How to acquire and process American Community Survey 5-Year Estimates Demographics to link to MassGIS' Census 2020 Geography Files - 1/30/2023

MASSGIS Bureau of Geographic Information
A Statewide Resource for Geospatial Technology and Data

The following instructions were prepared by MassGIS to assist users who prefer a spreadsheet-driven approach in acquiring demographics data to link to the Census 2020 geography files processed for Massachusetts instead of the Census APIs or the Census' interactive Explore Tables interface. It focuses on the 5-year estimates produced by the 2021 American Community Survey (ACS), but the workflow can be modified to work with other vintages of ACS data published after 2020 (but not after 2029 when the 2030 Census geography will replace the 2020 geography).

This process uses the table-based format, not the sequence-based format, of ACS demographics tables. The sequence-based format is being phased out by the Census Bureau after 2021. This process also requires the user to have access to Excel or a similar spreadsheet software option and a basic understanding of its functionality. The ACS doesn't provide demographics at a level more granular than block groups, so this process is not suitable for use with the Census 2020 blocks geography. Please see the ACS technical documentation and methodology for a more comprehensive review of the program and its products.

A list of all the demographics tables available from the 2021 ACS can be found in this spreadsheet hosted on the Census Bureau website: https://www2.census.gov/programs-surveys/acs/tech_docs/table_shells/table_lists/2021_DataProductList.xlsx.

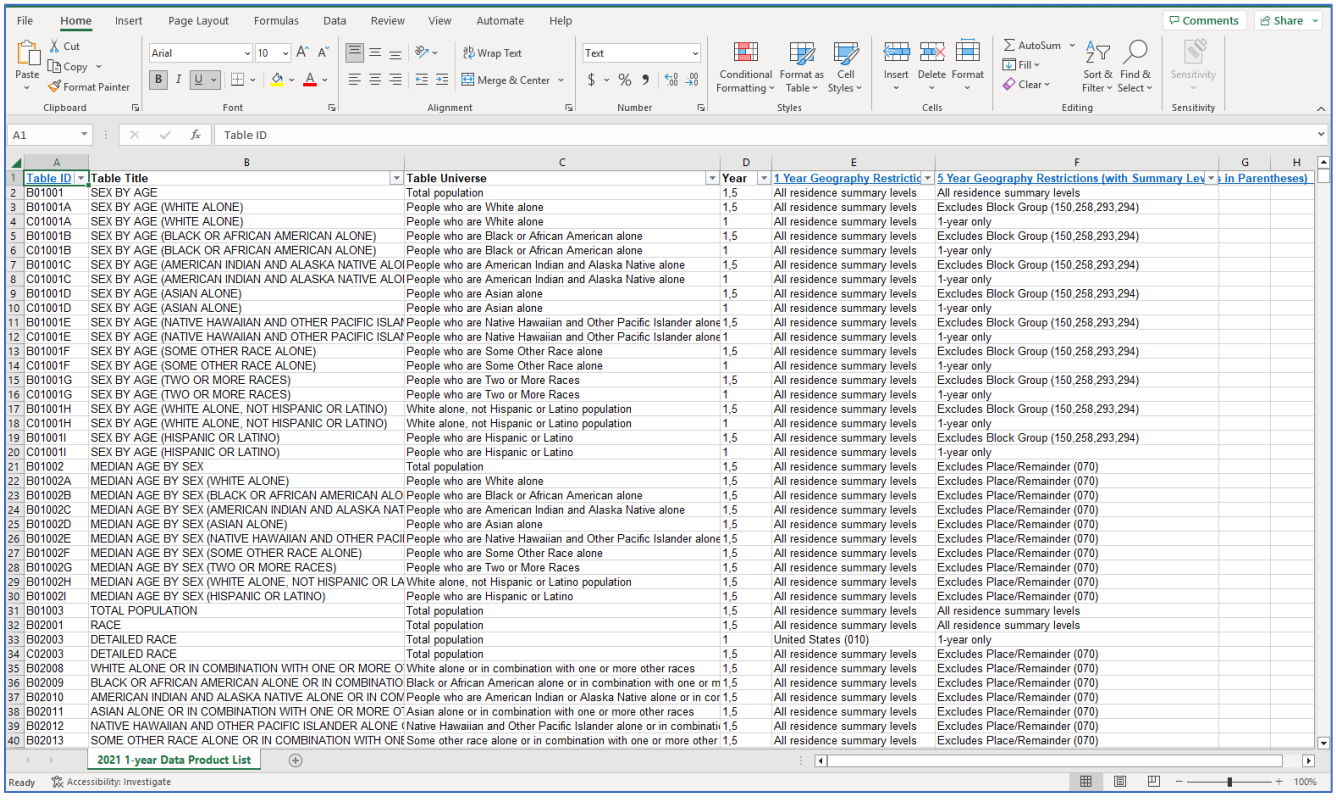
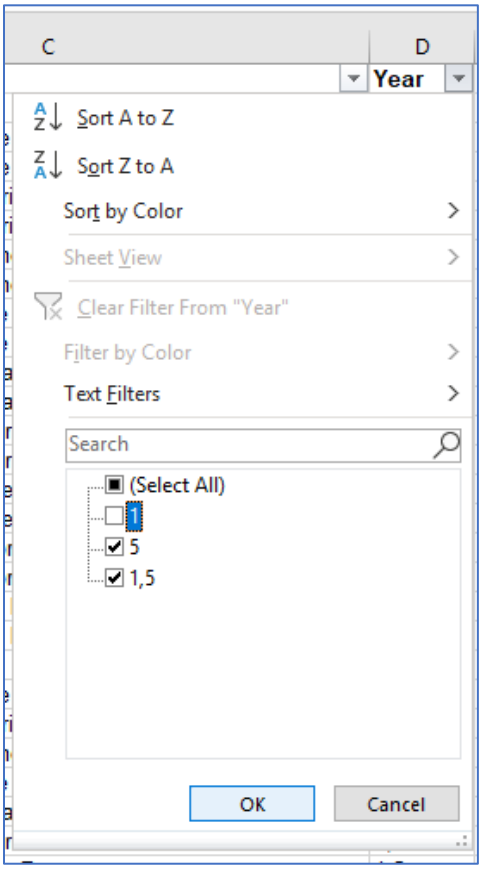


Table ID	Table Title	Table Universe	Year	1 Year Geography Restricti	5 Year Geography Restrictions (with Summary Lev	s in Parentheses)
B01001	SEX BY AGE	Total population	1,5	All residence summary levels	All residence summary levels	
B01001A	SEX BY AGE (WHITE ALONE)	People who are White alone	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001A	SEX BY AGE (WHITE ALONE)	People who are White alone	1	All residence summary levels	1-year only	
B01001B	SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)	People who are Black or African American alone	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001B	SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)	People who are Black or African American alone	1	All residence summary levels	1-year only	
B01001C	SEX BY AGE (AMERICAN INDIAN AND ALASKA NATIVE ALOI	People who are American Indian and Alaska Native alone	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001C	SEX BY AGE (AMERICAN INDIAN AND ALASKA NATIVE ALOI	People who are American Indian and Alaska Native alone	1	All residence summary levels	1-year only	
B01001D	SEX BY AGE (ASIAN ALONE)	People who are Asian alone	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001D	SEX BY AGE (ASIAN ALONE)	People who are Asian alone	1	All residence summary levels	1-year only	
B01001E	SEX BY AGE (NATIVE HAWAIIAN AND OTHER PACIFIC ISLAI	People who are Native Hawaiian and Other Pacific Islander alone	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001E	SEX BY AGE (NATIVE HAWAIIAN AND OTHER PACIFIC ISLAI	People who are Native Hawaiian and Other Pacific Islander alone	1	All residence summary levels	1-year only	
B01001F	SEX BY AGE (SOME OTHER RACE ALONE)	People who are Some Other Race alone	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001F	SEX BY AGE (SOME OTHER RACE ALONE)	People who are Some Other Race alone	1	All residence summary levels	1-year only	
B01001G	SEX BY AGE (TWO OR MORE RACES)	People who are Two or More Races	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001G	SEX BY AGE (TWO OR MORE RACES)	People who are Two or More Races	1	All residence summary levels	1-year only	
B01001H	SEX BY AGE (WHITE ALONE, NOT HISPANIC OR LATINO)	White alone, not Hispanic or Latino population	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001H	SEX BY AGE (WHITE ALONE, NOT HISPANIC OR LATINO)	White alone, not Hispanic or Latino population	1	All residence summary levels	1-year only	
B01001I	SEX BY AGE (HISPANIC OR LATINO)	People who are Hispanic or Latino	1,5	All residence summary levels	Excludes Block Group (150,258,293,294)	
C01001I	SEX BY AGE (HISPANIC OR LATINO)	People who are Hispanic or Latino	1	All residence summary levels	1-year only	
B01002	MEDIAN AGE BY SEX	Total population	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002A	MEDIAN AGE BY SEX (WHITE ALONE)	People who are White alone	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002B	MEDIAN AGE BY SEX (BLACK OR AFRICAN AMERICAN ALO	People who are Black or African American alone	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002C	MEDIAN AGE BY SEX (AMERICAN INDIAN AND ALASKA NAT	People who are American Indian and Alaska Native alone	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002D	MEDIAN AGE BY SEX (ASIAN ALONE)	People who are Asian alone	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002E	MEDIAN AGE BY SEX (NATIVE HAWAIIAN AND OTHER PACII	People who are Native Hawaiian and Other Pacific Islander alone	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002F	MEDIAN AGE BY SEX (SOME OTHER RACE ALONE)	People who are Some Other Race alone	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002G	MEDIAN AGE BY SEX (TWO OR MORE RACES)	People who are Two or More Races	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002H	MEDIAN AGE BY SEX (WHITE ALONE, NOT HISPANIC OR LA	White alone, not Hispanic or Latino population	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01002I	MEDIAN AGE BY SEX (HISPANIC OR LATINO)	People who are Hispanic or Latino	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B01003	TOTAL POPULATION	Total population	1,5	All residence summary levels	All residence summary levels	
B02001	RACE	Total population	1,5	All residence summary levels	All residence summary levels	
B02003	DETAILED RACE	Total population	1	United States (010)	1-year only	
C02003	DETAILED RACE	Total population	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B02008	WHITE ALONE OR IN COMBINATION WITH ONE OR MORE O	White alone or in combination with one or more other races	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B02009	BLACK OR AFRICAN AMERICAN ALONE OR IN COMBINATIO	Black or African American alone or in combination with one or m	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B02010	AMERICAN INDIAN AND ALASKA NATIVE ALONE OR IN COM	People who are American Indian or Alaska Native alone or in cor	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B02011	ASIAN ALONE OR IN COMBINATION WITH ONE OR MORE O	Asian alone or in combination with one or more other races	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B02012	NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER ALONE	Native Hawaiian and Other Pacific Islander alone or in combinati	1,5	All residence summary levels	Excludes Place/Remainder (070)	
B02013	SOME OTHER RACE ALONE OR IN COMBINATION WITH ONE	Some other race alone or in combination with one or more other	1,5	All residence summary levels	Excludes Place/Remainder (070)	

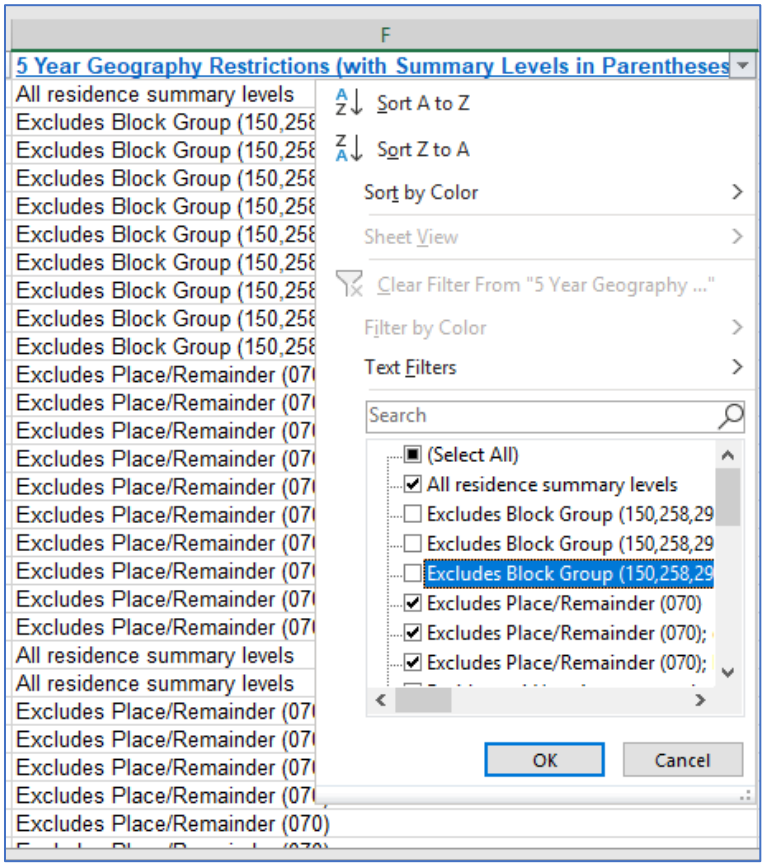
- **Download** this spreadsheet and **open** it in Excel (or similar spreadsheet software).

- In this spreadsheet, **apply filters** to column D [“Year”] and column F ["5 Year Geography Restrictions (with Summary Levels in Parentheses)"] to remove from consideration the tables that don’t contain information for the 5 year-estimates and the levels of geography one is interested in.

Year Filter



5 Year Geographic Restrictions Filter



The Year values should be “5” or “1,5” when looking for 5-year estimate tables.

The 5-Year Geography Restrictions filter will depend on which level of geography you want demographics for. The restriction values typically fall into two categories…

a) The restriction explicitly lists a specific subset of available geographies, or
b) The restriction implicitly includes all geographies not mentioned in an exclusion restriction (e.g. “Block Group (150, 258, 293, 294)” is a table that has demographics for all geographies the ACS aggregates data for except block groups)

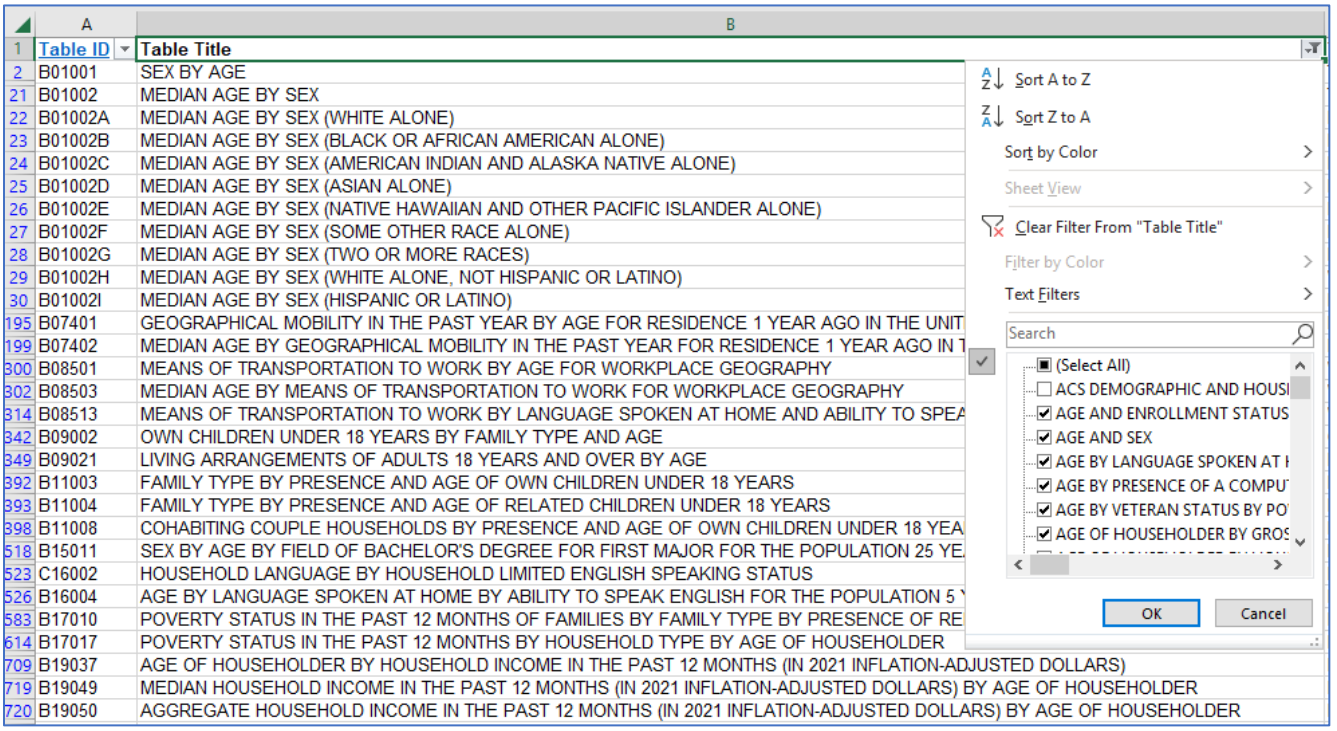
Note: The Census Bureau refers to cities and towns as “County Subdivisions” in the geographic hierarchy.

The following table denotes with a ☑ which geography restriction filters should be active to identify 5-year ACS demographics tables that are usable with each Census 2020 geography file available from MassGIS.

5-Year Geography Restriction	Block Groups	Census Tracts	County Subdivisions (Towns)
1-year only			
All residence summary levels	☑	☑	☑
Excludes Block Group (150,258,293,294)		☑	☑
Excludes Block Group (150,258,293,294); excludes Puerto Rico		☑	☑
Excludes Block Group (150,258,293,294); Puerto Rico only			
Excludes Place/Remainder (070)	☑	☑	☑
Excludes Place/Remainder (070); excludes Puerto Rico	☑	☑	☑
Excludes Place/Remainder (070); Puerto Rico only			
Residence 1 Year Ago geography; excludes Puerto Rico			☑
Residence 1 Year Ago geography; Puerto Rico only			
State (040); Puerto Rico only			
United States (010)			
United States (010), Region (020)			
United States (010), Region (020), Division (030), State (040)			
United States (010), Region (020), Division (030), State (040), Congressional District (500)			
United States (010), Region (020), Division (030), State (040); excludes Puerto Rico			
United States (010), Region (020), Division (030), State (040); Puerto Rico only			
United States (010), State (040)			
United States (010), State (040), County (050)			
United States (010), State (040), County (050), Census Tract (140), Block Group (150), Place (160), Congressional District (500), State Legislative District Upper (610), State Legislative District Lower (620)	☑	☑	
United States (010), State (040), County (050), Place (160)			
United States (010), State (040); excludes Puerto Rico			
United States (010), States (040), Metropolitan Division within Metropolitan Statistical Area (314), Combined Statistical Area (330), Congressional District (500), PUMA (795)			
Workplace geography			☑
Workplace geography; excludes County within Place (155)			
Workplace geography; excludes Place/Remainder (070) and County within Place (155)			☑

- After the appropriate filters have been activated, **review** the remaining records shown in the worksheet. Column B ["Table Title"] provides an indication of the subject matter each ACS table contains and Column A ["Table ID"] is that table's unique ID used in its downloadable file name. (The Table ID naming scheme is explained on this page.)

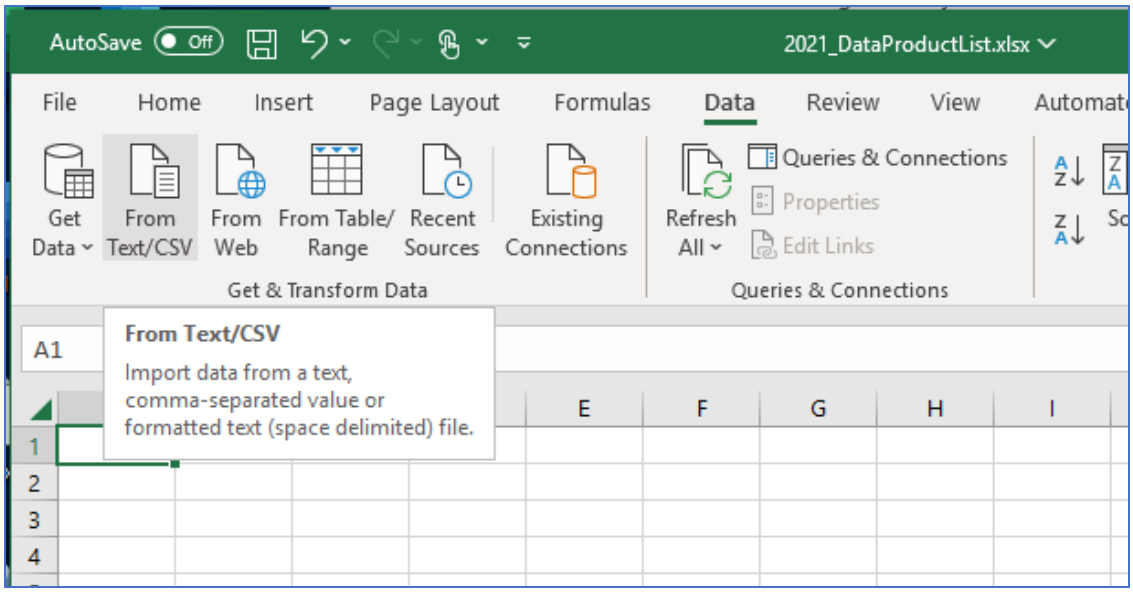
  One can narrow down the options by using the Search Bar in the Column B filter to search for common demographics keywords like "AGE", "RACE", "SEX", "INCOME", "DOLLARS", "WORK", "HOUSEHOLD", or other topics of interest. Additionally, only tables where the Table ID starts with "B" or "C" (but not "CP") are available from the data download site referenced in this document.



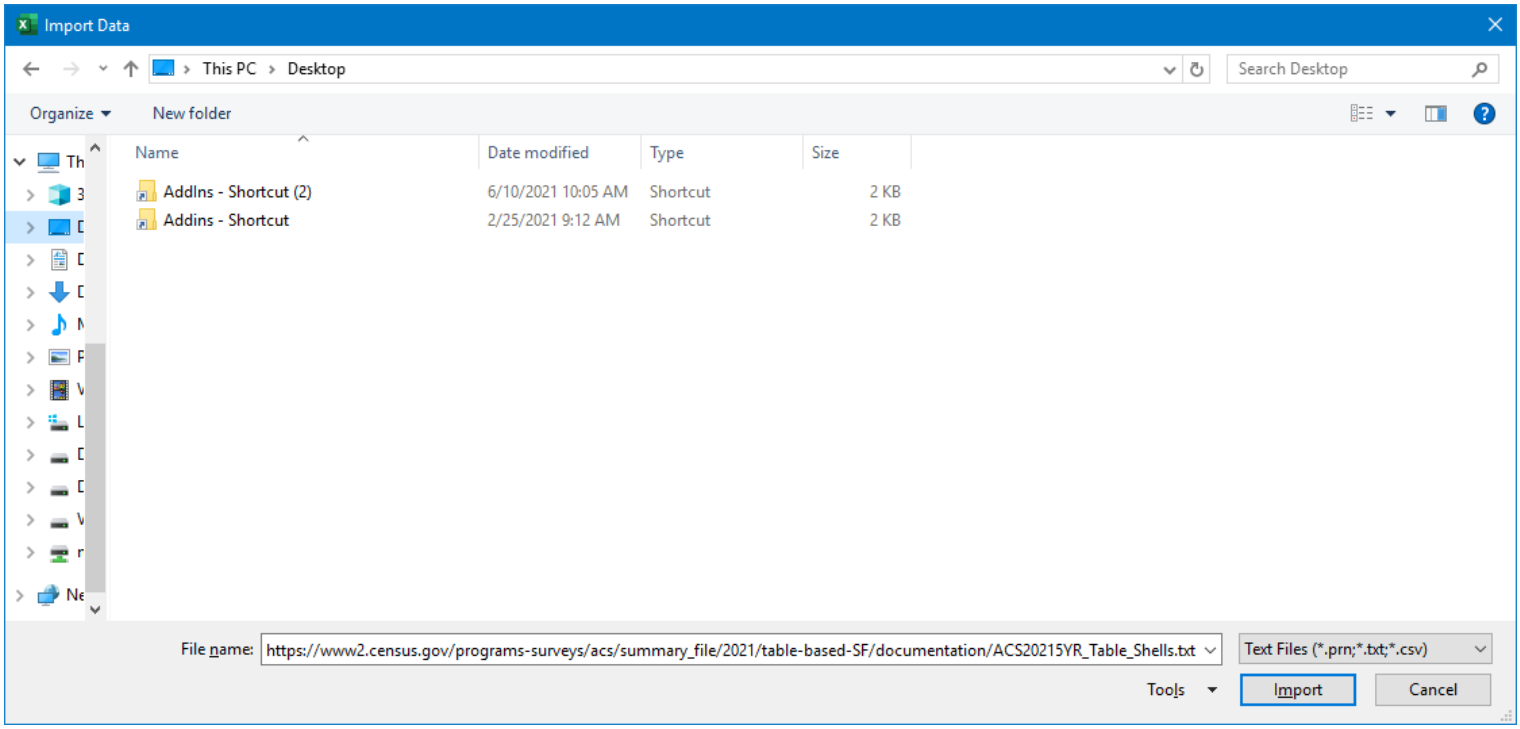
	A	B
1	Table ID	Table Title
2	B01001	SEX BY AGE
21	B01002	MEDIAN AGE BY SEX
22	B01002A	MEDIAN AGE BY SEX (WHITE ALONE)
23	B01002B	MEDIAN AGE BY SEX (BLACK OR AFRICAN AMERICAN ALONE)
24	B01002C	MEDIAN AGE BY SEX (AMERICAN INDIAN AND ALASKA NATIVE ALONE)
25	B01002D	MEDIAN AGE BY SEX (ASIAN ALONE)
26	B01002E	MEDIAN AGE BY SEX (NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER ALONE)
27	B01002F	MEDIAN AGE BY SEX (SOME OTHER RACE ALONE)
28	B01002G	MEDIAN AGE BY SEX (TWO OR MORE RACES)
29	B01002H	MEDIAN AGE BY SEX (WHITE ALONE, NOT HISPANIC OR LATINO)
30	B01002I	MEDIAN AGE BY SEX (HISPANIC OR LATINO)
195	B07401	GEOGRAPHICAL MOBILITY IN THE PAST YEAR BY AGE FOR RESIDENCE 1 YEAR AGO IN THE UNIT
199	B07402	MEDIAN AGE BY GEOGRAPHICAL MOBILITY IN THE PAST YEAR FOR RESIDENCE 1 YEAR AGO IN T
300	B08501	MEANS OF TRANSPORTATION TO WORK BY AGE FOR WORKPLACE GEOGRAPHY
302	B08503	MEDIAN AGE BY MEANS OF TRANSPORTATION TO WORK FOR WORKPLACE GEOGRAPHY
314	B08513	MEANS OF TRANSPORTATION TO WORK BY LANGUAGE SPOKEN AT HOME AND ABILITY TO SPEA
342	B09002	OWN CHILDREN UNDER 18 YEARS BY FAMILY TYPE AND AGE
349	B09021	LIVING ARRANGEMENTS OF ADULTS 18 YEARS AND OVER BY AGE
392	B11003	FAMILY TYPE BY PRESENCE AND AGE OF OWN CHILDREN UNDER 18 YEARS
393	B11004	FAMILY TYPE BY PRESENCE AND AGE OF RELATED CHILDREN UNDER 18 YEARS
398	B11008	COHABITING COUPLE HOUSEHOLDS BY PRESENCE AND AGE OF OWN CHILDREN UNDER 18 YEA
518	B15011	SEX BY AGE BY FIELD OF BACHELOR'S DEGREE FOR FIRST MAJOR FOR THE POPULATION 25 YE
523	C16002	HOUSEHOLD LANGUAGE BY HOUSEHOLD LIMITED ENGLISH SPEAKING STATUS
526	B16004	AGE BY LANGUAGE SPOKEN AT HOME BY ABILITY TO SPEAK ENGLISH FOR THE POPULATION 5 Y
583	B17010	POVERTY STATUS IN THE PAST 12 MONTHS OF FAMILIES BY FAMILY TYPE BY PRESENCE OF RE
614	B17017	POVERTY STATUS IN THE PAST 12 MONTHS BY HOUSEHOLD TYPE BY AGE OF HOUSEHOLDER
709	B19037	AGE OF HOUSEHOLDER BY HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2021 INFLATION-ADJUSTED DOLLARS)
719	B19049	MEDIAN HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2021 INFLATION-ADJUSTED DOLLARS) BY AGE OF HOUSEHOLDER
720	B19050	AGGREGATE HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2021 INFLATION-ADJUSTED DOLLARS) BY AGE OF HOUSEHOLDER

To discover the full set of attributes available in a given table, a second reference file is available from the Census Bureau; https://www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/documentation/ACS20215YR_Table_Shells.txt provides a comprehensive list of all attributes in all 2021 5-year estimates tables. For easier interactive review, it is recommended to add it as a new sheet in the copy of **2021_DataProductList.xlsx** you're working with. To do this…

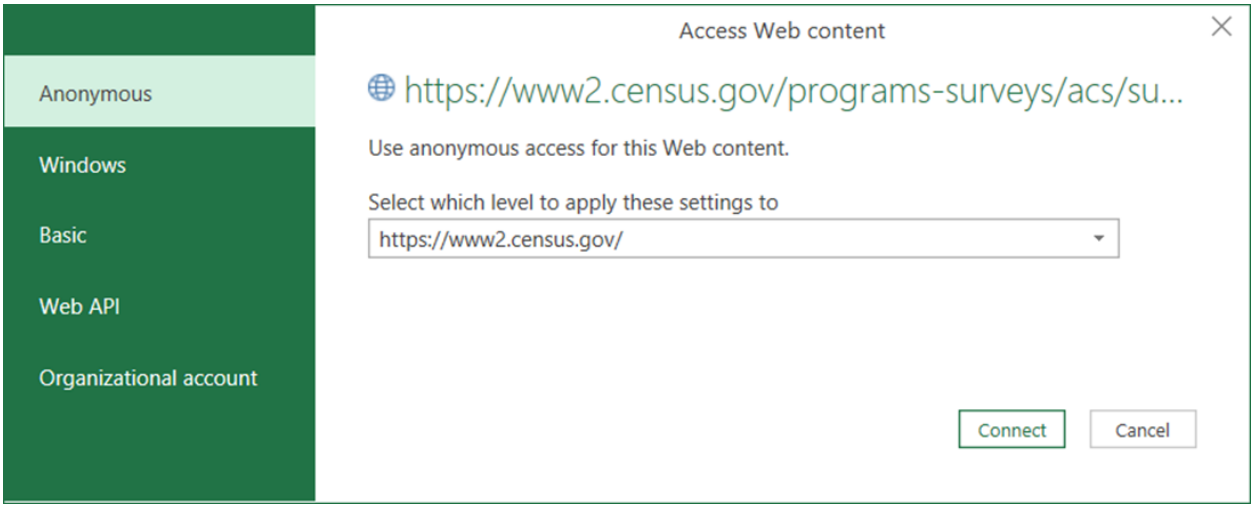
- **Switch** to the Data tab in the Excel Ribbon, and in the Get & Transform Data group, **click** on "From text/CSV".



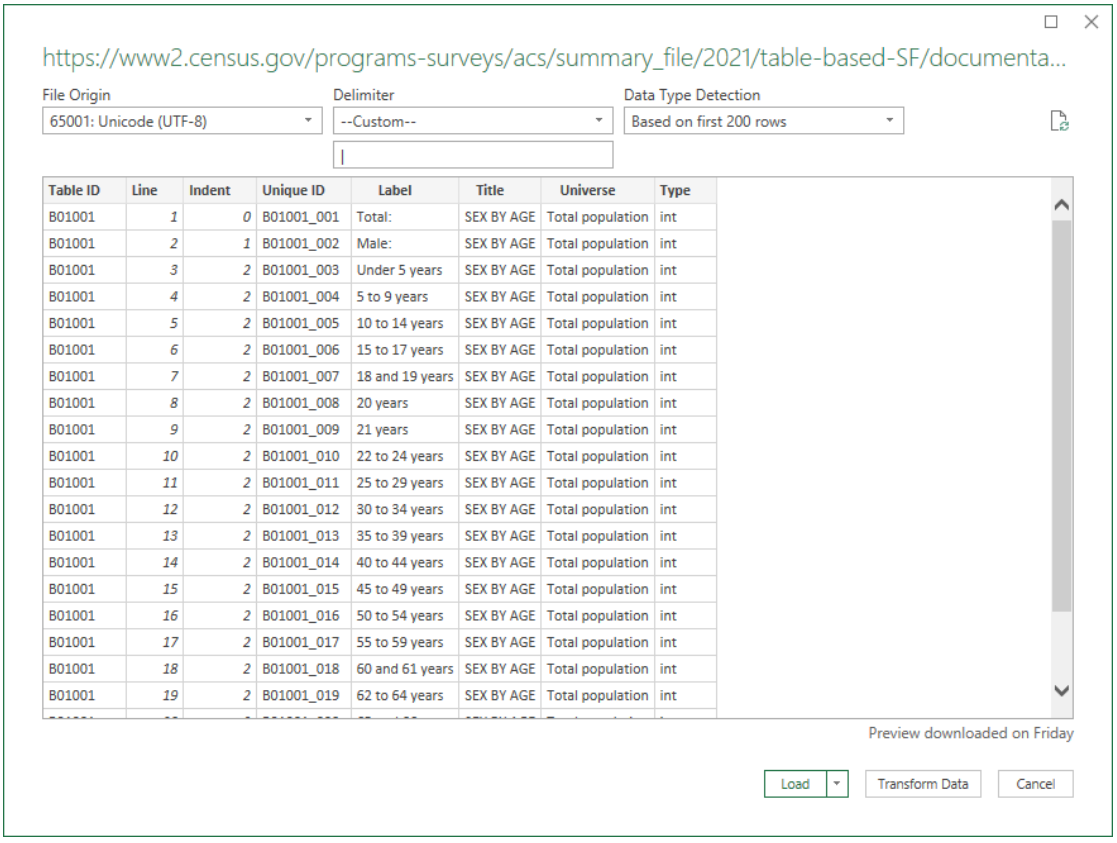
- In the pop-up that appears, **enter** the table shell text file URL from the previous paragraph as the File name.



- **Click** on the button that says “Open” or “Import” (and make sure you have no firewall or internet restrictions). A new pop-up window may appear requesting confirmation of anonymous access to the Census website. **Click** “Connect” if this happens.



Alternately, if this is not your first time connecting anonymously to the Census website, choosing “Open” or “Import” should directly launch the data loading pop-up window…



- After confirming that the Delimiter is set to "—Custom—" and the pipe symbol "|" appears beneath it, **click on the Load button**. A new worksheet should appear named ACS20215YR_Table_Shells.

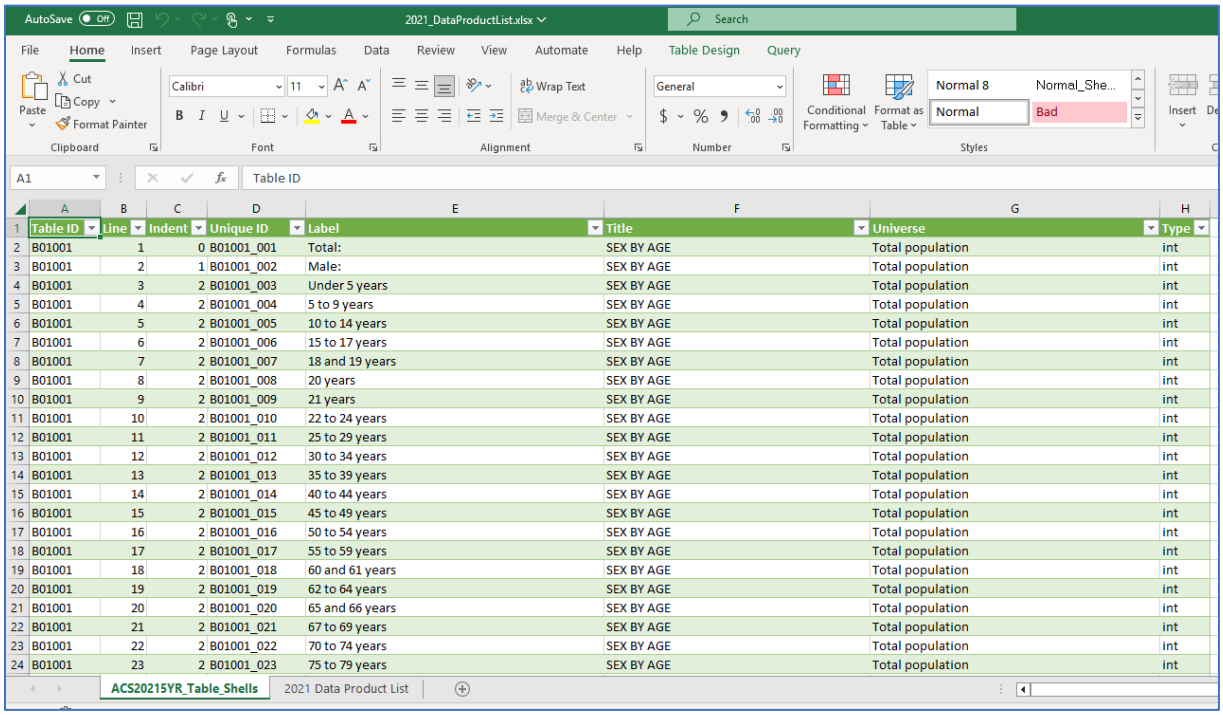
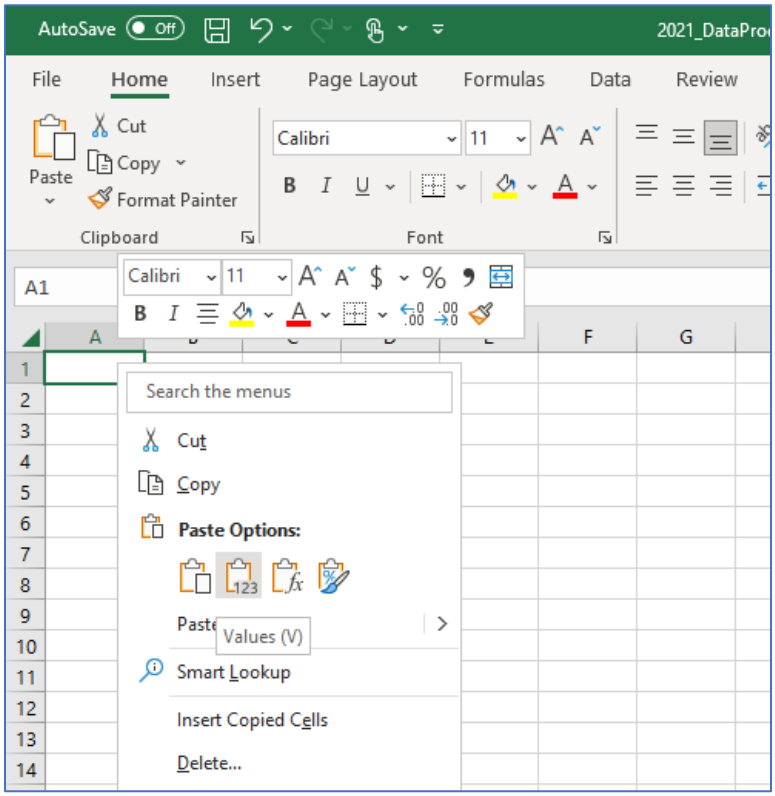


Table ID	Line	Indent	Unique ID	Label	Title	Universe	Type
B01001	1	0	B01001_001	Total:	SEX BY AGE	Total population	int
B01001	2	1	B01001_002	Male:	SEX BY AGE	Total population	int
B01001	3	2	B01001_003	Under 5 years	SEX BY AGE	Total population	int
B01001	4	2	B01001_004	5 to 9 years	SEX BY AGE	Total population	int
B01001	5	2	B01001_005	10 to 14 years	SEX BY AGE	Total population	int
B01001	6	2	B01001_006	15 to 17 years	SEX BY AGE	Total population	int
B01001	7	2	B01001_007	18 and 19 years	SEX BY AGE	Total population	int
B01001	8	2	B01001_008	20 years	SEX BY AGE	Total population	int
B01001	9	2	B01001_009	21 years	SEX BY AGE	Total population	int
B01001	10	2	B01001_010	22 to 24 years	SEX BY AGE	Total population	int
B01001	11	2	B01001_011	25 to 29 years	SEX BY AGE	Total population	int
B01001	12	2	B01001_012	30 to 34 years	SEX BY AGE	Total population	int
B01001	13	2	B01001_013	35 to 39 years	SEX BY AGE	Total population	int
B01001	14	2	B01001_014	40 to 44 years	SEX BY AGE	Total population	int
B01001	15	2	B01001_015	45 to 49 years	SEX BY AGE	Total population	int
B01001	16	2	B01001_016	50 to 54 years	SEX BY AGE	Total population	int
B01001	17	2	B01001_017	55 to 59 years	SEX BY AGE	Total population	int
B01001	18	2	B01001_018	60 and 61 years	SEX BY AGE	Total population	int
B01001	19	2	B01001_019	62 to 64 years	SEX BY AGE	Total population	int
B01001	20	2	B01001_020	65 and 66 years	SEX BY AGE	Total population	int
B01001	21	2	B01001_021	67 to 69 years	SEX BY AGE	Total population	int
B01001	22	2	B01001_022	70 to 74 years	SEX BY AGE	Total population	int
B01001	23	2	B01001_023	75 to 79 years	SEX BY AGE	Total population	int

If one's internet connection is slow or unreliable, one can optionally **copy** the entire contents of this worksheet into a new worksheet in the same workbook, using the Paste option for "Values" only.



If optionally copying and pasting into a new worksheet: After the paste is complete, **delete** the original worksheet and **rename** the new worksheet to have the original's name ("ACS20215YR_Table_Shells").

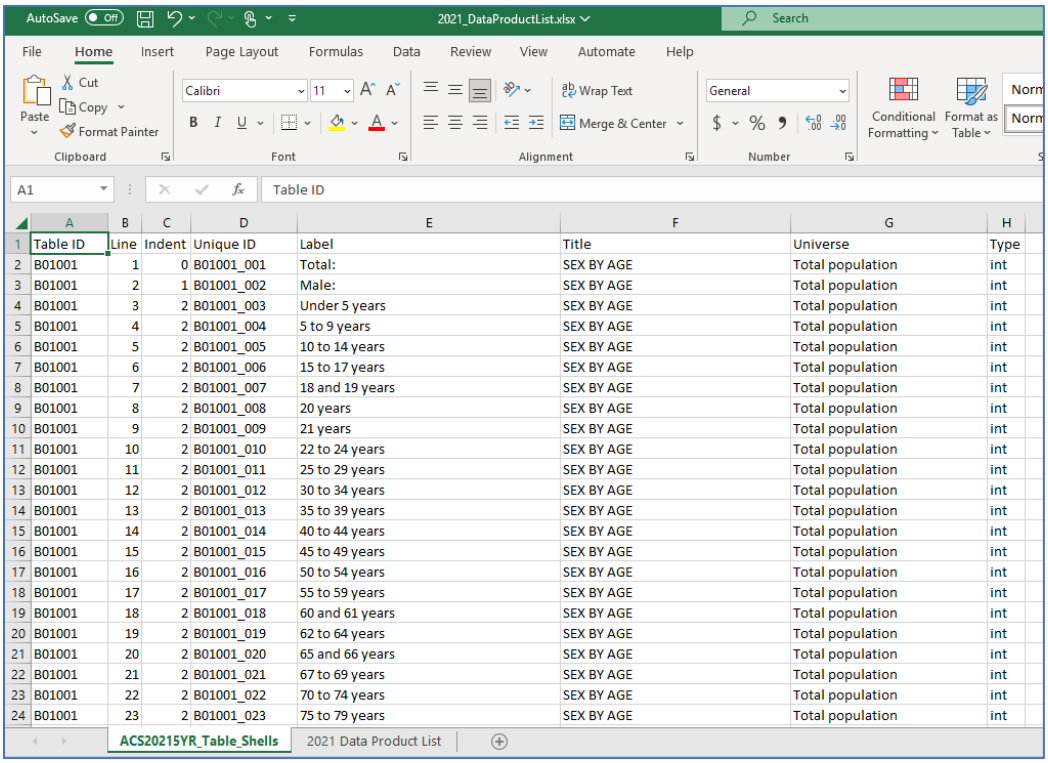


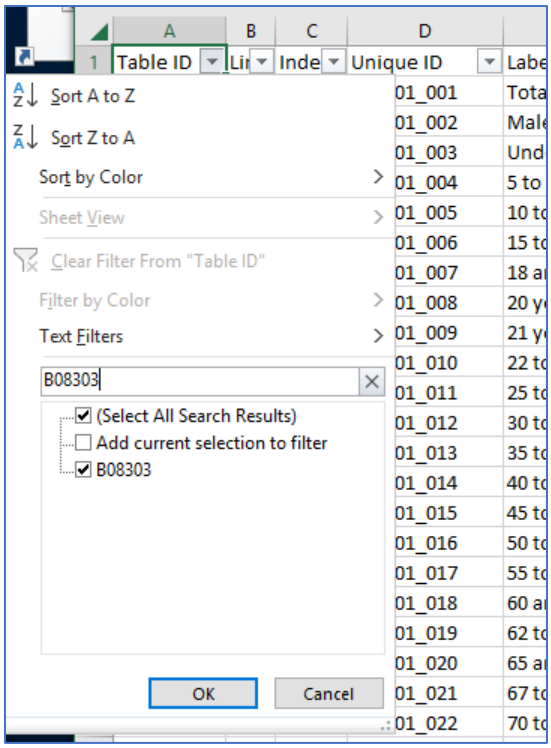
Table ID	Line	Indent	Unique ID	Label	Title	Universe	Type
B01001	1	0	B01001_001	Total:	SEX BY AGE	Total population	int
B01001	2	1	B01001_002	Male:	SEX BY AGE	Total population	int
B01001	3	2	B01001_003	Under 5 years	SEX BY AGE	Total population	int
B01001	4	2	B01001_004	5 to 9 years	SEX BY AGE	Total population	int
B01001	5	2	B01001_005	10 to 14 years	SEX BY AGE	Total population	int
B01001	6	2	B01001_006	15 to 17 years	SEX BY AGE	Total population	int
B01001	7	2	B01001_007	18 and 19 years	SEX BY AGE	Total population	int
B01001	8	2	B01001_008	20 years	SEX BY AGE	Total population	int
B01001	9	2	B01001_009	21 years	SEX BY AGE	Total population	int
B01001	10	2	B01001_010	22 to 24 years	SEX BY AGE	Total population	int
B01001	11	2	B01001_011	25 to 29 years	SEX BY AGE	Total population	int
B01001	12	2	B01001_012	30 to 34 years	SEX BY AGE	Total population	int
B01001	13	2	B01001_013	35 to 39 years	SEX BY AGE	Total population	int
B01001	14	2	B01001_014	40 to 44 years	SEX BY AGE	Total population	int
B01001	15	2	B01001_015	45 to 49 years	SEX BY AGE	Total population	int
B01001	16	2	B01001_016	50 to 54 years	SEX BY AGE	Total population	int
B01001	17	2	B01001_017	55 to 59 years	SEX BY AGE	Total population	int
B01001	18	2	B01001_018	60 and 61 years	SEX BY AGE	Total population	int
B01001	19	2	B01001_019	62 to 64 years	SEX BY AGE	Total population	int
B01001	20	2	B01001_020	65 and 66 years	SEX BY AGE	Total population	int
B01001	21	2	B01001_021	67 to 69 years	SEX BY AGE	Total population	int
B01001	22	2	B01001_022	70 to 74 years	SEX BY AGE	Total population	int
B01001	23	2	B01001_023	75 to 79 years	SEX BY AGE	Total population	int

- For a given table of interest in the Data Product List, **identify** its Table ID and **apply a filter** for that value in the Table Shells worksheet to see all the attributes available in that table.

Example: the selected record in the Data Product List is a table of interest with information about commuting times

248	B08018	PLACE OF WORK FOR WORKERS 16 YEARS AND OVER--NOT METROPOLITAN OR MICROPOLITAN STATISTICAL AREA LEVEL	Workers 16 years and over n
282	B08134	MEANS OF TRANSPORTATION TO WORK BY TRAVEL TIME TO WORK	Workers 16 years and over w
284	B08135	AGGREGATE TRAVEL TIME TO WORK (IN MINUTES) OF WORKERS BY TRAVEL TIME TO WORK	Workers 16 years and over w
285	B08136	AGGREGATE TRAVEL TIME TO WORK (IN MINUTES) OF WORKERS BY MEANS OF TRANSPORTATION TO WORK	Workers 16 years and over w
293	B08301	MEANS OF TRANSPORTATION TO WORK	Workers 16 years and over
295	B08302	TIME OF DEPARTURE TO GO TO WORK	Workers 16 years and over w
296	B08303	**TRAVEL TIME TO WORK**	Workers 16 years and over w
297	B08406	SEX OF WORKERS BY MEANS OF TRANSPORTATION TO WORK FOR WORKPLACE GEOGRAPHY	kers 16 years and over
299	B08412	SEX OF WORKERS BY TRAVEL TIME TO WORK FOR WORKPLACE GEOGRAPHY	kers 16 years and over w
300	B08501	MEANS OF TRANSPORTATION TO WORK BY AGE FOR WORKPLACE GEOGRAPHY	Workers 16 years and over
302	B08503	MEDIAN AGE BY MEANS OF TRANSPORTATION TO WORK FOR WORKPLACE GEOGRAPHY	Workers 16 years and over
303	B08505A	MEANS OF TRANSPORTATION TO WORK FOR WORKPLACE GEOGRAPHY (WHITE ALONE)	White alone workers 16 years

A filter is applied in the Table Shells worksheet using that table's Table ID

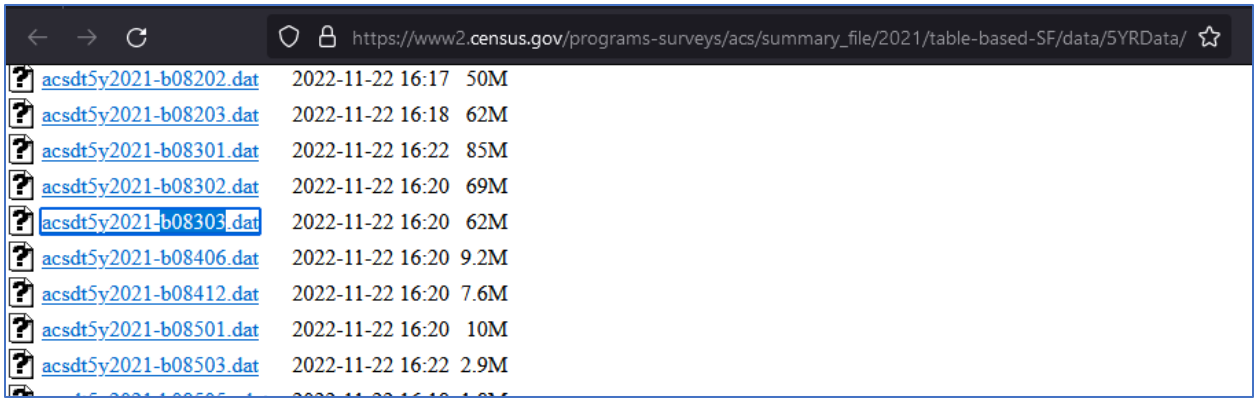


Result in the Table Shells worksheet

	A	B	C	D	E	F	G	H
1	Table ID	Li	Inde	Unique ID	Label	Title	Universe	Ty
5335	B08303	1	0	B08303_001	Total:	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5336	B08303	2	1	B08303_002	Less than 5 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5337	B08303	3	1	B08303_003	5 to 9 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5338	B08303	4	1	B08303_004	10 to 14 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5339	B08303	5	1	B08303_005	15 to 19 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5340	B08303	6	1	B08303_006	20 to 24 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5341	B08303	7	1	B08303_007	25 to 29 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5342	B08303	8	1	B08303_008	30 to 34 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5343	B08303	9	1	B08303_009	35 to 39 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5344	B08303	10	1	B08303_010	40 to 44 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5345	B08303	11	1	B08303_011	45 to 59 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5346	B08303	12	1	B08303_012	60 to 89 minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int
5347	B08303	13	1	B08303_013	90 or more minutes	TRAVEL TIME TO WORK	Workers 16 years and over wh	int

- When a table is identified that contains demographics of interest to process for linking to the MassGIS processed Census 2020 geography files, **locate** it at the following Census Bureau website: https://www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/data/5YRData/.

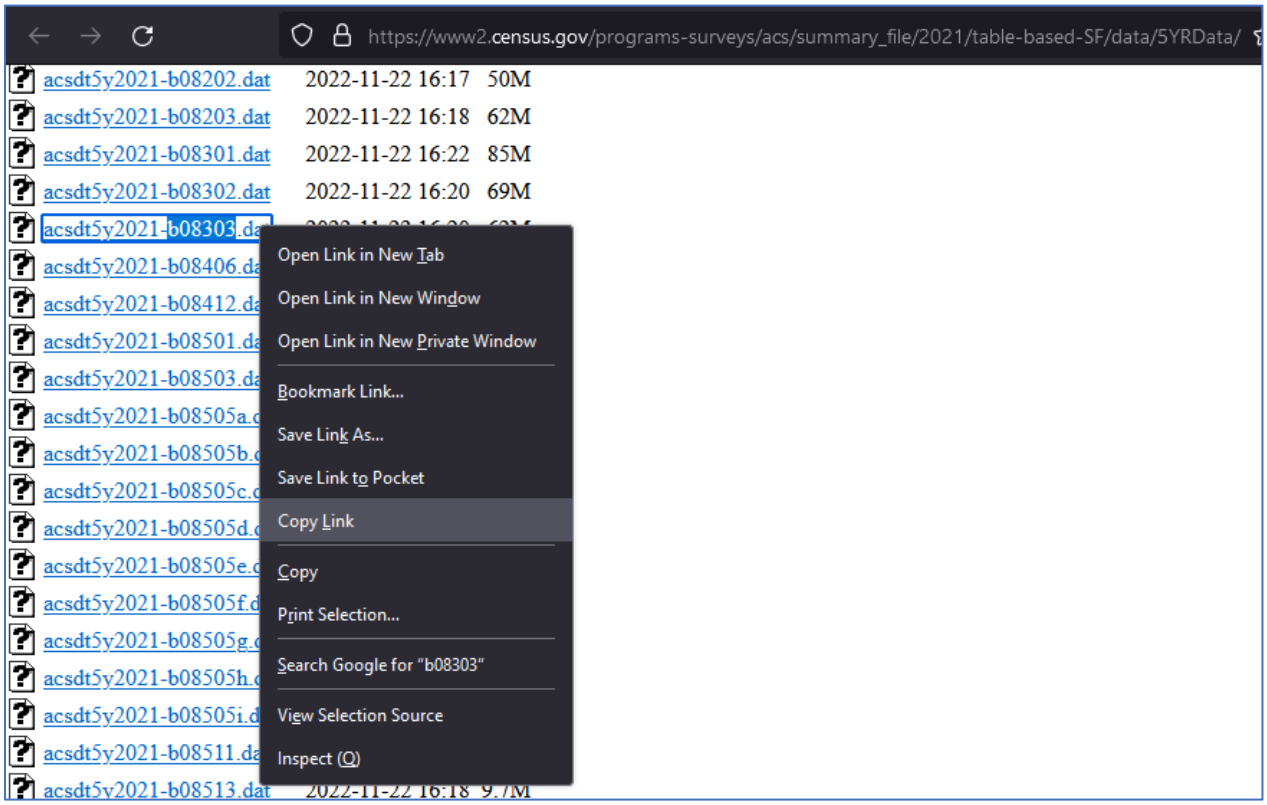
  The Table ID is part of the .dat file's name.



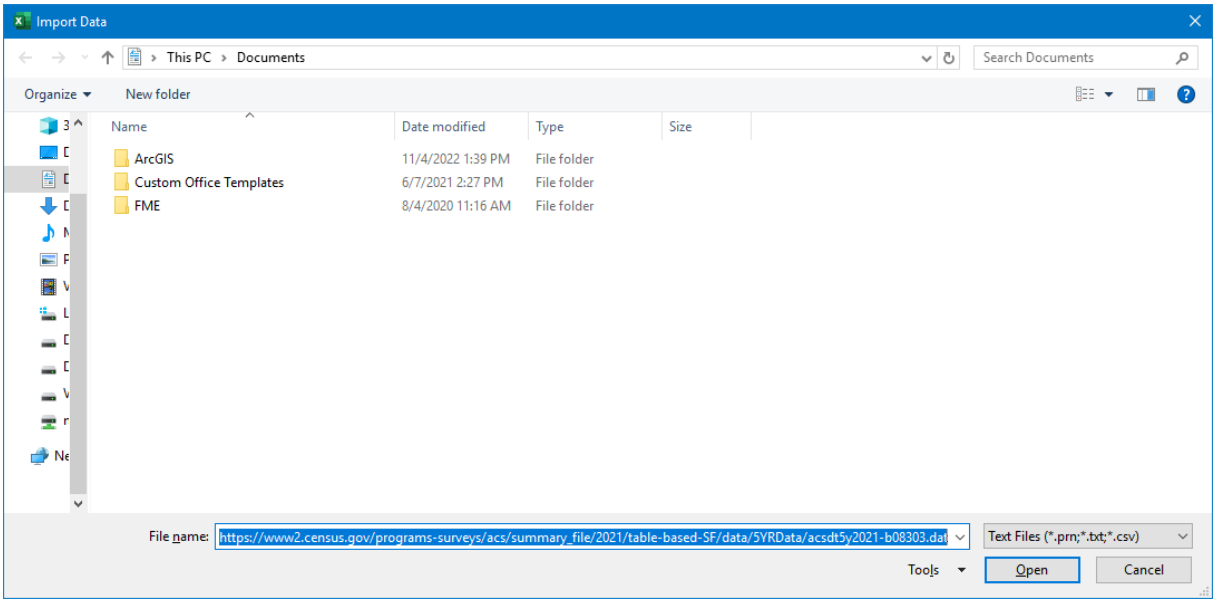
The next steps can take place within the same Excel workbook or a completely new one. This tutorial uses a new workbook to keep each subsequently downloaded ACS demographics table separate from each other.

- **Open** a blank Excel workbook and use the Excel Ribbon Data Tab's "From Text/CSV" option again to **load** the contents of the .dat file of interest. The .dat file's full URL can be acquired by right-clicking on the file and choosing the "Copy Link" option from within a browser.

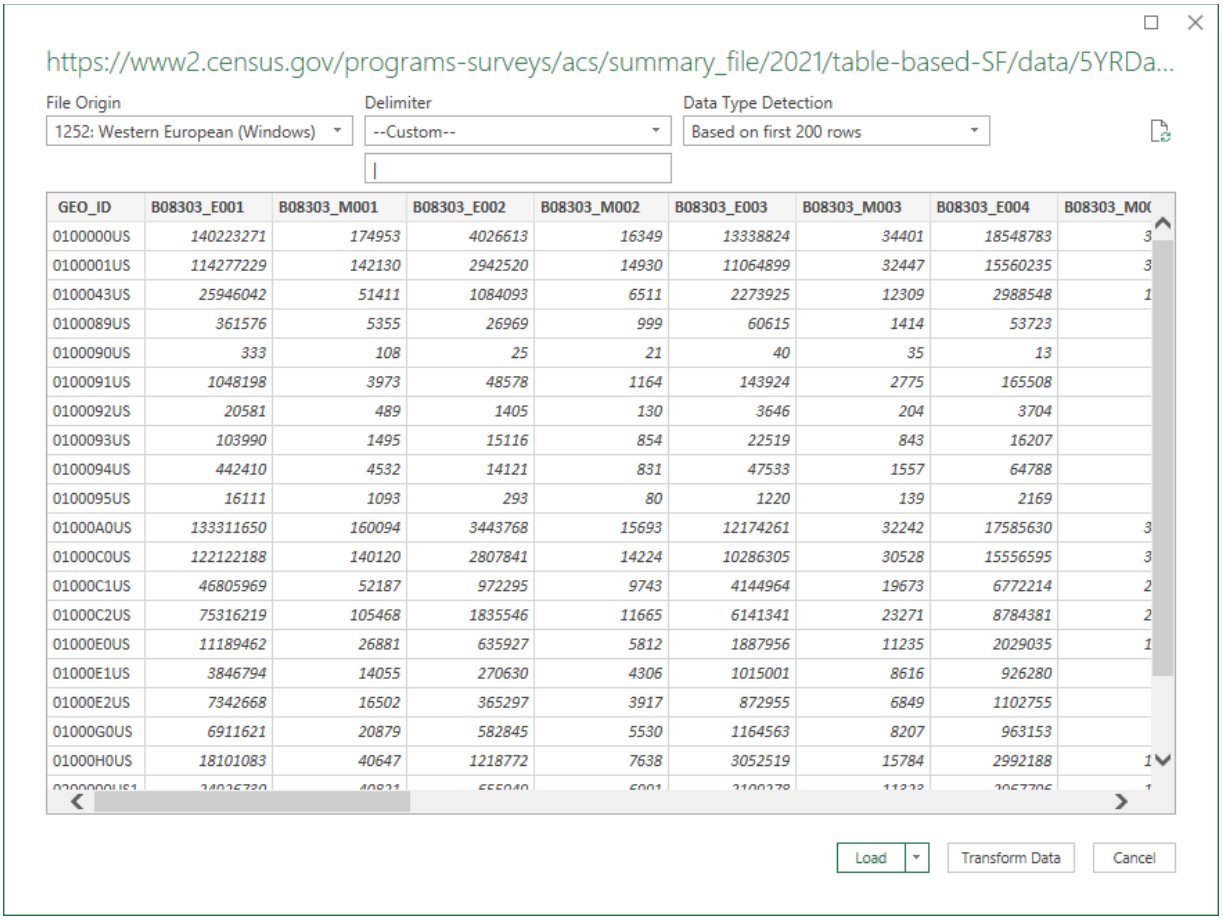
Acquire the URL of the .dat file with the browser function "Copy Link"



Paste the URL into the Import Data window's File name textbox

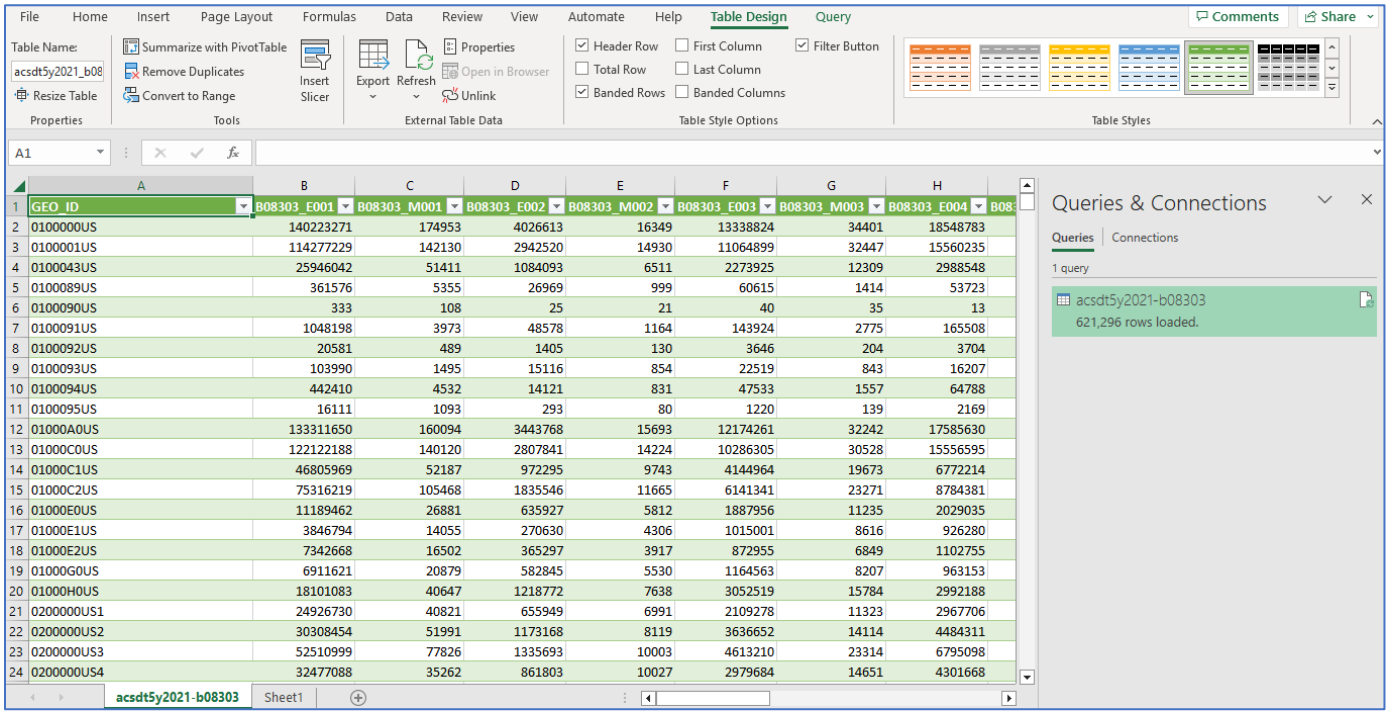


Confirm custom pipe symbol delimiter and field interpretation before loading



GEO_ID	B08303_E001	B08303_M001	B08303_E002	B08303_M002	B08303_E003	B08303_M003	B08303_E004	B08303_M0(
0100000US	140223271	174953	4026613	16349	13338824	34401	18548783	3
0100001US	114277229	142130	2942520	14930	11064899	32447	15560235	3
0100043US	25946042	51411	1084093	6511	2273925	12309	2988548	1
0100089US	361576	5355	26969	999	60615	1414	53723	
0100090US	333	108	25	21	40	35	13	
0100091US	1048198	3973	48578	1164	143924	2775	165508	
0100092US	20581	489	1405	130	3646	204	3704	
0100093US	103990	1495	15116	854	22519	843	16207	
0100094US	442410	4532	14121	831	47533	1557	64788	
0100095US	16111	1093	293	80	1220	139	2169	
01000A0US	133311650	160094	3443768	15693	12174261	32242	17585630	3
01000C0US	122122188	140120	2807841	14224	10286305	30528	15556595	3
01000C1US	46805969	52187	972295	9743	4144964	19673	6772214	2
01000C2US	75316219	105468	1835546	11665	6141341	23271	8784381	2
01000E0US	11189462	26881	635927	5812	1887956	11235	2029035	1
01000E1US	3846794	14055	270630	4306	1015001	8616	926280	
01000E2US	7342668	16502	365297	3917	872955	6849	1102755	
01000G0US	6911621	20879	582845	5530	1164563	8207	963153	
01000H0US	18101083	40647	1218772	7638	3052519	15784	2992188	1

The loading process can take a significant amount of time since a given .dat file contains all the attributes recorded in that table for all the levels of geography the data is summarized at, so there can be hundreds of thousands of records for dozens of attributes.



	A	B	C	D	E	F	G	H
1	GEO_ID	B08303_E001	B08303_M001	B08303_E002	B08303_M002	B08303_E003	B08303_M003	B08303_E004
2	0100000US	140223271	174953	4026613	16349	13338824	34401	18548783
3	0100001US	114277229	142130	2942520	14930	11064899	32447	15560235
4	0100043US	25946042	51411	1084093	6511	2273925	12309	2988548
5	0100089US	361576	5355	26969	999	60615	1414	53723
6	0100090US	333	108	25	21	40	35	13
7	0100091US	1048198	3973	48578	1164	143924	2775	165508
8	0100092US	20581	489	1405	130	3646	204	3704
9	0100093US	103990	1495	15116	854	22519	843	16207
10	0100094US	442410	4532	14121	831	47533	1557	64788
11	0100095US	16111	1093	293	80	1220	139	2169
12	01000A0US	133311650	160094	3443768	15693	12174261	32242	17585630
13	01000C0US	122122188	140120	2807841	14224	10286305	30528	15556595
14	01000C1US	46805969	52187	972295	9743	4144964	19673	6772214
15	01000C2US	75316219	105468	1835546	11665	6141341	23271	8784381
16	01000E0US	11189462	26881	635927	5812	1887956	11235	2029035
17	01000E1US	3846794	14055	270630	4306	1015001	8616	926280
18	01000E2US	7342668	16502	365297	3917	872955	6849	1102755
19	01000G0US	6911621	20879	582845	5530	1164563	8207	963153
20	01000H0US	18101083	40647	1218772	7638	3052519	15784	2992188
21	0200000US1	24926730	40821	655949	6991	2109278	11323	2967706
22	0200000US2	30308454	51991	1173168	8119	3636652	14114	4484311
23	0200000US3	52510999	77826	1335693	10003	4613210	23314	6795098
24	0200000US4	32477088	35262	861803	10027	2979684	14651	4301668

For tables this large, there may be some performance improvements when working without the constraint of an external internet-enabled connection. As previously mentioned, one can optionally copy the entire contents of this worksheet into a new worksheet using the Paste option for "Values" only, delete the original worksheet, and rename the new worksheet to have the original's name.

- In the worksheet containing the newly loaded .dat file's data, **rename** the first column from GEO_ID to be ACS_GEO_ID. Then insert 3 new empty columns after the ACS_GEO_ID field. **Name** the first one STATE, the second one SUMLEVEL, and the third one GEOID20.

	A	B	C	D	E	F	G	H
1	ACS_GEO_ID	STATE	SUMLEVEL	GEOID20	B08303_E001	B08303_M001	B08303_E002	B08303_M002
2	0100000US				140223271	174953	4026613	16349
3	0100001US				114277229	142130	2942520	14930
4	0100043US				25946042	51411	1084093	6511
5	0100089US				361576	5355	26969	999
6	0100090US				333	108	25	21
7	0100091US				1048198	3973	48578	1164
8	0100092US				20581	489	1405	130
9	0100093US				103990	1495	15116	854
10	0100094US				442410	4532	14121	831
11	0100095US				16111	1093	293	80
12	01000A0US				133311650	160094	3443768	15693
13	01000C0US				122122188	140120	2807841	14224
14	01000C1US				46805969	52187	972295	9743
15	01000C2US				75316219	105468	1835546	11665
16	01000E0US				11189462	26881	635927	5812
17	01000E1US				3846794	14055	270630	4306
18	01000E2US				7342668	16502	365297	3917
19	01000G0US				6911621	20879	582845	5530
20	01000H0US				18101083	40647	1218772	7638
21	0200000US1				24926730	40821	655949	6991
22	0200000US2				30308454	51991	1173168	8119
23	0200000US3				52510999	77826	1335693	10003
24	0200000US4				32477088	35262	861803	10027

- In column B [“STATE”], **calculate** cell B2 to be “ = MID(A2, 10, 2) “ (without the quotes). This should auto-populate values for records in column B, but if it doesn’t, do it manually (usually possible by selecting the first cell with the formula in it and double-clicking on its bottom right hand corner vertex). It’s expected the first several records may continue to have empty STATE values because those records reflect national demographics.
- In column C [“SUMLEVEL”], **calculate** cell C2 to be “ = LEFT(A2, 3) “ (without the quotes). This should auto-populate values for records in column C, but if it doesn’t, do it manually.
- In column D [“GEOID20”], **calculate** cell D2 to be “ = RIGHT(A2, LEN(A2) - FIND("US", A2) - 1) “ (without the quotes). This should auto-populate values for records in column D, but if it doesn’t, do it manually.

Appearance of example worksheet after populating the three new columns…

	A	B	C	D	E	F	G
1	ACS_GEO_ID	STATE	SUMLEVEL	GEOID20	B08303_E001	B08303_M001	B08303_E002
2	0100000US		010		140223271	174953	4026613
3	0100001US		010		114277229	142130	2942520
4	0100043US		010		25946042	51411	1084093
5	0100089US		010		361576	5355	26969
6	0100090US		010		333	108	25
7	0100091US		010		1048198	3973	48578
8	0100092US		010		20581	489	1405
9	0100093US		010		103990	1495	15116
10	0100094US		010		442410	4532	14121
11	0100095US		010		16111	1093	293
12	01000A0US		010		133311650	160094	3443768
13	01000C0US		010		122122188	140120	2807841
14	01000C1US		010		46805969	52187	972295
15	01000C2US		010		75316219	105468	1835546
16	01000E0US		010		11189462	26881	635927
17	01000E1US		010		3846794	14055	270630
18	01000E2US		010		7342668	16502	365297
19	01000G0US		010		6911621	20879	582845
20	01000H0US		010		18101083	40647	1218772
21	0200000US1	1	020	1	24926730	40821	655949
22	0200000US2	2	020	2	30308454	51991	1173168
23	0200000US3	3	020	3	52510999	77826	1335693
24	0200000US4	4	020	4	32477088	35262	861803

acsdt5y2021-b08303

And records further down…

	ACS_GEO_ID	STATE	SUMLEVEL	GEOID20	B08303_E001	B08303_M001	B08303_E002
198805	1400000US72153750501	72	140	72153750501	1631	405	133
198806	1400000US72153750502	72	140	72153750502	681	151	0
198807	1400000US72153750503	72	140	72153750503	422	136	0
198808	1400000US72153750601	72	140	72153750601	1484	335	0
198809	1400000US72153750602	72	140	72153750602	533	274	0
198810	1500000US010010201001	01	150	010010201001	308	118	48
198811	1500000US010010201002	01	150	010010201002	411	132	6
198812	1500000US010010202001	01	150	010010202001	299	87	0
198813	1500000US010010202002	01	150	010010202002	592	239	2
198814	1500000US010010203001	01	150	010010203001	1455	340	41

- **Activate a filter** on the STATE field to only allow values of "25" to remain. ("25" is the State FIPS code for Massachusetts.) Keep this filter active while selecting the summary level next.

  To capture demographics associated with…

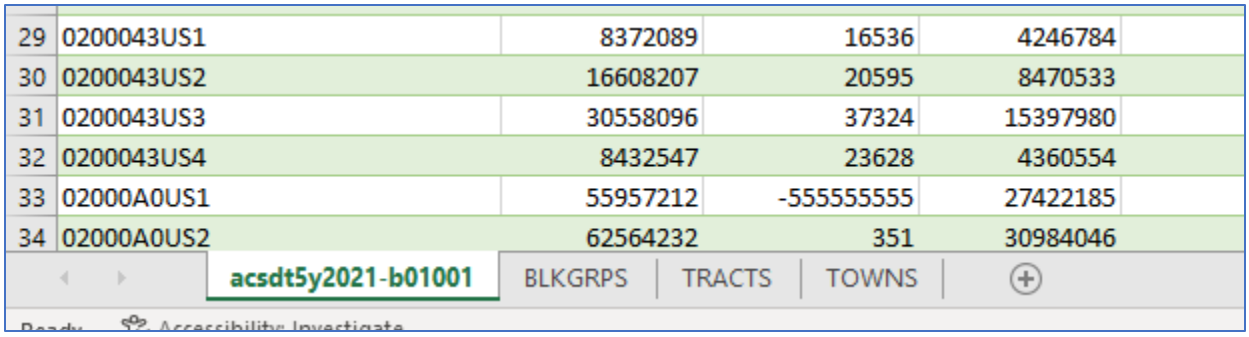
  … towns, activate a filter on SUMLEVEL to only capture values of "060".

  … tracts, activate a filter on SUMLEVEL to only capture values of "140".

  … block groups, activate a filter on SUMLEVEL to only capture values of "150".

With both STATE and SUMLEVEL filters active, the visible records should be copied to different worksheets for future use. It is recommended to assign names to those worksheets representative of the geography level captured. For this tutorial, it is assumed that the user wants to isolate and save records for the three levels of Census 2020 geography MassGIS has processed that are compatible with the ACS, and that the selected table has information recorded at each of those levels.

- **Create** 3 new worksheets in the workbook named "BLKGRPS", "TRACTS", and "TOWNS".



29	0200043US1	8372089	16536	4246784
30	0200043US2	16608207	20595	8470533
31	0200043US3	30558096	37324	15397980
32	0200043US4	8432547	23628	4360554
33	02000A0US1	55957212	-555555555	27422185
34	02000A0US2	62564232	351	30984046

acsdt5y2021-b01001 | BLKGRPS | TRACTS | TOWNS

- For each active STATE and SUMLEVEL filter combination, **copy and paste** the visible records from the .dat file's worksheet into the appropriately named destination worksheet based on the SUMLEVEL filter used (BLKGRPS, TRACTS, or TOWNS). It is recommended that the paste operation use the "Values" only option again.

Towns demographics where STATE = 25 and SUMLEVEL = 060

	A	B	C	D	E	F	G	H	I	J	K
1	ACS_GEO_ID	STATE	SUMLEVEL	GEOID20	B08303_E001	B08303_M001	B08303_E002	B08303_M002	B08303_E003	B08303_M003	B08303_E004
2	0600000US2500100000	25	060	2500100000	0	13	0	13	0	13	0
3	0600000US2500103690	25	060	2500103690	22970	758	795	223	3582	540	3817
4	0600000US2500107175	25	060	2500107175	9541	677	396	142	1126	296	1004
5	0600000US2500107980	25	060	2500107980	4093	448	46	48	367	188	861
6	0600000US2500112995	25	060	2500112995	2103	276	290	145	248	139	361
7	0600000US2500116775	25	060	2500116775	5867	516	289	148	608	128	1089
8	0600000US2500119295	25	060	2500119295	1880	315	51	63	275	95	285
9	0600000US2500123105	25	060	2500123105	13037	705	325	135	1680	354	3076
10	0600000US2500129020	25	060	2500129020	5828	496	353	171	918	323	1174
11	0600000US2500139100	25	060	2500139100	6754	363	64	37	693	201	1016

Tracts demographics where STATE = 25 and SUMLEVEL = 140

	A	B	C	D	E	F	G	H	I	J	K	L
1	ACS_GEO_ID	STATE	SUMLEVEL	GEOID20	B08303_E001	B08303_M001	B08303_E002	B08303_M002	B08303_E003	B08303_M003	B08303_E004	B08303_M004
2	1400000US25001010100	25	140	25001010100	1216	255	256	158	287	96	297	127
3	1400000US25001010206	25	140	25001010206	1503	264	154	100	180	87	310	138
4	1400000US25001010208	25	140	25001010208	522	208	33	44	180	129	76	54
5	1400000US25001010304	25	140	25001010304	998	233	11	17	181	77	199	74
6	1400000US25001010306	25	140	25001010306	882	236	40	61	94	65	86	68
7	1400000US25001010400	25	140	25001010400	1129	285	40	46	281	127	187	129
8	1400000US25001010500	25	140	25001010500	828	217	78	65	75	49	175	90
9	1400000US25001010600	25	140	25001010600	981	207	142	112	235	135	140	81
10	1400000US25001010700	25	140	25001010700	1122	215	148	77	13	22	221	87
11	1400000US25001010800	25	140	25001010800	1758	351	0	13	156	104	367	193
12	1400000US25001010900	25	140	25001010900	2335	348	46	48	211	153	494	222
13	1400000US25001011002	25	140	25001011002	1636	285	151	96	187	141	295	132
14	1400000US25001011100	25	140	25001011100	2688	532	160	140	540	286	663	293
15	1400000US25001011200	25	140	25001011200	1504	350	42	41	191	87	216	94

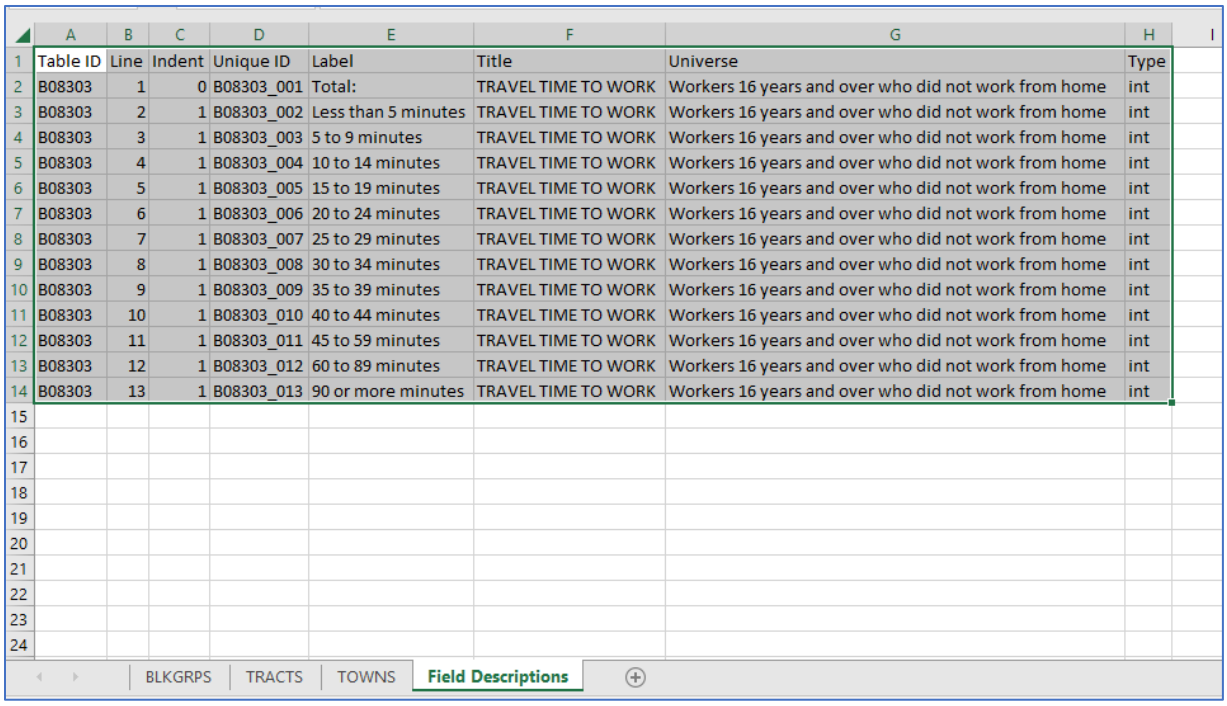
Block Groups demographics where STATE = 25 and SUMLEVEL = 150

	A	B	C	D	E	F	G	H	I	J	K	L
1	ACS_GEO_ID	STATE	SUMLEVEL	GEOID20	B08303_E001	B08303_M001	B08303_E002	B08303_M002	B08303_E003	B08303_M003	B08303_E004	B08303_M004
2	1500000US250010101001	25	150	250010101001	395	190	97	113	72	55	111	75
3	1500000US250010101002	25	150	250010101002	136	73	11	18	40	34	28	22
4	1500000US250010101003	25	150	250010101003	226	92	29	38	51	52	72	45
5	1500000US250010101004	25	150	250010101004	187	127	0	13	58	46	50	82
6	1500000US250010101005	25	150	250010101005	272	148	119	109	66	63	36	33
7	1500000US250010102061	25	150	250010102061	456	220	84	91	46	53	108	104
8	1500000US250010102062	25	150	250010102062	489	180	35	48	26	31	176	104
9	1500000US250010102063	25	150	250010102063	558	176	35	46	108	64	26	29
10	1500000US250010102081	25	150	250010102081	224	140	0	13	149	117	0	13
11	1500000US250010102082	25	150	250010102082	204	108	32	44	31	50	47	43
12	1500000US250010102083	25	150	250010102083	94	81	1	3	0	13	29	34
13	1500000US250010103041	25	150	250010103041	477	153	11	17	63	49	109	62
14	1500000US250010103042	25	150	250010103042	251	94	0	13	52	27	46	41
15	1500000US250010103043	25	150	250010103043	270	192	0	13	66	60	44	32

- Once the desired Census geography worksheets are populated, one can **delete** the original full nationwide worksheet of demographics from the workbook. Then **save** the Excel workbook with a name that is the Table ID of the ACS table that was processed, or another more intuitive name if preferred.

- The native field names assigned to the demographic attributes don't lend themselves to easy interpretation. To facilitate understanding of the ambiguous field names, it is recommended to **create** an additional worksheet in the workbook, **re-name** it "Field Descriptions", and **populate** it with the records from the Table Shells worksheet prepared earlier in the process…

Records copied from Table Shells worksheet filtered on the Table ID of the data file processed



	A	B	C	D	E	F	G	H	I
1	Table ID	Line	Indent	Unique ID	Label	Title	Universe	Type	
2	B08303	1	0	B08303_001	Total:	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
3	B08303	2	1	B08303_002	Less than 5 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
4	B08303	3	1	B08303_003	5 to 9 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
5	B08303	4	1	B08303_004	10 to 14 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
6	B08303	5	1	B08303_005	15 to 19 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
7	B08303	6	1	B08303_006	20 to 24 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
8	B08303	7	1	B08303_007	25 to 29 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
9	B08303	8	1	B08303_008	30 to 34 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
10	B08303	9	1	B08303_009	35 to 39 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
11	B08303	10	1	B08303_010	40 to 44 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
12	B08303	11	1	B08303_011	45 to 59 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
13	B08303	12	1	B08303_012	60 to 89 minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
14	B08303	13	1	B08303_013	90 or more minutes	TRAVEL TIME TO WORK	Workers 16 years and over who did not work from home	int	
15									
16									
17									
18									
19									
20									
21									
22									
23									
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BLKGRPS | TRACTS | TOWNS | **Field Descriptions**

It is important to remember that the "Unique ID" in the Field Descriptions worksheet assigned to each attribute as the basis of its field name appears in pairs in the ACS tables. (e.g., Unique ID *B08303_003* is the basis for two attribute names in table B08303… "B08303_**E**003" and "B08303_**M**003") The field names that include an "E" after the underscore indicate the field represents the estimated value of that attribute for that geographic feature. The field names that include an "M" after the underscore indicate that the field represents the margin-of-error (MOE) associated with the estimated value of that attribute for that geographic feature.

Optionally, one can attempt to rename the attributes in the processed tables with the information from the Table Shells or Field Descriptions worksheet. For example, B08303_E003 represents the number of workers 16 years old and over who did not work from home and had a travel time to work between 5 and 9 minutes. One possible alternate field name could be "COMMUTE_5_9", and this could also be recorded next to the B08303_003 entry in a new column in the Field Descriptions worksheet to maintain a lookup between the original and replacement field names.

At this stage, one can work directly with the Excel worksheets or export them to a preferable format (dBase tables for use with shapefiles**, file geodatabase tables, enterprise database (e.g., Oracle) tables, etc…). The GEOID20 field in the worksheets should contain the same values found in the GEOID20 field in the MassGIS processed Census 2020 geography and can be used in standard joins and relates in the GIS environment. If exporting the ACS demographics to a different format, take care that the GEOID20 field is interpreted and recorded as a text field so that it matches the GEOID20 text field in the geography layers. Also make sure that the demographics captured at a particular geography level

are only joined or related to the geography layer of the same level (Block groups to block groups, census tracts to census tracts, towns to towns).

** dBase tables are not recommended if the native ACS field names are kept intact. ACS field names are 11 characters long when accounting for the “E” and “M” identifiers needed to determine if a field is an estimate or a margin-of-error value. dBase tables truncate field names to have a maximum of 10 characters. The dBase table format may be acceptable if the field names are replaced with values 10 characters long or less.

Any technical questions about ACS data should be directed to Census Bureau resources and/or its listed contacts. For additional questions about this customized processing, please direct them to massgismail@mass.gov.