



Clinical & Translational Science Institute
of Southeast Wisconsin

HONEST BROKER DATA DICTIONARY

Clinical Research Data Warehouse—

Research Data Tools

i2b2 & TriNetX query tools help research teams discover and validate patient cohorts using existing well-aggregated, de-identified clinical data from various sources. Honest Broker is an IRB-approved research data extraction tool.

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Clinical Research Data Warehouse (CRDW)

The CRDW is an aggregation of de-identified clinical and demographic data from various sources.

- **De-identified** patient data is accessed through query tools and extracted using Honest Broker
- **Identified** patient data can be extracted by researchers who have an approved IRB protocol using the Honest Broker **Identified Extract** process
- **PHI** = Protected Health Information - not available on de-identified tables

CRDW Tools

All CTSI data warehouse tools are available at <https://ctri.mcw.edu/resources/bmi-links/>

Data Warehouses

- Froedtert & The Medical College of Wisconsin
 - Froedtert Hospital in Milwaukee
 - Froedtert Menomonee Falls (formerly Community Memorial Hospital)
 - Froedtert West Bend (formerly St. Joseph Hospital West Bend)
 - Community Physicians clinics
 - Medical College of Wisconsin clinics
- Children’s Wisconsin (Children’s Specialty Group data only)

Query Tools

- i2b2 – Informatics for Integrating Biology and the Bedside
- TriNetX (<https://www.trinetx.com/trinetx-live/>)

Data Extraction Tools

- Honest Broker (HIPAA-compliant, IRB-approved)
 - Offers De-identified & Identified data extract workflows
- Jupyter Hub
 - A re-encrypted "big data" environment for advanced coders/biostatisticians

Data Sources (w/start date)

- **Epic EHR (electronic health record) Systems**
 - Froedtert & Medical College of Wisconsin (October 2004)
 - Froedtert Menomonee Falls - Community Memorial Hospital (May 2012)

- Community Physicians Clinics (July 2013)
- Froedtert West Bend – St. Joseph’s (September 2013)
- Children’s Wisconsin (November 2013)
 - Children’s Specialty Group only (Children’s Medical Group data not available)
- **Froedtert Hospital legacy systems** (retired in 2012)
 - Affinity (clinical registration, ordering and billing system)
 - Intellidose (oncology treatment protocol system)
 - SIS (surgical documentation system)
- **GE/IDX Physician Billing System** (~1999 to 11/30/2018)
 - Group 3 Medical College Physicians
 - Group 4 Children’s Specialty Group
 - Group 7 FMCCP (Community Physicians)
- Genetic sequencing result data (~2007, low n)
 - Foundation Medicine, Tempus, Invitae, Ambry
- **NAACCR Tumor Registry** (SJH – 2001, CMH - 1989, FMLH – 1989)
- **OnCore Clinical Trials Management System**
 - Biospecimen data from MCW tissue bank (2012)
 - Clinical Trials enrollment (yes/no)
- **Muse ECG System** (1992 to present)
 - available in Jupyter Hub only - 9 tables with tracing details and waveform data

Data Integrity Partners

- MCW Institutional Review Board (IRB)
- Froedtert Office of Clinical Research and Innovative Care Compliance (OCRICC)
- F&MCW IT - Epic Core Team, Clinical Informatics & Pharmacy Informatics

Data Access (Data Release Agreements)

Intake form is available at <https://ctri.mcw.edu/cda/crdw/>

- PI should complete one Data Release Agreement (DRA) per project
- If you are in the early stages of project development, you may be general in your description of desired data elements and intended use of our tools.
- Contact Kris Osinski [kosinski@mcw.edu] to add new team members to an existing form

Data Team/Support

Technical Issues

- i2b2 or Honest Broker, contact CRDW@mcw.edu
- TriNetX, contact support@trinetx.com

User Access and Training Contact

- Kris Osinski, CTSI Biomedical Informatics Business Analyst, kosinski@mcw.edu

Honest Broker Tables

Allergy History

Source: Epic

Primary date for sort/filter: i2b2_start_date (this is a coalescence of two date fields)

*Table Granularity: each row represents a documented instance of a specific reaction for a specific allergen documented during a specific allergy review session for a specific patient, so a single patient could have multiple rows even if they have only one allergen in their record

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
hx_allergen_id*	ID of the Epic allergen from allergy history	
line*	The position of the allergen within the Epic allergy list	
hx_description	Name of the allergen (agent) from allergy history	
allergen_type_c	ID of the allergen type	
allergen_type_name	Name of the allergen type (e.g., Environmental, Food)	
reaction_c*	ID of the Epic reaction category	
reaction_name	Name of the Epic reaction category (e.g., Skin – rash vs. hives)	
hx_reaction_comment	Free text reaction comments	PHI
i2b2_start_date	This represents the hx_noted_date. If this field is empty, then it represents the alrgy_hx_entry_dttm.	Yes, shifted
hx_noted_date	The date the patient made it known that they had experienced an allergic reaction	Yes, shifted
alrgy_hx_entry_dttm	The date the allergy history was entered into Epic	Yes, shifted
hx_status_c	ID of the allergy history status	
hx_status_name	Name of the allergy history status: Active/Deleted	
hx_allergy_type_c	ID of the allergy type category. This value represents the nature or character of the allergy.	
hx_allergy_type_name	Name of the allergy type (e.g., side effect, intolerance)	
hx_severity_c	ID of the allergy severity category. This value represents how serious the allergy is.	
hx_severity_name	Name of the allergy severity category (High/Medium/Low)	
alrgy_hx_dlt_cmt	Free text reason for allergy deletion	PHI

Audiogram Basic Data

Source: Noah (system developed by HIMSA (Hearing Instrument Manufacturers' Software Assoc))

Primary date for sort/filter: audiogram_date

*Table Granularity: each row represents a specific audiogram for a specific patient, so a single patient could have multiple rows, one row for each audiogram

Column	Description	Encrypted?
fh_mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
patient_guid	Unique Noah system identified ID for each patient	PHI
audiogram_date	Date audiogram was performed	Yes, shifted
rt_pta3_air	PTA 3 equals the average threshold at 500, 1000, and 2000	
rt_pta3_bone	PTA 3 equals the average threshold at 500, 1000, and 2000	
rt_pta4_air	PTA4 is the average of thresholds at 500, 1000, 2000, 4000	
rt_pta4_bone	PTA4 is the average of thresholds at 500, 1000, 2000, 4000	
lf_pta3_air	PTA 3 equals the average threshold at 500, 1000, and 2000	
lf_pta3_bone	PTA 3 equals the average threshold at 500, 1000, and 2000	
lf_pta4_air	PTA4 is the average of thresholds at 500, 1000, 2000, 4000	
lf_pta4_bone	PTA4 is the average of thresholds at 500, 1000, 2000, 4000	
right_srt	Speech reception threshold	
left_srt	Speech reception threshold	
right_wrs	Word recognition score or speech recognition (it is a percent)	
left_wrs	Word recognition score or speech recognition (it is a percent)	

Audiogram Complete Data

Source: Noah (system developed by HIMSA (Hearing Instrument Manufacturers' Software Assoc))

Primary date for sort/filter: audiogram_date

*Table Granularity: each row represents a specific audiogram for a specific patient, so a single patient could have multiple rows, one row for each audiogram

**Note: Air measurements will use frequencies from 125 to 20000 and bone will use frequencies from 125 to 8000. Not all frequencies will be used in every audiogram.

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
patient_guid	Unique Noah system identified ID for each patient	PHI
audiogram_date*	Date audiogram was performed	Yes, shifted
ra125	Right air measured at frequency of 125	
ra250	Right air measured at frequency of 250	
ra500	Right air measured at frequency of 500	
ra750	Right air measured at frequency of 750	

ra1000	Right air measured at frequency of 1000	
ra1500	Right air measured at frequency of 1500	
ra2000	Right air measured at frequency of 2000	
ra3000	Right air measured at frequency of 3000	
ra4000	Right air measured at frequency of 4000	
ra6000	Right air measured at frequency of 6000	
ra8000	Right air measured at frequency of 8000	
ra9000	Right air measured at frequency of 9000	
ra10000	Right air measured at frequency of 10000	
ra11200	Right air measured at frequency of 11200	
ra12500	Right air measured at frequency of 12500	
ra14000	Right air measured at frequency of 14000	
ra16000	Right air measured at frequency of 16000	
ra18000	Right air measured at frequency of 18000	
ra20000	Right air measured at frequency of 20000	
rb125	Right bone measured at frequency of 125	
rb250	Right bone measured at frequency of 250	
rb500	Right bone measured at frequency of 500	
rb750	Right bone measured at frequency of 750	
rb1000	Right bone measured at frequency of 1000	
rb1500	Right bone measured at frequency of 1500	
rb2000	Right bone measured at frequency of 2000	
rb3000	Right bone measured at frequency of 3000	
rb4000	Right bone measured at frequency of 4000	
rb6000	Right bone measured at frequency of 6000	
rb8000	Right bone measured at frequency of 8000	
la125	Left air measured at frequency of 125	
la250	Left air measured at frequency of 250	
la500	Left air measured at frequency of 500	
la750	Left air measured at frequency of 750	
la1000	Left air measured at frequency of 1000	
la1500	Left air measured at frequency of 1500	
la2000	Left air measured at frequency of 2000	
la3000	Left air measured at frequency of 3000	
la4000	Left air measured at frequency of 4000	
la6000	Left air measured at frequency of 6000	
la8000	Left air measured at frequency of 8000	

la9000	Left air measured at frequency of 9000	
la10000	Left air measured at frequency of 10000	
la11200	Left air measured at frequency of 11200	
la12500	Left air measured at frequency of 12500	
la14000	Left air measured at frequency of 14000	
la16000	Left air measured at frequency of 16000	
la18000	Left air measured at frequency of 18000	
la20000	Left air measured at frequency of 20000	
lb125	Left bone measured at frequency of 125	
lb250	Left bone measured at frequency of 250	
lb500	Left bone measured at frequency of 500	
lb750	Left bone measured at frequency of 750	
lb1000	Left bone measured at frequency of 1000	
lb1500	Left bone measured at frequency of 1500	
lb2000	Left bone measured at frequency of 2000	
lb3000	Left bone measured at frequency of 3000	
lb4000	Left bone measured at frequency of 4000	
lb6000	Left bone measured at frequency of 6000	
lb8000	Left bone measured at frequency of 8000	

Biospecimen

Source: OnCore, specimen tracking system used by MCW Tissue Bank

Primary date for sort/filter: created_on_date

*Table Granularity: each row represents a specific diagnosis code for a specific specimen bar code for a specific patient, so a single patient could have multiple rows even if they have only one specimen bar code stored in the tissue bank

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
collection_date_time	Date the specimen was collected from the patient	Yes, shifted
frozen_date_time	Date the specimen was placed in Tissue Bank freezer	Yes, shifted
accession_date	Date the specimen record was created in OnCore	Yes, shifted
accession_time	Time the specimen record was created in OnCore	
pathology_status	Pathologist's determination; unknown if not reviewed	
specimen_bar_code*	MCW Tissue Bank identifier, need this ID with leading zero format to request tissue in iLab	No
specimen_type	The preparation method of the specimen	
body_site	The anatomical site from which the specimen was taken	

tumor_site	Additional detail about the body site	
initial_diagnosis*	Clinical indication(s) from the encounter in which the specimen was collected	
protocol_name	Indicates the owner of the banked tissue	
specimen_status	Availability status for the specimen	

Contact Info – Identified Extract Only

Sources: Epic

Primary date for sort/filter: (exempt from date filtering)

Special Filter: Patients with Research Contract Preference of Do Not Contact are filtered out

*Table Granularity: Each row represents a single patient and their respective contact facts

All data elements are as current as the last data refresh reported at <https://ctri.mcw.edu/resources/bmi-links/>

Column	Description	Encrypted?
patient_mrn*	Note: Froedtert MRN is in 00000000 format	PHI
full_name	Last name, First Name + Middle Initial	PHI
last_name	Last name (surname)	PHI
first_name	First name	PHI
middle_initial	Middle initial	PHI
add_line_1	Address, first line of street address	PHI
add_line_2	Address, second line of street address	PHI
city	Name of city	PHI
state_c	Machine-readable code for state	
state_name	Name of state	
country_c	Machine-readable code for country	
country_name	Name of country	
zip	Zip code (zip-9 when available)	PHI
home_phone	Home phone number	PHI
work_phone	Work phone number	PHI
all_mobiles	A list of all cell/mobile phone numbers for the patient	PHI
email_address	Primary email address	PHI
all_emails	Comma delimited list of all emails for the patient	PHI

Demographics

Sources: Epic, Social Security Death Master File (SSDMF), Census, Area of Deprivation Index (ADI)

Primary date for sort/filter: (exempt from date filtering)

*Table Granularity: Each row represents a single patient and their most current demographics facts

All data elements are as current as the last data refresh reported at <https://ctri.mcw.edu/resources/bmi-links/>

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI

patient_num*	Masked MRN, the i2b2 patient number	Yes
pat_name	Last name, First Name + Middle Initial	PHI
sex_c (see value set)	Category ID for the patient's sex/gender	No
sex	Category name for the patient's sex/gender	
gender_identity_c	Category ID for the patient's gender identity	No
gender_identity	Gender identity (Female, Male, Transgender Female/Male-to-Female, Transgender Male/Female-to-Male, Other, Choose not to disclose, Gender Fluid, Genderqueer/Queer)	
birth_date	Date of birth	Yes, shifted
vital_status	Possible statuses include alive and deceased. Note that there are many patient creation workflows that do not populate this item, so many alive patients could have blank statuses.	
death_date	Date of death	Yes, shifted
research_contact_pref	Patient-reported preference for being contacted by any means to participate in any research study	
marital_status_c	Category ID for the patient's reported marital status	No
marital_status	Category name for the patient's reported marital status	
employment_status_c	Category ID for the patient's reported employment status	No
employment_status	Category name for the patient's reported employment status	
race_c (see value set)	Category ID for the patient's reported race	No
race	Category name for the patient's reported race	
hispanic_c (see value set)	Category ID for the patient's ethnic background	No
ethnicity	Ethnic background (Hispanic/Non-Hispanic)	
language_code	Category ID for the patient's reported language	No
language	Category name for the patient's reported language	
need_interpreter	Indicates whether the patient needs an interpreter	
state_c	Internal ID of the state of patient's last known address	No
state_name	Name of the state of patient's last known address	
zip3	The first 3 digits of the zip code from the patient's last known address. Full zip code is considered PHI.	
ped_gest_age	A newborn's gestational age at birth	
primary_care_provider_id	Epic ID for the patient's PCP – Primary Care Provider	No
primary_care_provider_name	Name of the patient's PCP	
primary_care_provider_title	PCP's professional credentials (e.g., MD, DO)	
death_date_precision	Year/month vs. Year/month/day	
vital_status_source	Epic or SSDMF (social security death master file)	
death_date_source	Epic or SSDMF	
geocode_result	Categorical description of geocoding quality/reliability	

fips_block_group_id_2020	12-digit Federal Information Processing Series (FIPS) code - census block group identifier from 2020 census	PHI
adi_narank	Area of Deprivation Index national rank	
secondary_ruca_code_2010	Rural-Urban Commuting Area code derived from 2010 US Census and 2006-2010 American Community Survey (ACS) data; secondary RUCA code is more specific than primary (e.g. 10.3 vs. 10)	

Diagnosis (Dx)

Sources: Epic, GEIDX professional billing (Froedtert Affinity data planned for future!)

Primary date for sort/filter: dx_date

*Table Granularity: each row represents a specific diagnosis code from a specific encounter for a specific patient, so a single patient could have multiple rows even if they have only one encounter in their record

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the encounter (may be fabricated if not from Epic)	Yes
enc_type (see value set)	Category for broad characterization of encounter type	
dx_date	Date of the encounter associated with the diagnosis	Yes, shifted
provider_id	Epic ID for the provider linked to the diagnosis code	
provider_name	Name of the provider linked to the diagnosis code	
provider_title	Credentials of the provider linked to the diagnosis code	
dx_name	Description of the ICD diagnosis code	
dx_code*	ICD diagnosis code	
dx_type	9 = ICD-9, 10 = ICD-10	
dx_source (see value set)	Indicates the specific type of source for the diagnosis data	
dx_origin (see value set)	Indicates the broad source of the diagnosis data	
pdx (principal dx indicator)	P = Principal diagnosis, S = Secondary diagnosis	
dx_poa (see value set)	Flag to denote whether diagnosis was present on inpatient admission	
raw_pdx	Provides the specific source of the diagnosis code	
sourcesystem_cd	Indicates the source system for the data (e.g., IDX, Epic)	

Diagnostic Results

Source: Epic, Mosaik (future for Froedtert only)

Primary date for sort/filter: i2b2_date

*Table Granularity: each row represents a specific result component from a specific procedure order from a specific encounter for a specific patient, so a single patient could have multiple rows even if they have only one encounter in their record

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the encounter (may be fabricated if not from Epic)	Yes
i2b2_date	Represents a coalesce of specimen_date and result_date	Yes, shifted
loinc_code https://loinc.org	LOINC coding is a standardized terminology for health measurements, observations and documents	
component_id*	ID of the Epic clinical result component	
component_name	Name of the Epic clinical result component	
res_quant_or_qual	Indicates whether the result component contains quantitative or qualitative data. If blank, it contains neither.	
abnormal_ind (see value set)	Classifies non-normal results (e.g., Abnormal, Low, High)	
result_num	Numerical representation of the test result; for qualitative results this value will be 9999999	
result_unit	The unit of measure for the result	
result_modifier (see value set)	The operator for the result (e.g., GT=Greater Than)	
src_value	Raw recorded value for the clinical result component	
src_unit	Raw unit for the clinical result component	
order_proc_id*	The Epic order ID linked to the result	Yes
proc_id	The Epic internal procedure ID linked to the order	
px	The Epic external procedure ID linked to the order	
px_type	The type of code represented by the Epic external proc ID	
procedure_name	The name of the Epic procedure order	
provider_id	Epic ID for the provider linked to the procedure order	
provider_name	Name of the provider linked to the procedure order	
provider_title	Credentials of the provider linked to the procedure order	
specimen_date	Date/time the specimen or source of the result was acquired; this will likely be blank for abstracted result component data	Yes, shifted
result_date	Date the result was put in Final status	Yes, shifted
norm_range_low	The lower bound for the normal range	
norm_modifier_low	The operator for the lower bound	
norm_range_high	The upper bound for the normal range	
norm_modifier_high	The operator for the upper bound	

Encounters

Source: Epic, GEIDX/Professional (PB) Billing

Primary date for sort/filter: i2b2_date

*Table Granularity: each row represents data from a specific source system for a specific encounter for a specific patient, so a single patient could have multiple rows even if they only have a single encounter because that single encounter may generate data from more than one data source

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the encounter (may be fabricated if not from Epic)	Yes
enc_type (see value set)	Category for broad characterization of encounter type	
src_enc_type_c	Epic ID for the encounter type; blank if not Epic	
src_enc_type_name	Epic encounter type name or fabricated encounter source	
age_at_visit_days	Calculated age at visit in rounded days	
age_at_visit_years	Calculated age at visit in rounded years	
i2b2_date	Represents a coalescence of hospital admission time (IP), appointment time (OP), date of service (GEIDX billing) and contact date (all other or date missing)	Yes, shifted
department_name	This represents either the Epic encounter department name or the GEIDX billing service area	
department_id	Epic ID for the encounter department; blank if not Epic	
department_external_name	More detailed, user-friendly department name	
department_specialty	Specialty linked to the Epic encounter department	
payer_type_primary_c	Epic ID for the encounter's primary payer	
payer_type_primary_name	Category name of the encounter's primary payer	
payer_type_secondary_c	Epic ID for the encounter's secondary payer	
payer_type_secondary_name	Category name for the encounter's secondary payer	
appt_status_c	Epic ID for the encounter's appointment status	
appt_status_name	Epic appointment/visit status (e.g., Arrived, Completed)	
visit_type_id	Epic ID for the encounter's visit type	
visit_type_name	Epic visit type (e.g., New, Established, Lab Draw, EKG)	
visit_date	Date of encounter for non-encounter type 3	Yes, shifted
admit_date	The start date/time for encounter type 3. The patient was first admitted to the facility, bedded in the ED, or confirmed for an HOV (hospital outpatient visit) for this contact, regardless of patient's base patient class.	Yes, shifted
admit_source_c	Epic ID for the admission source	
admit_source_name	Epic name for the admission source	
discharge_date	Hospital discharge date and time for the patient contact	Yes, shifted

discharge_status_c (see value set)	PCORnet Common Data Model (CDM) code for discharge status – mapped from Epic discharge disposition	
discharge_status_name	Name for CDM discharge status (e.g., Home, Expired)	
length_of_stay_days	Hospital length of stay in days	
hosp_serv_c	Epic ID for the hospital service	
hosp_serv_name	Epic name for the hospital service	
adm_for_surg_yn	Indicates whether the patient is being admitted for surgery	
surgical_svc_c	Category ID for the surgical service for this encounter	
surgical_svc_name	Epic name for the surgical service for this encounter	
drg	Diagnostic Related Group assigned by inpatient coders	
drg_type	Type of DRG	
drg_name	Name of the DRG	
visit_provider_id	Epic ID of the provider associated with the encounter	
visit_provider_name	Name of the provider associated with the encounter	
visit_provider_title	Credentials of the provider associated with the encounter	
visit_provider_npi	NPI ID of the provider associated with the encounter	
admission_provider_id	Epic ID of the provider who wrote the admission order	
admission_provider_name	Name of the provider who wrote the admission order	
admission_provider_title	Credentials of the provider who wrote the admission order	
admission_provider_npi	NPI ID of the provider who wrote the admission order	
sourcesystem_cd*	Indicates the source system for the data (e.g., IDX, Epic)	

Encounters – Future Appointments – Identified Extract Only

Source: Epic

Primary date for sort/filter: appt_dttm

*Table Granularity: each row represents a specific encounter for a specific patient, so a single patient could have multiple rows because they may have more than one future appointment

Column	Description	Encrypted?
patient_mrn*	Note: Froedtert MRN is in 00000000 format	PHI
full_name	Last name, First Name + Middle Initial	PHI
encounter_id*	Epic ID for the future appointment encounter	PHI
appt_dttm	The date and time of the future appointment	PHI
visit_provider_id	Epic ID of the provider associated with the encounter	No
visit_provider_name	The encounter provider’s full name	
visit_provider_creds	The encounter provider’s credentials	
department_id	Epic ID for the encounter department	
department_name	Epic encounter department name	
enc_type_id	Epic ID for the encounter type; 50 = Appointment	
enc_type_name	Epic encounter type name	

visit_type_id	Epic visit type ID	
visit_type_name	Epic visit type (e.g., New, Established, Lab Draw, EKG)	

Genomics Ambry (Froedtert Only)

Source: Ambry genetic testing reports

Resource: genecards.org

Primary date for sort/filter: (exempt from date filtering, all data will be delivered)

*Table Granularity: each row represents a specific variant** at a specific genetic location for a specific gene from a specific sample site on a specific test date for a specific patient, so a single patient could have multiple rows even if they have only one genetic test date for a single sample site

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
provider_id	Epic ID of the ordering/treating physician	No
provider_name	Name of the ordering/treating physician	
accession_id	Unique identifier for the Ambry test	PHI
test_code	Vendor-specific ID for sequencing test that was run	
test_desc	Vendor-specific name for sequencing test that was run	
summary	Brief text summary of the test findings	
i2b2_date*	Coalesce of collection date and received date	Yes, shifted
sample_collection_date	Tissue collection date	Yes, shifted
received_date	Date the specimen was received by the 3rd party genomics lab vendor	Yes, shifted
sample_site*	The anatomical site from which tissue was taken	
genes_tested	e.g., BARD1, CHEK2	
gene	Specific gene for result data in the row (based on HGNC standard www.genenames.org)	
ref_seq	e.g., NM_###...	
protein_var**	protein variant (e.g., p.x#...)	
nucl_var**	nucleotide variant (e.g., c.x#...)	
reference_n (nucleotides)	e.g., A, C, G, T	
altered_n (nucleotides)	e.g., A, C, G, T	
allele_state	e.g., heterozygous	
chromosome	expressed as a number	
start	genomic start position of the gene relative to the chromosome on which it is located	
stop	genomic stop position of the gene relative to the chromosome on which it is located	
result_type	e.g., Pathogenic, Uncertain Significance	
var_type	Text description of the variant observation	

variant_class	SV=short variation, CN=Copy Number, RE=chromosomal rearrangement	
sourcesystem_cd	GENE AMBRY	

Genomics Foundation & Genomics Tempus (Froedtert Only, separate tables)

Source: Foundation Medicine and Tempus genetic testing reports

Resource: genecards.org

Primary date for sort/filter: (exempt from date filtering, all data will be delivered)

*Table Granularity: each row represents a specific variant** at a specific genetic location for a specific gene from a specific sample site on a specific test date for a specific patient, so a single patient could have multiple rows even if they have only one genetic test date for a single sample site

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
provider_id	Epic ID of the ordering/treating physician	No
provider_name	Name of the ordering/treating physician	
coll_date/test_date*	Tissue collection date	Yes, shifted
received_date	Date the specimen was received by the 3rd party genomics lab vendor	Yes, shifted
test_type	Vendor-specific name of sequencing that was run	
sample_site*	The anatomical site from which tissue was taken	
gene_symbol*	e.g., BRAF, CDKN2B	
gene_id	ID of the tested gene based on HGNC standard www.genenames.org	No
gene_name	e.g., B-Raf proto-oncogene, serine/threonine kinase	
reference_seq_name/ref_seq	e.g., NM_####...	
chromosome	chr#	
position	Numeric data	
strand	+ vs. -	
wildtype (pertinent negative)	F (false) or T (true)	
vus variant_of_unknown_significance	F (false) or T (true)	
tx (known_treatment)	F (false) or T (true)	
diagnosis	Text "diagnosis" from results report; typically represents the clinical indication for the testing	PHI
protein_seq_variant**	p.x#...	
nucleotide_variant**	c.x#...	
reference_n (nucleotides)	e.g., A, C, G, T	
altered_n (nucleotides)	e.g., A, C, G, T	
allele_freq	Numeric data	
allele_fraction	Numeric data	

tmb_status (tumor_mutation_burden)	e.g., low, intermediate	
tmb_score	Numeric score	
tmb_score_units	e.g., mutations-per-megabase	
usat_stability	Microsatellite instability (MSI) is the condition of genetic hypermutability (predisposition to mutation) that results from impaired DNA mismatch repair (MMR). The presence of MSI represents phenotypic evidence that MMR is not functioning normally.	
variant_type/var_type	Text description of the variant observation	
gene_1 (rearrangement)	e.g., BRCA2	
gene_2 (rearrangement)	e.g., BRCA2	
pos_1 (position)	e.g., chr#.#-#	
pos_2 (position)	e.g., chr#.#-#	
re_type (rearrangement)	e.g., deletion, duplication, rearrangement	
amp_del	amplification vs. loss	
copy_number/cn_variant	Numeric data	
ratio	measured sample mRNA / control mRNA	
status	Known/unknown/likely/ambiguous	
variant_class	SV=short variation, CN=Copy Number, RE=chromosomal rearrangement	
sourcesystem_cd	FM=Foundation Medicine, TEMP = Tempus	

Genomics Invitae (Froedtert Only)

Source: Invitae (<https://www.invitae.com/en/assay/>)

Resource: genecards.org

Primary date for sort/filter: (exempt from date filtering, all data will be delivered)

*Table Granularity: each row represents a specific variant** at a specific genetic location for a specific gene from a specific sample site on a specific test date for a specific patient, so a single patient could have multiple rows even if they have only one genetic test date for a single sample site

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
provider_name	Name of the ordering/treating physician	
order_date	Date the testing was ordered	Yes, shifted
sample_collection_date	Date the specimen was taken	Yes, shifted
received_date	Date the specimen was received by the 3rd party genomics lab vendor	Yes, shifted
test_type	Vendor-specific name of sequencing panel	
indication	Text "diagnosis" from results report; typically represents the clinical indication for the testing	PHI
family_history	Text describes familial history provided from patient	PHI

icd10_codes	ICD diagnosis coding linked to the test	
genes_tested	The panel of genes tested	
gene_symbol	HGNC symbol (https://www.genenames.org)	
reference_seq_name	e.g., NM_###...	
protein_seq_variant**	p.x#...	
nucleotide_variant**	c.x#...	
reference_n (nucleotides)	e.g., A, C, G, T	
altered_n (nucleotides)	e.g., A, C, G, T	
variant_class	SNV=single nucleotide variant	
sourcesystem_cd	INV = Invitae	

Genomic Summary (Froedtert Only)

Source: Foundation Medicine, Tempus, Ambry and Invitae (Guardant coming soon!)

Resource: genecards.org

Primary date for sort/filter: (exempt from date filtering, all data will be delivered)

*Table Granularity: each row represents a specific variant** at a specific genetic location for a specific gene from a specific sample site on a specific test date for a specific patient, so a single patient could have multiple rows even if they have only one genetic test date for a single sample site

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
provider_id	Epic ID of the ordering/treating physician	No
provider_name	Name of the ordering/treating physician	
diagnosis	Text "diagnosis" from results report; typically represents the clinical indication for the testing	PHI
sample_site*	The anatomical site from which tissue was taken	
i2b2_date*	A coalescence of dates: collection, order, received	Yes, shifted
order_date	Date the testing was ordered	Yes, shifted
sample_collection_date	Date the specimen was taken	Yes, shifted
received_date	Date the specimen was received by the 3rd party genomics lab vendor	Yes, shifted
test_type	Vendor-specific name of sequencing that was run	
gene	HGNC symbol (https://www.genenames.org)	
nucl_var	Nucleotide variant	
var_type	Variant type	No
variant_class	SV=short variation, CN=Copy Number, RE=chromosomal rearrangement	
sourcesystem_cd	FM=Foundation Medicine, TEMP = Tempus, INV = Invitae	

Imaging Orders

Source: Epic orders

Primary date for sort/filter: i2b2_date (a coalescence of multiple date fields)

*Table Granularity: each row represents a specific reading radiologist for a specific procedure order from a specific encounter for a specific patient, so a single patient could have multiple rows, one row for each reading radiologist even if that patient only has one imaging procedure in their record

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the encounter (may be fabricated if not from Epic)	Yes
enc_type (see value set)	Category for broad characterization of encounter type	
i2b2_date	Represents a coalesce of various procedure-related dates (specimen_taken_time, proc_bgn_time, order_time)	Yes, shifted
image_start_time	The date and time the imaging tech started taking the image	Yes, shifted
image_end_time	The date and time the imaging tech stopped taking the image	Yes, shifted
result_entry_date	The date the imaging result was filed to Epic via PACS or AXIS (Ophthalmology)	Yes, shifted
order_id*	Unique patient-specific order ID for a procedure order	Yes
acc_num	The unique accession ID for the image	Yes
proc_code	Epic procedure code for a procedure order	No
px	The code linked to an Epic procedure, some have coding embedded in them but many (like nursing orders) do not	
px_type	CH = CPT/HCPCS, OT = Other, 9 = ICD-9, 10 = ICD-10	
procedure_name	Procedure name from Epic's procedure master file (EAP)	
order_type_c	ID of the order type linked to the Epic procedure order	No
order_type_name	Epic order types broadly classify procedure orders	
order_status_c	ID of the Epic order status	No
order_status_name	Includes status such as Resulted, Completed, Sent	
dx_id	ID of diagnosis record associated with the order	No
primary_clinical_indication	Text "diagnosis"; typically represents the first listed clinical indication for the procedure	
i2b2_provider_id	Represents a coalesce of various procedure-related providers (authorizing, performing, billing or referring)	No
i2b2_provider_name	Name of the provider linked to the procedure record	
i2b2_provider_title	Credentials of the provider linked to the procedure record	
reading_radiologist_prov_id*	Epic ID of the interpreting/reading provider for the image - if a resident/fellow did the interp/read, the attending physician will also have a row in the table	No
reading_radiologist_name	Name of the interpreting/reading provider for the image	
reading_radiologist_title	Credentials for the interpreting/reading provider for the image (e.g., MD, DO, OD)	

Immunization

Source: Epic

Primary date for sort/filter: immune_date

*Table Granularity: each row represents a specific immunization instance from a specific encounter for a specific patient, so a single patient could have multiple rows even if they only have a single encounter in their record; likewise, a single patient can have multiple instances of a single vaccine

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
immunzatn_id*	Epic ID for the immunization substance record	No
immune_date	Date when the immunization was administered	Yes, shifted
immunization_name	Name of the Epic immunization record	
immun_type_c	Category ID for the immunization type	
immun_type_name	Name of the immunization type (e.g., Pediatric)	
dose	Dosage information for the immunization	
route_c	Category ID of the immunization route	
route_name	Name of the immunization route such as oral, intramuscular, or intradermal	
site_c	Category ID of the immunization site	
site_name	The anatomical location of the injection (e.g., left arm)	
mfg_c	Category ID for the vaccine manufacturer	
mfg_title	Name of the vaccine manufacturer	
lot	An alphanumeric ID for the immunization lot	
given_by_user_id	The Epic user ID of the person who administered the vaccine (not populated if the vaccine was entered as historical)	No
entry_user_id	The Epic user ID of the person who entered the vaccine record	No
entry_date	The date the vaccine record was created in Epic	Yes, shifted
expiration_date	Expiration date for the immunization lot	Yes, shifted
defer_reason_c	Category ID for the reason the vaccine was deferred	
defer_reason_title	Name of the deferral reason	
immunization_time	Date and time of the vaccine administration	Yes, shifted
imm_product	Vaccine brand name, for non-generic immunizations	
ndc_num_id	NDC (National Drug Code) ID, the universal product identifier	
immnztn_status_c	Epic ID for the immunization status	
immnztn_status_name	Given, incomplete, deferred, refused, etc.	
imm_historic_adm_yn	Indicates whether the immunization entry is historical	

Medication Orders

Source: Epic

Primary date for sort/filter: order_date

*Table Granularity: each row represents a specific medication ingredient from a specific medication order from a specific encounter for a specific patient, so a single patient could have multiple rows even if they only have a single encounter in their record; likewise, a single patient can have multiple orders for a single medication ingredient

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
order_med_id*	Unique patient-specific ID for a medication order	Yes
order_date	Date/time of the medication order	Yes, shifted
medication_id	Epic internal ID for each medication	No
medication_name	Epic internal name for each medication	
pharm_class_c	Category ID for the pharmacologic class	No
pharm_class	Pharmacologic class name (see References)	
pharm_subclass_c	Category ID for the pharmacologic subclass	No
pharm_subclass	Pharmacologic subclass name (see References)	
ingredient_rxcui	RxNorm Concept Unique Identifier (CUI) for a clinical drug ingredient (see References)	No
ingredient_rxcui_name	Name of the drug ingredient	
specific_rxcui	RxNorm concept unique identifier for a clinical drug (see References); this could be dose or brand level	No
specific_rxcui_type	e.g., SCD = Semantic Clinical Drug (see References)	
gpi	Generic Product Identifier (see References)	No
order_class	Classifies medication orders (e.g., Sample, Historical)	
ordering_mode	Inpatient vs. Outpatient	
order_status	Classifies the med order's status (e.g., Sent, Canceled)	
order_route	The medication route entered on the order	
freq_id	Epic internal ID for the frequency record	No
frequency	The administration frequency entered on the order	
dose	The dispensation amount entered on the order	
dose_unit	The dose unit entered on the order	
quantity	Medication dispense/quantity	
part_of_mix_yn	Y=Yes, N=No	
mix_ingredient_type	Classifies the medication mixture ingredient	
mix_parent_medication_id	Epic internal ID for the parent mixture medication	No
mix_parent_medication_name	Epic name for the parent mixture medication	
auth_prov_id	The ID of the provider who authorized the order	No

auth_provider	The name of the provider who authorized the order	
auth_provider_type	The role of the provider who authorized the order	
auth_prov_title	The authorizing provider's credentials	

Medications Administered

Source: Epic

Primary date for sort/filter: order_date_time

MAR = Medication Administration Record

*Table Granularity: each row represents a specific MAR administration of a specific medication ingredient for a specific medication order from a specific encounter for a specific patient, so a single patient could have multiple rows even if they only have a single encounter in their record; likewise, a single patient can have multiple administrations for a single medication ingredient

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
order_med_id*	Unique patient-specific ID for a medication order	Yes
order_date	Date/time of the medication order	Yes, shifted
medication_id	Epic internal ID for each medication	No
medication_name	Epic internal name for each medication	
instance_num	This number represents the scheduled frequency of each medication order within the MAR	
mar_event_time*	Date/time associated with each administration	Yes, shifted
mar_action	The MAR action associated with each administration (e.g., Due, Given, New Bag, Completed)	
mar_dose	The dose for each medication administration	
mar_dose_unit	The dose unit for each medication administration	
mar_route	The route associated with each administration	
pharm_class_c	Category ID for the pharmacologic class	
pharm_class	Pharmacologic class name (see References)	
pharm_subclass_c	Category ID for the pharmacologic subclass	
pharm_subclass	Pharmacologic subclass name (see References)	
ingredient_rxcui*	RxNorm Concept Unique Identifier (CUI) for a clinical drug ingredient (see References)	No
ingredient_rxcui_name	Name of the drug ingredient	
specific_rxcui	RxNorm Concept Unique Identifier (CUI) for a clinical drug (see References); this could be dose or brand level	No
specific_rxcui_type	e.g., SCD = Semantic Clinical Drug (see References)	
gpi	Generic Product Identifier (see References)	No
order_class	Classifies medication orders (e.g., Sample, Historical)	
ordering_mode	Inpatient vs. Outpatient	

order_status	Classifies the med order's status (e.g., Sent, Canceled)	
freq_id	Epic internal ID for the frequency record	No
frequency	The administration frequency entered on the order	
order_dose	The dispensation amount entered on the order	
order_dose_unit	The dose unit entered on the order	
quantity	Medication dispense/quantity	
part_of_mix_yn	Y=Yes, N=No	
mix_ingredient_type	Classifies the medication mixture ingredient	
mix_parent_medication_id	Epic internal ID for the parent mixture medication	No
mix_parent_medication_name	Epic name for the parent mixture medication	
auth_prov_id	The Epic ID of the provider who authorized the order	No
auth_provider	The name of the provider who authorized the order	
auth_provider_type	The role of the provider who authorized the order	
auth_prov_title	The authorizing provider's credentials	

NAACCR (Froedtert Only)

Source: NAACCR Tumor Registry (see [References](#))

NOTES: the NAACCR registry has its own data dictionary. This is a complicated database.

- The registry item number is embedded in our table column names as _N<item number> so you can search the NAACCR data dictionary by column name or item number
- The Froedtert health system cancer registrars abstract data from each hospital (Milwaukee, Meno Falls, West Bend) separately, so patients can have multiple rows for the same tumor from more than one hospital
- All date columns are shifted
- Primary date for sort/filter: date_of_first_contact

Columns listed here are ONLY those which are either used to build the composite key* to define a unique row AND/OR are unavailable in our Deidentified Honest Broker tool

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Deidentified MRN, the i2b2/TriNetX patient ID	Yes
PATIENT_ID_NUMBER_N20		PHI
PATIENT_SYSTEM_ID_HOSP_N21		PHI
TUMOR_RECORD_NUMBER_N60*		
ADDR_AT_DX...	Items 70,100	PHI
COUNTY_AT...	Items 89,90,94,95,96,97	PHI
CENSUS_TRACT...	Items 110,125,130,135	PHI
TEXT_USUAL_OCCUPATION_N310	Text items not de-identified	PHI
TEXT_USUAL_INDUSTRY_N320	Text items not de-identified	PHI

CENSUS_BLOCK...	Items 361,362,363,368	PHI
REPORTING_FACILITY_N540* **Commission on Cancer	CoC** code for the facility whose data are described in the record. A listing of valid FINs can be found at http://www.facs.org/cancer/coc/fin.html .	
ACCESSION_NUMBER_HOSP_N550*	Unique identifier for each patient in each hospital registry	PHI
SEQUENCE_NUMBER_HOSPITA_N560*	Indicates the sequence of all malignant & non-malignant neoplasms over the lifetime of the patient. If 2 or more malignant tumors are diagnosed at the same time, the lowest sequence # will be assigned to the diagnosis with the worst prognosis.	
DATE_OF1ST_CONTACT_N580	Primary sort date for table in Honest Broker	Yes, shifted
ADDR_CURRENT...	Items 1810,1830	PHI
COUNTY_CURRENT_N1840		PHI
FOLLOW_UP_CONTACT...	Items 1842,1846, 2392, 2393, 2394	PHI
DATE_CASE_LAST_CHANGED_N2100*		Yes, shifted
STATE_REQUESTOR_ITEMS_N2220		PHI
NAME...	Items 2230,2240,2250,2260,2270,2280,2290, 2390	PHI
MEDICAL_RECORD_NUMBER_N2300	This MRN could be different from the FH MRN	PHI
MILITARY_RECORD_NO_SUFF_N2310		PHI
MEDICARE_BENEFICIARY_ID_N2315		PHI
SOCIAL_SECURITY_NUMBER_N2320		PHI
ADDR...	Items 2330,2335,2350,2355	PHI
LATITUDE_N2352		PHI
LONGITUDE_N2354		PHI
TELEPHONE_N2360		PHI
DC_STATE_FILE_NUMBER_N2380		PHI
TEXT_DX_PROC...	Items 2520,2530,2540,2550,2560,2570	PHI
TEXT_PRIMARY_SITE_TITLE_N2580		PHI
TEXT_HISTOLOGY_TITLE_N2590		PHI
TEXT_STAGING_N2600		PHI
RX_TEXT...	Items 2610,2620,2630,2640,2650,2660,2670	PHI
TEXT_REMARKS_N2680		PHI
TEXT_PLACE_OF_DIAGNOSIS_N2690		PHI
NPCR_SPECIFIC_FIELD_N3720		PHI
PATH_REPORTING_FAC...	Items 7010,7011,7012,7013,7014	PHI
PATH_REPORT_NUMBER...	Items 7090,7091,7092,7093,7094	PHI
PATH_ORDER_PHYS_LIC...	Items 7100,7101,7102,7103,7104	PHI
PATH_ORDERING_FAC...	Items 7190,7191,7192,7193,7194	PHI

Ob/Gyn Mother & Baby Data (Froedtert Only)

Source: Epic

Primary date for sort/filter: mom_admit_dttm

*Table Granularity: each row represents data for a specific baby from a specific delivery encounter for a specific mother, so one mother could have multiple rows even if she only has a single delivery encounter in her record

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
delivery_encounter_num*	ID of the delivery encounter	Yes
del_dept_id	ID of the department for the delivery encounter	
del_dept_name	Name of the department for the delivery encounter	
mom_admit_dttm	Date/time of the mother's delivery admission	Yes, shifted
mom_disch_dttm	Date/time of the mother's delivery discharge	Yes, shifted
mom_los	Mom's length of stay in days for the delivery encounter	
mom_disch_disp	Mom's discharge disposition from the delivery encounter	
mom_age_at_del	Mom's age at delivery in years	
mom_marital_status	Mom's current marital status	
mom_race	Mom's current race	
mom_ethnicity	Mom's current ethnicity	
mom_ht_ftin	Mom's height in feet/inches	
mom_wt_oz	Mom's weight in ounces	
mom_bmi	Mom's body mass index	
edd	Date/time of estimated delivery date	Yes, shifted
preeclampsia	Indicates presence of a preeclampsia diagnosis on the delivery encounter **this variable should be validated using the Diagnosis table**	
pregest_dm	Indicates presence of a pregestational diabetes diagnosis on the delivery encounter **this variable should be validated using the Diagnosis table**	
gestational_dm	Indicates presence of a gestational diabetes diagnosis on the delivery encounter **this variable should be validated using the Diagnosis table**	
placental_abruption	Indicates presence of a placental abruption diagnosis on the delivery encounter **this variable should be validated using the Diagnosis table**	
maternal_dvt	Indicates presence of a maternal deep vein thrombosis diagnosis on the delivery encounter **this variable should be validated using the Diagnosis table**	
mom_receive_antibiotics	Y/N if mother received antibiotics during labor	
mom_receive_steroids	Y/N if mother received steroids during labor	

induction_datetime	Date/time of induction of labor	Yes, shifted
rupture_membrane_datetime	Date/time of membrane rupture	Yes, shifted
rupture_membrane_type	Type of membrane rupture	
del_stage1_hrs	Length of the first stage of labor in hours	
del_stage2_hrs	Length of the second stage of labor in hours	
del_stage3_hrs	Length of the third stage of labor in hours	
cord_clamp_datetime	Date/time of umbilical cord clamping	Yes, shifted
placenta_delivery_datetime	Date/time of placenta delivery	Yes, shifted
bloodloss_del	The amount of blood lost in the delivery, in milliliters	
bloodloss_total	Total blood loss for a delivery encounter or pregnancy	
baby_mrn*	Froedtert medical record number in 00000000 format	PHI
baby_patient_num*	Masked MRN, the i2b2 patient number	Yes
birth_encounter_num	ID of the birth encounter	Yes
baby_yob_shifted	Baby's year of birth	Yes, shifted
baby_dob_shifted	Baby's date of birth	Yes, shifted
baby_dod_shifted	Baby's date of death	Yes, shifted
baby_admit_dttm_shifted	Date/time of the baby's birth admission	Yes, shifted
baby_disch_dttm_shifted	Date/time of the baby's birth discharge	Yes, shifted
baby_los	Baby's length of stay in days for the birth encounter	
baby_disch_disp	Baby's discharge disposition from the birth encounter	
baby_birth_ht_in	Baby's birth height in inches	
baby_birth_wt_oz	Baby's birth weight in ounces	
baby_birth_wt_gms	Baby's birth weight in grams	
gest_age_wks	Baby's gestational age in weeks and days	
apgar_1min_total	Baby's 1 minute Apgar score	
apgar_1min_breath	Baby's 1 minute Apgar breathing score	
apgar_1min_grimace	Baby's 1 minute Apgar grimace score	
apgar_1min_heartrate	Baby's 1 minute Apgar heart rate score	
apgar_1min_muscletone	Baby's 1 minute Apgar muscle tone score	
apgar_1min_skincolor	Baby's 1 minute Apgar skin color score	
apgar_5min_total	Baby's 5 minute Apgar score	
apgar_5min_breath	Baby's 1 minute Apgar breathing score	
apgar_5min_grimace	Baby's 1 minute Apgar grimace score	
apgar_5min_heartrate	Baby's 1 minute Apgar heart rate score	
apgar_5min_muscletone	Baby's 1 minute Apgar muscle tone score	
apgar_5min_skincolor	Baby's 1 minute Apgar skin color score	
apgar_10min_total	Baby's 10 minute Apgar score	
apgar_10min_breath	Baby's 10 minute Apgar breathing score	
apgar_10min_grimace	Baby's 10 minute Apgar grimace score	

apgar_10min_hearttrate	Baby's 10 minute Apgar heart rate score	
apgar_10min_muscltone	Baby's 10 minute Apgar muscle tone score	
apgar_10min_skincolor	Baby's 10 minute Apgar skin color score	
anesth_conc	Comma delimited list of all anesthesia methods for the delivery	
del_meth_id	ID of the delivery method used for the birth	
delivery_method	Name of the delivery method used for the birth	
baby_sex	Baby's current gender	
baby_race	Baby's current race	
baby_ethnicity	Baby's current ethnicity	
ob_gravidity	Number of pregnancies documented on the first OB visit up to 90 days after the delivery	
ob_parity	Number of viable offspring documented on the first OB visit up to 90 days after the delivery	
ob_multiple_births	Number of multiple births documented on the first OB visit up to 90 days after the delivery	

Problem List

Source: Epic

Primary date for sort/filter: date_for_filter

Dx = Diagnosis

*Table Granularity: each row represents a specific problem list diagnosis code from a specific encounter for a specific patient, so a single patient could have multiple rows even if they only have a single encounter in their record

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
epic_dx_id	Epic's internal ID for a problem list entry	No
epic_dx_description	Froedtert's internal name for the problem list diagnosis	
dx_code*	ICD diagnosis code	
dx_code_type	Indicates which ICD version the dx code is from	
dx_code_description	Standardized ICD description for each diagnosis code	
date_for_filter	Represents a coalesce of noted_date, date_of_entry, contact_date and resolved_date	Yes, shifted
noted_date	The date the problem was first diagnosed. This date will default to the encounter date unless the patient reports a problem start date that precedes the encounter.	Yes, shifted
resolved_date	The date the problem was resolved	Yes, shifted
date_of_entry	The date the problem was either first entered into the patient's medical record or last edited	Yes, shifted
chronic_yn	Indicates whether or not this problem is flagged as chronic	

principal_pl_yn	Is this problem the principal problem? Yes or No	
hospital_pl_yn	Is this problem a hospital problem? Yes or No	

Procedures (Px)

Source: Epic orders, Epic hospital billing, GEIDX professional billing

Primary date for sort/filter: i2b2_date (a coalescence of multiple date fields)

*Table Granularity: each row represents a specific procedure source for a specific procedure code from a specific encounter for a specific patient, so a single patient could have multiple rows even if they only have a single encounter in their record

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the encounter (may be fabricated if not from Epic)	Yes
enc_type (see value set)	Category for broad characterization of encounter type	
i2b2_date	Represents a coalesce of various procedure-related dates (service_date, specimen_taken_time, proc_bgn_time, order_time)	Yes, shifted
order_id	Unique patient-specific ID for a procedure order	Yes
procedure_source*	Indicates the source of the procedure coding	
proc_code	Epic code for procedure orders, some have coding embedded in them but many (like nursing orders) do not	No
px*	This represents the coding (e.g., CPT, HCPCS, none) linked to the procedure record	
px_type (see value set)	Indicates which coding system the px value is from	
procedure_name	Procedure name from Epic's procedure master file (EAP)	
quantity	The number of units for the procedure	
order_type_c	ID of the order type linked to the Epic procedure order	No
order_type_name	Epic order types broadly classify procedure orders	
order_status_c	ID of the Epic order status	No
order_status_name	Includes status such as Resulted, Completed, Sent	
provider_id	Epic ID of the provider linked to the procedure record	No
provider_name	Name of the provider linked to the procedure record	
provider_title	Credentials of the provider linked to the procedure record	
sourcesystem_cd	Indicates the source system for the data (e.g., IDX, Epic)	

Social Determinants of Health – SDOH Wheel (Froedtert Only)

Source: Epic

Primary date for sort/filter: contact_date

*Table Granularity: each row represents a specific social determinants of health review question or score from a specific encounter for a specific patient, so a single patient can have multiple rows

Column	Description	Encrypted?
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mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
contact_date	Date of the encounter on which social determinant history was taken	Yes, shifted
social_determinant	CRDW curated SDOH grouper (see grid below for detail)	
flo_meas_id	Unique ID for each SDOH flowsheet measurement	
disp_name	Display name of the flowsheet	
loinc_question_code	LOINC code for social determinant question	
answer_id	This value is either the category ID for the patient's answer to the question from Epic or the calculated score value	
answer_name	Category name for the patient's answer to the question	
loinc_answer_code	LOINC code for social determinant answer	
recorded_time	Date/time instant the reading was taken	Yes, shifted

social_determinant grouper	social_determinant questions
Alcohol Use	How often, how many drinks in a day, how often 6 or more
Financial Resource Strain	Hard to pay for basics
Food Insecurity	In last year... food didn't last, worried food would run out
Housing Stability	In last year... how many places, stay in shelter, unable to pay mortgage/rent
Intimate Partner Violence	In last year... afraid, physically hurt, emotionally abused, forced sex
PHQ	PHQ-2 and PHQ-9 – all questions and scores
Physical Activity	On average... how many days/week, how many minutes/day
Social Connections	Marital status, clubs/groups, attendance, friends/relative, phone activity
Stress	Recently feel stress/tense/restless/nervous/anxious or have sleep disturbance
Transportation	Missed medical appt/medication, missed work/meetings/daily activity

Social History – Lifestyle

Source: Epic

Primary date for sort/filter: contact_date

*Table Granularity: each row represents a specific social history review from a specific encounter for a specific patient, so a single patient can have multiple rows

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
contact_date	Date of the encounter on which tobacco history was taken	Yes, shifted
unknown_fam_hx_yn	Y if the patient's family history is unknown by the patient. N otherwise.	

edu_level_c	Category ID for the patient's highest level of school attended	
edu_level_name	Category name for the highest level of school attended	
years_education	Free text comments added by clinician regarding education *ONLY AVAILABLE ON IDENTIFIED TABLES*	PHI
alcohol_use_c	Category ID classifying the patient's history of alcohol use	
alcohol_use_name	Category name for the patient's history of alcohol use	
alcohol_oz_per_week	The fluid ounces of alcohol the patient consumes per week	
alcohol_freq_c	Category ID classifying the frequency of alcohol use	
alcohol_freq_name	Category name for the frequency of alcohol use	
alcohol_drinks_per_day_c	Category ID classifying the # of drinks per day	
alcohol_drinks_per_day_name	Category name for the # of drinks per day	
alcohol_comment	Free text comments added by clinician regarding alcohol use *ONLY AVAILABLE ON IDENTIFIED TABLES*	PHI
ill_drug_user_c	Category ID classifying the patient's history of illicit drug use	
ill_drug_user_name	Category name for the patient's history of drug use	
illicit_drug_cmt	Free text comments added by clinician regarding illicit drug use *ONLY AVAILABLE ON IDENTIFIED TABLES*	PHI
tobacco_user_c	Category ID classifying the patient's history of tobacco use	
tobacco_user_name	Category name for the patient's history of tobacco use	
tobacco_pak_per_dy	The number of packs of cigarettes the patient smokes per day, or null if the patient does not smoke.	
tobacco_used_years	Indicates the number of years a patient has smoked	
smoking_quit_date	Date on which the patient quit smoking	Yes, shifted
cigarettes_yn	Y if the patient uses cigarettes. N if the patient does not.	
pipes_yn	Y if the patient smokes a pipe. N if the patient does not.	
cigars_yn	Y if the patient uses cigars. N if the patient does not.	
snuff_yn	Y if the patient uses snuff. N if the patient does not.	
chew_yn	Y if the patient uses chewing tobacco. N if the patient does not.	
smokeless_tob_use_c	Category ID classifying the patient's smokeless tobacco use	
smokeless_tob_use_name	Category name for the patient's smokeless tobacco use	
tobacco_comment	Free text comments added by clinician regarding tobacco use *ONLY AVAILABLE ON IDENTIFIED TABLES*	PHI
sexually_active_c	Category ID classifying the patient's sexual activity status at the time of the encounter	
sexually_active_name	Category name for the patient's sexual activity status at the time of the encounter	
sex_comment	Free text comments added by clinician regarding sex activity *ONLY AVAILABLE ON IDENTIFIED TABLES*	PHI
female_partner_yn	Y if patient has a female sexual partner. N if patient does not.	
male_partner_yn	Y if patient has a male sexual partner. N if patient does not.	
condom_yn	Y if patient uses a condom during sexual activity. N if patient does not.	

pill_yn	Y if patient uses birth control pills. N if patient does not.	
diaphragm_yn	Y if patient uses a diaphragm. N if patient does not.	
iud_yn	Y if patient uses an IUD. N if patient does not.	
surgical_yn	Y if patient uses a surgical method of birth control such as hysterectomy, vasectomy, or tubal ligation. N if patient does not.	
spermicide_yn	Y if patient uses spermicide. N if patient does not.	
implant_yn	Y if patient uses an implant as a form of birth control. N if patient does not.	
rhythm_yn	Y if patient uses the rhythm method as a form of birth control. N if patient does not.	
injection_yn	Y if patient uses an injection as a form of birth control. N if patient does not.	
sponge_yn	Y if patient uses a sponge as a form of birth control. N if patient does not.	
inserts_yn	Y if the patient uses inserts as a form of birth control. N if patient does not.	
abstinence_yn	Y if patient practices abstinence. N if patient does not.	
fin_resource_strain_c	Category ID for the patient's level of financial strain	
fin_resource_strain_name	Category name for the patient's level of financial strain	
ipv_emotional_abuse_c	Category ID for the patient's emotional abuse from an intimate partner	
ipv_emotional_abuse_name	Category name for the patient's emotional abuse from an intimate partner	
ipv_fear_c	Category ID for the patient's fear of an intimate partner	
ipv_fear_name	Category name for the patient's fear of an intimate partner	
ipv_sexual_abuse_c	Category ID for the patient's sexual abuse from an intimate partner	
ipv_sexual_abuse_name	Category name for the patient's sexual abuse from an intimate partner	
ipv_physical_abuse_c	Category ID for the patient's physical abuse from an intimate partner	
ipv_physical_abuse_name	Category name for the patient's physical abuse from an intimate partner	
living_w_spouse_c	Category ID for the patient's spouse/partner living situation	
living_w_spouse_name	Category name for the patient's spouse/partner living situation	
daily_stress_c	Category ID for the patient's level of daily stress	
daily_stress_name	Category name for the patient's level of daily stress	
phone_communication_c	Category ID for the patient's level of phone communication with friends or family	
phone_communication_name	Category name for the patient's level of phone communication with friends or family	
socialization_freq_c	Category ID for the patient's level of in person socialization with friends or family	

socialization_freq_name	Category name for the patient's level of in person socialization with friends or family	
church_attendance_c	Category ID for the patient's level of religious svc attendance	
church_attendance_name	Category name for the patient's level of religious service attendance	
clubmtg_attendance_c	Category ID for the patient's level of club/org meeting attendance in a year	
clubmtg_attendance_name	Category name for the patient's level of club/org meeting attendance in a year	
club_member_c	Category ID for the patient's membership in any clubs/orgs	
club_member_name	Category name for the patient's membership in any clubs/orgs	
phys_act_days_per_week_c	Category ID for the patient's level of weekly physical activity	
phys_act_days_per_week_name	Category name for the patient's level of weekly physical activity	
phys_act_min_per_sess_c	Category ID for how many minutes are spent exercising on days that they exercise	
phys_act_min_per_sess_name	Category name for how many minutes are spent exercising on days that they exercise	
food_insecurity_scarce_c	Category ID for whether or not the patient had run out of food and was not able to buy more	
food_insecurity_scarce_name	Category name for whether or not the patient had run out of food and was not able to buy more	
food_insecurity_worry_c	Category ID for whether the patient worried about food running out in the past year or not	
food_insecurity_worry_name	Category name for whether the patient worried about food running out in the past year or not	
med_transport_needs_c	Category ID for whether the patient had difficulty regarding transportation for medical appointments and medicine	
med_transport_needs_name	Category name for whether the patient had difficulty regarding transportation for medical appts and medicine	
other_transport_needs_c	Category ID for whether the patient had difficulty regarding transportation for things other than medical appointments and medicine	
other_transport_needs_name	Category name for whether the patient had difficulty regarding transportation for things other than medical appointments and medicine	

Surgical Case

Source: Epic

Primary date for sort/filter: sched_start_time

*Table Granularity: each row represents a surgical log, so a single patient can have multiple rows

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id	ID of the Epic encounter	Yes
surgery_encounter_num/id	ID of the Epic surgery encounter	Yes

case_id	ID of the surgical case	Yes
log_id*	ID of the surgical log	Yes
sched_start_time	The scheduled date/time for the surgical case	Yes, shifted
hist_sched_dttm	Date/time the user scheduled the case	Yes, shifted
postop_dest_c	ID of the patient's post-operative destination	No
postop_dest	Name of the patient's post-operative destination	
service_c	Category ID for the surgical service of the case	No
surgical_service	Category name for the surgical service of the case	
case_class_c	Case classification ID for the surgical case	No
case_class	Case classification name for the surgical case (e.g., Elective)	
loc_id	ID of the location where the procedure is scheduled to be performed	No
loc_name	Name of the location where the procedure is scheduled to be performed	
room_id	Category ID for the room where the surgery was performed	
room_name	Category name for the room where the surgery was performed	
asa_rating_c	ASA rating category ID for the procedure from the case log	No
asa	ASA rating category name for the procedure from the case log	
log_type	Surgical vs. Procedure	
status_c	Category ID for the log status	No
or_status	Category name for the log status (e.g., Posted, Unposted)	
proc_ids	Epic ID(s) for the scheduled procedure(s)	No
proc_names	Epic name(s) for the scheduled procedure(s)	
anes_types	Epic name(s) for the type of anesthesia for each procedure	
mallampati_score	Airway patency score from the pre-op anesthesia note	
defaulted_length	Defaulted length of time for this procedure in minutes	
in_room	Date/time patient was wheeled into the room	Yes, shifted
out_of_room	Date/time patient was wheeled out of the room	Yes, shifted
anesthesia_start	Date/time anesthesia was started	Yes, shifted
induction	Date/time patient was induced	Yes, shifted
anesthesia_intubation	Date/time patient was intubated	Yes, shifted
emergence	Date/time patient emerged from anesthesia	Yes, shifted
extubation	Date/time patient extubated after anesthesia	Yes, shifted
anesthesia_finish	Date/time anesthesia was stopped	Yes, shifted
incision_open	Date/time incision was opened	Yes, shifted
incision_closed	Date/time incision was closed	Yes, shifted
procedure_start	Date/time procedure was started	Yes, shifted
procedure_finish	Date/time procedure was stopped	Yes, shifted
in_recovery_pacu	Date/time arrived in PACU	Yes, shifted
out_of_recovery_pacu	Date/time out of PACU	Yes, shifted

all_surgeon_roles	Comma separated list of all surgeon roles for the case	
primary_surgeons	Comma separated list of case primary surgeons	
surgery_residents	Comma separated list of case surgery residents	
surgery_fellows	Comma separated list of case surgery fellows	
all_surgeons	Comma separated list of all surgeon names for the case	
all_surgeons_prov_id	Comma separated list of all surgeon IDs for the case	No
all_anes_staff_roles	Comma separated list of all anesthesia staff roles for the case	
anesthesiologists	Comma separated list of case anesthesiologists	
anesthesia_residents	Comma separated list of case anesthesia residents	
crnas	Comma separated list of case CRNAs	
all_anes_staff	Comma separated list of all anesthesia staff names for the case	
all_anes_staff_prov_id	Comma separated list of all anesthesia staff IDs for the case	No

Vitals

Source: Epic Encounters

Primary date for sort/filter: measure_date

*Table Granularity: each row represents the most recent set of vitals measurements from a specific encounter for a specific patient, so a single patient can have multiple rows

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
measure_date	The date the measurement was recorded	Yes, shifted
height	The patient height in inches recorded during the encounter	
weight	The patient's weight in pounds as recorded during the encounter.	
bmi	The patient's Body Mass Index calculated using the recorded height and weight	
bp_diastolic	The diastolic portion of the patient's blood pressure measured at this encounter	
bp_systolic	The systolic portion of the patient's blood pressure measured at the encounter	
pulse	The patient's pulse taken during this encounter	
temperature	The patient's temperature taken during this encounter. This value is in degrees Fahrenheit regardless of how the temperature reading was entered.	
respirations	The patient's respiration rate as recorded during this encounter	
stopbang_score	The patient's most recent total stopbang_score recorded during this encounter. STOP-Bang screening tool for risk of obstructive sleep apnea.	

Reference Value Sets

Encounter Type [*enc_type*]

<https://pcorner.org/data-driven-common-model/>

AV	Ambulatory Visit	An in-person outpatient visit
ED	Emergency Visit	The patient was admitted and discharged from an emergency department
EI	ED to Inpatient	The patient started their stay as emergency and then admitted as inpatient
IP	Inpatient Stay	The patient was admitted (or planned to be) with inpatient status
IS	Non-Acute Institutional Stay	The patient was admitted to Hospice care
NI	No Information	Unable to link non-Epic data to a known Epic encounter
OA	Other Ambulatory	A patient-specific visit with clinical coding in which the patient was not present (e.g., Telephone, Refill, Lab Only, Patient Message)
OS	Observation Stay	The patient was admitted (or planned to be) with observation status
OT	Other	Non-visit documentation that typically contains important clinical data (e.g., Clinical Documentation, History, Letter, Scan, Abstract)
TH	Telehealth	A remote outpatient visit using video technology

Discharge Status [*discharge_status_c*]

<https://pcorner.org/data-driven-common-model/>

AF	Adult Foster Home	
AL	Assisted Living Facility	Group Home/Assisted Living
AM	Against Medical Advice	
AW	Absent Without Leave	
EX	Expired	
HH	Home Health	
HO	Home/Self Care	
HS	Hospice	Hospice in the Home or at a Medical Facility
IP	Other Acute Inpatient Hospital	
NH	Nursing Home/ICF	Intermediate Care Facility
OT	Other	Includes Court/Law Enforcement, ED Diversions
RH	Rehabilitation Facility	
RS	Residential Facility	Custodial/Support Care Facility
SH	Still in Hospital	Still Patient
SN	Skilled Nursing Facility	Includes Swing Bed
NI	No information	
UN	Unknown	Includes ED never arrived/left without being seen

Diagnosis Present on Admission [*dx_poa*]

<https://pcorner.org/data-driven-common-model/>

<https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/Coding>

Y	Diagnosis present at time of inpatient admission
N	Diagnosis not present at time of inpatient admission

U	Insufficient documentation to determine if the condition was present at the time of inpatient admission
W	Clinically undetermined. Provider unable to clinically determine whether the condition was present at the time of inpatient admission
1	Unreported / not used. Exempt from present-on-admission reporting.
NI	No information
UN	Unknown
OT	Other

Diagnosis Source [dx_source]

<https://pcorntest.org/data-driven-common-model/>

AD	Admitting	Encounter
DI	Discharge	Billing
FI	Final	Billing
IN	Interim	Encounter
NI	No information	Unable to link non-Epic data to a known Epic encounter
UN	Unknown	
OT	Other	Includes Medical History

Diagnosis Origin [dx_origin]

<https://pcorntest.org/data-driven-common-model/>

OD	Order/EHR	From an Epic order or encounter
BI	Billing	From hospital or physician billing transaction
CL	Claim	From a hospital or physician claim
DR	Derived	Imputed from NLP or other analytic process
NI	No information	Unable to determine origin
UN	Unknown	
OT	Other	Includes Medical History

Procedure Type (px_type)

<https://pcorntest.org/data-driven-common-model/>

09	ICD-9-CM (numbers w/wo a decimal)
10	ICD-10-PCS (alphanumeric)
CH	CPT or HCPCS
OT	Custom institutional coding

Ethnicity [hispanic_c]

<https://pcorntest.org/data-driven-common-model/>

Y	Yes, Hispanic
N	No, Non Hispanic
R	Refuse to answer
NI	No information

UN	Unknown
OT	Other

Race [*race_c*]

<https://pcorner.org/data-driven-common-model/>

01	American Indian or Alaska Native
02	Asian
03	Black or African American
04	Native Hawaiian or Other Pacific Islander
05	White or Caucasian
06	Multiple race/Multiracial
07	Refuse to answer
NI	No information
UN	Unknown
OT	Other

Sex [*sex_c*]

1	Female
2	Male
3	Unknown
950	Nonbinary
951	X
999	Other

Result Abnormal Indicator (*abnormal_ind*)

<https://pcorner.org/data-driven-common-model/>

AB	Abnormal
AH	Abnormally high
AL	Abnormally low
CH	Critically high
CL	Critically low
CR	Critical
IN	Inconclusive
NL	Normal
NI	No information
UN	Unknown
OT	Other

Result Modifier (*result_modifier*)

<https://pcorner.org/data-driven-common-model/>

EQ	Equal
GE	Greater than or equal to
GT	Greater than

LE	Less than or equal to
LT	Less than
TX	Text
NI	No information
NO	No higher/lower limit
UN	Unknown
OT	Other

References

Medication classes: <https://www.wolterskluwer CDI.com/drug-data/medi-span-electronic-drug-file/>

Medication GPIs: <https://www.wolterskluwer CDI.com/drug-data/gpi/>

NAACCR Tumor Registry: <https://apps.naacr.org/data-dictionary/data-dictionary>

- Click on the Version you want to review and then select the Data Descriptor Table

NCI Collaborative Staging <https://seer.cancer.gov/archive/manuals/2015/appendixc.html>

AJCC Staging System: <https://cancerstaging.org/Pages/default.aspx>

LOINC: <https://loinc.org>

RxNorm: <https://mor.nlm.nih.gov/RxNav/>

RxNorm CUI Types: <https://www.nlm.nih.gov/research/umls/rxnorm/docs/appendix5.html>

RUCA Codes: <https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/documentation/>

ADI: <https://www.neighborhoodatlas.medicine.wisc.edu/>

FIPS Codes: <https://www.census.gov/programs-surveys/geography/guidance/geo-identifiers.html>

Change Log

- Version 2.0 - July 2020 - aligned Children's tables to Froedtert format
- Version 2.1 - Aug 2020 - updated columns on Froedtert Genomics table
- Version 2.2 - Aug 2020 - added Admission Source & Hospital Service to Encounters table
- Version 2.3 - Sept 2020 - expanded Froedtert Social History tables variables
- Version 2.4 - Sept 2020 - added new Froedtert Imaging Orders table
- Version 2.5 - Jan 2021 - added Research Contact Preference columns to Patient Demographics table and filtered out patients who answer Do Not Contact from the identified Patient Contact table
- Version 2.6 - Mar 2021 - added Received Date column and added Tempus data source to Genomics table; added Telehealth (TH) to Encounter Type value set
- Version 2.7 - May 2021 - added Value Sets for Race and Ethnicity on Demographics table
- Version 2.8 - July 2021 - added Appendix A for Muse ECG Data available in the Jupyter Hub
- Version 2.9 - Nov 2021 - added Invitae data source to the Genomics table; added 4 new columns for SES variables to Patient Demographics along with reference links; added reference value sets for Diagnosis Origin, Lab Result Abnormal Indicator, and Procedure Type
- Version 2.10 - Nov 2021 - added Genomics Summary and Genomics Invitae tables; added new columns in Encounters for Appt Status ID, Visit Type ID, Admit for Surgery, Surgical Service ID and Surgical Service Name
- Version 2.11 – Feb 2022 – updated Appendix A ekg_meas_matrix and ekg_meas_matrix_leads tables with new columns
- Version 2.12 – Mar 2022 – added new Genomics table for Ambry genetic testing results
- Version 2.13 – May 2022 – added Value Set reference for Sex on Demographics table and added new Surgical Case table definition
- Version 2.14 – Sept 2022 – added new columns for Gender Identity on Demographics table
- Version 2.15 – Nov 2022 – updated definitions for Discharge Status on the Encounters table and added Discharge Status reference table
- Version 2.16 – Dec 2022 – updated columns for Biospecimen, now available for both FH and CW
- Version 2.17 – Feb 2023 – added patient name to Demographics and STOP-Bang column to Vitals
- Version 2.18 – Mar 2023 – added new Children’s Imaging Orders and Surgical Case tables
- Version 2.19 – May 2023 – added new Social Determinants of Health SDOH Wheel table
- Version 2.20 – July 2023 – added reference table for Diagnosis Present on Admission (dx_poa) and added new column in Surgical Case for defaulted length of case
- Version 2.21 – Oct 2023 – updated NAACCR table to include ALL columns; the table defined in this document include ONLY columns that must be excluded on the De-identified table to protect PHI
- Version 2.22 – Oct 2023 – added a social determinant sub-table to better describe the SDOH groups and questions included in the table
- Version 2.23 – Jan 2024 – added new columns to Surgical Case, added Quantity to Procedures
- Version 2.24 – Jan 2024 – added two new Noah Audiogram tables

Appendix A - Muse Electrocardiogram (ECG/EKG) Database

GE Healthcare's Muse system captures resting ECG test data, both confirmed and unconfirmed.

- Confirmed tests - results were read and confirmed by a physician
- Unconfirmed tests - results were not interpreted or read by a physician

Interpretations are stored as free text and not available in Jupyter Hub which is a de-identified data environment. Only discrete de-identified data elements are available in these tables.

Muse receives ECG ordering data from Epic via an orders interface, tracings are performed and stored on a portable Muse cart, results are transferred to the main Muse database, and then physician interpretations are documented and stored in Muse. Discrete result data elements and narrative text interpretations (result comments) are interfaced back to Epic from Muse via a results interface. Charge messages are also generated in Muse and flow back to Epic via a separate charge interface.

ekg_patient_tracings

This table contains basic information about the patient for each ECG tracing record.

*Table Granularity: each row represents a single tracing record for a specific patient, so a single patient can have multiple rows

Column	Description	Encrypted?
patient_trac_id*	Unique Muse ID for the ECG tracing	Yes
patient_hash*	Unique encrypted Epic Patient ID - links to other tables	Yes
gender		
race		

ekg_order

This table contains information from Epic (denoted as HIS) about the ECG order.

Column	Description	Encrypted?
order_id	Unique Muse ID for the ECG order	Yes
patient_trac_id	Unique Muse ID for the ECG tracing	Yes
hist_test_type	ECG order abbreviation from Epic	
requisition_number	Epic ID for the ECG order - links to the Procedures table	Yes
his_location	Location of the patient from Epic (department abbreviation)	
extra_order_data1	ECG order abbreviation from Epic	
extra_order_data2	ECG order name from Epic	
extra_order_data3	Muse cart ID	
reason_for_test	Clinical indication - why the ECG was performed	
comments	null field - free text data are not available in de-identified form	
his_ordering_md_last_name	Last name of ordering provider from Epic	
his_ordering_md_first_name	First name of ordering provider from Epic	
ordering_md_id	Muse ID for the ordering provider	

ekg_test_demographics

This table contains basic information about the ECG tracing record.

Column	Description	Encrypted?
test_demographics_id	Unique Muse ID for the ECG tracing record	Yes
patient_trac_id	Unique Muse ID for the ECG tracing	Yes
data_type	The value for this variable is always RESTING	
site_name	The value for this variable is always FROEDTERT	
acquisition_device	Name/acronym for the device on which the tracing was performed	
overreader_last_name	Last name of the provider who read the ECG tracing	
overreader_first_name	First name of the provider who read the ECG tracing	
acquisition_time	The time the ECG tracing was performed (00:00:00)	No
acquisition_date_shifted	The date the ECG tracing was performed	Yes, shifted
overreader_id	Unique Muse ID for the provider who read the ECG tracing	
status	The status of the tracing (e.g., Confirmed, Unconfirmed)	
location_name	The department in which the ECG was performed	
room_id	The room in which the ECG was performed	
test_reason	Clinical indication - why the ECG was performed	

ekg_resting_ecg_meas

Column	Description	Encrypted?
resting_ecg_meas_id	Unique Muse ID for the ECG measurement record	Yes
patient_trac_id	Unique Muse ID for the ECG tracing	Yes
systolic_bp	The systolic portion of the patient's blood pressure	
diastolic_bp	The diastolic portion of the patient's blood pressure	
ventricular_rate	Ventricular rate in BPM (beats per minute)	
atrial_rate	Atrial rate in BPM (beats per minute)	
printerval	P-R interval in msec (milliseconds)	
qrsduration	QRS duration in msec (milliseconds)	
qtinterval	Q-T interval in msec (milliseconds)	
qtcorrected	Bazett's algorithm	
paxis	P axis	
raxis	R axis	
taxis	T axis	
qrscount	QRS count	
qonset	Q onset (median complex sample point)	
qoffset	Q offset (median complex sample point)	
ponset	P onset (median complex sample point)	
poffset	P offset (median complex sample point)	
toffset	T onset (median complex sample point)	

ecgsample_base	ECG sample rate base	
ecgsample_exponent	ECG sample rate base exponent	
qtc_frederica	QT calculated with the Frederica algorithm	

ekg_qrs_times_types

*Table Granularity: each row represents a single QRS Times and Types record for a specific tracing record, so a single tracing record can have multiple rows

Column	Description	Encrypted?
qrs_times_types_id*	Unique Muse ID for the QRS Time/Type record	Yes
patient_trac_id*	Unique Muse ID for the ECG tracing	Yes
globalrr	The global mean R-R measurement	
qtrggr	Sample index of the QRS trigger from the start of the median (124 for 250 sps, 248 for 500 sps)	
qrs_number	The number of each QRS	
qrs_type	The beat type number for this QRS as determined by analysis	
qrs_time	The sample index (zero based) of the beginning of this QRS complex, from the beginning of the waveform	

ekg_waveform

*Table Granularity: each row represents a single waveform record for a specific tracing record, so a single tracing record can have multiple rows

Column	Description	Encrypted?
waveform_id*	Unique Muse ID for the ECG waveform record	Yes
patient_trac_id*	Unique Muse ID for the ECG tracing	Yes
waveform_type	Type of waveform record (Median or Rhythm)	
waveform_start_time	Offset in buffer to beginning of waveform. The value for this variable is always 0 (zero)	
number_of_leads	Total number of channels in the waveform excluding derived leads. For 12-lead, use 8. For 15-lead, use 11.	
sample_type	The value for this variable is always CONTINUOUS_SAMPLES	
sample_base	Sample rate base	
sample_exponent	Exponent value used in conjunction with the Sample Base value	
high_pass_filter	Applied to data before received by Muse (in hundredths of Hertz)	
low_pass_filter	Applied to data before received by Muse (in Hertz, usually 150)	
ac_filter	Applied to data before received by Muse (in Hertz)	

ekg_lead_data

*Table Granularity: each row represents a single lead record for a specific waveform record, so a single waveform record can have multiple rows

Column	Description	Encrypted?
lead_data_id*	Unique Muse ID for the ECG lead record	Yes

waveform_id*	Unique Muse ID for the ECG waveform record	Yes
lead_byte_count_total	Total uncompressed lead buffer size in bytes	
lead_time_offset	Offset of lead in reference to the waveform in milliseconds	
lead_sample_count_total	Total number of samples in the lead buffer	
lead_amplitude_units_per_bit	A/D scaling factor (number of volts per A/D bit)	
lead_amplitude_units	A/D scaling factor units (usually microvolts)	
lead_low_limit	Low limit value for a single lead measurement	
lead_high_limit	High limit value for a single lead measurement	
lead_id	The specific lead identifier (e.g., V1, V2)	
lead_offset_first_sample	Offset within lead buffer of first valid lead data	
first_sample_baseline	Amount of baseline shift	
lead_sample_size	Size of individual data sample in bytes	
lead_off	True/False value indicating that the lead is off	
excessive_acnoise	True/False value indicating that excessive AC noise is present	
muscle_noise	True/False value indicating that muscle noise is present	
lead_data_crc32	32-bit CRC of unencoded and uncompressed raw signal data for the current lead	
wave_form_data	Base64 encoded uncompressed raw data for the current lead. Each data sample must be in low byte/high byte format (little endian format).	

ekg_pharma_data

Column	Description	Encrypted?
pharma_data_id	Unique Muse ID for the ECG pharmaceutical record	Yes
patient_trac_id	Unique Muse ID for the ECG tracing	Yes
pharma_rrinterval	RR interval	
pharma_unique_ecgid	Unique ECG ID assigned by the cart	
pharma_ppinterval	PP interval	
pharma_cart_id	Value assigned by the cart	

ekg_meas_matrix

Column	Description	Encrypted?
meas_matrix_id	Unique Muse ID for the ECG measurement matrix record	Yes
patient_trac_id	Unique Muse ID for the ECG tracing	Yes
raw_data	This variable is a long character string of 18 global measurements as well as per-lead measurements consisting of 53 4-byte values per lead. The 4-bytes are broken into three parts: lead ID, measurement ID, and actual measurement value.	
pon	P-wave onset in median beat (in samples)	
poff	P-wave offset in median beat	

qon	Q-Onset in median beat	
qoff	Q-Offset in median beat	
ton	T-Onset in median beat	
toff	T-Offset in median beat	
nqrs	Number of QRS Complexes	
qrsdur	QRS Duration	
qt	QT Interval	
qtc	QT Corrected	
print	PR Interval	
vrate	Ventricular Rate	
avgrr	Average R-R Interval	

ekg_meas_matrix_leads

Column	Description	Encrypted?
meas_matrix_lead_id	Unique Muse ID for the ECG measurement matrix lead	Yes
meas_matrix_id	Unique Muse ID for the ECG measurement matrix record	Yes
lead_id	The specific lead identifier (e.g., V1, V2)	
pona	P Wave amplitude at P-onset	
pamp	P wave amplitude	
pdur	P wave duration	
bmpar	P wave area	
bmipi	P wave intrinsicoid (time from P onset to peak of P)	
p_amp	P Prime amplitude	
p_dur	P Prime duration	
bmppar	P Prime area	
bmppi	P Prime intrinsicoid (time from P onset to peak of P')	
qamp	Q wave amplitude	
qdur	Q wave duration	
bmqar	Q wave area	
bmqi	Q intrinsicoid (time from Q onset to peak of Q)	
ramp	R amplitude	
rdur	R duration	
bmrrar	R wave area	
bmri	R intrinsicoid (time from R onset to peak of R)	
samp	S amplitude	
sdur	S duration	
bmsar	S wave area	

bmsi	S intrinsicoid (time from Q onset to peak of S)	
r_amp	R Prime amplitude	
r_dur	R Prime duration	
bmrpar	R Prime wave area	
bmrpi	R Prime intrinsicoid (time from Q onset to peak of R Prime)	
s_amp	S Prime Amplitude	
s_dur	S Prime Duration	
bmspar	S Prime wave area	
bmspi	S intrinsicoid (time from Q onset to peak of S prime)	
stj	STJ point, End of QRS Point Amplitude	
stm	STM point, Middle of the ST Segment Amplitude	
ste	STE point, End of ST Segment Amplitude	
mxsta	Maximum of STJ, STM, STE Amplitudes	
mnsta	Minimum of STJ and STM Amplitudes	
spta	Special T-Wave amplitude	
qrsa	Total QRS area	
qrsdef	QRS Deflection	
maxra	Maximum R Amplitude (R or R Prime)	
maxsa	Maximum S Amplitude (S or S Prime)	
tamp	T amplitude	
tdur	T duration	
bmtar	T wave area	
bmti	T intrinsicoid (time from STE to peak of T)	
t_amp	T Prime amplitude	
tpdur	T Prime duration	
bmtpar	T Prime area	
bmtpi	T Prime intrinsicoid (time from STE to peak of T)	
tend	T Amplitude at T offset	
parea	P wave area, includes P and P Prime	
qrsar	QRS area	
tarea	T wave area, include T and T Prime	
qrsint	QRS intrinsicoid	
Bitflg	Bitmask sum of (values) decoded as follows: <ul style="list-style-type: none"> • Bit 1 (2) :TTAL- Peak of T > ST measurement • Bit 2 (4) :STDOWN- ST Segment Depressed • Bit 3 (8) :STELEV- ST Segment Elevated • Bit 4 (16) :JELEV- J point Elevated by 100uV • Bit 5 (32) :DLTWV- Delta-Wave Detected • Bit 6 (64) :STINJ- ST Segment Elevated • Bit 7 (128):PPDEEP- P Prime Area was 1000uV*ms 	

Appendix B – Tables in Development

ECG/EKG Tracings

Source: Muse ECG/EKG system, Epic

Primary date for sort/filter: acquisition_datetime

*Table Granularity: each row represents a specific electrocardiogram tracing record from a specific encounter for a specific patient, so a single patient could have multiple rows, one row for each tracing record even if that patient only has one encounter in their record

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
enc_type (see value set)	Category for broad characterization of encounter type	
order_id	ID of the Epic order	Yes
patient_trac_id	Unique Muse ID for the ECG tracing	Yes
acquisition_datetime	GET THIS FROM MUSE_DATA TABLE	Yes, shifted
test_type	Muse procedure code from Epic orders interface	
test_name	Muse procedure name from Epic orders interface	
test_status	Muse tracing status	
test_location_abbrev	Muse tracing location department abbreviation from Epic	
test_location_name	Muse tracing location department name from Epic	
systolic_bp	The systolic portion of the patient's blood pressure	
diastolic_bp	The diastolic portion of the patient's blood pressure	
ventricular_rate	Ventricular rate in BPM (beats per minute)	
atrial_rate	Atrial rate in BPM (beats per minute)	
printerval	P-R interval in msec (milliseconds)	
qrsduration	QRS duration in msec (milliseconds)	
qtinterval	Q-T interval in msec (milliseconds)	
qtcorrected	Bazett's algorithm	
paxis	P axis	
raxis	R axis	
taxis	T axis	
qrscount	QRS count	
qonset	Q onset (median complex sample point)	
qoffset	Q offset (median complex sample point)	
ponset	P onset (median complex sample point)	
poffset	P offset (median complex sample point)	
toffset	T onset (median complex sample point)	

ecgsample_base	ECG sample rate base	
ecgsample_exponent	ECG sample rate base exponent	
qtc_frederica	QT calculated with the Frederica algorithm	
ordering_md_last_name		
ordering_md_first_name		
overreader_last_name		
overreader_first_name		
test_reason	Muse reason for tracing	Yes
result_comment	Text with findings from the reading cardiologist	Yes

Echo

Source: Xcelera echo imaging system, Epic

Primary date for sort/filter: **acquisition_datetime**

*Table Granularity: **each row represents a specific electrocardiogram tracing record from a specific encounter for a specific patient, so a single patient could have multiple rows, one row for each tracing record even if that patient only has one encounter in their record**

Column	Description	Encrypted?
mrn*	Note: Froedtert MRN is in 00000000 format	PHI
patient_num*	Masked MRN, the i2b2 patient number	Yes
encounter_num/id*	ID of the Epic encounter	Yes
enc_type (see value set)	Category for broad characterization of encounter type	
study_id	Unique Xcelera ID for the echocardiogram	Yes
acquisition_datetime		Yes, shifted
test_type	Muse procedure code from Epic orders interface	
test_name	Muse procedure name from Epic orders interface	
test_status	Muse tracing status	
test_location_abbrev	Muse tracing location department abbreviation from Epic	
test_location_name	Muse tracing location department name from Epic	
systolic_bp	The systolic portion of the patient's blood pressure	
diastolic_bp	The diastolic portion of the patient's blood pressure	
ventricular_rate	Ventricular rate in BPM (beats per minute)	
atrial_rate	Atrial rate in BPM (beats per minute)	
printerval	P-R interval in msec (milliseconds)	
qrsduration	QRS duration in msec (milliseconds)	
qinterval	Q-T interval in msec (milliseconds)	
qtcorrected	Bazett's algorithm	
paxis	P axis	

raxis	R axis	
taxis	T axis	
qrscount	QRS count	
qonset	Q onset (median complex sample point)	
qoffset	Q offset (median complex sample point)	
ponset	P onset (median complex sample point)	
poffset	P offset (median complex sample point)	
toffset	T onset (median complex sample point)	
ecgsample_base	ECG sample rate base	
ecgsample_exponent	ECG sample rate base exponent	
qtc_frederica	QT calculated with the Frederica algorithm	
ordering_md_last_name		
ordering_md_first_name		
overreader_last_name		
overreader_first_name		
test_reason	Muse reason for tracing	Yes
result_comment	Text with findings from the reading cardiologist	Yes