

Final Project Description

What is the Question?

In finding a question to explore for the (In) Tolerance prompt, I was immediately drawn to the second definition of this word discussed in class: *A capacity to endure. Resilience*. These words immediately struck me as a summary of the past year under COVID-19. As we are finally close to seeing the light at the end of the tunnel I wanted to capture the resilience that we, as a global society, have had to COVID-19 in my final project. My question is thus : “How have we as a society begin to rebound from COVID?” I wanted to keep this question broad so that the dataset that I end up with can help define what rebounding means and what form it takes. I’m particularly interested in seeing the recent effects of vaccines so I’m also interested in the question of “Can we see the global effects of vaccination taking place?” I initially was inspired by this visualization from Reddit:

https://www.reddit.com/r/dataisbeautiful/comments/mlxivl/oc_are_covid19_vaccinations_working , although I thought the scatter chart was not an impactful way to relay the data.

The Dataset

The dataset I am using comes from <https://github.com/owid/covid-19-data/tree/master/public/data>. This data is courtesy of the organization ‘Our World in Data’, whose mission is to use research and data to make progress against global problems. The dataset from this website has various statistics about covid cases and vaccination progress for countries around the globe broken down by day. It also has statistics about the countries themselves, such as its population, median age, and GDP. I originally had a truncated form of the dataset for my prototype for the last submissions but I wanted to include more variables and ultimately ended up with a dataset that looks like this:

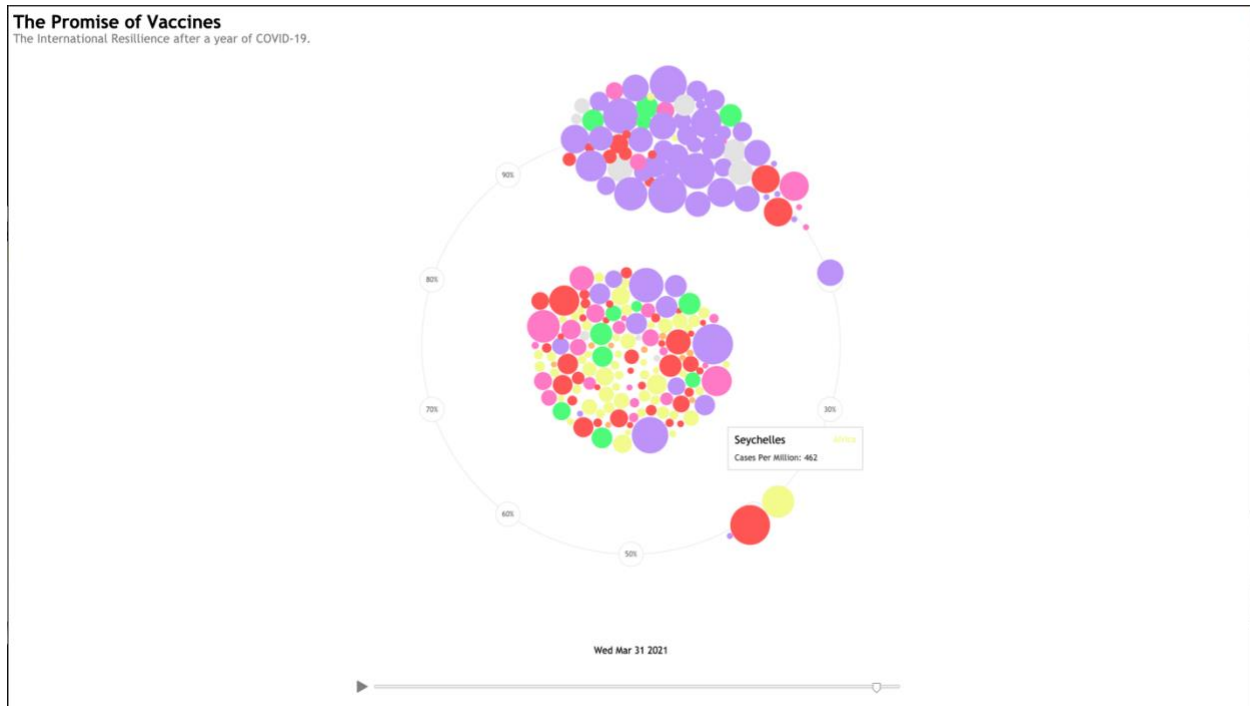
	iso_code	continent	location	date	new_cases_smoothed_per_million	people_vaccinated_per_hundred	stringency_index	human_development_index	extreme_poverty	median_age
0	AFG	Asia	Afghanistan	2020-02-24	0.0	0.0	8.33	0.511	0.0	18.6
1	AFG	Asia	Afghanistan	2020-02-25	0.0	0.0	8.33	0.511	0.0	18.6
2	AFG	Asia	Afghanistan	2020-02-26	0.0	0.0	8.33	0.511	0.0	18.6
3	AFG	Asia	Afghanistan	2020-02-27	0.0	0.0	8.33	0.511	0.0	18.6

Previously I did not have the stringency index, human development index, poverty index, and median age in the dataset, but wanting to make my visual more interactive from my prototype discussed before, I added more variables to the dataset and thus my final interactive visual that can help answer my questions posed above.

The Process – Dynamic Visual

Please note, I am only covering my process going forward from the first project checkpoint to avoid redundancy, please refer to my previous submission for the process up to

this point. As a baseline, below is a screenshot from my interactive visualization at the previous checkpoint:



As a recap of the visual above, the circles are individual countries, the size of the circle is the number of new covid cases, and the color is the continent that the country belongs to. All countries start in the center of the ring, which represents zero vaccinations. As countries begin to be vaccinated, they ‘jump’ to the top of the ring, and progress around the ring as they increase in the proportion of their population that is vaccinated. I was very happy with this original prototype interactive visual but it definitely needed some work. Indeed the question of “How have we as a society begin to rebound from COVID?” has not completely answered – there is an obvious trend of some continents having better progress than others, but there is much more to be explored. First, I wanted to include other variables as an interactive component that could be chosen for the color – this way the viewer can get other insights into why certain countries are further along in vaccinations than others. Additionally, I wanted to add more interactivity more generally to this graph – from modifying color, speed, filtering, and more.

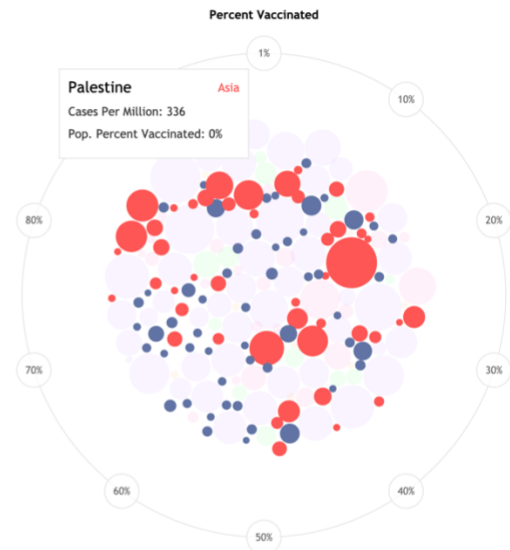
To begin with adding more interactivity to the graph, I wanted to provide a means for the user to filter data down to something more visually manageable rather than viewing all three hundred plus bubbles at once which may be difficult to comprehend. Thus, my first step was to add filters for both continent and country as in the image below:

The Promise of Vaccines

The International Resilience after a year of COVID-19.

Filters

Filter Continent	Filter Country
Africa	Afghanistan
Asia	Africa
Europe	Albania
North America	Algeria



Fri Dec 11 2020

When filtering, I made the design decision to not completely remove points, but to just highlight the selected ones and make the not selected ones transparent. I went with this decision because even through filtering I wanted the viewer to capture the proportion of all the countries that are covered by their specific selection. After the addition of this filter, I wanted to include an interactive way for users to change the variable represented by color. I added another select box for the color variable:

The Promise of Vaccines

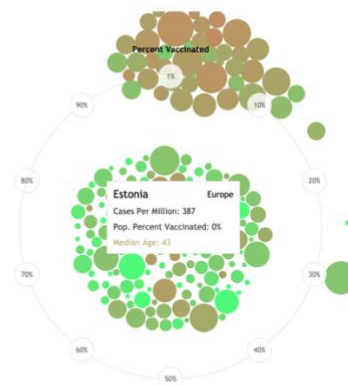
The International Resilience after a year of COVID-19.

Filters

Filter Continent	Filter Country
Africa	Afghanistan
Asia	Africa
Europe	Albania
North America	Algeria

Variable

Color
Median Age



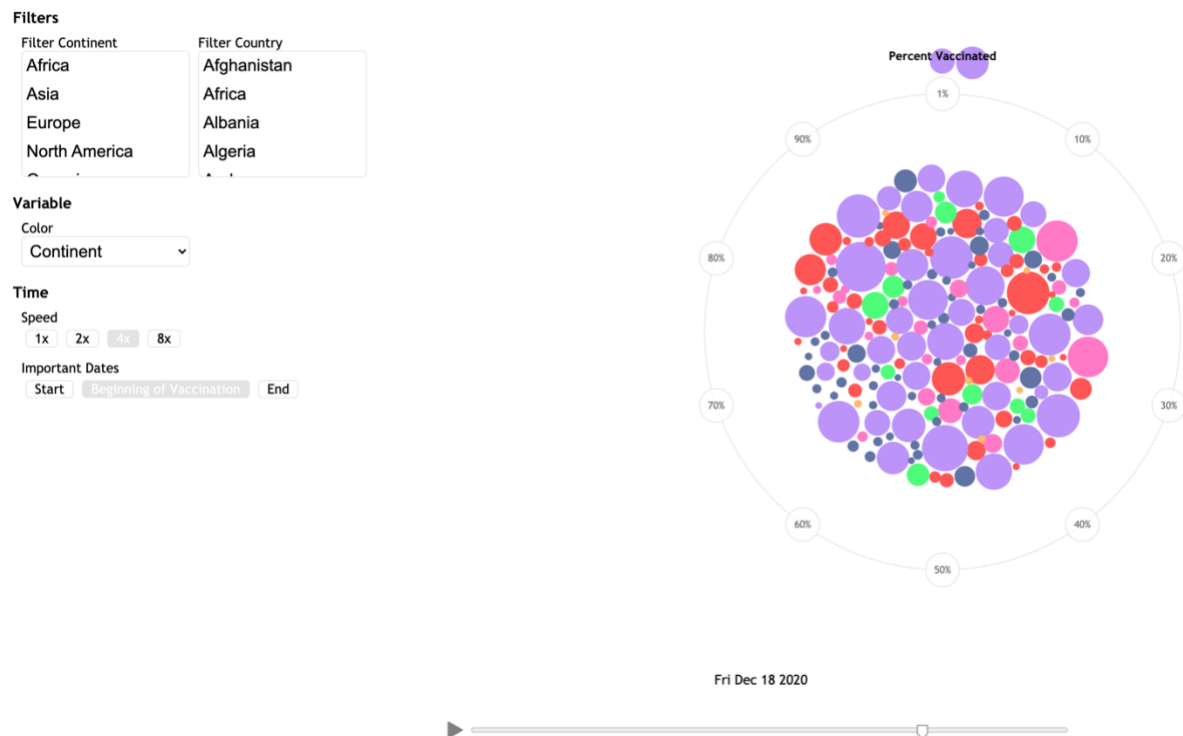
Wed Jan 20 2021

I added the ability to select from Continent, Poverty Level, Human Development Index, Median Age, and Stringency of Covid Protocols. I think this is perhaps the most important addition I have made to the project as far as attaining insight: by having a viewer be able in real-time change the selected coloring, the viewer gains insight into different avenues for the progression of vaccines across the globe, whether that by wealth disparity, age difference or more – I will discuss more about insights gained in a section below.

The final area of user interactivity I wanted to add surrounded the temporal nature of my visualization. Indeed, since the data goes back for over one year of COVID, vaccinations are only a recent occurrence and previously the viewer had to wait for the whole animation to run to see the start of vaccinations or manually move the slider to get to the ‘interesting’ part of the visual. To address this issue, I added two additional components to interactivity. First, the ability to ‘speed up’ the graph. Second, the ability to select specific ‘points of interest’ in the graph:

The Promise of Vaccines

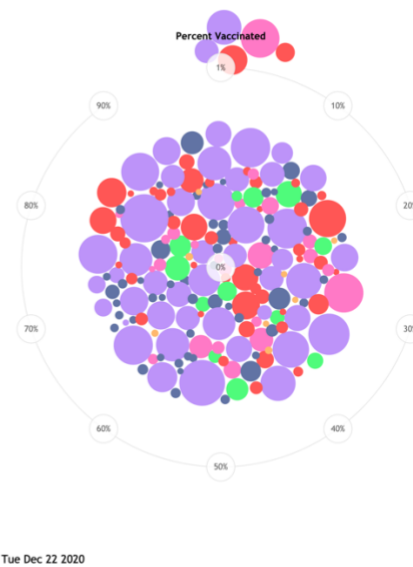
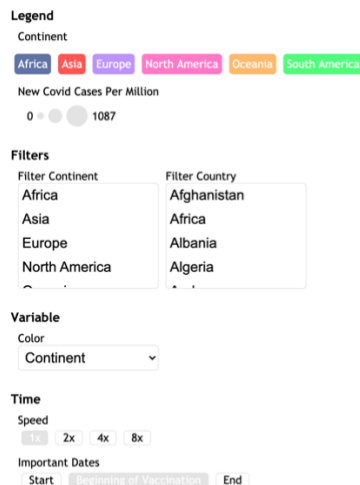
The International Resilience after a year of COVID-19.



As shown in the figure above, the user can now select a speed and important dates for the graph. I also defaulted the start of the graph to the very beginning of vaccination so that the user can see the most important insights about the effects of vaccination right away. After showing the above graph during class, I received several points of helpful feedback from my peers. Particularly, they highlighted that the ring going from 90% to 1% is a bit confusing – it can make one think that a bubble to the left of 1% is at 100% vaccinated which is not the case. Second, they mentioned that it would be helpful to have a legend and some description of what the variables mean (e.g ‘Poverty’ by itself doesn’t really mean anything). Taking this feedback into consideration, I ended with the final visualization below:

The Promise of Vaccines

The International Resilience after a year of COVID-19.



As seen above, I add a legend as well as truncate the last portion of the circle as to not confuse viewers to whether a circle is at 1% or 90% or above. I additionally added a '0%' circle in the center of the ring to explicitly note that these countries have zero percent vaccinated.

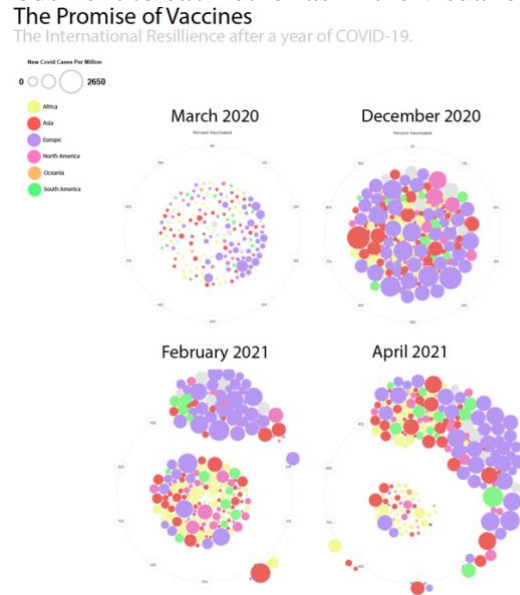
Positives and Negatives – Dynamic Visual

I am extremely proud of the outcome of the dynamic visual above. The creation process was a learning process as I learned d3 for the first time. I am very satisfied with the risks I took with the unique visualization strategy of a ring – I think the real strength of the graph is you can really see the 'jump' in a country when it begins to vaccinate. Looking at the progress from part one of the final project, I think the amount of added interactivity and clarity to the graph really help make the graph feel dynamic and that the viewer has real agency to explore trends via manipulating and highlighting different variables. However, there are a couple areas of the final graphic that I think are not perfect. Because the visualization strategy of a ring is novel I think it may be a bit hard for viewers to initially understand what is going on – indeed a x,y scatter bubble chart could equally plot the data. However, I think the tradeoff here is worth it – although this ring chart is not as familiar to viewers, I think it allows for the 'jump' in a country from none to the beginning of vaccinations to be very apparent to the viewer – you would not get this in a scatter chart and would additionally have hundreds of bubbles cluttered around the bottom of the axis around zero percent vaccination.

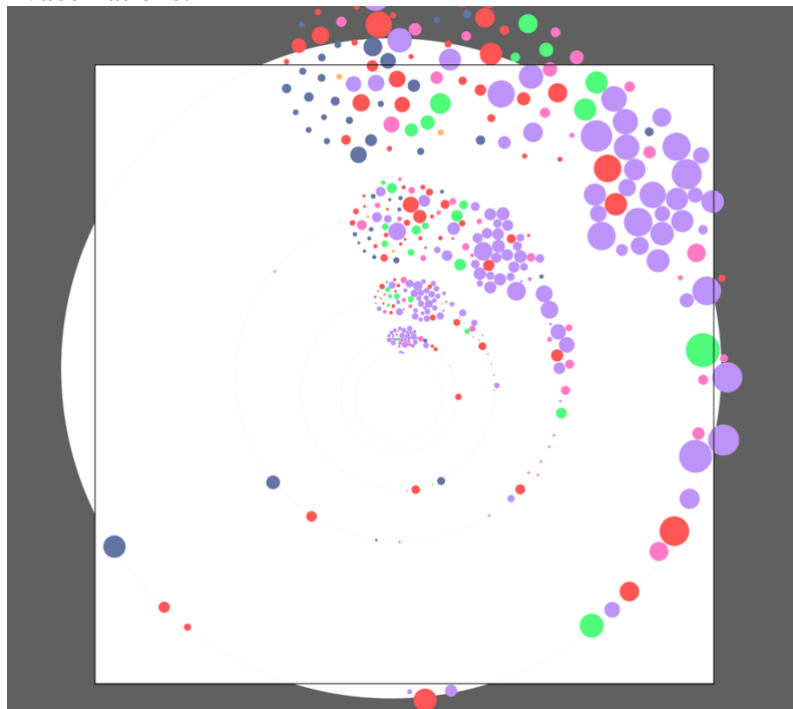
The Process – Static Visual

Happy with the visualization above, I transitioned to crafting my static visualization. Transitioning from dynamic to static, I had to decide what variable to choose for the color. I ultimately decided with keeping the continent for the color because I think it is important to keep the geographic nature of the data within the static visualization. This variable helps to highlight the geographic inequalities in vaccine distribution much more than any other variable in my

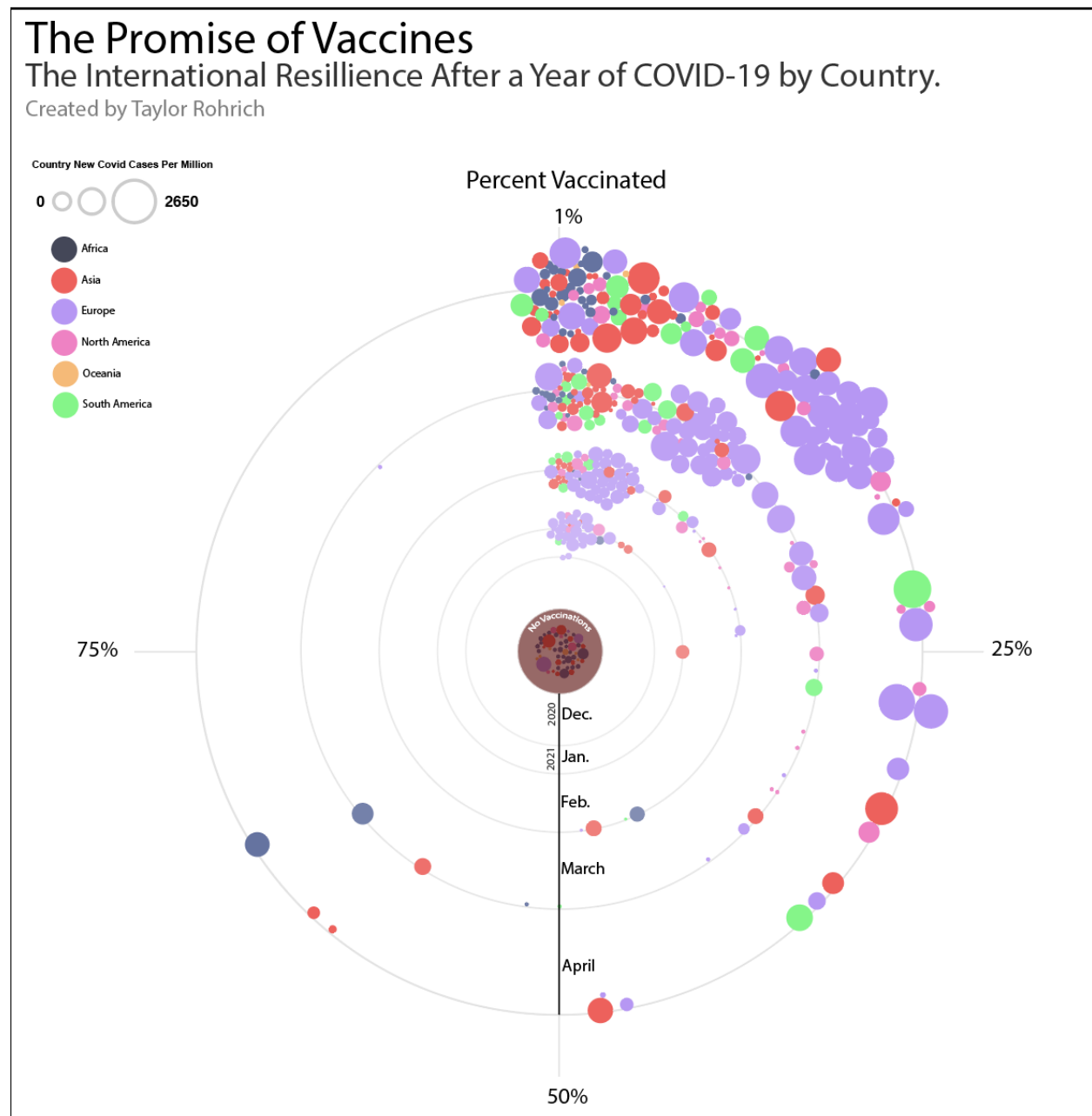
opinion. For a while I really struggled with the way to craft this visual – I found it very difficult to capture the temporal nature of the data in the interactive visualization. I initially explored putting different time periods next to each other as in the visual below:



However, I realized that the most interesting part of my graph is when vaccines begin –I wanted to include in this visual only time for when vaccinations were happening to explore the interesting trends. Second, I was not happy with the multitude of graphs for different time periods, I want to explore Tufts idea of ‘layering’ and attempt to put all of the temporal time periods onto one singular graph. I explored a ‘nesting’ format, where each ring represents a different month of vaccinations:



In the above diagram, the most outer ring is the most recent month and the innermost is the oldest month. I enjoyed the general concept of this visual above and explored it further. I decided to make the country circles much more 'compact' so that the rings can be placed closer together. Additionally, I added tick marks to represent the percent vaccinated. I also added a legend for the size and color of the circles. I also include a label for what month the rings represent, and also make the months that are furthest in the past more transparent to draw attention to the most recent month. Finally, I wanted to represent the countries that still have not begun any vaccinations – I placed these at the center of this visual and highlighted the background red to represent that this area is distinct from the rings above and doesn't represent a time period. The final image is below:



Positives and Negatives – Static Visualization

I am overall happy with the result above – I got out of my comfort zone by trying to stack all the months in one graph --- previously on the Between Things assignment I could not take this leap and has different graphs for different time periods. I think this visualization strategy helps compare the different months all at once. I also like the metaphor of a ‘clock’/ ‘solar system’, where one can see the general trend of countries and continents progressing further and further as time progresses. However, there are some drawbacks to this graph. Due to stacking the different month rings on top of each other and scaling the rings to be bigger and bigger, visually it appears that the most recent month of April has country circles that are bigger than all previous months – the reality is not that covid cases are higher in April, just that by scaling this ring to be bigger than the others the circles end up being larger as well. Thus, the size scale really is only applicable for comparing within the same ring. However, I think this negative is worth the tradeoff of being able to stack all the time rings into one graphic and the viewer is able to ultimately better understand trends through time.

Insights gained

From the perspective of the dynamic visualization, I believe that the user interactivity element helps viewers gain insight into the question of “How have we as a society begin to rebound from COVID?” and ultimately “can we see trends in inequality and vaccine progress?” By looking at the graph through time, it becomes evident that globally we are recovering from COVID – the viewer sees that the majority of countries have begun vaccinations and as the percentage of citizens vaccinated for a country increases there is a general trends that the number of new covid cases decreases as well. Although this is an optimistic trend, by exploring the variables we can highlight global inequalities that exist within this global trend. From a continent perspective, it appears that the generally affluent nations of Europe of a whole have made the most vaccination progress. Likewise, when looking at the poverty level of countries, the ones left most behind as far as vaccination progress tend to have the highest levels of poverty. Indeed, a similar trend can be seen from the human development index. However, we do not see the same trend with the median age of a country – even though biologically older people are at higher risk of COVID, these countries with the older median age tend to not have higher rates of covid and even more importantly these countries with higher median age have higher vaccination percentage! This leads back to global inequality – even though there are countries with older people, these countries tend to be rich and thus are privileged to have infrastructure to handle COVID cases as well as distribute more vaccines. Taken altogether, the dynamic visualization does show a global sense of optimism that we as a global society have begun to recover from COVID – yet this recovery is not equal – rich, less impoverished nations lead in recovery, once again exposing inequality on the global level of the pandemic.

To transfer most of the insight of the interactive graphic to the static one, I thought that utilizing the continent variable for color represented most of the insight gained from the interactive one. Even though the interactive temporal notion is not shown in the static graph, I think the nesting of the ‘rings’ for different months does a good job of representing the insight that we globally have begun to recover from covid, yet there is a distinct geographic inequality in

vaccination and covid progress – the viewer can see a huge ‘cluster’ of European nations making the most progress. Likewise, by putting the countries that are still not beginning vaccinations in the center of the graph, we can likewise see this geographic inequality at play.

Conclusion

Looking back at this semester, this final project took multitudes more time than any other assignment worked on, but this was a result of me really wanting to learn and explore d3 and attempt many different visual design strategies and how interactivity can help (and in some cases hurt) a graph. I am extremely proud with both my visualizations produced and think I really took the biggest leap with this project to step out of my comfort zone, creating a custom visualization strategy that I thought would work best with the data. I am excited to share my visualization with my classmates and receive their thoughts and feedback!