

1. Section in the report describing the enrichment data and data type (Housing Data Set)

| Name       | Definition  | Data type | Possible values  | Required?                    |
|------------|---|-----------|--|------------------------------|
| GEO_ID     | Geography (unique ID associated with the county)                                | STRING    | 0500000US01003, 0500000US01005, etc.                     | YES (primary key)            |
| NAME       | Geographic Area Name (non-unique county name, along with the state)             | STRING    | Autauga County, Alabama; Baldwin County, Alabama; etc.,. | YES (non-unique foreign key) |
| DP04_0001E | Estimate!!HOUSING OCCUPANCY!!Total housing units                                | INTEGERS  | 24170, 114350, etc.                                      | NA                           |
| DP04_0001M | Margin of Error!!HOUSING OCCUPANCY!!Total housing units                         | INTEGERS  | 70, 201, etc.  | NA                           |
| DP04_0002E | Estimate!!HOUSING OCCUPANCY!!Total housing units!!Occupied housing units        | INTEGERS  | 21856, 78560, etc.                                       | NA                           |
| DP04_0002M | Margin of Error!!HOUSING OCCUPANCY!!Total housing units!!Occupied housing units | INTEGERS  | 424, 1307, etc.  | NA                           |
| DP04_0003E | Estimate!!HOUSING OCCUPANCY!!Total housing units!!Vacant housing units          | INTEGERS  | 2314, 34517, etc.  | NA                           |
| DP04_0003M | Margin of Error!!HOUSING OCCUPANCY!!Total housing units!!Vacant housing units   | INTEGERS  | 426, 1320, etc.  | NA                           |
| DP04_0004E | Estimate!!HOUSING OCCUPANCY!!Total housing units!!Homeowner vacancy rate        | FLOAT     | 1.1, 2.5, etc.   | NA                           |
| DP04_0004M | Margin of Error!!HOUSING OCCUPANCY!!Total housing units!!Homeowner vacancy rate | FLOAT     | 0.8, 0.6, etc.   | NA                           |
| DP04_0005E | Estimate!!HOUSING OCCUPANCY!!Total housing units!!Rental vacancy rate           | FLOAT     | 4.2, 25.4, ETC.  | NA                           |
| DP04_0005M | Margin of Error!!HOUSING OCCUPANCY!!Total housing units!!Rental vacancy rate    | FLOAT     | 2.5,2.4, etc.  | NA                           |
| DP04_0006E | Estimate!!UNITS IN STRUCTURE!!Total housing units                               | INTEGERS  | 24170, 114350,etc.                                       | NA                           |

|            |  |          |                    |    |
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| DP04_0006M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units                   | INTEGERS | 70, 201, etc.      | NA |
| DP04_0007E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!1-unit, detached        | INTEGERS | 17610, 87905, etc. | NA |
| DP04_0007M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!1-unit, detached | INTEGERS | 514, 1378, etc.    | NA |
| DP04_0008E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!1-unit, attached        | INTEGERS | 299, 1750, etc.    | NA |
| DP04_0008M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!1-unit, attached | INTEGERS | 140, 362, etc.     | NA |
| DP04_0009E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!2 units                 | INTEGERS | 53, 1981, etc.     | NA |
| DP04_0009M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!2 units          | INTEGERS | 57, 363, etc.      | NA |
| DP04_0010E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!3 or 4 units            | INTEGERS | 400, 2838, etc.    | NA |
| DP04_0010M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!3 or 4 units     | INTEGERS | 171, 522, etc.     | NA |
| DP04_0011E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!5 to 9 units            | INTEGERS | 553, 3901, etc.    | NA |
| DP04_0011M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!5 to 9 units     | INTEGERS | 197, 611, etc.     | NA |
| DP04_0012E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!10 to 19 units          | INTEGERS | 396, 4370, etc.    | NA |
| DP04_0012M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!10 to 19 units   | INTEGERS | 220, 791, etc.     | NA |
| DP04_0013E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!20 or more units        | INTEGERS | 578, 16585, etc.   | NA |
| DP04_0013M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!20 or more units | INTEGERS | 263, 670, etc.     | NA |

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| DP04_0014E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!Mobile home                | INTEGERS | 4112, 12578, etc.   | NA |
| DP04_0014M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!Mobile home         | INTEGERS | 452, 982, etc.      | NA |
| DP04_0015E | Estimate!!UNITS IN STRUCTURE!!Total housing units!!Boat, RV, van, etc.        | INTEGERS | 88, 382, etc.       | NA |
| DP04_0015M | Margin of Error!!UNITS IN STRUCTURE!!Total housing units!!Boat, RV, van, etc. | INTEGERS | 79, 180, etc.       | NA |
| DP04_0027E | Estimate!!ROOMS!!Total housing units  | INTEGERS | 24710, 121763, etc. | NA |
| DP04_0027M | Margin of Error!!ROOMS!!Total housing units                                   | INTEGERS | 70, 201, etc.       | NA |
| DP04_0028E | Estimate!!ROOMS!!Total housing units!!1 room                                  | INTEGERS | 169, 1526, etc.     | NA |
| DP04_0028M | Margin of Error!!ROOMS!!Total housing units!!1 room                           | INTEGERS | 120, 484, etc.      | NA |
| DP04_0029E | Estimate!!ROOMS!!Total housing units!!2 rooms                                 | INTEGERS | 236, 1458, etc.     | NA |
| DP04_0029M | Margin of Error!!ROOMS!!Total housing units!!2 rooms                          | INTEGERS | 124, 331, etc.      | NA |
| DP04_0030E | Estimate!!ROOMS!!Total housing units!!3 rooms                                 | INTEGERS | 1167, 6065, etc.    | NA |
| DP04_0030M | Margin of Error!!ROOMS!!Total housing units!!3 rooms                          | INTEGERS | 316, 992, etc,      | NA |
| DP04_0031E | Estimate!!ROOMS!!Total housing units!!4 rooms                                 | INTEGERS | 2784, 17890, etc.   | NA |
| DP04_0031M | Margin of Error!!ROOMS!!Total housing units!!4 rooms                          | INTEGERS | 460, 1166, etc.     | NA |
| DP04_0032E | Estimate!!ROOMS!!Total housing units!!5 rooms                                 | INTEGERS | 4643, 26240, etc.   | NA |
| DP04_0032M | Margin of Error!!ROOMS!!Total housing units!!5 rooms                          | INTEGERS | 569, 1931, etc.     | NA |
| DP04_0033E | Estimate!!ROOMS!!Total housing units!!6 rooms                                 | INTEGERS | 5692, 29562, etc.   | NA |
| DP04_0033M | Margin of Error!!ROOMS!!Total housing units!!6 rooms                          | INTEGERS | 578, 1438, etc.     | NA |

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| DP04_0034E | Estimate!!ROOMS!!Total housing units!!7 rooms                | INTEGERS | 3857, 16890, etc.   | NA |
| DP04_0034M | Margin of Error!!ROOMS!!Total housing units!!7 rooms         | INTEGERS | 485, 1183, etc.     | NA |
| DP04_0035E | Estimate!!ROOMS!!Total housing units!!8 rooms                | INTEGERS | 2524, 11888, etc.   | NA |
| DP04_0035M | Margin of Error!!ROOMS!!Total housing units!!8 rooms         | INTEGERS | 438, 991, etc       | NA |
| DP04_0036E | Estimate!!ROOMS!!Total housing units!!9 rooms or more        | INTEGERS | 3098, 13980, etc.   | NA |
| DP04_0036M | Margin of Error!!ROOMS!!Total housing units!!9 rooms or more | INTEGERS | 400, 1094, etc.     | NA |
| DP04_0037E | Estimate!!ROOMS!!Total housing units!!Median rooms           | FLOAT    | 6, 5.8, etc.        | NA |
| DP04_0037M | Margin of Error!!ROOMS!!Total housing units!!Median rooms    | FLOAT    | 0.2, 0.1, etc.      | NA |
| DP04_0038E | Estimate!!BEDROOMS!!Total housing units                      | INTEGERS | 24710, 121763, etc. | NA |
| DP04_0038M | Margin of Error!!BEDROOMS!!Total housing units               | INTEGERS | 70, 201, etc.       | NA |
| DP04_0039E | Estimate!!BEDROOMS!!Total housing units!!No bedroom          | INTEGERS | 175, 1546, etc.     | NA |
| DP04_0039M | Margin of Error!!BEDROOMS!!Total housing units!!No bedroom   | INTEGERS | 120, 428, etc.      | NA |
| DP04_0040E | Estimate!!BEDROOMS!!Total housing units!!1 bedroom           | INTEGERS | 869, 4523, etc.     | NA |
| DP04_0040M | Margin of Error!!BEDROOMS!!Total housing units!!1 bedroom    | INTEGERS | 278, 425, etc.      | NA |
| DP04_0041E | Estimate!!BEDROOMS!!Total housing units!!2 bedrooms          | INTEGERS | 4184, 25555, etc.   | NA |
| DP04_0041M | Margin of Error!!BEDROOMS!!Total housing units!!2 bedrooms   | INTEGERS | 533, 1464, etc,     | NA |
| DP04_0042E | Estimate!!BEDROOMS!!Total housing units!!3 bedrooms          | INTEGERS | 11588, 61067, etc.  | NA |

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| DP04_0042M | Margin of Error!!BEDROOMS!!Total housing units!!3 bedrooms   | INTEGERS | 681, 1577, etc.    | NA |
| DP04_0043E | Estimate!!BEDROOMS!!Total housing units!!4 bedrooms  | INTEGERS | 6289, 22539, etc.  | NA |
| DP04_0043M | Margin of Error!!BEDROOMS!!Total housing units!!4 bedrooms   | INTEGERS | 660, 1161, etc.    | NA |
| DP04_0044E | Estimate!!BEDROOMS!!Total housing units!!5 or more bedrooms  | INTEGERS | 1065, 4402, etc.   | NA |
| DP04_0044M | Margin of Error!!BEDROOMS!!Total housing units!!5 or more bedrooms                                     | INTEGERS | 316, 610, etc.     | NA |
| DP04_0045E | Estimate!!HOUSING TENURE!!Occupied housing units   | INTEGERS | 21865, 87340, etc. | NA |
| DP04_0045M | Margin of Error!!HOUSING TENURE!!Occupied housing units  | INTEGERS | 424, 1370, etc.    | NA |
| DP04_0046E | Estimate!!HOUSING TENURE!!Occupied housing units!!Owner-occupied                                       | INTEGERS | 16227, 42570, etc. | NA |
| DP04_0046M | Margin of Error!!HOUSING TENURE!!Occupied housing units!!Owner-occupied                                | INTEGERS | 520, 1679, etc,    | NA |
| DP04_0047E | Estimate!!HOUSING TENURE!!Occupied housing units!!Renter-occupied                                      | INTEGERS | 5629, 19968, etc.  | NA |
| DP04_0047M | Margin of Error!!HOUSING TENURE!!Occupied housing units!!Renter-occupied                               | INTEGERS | 491, 1328, etc.    | NA |
| DP04_0048E | Estimate!!HOUSING TENURE!!Occupied housing units!!Average household size of owner-occupied unit        | FLOAT    | 2.71, 2.70, etc.   | NA |
| DP04_0048M | Margin of Error!!HOUSING TENURE!!Occupied housing units!!Average household size of owner-occupied unit | FLOAT    | 0.07, 0.06, etc,   | NA |
| DP04_0049E | Estimate!!HOUSING TENURE!!Occupied housing units!!Average household size of renter-occupied unit       | FLOAT    | 2.4, 2.35, etc.    | NA |
| DP04_0049M | Margin of Error!!HOUSING TENURE!!Occupied housing  | FLOAT    | 0.16, 0.14, etc.   | NA |

|            |   |          |                    |    |
|------------|---|----------|--------------------|----|
|            | units!!Average household size of renter-occupied unit   |          |                    |    |
| DP04_0050E | Estimate!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units                                | INTEGERS | 21865, 87340, etc. | NA |
| DP04_0050M | Margin of Error!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units                         | INTEGERS | 424, 1370, etc.    | NA |
| DP04_0051E | Estimate!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 2019 or later        | INTEGERS | 1872, 8842, etc.   | NA |
| DP04_0051M | Margin of Error!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 2019 or later | INTEGERS | 374, 918, etc.     | NA |
| DP04_0052E | Estimate!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 2015 to 2018         | INTEGERS | 6399, 24560, etc.  | NA |
| DP04_0052M | Margin of Error!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 2015 to 2018  | INTEGERS | 563, 1190, etc.    | NA |
| DP04_0053E | Estimate!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 2010 to 2014         | INTEGERS | 3442, 14350, etc,  | NA |
| DP04_0053M | Margin of Error!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 2010 to 2014  | INTEGERS | 506, 1253, etc.    | NA |
| DP04_0054E | Estimate!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 2000 to 2009         | INTEGERS | 5222, 16789, etc.  | NA |
| DP04_0054M | Margin of Error!!YEAR HOUSEHOLDER MOVED   | INTEGERS | 532, 1187, etc.    | NA |

|            |  |          |                    |    |
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|            | INTO UNIT!!Occupied housing units!!Moved in 2000 to 2009   |          |                    |    |
| DP04_0055E | Estimate!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 1990 to 1999            | INTEGERS | 2759, 9872, etc,   | NA |
| DP04_0055M | Margin of Error!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 1990 to 1999     | INTEGERS | 410, 772, etc.     | NA |
| DP04_0056E | Estimate!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 1989 and earlier        | INTEGERS | 2152, 6870, etc.   | NA |
| DP04_0056M | Margin of Error!!YEAR HOUSEHOLDER MOVED INTO UNIT!!Occupied housing units!!Moved in 1989 and earlier | INTEGERS | 299, 584, etc.     | NA |
| DP04_0057E | Estimate!!VEHICLES AVAILABLE!!Occupied housing units   | INTEGERS | 21865, 87340, etc. | NA |
| DP04_0057M | Margin of Error!!VEHICLES AVAILABLE!!Occupied housing units  | INTEGERS | 424, 1370, etc.    | NA |
| DP04_0058E | Estimate!!VEHICLES AVAILABLE!!Occupied housing units!!No vehicles available                          | INTEGERS | 1182, 2412, etc.   | NA |
| DP04_0058M | Margin of Error!!VEHICLES AVAILABLE!!Occupied housing units!!No vehicles available                   | INTEGERS | 282, 369, etc.     | NA |
| DP04_0059E | Estimate!!VEHICLES AVAILABLE!!Occupied housing units!!1 vehicle available                            | INTEGERS | 6891, 27061, etc.  | NA |
| DP04_0059M | Margin of Error!!VEHICLES AVAILABLE!!Occupied housing units!!1 vehicle available                     | INTEGERS | 606, 1440, etc.    | NA |
| DP04_0060E | Estimate!!VEHICLES AVAILABLE!!Occupied   | INTEGERS | 7383, 37838, etc.  | NA |

|            |   |          |                    |    |
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|            | housing units!!2 vehicles available   |          |                    |    |
| DP04_0060M | Margin of Error!!VEHICLES AVAILABLE!!Occupied housing units!!2 vehicles available         | INTEGERS | 522, 1576, etc.    | NA |
| DP04_0061E | Estimate!!VEHICLES AVAILABLE!!Occupied housing units!!3 or more vehicles available        | INTEGERS | 6400, 19789, etc.  | NA |
| DP04_0061M | Margin of Error!!VEHICLES AVAILABLE!!Occupied housing units!!3 or more vehicles available | INTEGERS | 537, 13560, etc.   | NA |
| DP04_0076E | Estimate!!OCCUPANTS PER ROOM!!Occupied housing units                                      | INTEGERS | 21865, 87340, etc. | NA |
| DP04_0076M | Margin of Error!!OCCUPANTS PER ROOM!!Occupied housing units                               | INTEGERS | 424, 1370, etc.    | NA |
| DP04_0077E | Estimate!!OCCUPANTS PER ROOM!!Occupied housing units!!1.00 or less                        | INTEGERS | 21565, 81340, etc. | NA |
| DP04_0077M | Margin of Error!!OCCUPANTS PER ROOM!!Occupied housing units!!1.00 or less                 | INTEGERS | 424, 1370, etc.    | NA |
| DP04_0078E | Estimate!!OCCUPANTS PER ROOM!!Occupied housing units!!1.01 to 1.50                        | INTEGERS | 190, 772, etc.     | NA |
| DP04_0078M | Margin of Error!!OCCUPANTS PER ROOM!!Occupied housing units!!1.01 to 1.50                 | INTEGERS | 122, 272, etc.     | NA |
| DP04_0079E | Estimate!!OCCUPANTS PER ROOM!!Occupied housing units!!1.51 or more                        | INTEGERS | 132, 529, etc.     | NA |
| DP04_0079M | Margin of Error!!OCCUPANTS PER ROOM!!Occupied housing units!!1.51 or more                 | INTEGERS | 112, 273, etc.     | NA |

2. How can you merge the data with the primary COVID-19 dataset?

To merge the data from the enrichment data set to the main COVID-19 data set, we could use the following values as joins:



- a. GEO\_ID (the last 5 digits in the GEO\_ID) can be mapped with the County\_FIPS in all the COVID Analysis data sets.
- b. We could also map together the NAME (name of the county) with the CountyName
- c. Along with these two, since there can be some duplicity in the county name, we could also map the Geographic Area Name (which has both the county and the state name) to the State in the main COVID Analysis data set

The condition that I used to merge the data is with GEO\_ID on county\_FIPS

3. Describe how your enrichment data(housing) can help in the analysis of COVID-19 spread. Pose initial hypothesis questions

When we look at the data present, we can see that the main categories are Housing Occupancy, Number of housing units, Total number of rooms and bedrooms, Vehicles available, the years people moved into the homes, and the number of people occupying this housing unit. By analyzing this data, we can see that the number of occupants per house defines the density of the population in that area for that county. So, with this pattern, we can predict the number of COVID cases, as the higher the density of people, the more likely the increase in cases of COVID. There is another column about Vehicles available, with this we can determine the spread of COVID and the point of origin of the cases from that county if traveled to the other.

Some of the initial questions that I can pose depending on the above paragraphs are:

- a. How the number of houses correlates with the number of cases.
- b. How many covid cases may increase depending on the number of people occupying the houses
- c. What demographic of people can be affected by COVID-19 depending on the moving in year
- d. How can COVID spread depending on the number of vehicles that people own, (and the amount of infection they can carry)