VetFed Pipeline V1

1.     Load the Census Block Data for Veterans into GIS, and create a visualization of the number of veterans by Census block

2.     Create a new table that stores the centroid of each Census block alongside the number of veterans in that block

3.     Load healthcare facilities into GIS

4.     Use the Spatially Constrained Multivariate Clustering tool to cluster the healthcare facilities into 58 clusters (an average of 1 per county), and then use the Mean Center tool to compute the centroids of the resulting clusters. This table of centroids will be our set of candidate facilities. Call this table “All Candidate Facilities”

5.     Use the Spatially Constrained Multivariate Clustering tool to cluster the census block centroids into 116 clusters (an average of 2 per county). Then, use the Mean Center tool to compute the centroids of the resulting clusters, and use the dissolve tool to compute the sums of veterans assigned to each cluster. Join these two tables, to generate our set of demand points. Call this table “All Demand Points”.

6.     Run a Maximum Coverage location allocation problem, with the maximum number of facilities set to 13, the maximum driving distance set to 50, the candidate facilities drawn from “All Candidate Facilities”, and the demand points drawn from “All Demand Points”. Weight each demand point by the number of veterans in the cluster. This will determine 13 locations for dense clinics.

a.     We will have to experiment with the 13 figure, which I got from the number of cities with a population above 300,000. I cannot find a way to specify a *minimum* facility capacity, which is why this stage of experimentation is right now necessary.

7.     Export the selected facilities and assigned demand points to two tables, respectively titled “Dense Clinics” and “Dense Coverage”. In the “Dense Clinics” table, also store the total number of veterans assigned to each clinic (this is a field in the facilities attribute table from the location allocation problem).

8.     Export the facilities *not*selected and demand points *not* covered to two other tables, respectively titled “Sparse Clinic Candidates” and “Sparse Coverage”

9.     We will now run a second location allocation problem, this time using the minimize facilities optimization, and the maximum driving distance set to 200. This will determine our network of sparse clinics. The facilities and demand points used here come from the tables generated in step 8.

10.  We have determined a dense and sparse network of clinics. We now need to choose a subset of these clinics in which to build rooms for psychologists and audiologists, both of whom have a 100-mile radius for dense clinics and 200-mile radius for sparse clinics. Thus, we will choose a subset of dense clinics in which to hire psychologists/audiologists, and a subset of sparse clinics in which to hire psychologists/audiologists. First, take the facilities and demand points from the “Dense Clinics” and “Dense Coverage” tables. Run a new minimize facilities optimization with these facilities and demand points, with driving distance set to 100. The facilities chosen here will be the dense clinics in which we hire psychologists and audiologists. Store the selected facilities as “Dense Psych/Audio Clinics”, alongside the number of veterans assigned to them.

11.  Then, do the same for facilities and demand points covered by the location allocation in step 9, to determine the sparse facilities in which to hire psychologists and audiologists. Store the selected facilities as “Sparse Psych/Audio Clinics”, alongside the number of veterans assigned to them.