATININE_QRANGE	Numeric	8
EGFR_CALCULATED_MEDIAN	Numeric	8
EGFR_CALCULATED_QRANGE	Numeric	8
CREATININE_N_SUM	Numeric	8
ACE_ARB_SUM	Numeric	8
ANTIHYPERTENSIVES_SUM	Numeric	8
ANTIARRHY_DIGOXIN_SUM	Numeric	8
ANTICO_PLATELET_SUM	Numeric	8
LIPID_LOWERING_SUM	Numeric	8
NITRATES_SUM	Numeric	8
ASPIRIN_SUM	Numeric	8
LOOP_DIURETICS_SUM	Numeric	8
ANTIPSYCHOTICS_SUM	Numeric	8
NON_SEL_ALPHA_SUM	Numeric	8
PERIPH_VASO_SUM	Numeric	8
ORAL_GLUCOCORT_SUM	Numeric	8
BONE_RESORPTION_SUM	Numeric	8
BETA_BLOCKER_SUM	Numeric	8
CALCUIM_CHANNEL_SUM	Numeric	8
THIAZIDE_DIURETICS_SUM	Numeric	8
HYPERTENSION_SUM	Numeric	8
HYPERLIPIDEMIA_SUM	Numeric	8
CANCER_SUM	Numeric	8
LIVER_DISEASE_SUM	Numeric	8
PULMONARY_SUM	Numeric	8
HEART_FAILURE_SUM	Numeric	8
RETINOPATHY_SUM	Numeric	8
STROKE_SUM	Numeric	8
CAROTID_DISEASE_SUM	Numeric	8
OBSTRUCT_CORONARY_DISEASE_SUM	Numeric	8
PERIPHERAL_ARTERY_DISEASE_SUM	Numeric	8
CARDIAC_VALVE_DISEASE_SUM	Numeric	8
CARDIAC_ARRHYTHMIA_SUM	Numeric	8
SMOKING_COPD_SUM	Numeric	8
SERIOUS_MENTAL_SUM	Numeric	8
DEPRESSION_SUM	Numeric	8
PARKINSONS_SUM	Numeric	8
MEDS_FLAG	Char	25

TYPE	Char	1
PAGE	Numeric	8
TABLE	Numeric	8
PATID_N	Numeric	8
REMAIN_ON_DRUG_SUM	Numeric	8
METFORMIN_730_SUM	Numeric	8
SULGEN2_730_SUM	Numeric	8
DPP4_730_SUM	Numeric	8
GLP1_730_SUM	Numeric	8
ANYINSULIN_730_SUM	Numeric	8
AGE__MEDIAN	Numeric	8
AGE__QRANGE	Numeric	8
MALE_SUM	Numeric	8
FEMALE_SUM	Numeric	8
SEX_OTHER_SUM	Numeric	8
SEX_MISSING_SUM	Numeric	8
WHITE_SUM	Numeric	8
BLACK_SUM	Numeric	8
OTHER_SUM	Numeric	8
UNKNOWN_SUM	Numeric	8
HISPANIC_LATINO_SUM	Numeric	8
COHORT_ENTRY_2012_SUM	Numeric	8
COHORT_ENTRY_2013_SUM	Numeric	8
COHORT_ENTRY_2014_SUM	Numeric	8
COHORT_ENTRY_2015_SUM	Numeric	8
COHORT_ENTRY_2016_SUM	Numeric	8
COHORT_ENTRY_2017_SUM	Numeric	8
HOSPITALIZATION_SUM	Numeric	8
NUM_ED_VISITS_MEDIAN	Numeric	8
NUM_ED_VISITS_QRANGE	Numeric	8
NUM_OUTPATIENT_VISITS_MEDIAN	Numeric	8
NUM_OUTPATIENT_VISITS_QRANGE	Numeric	8
SYSTOLIC_BP_MEDIAN	Numeric	8
SYSTOLIC_BP_QRANGE	Numeric	8
DIASTOLIC_BP_MEDIAN	Numeric	8
DIASTOLIC_BP_QRANGE	Numeric	8
BP_N_SUM	Numeric	8
BMI_MEDIAN	Numeric	8
BMI_QRANGE	Numeric	8

BMI_N_SUM	Numeric	8
A1C_MEDIAN	Numeric	8
A1C_QRANGE	Numeric	8
A1C_N_SUM	Numeric	8
LDL_MEDIAN	Numeric	8
LDL_QRANGE	Numeric	8
LDL_N_SUM	Numeric	8
CREATININE_MEDIAN	Numeric	8
CREATININE_QRANGE	Numeric	8
EGFR_CALCULATED_MEDIAN	Numeric	8
EGFR_CALCULATED_QRANGE	Numeric	8
CREATININE_N_SUM	Numeric	8
ACE_ARB_SUM	Numeric	8
ANTIHYPERTENSIVES_SUM	Numeric	8
ANTIARRHY_DIGOXIN_SUM	Numeric	8
ANTICO_PLATELET_SUM	Numeric	8
LIPID_LOWERING_SUM	Numeric	8
NITRATES_SUM	Numeric	8
ASPIRIN_SUM	Numeric	8
LOOP_DIURETICS_SUM	Numeric	8
ANTIPSYCHOTICS_SUM	Numeric	8
NON_SEL_ALPHA_SUM	Numeric	8
PERIPH_VASO_SUM	Numeric	8
ORAL_GLUCOCORT_SUM	Numeric	8
BONE_RESORPTION_SUM	Numeric	8
BETA_BLOCKER_SUM	Numeric	8
CALCUIM_CHANNEL_SUM	Numeric	8
THIAZIDE_DIURETICS_SUM	Numeric	8
HYPERTENSION_SUM	Numeric	8
HYPERLIPIDEMIA_SUM	Numeric	8
CANCER_SUM	Numeric	8
LIVER_DISEASE_SUM	Numeric	8
PULMONARY_SUM	Numeric	8
HEART_FAILURE_SUM	Numeric	8
RETINOPATHY_SUM	Numeric	8
STROKE_SUM	Numeric	8
CAROTID_DISEASE_SUM	Numeric	8
OBSTRUCT_CORONARY_DISEASE_SUM	Numeric	8
PERIPHERAL_ARTERY_DISEASE_SUM	Numeric	8

CARDIAC_VALVE_DISEASE_SUM	Numeric	8
CARDIAC_ARRHYTHMIA_SUM	Numeric	8
SMOKING_COPD_SUM	Numeric	8
SERIOUS_MENTAL_SUM	Numeric	8
DEPRESSION_SUM	Numeric	8
PARKINSONS_SUM	Numeric	8