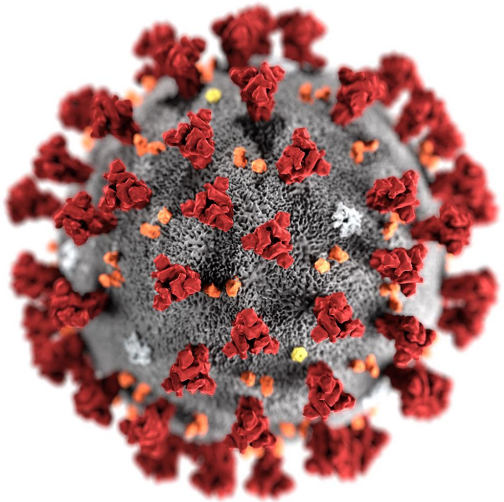
Possible Covid-19 Spread Analysis over Attractions & Restaurants & Cafés & Pubs in London

09.06.2020

Burak Akay



Introduction

COVID - 19 has made a huge impact on daily life. There were several restrictions on daily life but the UK government ease down some restriction so people can socialize and reopen their business again.

It seems that people prefer to socialize in open spaces of their boroughs to prevent any infection caused by commuting. They supply all their need from local stores and using outdoor spaces for social events but the UK government ıs planning to open restaurants & cafés & pubs ın a short time and people are starting to go these places. It means that these socializing events might affect the spread of the virus. Especially, indoor environments, like pubs and restaurants, have huge potential to spread of germs. All these events might end with a second peak of the virus.

The idea of this study is ;

- To show people risky places in their boroughs so they can take their safety actions beforehand if they want to go to those places.
- To show restaurants & cafés & pubs how risky they are. By using this study, they can take safety actions and change their business model or service beforehand without losing their popularity and income.

Data Description

Based on the definition of our problem, I'll be combining ;

- London's Land Area and Population Density, Ward and Borough that contains density with all
- List of London Boroughs that contains borough information.
- Foursquare API to collect find the lıst of popular in London.

Following data sources will be needed to extract/generate the required information:

- London's Land Area and Population Density, Ward and Borough data is publicly available at this website: https://data.london.gov.uk/download/land-area-and-population-density-ward-and-borough/77e9257d-ad9d-47aa-aeed-59a00741f301/housing-density-borough.csv
- List of London Boroughs: https://en.wikipedia.org/wiki/List_of_London_boroughs
- Popular locations: Foursquare API

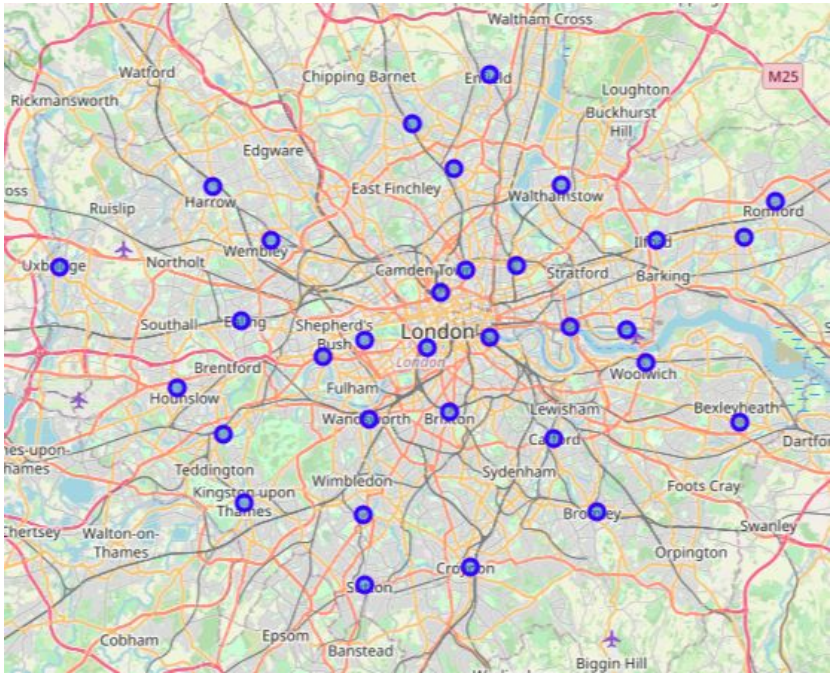
Methodology

As a database, I used Wikipedia and get all borough information in my study. Then combine the density of each borough and popular places information based on Wikipedia data.

	Borough	Inner	Status	Local authority	Political control	Headquarters	Area (sq mi)	Population (2013 est)[1]	Co-ordinates	Nr. in map
0	Barking and Dagenham [note 1]	NaN	NaN	Barking and Dagenham London Borough Council	Labour	Town Hall, 1 Town Square	13.93	194352	51°33′39″N 0°09′21″E / 51.5607°N 0.1557°E	25
1	Barnet	NaN	NaN	Barnet London Borough Council	Conservative	Barnet House, 2 Bristol Avenue, Colindale	33.49	369088	51°37′31″N 0°09′06″W / 51.6252°N 0.1517°W	31
2	Bexley	NaN	NaN	Bexley London Borough Council	Conservative	Civic Offices, 2 Watling Street	23.38	236687	51°27′18″N 0°09′02″E / 51.4549°N 0.1505°E	23
3	Brent	NaN	NaN	Brent London Borough Council	Labour	Brent Civic Centre, Engineers Way	16.70	317264	51°33′32″N 0°16′54″W / 51.5588°N 0.2817°W	12
4	Bromley	NaN	NaN	Bromley London Borough Council	Conservative	Civic Centre, Stockwell Close	57.97	317899	51°24′14″N 0°01′11″E / 51.4039°N 0.0198°E	20

Methodology

I used python folium library to visualize geographic details of London's boroughs and point all boroughs locations with their latitude and longitude values. We will use these locations to find out popular locations.



Methodology

Then I added the population density file to this file to get the 2020 density of each neighbour. I used the 2020's Population Per Square Kilometre values from GLA Population Projections source.

	Code	Name	Year	Source	Population	Inland_Area_Hectares	Total_Area_Hectares	Population_per_hectare	Square_Kilometres	Population_per_square_kilometre
0	E09000001	City of London	1999	ONS MYE	6581	290.4	314.9	22.7	2.9	2266.2
1	E09000001	City of London	2000	ONS MYE	7014	290.4	314.9	24.2	2.9	2415.3
2	E09000001	City of London	2001	ONS MYE	7359	290.4	314.9	25.3	2.9	2534.1
3	E09000001	City of London	2002	ONS MYE	7280	290.4	314.9	25.1	2.9	2506.9
4	E09000001	City of London	2003	ONS MYE	7115	290.4	314.9	24.5	2.9	2450.1

Methodology

Then I added the population density file to this file to get the 2020 density of each neighbour. I used the 2020's Population Per Square Kilometre values from GLA Population Projections source. You can see the both data below.

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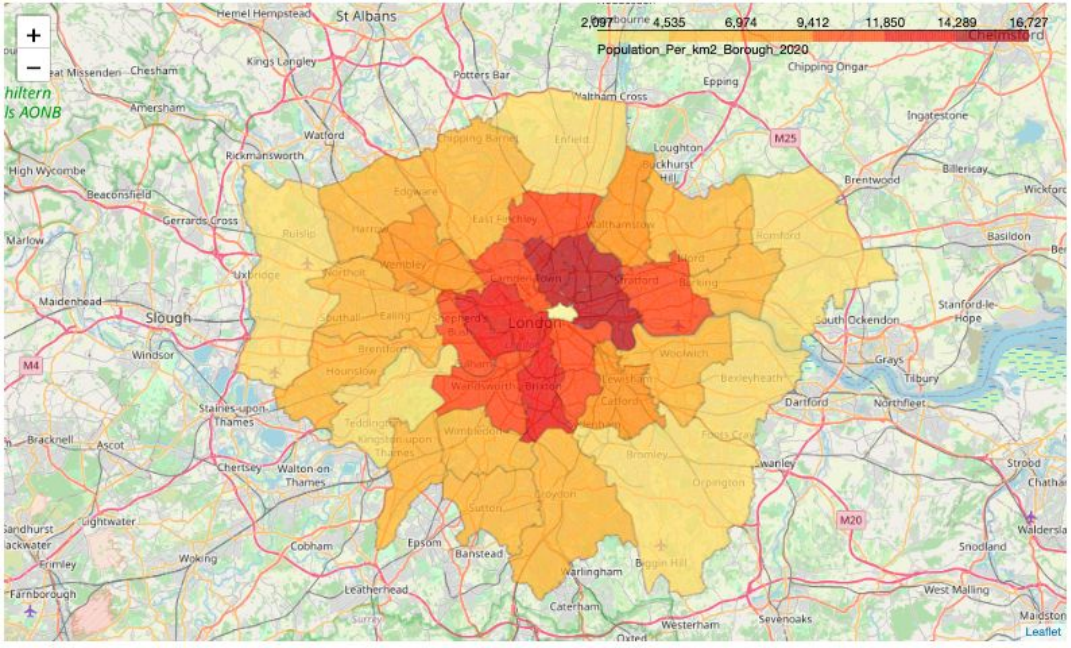
2	E09000001	City of London	2001	ONS MYE	7359	290.4	314.9	25.3	2.9	2534.1
3	E09000001	City of London	2002	ONS MYE	7280	290.4	314.9	25.1	2.9	2506.9
4	E09000001	City of London	2003	ONS MYE	7115	290.4	314.9	24.5	2.9	2450.1

	Borough	Lat	Long	Population_Per_km2_Borough_2020
0	Barking and Dagenham	51.560833	0.155833	6047.6
1	Barnet	51.625278	-0.151667	4693.4
2	Bexley	51.455000	0.150556	4208.8
3	Brent	51.558889	-0.281667	7953.6
4	Bromley	51.403889	0.019722	2240.6

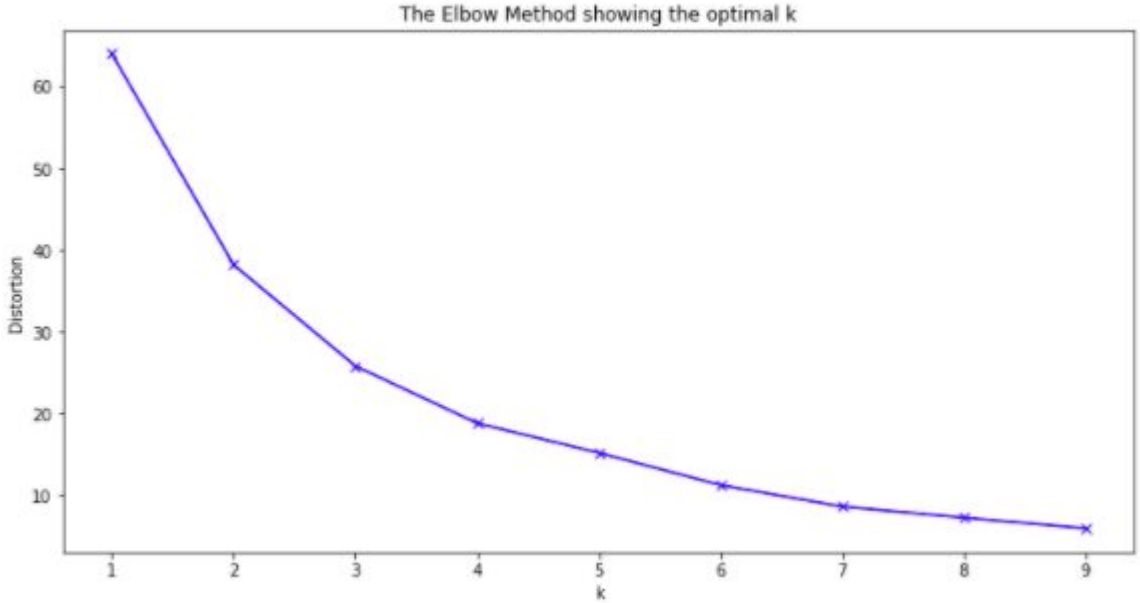
Methodology

By using these values I created a choropleth map to visualize the population density of boroughs. We can see that the city centre is at high risk because of the density of those boroughs. We can easily say that the most popular places in those boroughs have a huge contamination risk. We will not only look those boroughs but also outskirts of the city centre by using Foursquare API.



Methodology

First, I will analyze the K-Means with elbow method and will use optimum k value. As you can see in the below, we can you 4 as a value.



Methodology

Let’s use Foursquare API to download the top ten locations for each borough and combine with our data.

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Barking and Dagenham	Robert Clack Leisure Centre	Central Park	Beacontree Heath Leisure Centre	Dagenham Swimming Pool	Becontree Heath Bus Station	Crowlands Heath Golf Course	wilko	Goodlooking Optics	Gourmet Burger Kitchen	Grange Wellington Hotel
1	Barnet	The Atrium	Beaconsfield Road (BF)	Bellissima Beauty Clinic	Premium Electrical	wilko	Grange Wellington Hotel	Godiva	Golden Lion	Goodlooking Optics	Gourmet Burger Kitchen
2	Bexley	wilko	Argos	Twin Palace	Bexleyheath Clock Tower	Bexleyheath Marriott Hotel	Boots	Broadway Shopping Centre	Burger King	Caffè Nero	The Furze Wren (Wetherspoon)
3	Brent	Starbucks	Costa Coffee	Gap Factory Store	Bobby Moore Club	Better Wembley	London Designer	Currys PC	Tesco	Nike Factory	Next
4	Bromley	Costa Coffee	Caffè Nero	wilko	Patisserie Valerie						

	Borough	Lat	Long	Population_Per_km2_Borough_2020	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th M Comn Ve
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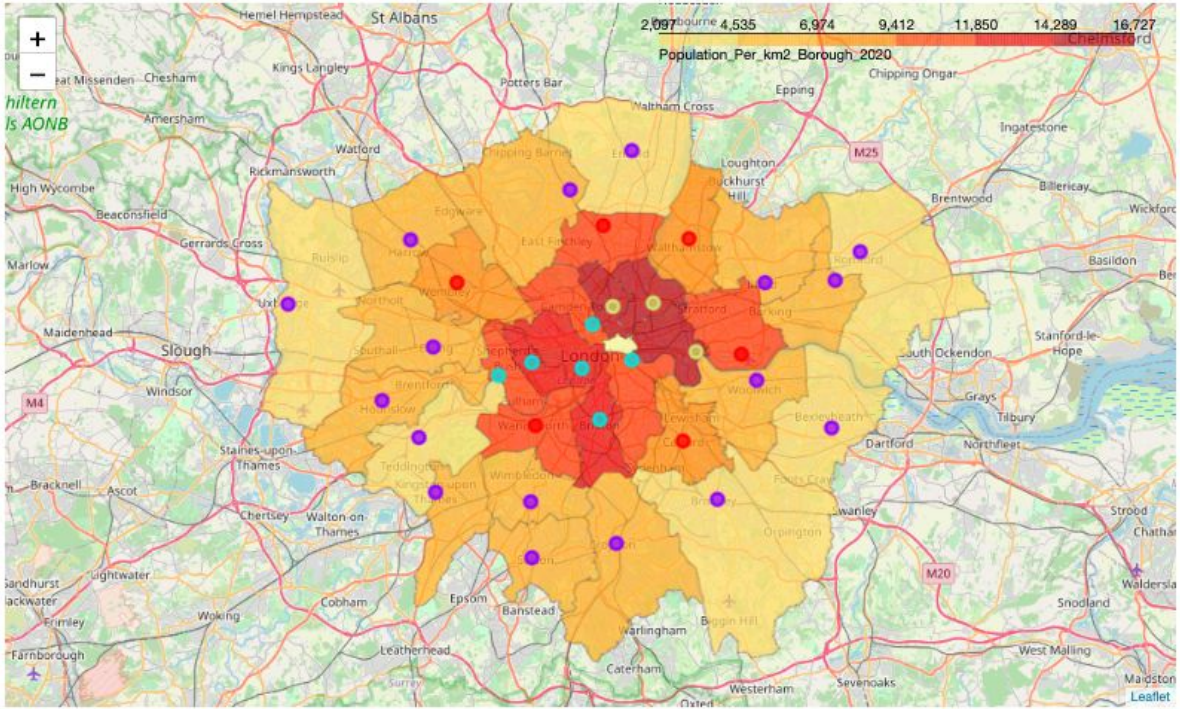
1	Barnet	51.625278	-0.151667	4693.4	1	The Atrium	Beaconsfield Road (BF)	Bellissima Beauty Clinic	Premium Electrical	wilko	Grange Wellington Hotel	Goo
2	Bexley	51.455000	0.150556	4208.8	1	wilko	Argos	Twin Palace	Bexleyheath Clock Tower	Bexleyheath Marriott Hotel	Boots	Broadv Shopp Cer
3	Brent	51.558889	-0.281667	7953.6	0	Starbucks	Costa Coffee	Gap Factory Store	Bobby Moore Club	Better Wembley Leisure Centre	London Designer Outlet	Cu PC Wi
4	Bromley	51.403889	0.019722	2240.6	1	Costa Coffee	Caffè Nero	wilko	Patisserie Valerie	Lush	Apple Bromley	Cow

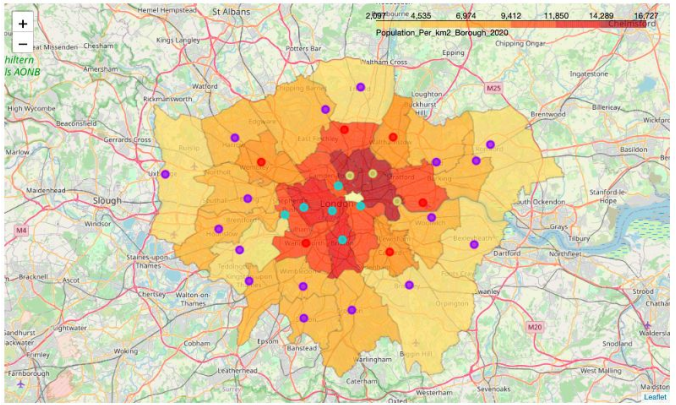
Methodology

We look into closer to each borough ;



Methodology

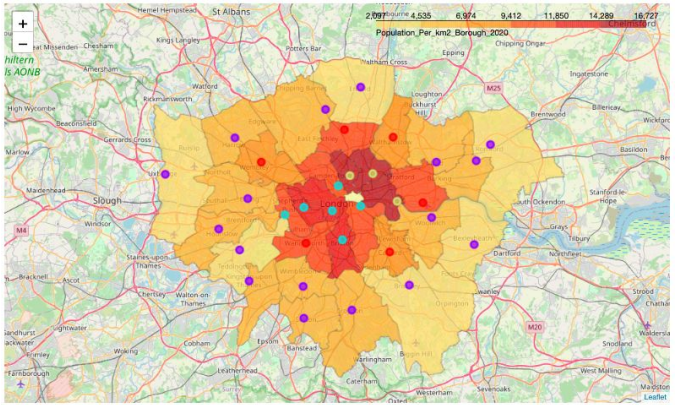
Red Boroughs(dots),



	Borough	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
3	Brent	Starbucks	Costa Coffee	Gap Factory Store	Bobby Moore Club	Better Wembley Leisure Centre	London Designer Outlet	Currys PC World	Tesco Express	Nike Factory Store	Next Clearance
12	Haringey	Green Rooms Bar	Canteen	Crystal Restaurant	Nando's	Coffee Break	Greggs	Woodside Park	Akdeniz Gida Pazari	The Prince	Vue
21	Lewisham	Costa Coffee	Domino's Pizza	Riva Restaurant & Lounge	Lidl	La Pizzeria Italiana	Turkish Food Xpress	Kaspa's	Platform 1	Platform 2	Boots
23	Newham	Hampton by Hilton	Pret A Manger	Connaugh House Hotel	Travelodge London Excel Hotel	Boots	London Regatta Centre	London City Airport (LCY) (London City Airport)	Yi-Ban	Royal Albert DLR Station	LCY Runway 09-27
29	Waltham Forest	Waltham Forest College Swimming Pool	The William Morris	The Bell	Wynwood art district	William Morris Gallery	Buhler + Co.	William Morris Gallery Tea Room	Forest YMCA	Clapton Craft	Yard Sale Pizza
30	Wandsworth	Starbucks	Press Café	The Grapes	Five Guys	Waitrose & Partners	The Chutney	Flying Tiger	Co-op Food	Cineworld	Chit Chaat Chai

Methodology

Yellow Boroughs (dots),



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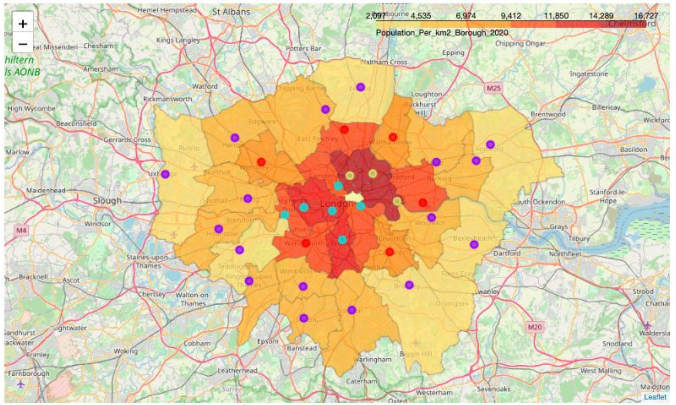
10	Hackney	Peg	Camarelli - Brazilian Butchers (Brazilian Centre)	London Star Night	Nike Hackney	Hackney Central Walkway	Hackney Central London Overground Station	LARDO	Pophams Bakery	Argun Printers & Stationers	JD Sports
17	Islington	The Sampler	Lonsdale Square	Little Angel Theatre	Oliver Bonas	Viet Garden	Ottolenghi	Laki Kane	Urban Social Coffee	Paper Mache Tiger	Union Chapel
28	Tower Hamlets	Super Three Private Cuisine	East India DLR Station	Sandwich Plus	La Mook	Bar Salento	Sichuan Kitchen	Azura at Radisson Edwardian	Aspen Way Bus Stop	Traffic Light Tree	Blackwall DLR Station

Methodology

Turquoise Boroughs (dots),



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23	Newham	Hampton by Hilton	Pret A Manger	Connaugh House Hotel	Travelodge London Excel Hotel	Boots	London Regatta Centre	London City Airport (LCY) (London City Airport)	Yi-Ban	Royal Albert DLR Station	LCY Runway 09-27
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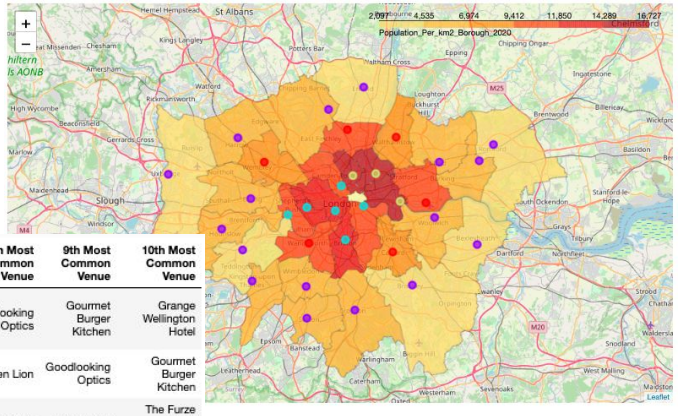
30	Wandsworth	Starbucks	Press Café	The Grapes	Five Guys	Waitrose & Partners	The Chutney	Flying Tiger	Co-op Food	Cineworld	Chit Chaat Chai

Methodology

Purple Boroughs (dots),



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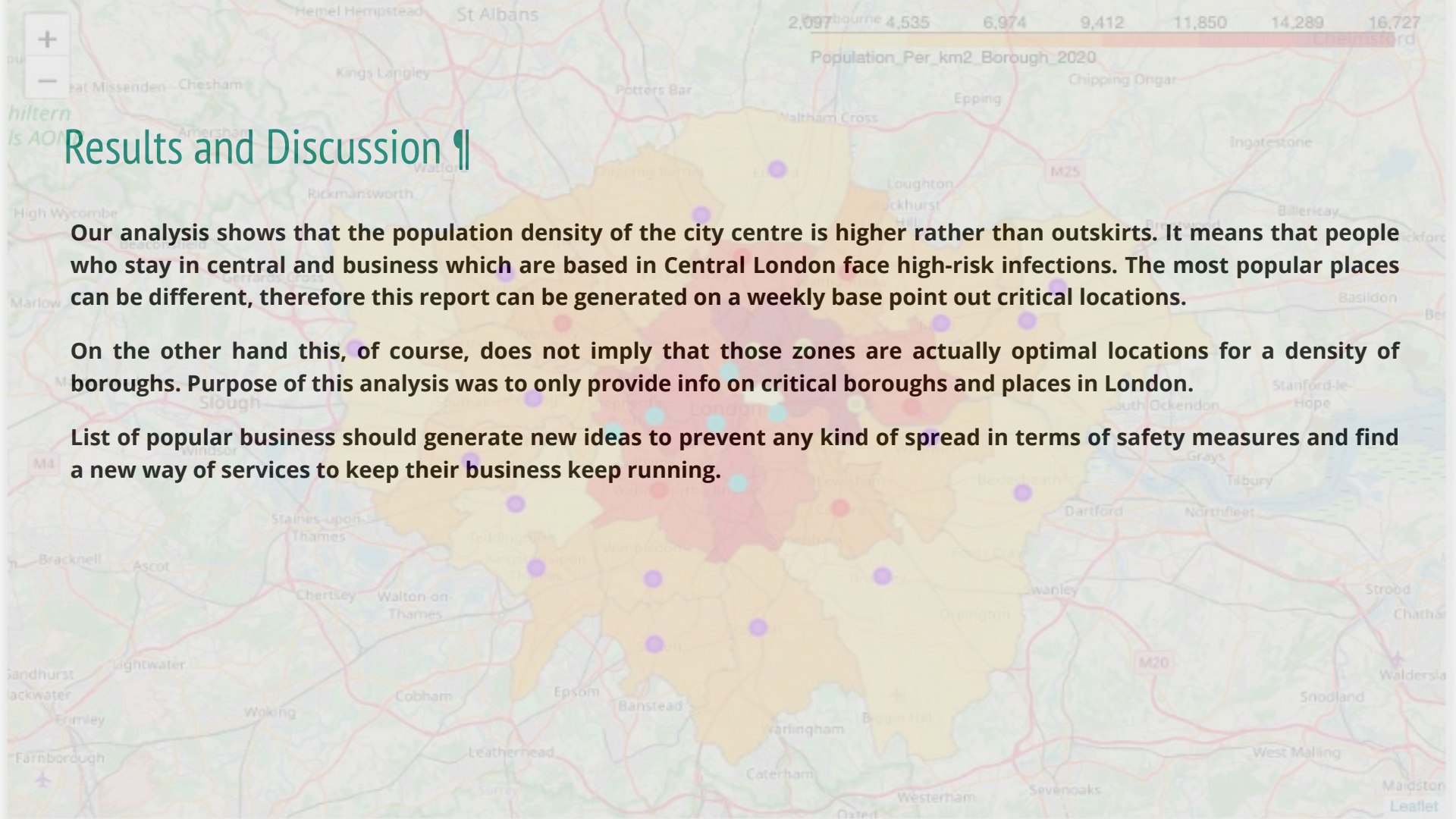
4	Bromley	Costa Coffee	Caffè Nero	wilko	Patisserie Valerie	Lush	Apple Bromley	Cow and Pig	O'Neill's	Waterstones	Five Guys
6	Croydon	Nando's	Forbidden Planet	Crushed Bean	The Ludoquist	The Crown & Pepper	Anabella's Kitchen	Cronx Bar	Bao Bao	Leisure Club	The Cronx
7	Ealing	Starbucks	Caffè Nero	Osteria del Portico	La Rueda	The North Star	Questors Theatre	Harris + Hoole	Primark	Pret A Manger	Honest Burgers
8	Enfield	Superdrug	Prezzo	The Taps	JD Sports	PizzaExpress	Boots	Bonito Café	Topman	Topshop	Pearsons
9	Greenwich	wilko	WHSmith	New Look	M&S Foodhall	Wimpy	Iceland	Greggs	Costa Coffee	Argos	Boots
13	Harrow	Costa Coffee	Tesco	Safari Cinema	Sam's Chicken	Shree Krishna Vada Pav (SKVP)	Sainsbury's Local	Ganleys Irish Bar	Game	Greggs	Green Rooms Bar
14	Havering	Greggs	Costa Coffee	wilko	Topshop	Primark	Home Bargains	Premier Inn Romford Central hotel	Boots	KFC	Better Gym Romford
15	Hillingdon	Costa Coffee	Boots	wilko	Lidl	Harris + Hoole	Coffee Break	Uxbridge London Underground Station	Uxbridge Station Sidings	Five Guys	Virgin Active
16	Hounslow	Civic Guest House	Lampton Park	The Black Horse	Mimi's Coffee & Dessert Lounge	Americano	Cafe Venezia	wilko	Golden Lion	Goodlooking Optics	Gourmet Burger Kitchen
19	Kingston upon Thames	Costa Coffee	Greggs	Starbucks	Waterstones	Côte Brasserie	Comptoir Libanais	The Bentall Centre	Costcutter	Creams	TK Maxx
22	Merton	Princess of India	Bus Stop J Morden	Ganleys Irish Bar	Bella Donna	Lidl	Sainsbury's	Greggs	Wimpy	KFC	Cafe la Lavella
22	Merton	Princess of India	Bus Stop J Morden	Ganleys Irish Bar	Bella Donna	Lidl	Sainsbury's	Greggs	Wimpy	KFC	Cafe la Lavella
24	Redbridge	Greggs	Subway	Lidl	Blue Inc Clothing	Ilford Kebab	JRC Global Buffet	Argos	O'Neill's	Waterstones	Costa Coffee
25	Richmond upon Thames	Sheesh mahal	Nando's	The White Swan	The George	WHSmith	Boots	Waitrose & Partners	The Three Kings	The Barmy Arms	Waterstones
27	Sutton	Subway	Caffè Nero	Waterstones	Nando's	New Look	Next	Poppins	Patisserie Valerie	O'Neill's	Greggs



Results and Discussion ¶

Our analysis shows that the population density of the city centre is higher rather than outskirts. It means that people who stay in central and business which are based in Central London face high-risk infections. The most popular places can be different, therefore this report can be generated on a weekly base point out critical locations.

On the other hand this, of course, does not imply that those zones are actually optimal locations for a density of boroughs. Purpose of this analysis was to only provide info on critical boroughs and places in London.

List of popular business should generate new ideas to prevent any kind of spread in terms of safety measures and find a new way of services to keep their business keep running.

Results and Discussion ¶

As a result, people are turning to their social lives, their business and start to go to work. For this reason, people can achieve better outcomes by using these results.

Not only for people and business owners but also city councils can generate this report more regularly and keep in control.