# *COVID-19 Vaccine Hesitancy*

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**https://github.com/CanOpenerInACan/Data-Science-Masters**

**Which Domain?**

COVID would be in the health domain, although the approach would be more of a governmental problem solving model. This could be applied to a variety of business approaches, but the end goal is to get people vaccinated that are hesitant.

Lisa Rosenbaum M.D., Escaping Catch-22 — Overcoming Covid Vaccine Hesitancy. https://www.nejm.org/doi/full/10.1056/NEJMms2101220
This seems like a decent bit of context on why people are hesitant, what we can do to avoid the hesitancy and ways we can identify the people that might be able to be swayed in their decision.

E Callaway. OXFORD COVID VACCINE RESULTS PUZZLE SCIENTISTS. https://covidcalltohumanity.org/wp-content/uploads/2020/04/Nature_Why-Oxfords-Positive-COVID-vaccine-results-are-puzzling-scientists.pdf
This is an article from 2020 when vaccines are first being developed and getting ready to be distributed. A lot of hesitancy seems to be a combination of government mistrust and how it was seemingly rushed, so getting more insight into why we were able to create the vaccines so fast is helpful.

Gary L Freed. Actionable lessons for the US COVID vaccine program. Israel Journal of Health Policy Research.https://ijhpr.biomedcentral.com/articles/10.1186/s13584-021-00452-2
This gives us an outside look of how the US handled the COVID vaccines and pandemic and talks about the shortcomings. It's more focused on preventing future pandemics but still a lot to learn here.

IHME COVID-19 Forecasting Team. Modeling COVID-19 scenarios for the United States. https://www.researchgate.net/profile/Simon-Hay/publication/346381819_Modeling_COVID-19_scenarios_for_the_United_States/links/5fc5894aa6fdcce95268fd58/Modeling-COVID-19-scenarios-for-the-United-States.pdf
This shows a more analytical approach of each individual state, which will be very interesting to look into. This shows approaches and how each state handled things, along with a ton of modelled stats that give more depth to the states. If I can find a way to line up the times between this and the original dataset, even if it is setting up a blanket stat per state, I may add some of this into the dataset.

Mohammad S Razai. Covid-19 vaccine hesitancy among ethnic minority groups. https://www.bmj.com/content/372/bmj.n513.long.

This shows one of the many reasons for the hesitancy amongst Americans for getting the vaccine. This is one of the more common reasons, but looking into racial composition of the different counties may be worth looking into.

Malik Sallam. COVID-19 Vaccine Hesitancy Worldwide: A Concise Systematic Review of Vaccine Acceptance Rates. https://www.mdpi.com/2076-393X/9/2/160.
This looks into more of the reasons people accept or are hesitant about the vaccine. It takes a more worldwide approach but still gives more reasons for why people may be cautious about this.

Patricia Soares. Factors Associated with COVID-19 Vaccine Hesitancy
https://www.mdpi.com/2076-393X/9/3/300/htm
This looks into some of the reasons for hesitancy and may help us identify what the issues are and how to alleviate them.

Federico Germani. The anti-vaccination infodemic on social media: A behavioral analysis.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0247642.
This looks beyond hesitancy and into the people that are full on anti-vaccination. The rising movement may be too long gone to convince the safety of the vaccines and need for taking them, but the dissenting opinions also cause some of the hesitancy.

Ève Dubé, Jeremy K. Ward, Pierre Verger, and Noni E. MacDonald. Vaccine Hesitancy, Acceptance, and Anti-Vaccination: Trends and Future Prospects for Public Health.
https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-090419-102240. Annual Review of Public Health

Raphael Fontes. US Election 2020.
https://www.kaggle.com/unanimad/us-election-2020?select=president_county_candidate.csv
If possible, this may lead to some additional information. Although COVID was a worldwide issue that had nothing to do with politics outside of how it was handled, there has been a continued split of opinion that may contribute to the hesitancy. This could also be used in helping identify places where we can change people's minds. If a county is too politically opinionated, we may want to look into more neutral voting counties that may be more receptive to changing their minds.

**Which Data?**
https://www.kaggle.com/deepshah16/vaccine-hesitancy-for-covid19
The data was gathered from data.gov.

**Research Questions? Benefits? Why analyze these data?**
I want to tackle this from the perspective of both local governments and federal governments on who we need to focus on convincing to get the vaccine and who are most likely to be swayed with some incentive (like the vaccine lotteries etc.). I feel like taking several

approaches and ways to combat the hesitancy would be interesting and see what incentives work and how to make things safe.

**What Method?**

Beyond doing something as simple as a regression model for trying to estimate hesitancy numbers with the other features, it may be interesting to look into an approach used in fraud cases to find the places most likely to be hesitant and be swayed. By identifying the problem places and either changing the public perceptions of the vaccine or offering incentives in the county.

**Potential Issues?**

I would like to find not only the places with the most hesitancy, but also the ones that might be easiest to sway. I'm not exactly sure how to go about that, but it would be nice to be able to prioritize a county with a higher chance to be swayed and convinced than one that may have higher hesitancy but also won't be changing their mind. This could be solved by looking at individual state make ups, maybe political leaning (if I want to delve into that sort of thing pertaining to COVID) or maybe other factors. I also may have an issue with the use of "hesitancy" and what exactly that entails. Is someone who is strictly anti-vaccination and a COVID denier considered hesitant? I would need to look into the data in the dataset and figure out exactly what is being measured here, and if we can differentiate the hesitant people from the people outright not interested.

**Concluding Remarks**

I want to take several approaches to a more simple problem. Focus on the data exploration, the plan of attack and using the data to make decisions rather than creating a complex model that does a lot more behind the scenes. I also am interested in this because my dad is anti-vaccine and I am seeing him in a couple of weeks, so getting the chance to do more research into the subject and possibly explain more things with data and numbers may be helpful (although I'm not entirely sure it will). I am also very open to expanding this if required or if there are ideas for more. I want more than a regression model to predict the hesitancy and want to look at it from more perspectives and put myself in the shoes of someone tasked with getting people vaccinated and finding ways to target specific counties that may need to be targeted. I also have yet to do a COVID-19 dataset or project in all my Data Science courses and feel with things turning the corner and being more of a complete picture, there is a chance to look into it all.