

Analysis of Manhattan NY neighborhoods for the opening of CBD retail stores

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Introduction

The 2018 Farm Act ([Link Here](#)) passed by the US Federal Government legalized the cultivation, distribution, and use of Hemp at a federal level, effectively negating a ban on usage of hemp that has existed for decades. Prior to the passage of the Farm Act, hemp was not legal to grow or use in the US and the small amounts that were cultivated were for the purposes of scientific research.

Cannabis consists of multiple types of plants; for the purposes of this document we shall simplify our language and use Cannabis to refer to two specific types:

- Hemp – an industrial and medical plant that contains primarily CBD as its medicinal and wellness product. CBD (cannabidiol) is a key component of hemp, and it has many medicinal and wellness uses. Unlike traditional marijuana (which remains illegal at the Federal level in the US, though legal at state level in multiple states), hemp contains primarily CBD and very little of the hallucination-inducing THC.
- Marijuana – a recreational and medical plant that contains both THC and CBD, both of which have been shown to have medicinal and wellness uses

While rigorous, scientific studies are still in their early stages due to the very recent legalization of Hemp, notable uses of CBD for wellness and medicinal purposes show that it has benefits for pain relief, nausea, headaches, seizures, and several other conditions.

As a result of these leading indicators of the applicability of CBD as a medicinal product, I believe there is a business opportunity for the local (at a neighborhood level) marketing & sales of CBD products.

Because of the legalization of marijuana at the state level in places like CA and CO, we can understand the adoption of and usage of both THC and CBD products for recreational uses, inclusive of medicinal uses. A study conducted by the US National Institutes of Health ([click here for study](#)) surveyed users of CBD and THC in states where Cannabis is legal. The study resulted in statistically significant findings indicating odds of using CBD to treat medical conditions, by age. We can therefore apply the results of this survey to populations in states where Marijuana has NOT been legal, but Hemp has recently become legal and infer CBD usage potential by population characteristics.

This project will test the attractiveness of various neighborhoods in the Manhattan NY area for the opening of CBD retail stores. The hypothetical business case supports investment in 2-3 CBD retail stores. The goal of the analysis is to identify 2-3 locations that would – before detailed boots-on-the-ground research – appear to support the opening of a CBD retail focused store. To rate neighborhood potential, we'll base rankings on:

- **Population characteristics:** we'll calculate a "usage potential" factor that applies the likelihood of using CBD products to treat medical conditions (as defined in the NIH study) to the populations for each zip code in Manhattan, NY.
- **Competition:** neighborhoods that have the lowest density of pharmacies indicate lower competition from other wellness-oriented product sellers, and therefore may be more attractive areas in which to open a CBD store.

By blending population and neighborhood pharmacy competition characteristics together we will be able to identify 2-3 locations where a CBD retail store may be positioned to be successful.

Data Description

Population Characteristics

US Census data extracted from : [\(Click Here\)](#).

List of Manhattan only zip codes : [\(Click Here\)](#).

Competition

Leverage an API to call information from Foursquare, specifically to retrieve a list of pharmacies within 1000 feet of the zip code starting location

Research on CBD Usage by Age Range

This article from the NIH [\(Click Here\)](#) shows the odds of CBD usage for medical purposes, by age range. This information will be used to calculate a "usage probability" for each zip code

Methodology

- A. Extract and prepare US Census Data for New York, and group the census population data ranges into ranges that match the NIH report
- B. Develop a "usage potential" by applying the odds ratio from the NIH report to each population age range by zip code.
- C. Slim down the resulting list of zip codes into only those zip codes that are part of Manhattan NYC
- D. Sort the resulting table and extract the top 5 neighborhoods based highest "usage potential"
- E. Extract foursquare information for each neighborhood: pharmacies within 1000ft radius within our top zip codes
- F. Build a map that shows a general vicinity for the two most desirable locations and which also contains markers for competitors (pharmacies) for reference.

Results

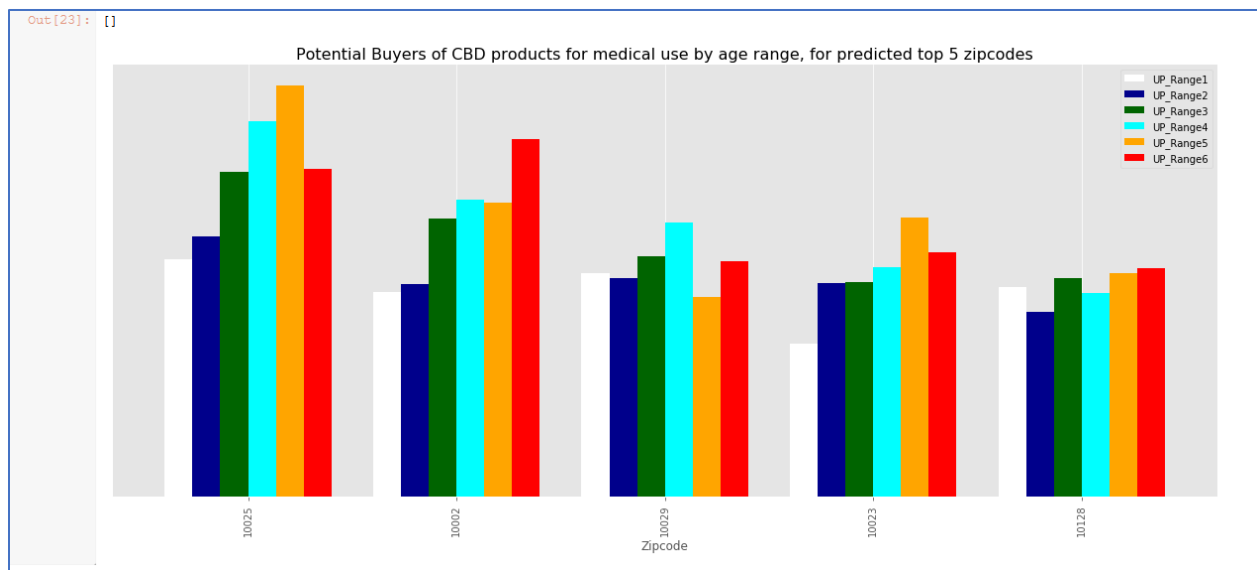
- Here are the resulting top 5 zip codes in Manhattan, as ranked by calculated “usage potential” using US Census data for population and the “odds ratio” from the NIH report.

Out[16]:

	Borough	Neighborhood	Zipcode	UP_Range1	UP_Range2	UP_Range3	UP_Range4	UP_Range5	UP_Range6	R1PCT	R2PCT	R3PCT	R4PCT	R5PCT	R6PCT	Total Pop	Total_UP
0	Manhattan	Upper West Side	10025	16780.50	18400.84	22951.10	26529.15	29027.08	23156.48	0.179589	0.131731	0.131445	0.131964	0.114757	0.077642	94382	136845.15
1	Manhattan	Lower East Side	10002	14458.95	15004.24	19610.00	20997.54	20767.32	25242.08	0.187424	0.130099	0.136028	0.126506	0.099442	0.102509	77925	116080.13
2	Manhattan	East Harlem	10029	15805.35	15424.56	16951.55	19376.61	14115.56	16637.40	0.197425	0.128880	0.113311	0.112495	0.065132	0.065108	80866	98311.03
3	Manhattan	Upper West Side	10023	10829.61	15084.16	15136.70	16194.39	19719.44	17275.72	0.177829	0.165686	0.133010	0.123598	0.119615	0.088874	61514	94240.02
4	Manhattan	Upper East Side	10128	14786.64	13044.72	15453.05	14396.67	15801.28	16153.92	0.238050	0.140478	0.133130	0.107725	0.093971	0.081475	62743	89636.28

Discussion

Here’s a bar chart of the top 5 neighborhoods’ “usage potential”, by population range:

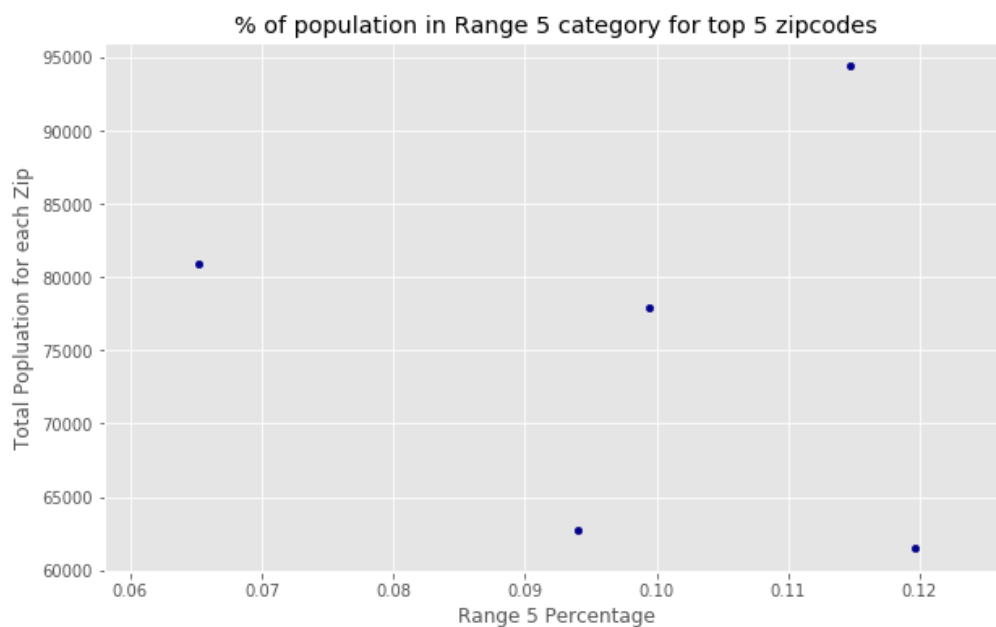


- Total population isn’t necessarily the strongest indicator of highest usage potential. For example, zip 10002 has a lower population than zip 10029 but has a far higher total usage potential. Therefore, it is likely that demographics within each zip code that is driving the ranked results.

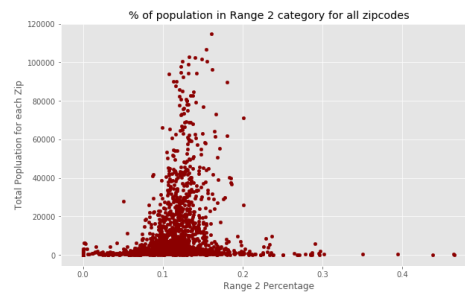
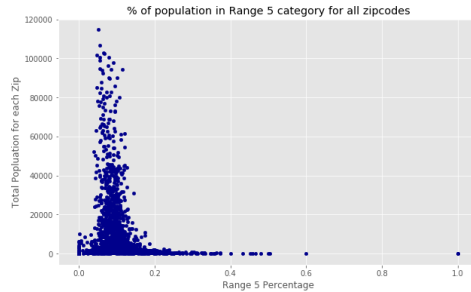
Range Name	Grouping
Range 0	Less than 24
Range 1	25 - 34
Range 2	35 - 44
Range 3	45 - 54
Range 4	55 - 64
Range 5	65 - 74
Range 6	older than 75

Out[9]:		
	Range	Odds
0	Range1	0.99
1	Range2	1.48
2	Range3	1.85
3	Range4	2.13
4	Range5	2.68
5	Range6	3.16

- The NIH report (see above link) shows that age plays a significant role in the odds of a person using CBD for medical purposes. For the purposes of this report, we discarded the “less than 24” range, as the NIH report shows the # of respondents in this category to be very small.



- The above plot shows the distribution of Range 5 Population (ages 65-74) across our top 5 zip codes.



- For comparison sake, the two plots above show the distribution of population ranges across all NY State zipcodes, for range 5 (65-74) and range 2 (35-44). These two tables plus the table showing the range 5 distribution across our top 5 zipcodes indicates
 - Manhattan zipcodes have a smaller, more focused population distribution
 - The older populations – because of the odds of their using CBD – are important in determining where our stores should be located.

Out[55]:

	Zipcode	Competitors
0	10025	9
1	10002	50
2	10029	31
3	10023	16
4	10128	20

- Now that we've determined our top 5 neighborhoods based on usage potential, it's important to also analyze the # of competitors (in this case: pharmacies) in each zip code. The above table shows the count of pharmacies located within 1000ft of the zip code. Zip codes 10025 and 10023 have the fewest # of pharmacies.

Key Observations and Conclusion

- We now know that age distribution in the population is one of the key drivers of calculating total usage potential.
- Zip code 10025 has a heavy population weighting towards the older end of the spectrum, vaulting it to the top of the list.
- In terms of picking a second location, our 4th place finisher (Zip code 10023) happens to be in the same neighborhood as our first place finisher: Upper West Side.
 - For the sake of making logistics easier (shipping, stocking, staffing, etc.) we'll assume that having our first two CBD retail stores located within a reasonable proximity makes sense.
- Our competitor search indicates that these two zip codes (10025, 10023) also have the fewest pharmacies, which may lower the barrier to success for us when we open our stores.
- Finally, because of the population demographics of our selected zip codes (10023 and 10025), we'll want to factor in a few considerations when designing, branding, and operating our stores:
 - We'll want wide aisles that are easy to navigate, catering to a more elderly population

- Our buildings will need handicapped access ramps, as we're likely to be working with customers on crutches, using canes, in wheelchairs
- Our brand should be one that is trustable for an older customer base (test marketing will be needed)
- We'll want to have a heavy emphasis on helpful, available staff to engage with customers 1-1 to help them find the products that they need.



- The above map contains starting locations for our stores (blue circles) and locations of our competitors (red dots).