Avoiding Hiccups with HCUP: A Beginner's Guide to HCUP at WMed

The following provides information on the documentation needed to complete a Healthcare Cost and Utilization Project (HCUP) research study at WMed. WMed's HCUP data sources are overseen by the WMed Data Analytics Unit (DASU). Any questions can be directed to dataanalytics@wmed.edu

Initiating a New HCUP Project

To initiate a new project and schedule a consultation with the DASU, please submit a Project Request & Triage form: https://edc.wmed.edu/surveys/?s=8KLWR3YFLW. Prior to the consultation, or project initiation meeting, teams should provide the DASU team with a draft of the protocol (see information on the protocol template below). Desired research questions **must** be listed.

Prior to project implementation and analysis, the DASU team requires the following documentation to be completed in full:

- 1. Word document protocol
- 2. Excel file template for target population and comorbidity/procedure ICD code descriptors

Protocol

A written protocol is required for all HCUP projects. An HCUP protocol template can be found on the WMed HRPP/IRB Forms and Templates webpage: https://wmed.edu/node/723.

Teams should complete the protocol to the best of their ability. Teams do **not** have to complete the statistical plan section; after meeting with the investigative team, a WMed biostatistician will assist with this section. It is important for study teams to list clear objectives and/or research questions in the protocol so the appropriate statistical analysis plan can be written.

Excel File of Data Descriptors and ICD Codes

In order to provide clarity for the biostatisticians and maximize efficiency, an International Classification of Diseases (ICD) Excel template has been created for collecting ICD codes for HCUP projects. Note: Teams **must** use this template for HCUP projects.

There are 3 sections in the Excel file: 1) defining the target population (inclusion/exclusion criteria), 2) comorbidities/ co-occurrences of interest, and 3) procedures of interest

How to Find Codes

The HCUP databases include billable ICD or PCS codes.

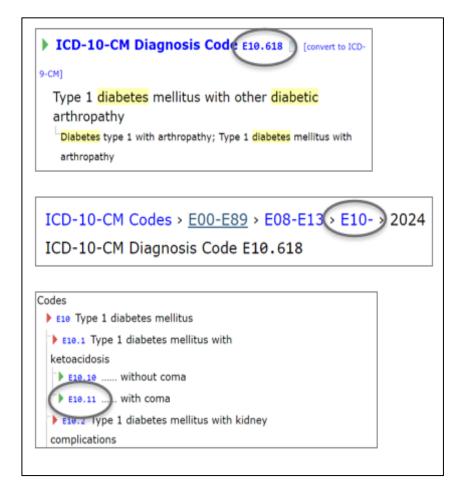
The following websites can be used to look up codes:

ICD 10: https://www.icd10data.com

ICD 9: https://www.icd9data.com

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    ▶ E10.1 Type 1 diabetes mellitus with ketoacidosis
    ▶ E10.10 ...... without coma
    ▶ E10.11 ..... with coma
    ▶ E10.2 Type 1 diabetes mellitus with kidney complications
    ▶ E10.21 Type 1 diabetes mellitus with diabetic nephropathy
    ▶ E10.22 Type 1 diabetes mellitus with diabetic chronic kidney disease
    ▶ E10.29 Type 1 diabetes mellitus with other diabetic kidney complication
    ▶ E10.3 Type 1 diabetes mellitus with ophthalmic complications
    ▶ E10.31 Type 1 diabetes mellitus with unspecified diabetic retinopathy
    ▶ E10.311 ..... with macular edema
    ▶ E10.319 ..... without macular edema
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Only the codes with the green arrows are searchable in HCUP; those with the red arrows will not pull results.



For example, if we want to look at the full hierarchy of options for type 1 diabetes, we would put diabetes in the search bar. Then, we could click on option E10.618 on the results screen. The next page will bring up more details on code E10.618. To see the full list of options for type 1 diabetes, we can then click on E10 to go back to the leading category. On the E10 page, if we scroll down to the codes, we can see all the codes that fall into the Type 1 diabetes category and can easily grab the ones with the green arrows that meet the search criteria for the project. So, if we were interested in patients with type 1 diabetes with ketoacidosis with coma, we would include E10.11 on the Excel spreadsheet.

Completing the Excel File of Data Descriptors and ICD Codes

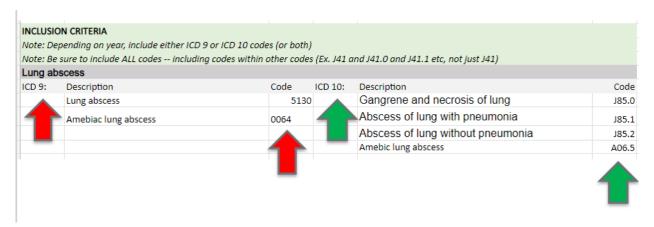
Target (Inclusion/Exclusion Criteria) Worksheet (1st tab)

The 1st worksheet (tab) of the Excel file is for placing inclusion and/or exclusion criteria.

This is	a sample template for submitting diagnosis codes for a HCUP project. It would biostatisticians whe				ity with the
This she	et is for designating the criteria for the population of interest.				
	ON CRITERIA				
	epending on year, include either ICD 9 or ICD 10 codes (or both)				
	sure to include ALL codes including codes within other codes (Ex. J41 and J4	11.0 and J	11.1 etc, n	ot just J41)	
Lung at	oscess				
ICD 9:	Description	Code	ICD 10:	Description	Co
	Lung abscess	5130)	Gangrene and necrosis of lung	J85
	Amebiac lung abscess	0064		Abscess of lung with pneumonia	J85
				Abscess of lung without pneumonia	J85
				Amebic lung abscess	A06
ANOTHE	R DIAGNOSIS, if applicable				
CD9:	Description	Code	ICD10:	Description	Code
OTHER C	CRITERIA (Not ICD Codes)				
	Only primary diagnosis				
	Adults age >= 18				
EXCLUSI	ON CRITERIA				
	Are there specific ICD codes you do NOT want in the target sample?				
History o	of tuberculosis				
CD 9:	Description	Code	ICD10:	Description	Code
	Primary tuberculous infection, unspecified	01000		J65 Pneumoconiosis associated with tuberculosis	J65
	Primary tuberculous infection, bacteriological or histological examin	01001		O98011 Tuberculosis complicating pregnancy	fi 098.01
	Primary tuberculous infection, bacteriological or histological examin	01002		O98012 Tuberculosis complicating pregnancy	
	Primary tuberculous infection, tubercle bacilli found (in sputum) by	01003		O98013 Tuberculosis complicating pregnancy	

Inclusion:

The first part is for inclusion codes (for identifying population of interest).



Teams should start in the dark grey header by stating the variable of interest (Lung Abscess).

Depending on the years the team is interested in analyzing, include ICD9 (1993-2014, red on left), ICD10 (2016-2021, green on right), or both. If teams are only doing ICD9 or ICD10, they need to only fill in that part of the Excel worksheet and leave the other part blank. For example, if a team is only interested in the years 2016-2021, they would fill out the ICD10 side and leave the ICD9 side blank.

Note: The ICD codes must be in their own column with no other text.

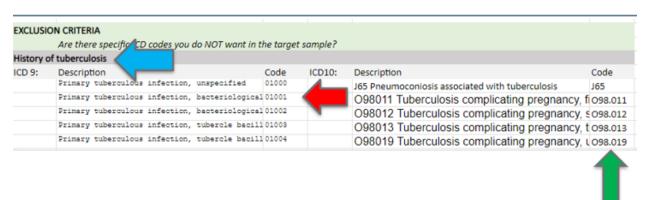
Teams can create another dark grey header and repeat the process if there is a second inclusion ICD criteria. For example, a team could do one dark grey header for 'Lung Abscess' and a second dark grey header for 'Fungus' if they want to look at cases of lung abscess AND fungus.

There is also an option to put other criteria not related to ICD codes, such as limit ICD codes to only primary diagnosis, limit to a specific age group, etc.

20					
21	OTHER CRITERIA (Not ICD Codes)				
22	Only primary diagnosis				
23	Adults age >= 18				
24					

Exclusion:

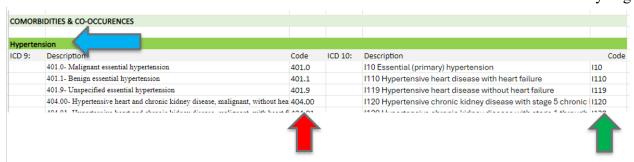
Still on the 1st tab, the team can put **exclusion** criteria (codes they want to **not** occur in sample)



A variable name goes in the dark grey header (blue arrow). Again, depending on the years of interest, the team would include the ICD codes for ICD9 (red arrow) and/or ICD 10 (green arrow).

Comorbidities/ Co-Occurrences Worksheet (2nd Tab)

The second tab allows for comorbidities and/or co-occurrences the team is interested in analyzing.



The heading should make it clear how to group the codes (i.e., which codes to include for a diagnosis, example 'Hypertension'). Depending on the years of interest, the team would include the ICD codes for ICD9 (red arrow) and/or ICD 10 (green arrow). Note: The ICD codes must be in their own column with no other text.

Teams are welcome to include as many or as few comorbidities as they desire for the project.

Elixhauser Comorbidity Software

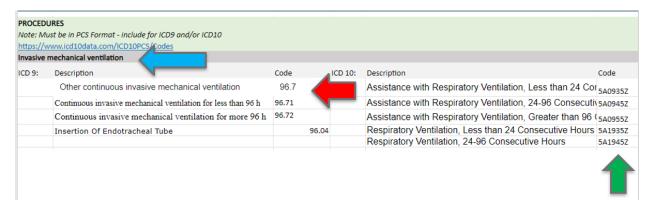
Some comorbidities are already included in the HCUP database. They are classified using the Elixhauser Comorbidity software. The table below contains a list of the variables.

Note: Some are only available in ICD9 or ICD10 but not both. If teams would rather use these than find individual ICD codes, they can indicate so on the Excel worksheet; simply put "AIDS - Elixhauser" (there is no need to then list additional ICD codes). Definitions for the codes included in each group can be found here: https://hcup-us.ahrq.gov/toolssoftware/comorbidityicd10/CMR-Reference-File-v2025-1.xlsx

Diagnosis	ICD9	ICD10
Aids	Y	Y
Alcohol abuse	Y	Y
Deficiency anemias	Y	Y
Autoimmune Conditions		Y
Rheumatoid arthritis/collagen vascular disease	Y	
Chronic blood loss anemia	Y	Y
Lymphoma	Y	Y
Leukemia		Y
Metastatic Cancer	Y	Y
Solid tumor without metastasis, in situ	Y	Y
Solid tumor without metastasis, malignant		Y
Cerebrovascular disease		Y
Congestive heart failure	Y	Y
Chronic pulmonary disease	Y	Y
Coagulopathy	Y	Y
Dementia		Y
Depression	Y	Y
Diabetes, uncomplicated	Y	Y
Diabetes with chronic complications	Y	Y
Drug abuse	Y	Y
Hypertension (uncomplicated and complicated)	Y	Y
Hypothyroidism	Y	Y
Other thyroid disorders		Y
Liver disease	Y	Y
Fluid and electrolyte disorders	Y	
Neurological disorders affecting movement		Y
Other neurological disorders	Y	Y
Seizures and epilepsy		Y
Obesity	Y	Y
Paralysis	Y	Y
Peripheral vascular disorders	Y	Y
Psychoses	Y	Y
Pulmonary circulation disorders	Y	Y
Renal failure	Y	Y
Peptic ulcer disease excluding bleeding	Y	Y
Valvular disease	Y	Y
Weight loss	Y	Y

Procedures Worksheet (3rd Tab)

The third and final tab of the Excel file allows for procedures, if applicable.



The heading should make it clear how to group the codes. Again, depending on the years of interest, the team would include the PCS codes for ICD9 (red arrow) and/or ICD 10 (green arrow).

Procedure codes must be **PCS format.** Codes can be accessed at this website: https://www.icd10data.com/ICD10PCS/Codes

Again, only the billable codes are recorded in HCUP (those with green arrows in the image below):

ICD-10-PCS > 0 > 1 > 2 > Peripheral Nerve

Peripheral Nerve

012Y Peripheral Nerve
012YX External
012YX0 Drainage Device
012YX0 Change Drainage Device in Peripheral Nerve, External Approach
012YXY Other Device
012YXYZ Change Other Device in Peripheral Nerve, External Approach

Note: The PCS codes must be in their own column in the Excel worksheet with no other text.