



# Project Tycho

## **Viruses Gone Wild**



YEAR	DATE	MONTH	QUARTER	SEASON	WEEK	ALABAMA	ALASKA	ARIZONA	ARKANSA	CALIFORN	COLORAD	CONNECT	DELAWAR	DISTRICT C	FLORIDA	GEORGIA	HAWAII	IDAHO	ILLINOIS	IN
1928	1/1/1928	January	Q1	Winter	1	97	0	8	76	74	85	71	20	0	3	34	0	0	38	
1928	1/8/1928	January	Q1	Winter	2	165	0	27	183	96	61	142	17	0	7	173	0	2	58	
1928	1/15/1928	January	Q1	Winter	3	210	0	19	206	70	29	139	37	0	6	0	0	2	46	
1928	1/22/1928	January	Q1	Winter	4	332	0	8	254	100	139	164	10	20	13	251	0	0	61	
1928	1/29/1928	January	Q1	Winter	5	212	0	2	384	127	52	265	13	22	7	314	0	1	84	
1928	2/5/1928	February	Q1	Spring	6	192	0	27	491	149	82	280	8	36	24	196	0	0	101	
1928	2/12/1928	February	Q1	Spring	7	264	0	4	605	146	40	318	10	61	19	214	0	0	103	
1928	2/19/1928	February	Q1	Spring	8	365	0	7	673	151	44	358	4	0	16	325	0	0	156	
1928	2/26/1928	February	Q1	Spring	9	292	0	4	626	205	30	358	8	113	11	321	0	0	151	
1928	3/4/1928	March	Q1	Spring	10	369	0	17	539	284	41	377	10	0	32	236	0	0	149	
1928	3/11/1928	March	Q1	Spring	11	496	0	31	385	187	34	398	15	0	48	187	0	0	260	
1928	3/18/1928	March	Q1	Spring	12	586	0	27	506	234	25	301	21	182	70	105	0	0	232	
1928	3/25/1928	March	Q1	Spring	13	580	0	33	556	184	44	317	19	0	66	259	0	0	180	
1928	4/1/1928	April	Q2	Spring	14	443	0	33	244	125	183	371	14	234	42	143	0	0	226	
1928	4/8/1928	April	Q2	Spring	15	408	0	34	426	118	86	369	27	0	81	134	0	9	164	
1928	4/15/1928	April	Q2	Spring	16	393	0	56	247	159	102	363	14	190	92	114	0	0	234	
1928	4/22/1928	April	Q2	Spring	17	426	0	8	393	111	96	354	35	168	94	150	0	0	173	
1928	4/29/1928	April	Q2	Spring	18	251	0	9	449	120	184	379	30	0	142	367	0	0	244	
1928	5/6/1928	May	Q2	Summer	19	366	0	119	351	109	20	381	43	181	101	160	0	1	275	
1928	5/13/1928	May	Q2	Summer	20	370	0	5	306	120	139	279	40	234	70	103	0	4	214	
1928	5/20/1928	May	Q2	Summer	21	361	0	9	178	89	126	354	20	191	133	128	0	1	244	
1928	5/27/1928	May	Q2	Summer	22	262	0	9	167	90	0	351	38	215	175	104	0	10	268	
1928	6/3/1928	June	Q2	Summer	23	219	0	14	181	71	67	340	10	192	79	75	0	0	195	
1928	6/10/1928	June	Q2	Summer	24	151	0	205	102	49	85	289	16	124	118	50	0	1	216	
1928	6/17/1928	June	Q2	Summer	25	127	0	0	34	38	59	293	18	130	92	0	0	6	186	
1928	6/24/1928	June	Q2	Summer	26	106	0	6	61	38	9	247	35	95	21	0	0	0	185	

# The Data

New variables calculated from the original data set bringing more clarity to the data.

DATE, MONTH, QUARTER, SEASON, REGION, DIVISION added



## Introduction to Measles

Measles is a highly contagious, serious disease caused by a virus. In 1980, before widespread vaccination, measles caused an estimated 2.6 million deaths each year.

## Key Facts

During 2000-2013, measles vaccination prevented an estimated 15.6 million deaths making measles vaccine one of the best buys in public health.

## Measles Across USA

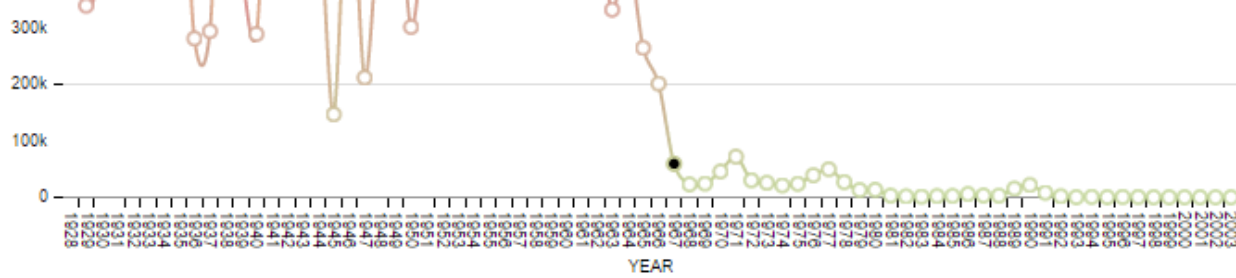
January 1928 - December 2013

## Vaccination

Protect yourself!

# The Story

Explanatory visualization system VS Exploratory Visualization System



## Occurrence Within a Year by Week

A look at how the introduction of vaccines significantly affected the case rate

Winter and Spring seems to be the periods in which most cases occur. The curve seems quite smooth, with a few small fluctuations.



## The Headlines

Each visualization had its own headline, subtitle and a simple explanation that what was happening



# The Heat map

Showing states VS the year

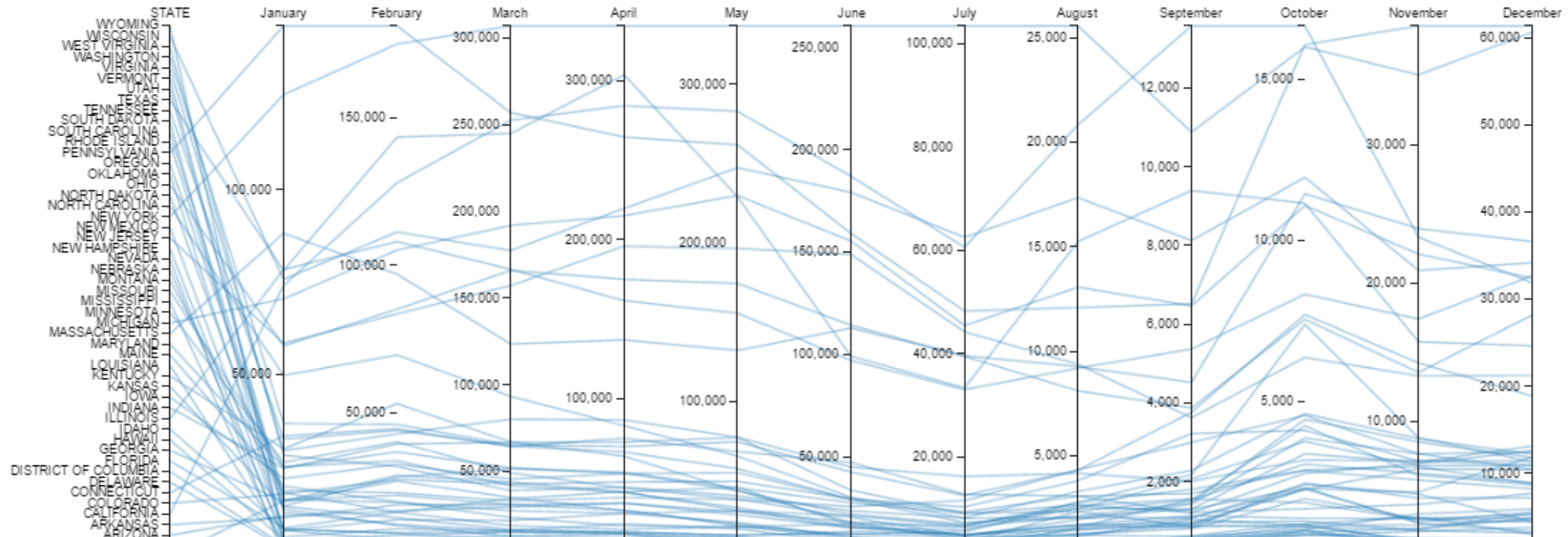




# Measles by Month

A look at how occurrence of measles varies historically across the 12 months

State with a higher contrast show that it has significantly **higher** case count. The data shown is aggregated case count from **1928-2003** per state



## Parallel Coordinates

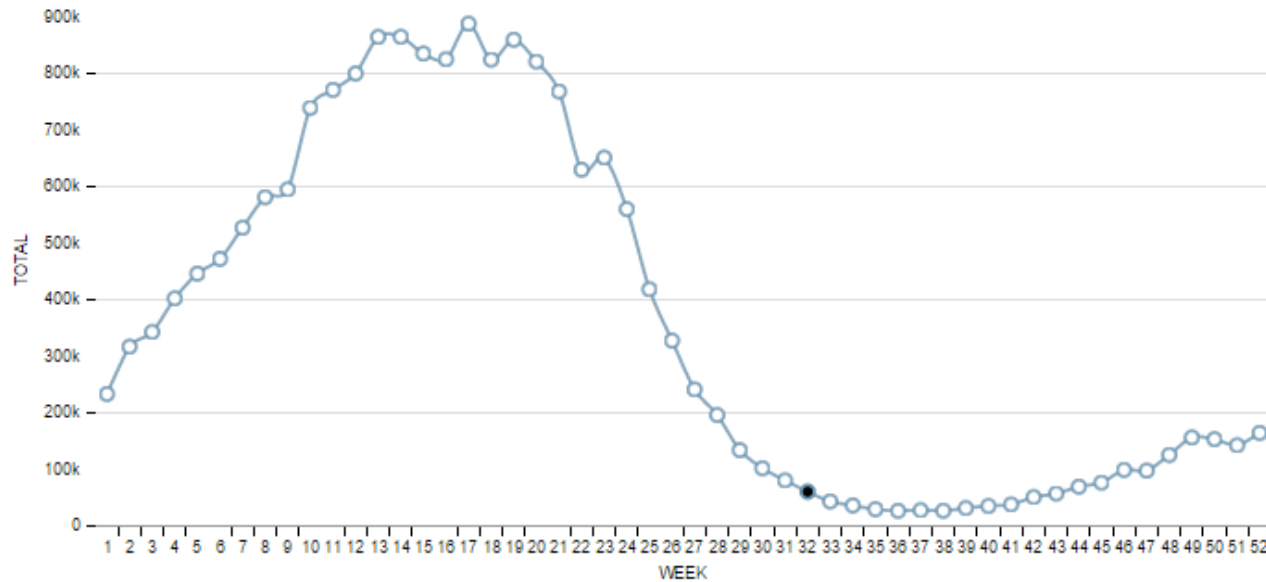
States of US against the 12 months

Interactivity: Brushing

# Occurrence Within a Year by Week

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Winter and Spring seems to be the periods in which most cases occur. The curve seems quite smooth, with a few small fluctuations.

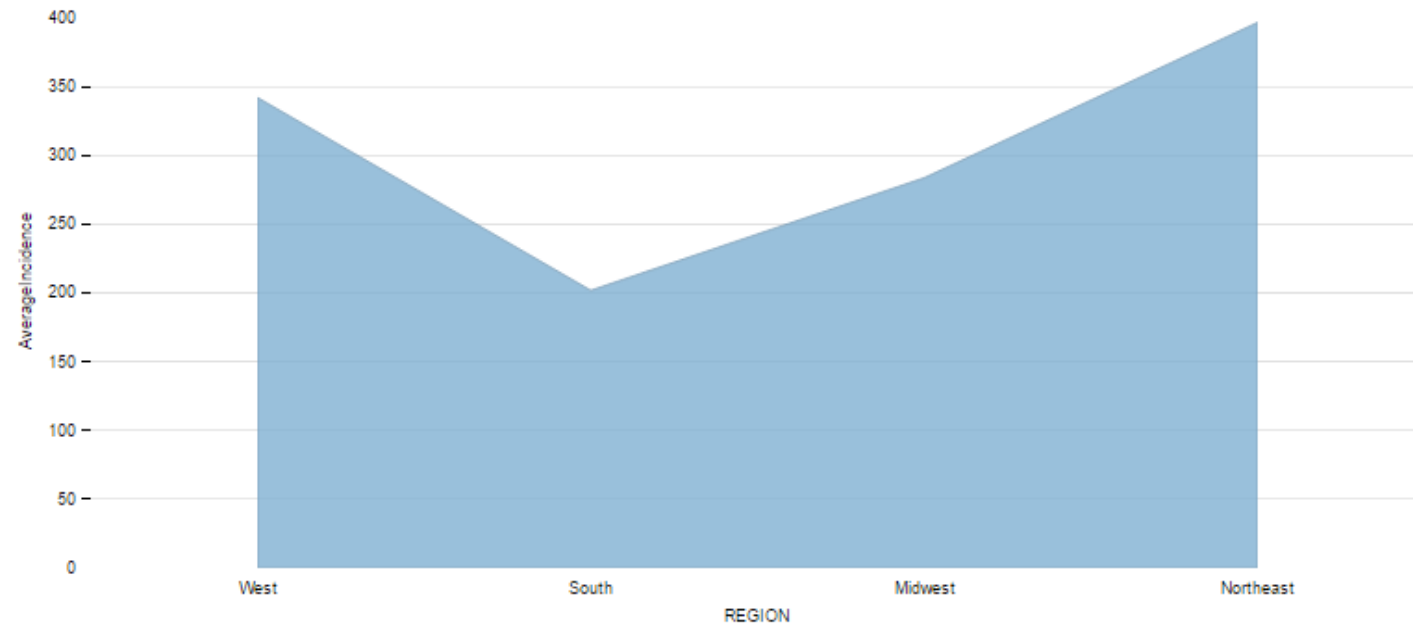


## Line Chart

Line chart with hover interactivity

Marked important events



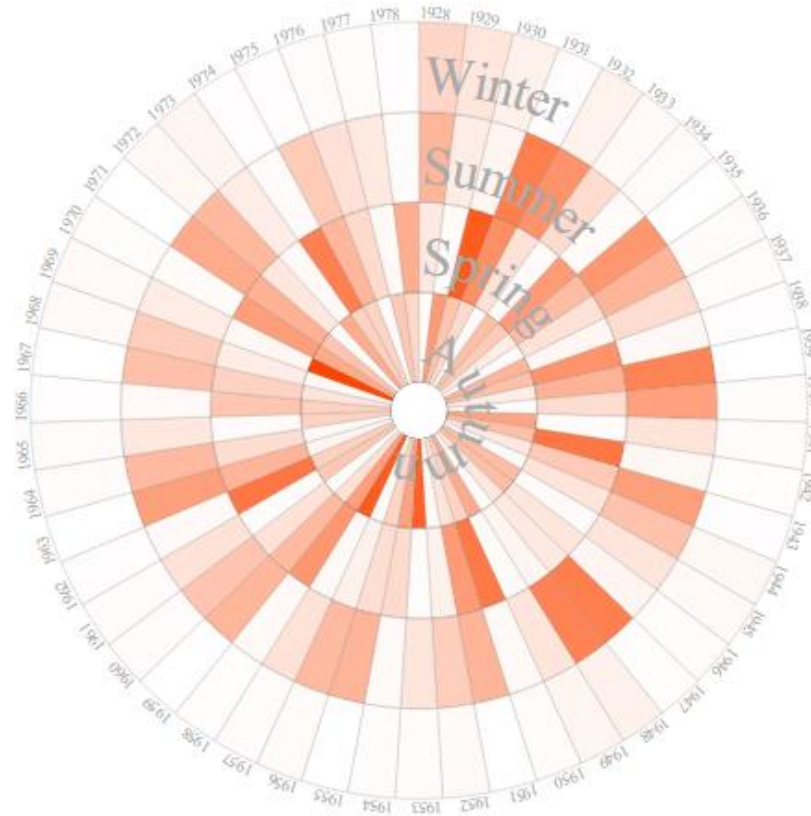


# Area Chart

Area charts for regions for USA

Support on hover details

From 1928 - 1978, dive into this circular heat map to see how the 4 season in these 50 years affect the case occurrence



## Circular Heat map

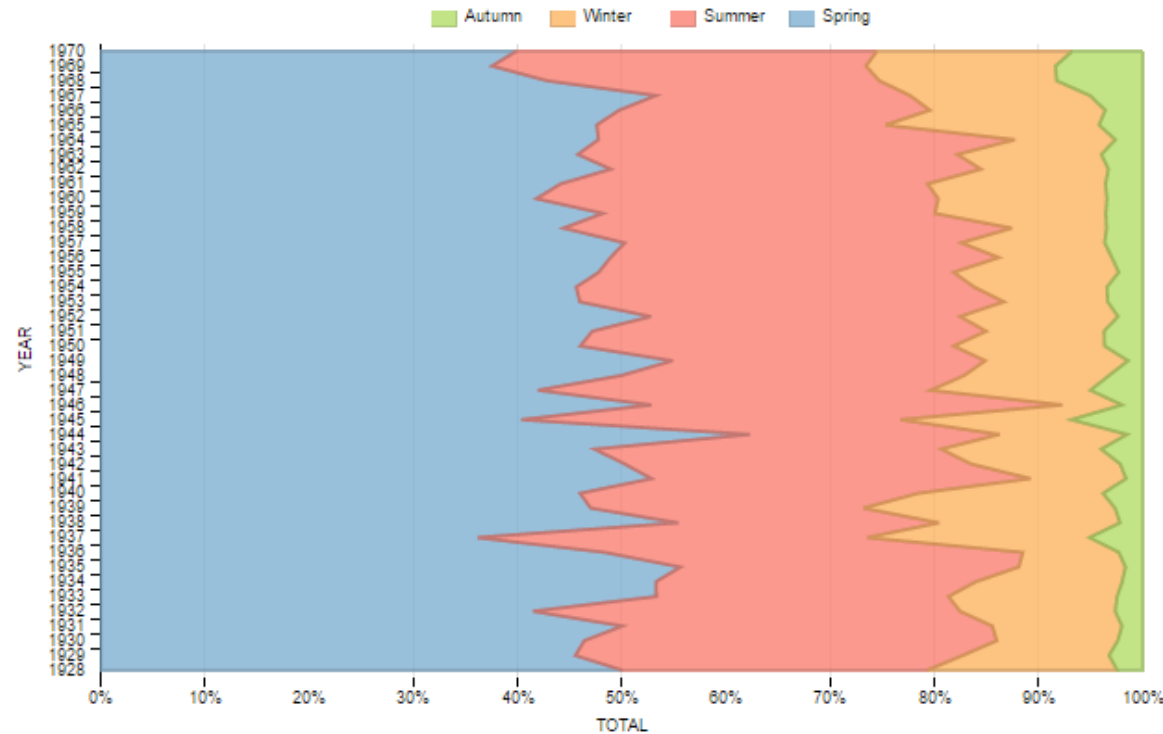
Segments: Year

Each inner circle represents a season

Immediate seasonality trends visible

# Seasonality

From 1928 - 1978, dive into this circular heat map to see how the 4 season in these 50 years affect the case occurrence



## Percentage Vertical Area Charts

Different representation of seasonality

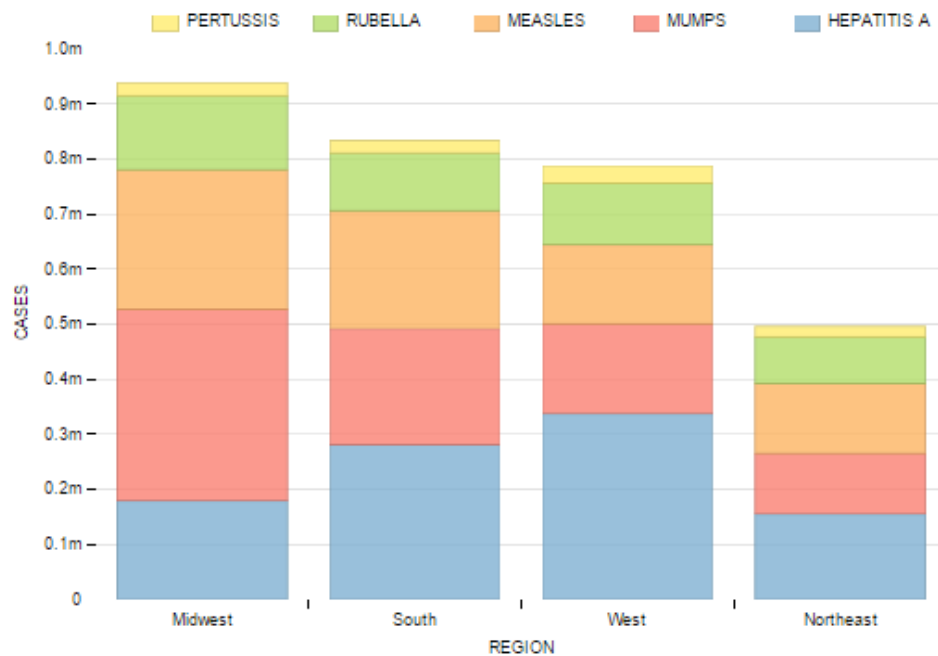
Shows disease in each season as a percentage of the whole

Validates circular heat map

# Diseased Regions

## Stacked Barchat of the 4 US Regions

The regions of US subdivided into the number of cases of each disease that were recorded there from the Year 1966 - 2003



## Stacked Barcharts

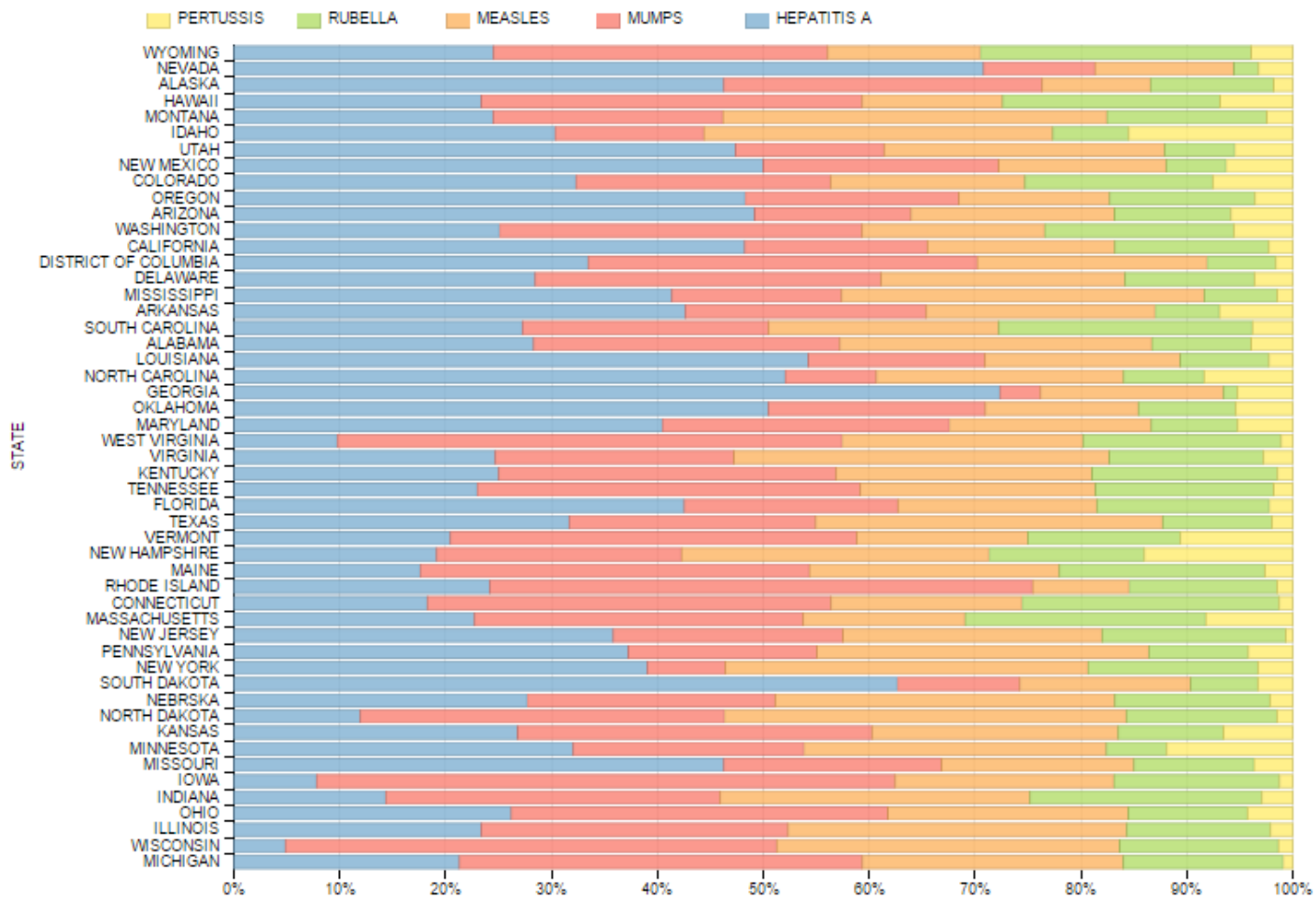
All Diseases

Barchart shows how the compare to each other region wise

Supports hover interactivity

Easy comparisons





# Percentage Stacked Barcharts

State vs Virus

Shows how each state fared against all 5 diseases

Which disease had the biggest share of all in each state

The size of each bubble encodes the total sum of diseases in that region, the bubble is further divided into sub bubbles based on the number of divisions the region has



## Bubble inside of bubbles

Bubble Charts with Regions and divisions against the disease

Shows how each division in the region was affected by each disease

# Interactivity

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The different type of interactive measures that were used in this system

1. Animated sort
2. Hover to show details
3. Animated bar chart and other charts the iterate over a set variable
4. Ranking
5. Highlighting

# Implementation

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1. HTML
2. JavaScript
3. D3.js
4. Dimple.js
5. jQuery
6. Foundation library to make the interface
7. Microsoft Excel to manipulate data



# Evaluation Interview Questions

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1. Do you understand what the visualization is about
2. Do you think you can quickly identify which state was the most affect by measles
3. Do you think the interaction functions are intuitive and self explanatory
4. Is the systems responsive?

# Interview Statistics

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1. 7 subjects
2. Interactions are self explanatory
3. “I love the heading & photos at top”
4. Details make it easy to understand what the system is trying to achieve
5. Animated charts slow on some systems and browsers
6. USA Map not well received

# Future Work & Improvements

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1. Improve interactivity
2. Add Tycho level 2 & 3 in-state data
3. Add more comparison functions
4. Move towards exploratory visualization system

# Thank You

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## The Team:

- Omar Akhtar
- Zhuoheng Xie
- Yue Zhang
- AbdulRehman Aljasim

