**IEOR 4404 Project Proposal - Spring 2021**

Group members:

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**1. Problem:**

How to optimize the overall vaccination process in New York City.

**2. The value proposition:**

As the COVID-19 is spreading widely, vaccination is the only effective way to slow the spread rate and control the pandemic. In such a situation, how to increase the efficiency of the vaccination seems to be really important. For residents in New York, efficiency and rate of the vaccination will influence their safety level to some extent. Hence, it is important to distribute the vaccination location, perfect the inoculation flow, which will better boost the effectiveness. To the whole society, it is absolutely meaningful to perfect this system and ease the negative influence of this pandemic.

**3. The initial structure of the system:**

It would be appropriate for us to suppose these few things:

1. People’s arrivals follow a Non-homogeneous Poisson Process with a different rate:
2. People’s expectation for different vaccines will affect how willing they want to get a certain vaccine, so the arrival rate for each vaccine will be different.
3. For different vaccines, people may (**✔**) or may not (**×**) need to get a second shot:

* Pfizer: **✔** two times with a separation of 21 days;
* Moderna: **✔** two times with a separation of 28 days;
* Johnson & Johnson/Janssen: **×** only need one shot.

1. Each type of vaccine’s arrivals (to the vaccine site) follow a Non-homogeneous Poisson Process, since the productivity will change over time depending on the demand of them.
2. Each vaccination site has the same service time.

Also, we may consider priority of different groups of people, online appointment, and other factors if possible.

**4. Describe the data:**

We don’t need large amounts of data for this project, but we do require some.

1. Number of COVID-19 vaccines.
2. Distribution of vaccines.
3. Number of COVID cases remaining.
4. Number of people who get vaccinated.
5. Number of people who get vaccinated at each vaccination site.
6. Number of vaccination sites.
7. Further information if needed.

**5. General plan:**

| Tasks | Deadlines | Tasks | Deadlines |
| --- | --- | --- | --- |
| Finish project proposal **✔** | Mar 28 | Complete the system and start to simulate | April 15 |
| Collect data and perfect the overall structure | April 1 | Seek further improvement if any | April 18 |
| Construct the main structure of the system | April 5 | Finish final report | April 23 |

Meet twice a week via Zoom, and keep work up to date on google drive.