COVID Mitigation Monitoring Project

21 Mitigations and Infections per 100,000 People

Infection Level
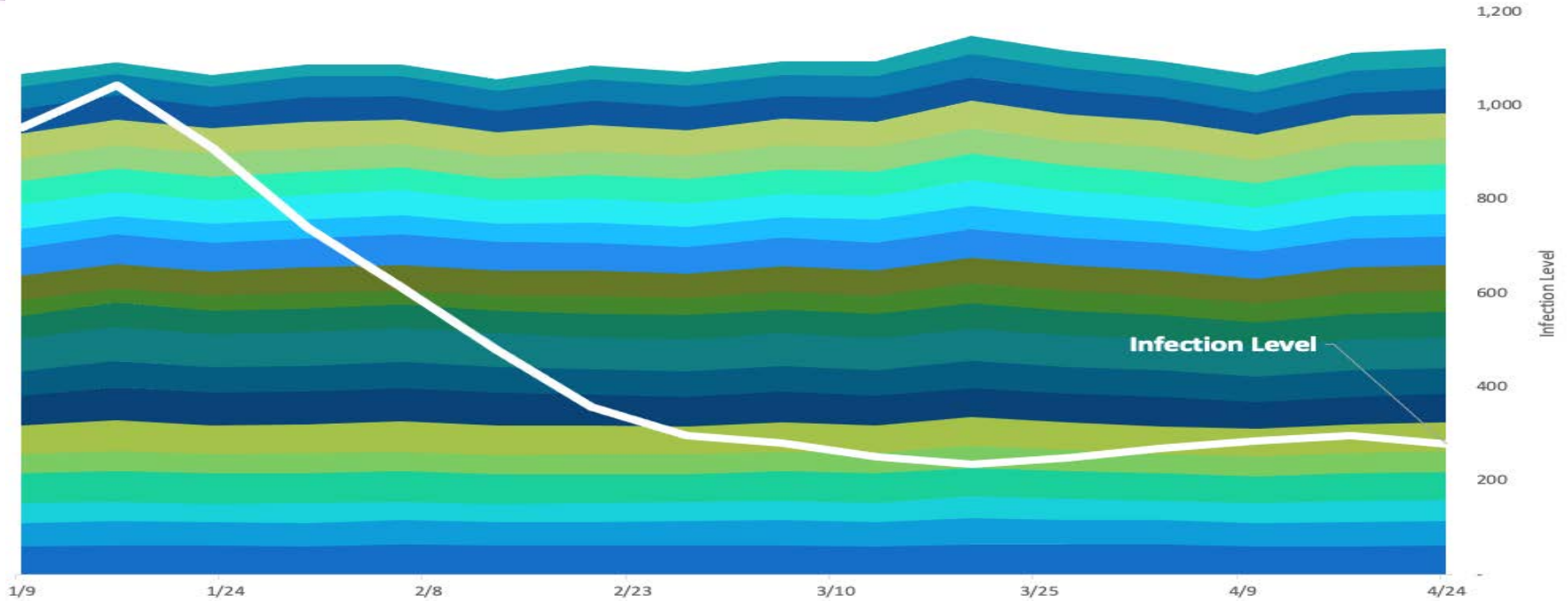
CMMP

CMMP

Researchers

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COVID Mitigation Monitoring

Objective: To identify the degree to which people are actually practicing a list of 21 mitigation strategies on a state by state basis and to combine that with reported COVID-19 experience to identify strategies that are having the most significant impact.

Responses: We started collecting observations in July. In September, we had enough observations to have credible results for most questions for 20 states. From September to April, we received over 10,000 observations from all 50 states and DC.

Reports: Producing weekly flash reports, detailed bi-monthly analysis and longitudinal reports at December, February and April.

Take Away: Prevalence of Mitigation strategies across the US and in individual states can be used to evaluate potential strategies enhance safety of families communities and businesses.

COVID Mitigation Monitoring Project

Excerpts from Eight Month Summary

September 2020 through April 2021

SOCIETY OF ACTUARIES®

Project Summary

COVID -19 Data

Using data from Johns Hopkins and the CDC, we calculate two statistics:

- ▶ **Infection Level** - The rate of new cases in each state and the U.S. per 100,000 people

- ▶ **Daily New Infection Rate [NIR]** - Rolling average of an individual day's rate of new infections compared to the previous two weeks

Mitigation Methods Survey

Collects information from volunteers on compliance with a variety of COVID Mitigation strategies in each state

- ▶ Asks 23 questions, volunteers answer between 0% and 100% that they see the strategy in use in their area

- ▶ Participants are asked to fill out survey every week

- ▶ For methodology details, visit our website

We combine the John's Hopkins data with our survey data and analyze the results to better understand what is happening on the ground to reduce the spread of COVID across the country

Over the past 8 months we collected over 10,000 observations from individuals in **50** states and DC

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US COVID Status at a Glance

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Total Cases	7.2M	9.1M	13.5M	20M	26.2M	28.6M	30.5M	32.3M
New Cases	1.2M	1.9M	4.4M	6.5M	6.2M	2.4M	1.8M	1.9M
Total Deaths	207K	231K	267K	346K	441K	512K	544K	576K
New Deaths	23K	24K	36K	79K	95K	71K	32K	32K

- These eight months saw the COVID Pandemic in the U.S. going from almost under control in late August and early September to raging out of control in December and January to moderating again in February and leveling off at a lower level in March and April.

- Deaths consistently lag infections, peaking in January but like new cases falling to a third of the peak by March.

- Distribution of vaccines started in mid-December. Over 20 million Americans had been vaccinated by the end of February and 100 million by the end of April,

U.S. COVID Status at a Glance

|	Sep	Oct	Nov	Dec	Jan	Feb	Mar	APR
Average U.S. Infection Level*	171	224	541	859	904	469	256	279
Change in Infection Level*	(58)	53	317	318	48	(435)	(211)	23
Average U.S. NIR	7.2%	8.3%	8.5%	7.6%	6.8%	5.7%	7.0%	6.9%
Change in NIR	0.8%	1.1%	0.3%	-1.0%	-0.7%	-1.1%	1.3%	-0.1%
Average Mitigation Compliance	63.0%	62.9%	62.9%	62.9%	63.0%	62.3%	63.0%	61.5%
Mitigation Compliance Change		-0.1%	0.0%	0.0%	0.1%	-0.7%	0.7%	-1.5%

- The infection level rose by over 400% from September to January. Then fell by 48% in February with the end of holiday season and the impact of vaccinations.

- Average all mitigation compliance fell steadily over the last six months but the impact of immunity from prior infections and vaccinations rose significantly starting in January and reaching almost 50% by the end of April.

How many Observations did we collect?

Response Counts	April	March	February	January	December	November	October	September	Total
CA	124	157	122	137	180	119	103	78	1020
NY	187	213	115	102	109	71	77	58	932
PA	83	104	90	84	109	82	72	69	693
TX	98	104	79	98	114	75	54	61	683
FL	71	82	69	68	104	51	35	26	506
OH	42	69	55	60	64	53	36	29	408
NJ	56	51	32	44	63	38	53	53	390
MN	40	53	43	45	62	52	30	31	356
IL	86	73	44	46	56	38	35	29	407
WA	48	41	32	38	48	31	37	32	307

Infection Level in USA

(New Cases per 100,000 People)
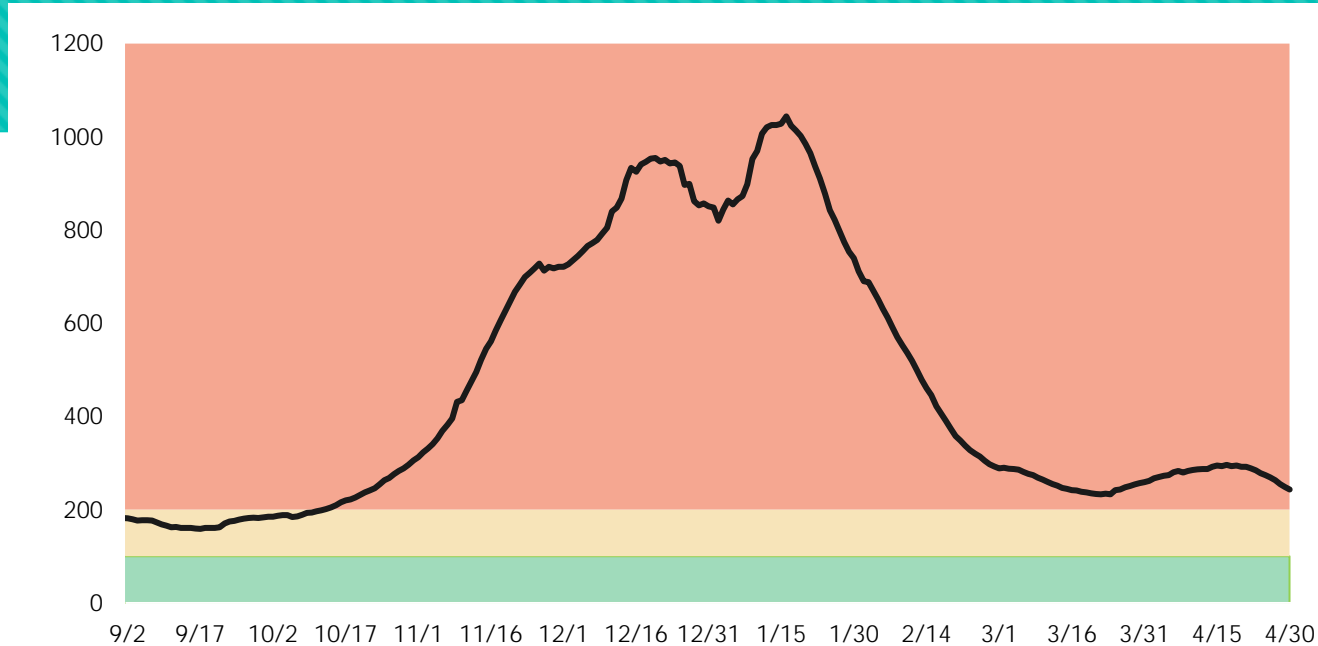
Based on the sum of new cases over previous 14 days. Data indicates most infections last about 14 days.*

The Infection Level rose from October to January. Enhanced mitigations in several states and the vaccine rollout led to the sharp downturn. At the peak, the Infection Level exceeded 1% (1000 per 100,000) but at the end of April was close to a quarter of that level

*Source: Health.Com Article "How Long Does Coronavirus Last"

Daily New Infection Rate in USA [NIR]

(percentage of last two week's cases, rolling 7-day average)
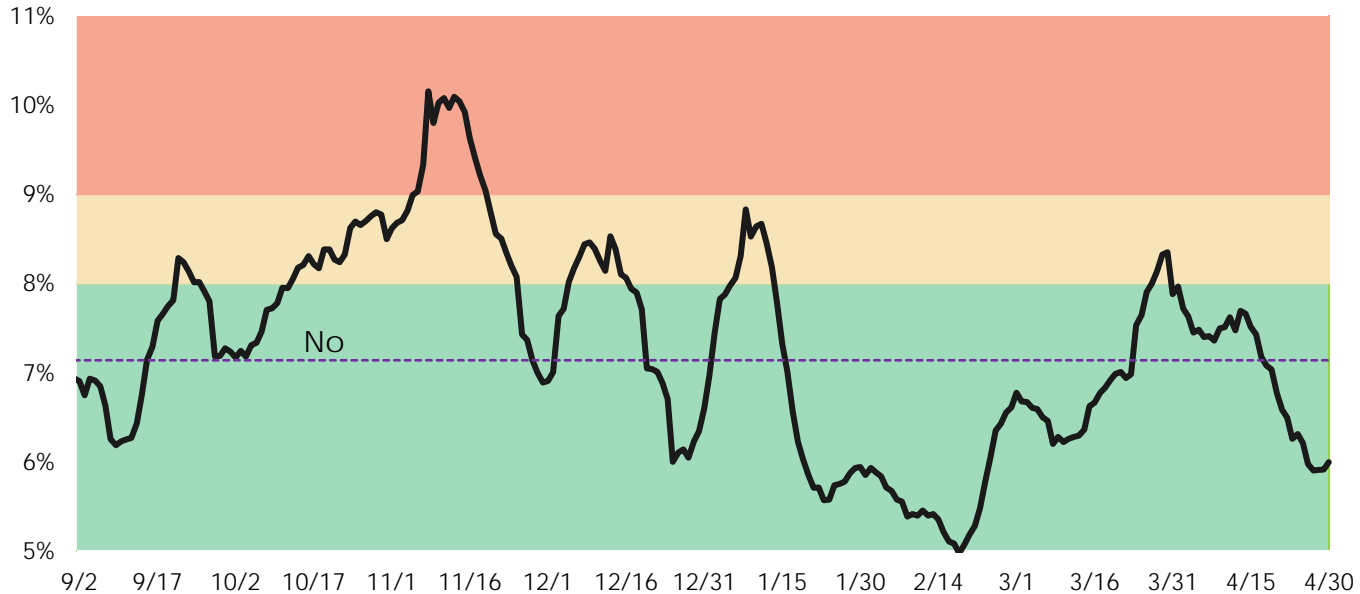
No Growth Level: If new infections in the US remain below 7.14%, the number of cases of COVID will shrink over time in the US.

NIR got as high as 10% and as low as 5% over this eight-month period. The NIR increased sharply in late February through March, in April has moved back below the No Growth level. By the end of April, immunities from vaccinations and prior infections may have reached a level that makes future peaks less likely.

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*Source: Health.Com Article "How Long Does Coronavirus Last"
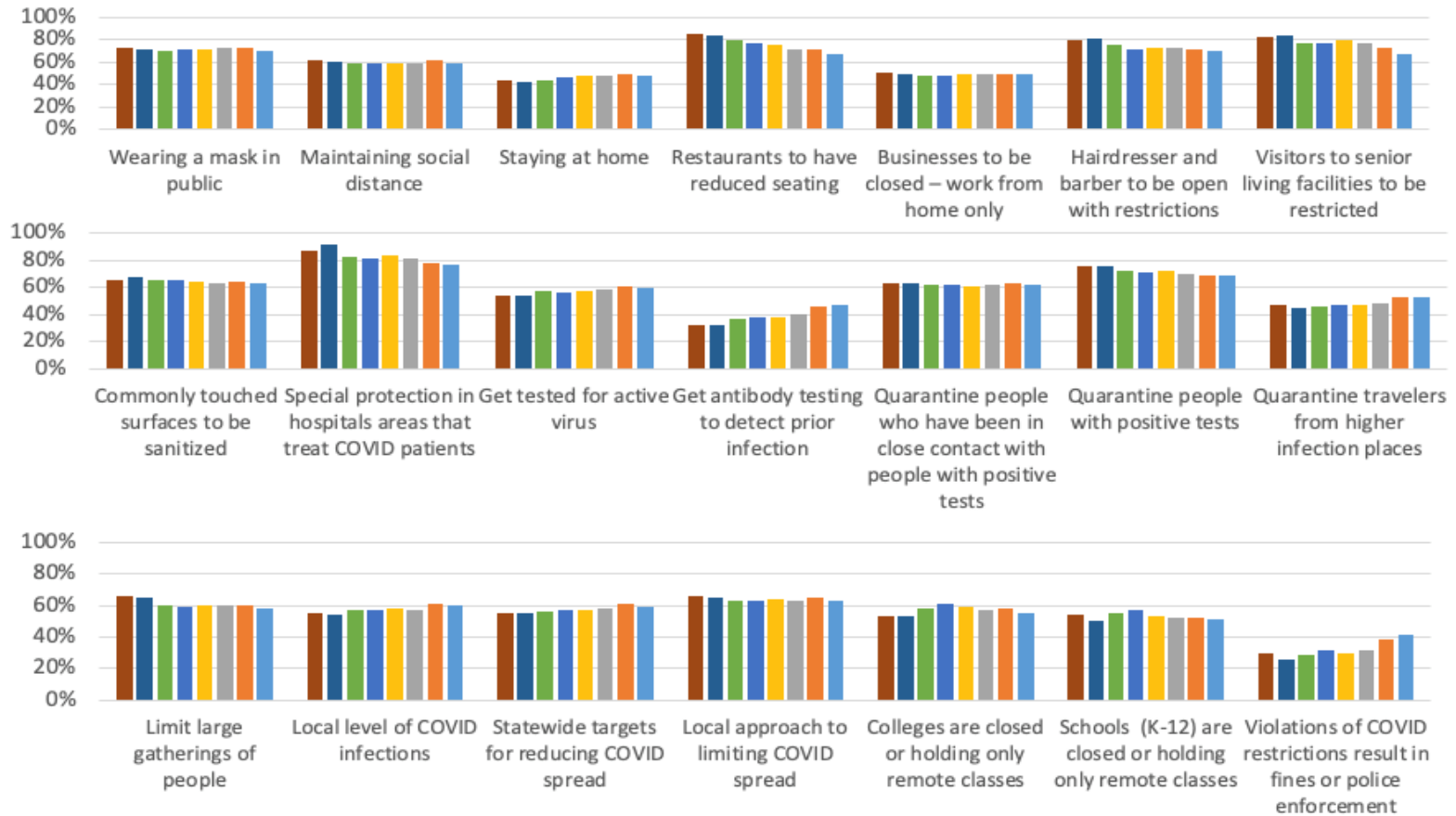
U.S. National
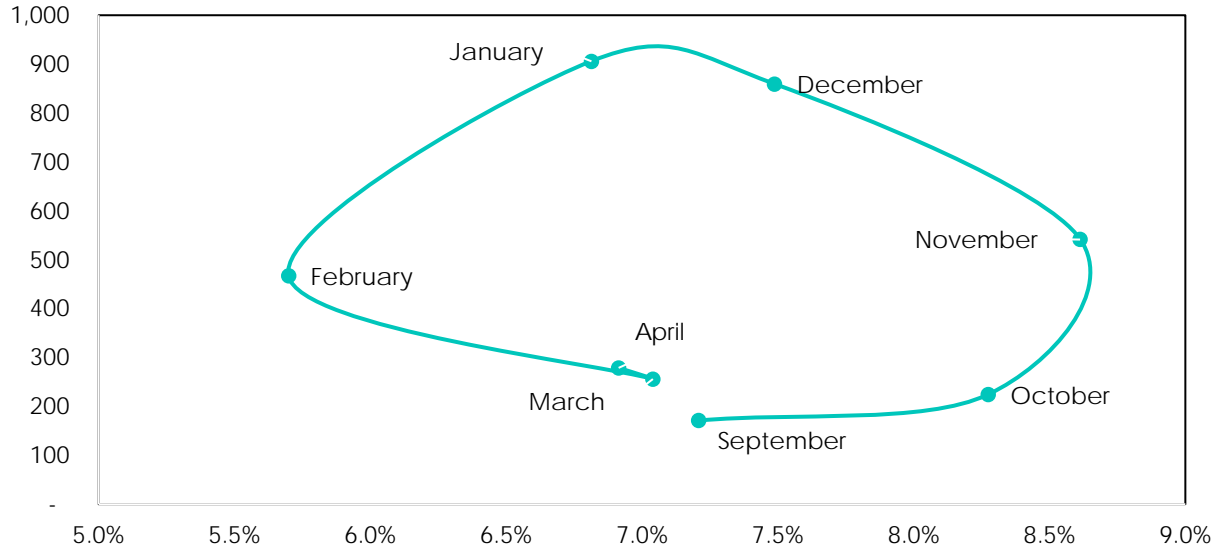
The pandemic followed a circular path for seven months before the impact of the more infectious variant strains and relaxation of COVID restrictions resulted in a small backtrack in April. With average NIR falling below the No Growth level (7.14%) in April, we can expect further drop in infection level in May.
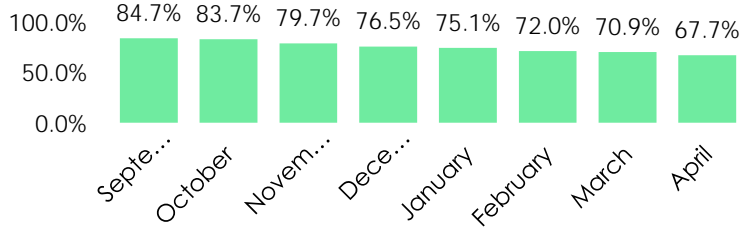
Average Compliance by Month

(For all surveys)

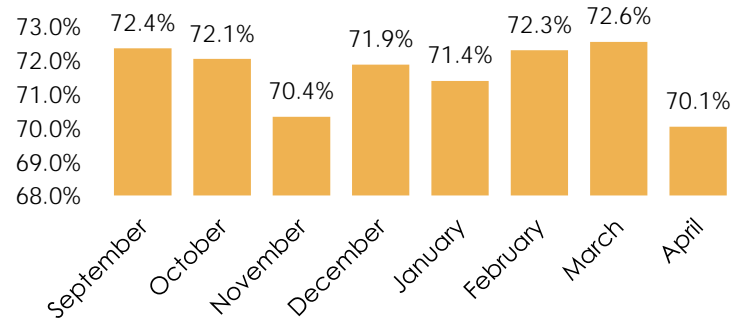September ■ October ■ November ■ December ■ January ■ February ■ March ■ April
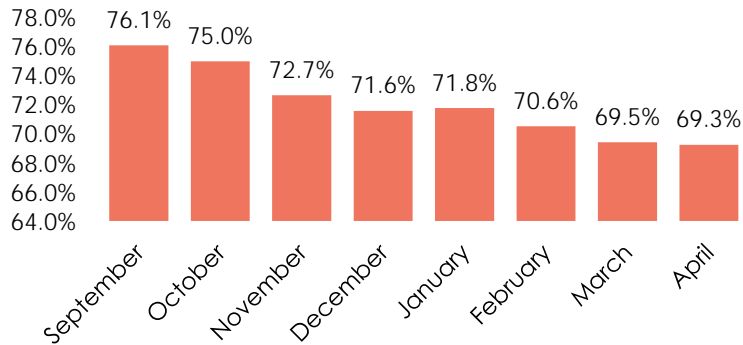
Average Percent Compliance
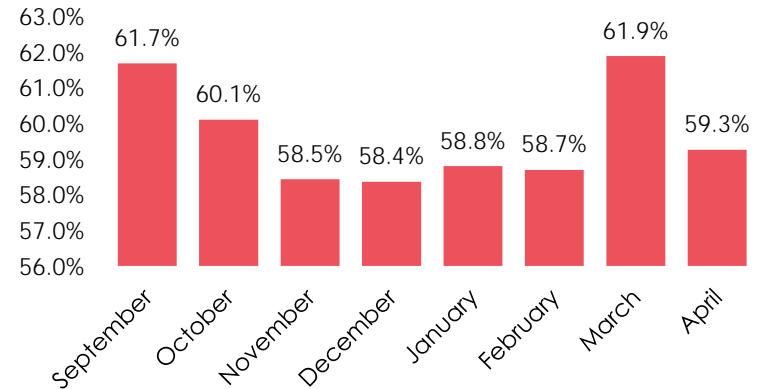
Restaurants to have reduced seating

Month	Percent
September	84.7%
October	83.7%
November	79.7%
December	76.5%
January	75.1%
February	72.0%
March	70.9%
April	67.7%

Wearing a mask in public

Month	Percent
September	72.4%
October	72.1%
November	70.4%
December	71.9%
January	71.4%
February	72.3%
March	72.6%
April	70.1%

Quarantine people with positive tests

Month	Percent
September	76.1%
October	75.0%
November	72.7%
December	71.6%
January	71.8%
February	70.6%
March	69.5%
April	69.3%

Maintaining social distance

Month	Percent
September	61.7%
October	60.1%
November	58.5%
December	58.4%
January	58.8%
February	58.7%
March	61.9%
April	59.3%

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21 Mitigation Strategies over Time

Compliance with 21 Mitigation Strategies

- Low Compliance
- Medium Compliance
- High Compliance
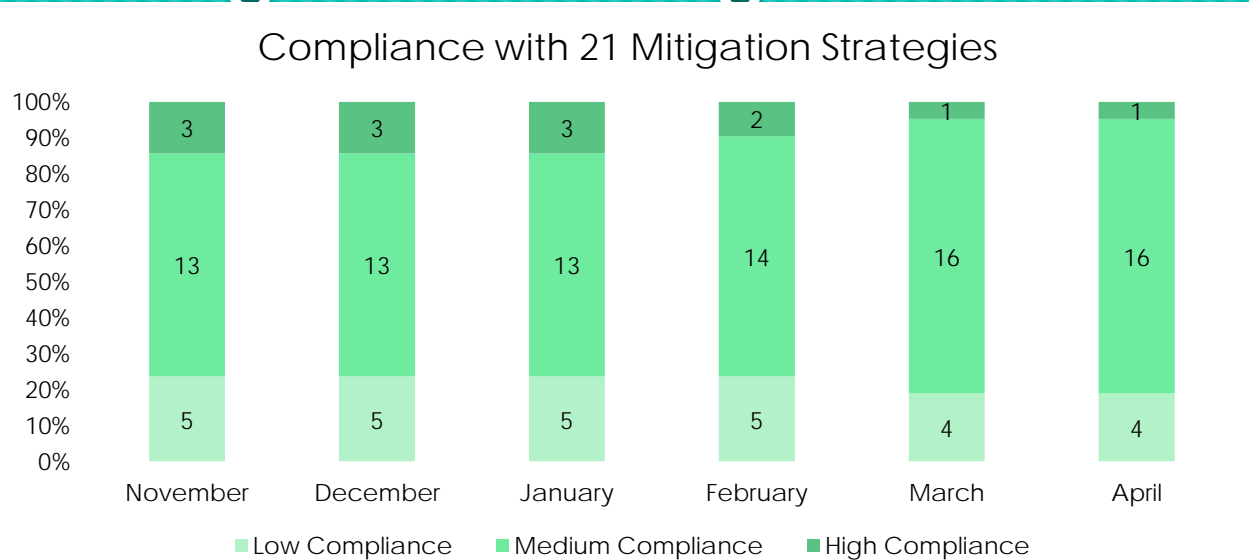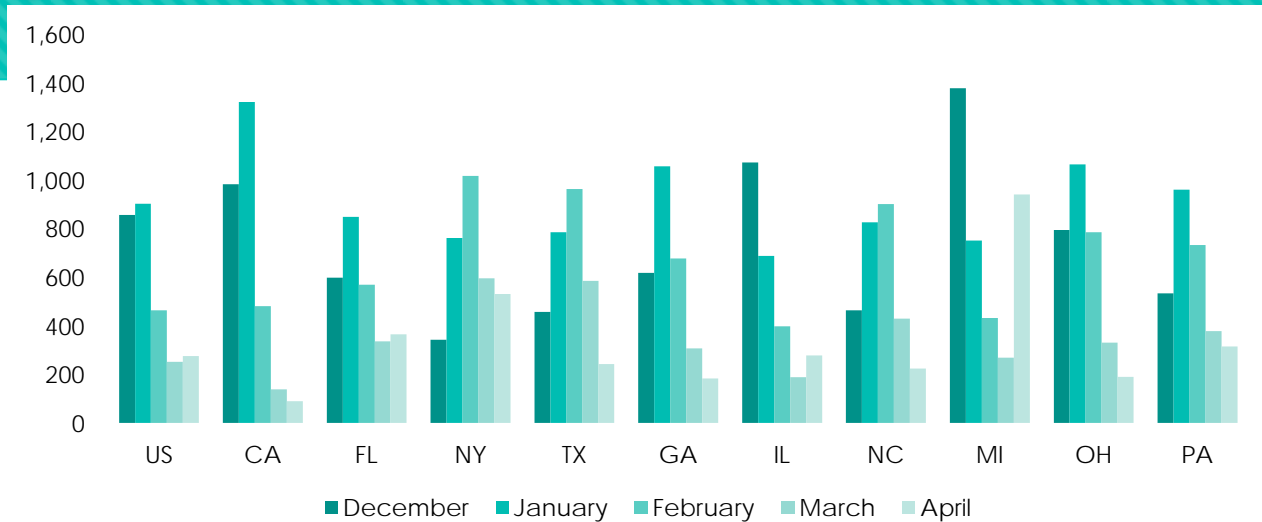
○ As overall mitigation has decreased, the number of mitigations with high compliance has decreased from 5 in September to only 2 in February and one in March/April.

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Compliance Basis: High Compliance is over 75%, Medium Compliance is 50%-75%, Low Compliance is below 50%.

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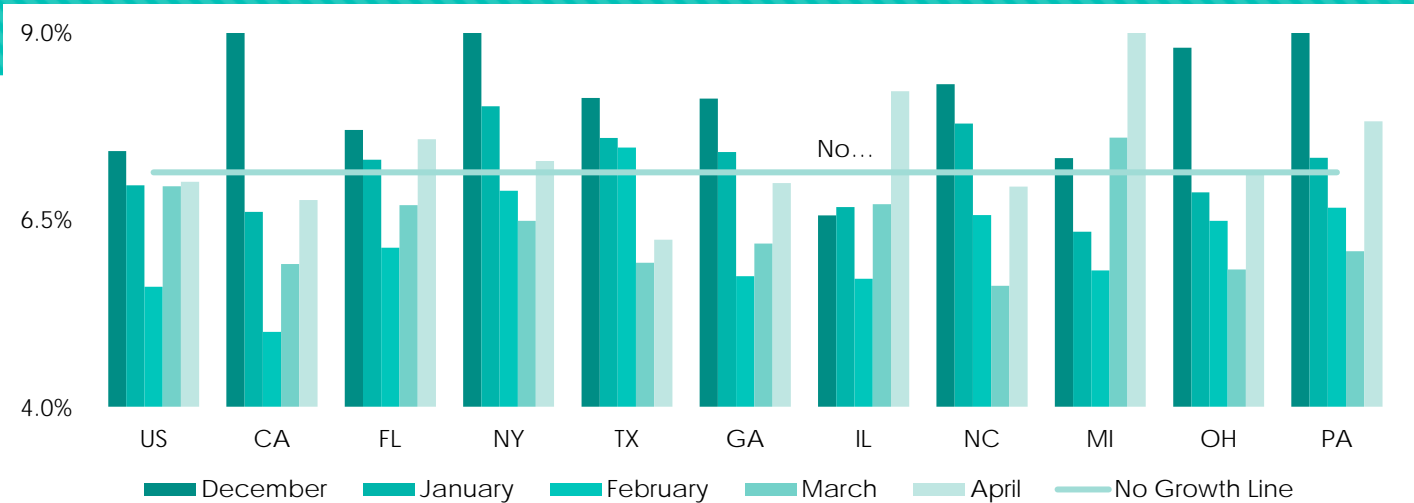# Infection Level in 10 Most Populous States

(Monthly Averages)

► The Infection Level peaked in a different month by state in either December, January or February. All of the 10 large states are lower than that peak in April.
► Michigan has had a new wave of infections in April. That spike has started to recede by the end of April but infections are still running much higher in Michigan than in any other state.

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NIR in 10 Most Populous States

(Monthly Averages)

Chart showing NIR monthly averages (December, January, February, March, April, No Growth Line) for US, CA, FL, NY, TX, GA, IL, NC, MI, OH, PA. Y-axis ranges from 4.0% to 9.0% with 6.5% marked. No Growth Line labeled "No..."

- ▶ All ten states had reached a NIR below the No Growth line (7.14%) in March, but five have moved back up to or surpassed that level in April.
- ▶ Nine of the states were above the No Growth line in December. At that time, only Illinois was below.

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Percent Compliance

(Monthly Averages for 10 states with highest population)

Jan 1-15							
California	Top 5			California	Bottom 5		
	1	Special protection in hospitals areas that treat COVID patients	73.3%		21	Violations of COVID restrictions result in fines or police enforcement	33.7%
	2	Restaurants to have reduced seating	72.6%		20	Get antibody testing to detect prior infection	41.3%
	3	Colleges are closed or holding only remote classes	72.3%		19	Quarantine travelers from higher infection places	50.8%
	4	Hairdresser and barber to be open with restrictions	69.8%		18	Staying at home	51.1%
	5	Schools (K-12) are closed or holding only remote classes	68.1%		17	Businesses to be closed – work from home only	53.7%
Florida	Top 5			Florida	Bottom 5		
	1	Special protection in hospitals areas that treat COVID patients	75.2%		21	Violations of COVID restrictions result in fines or police enforcement	21.8%
	2	Wearing a mask in public	66.3%		20	Schools (K-12) are closed or holding only remote classes	32.9%
	3	Quarantine people with positive tests	64.9%		19	Get antibody testing to detect prior infection	39.5%
	4	Hairdresser and barber to be open with restrictions	64.4%		18	Businesses to be closed – work from home only	39.7%
	5	Commonly touched surfaces to be sanitized	60.6%		17	Staying at home	40.7%
New York	Top 5			New York	Bottom 5		
	1	Restaurants to have reduced seating	83.3%		21	Get antibody testing to detect prior infection	44.6%
	2	Special protection in hospitals areas that treat COVID patients	82.3%		20	Violations of COVID restrictions result in fines or police enforcement	45.3%
	3	Visitors to senior living facilities to be restricted	79.6%		19	Businesses to be closed – work from home only	50.6%
	4	Hairdresser and barber to be open with restrictions	78.1%		18	Staying at home	51.7%
	5	Wearing a mask in public	76.2%		17	Schools (K-12) are closed or holding only remote classes	56.2%
Pennsylvania	Top 5			Pennsylvania	Bottom 5		
	1	Special protection in hospitals areas that treat COVID patients	88.1%		21	Violations of COVID restrictions result in fines or police enforcement	29.2%
	2	Restaurants to have reduced seating	82.1%		20	Get antibody testing to detect prior infection	34.8%
	3	Visitors to senior living facilities to be restricted	81.7%		19	Staying at home	47.5%
	4	Hairdresser and barber to be open with restrictions	75.3%		18	Quarantine travelers from higher infection places	49.8%
	5	Quarantine people with positive tests	74.9%		17	Businesses to be closed – work from home only	52.6%
Texas	Top 5			Texas	Bottom 5		
	1	Special protection in hospitals areas that treat COVID patients	78.1%		21	Violations of COVID restrictions result in fines or police enforcement	29.6%
	2	Visitors to senior living facilities to be restricted	71.7%		20	Get antibody testing to detect prior infection	38.1%
	3	Quarantine people with positive tests	70.6%		19	Schools (K-12) are closed or holding only remote classes	40.5%
	4	Wearing a mask in public	70.5%		18	Quarantine travelers from higher infection places	42.7%
	5	Restaurants to have reduced seating	68.1%		17	Staying at home	42.9%

Underreporting

		March Cumulative Unreported (millions)	As Pct. of Population
1	Texas	3.7	13%
2	California	3.5	9%
3	Illinois	2.4	19%
4	Ohio	2.1	18%
5	Florida	2.1	10%
6	Pennsylvania	1.2	10%
7	Georgia	1.2	11%
8	New Jersey	1.1	12%
9	Wisconsin	1.0	17%
10	Maryland	0.9	15%
Other 40 States		10.8	
Total Est Unreported		29.9	9%

► Based upon the CDC study of Seroprevalence of antibodies.
► Rates of testing are trending downwards as medical staff are being reassigned from testing to vaccinations.
► This measure of underreporting has trended downwards slightly over time.
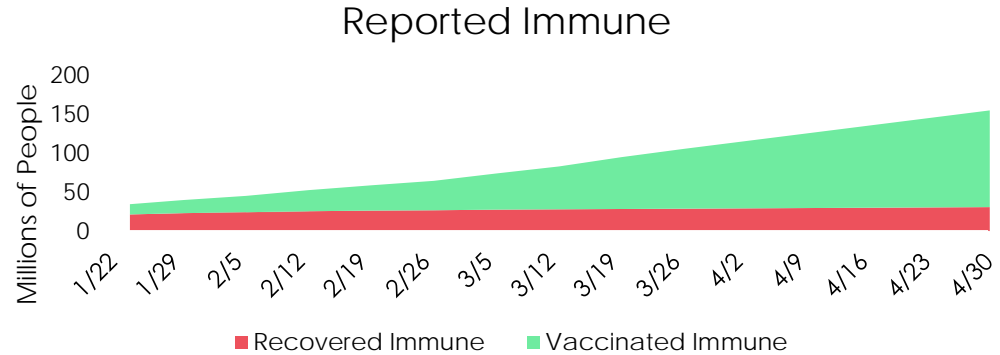
Immunity and Vaccinations

The total population of immune people in the United States is made up of three groups:

➢ 1. People who have had virus and reported
➢ 2. People who have had virus and were not tested and not reported
➢ 3. People who have had vaccine

Remember there are some people who had the virus and also got vaccinated.

➢ An adjustment for that is made in the calculation of Estimated Unreported Recovered Immune.

Reported Immune

Y-axis: Millions of People (0, 50, 100, 150, 200)
X-axis: 1/22, 1/29, 2/5, 2/12, 2/19, 2/26, 3/5, 3/12, 3/19, 3/26, 4/2, 4/9, 4/16, 4/23, 4/30

Legend: ■ Recovered Immune ■ Vaccinated Immune

Estimated Total Immune

Y-axis: Pct of Population (0%, 20%, 40%, 60%)
X-axis: 1/22, 1/29, 2/5, 2/12, 2/19, 2/26, 3/5, 3/12, 3/19, 3/26, 4/2, 4/9, 4/16, 4/23, 4/30

Legend: ■ Reported Recovered Immune ■ Vaccinated Immune ■ Est Unreported Recovered Immune
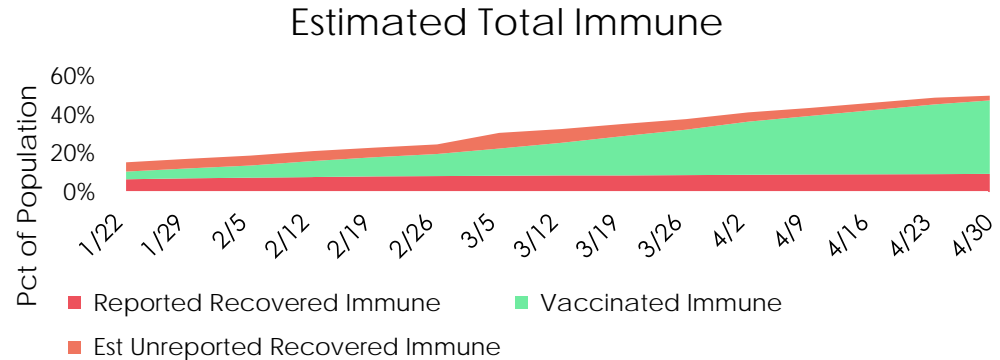
Immunity
Selected States

	April 30	Reported Immune	Est. Total Immune
1	Massachusetts	57%	57%
2	Rhode Island	57%	57%
3	New Hampshire	57%	57%
4	Connecticut	56%	56%
5	New Jersey	53%	57%
6	New Mexico	53%	56%
7	South Dakota	53%	54%
8	California	52%	53%
9	Maine	52%	52%
10	Pennsylvania	51%	54%

	April 30	Reported Immune	Est. Total Immune
51	Mississippi	38%	42%
50	Louisiana	38%	39%
49	Alabama	38%	43%
48	Idaho	39%	45%
47	West Virginia	40%	40%
46	Wyoming	40%	53%
45	Georgia	40%	45%
44	Tennessee	42%	45%
43	Indiana	42%	46%
42	Arkansas	42%	43%

Correlation between Mitigations and U.S. Infection Level

(Weekly Mitigation Average and USIL one Week Later, September - February)
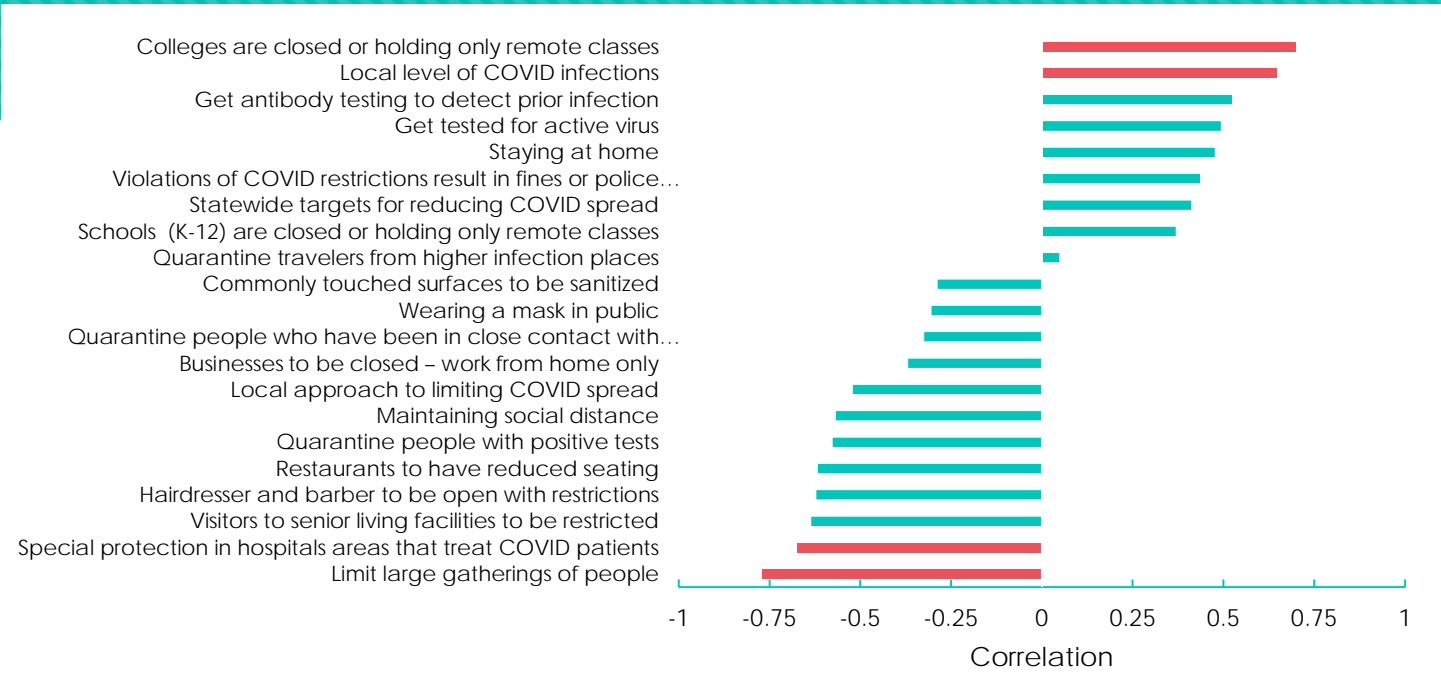
- ▶ It is difficult to draw conclusions about why a mitigation would be strongly positively or negatively correlated with the U.S. Infection Level. Some factors that might influence the power of a mitigant as a forward indicator include how easy it is to implement, who is in control of the mitigation (personal, business, governmental), and what other mitigants are logistically and politically tied into that mitigation.

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What Difference Does it Make?

Five States with High Compliance Compared to Five
States with Low Compliance with Adj for Underreporting
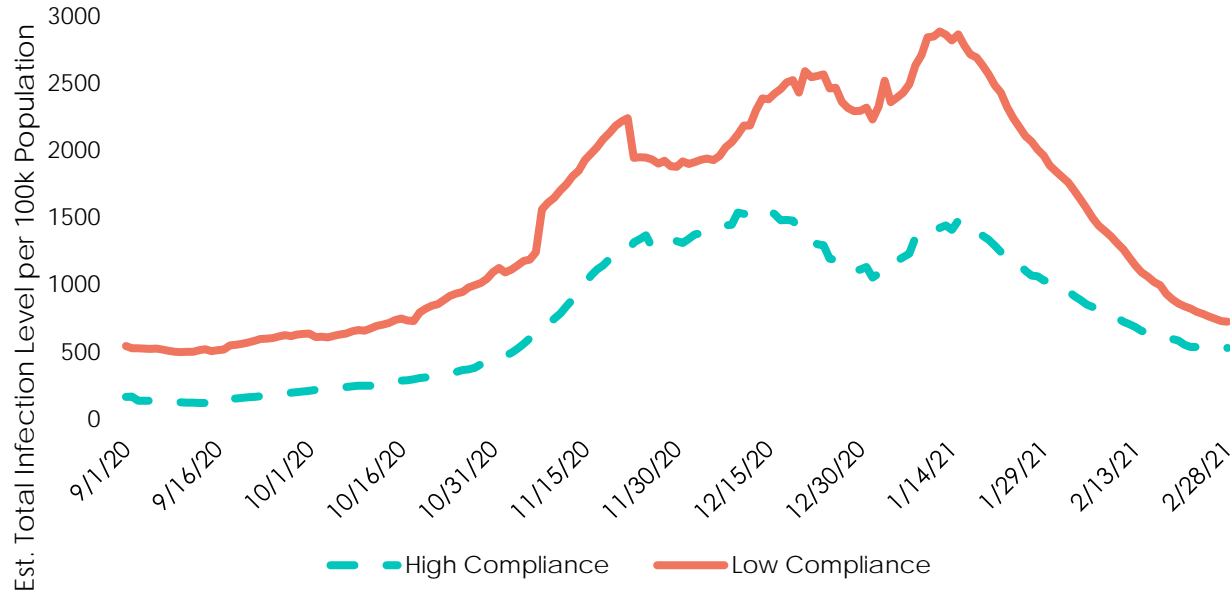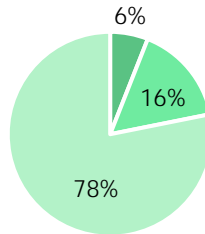
Smaller Gatherings

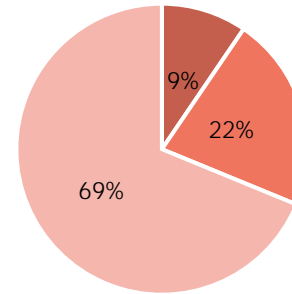| Average Gathering	This Year	Last Year	Change
Thanksgiving	9	16	(7)
December	4	17	(13)
Super Bowl	7	19	(12)

Thanksgiving

9%
22%
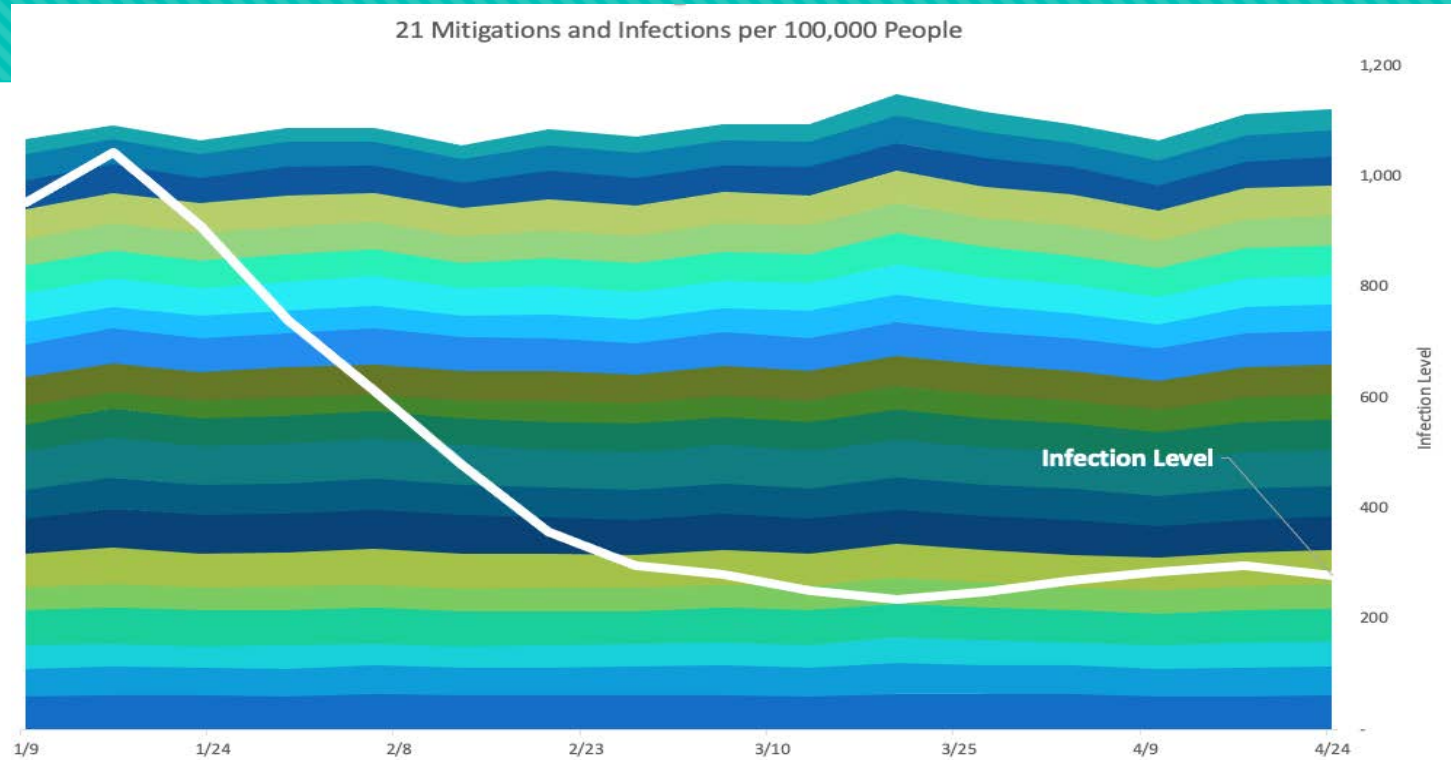69%
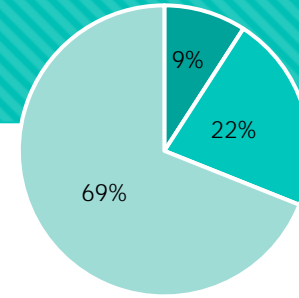
■ Increase ■ Same ■ Decrease

December Holidays

6%
16%
78%

■ Increase ■ Same ■ Decrease

Superbowl

9%
22%
69%

■ Increase ■ Same ■ Decrease

Summary & Conclusions

21 Mitigations and Infections per 100,000 People

Practical Applications

What can we hope Individuals, companies, and public officials to do?

Individuals

Public Officials
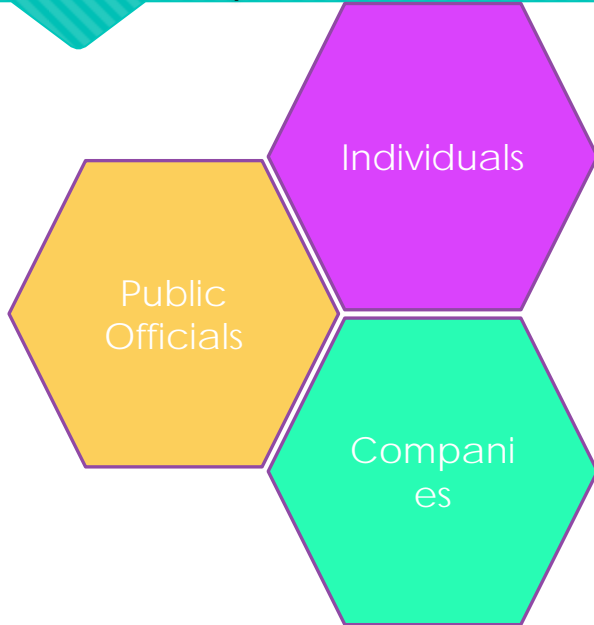
Companies

Individuals:

Choose personal mitigations. Such as "Wear a mask". "Socially Distance"
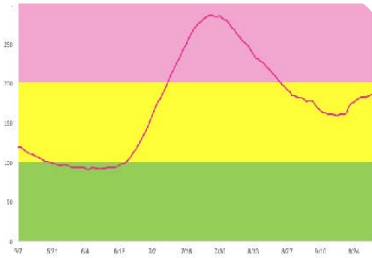
Companies:

Choose company mitigation strategy. Allow employees to work from home if possible. Create systems for contact tracing if an employee gets infected. Lobby public officials.

Public Officials:

See what is happening in other states. Can make choices from 21 mitigation strategies according to what will work in state.

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Conclusions

How Bad Can it Get?

Compliance varies by state.

Understand drivers of COVID spread.

Every State has a unique story

Applications to other Emerging Risks

- *Longitudinal Crowdsourcing* can bring insights as we live through a new emerging risk.
  - Don't have to wait for the next quarter's claims analysis
  - Can collect local information about how companies are handling their employee situations

- By asking many people may get insights that allow you to anticipate changes that could result from a new emerging risk
  - Not limited to polling your own employees or customers