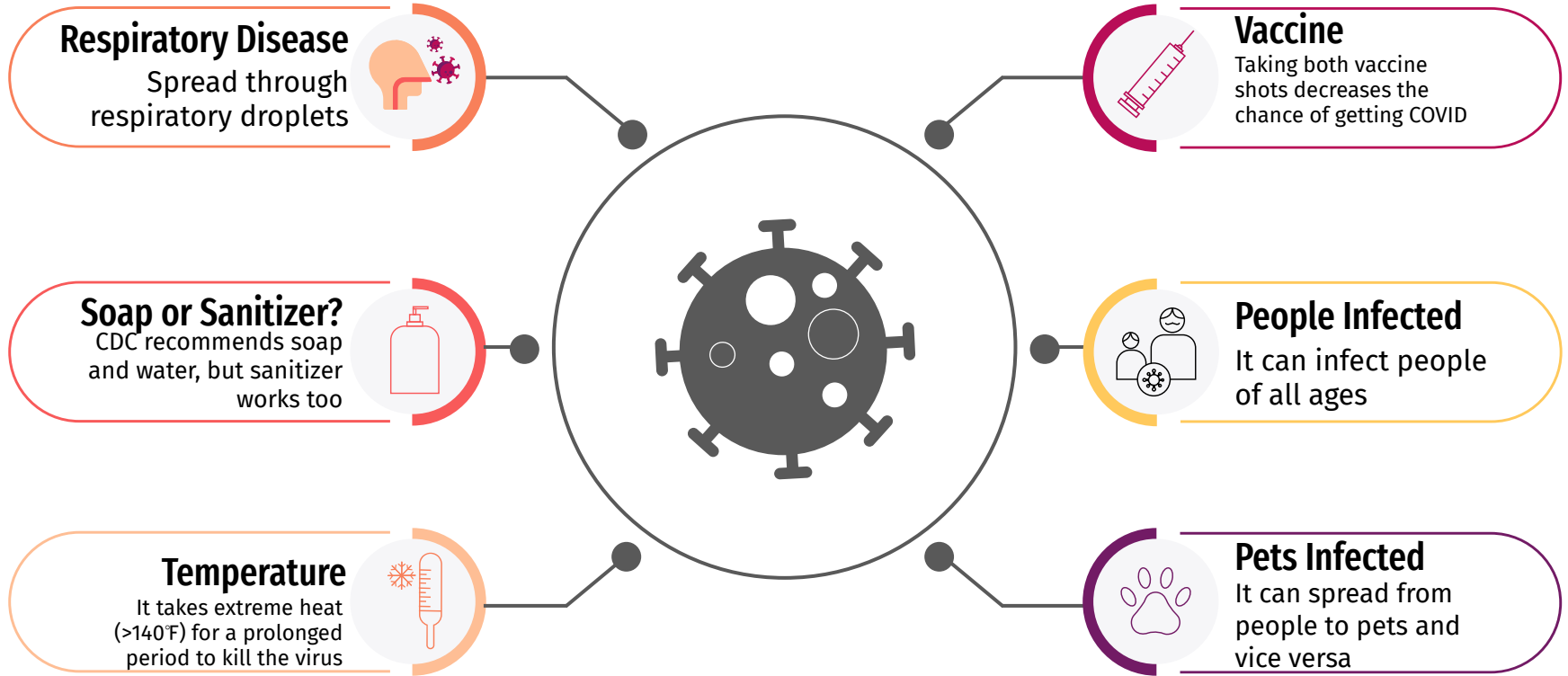


COVID-19 Indicators Tracker

Chika Chuku,
Marilyn Pothan,
Rankin D'Souza,
Yi-Hsuan Chen

UMD Data Challenge 2021 - Team 13

What is COVID-19?



Data Source



Global Survey

University of Maryland COVID-19 Symptoms & Attitude Survey:
<https://covidmap.umd.edu/methodology.html>



Insights From Survey

What indicators lead to an increased instance of COVID
like illness in the population?



Our Goals

1

Understand factors that relate to the spread of COVID-19.

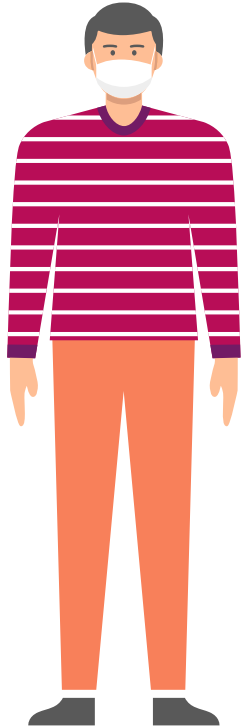


2

Offer suggestion to lawmakers and health officials by using insights from the survey findings.



Summary of Methods



Data Gathering

PYTHON
API
JSON
CSV/EXCEL

1

Mapping

Tableau

2

Statistical Testing

F tests, Linear
Regression,
Correlation
Matrix, Heat
Map

3



6 FEET APART

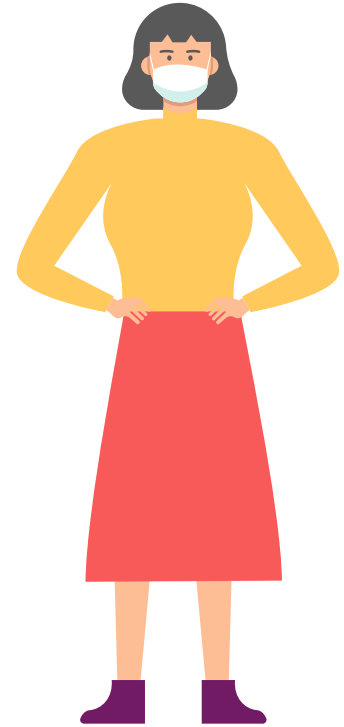
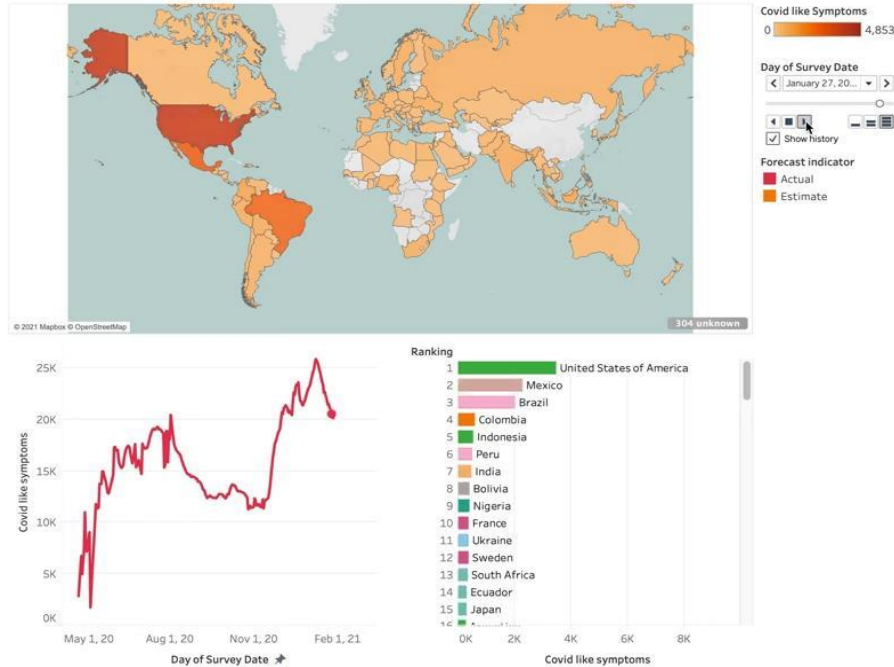


Tableau-COVID like symptoms throughout survey dates



Animations World cli map Graph by countries Ranking Time series Interactive map Animations_both

Sources: COVID-19 World Survey Data API
<https://covidmap.umd.edu/methodology.html>

World Health Organization

North and South America Members Chosen For Higher Rates of COVID-Like Symptoms

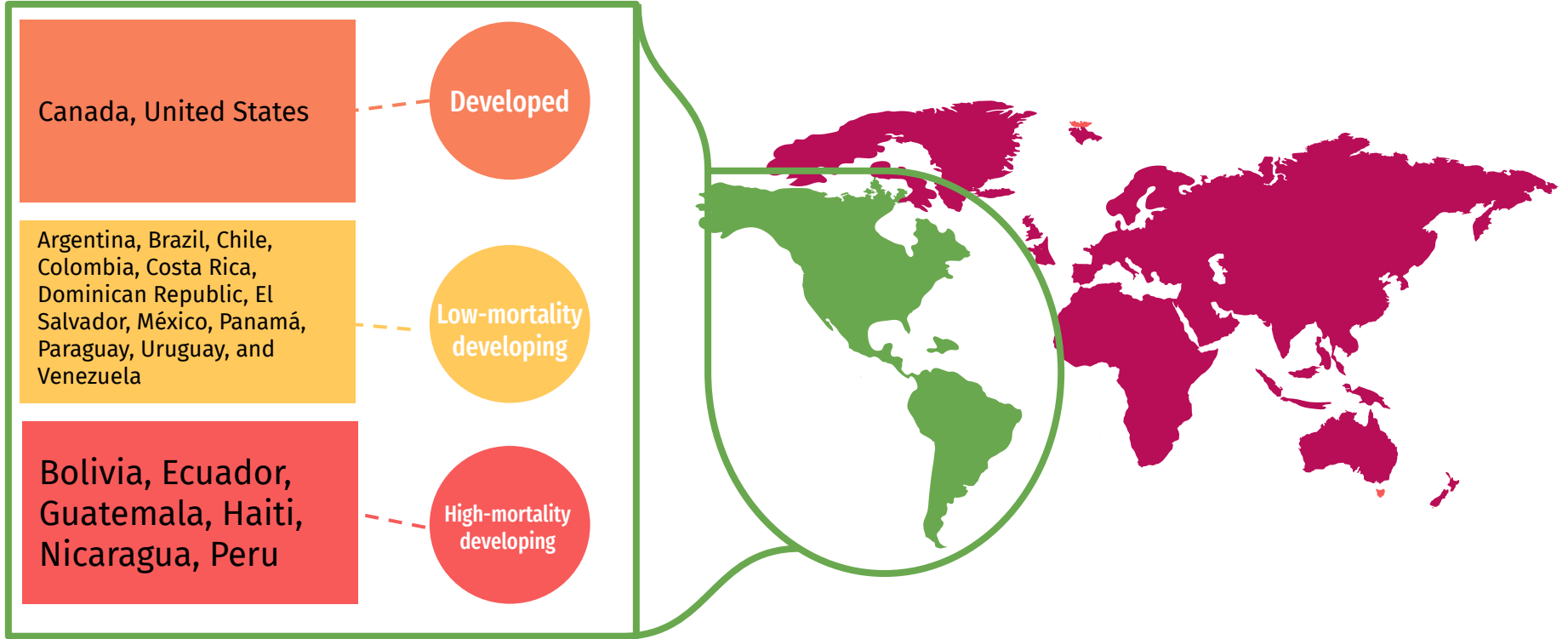
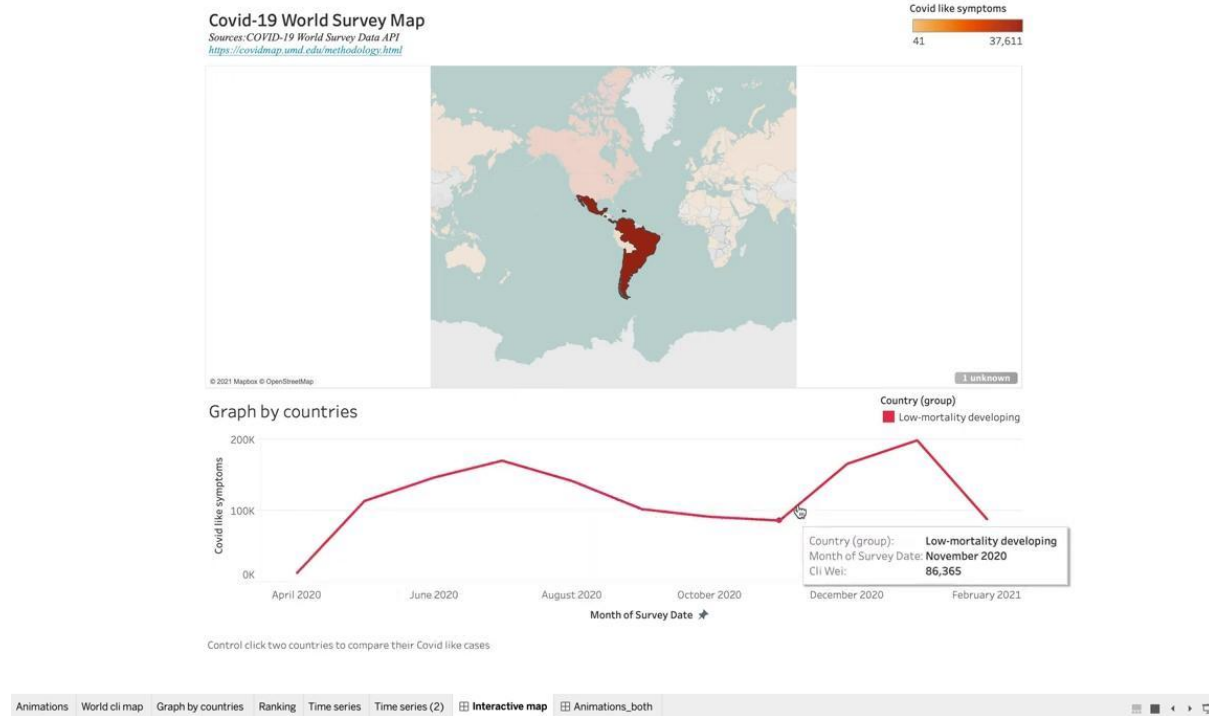


Tableau-Interactive Map



Sources: COVID-19 World Survey Data API
<https://covidmap.umd.edu/methodology.html>

Research Questions

01

Does the spread of the virus vary between developed and developing regions?



02

What factors have significant correlation with the spread of the virus in these regions?



03

What are explanations for these factors and how will this lead us to solutions?



Q1: Does the spread of the virus vary between developed and developing regions?



Q1: Does the spread of the virus vary between developed and developing regions?

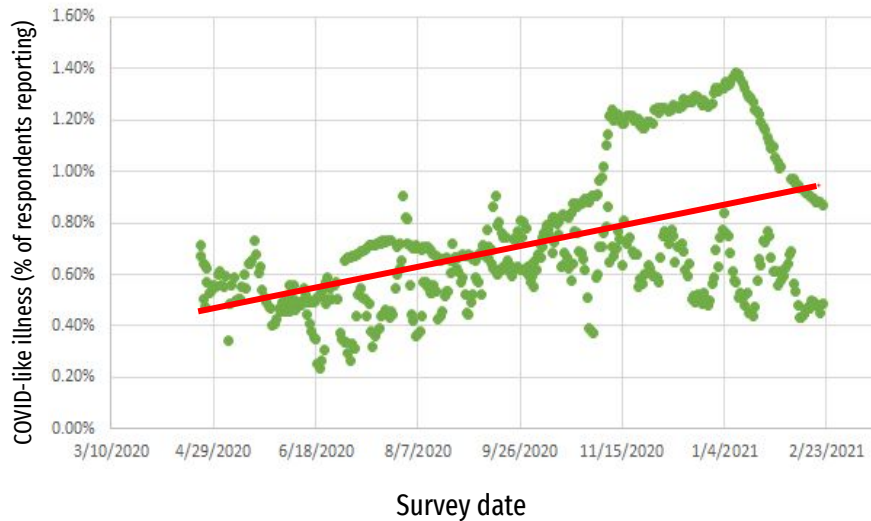
Null Hypothesis

The spread of the virus does not vary between developed and developing nations

Alternative Hypothesis

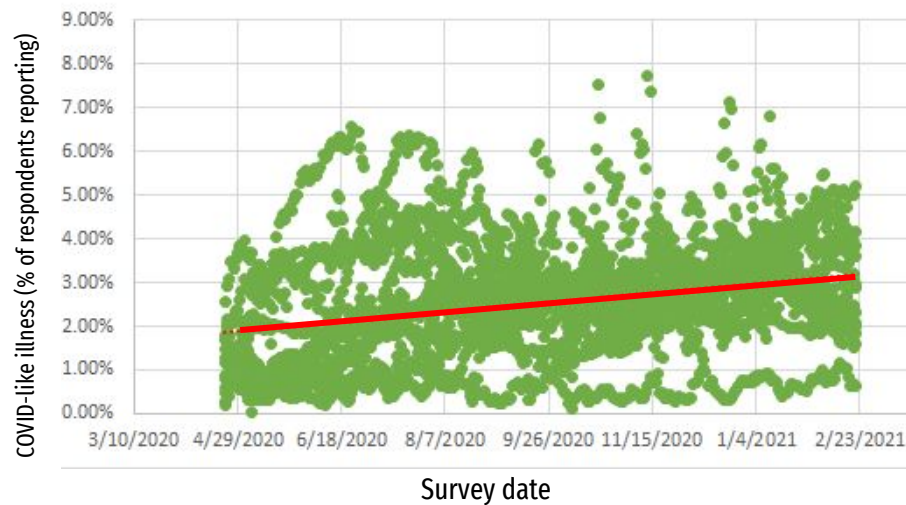
There is variance of the spread on covid like symptoms in developed and developing nations

Q1: Does the spread of the virus vary between developed and developing regions?



COVID-like illness in **Developed Countries**

$$y = 2 \times 10^{-5}x - 0.7077$$



COVID-like illness in **Developing Countries**

$$y = 4 \times 10^{-5}x - 1.905$$

F-Test

F-Test Two-Sample for Variances		
	<i>Developing</i>	<i>Developed</i>
Mean	0.025106017	0.007171227
Variance	0.000160095	6.82157E-06
Observations	4266	558
df	4265	557
F	23.46895816	
P(F<=f) one-tail	2.546E-261	
F Critical one-tail	1.113297871	

- A variety in the spread of CLI
- $F > F$ critical tail
- Can reject the null hypothesis

The prevalence of COVID-19 like symptoms differs between developed and developing countries in the Americas.

Q2: What factors have significant correlation with the spread of the virus in these regions?

Q2: What factors have significant correlation with the spread of the virus in these regions?

Indicators chosen from the API



COVID (cli)

% of survey respondents that have reported COVID-like illness.(fever, along with cough, shortness of breath, or difficulty breathing.)



Finance (hf)

Survey respondents who are worried about themselves and their household finances.



Wash_hands_24h_3-6

Survey respondents who washed their hands 3-6 times in the last 24 hours.



Contact (dc)

Survey respondents that have reported having had direct contact with people not staying with them.



Mask (Mc)

Survey respondents who wore a mask all the time or most of the time when in public.



Wash_hands_24h_7orMore

Survey respondents who washed their hands 7+ times in the last 24 hours.

Q2: What factors have significant correlation with the spread of the virus in these regions?

Indicators chosen from the API



Trust_who

Respondents more likely to get vaccinated if recommended by the WHO.



Trust_govt

Respondents more likely to get vaccinated if recommended by government health officials.



Concerned_sideeffects

Respondents being very or moderately concerned about COVID-19 vaccine side effects.

Hesitant_sideeffects

Respondents concerned about COVID-19 vaccine side effects, (would NOT choose to get vaccinated).



Will Take Vaccine

Respondents who will take the vaccine when they are able to.

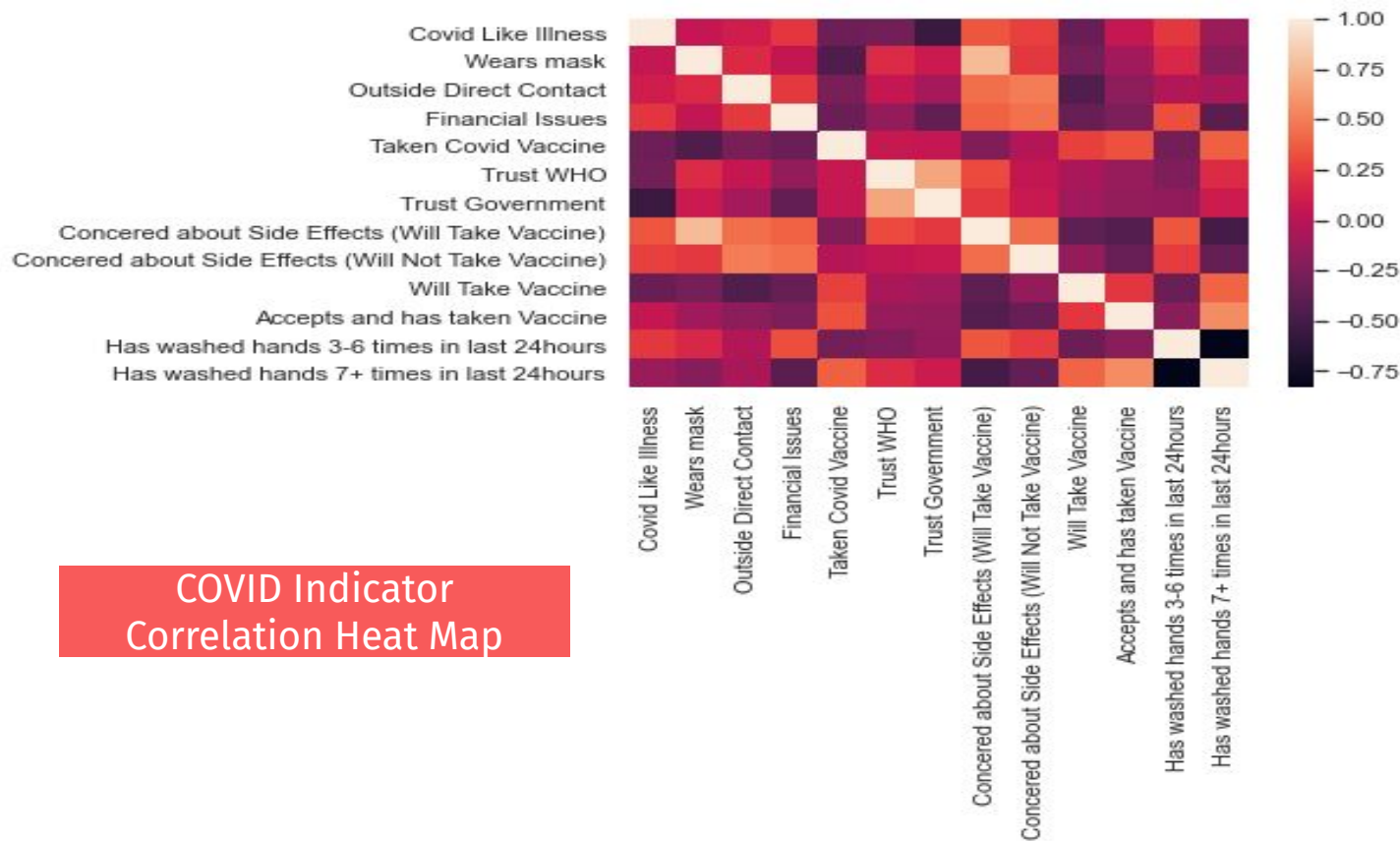


Vaccine

Respondents that took the vaccine.



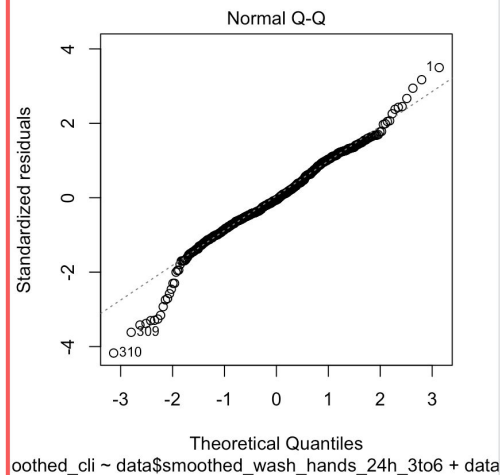
Q2: What factors have significant correlation with the spread of the virus?



Q2: What factors have significant correlation with the spread of the virus?

Selected Indicators

Dependent variable:	
smoothed_cli	
smoothed_wash_hands_24h_3to6	0.01 (0.01)
smoothed_hf Having Trouble With Finances	-0.01*** (0.001)
smoothed_mc Wore Mask	0.01*** (0.001)
smoothed_trust_who	-0.001 (0.002)
smoothed_trust_govt Trusts Government Guidance	-0.01*** (0.002)
smoothed_access_wash	-0.1 (0.1)
smoothed_wash_hands_24h_7ormore Wash hands 7 or more time a day	-0.02*** (0.01)
smoothed_sideeffects	0.000 (0.001)
smoothed_dc Direct contact with people	0.01*** (0.001)
smoothed_modified_acceptance	-0.001 (0.001)



Observations	583
R2	0.9
Adjusted R2	0.9
Residual Std. Error	0.001 (df = 562)
F Statistic	218.1*** (df = 20; 562)

Note: *p<0.1; **p<0.05; ***p<0.01

Q2: What factors have significant correlation with the spread of the virus in these regions?



Trust_govt

Respondents more likely to get vaccinated if recommended by government health officials.



Finance (hf)

Survey respondents who are worried about themselves and their household finances.



Wash_hands_24h_7orMore

Survey respondents who washed their hands 7+ times in the last 24 hours.



Contact (dc)

Survey respondents that have reported having had direct contact with people not staying with them.



Mask (Mc)

Survey respondents who wore a mask all the time or most of the time when in public.



Q2: What factors have significant correlation with the spread of the virus in these regions?



	<i>smoothed_cli</i>
smoothed_cli	1
smoothed_mc	0.330274279
smoothed_dc	0.681495671
smoothed_hf	0.506153439
smoothed_covid_vaccine	-0.39837421
smoothed_trust_who	-0.33168915
smoothed_trust_govt	-0.26891097
smoothed_sideeffects	0.427342531
smoothed_hesitant_sideeffects	0.455425442
smoothed_modified_acceptance	-0.29842439
smoothed_access_wash	-0.21993046
smoothed_wash_hands_24h_3to6	0.727616185
smoothed_wash_hands_24h_7ormore	-0.78869761

Correlation Matrix - **Developed Countries**



Q2: What factors have significant correlation with the spread of the virus in these regions?



Missing Data

	<i>smoothed_cli</i>
smoothed_cli	1
smoothed_mc	-0.011326348
smoothed_dc	0.052188696
smoothed_hf	-0.110338673
smoothed_covid_vaccine	0.001234285
smoothed_trust_who	-0.287728121
smoothed_trust_govt	-0.438463216
smoothed_sideeffects	0.399235476
smoothed_hesitant_sideeffects	0.433656411
smoothed_modified_acceptance	-0.692546243
smoothed_access_wash	0.130538781
smoothed_wash_hands_24h_3to6	0.092905212
smoothed_wash_hands_24h_7ormore	0.028405712

Correlation Matrix - Developing Countries

Q3: What are explanations for these factors and how will this lead us to solutions?

One month forecast for COVID- like Symptoms worldwide

Time series - March 20, 2021



The plot of sum of Cli Wei (actual & forecast) for Survey Date Day. Color shows details about Forecast indicator.



Government Policies

1

Emergency Relief Fund

2

Distribution of Masks

3

Promoting handwashing behaviors

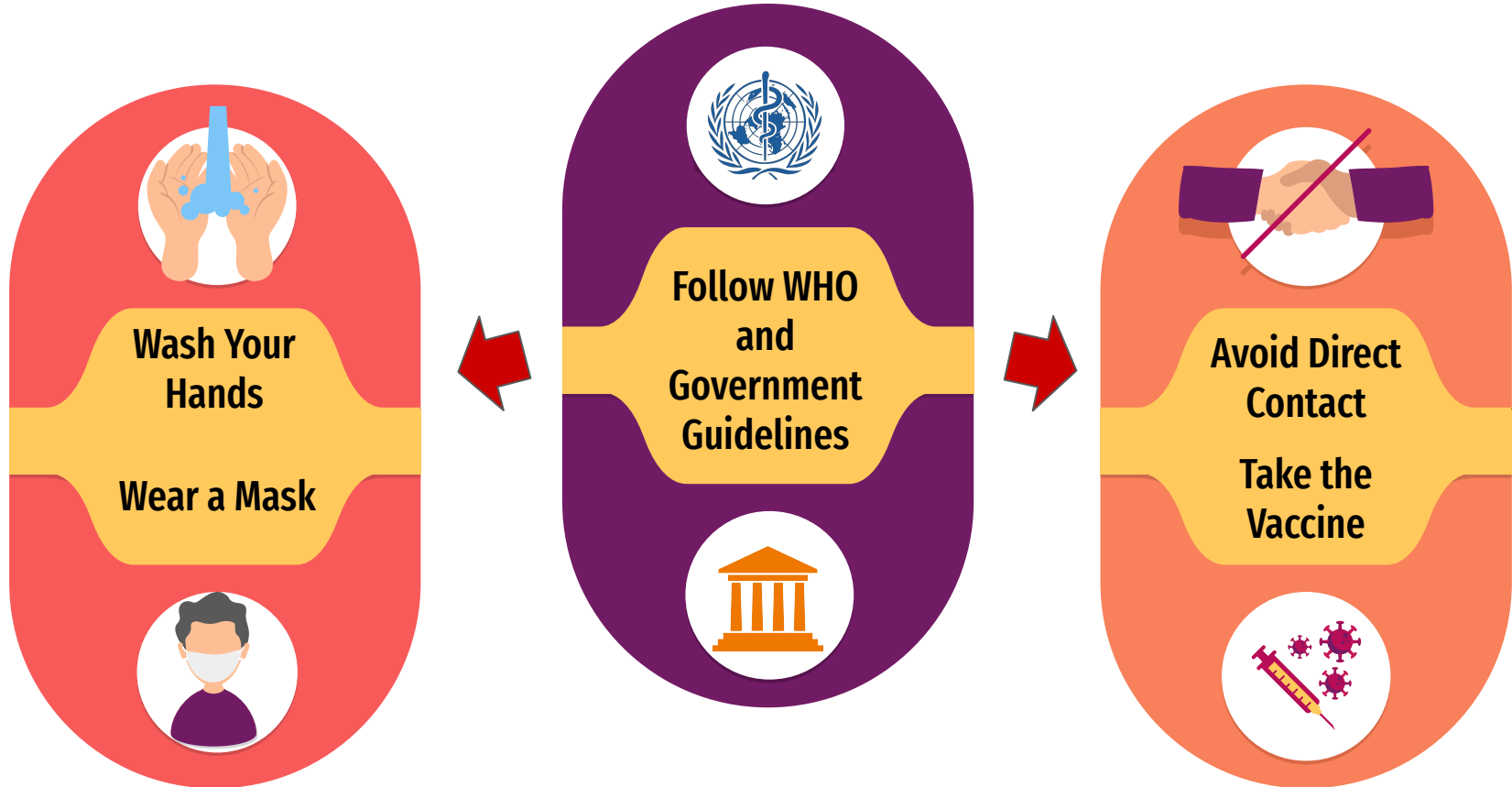
4

Transparent communication with citizens

5

Limit misinformation regarding vaccine side-effects

Population Recommended Actions

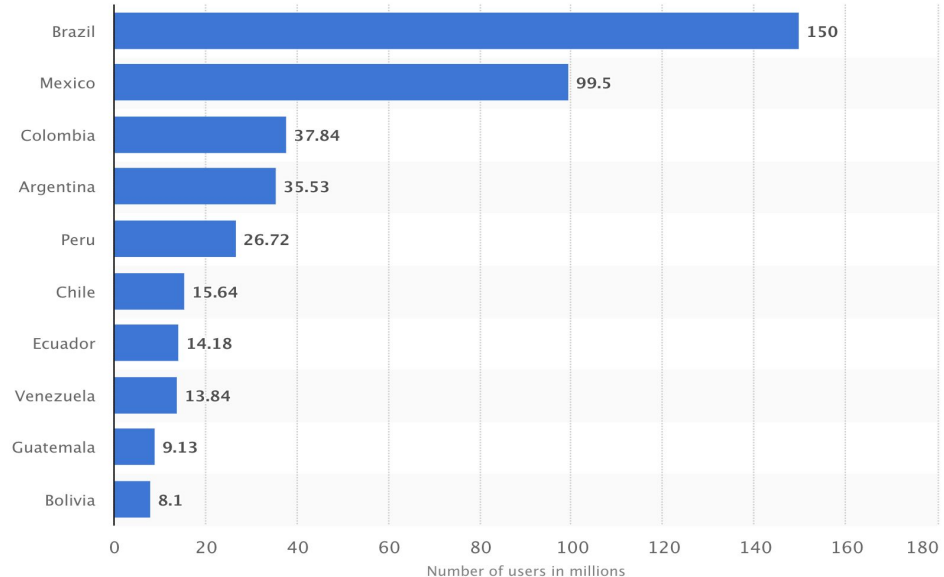


Recommendation For Future Study

The sampling frame is the Facebook Active User Base (FAUB) :

Change survey
response method

Countries with the most Facebook users in Latin America as of January 2021



Source: <https://www.statista.com/statistics/979053/countries-with-most-facebook-users-latin-america/>

Thank you!



Marilyn Pothén
Undergraduate
UMD InfoSci



Chika Chuku
Undergraduate
UMD InfoSci



Ryan Van Slyke
Mentor
Associate at Booz
Allen Hamilton

TEAM 13



Rankin D'Souza
Undergraduate
UMD InfoSci



Yi-Hsuan Chen
Graduate
UMD MSMA

Resources

- Credit to **Slidesgo** and **Freepik** for the initial slide template.
- <https://www.statista.com/statistics/979053/countries-with-most-facebook-users-latin-america/>
- https://covidmap.umd.edu/document/css_methods_brief.pdf
- <https://www.theverge.com/facebook/2020/4/20/21227347/facebook-symptom-tracker-survey-carnegie-mellon-global-expansion-ppe-ml-ai-mark-zuckerberg>
- <https://covidmap.umd.edu/api.html>
- https://www.who.int/whr/2004/annex/topic/en/annex_member_en.pdf