BLOOD ADEQUACY:
Identifying Blood Donor Segments and Implementing Management Dashboard using Machine Learning and Data Visualization

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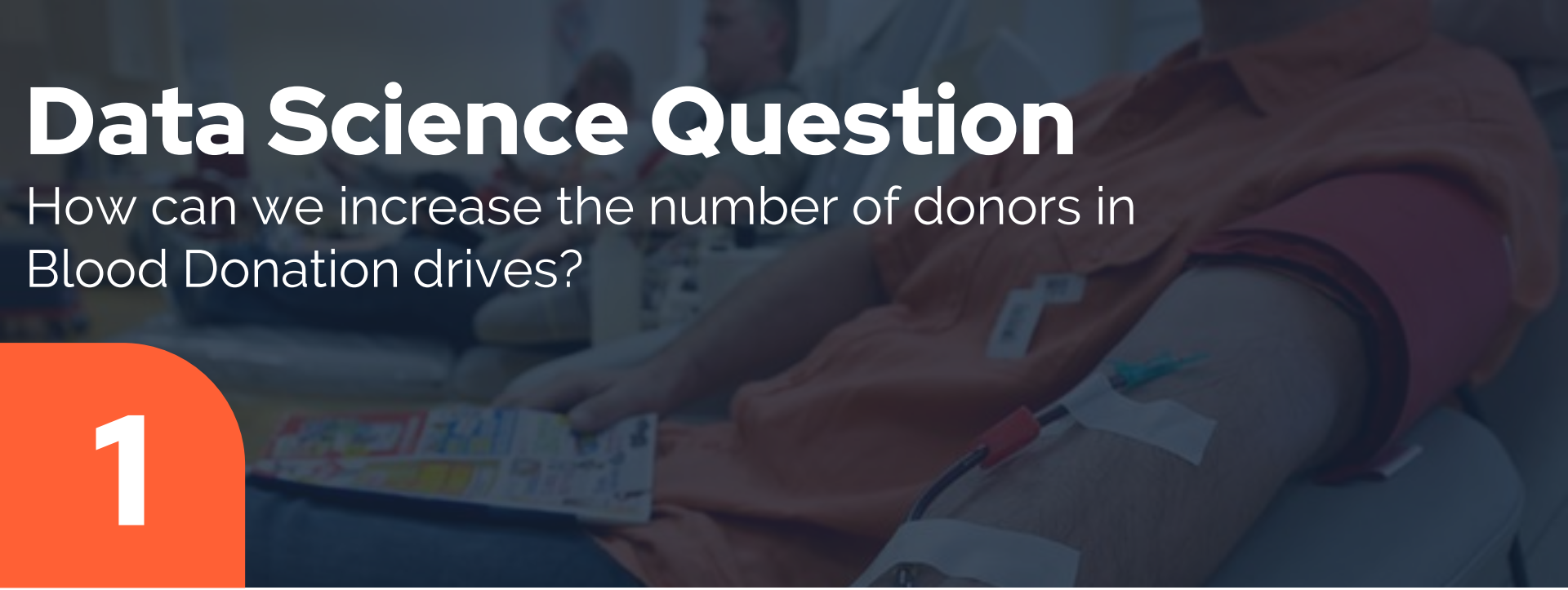
Hello!

3 Economists by training, and 1 IT professional

All working with Finance background

Soon-to-be zero to hero Data Scientists!



Data Science Question

How can we increase the number of donors in Blood Donation drives?

1

By **knowing the right people** to invite

Current situation

Taguig Pateros District Hospital

- Increase in demand for **blood type O+**
- Hosts monthly **in-house and mobile blood drive** campaigns
- Conducts **advocacy talks** in barangays, companies, and schools

Current situation

Challenge:

Recruit and Retain eligible blood donors

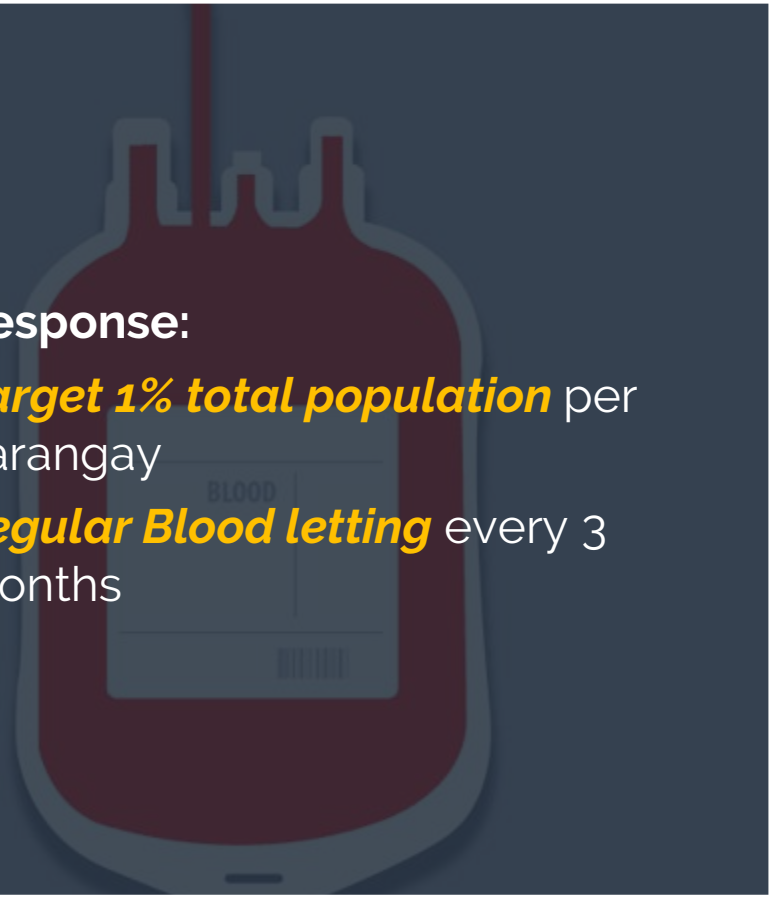
Other challenges:

* *Service Delivery*
* *Human Resource for Health*
* *Health Information System*

Response:

Target 1% total population per barangay

Regular Blood letting every 3 months



Scope and Limitation

Manual registration and collection of donor data

Records of medical history are maintained collectively and not matched per donor

Handwritten forms are only encoded if additional manpower (interns) are available

From the data provided by Taguig Pateros District Hospital, we have **1,969 blood donations** recorded in 2019. These are from **1,955 unique donors** with **13 returnees**.

SOLUTION

Blood Donor Segmentation

Explore and analyze patterns from the blood donor data set

Data Dashboard

Communicate and share data across blood center facilities through reporting dashboards

Share EDA insights and propose initiatives

Assess room for improvements, provide alternatives, and introduce new projects to improve donor recruitment and retention

give blood, give life


Employing Machine Learning
through
Clustering
specifically
K-modes Clustering

How does it work?

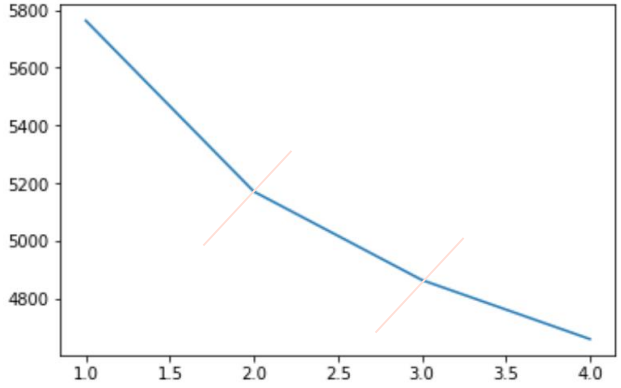
What data used?
How we cleaned data?

- Name
- Blood Type
- Location
- Cellphone Number
- Blood Donation Date

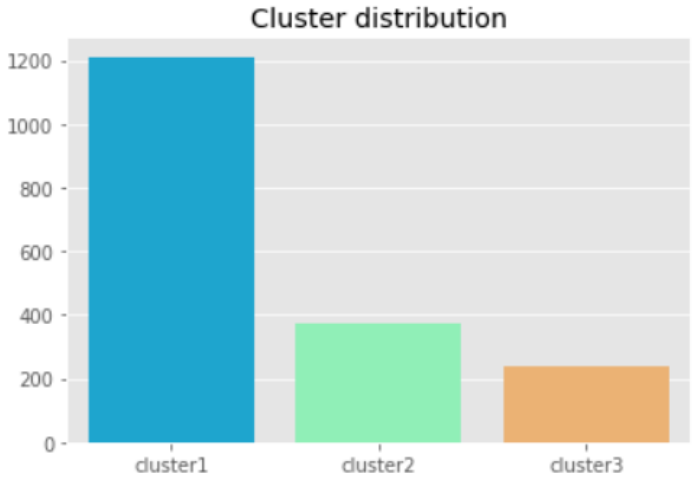
- Blood Donor ID
- Gender
- Blood Type
- Address
- Barangay
- Network
- Donation Month
- Blood Drive Location
- Returnee

How does it work?

Perform EDA and apply Machine Learning using Cao initialization



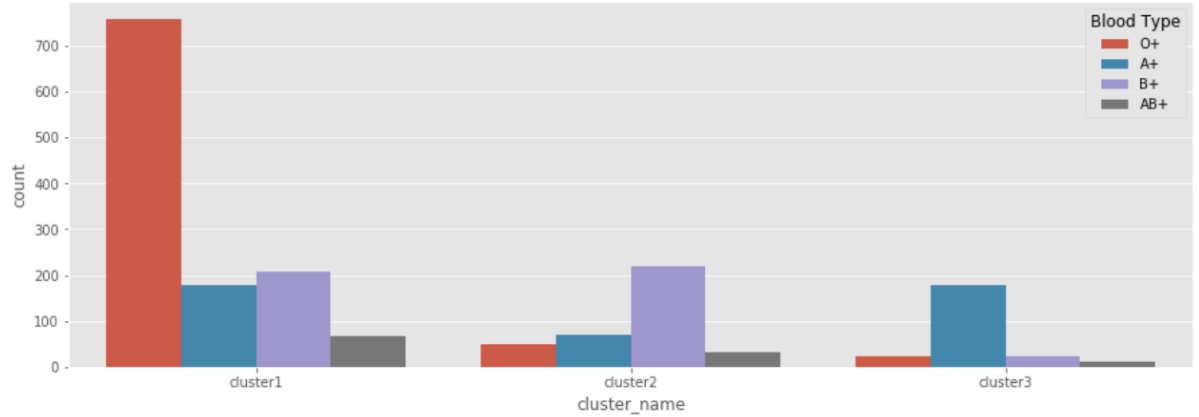

```
In [19]: df_donor.info()

<class 'pandas.core.frame.DataFrame'>
Index: 1819 entries, P1 to P2012
Data columns (total 6 columns):
Gender                  1819 non-null object
Blood Type              1819 non-null object
Barangay                1819 non-null object
Network                 1819 non-null object
Month                   1819 non-null object
Blood Drive Location    1819 non-null object
dtypes: object(6)
memory usage: 99.5+ KB
```

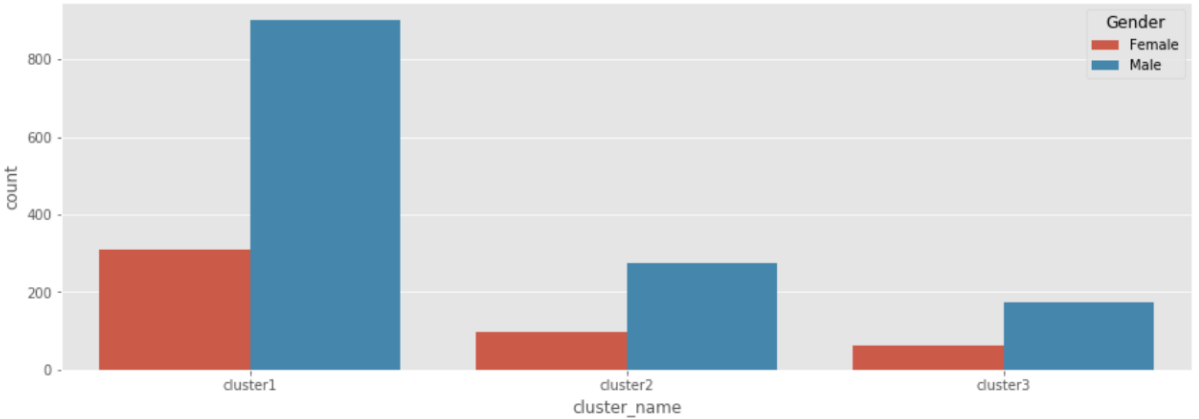


cluster_name	Number of Donations
cluster1	1211
cluster2	371
cluster3	237
Total	**1819**

How does it work?

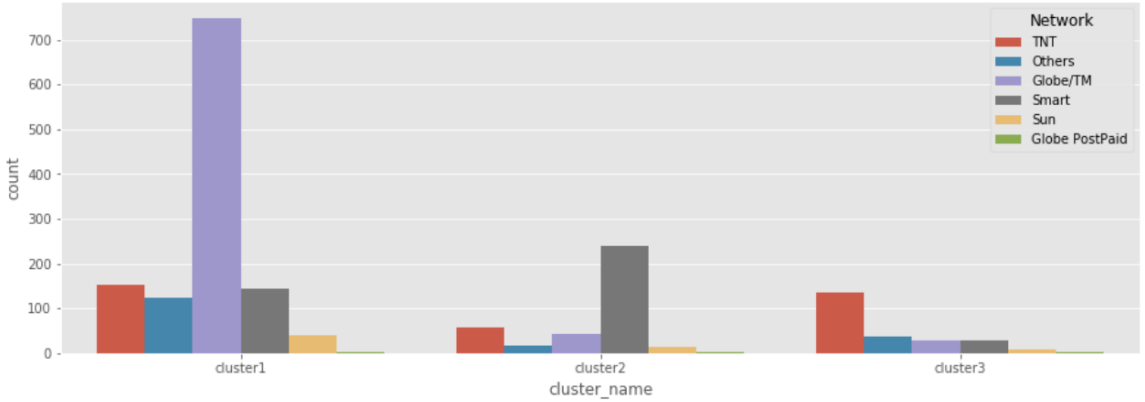
Mine insights

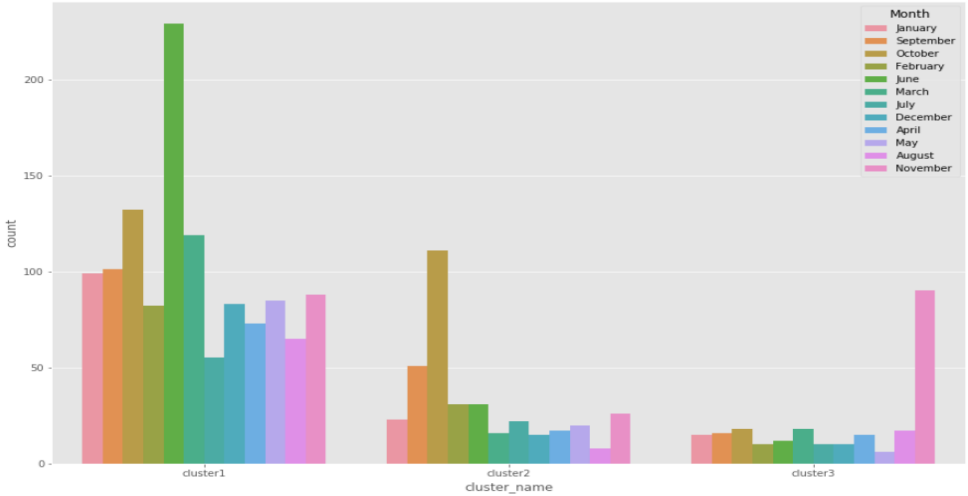




How does it work?

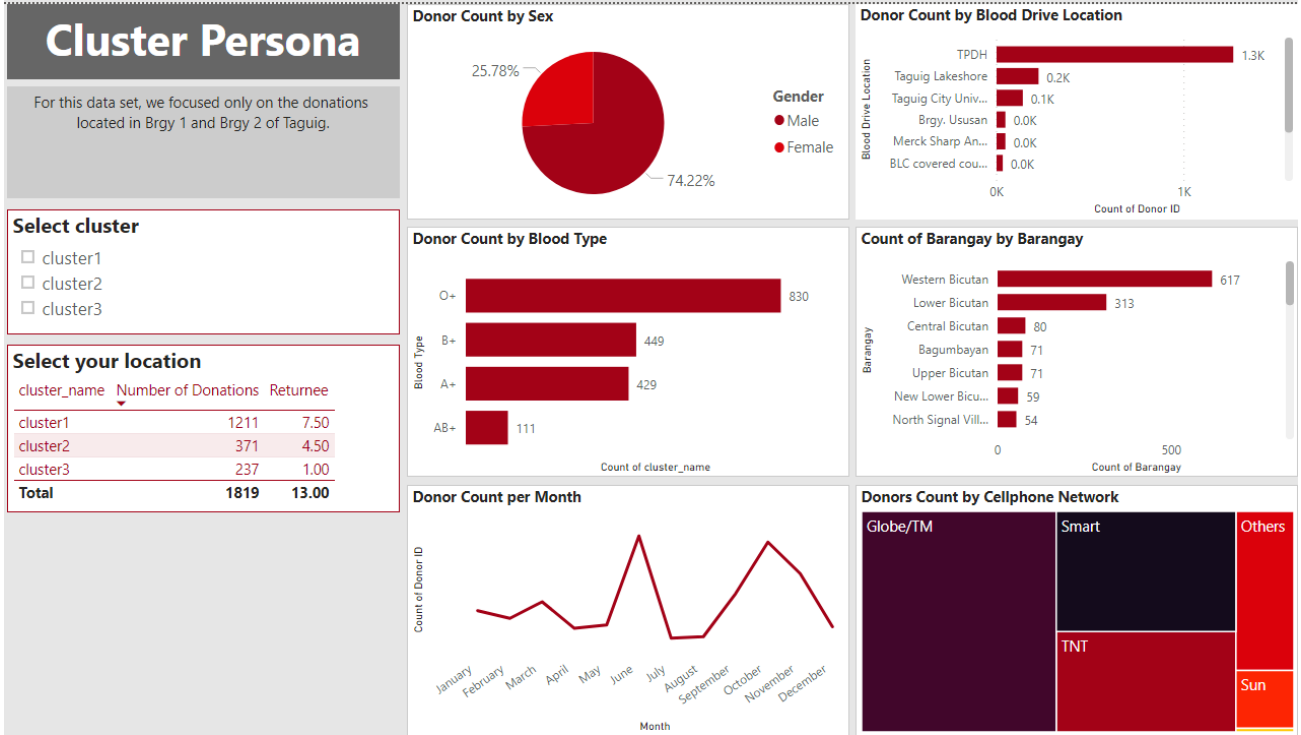
Mine insights





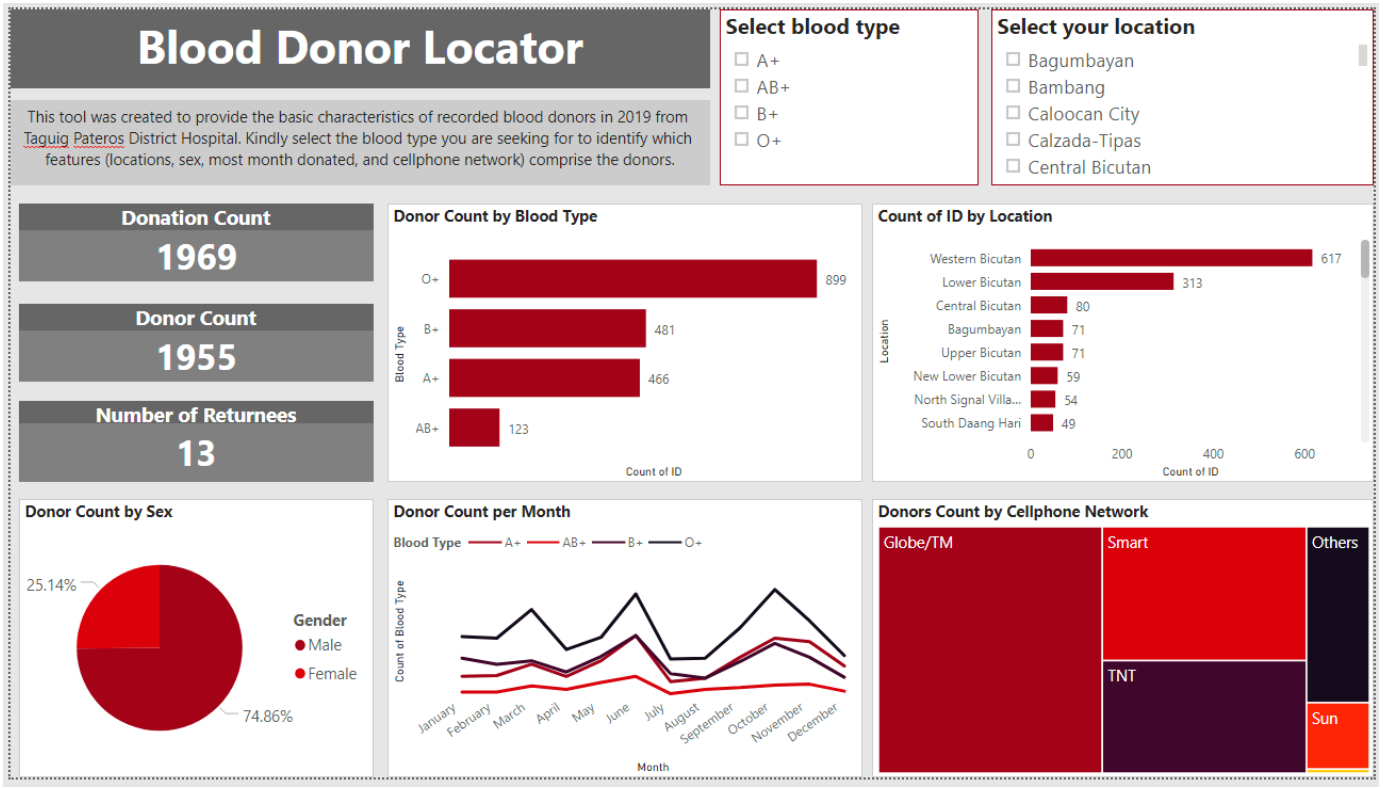
How does it work?

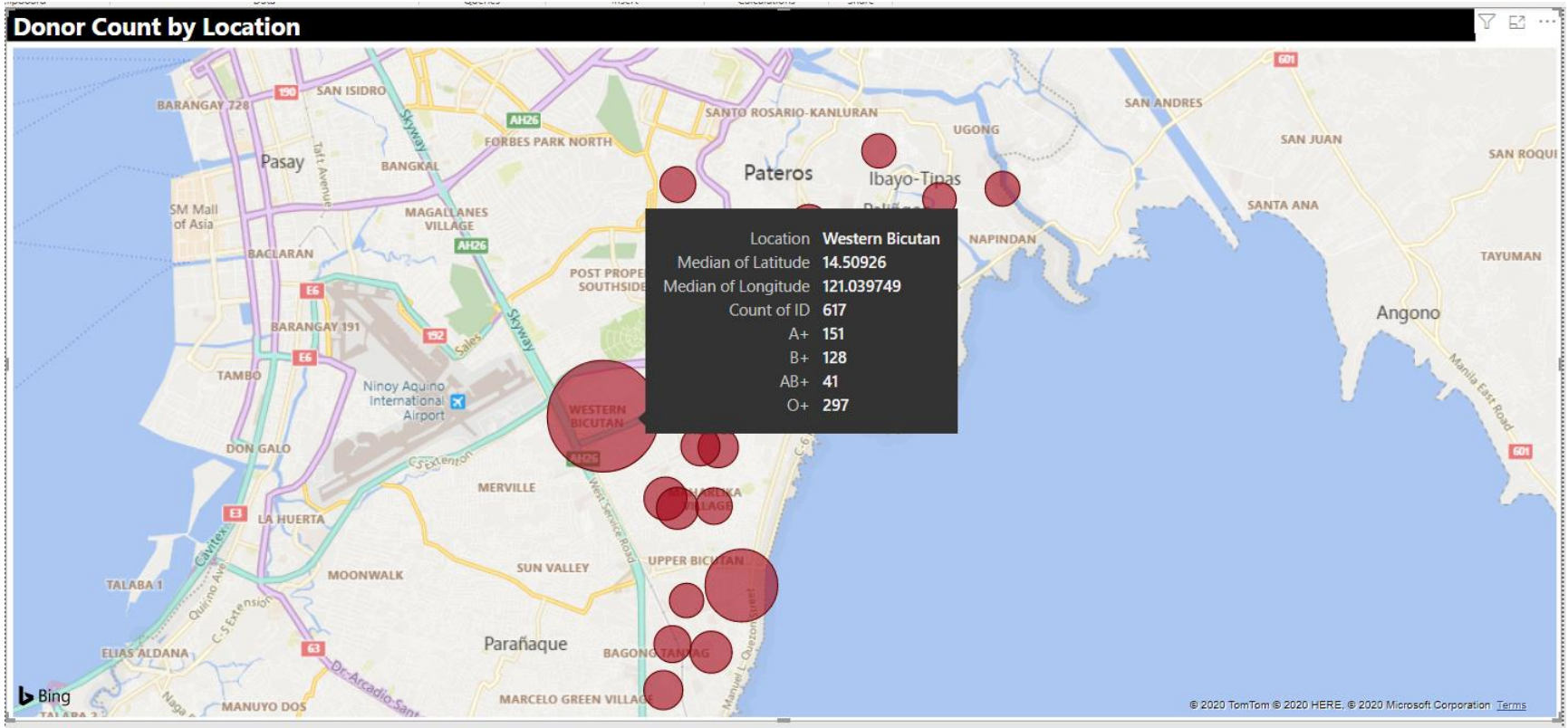
Create visualization tool



Dashboard Prototype

Data in tool to be updated regularly




Donor Count by Location
Location Western Bicutan
Median of Latitude 14.50926
Median of Longitude 121.039749
Count of ID 617
A+ 151
B+ 128
AB+ 41
O+ 297
Pasay
Pateros
Ibayo-Tipas
Angono
Parañaque
SAN ISIDRO
BARANGAY 728
SANTO ROSARIO-KANLURAN
FORBES PARK NORTH
BANGKAL
MAGALLANES VILLAGE
SM Mall of Asia
BACLARAN
BARANGAY 191
TAMBO
Ninoy Aquino International Airport
DON GALO
WESTERN BICUTAN
MERVILLE
LA HUERTA
MOONWALK
SUN VALLEY
UPPER BICUTAN
TALABA 1
ELIAS ALDANA
MANUYO DOS
MARCELO GREEN VILLAGE
BAGONG TANDANG
UGONG
SAN ANDRES
SAN JUAN
SAN ROQUE
SANTA ANA
NAPINDAN
TAYUMAN
Skyway
West Service Road
Manila East Road
Bing
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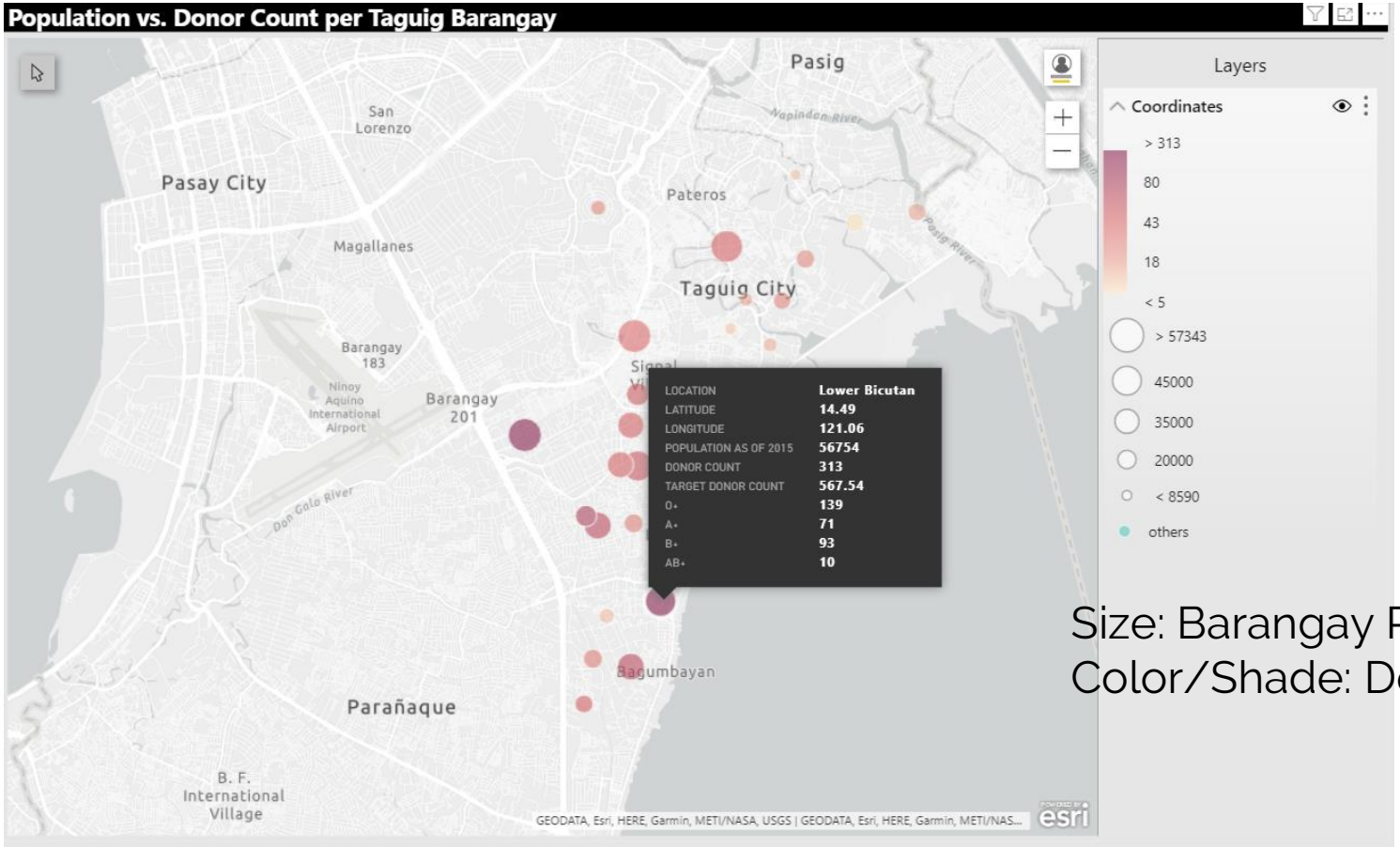

Size: Barangay Population
Color/Shade: Donor Count

Insights and Conclusion

Item	Key group of new donors	Regular donors (Returnees)	New donors
Blood Type	O+	B+	A+
Gender	Male	Male	Male
Barangay	Western Bicutan	Lower Bicutan	Western Bicutan
Facility	TPDH	TPDH	TPDH
Month	June	October	November
Network	Globe	Smart	TNT

Data-driven Recommendations

*Gather more **demographic information** (ex. Sex, Age, Blood volume donated (cc), Employment Status) that can help improve segmentation.

*Conduct survey to observe **behavioral pattern** of donors (ex. motivation).

Data-driven Recommendations

*Assign a health coordinator that would **recruit** blood donors on Ibayo-Tipas, Palingon, and Bambang (lowest number of donors).

*Continue **retention** initiatives such as recognizing commitment in doing voluntary blood donation and partnering with companies for Western, Lower, and Central Bicutan (highest number of donors).

*Increase in **frequency of mobile blood drive** during month of July and August. Target barangays far from the in-house facility.

Ways of Working – Recommendations

*__Automate follow-up invites__ for blood donation by creating a scheduling tool based on the last date of the donation + 3 months, and the contact number provided in initial donation.

*__Digitalize the donor data collection__ through use of registration laptop and online survey. To decentralize, you may opt to provide QR code directing to survey link and inspect “completed/submitted results” before proceeding.

*Advocacy talks - __Innovate materials__ to be used (ex. redesign slides, use of videos/testimonials), __tie-up with barangay__ for awareness sessions

THANK YOU!

Should you be interested to know more about the project, feel free to reach out to us.