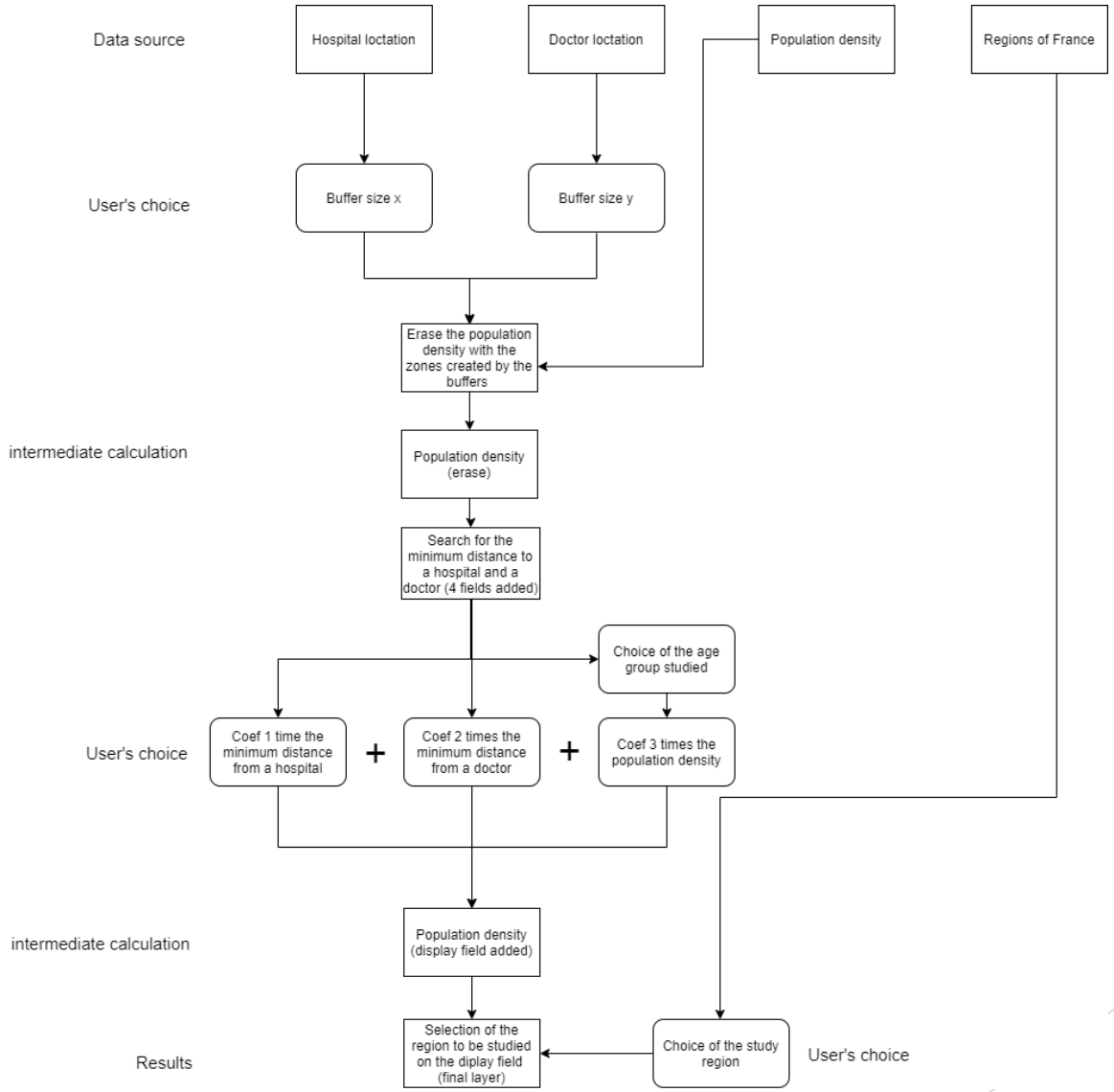
Access to health care

- Objective:

Find the farthest areas from a hospital and a doctor with a high population density. This for different age groups and for a region or the whole country.

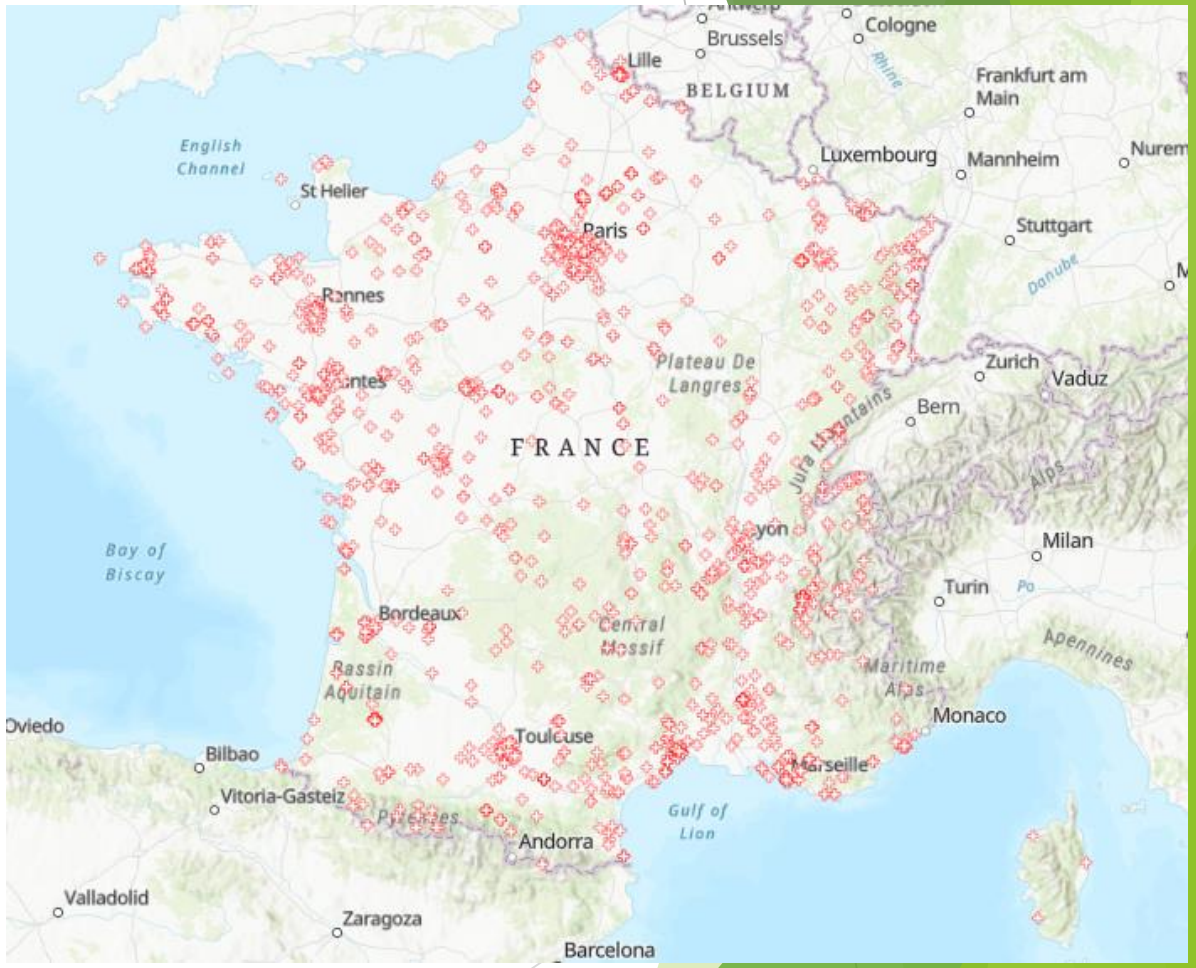
Flowchart:


Data source
Hospital loctation
Doctor loctation
Population density
Regions of France
User's choice
Buffer size x
Buffer size y
Erase the population density with the zones created by the buffers
intermediate calculation
Population density (erase)
Search for the minimum distance to a hospital and a doctor (4 fields added)
Choice of the age group studied
User's choice
Coef 1 time the minimum distance from a hospital
+
Coef 2 times the minimum distance from a doctor
+
Coef 3 times the population density
intermediate calculation
Population density (display field added)
Results
Selection of the region to be studied on the diplay field (final layer)
Choice of the study region
User's choice

Data:

Hospital

Doctor



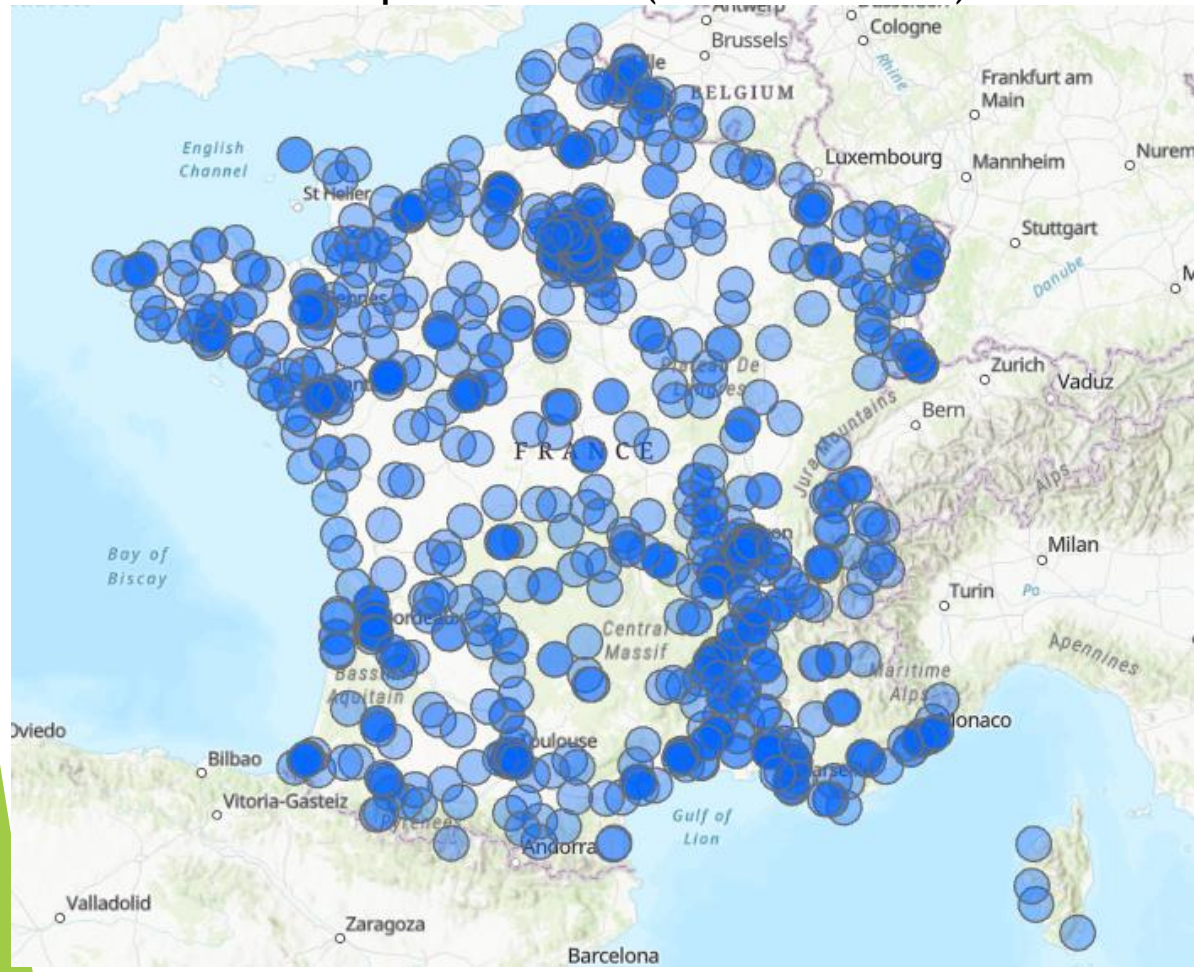
Data:

Regions of France

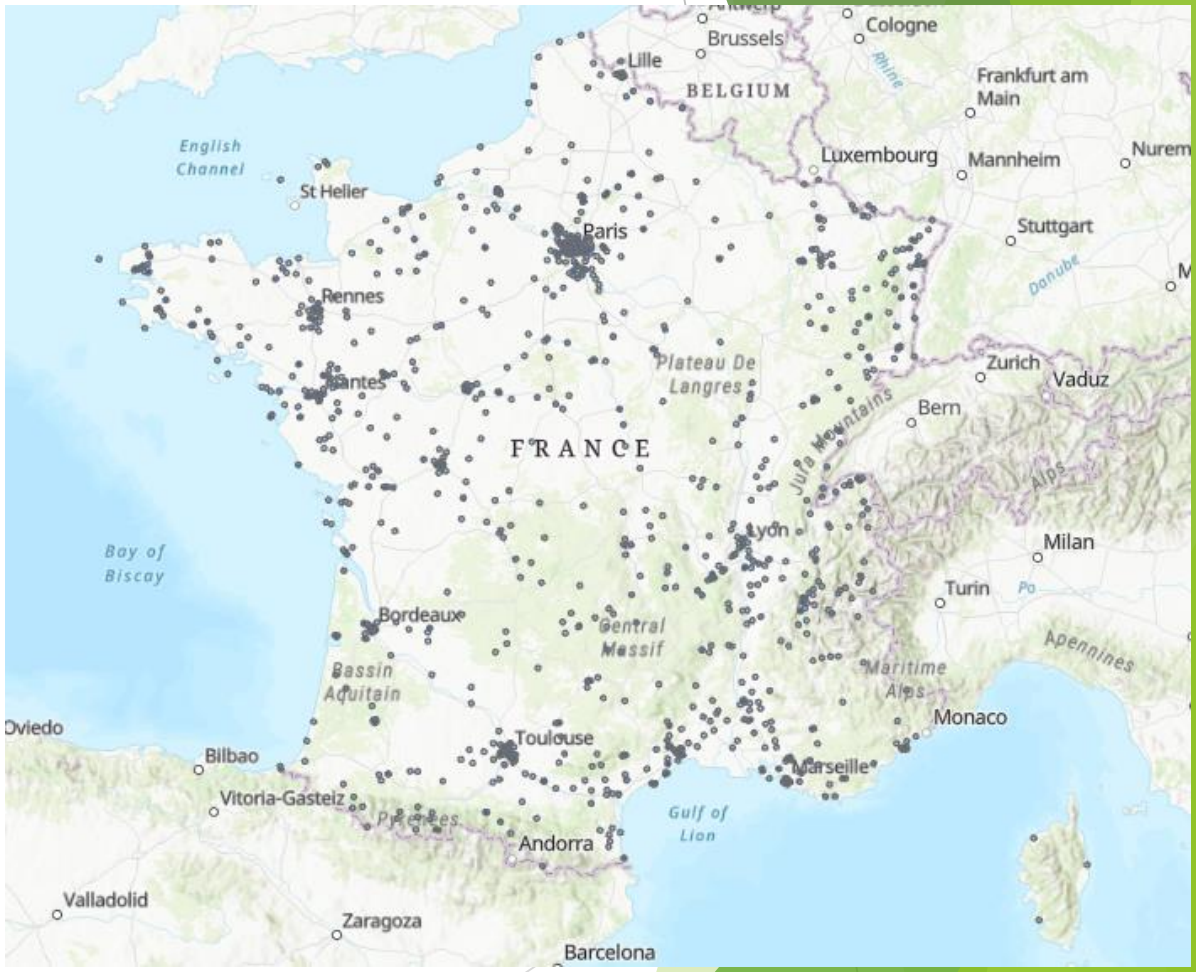
Population density

Intermediate calculation:

Hospital buffer (20 Kilometers)

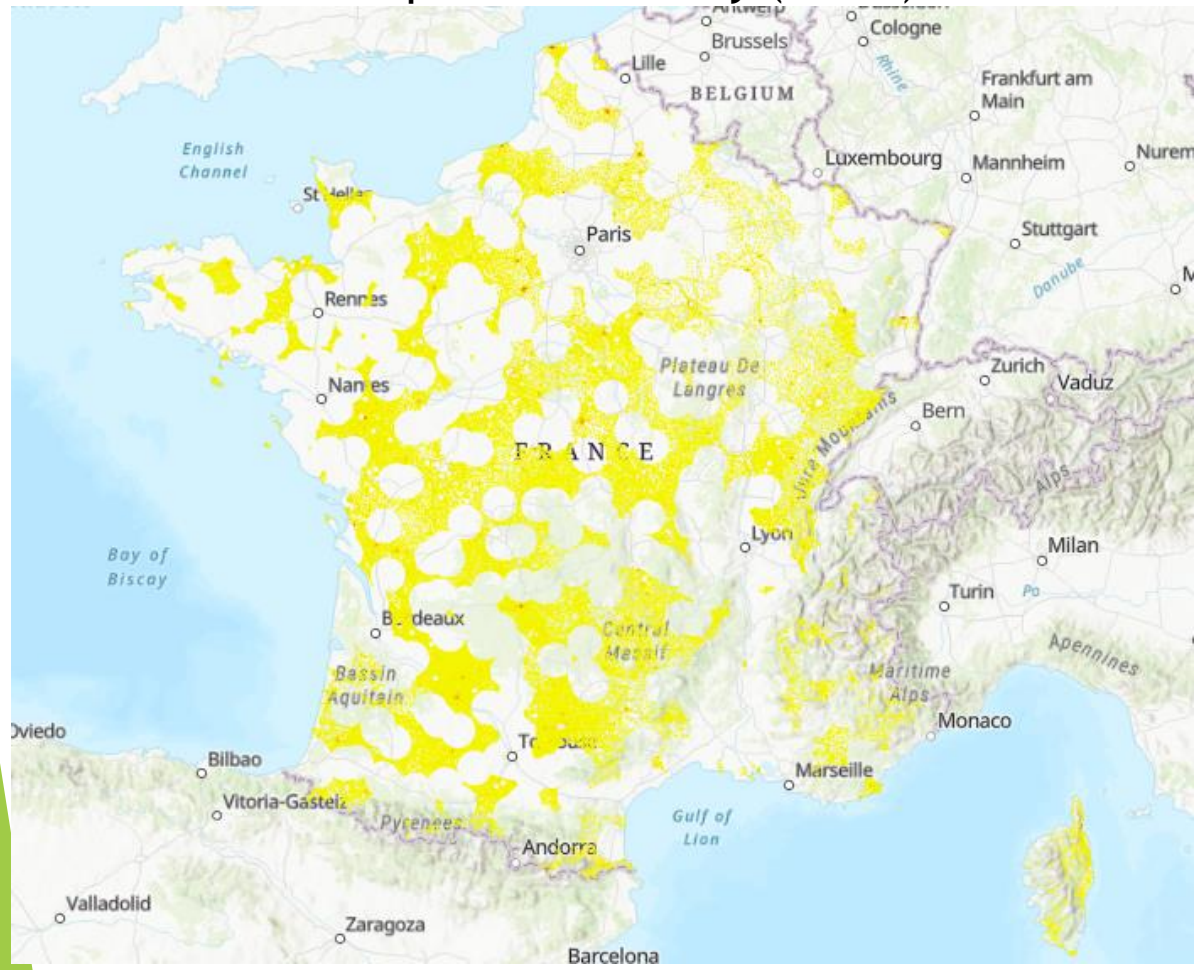


Doctor buffer (3 Kilometers)



Intermediate calculation:

Population density (erase)



4 fields added with the near tool

NEAR_FIDH	NEAR_DISTH	NEAR_FID	NEAR_DIST
407	25750	242	48839,102141
407	25478	242	49449,050772
407	25241	242	50071,502902
407	25043	242	50705,998038
407	25108	242	47434,101429
407	24788	242	48041,13069
407	24505	242	48661,098589
407	24259	242	49293,516908
407	24053	242	49937,912601
407	24935	242	45439,924289
407	24532	242	46029,909944
407	24163	242	46633,834101
407	23830	242	47251,16228
407	23535	242	47881,376005
407	23279	242	48523,973187
407	22890	242	49844,392839
407	24478	242	44040,457816
407	24025	242	44626,601313
407	23606	242	45227,21648
407	23222	242	45841,734466
407	22876	242	46469,603685

Intermediate calculation:

Population density (display field added),
Coef1=3, Coef2=0,5, Coef3=6000

Displa
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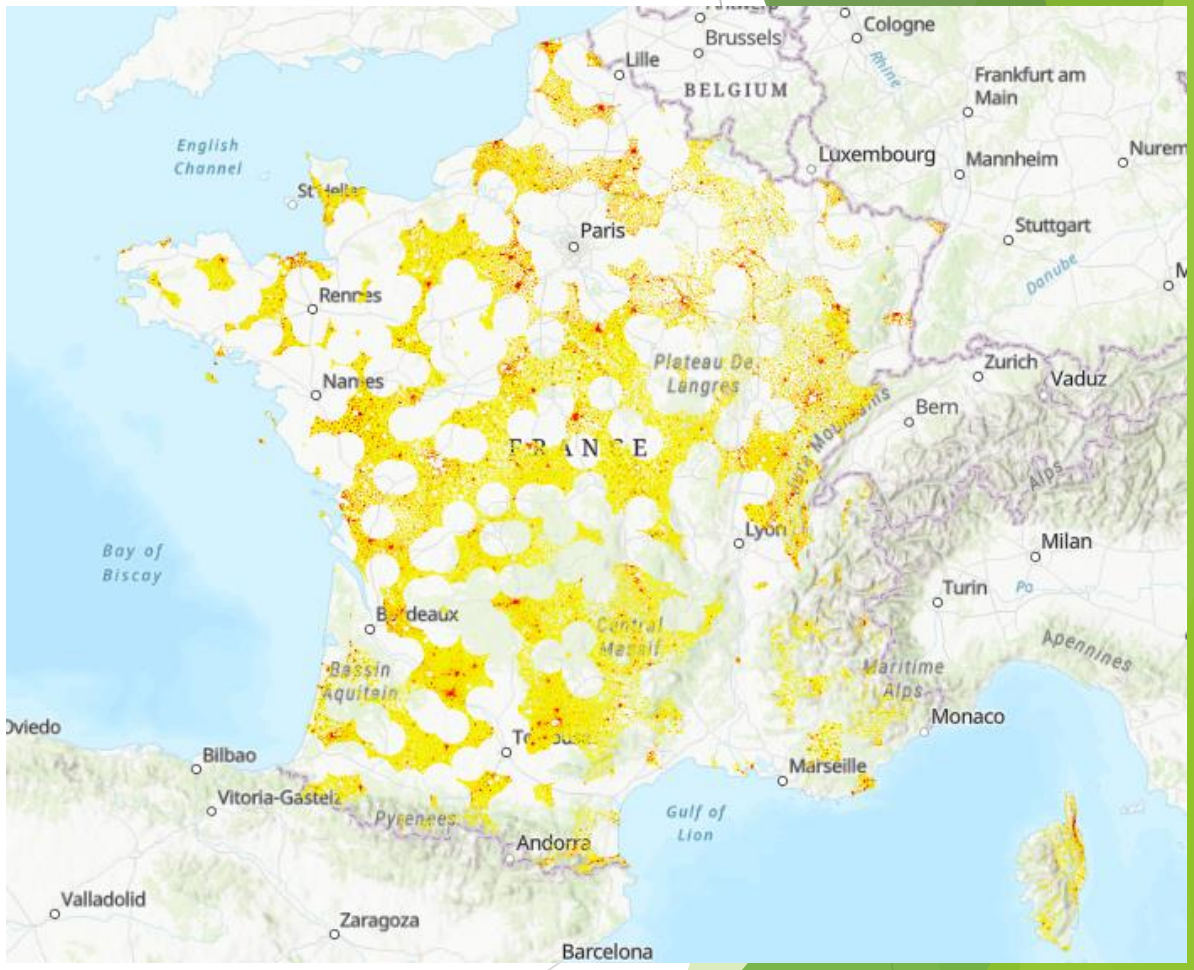
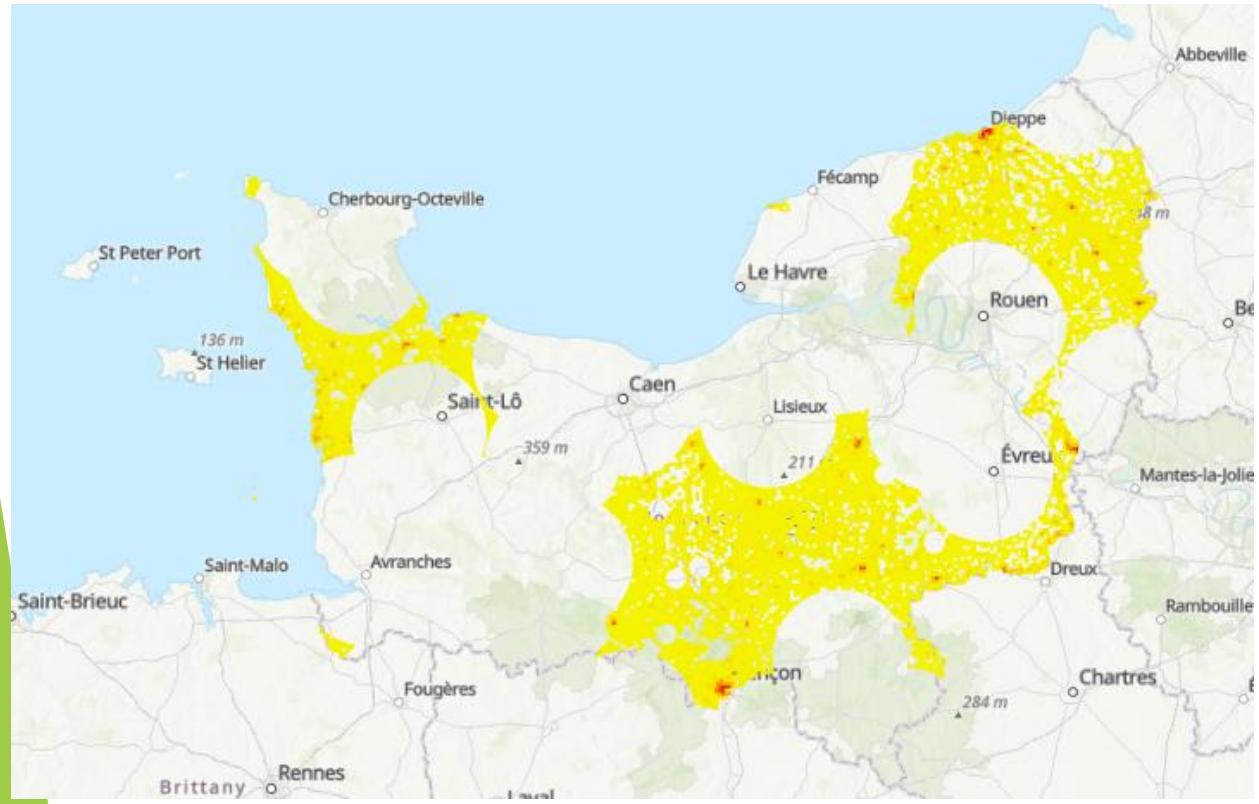
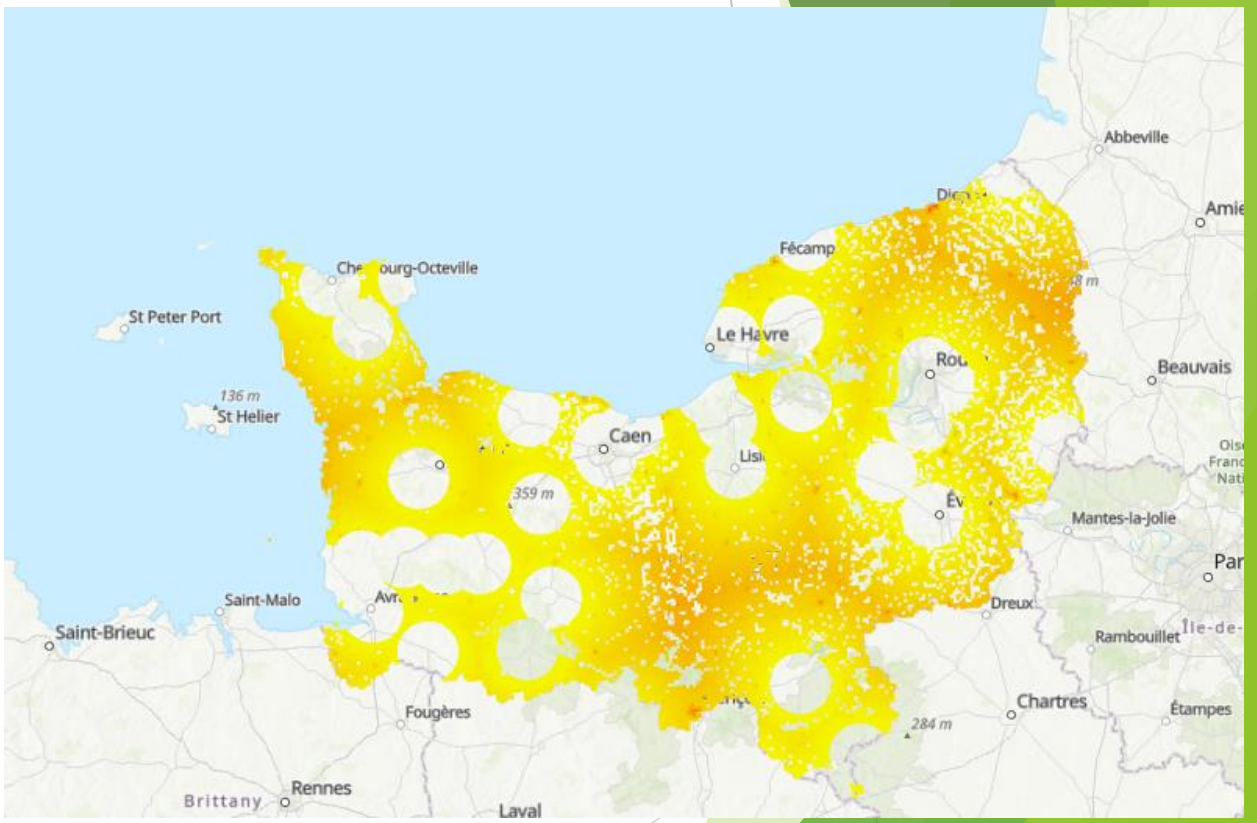
67454
67529
67586
67626
67638
67660
67667
67676
67733
67735
67790
67799
67844
67848
67898
67909
67952
67983
68043

Results (Whole country for all ages)



Different results :





A little bit of code:

Creation of a list with the user's choices:

```
def HospitalDoctor():
    import arcpy
    MyList=[]
    MyList.append(str(input("Enter the loctaion of the workspace : ")))
    MyList.append(str(input("Enter the buffer size for the hospitals (E.g. 20 Kilometers) : ")))
    MyList.append(str(input("Enter the buffer size for the doctors (E.g. 3 Kilometers) : ")))
    MyList.append(float(input("Enter the coefficient relating to the minimum distance from a hospital (E.g. 3 ): ")))
    MyList.append(float(input("Enter the coefficient relating to the minimum distance from a doctor (E.g. 0.5 ): ")))
    MyList.append(float(input("Enter the population density coefficient  (E.g. 6000 ): ")))
    MyList.append(str(input("Enter the population density category in the following list  (Ind, Ind_0_3,Ind_4_5,Ind_6_1
    MyList.append(str(input("Enter the region you wish to select in the following list (Whole country,Corse,Île-de-Fran
    print ("The program is running...")
```

A little bit of code:

Intermediate calculation (Buffer, Erase, CalculateField):

```
arcpy.Buffer_analysis("Hospital.shp", "buffer1",MyList[1])
arcpy.Buffer_analysis("Doctor.shp", "buffer2",MyList[2])
arcpy.Erase_analysis("Densité de pop/Filosofi2015_carreaux_1000m_metropole.shp", "buffer1.shp", "PopMD")
arcpy.Erase_analysis("PopMD.shp", "buffer2.shp", "PopMH")
arcpy.Near_analysis("PopMH.shp", "Hospital.shp")
arcpy.FeatureClassToFeatureClass_conversion("PopMH.shp", "C:/EPF S8/Geospatial programming/Project", "PopNH.shp")
arcpy.AddField_management("PopNH.shp","NEAR_FIDH","LONG")
arcpy.CalculateField_management("PopNH.shp","NEAR_FIDH","!NEAR_FID!","PYTHON_9.3")
arcpy.DeleteField_management("PopNH.shp","NEAR_FID")
arcpy.AddField_management("PopNH.shp","NEAR_DISTH","LONG")
arcpy.CalculateField_management("PopNH.shp","NEAR_DISTH","!NEAR_DIST!","PYTHON_9.3")
arcpy.DeleteField_management("PopNH.shp","NEAR_DIST")
arcpy.Near_analysis("PopNH.shp", "Doctor.shp")
arcpy.AddField_management("PopNH.shp","Display","LONG")
Expression=str(MyList[3])+"*!NEAR_DISTH!+"+str(MyList[4])+"*!NEAR_DIST!+"+str(MyList[5])+"*!"+str(MyList[6])+"!"
arcpy.CalculateField_management("PopNH.shp","Display",Expression,"PYTHON_9.3")
```

A little bit of code:

Region selection:

```
if MyList[7] != "Whole country":
    arcpy.MakeFeatureLayer_management("regions-20180101.shp","Selecte")
    qry="nom ="+"'"+str(MyList[7])+"'"
    arcpy.SelectLayerByAttribute_management("Selecte","NEW_SELECTION",qry)
    arcpy.CopyFeatures_management("Selecte", "regions-20180101 selection")
    arcpy.MakeFeatureLayer_management("PopNH.shp","Selecte2")
    arcpy.MakeFeatureLayer_management("regions-20180101 selection.shp","Selecte3")
    arcpy.SelectLayerByLocation_management ("Selecte2","INTERSECT","Selecte3")
    arcpy.CopyFeatures_management("Selecte2", "PopNHFinale.shp")
else  :
    arcpy.CopyFeatures_management("PopNH.shp","PopNHFinale.shp")
print ("The program has finished running, open Arcgis Pro to see the results (layer PopNHFinale.shp)")
```