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Two states, two VERY different COVID tactics.... but the same depressing result: California ordered strict lockdowns, while Florida 'trusted common sense' and now both have nearly identical case rates, hospitalizations an deaths

- **California Gov Gavin Newsom has issued very strict orders during the coronavirus pandemic with bars an indoor dining shuttered and most residents under lockdown**
- **Florida Gov Ron DeSantis has issued very few closures and has been very critical of states like California with harsh restrictions**
- **When it comes to overall cases and deaths, California has higher numbers with 3,039,044 total cases and 35,004 total deaths and Florida with 1,613,884 total infections and 24,739 fatalities**
- **Adjusting for population, Florida has 5,043 COVID-19 cases and 91 deaths per 100,000 residents while California has about 4,595 cases and 51 deaths per 100,000, showing a similar curve**
- **Historically, Florida was reporting about 44 hospitalizations per 100,000 while California has about 22 per 100,000, with both states seeing a spike in mid-January and now a decline**

By MARY KEKATOS FOR DAILYMAIL.COM

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Since the first cases of **coronavirus** were identified in the U.S., **California** and **Florida** have stood out for taking very different approaches to the crisis.

Over the course of the last year, California Gov Gavin Newsom has ordered businesses such as bars and indoor dining in restaurants to be shut down due to a rising number of cases and hospitalizations, and has imposed mask mandates.

The state's schools have also been largely remote since March and most residents are under **lockdown** orders.


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By comparison, Florida Gov Ron DeSantis has issued very few closures, lifting restrictions bars, restaurants and virtually every other business in September.

DeSantis has refused to shut down schools statewide and has said a mask mandate is 'off the table.' Two mont ago, he even criticized states like California with harsher restrictions and said he trusted his residents to 'use common sense'.

'How has that worked out in the states that have done it?... What about all these states where you have an explosion in cases?' DeSantis told reporters.

'At some point, does the observed experience matter? I'm opposed to mandates. Period. I don't think they work.'

Despite these different approaches, both states ended up with the same outcome. A DailyMail.com analysis shows that, over the course of one year, both state have near-identical rates of cases, deaths and hospitalizations.
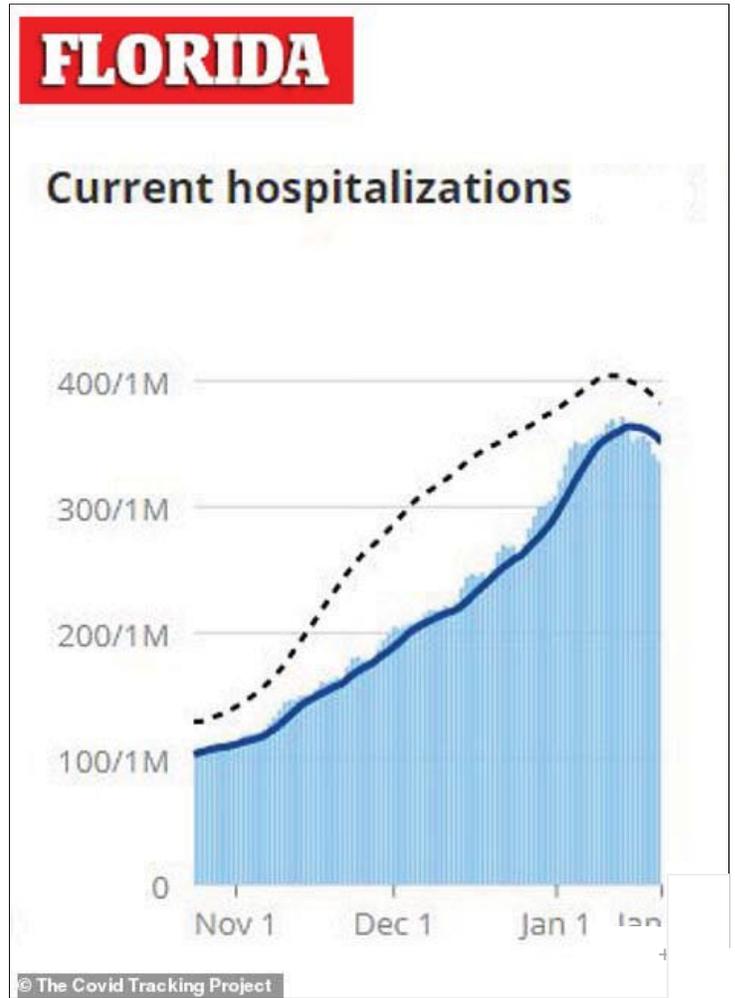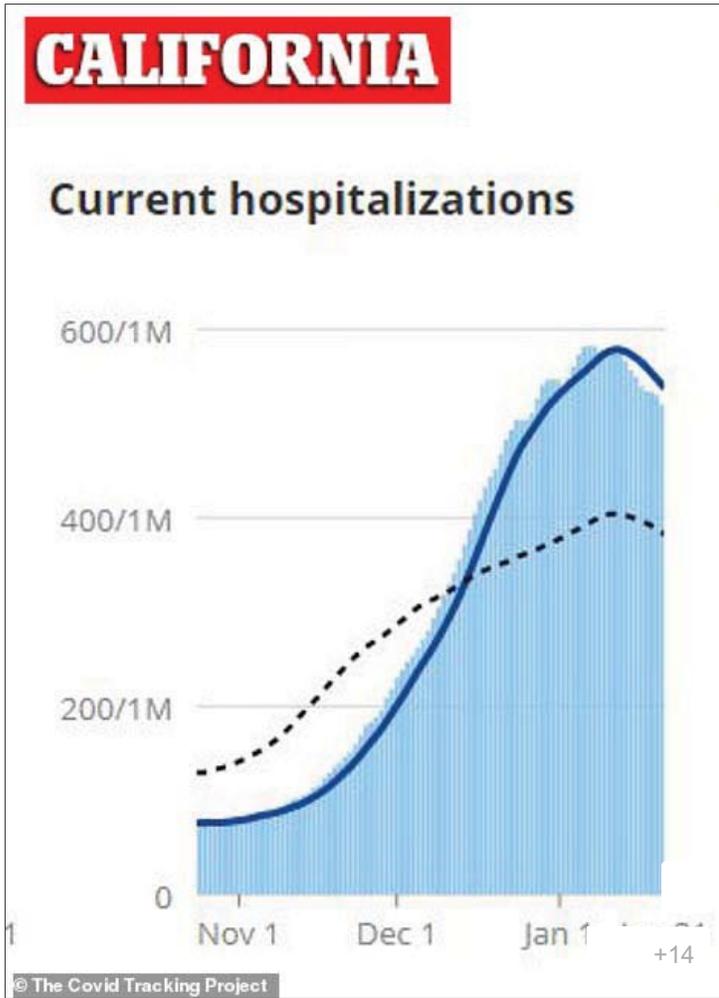
California has had a slowly increasing hospitalization rate of 150 hospitalizations per million people to nearly 600 per mil and Florida (right) has seen increasing hospitalization rate of 100 hospitalizations per million people to nearly 400 per million. The curves bear a striking resemblance to each other. The dashed line represents the national seven-day average and the solid line represents California's and Florida's seven-day averages
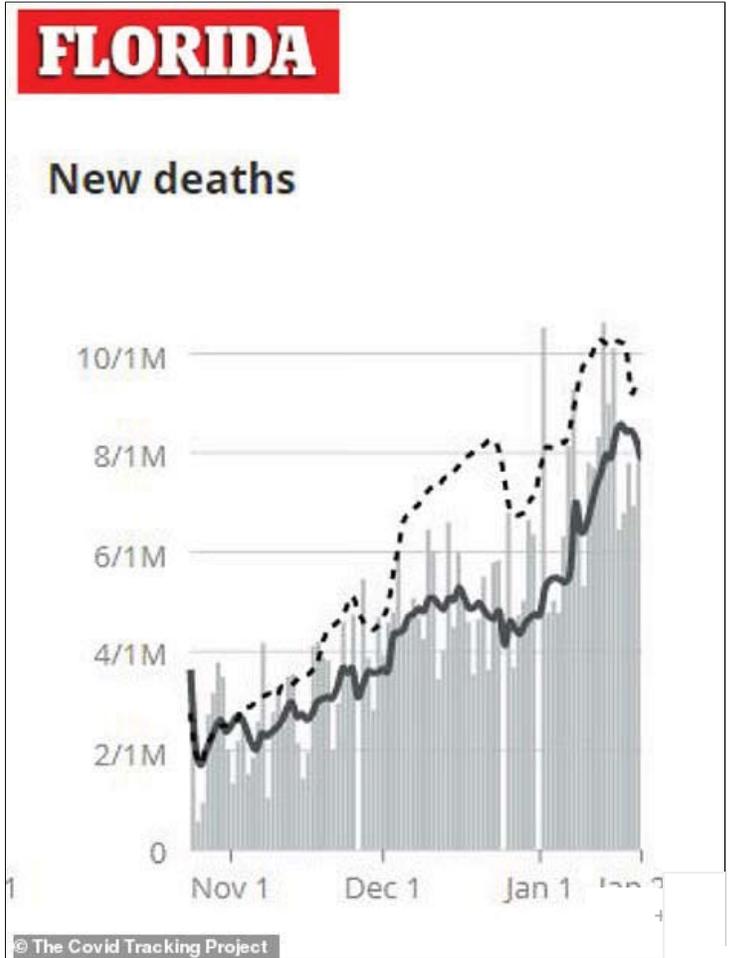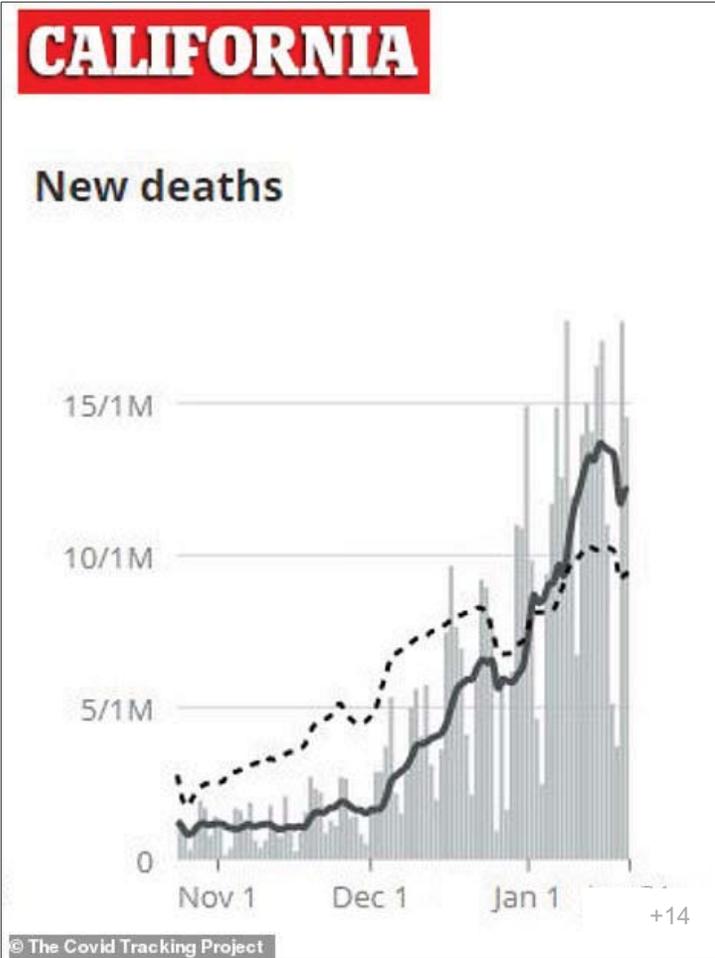
California (left) is seeing an average of about 10 deaths per million people while Florida (right) is experiencing an average six deaths per million people. Both states have very similar curves. The dashed line represents the national seven-day av and the solid line represents California's and Florida's seven-day averages
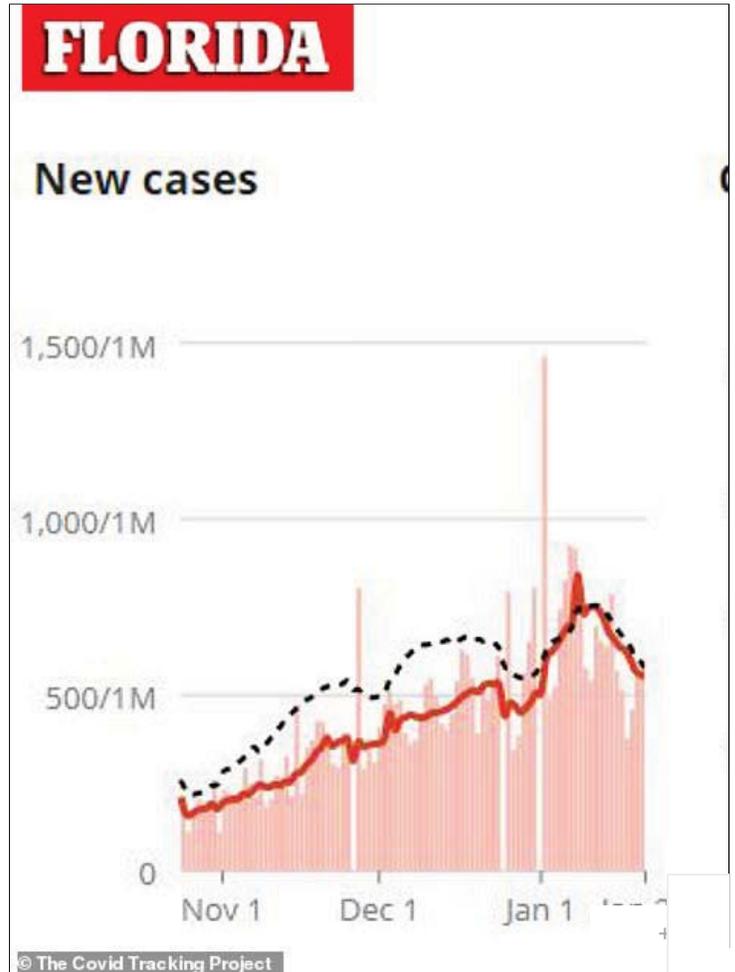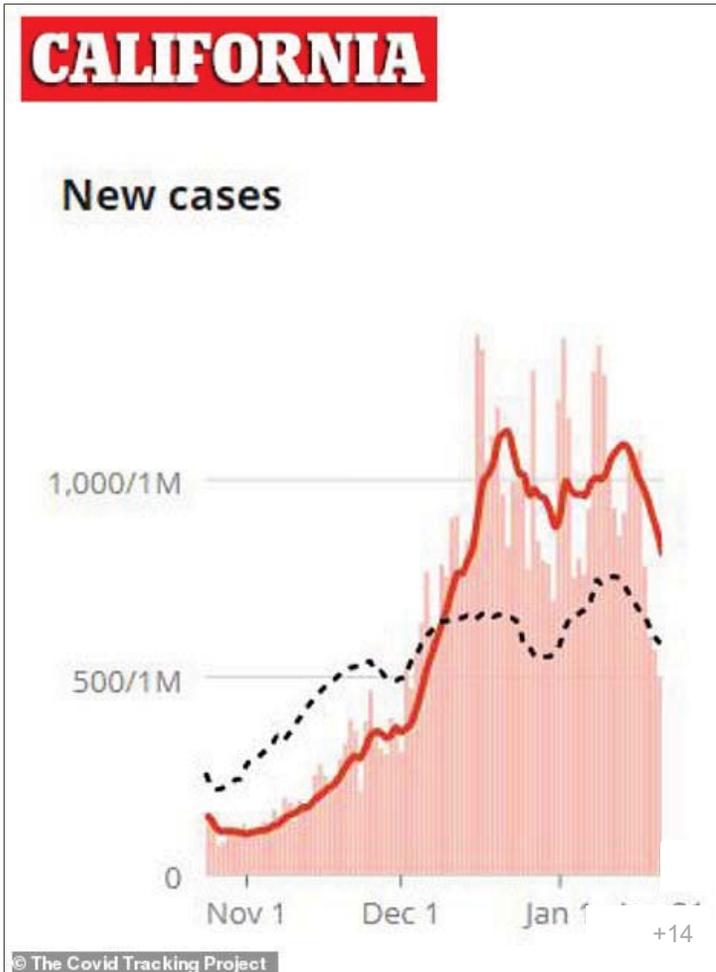
California (left) and Florida (right) are both reporting an average of between 500 cases and 1,000 cases per million peopl and each seeing a decline in the latter part of January. The dashed line represents the national seven-day average and the solid line represents California's and Florida's seven-day averages.

When looking at the raw numbers, California has the edge.

The Golden State has 3,039,044 total cases and 35,004 total deaths - both figures are the highest in the nation.

By comparison, Florida is reporting 1,613,884 total infections and 24,739 fatalities.

However, population size must be taken into consideration. California has about 40 million residents and Florida has about 22 million.

When adjusted for this metric, the edge shifts to Florida, but just slightly.

Florida has about 5,043 COVID-19 cases per 100,000 residents while California has about 4,595 per 100,000, according to **The Tampa Bay Times** and a DailyMail.com analysis.

According to The COVID Tracking Project, California and Florida are both reporting an average of between 500 cases and 1,000 cases per million people, and each are seeing a decline in the latter part of January.

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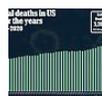
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For deaths, California is seeing an average of about 10 deaths per million people while Florida (right) is experiencing an average of six deaths per million people, The Tracking Project found.

However, both states are following a similar curve with a spike in cases around January 1 and infections starting to tail off and deaths both increasing.

How about when adjusted for the last 90 days?

The Times notes that COVID cases in the last 90 days when adjusted for population is higher - but not by much- in Florida than in California at 1,903 per 100,000 compared to 1,629 per 100,000, near identical.

Deaths tells a similar story. Over the last 90 days, Florida has recorded 33 deaths per 100,000 in comparison with 15 deaths per 100,000. Once more their curves appear similar with fatalities spiking around mid-January.

California Gov Gavin Newsom has issued very strict orders during the coronavirus pandemic (orange lines) such as bars and indoor dining shuttered and gradually loosening as cases decline (blue lines). Once rates increase, he issues lockdowns again

FLORIDA

Select another state

| Florida ▾ | How to read this graphic | New Confirmed Cases | New Deaths |

RECENT OPENING AND CLOSING POLICY DECISIONS

● Restriction/closing   ● Opening   ● Deferring decisions to county   ● Other

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12,075 cases
1,292,252 cumulative cases

New Confirmed Cases

30,000

20,000

10,000

0

Apr 1   Jul 1   Oct 1   D

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+14
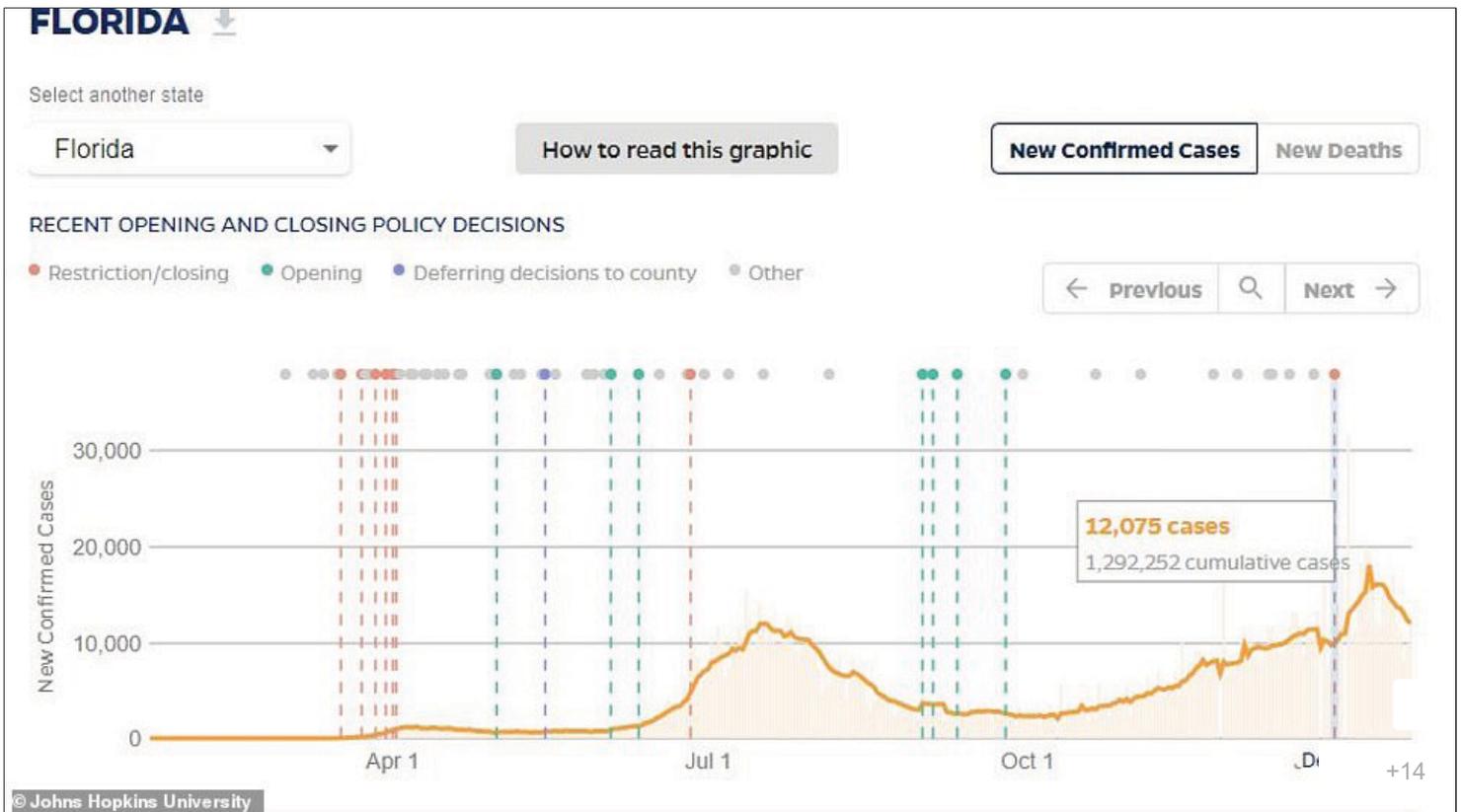
Florida Gov Ron DeSantis as issued very few closures (orange lines) and has been very critical of states like California with harsh restrictions, with both states following similar curves, In fact, even with rising rates, he has chosen to reopen (blue lines) much of his state

COVID HOSPITALIZATIONS

Number of hospitalizations each day due to Covid
(per 100,000 residents)

40

35

30

25

20

15

10

5

0

California

Florida

Aug   **Sept**   **Oct**   **Nov**   **Dec**
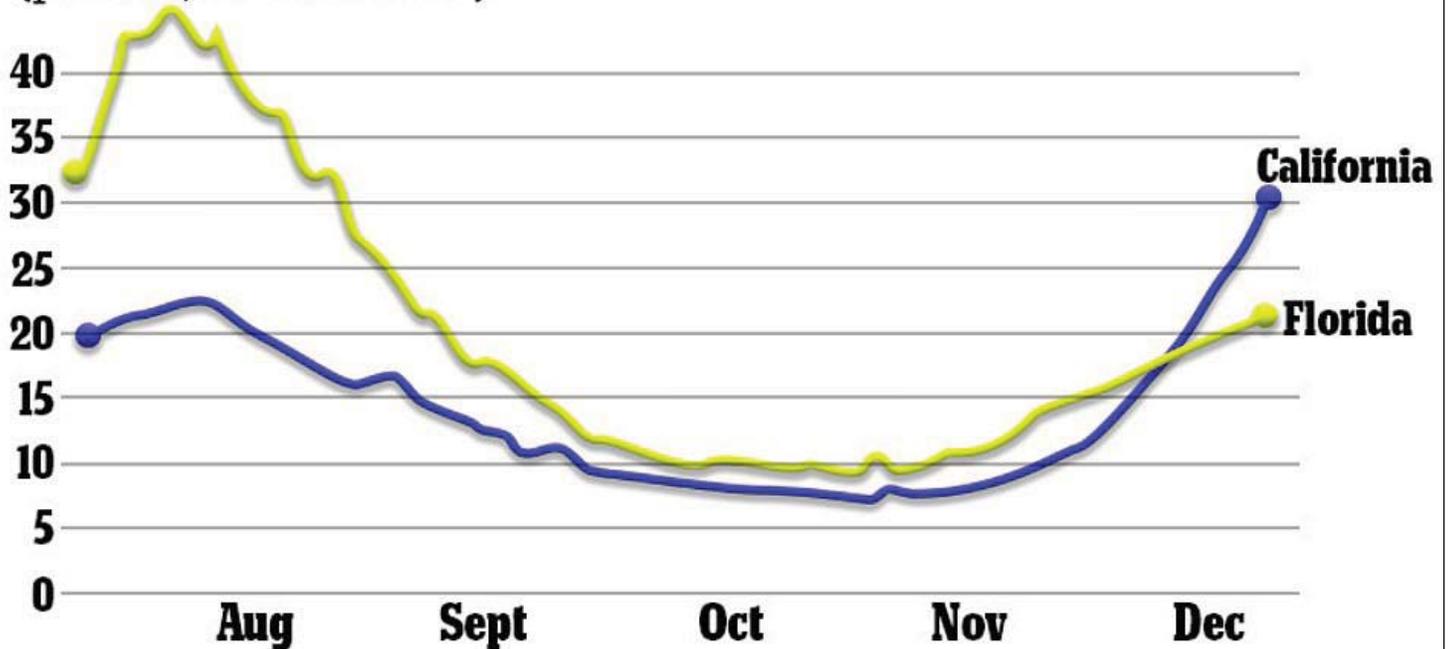
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Hospitalizations for the two states over the last several months show they have been following the same curve with around 30 per 100,000 last month for California and 21 per 100,000 last month for Florida

How do the states compare when it comes to COVID-19 hospitalizations?

The COVID Tracking Project, which has been recording hospitalizations in every state, does not have a figure for all hospitalizations ever reported in California while, in Florida, this data was not made publicly available until July.

At its peak on January 12, California reported a single-day total of 22,665 people hospitalized due to the virus while Florida reported 7,762 people on January 14.

When adjusted for 100,000, California still has a higher hospitalization rate.

California has a rate of about 56 hospitalizations per 100,000 while Florida has about 35 per 100,000.

However, The Tampa Bay Times, notes that Florida's rate has been historically higher until recently.

For example, in late July, Florida was reporting about 44 hospitalizations per 100,000 while California has about 22 per 100,000.
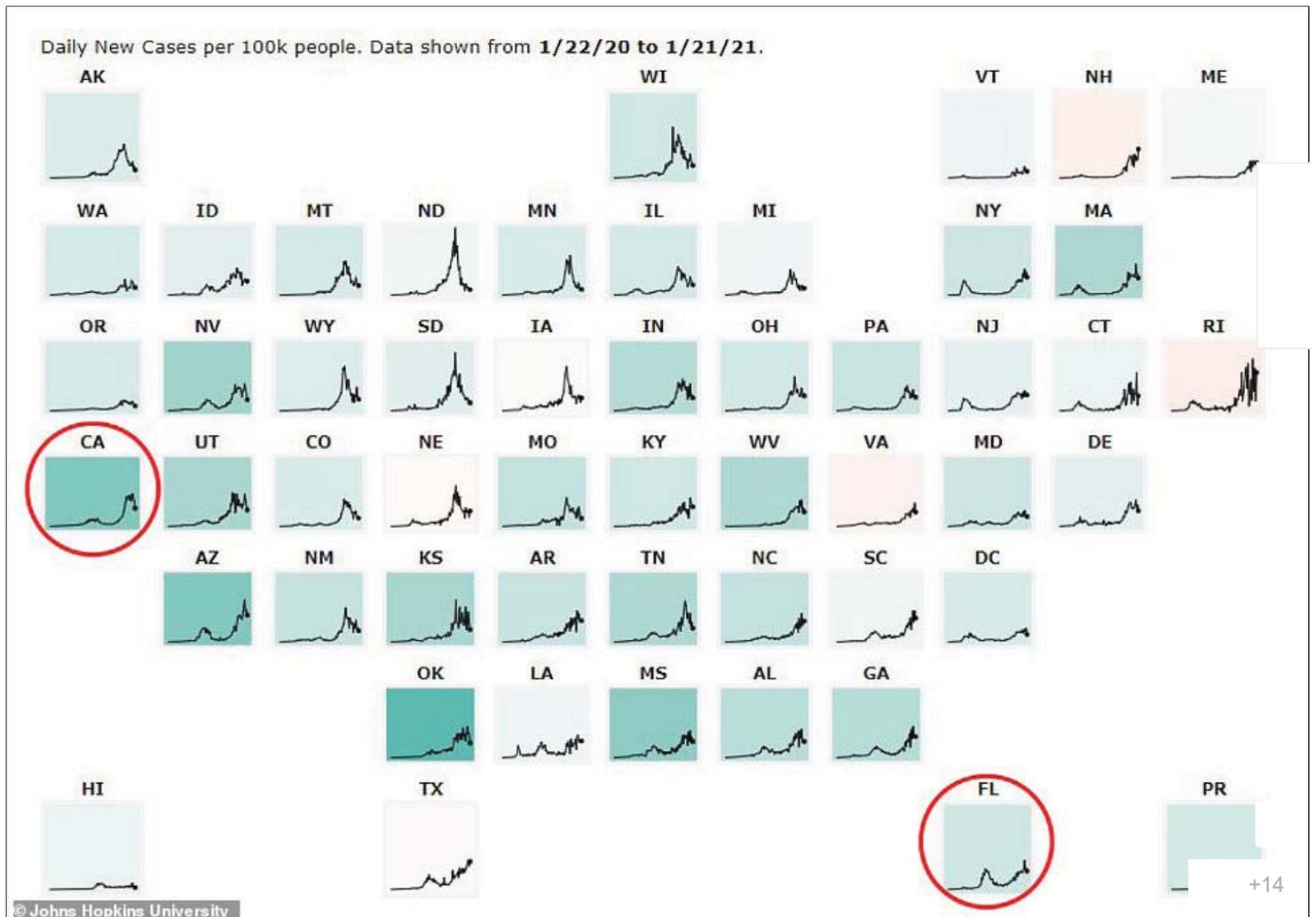
Overall, the two states are quite similar with California having higher total numbers but Florida having a higher rate of cases and deaths when accounting for population, with both states now trending downward
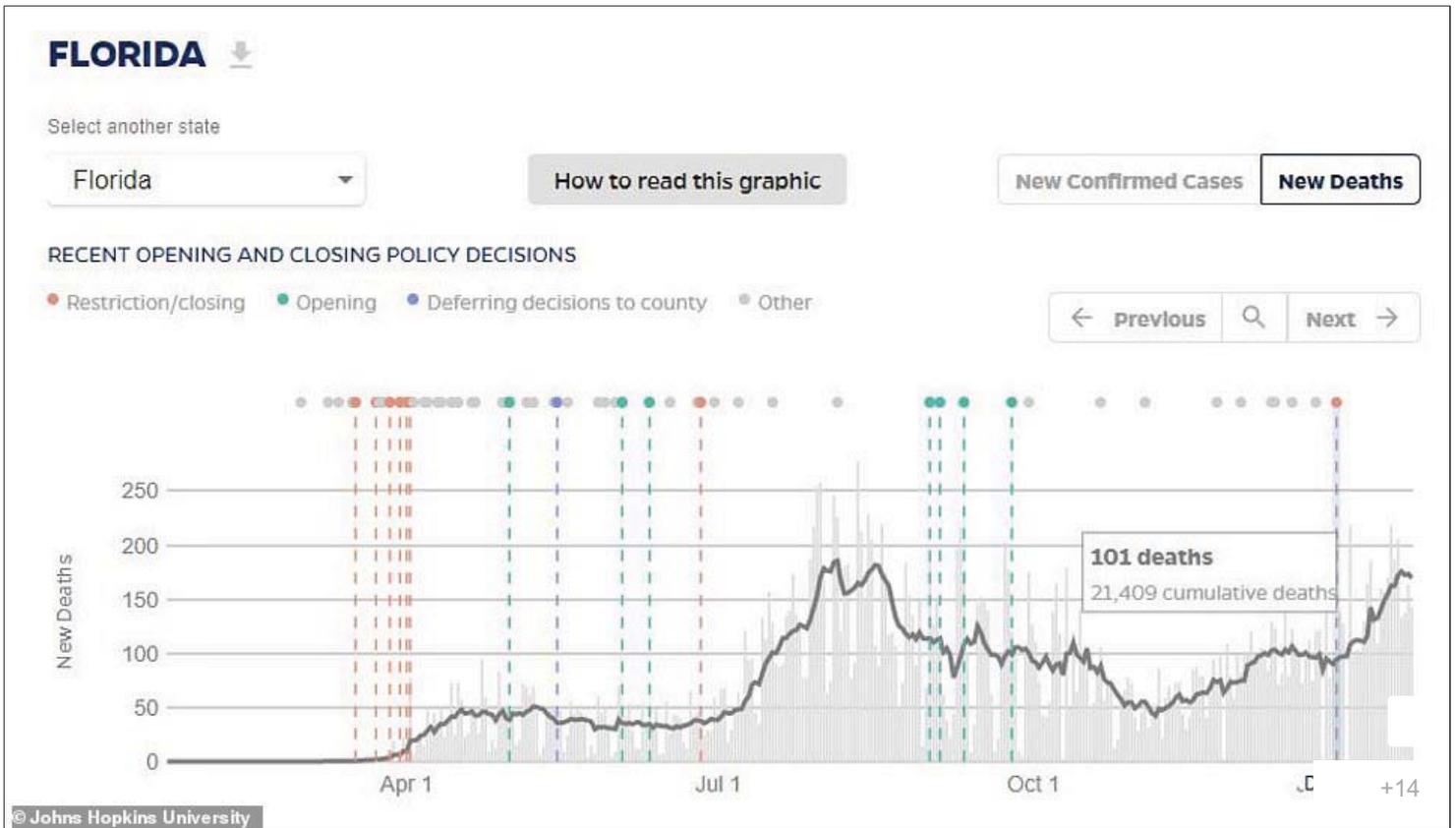
Despite Florida and California's very different approaches, the curves of their death rates are near-identical. Florida's orange lines represent closures while the blue lines represent reopening. Even with rising rates, DeSantis has closed very little.

California (above) and Florida shows a peak around mid-April, again around mid-July and another peak during the holiday season. The only difference is during each peak, California has ordered a restriction or closing (orange lines)

Worth noting when it comes to hospitalizations is age.

More than one-fifth of, or 21 percent, of Florida's population is at least 65 years old with at least 4.6 million out of the state's 22 million identifying as senior citizens.

Comparatively, just 15 percent of California's population is elderly with six million out of 40 million aged 65 and up.

This means more residents in Florida are susceptible to a virus that preys on the elderly.

Overall, the two states are quite similar despite their different approaches with California having higher total numbers but Florida having a higher rate of cases and deaths when accounting for population, with both states now trending downward.

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DeSantis has refused to shut down schools statewide and said he trusted his residents to 'use common sense'. Pictured: DeSantis speaks at a COVID-19 testing site, January 6

Newsom has ordered schools to be largely remote since March and most residents are under lockdown orders due to rising rates. Pictured: Newsom addresses a news conference held at the launch of mass COVID-19 vaccination site at Dodger Stadium, January 15

Additionally, Florida has had higher hospitalization rates historically but has recently been overtaken by California, and both are on a similar curve.

Dr Brad Pollock, associate dean for Public Health Sciences at the UC Davis School of Medicine, told the **Sacramento Bee** there are some factors out of politicians' control when it comes to transmission.

This includes population density, the number of multi-generational households and the public cooperating with state laws and mandates.

'The epidemic has not been uniform across the country,' he said. 'Some of the differences can be attributed to policy-making. Some of them are just bad luck.'

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Sociallybad2, London, United States, about 10 hours ago

Where's the Russia insurrection news?

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Clappy111, golden, United States, about 17 hours ago

For the next four years, when the left says they are simply following the science...simply substitute the word "emotion" for the word "science".......

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Lofe, USA City, United States, about 19 hours ago

Umm...Cali still has a lower rate. Even by half for hospitalization. Wierd article

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powermkp, Chicago, United States, about 20 hours ago

So much for listening to the science...

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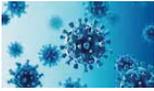
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Mandatory lockdowns may not be any better at controlling COVID-19 than less restrictive measures, study finds

"Similar reductions in case growth may be achievable with less restrictive interventions," researchers concluded

By **Paul Best** | Fox News

Global study: Lockdowns may not be more effective against COVID-19

'Unreported Truths' author Alex Berenson joins 'Tucker Carlson Tonight' with reaction

Mandatory stay-at-home orders and business closures may not be more effective at controlling the spread of the coronavirus than less restrictive, voluntary measures, a new study found.

At the beginning of the pandemic, Sweden and South Korea did not implement mandatory lockdowns in the form of stay-at-home orders and business closures, though many people still isolated and followed measures to mitigate the spread of the virus voluntarily.

Sweden relied on "social distancing guidelines, discouraging of international and domestic travel, and a ban on large gatherings," while South Korea relied on "intensive investments in testing, contact tracing, and isolation of infected cases and close contacts."

The findings appeared in the European Journal of Clinical Investigation.

BIDEN UNVEILS 'BOLD' VACCINATION PLAN TO FIX TRUMP'S 'DISMAL FAILURE'

The Stanford University researchers compared the spread of COVID-19 in Sweden and South Korea to the spread in eight countries that did implement more restrictive mandatory lockdowns: Britain, France, Germany, Iran, Italy, Netherlands, Spain and the United States.

They found that nonpharmaceutical interventions were effective in nine out of 10 countries, but there was "no clear, significant beneficial effect of [more restrictive non-pharmaceutical interventions] on case growth in any country."

The researchers pointed out that while they found "no evidence of large anti-contagion effects from mandatory stay-at-home and business closure policies," cross-country comparisons were difficult because "countries may have different rules, cultures, and relationships between the government and citizenry."

HIGH DEMAND FOR COVID-19 VACCINE LEAVES FLORIDA SENIORS STRUGGLING TO GET THE JAB: 'IT SEEMS HOPELESS'

This does not mean that measures to mitigate the spread of COVID-19 are ineffective, just that more restrictive nonpharmaceutical interventions may not provide more benefits than less restrictive voluntary measures, according to these researchers.

"While small benefits cannot be excluded, we do not find significant benefits on case growth of more restrictive [nonpharmaceutical interventions]," the study concluded. "Similar reductions in case growth may be achievable with less restrictive interventions."

Other studies have found that lockdowns do work.

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For instance, researchers from Rice University found in a study last month that "states that are more open are susceptible to higher COVID-19 death rates."

"The increasingly strong relationship between high levels of openness and high [daily deaths per million] suggests that lockdowns have been effective in both reducing [daily deaths per million] in highly infected states and in preventing new spikes in deaths."

Another study by researchers at Columbia University found that "school closures and voluntary or mandated stay-at-home measures" reduced the spread of COVID-19 in New York City last spring by 70%.

Paul Best is a reporter for FOX Business and Fox News. Follow him on twitter at @KincaidBest.

Conversation   335 Comments

What do you think?

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theavenger793
2 days ago

Well, have they looked at CA which was touted as a model early on but now has a serious problem even though CA has done many lockdowns since March 2020. One thing is clear though: all of the studies can't be right. One thing apparently not measured by the studies is how businesses or local economies have been affected; that has to be part of any study. NYC may have been considered a success when compared to itself, but otherwise not as for many months since March 2020 they were essentially the epicenter of COVID, but the study's authors seemed to have glossed over this little fact.

Reply   👍 42   👎 1

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> **woyed** › theavenger793
> 1 day ago
>
> Reduced the spread of Covid-19 in NYC?
> Seriously? Aren't they ashamed to even print that?
>
> Another Canadian study also just showed they are 10 times more lethal than Wuhan
> The WHO has even condemned lockdowns.
>
> These myopic, selfish, politically motivated unscientific lockdowns had
> no precedent, no clinical support, yet they will lead to countless ...**See more**
>
> Reply   👍 19   👎 2
>
> Show 3 more replies ⌄

> **BigFoot2012** › theavenger793
> 2 days ago
>
> No need to look at CA or an extensive study. Ferguson's predictions in early March were the basis for the lockdowns and continue to be. By October, Sweden (with no lockdowns) had 1/12 of his predicted number of deaths for them if no lockdowns were done; so did the UK (with lockdowns) and had deaths going at a much higher rate.
>
> Reply   👍 13   👎 2
>
> Show 3 more replies ⌄

carlmon

2 days ago

If you want to decrease cases and hospitalizations, reduce testing. Cases (positive tests) are directly proportional to test numbers - in fact, calling it case rate is misleading because a rate normally refers to a percentage. The number of positive tests, and whether they're increasing or decreasing, is an absolutely useless metric if it isn't compared with the test rate.

Reply   👍 26   👎

---

kenin

2 days ago

So, if you think lockdowns don't work, you've got studies to back it up, and if you think they do work, you've got studies to back it up. Is it any wonder that "follow the science" is such a joke?

If you use basic reasoning you can see that if everyone just stayed home, no one would get sick. Sounds great, but people need to eat, they want their power to stay on, they want their Internet to work, they want their packages delivered, and the list goes on and on. You can't just tell everyone to stay home. That's the most absurd example of groupthink that's ever come along. No pandemic has ever been dealt with by ordering everyone to stay home. You implement basic public health measures and you tell people to be careful.

People who support lockdowns have one thing in common - jobs where they can sit home and keep getting a paycheck. *(Edited)*

Reply   👍 48   👎

> **jpcook** › kenin
> 1 day ago
>
> Studies that back up either position, just confirms the idea that any study, any statistic, with enough care, can be designed to show exactly that which those doing the study, WANT it to show.
>
> Reply   👍 6   👎 1

> **tomuchtime** › kenin
> 2 days ago
>
> slowing the spread saved the live of countless people who had to go to work for a living even in lock downs
>
> Reply   👍 3   👎 26
>
> Show 2 more replies ⌄

Freedomsurvives

2 days ago

Of course it doesn't. Lockdowns have NEVER been about Public Health. They were opportunities to not only wreck the economy, but have also been a way for state and local leadership to exert their control and power of their constituencies. It's sick and disgusting at the amount of people that have fallen for this.

Reply   👍 133   👎 16

Show 6 previous replies ⌄

Langleyphil › Freedomsurvives
1 day ago   ⋮

IT WAS DESIGNED TO HURT TRUMP. AND IT DID. now even cuomo favors opening the economy. Go figure.

Reply   👍 9   👎

jpcook › Freedomsurvives
1 day ago   ⋮

"....a way for state and local leadership to exert their control and power...... "
You nailed it. The RESPONSE to the pandemic, as well as several OTHER recent events, have served to separate the "sheep" from the "goats", so to speak, so it is possible to proceed with isolation and disposal of the "goats".

Reply   👍 7   👎

CO2Producer   ⋮
2 days ago

 Huh. Republicans have been stating EXACTLY this for months. I guess they were right after all.

Reply   👍 75   👎 1

ImpeachChinaBiden   ⋮
2 days ago

Appears that Trump was right again about the Dems lockdowns.
We all know it was done not to fight Covid but to derail the economy and defeat Trump.

Reply   👍 144   👎 9

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BigFoot2012 › ImpeachChinaBiden
2 days ago   ⋮

Trump was right in February when he said the cure should not be worse than the disease, but then he allowed Fauci/Birx/Gates to destroy the economy and the structure of this country (with most governors running their states as personal fiefdoms). Trump could have easily stopped the lockdowns by bringing Title 18, USC, Section 242 charges against state/local officials and law enforcement officers.

Reply   👍 10   👎 2

orangemangone › ImpeachChinaBiden
2 days ago   ⋮

You need to drink more Kool Aid ... or get an I. Q. test.

Reply   👍 4   👎 30

Show 1 more replies ⌄

taggert   ⋮

2 days ago

After the regime change, it's fine to get people making money for government again.

Reply   👍 47   👎 1

Jmcgowan5571   ⋮

2 days ago

Somthe election is over and suddenly all the leftist that were pushing lockdowns are doing an about face. They know Biden will bail them out for the losses for shutting down to win the election. However these states failed to consider thelosses they will incur in the coming years due to loss of businesses and residents that left the states.

Reply   👍 55   👎 2

> **Marian** › Jmcgowan5571   ⋮
>
> 2 days ago
>
> And they don't care that their great grandchildren will still be paying for their selfishness.
>
> Reply   👍 22   👎 1

Hammer67   ⋮

2 days ago

so, CA is out of control and has some of strictest rules?? and now cuomo and lightfoot both say fine to open up? so now when cases are higher they say ok to open but when desantis was opening and trump wanted to open they said opening would kill people.

Reply   👍 73   👎 5

Show 2 previous replies ⌄

> **jpcook** › Hammer67   ⋮
>
> 1 day ago
>
> Bingo....
>
> Reply   👍 5   👎

> **Mikee551** › Hammer67   ⋮
>
> 2 days ago
>
> Right on!
>
> Reply   👍 14   👎 1

---

leighcarroll   ⋮

2 days ago

By April, the lockdowns were about the coming election and creating panic.

Reply   👍 93   👎 4

DR. ERAN BENDAVID (Orcid ID : 0000-0002-8364-4711)

PROF. JOHN IOANNIDIS (Orcid ID : 0000-0003-3118-6859)

Article type   : Original Paper

Assessing Mandatory Stay-at-Home and Business Closure Effects on the Spread of COVID-19

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Abstract

Background and Aims: The most restrictive non-pharmaceutical interventions (NPIs) for controlling the spread of COVID-19 are mandatory stay-at-home and business closures. Given the consequences of these policies, it is important to assess their effects. We evaluate the effects on epidemic case growth of more restrictive NPIs (mrNPIs), above and beyond those of less restrictive NPIs (lrNPIs).

Methods: We first estimate COVID-19 case growth in relation to any NPI implementation in subnational regions of 10 countries: England, France, Germany, Iran, Italy, Netherlands, Spain, South Korea, Sweden, and the US. Using first-difference models with fixed effects, we isolate the effects of mrNPIs by subtracting the combined effects of lrNPIs and epidemic dynamics from all NPIs. We use case growth in Sweden and South Korea, two countries that did not implement mandatory stay-at-home and business closures, as comparison countries for the other 8 countries (16 total comparisons).

Results: Implementing any NPIs was associated with significant reductions in case growth in 9 out of 10 study countries, including South Korea and Sweden that implemented only lrNPIs (Spain had a non-significant effect). After subtracting the epidemic and lrNPI effects, we find no clear, significant beneficial effect of mrNPIs on case growth in any country. In France, e.g., the effect of mrNPIs was +7% (95CI -5%-19%) when compared with Sweden, and +13% (-12%-38%) when compared with South Korea (positive means pro-contagion). The 95% confidence intervals excluded 30% declines in all 16 comparisons and 15% declines in 11/16 comparisons.

Conclusions: While small benefits cannot be excluded, we do not find significant benefits on case growth of more restrictive NPIs. Similar reductions in case growth may be achievable with less restrictive interventions.

Introduction

  The spread of COVID-19 has led to multiple policy responses that aim to reduce the transmission of the SARS-CoV-2. The principal goal of these so-called non-pharmaceutical interventions (NPI) is to reduce transmission in the absence of pharmaceutical options in order to reduce resultant death, disease, and health system overload. Some of the most restrictive NPI policies include mandatory stay-at-home and business closure orders ("lockdowns"). The early adoption of these more restrictive non-pharmaceutical interventions (mrNPIs) in early 2020 was justified because of the rapid spread of the disease, overwhelmed health systems in some hard-hit places, and substantial uncertainty about the virus' morbidity and mortality.[1]

  Because of the potential harmful health effects of mrNPI – including hunger[2], opioid-related overdoses[3], missed vaccinations[4,5], increase in non-COVID diseases from missed health services[6–9], domestic abuse[10], mental health and suicidality[11,12], as well as a host of economic consequences with health implications[13,14] – it is increasingly recognized that their postulated benefits deserve careful study. One approach to evaluating NPI benefits uses disease modeling approaches. One prominent modeling analysis estimated that, across Europe, mrNPIs accounted for 81% of the reduction in the effective reproduction number (R_t), a measure of disease transmission.[15] However, in the absence of empirical assessment of the policies, their effects on reduced transmission are assumed rather than assessed.[16,17] That analysis attributes nearly all the reduction in transmission to the last intervention, whichever intervention happened to be last, complete lockdowns in France, or banning of public events in Sweden.[16]

  Another, more empirically-grounded approach to assessing NPI effects uses statistical regression models and exploits variation in the location and timing of NPI implementations to identify changes in epidemic spread following various policies.[18] These empirical studies find large reductions in the growth rate of new cases that are attributable to NPIs. An important challenge with these analyses is that they use pre-policy growth rates to determine the "counterfactual" trajectory of new cases – the expected case growth rate in the absence of NPIs. This is problematic because it is widely recognized that epidemic dynamics are time-varying, and brakes on disease transmission occur without any interventions (through resolution of infections), as well as from behavior changes unrelated to the NPIs.[19,20] These epidemic dynamics are demonstrated by an analysis showing that

slowing of COVID-19 epidemic growth was similar in many contexts, in a way that is more consistent with natural dynamics than policy prescriptions.[21]

These challenges suggest that assessing the impact of mrNPIs is important, yet difficult. We propose an approach that balances the strengths of empirical analyses while taking into consideration underlying epidemic dynamics. We compare epidemic spread in places that implemented mrNPIs to counterfactuals that implemented only less-restrictive NPIs (lrNPIs). In this way, it may be possible to isolate the role of mrNPIs, net of lrNPIs *and* epidemic dynamics.

Here, we use Sweden and South Korea as the counterfactuals to isolate the effects of mrNPIs in countries that implemented mrNPIs as well as lrNPIs. Unlike most of its neighbors that implemented mandatory stay-at-home and business closures, Sweden's approach in the early stages of the pandemic relied entirely on lrNPIs, including social distancing guidelines, discouraging of international and domestic travel, and a ban on large gatherings.[22,23] South Korea also did not implement mrNPIs. Its strategy relied on intensive investments in testing, contact tracing, and isolation of infected cases and close contacts.[24,25]

Methods

We isolate the effect of more restrictive NPIs (mrNPIs) by comparing the combined effect size of all NPIs in eight countries that implemented more restrictive policies (England, France, Germany, Iran, Italy, the Netherlands, Spain, and the United States) with the effect size of all NPIs in the two countries that only implemented less restrictive NPIs (lrNPIs). In effect, we follow the general scheme:

$$Effects\ of\ mrNPI \\ = Effects\ of\ (mrNPI + lrNPI + epidemic\ dynamics) - Effects\ of\ (lrNPI + \\ epidemic\ dynamics)$$

We analyze only these countries because the analysis depends on sub-national data, which was only available for those countries, as explained further below.

The conceptual model underlying this approach is that, prior to meaningful population immunity, individual behavior is the primary driver of reductions in transmission rate, and that any NPI may provide a nudge towards individual behavior change, with response rates that vary between individuals and over time. lrNPIs could have large anti-contagion effects if individual behavioral

response is large, in which case additional, more restrictive NPIs may not provide much additional benefit. On the other hand, if lrNPIs provide relatively small nudges to individual behavior, then mrNPIs may result in large behavioral effects at the margin, and large reductions in the growth of new cases. However, because underlying epidemic dynamics are imprecisely characterized and are important for estimating the policy effects, our models test the extent to which mrNPIs had additional effect on reducing transmission by differencing the sum of NPI effects and epidemic dynamics in countries that did not enact mrNPIs from the sum of NPI effects and epidemic dynamics in countries that did.

We estimate the unique effects of mrNPIs on case growth rate during the northern hemispheric spring of 2020 in England, France, Germany, Iran, Italy, the Netherlands, Spain, and the United States by comparing the effect of NPIs in these countries to those in Sweden and South Korea (separately). The data we use builds on an analysis of NPI effects and consists of daily case numbers in subnational administrative regions of each country (e.g. regions in France, provinces in Iran, states in the US, and counties in Sweden), merged with the type and timing of policies in each administrative region.[18,26] We use data from a COVID-19 policy databank and previous analyses of policy impacts to determine the timing and location of each NPI.[18,27] Each observation in the data, then, is identified by the subnational administrative region and the date, with data on the number of cases on that date and indicators characterizing the presence of each policy. We include indicators for changes in case definitions or testing technologies to capture abrupt changes in case counts that are not the result of the underlying epidemic (these are mostly single-day indicators), as suggested in a previous analysis.[18]

We define the dependent variable as the daily difference in the natural log of the number of confirmed cases, which approximates the daily growth rate of infections (g). We then estimate the following linear models:

$$g_{cit} = \theta_{0,ci} + \delta_{ct} + \sum_{p=1}^{p_c} (\gamma_{pc} Policy_{pcit}) + \mu_{cit} + \varepsilon_{cit}$$

The model terms are indexed by country (c), sub-national unit (i), day (t), and NPI indicator (p). $\theta_{0,ci}$ are a series of fixed effects for the subnational unit, and δ_{ct} are country-specific day-of-week fixed effects. The parameters of interest are γ_{pc}, which identify the effect of each policy on the growth rate

in cases. The parameters μ_{cit} are the single-day indicators that model changes in case definitions that result in short discontinuities in case counts that are not due to underlying epidemic changes.

We estimate these models separately for each pair of countries (one with mrNPIs, one without), for a total of 16 models. We then add the coefficients of all the policies for the country with mrNPIs (yielding the combined effects of all NPIs in the mrNPI country) and subtract the combined effects of all NPIs in the comparator country without mrNPI. As noted above, the difference isolates the effect of mrNPIs on case growth rates. We estimate robust standard errors throughout, with clustering at the day-of-week level to account for serial correlation.

It is important to note that because the true number of infections is not visible in any country, it is impossible to assess the impact of national policies on transmission of new infections.[28] Instead, we follow other studies evaluating the effects of NPIs that use case numbers, implicitly assuming that their observed dynamics may represent a consistent shadow of the underlying infection dynamics.[18]

The code for the data preparation, analysis, and visualization is provided along with the article.

Results

The growth rate in new cases prior to implementation of any NPIs was positive in all study countries (Figure 1). The figure shows that, across all subnational units in all ten countries, the average growth rate prior to NPIs ranged from 0.23 in Spain (23% daily growth; 95CI 0.13 to 0.34) to 0.47 (95CI 0.39 to 0.55) in the Netherlands. The average across all 10 countries was 0.32, and in South Korea and Sweden, the two countries without mrNPIs, the pre-NPI growth rates were 0.25 and 0.33, respectively. The variation of pre-policy growth rates in cases may reflect epidemic intensity, testing coverage (higher growth may be a reflection of expanding testing capacity and of more people wishing to be tested), and pre-policy behavior changes that led to increased or decreased transmission.

Figure 2 and Figure 3 demonstrate the effects of individual NPIs (Figure 2) and all NPIs combined (Figure 3) on daily growth in case counts. While the effects of 3 individual NPIs were positive – that is, contributing paradoxically to case growth – and significant (one in Germany, one in Italy, and one in Spain, out of 51 individual NPIs in all 10 countries), the effects of about half of individual NPIs were negative and significant. The combined effects of all NPIs (Figure 3) were

negative and significant in 9 out of 10 countries, where their combined effects ranged from -0.10 (95CI -0.06 to -0.13) in England to -0.33 (95CI -0.09 to -0.57) in South Korea. Spain was the only country where the effect of NPIs was not distinguishable from 0 (-0.02; 95CI -0.12 to 0.07).

Figure 4 shows the effect of mrNPIs in the 8 countries where mrNPIs were implemented, after accounting for the effects of lrNPIs and underlying epidemic dynamics. In none of the 8 countries and in none out of the 16 comparisons (against Sweden or South Korea) were the effects of mrNPIs significantly negative (beneficial). The point estimates were positive (point in the direction of mrNPIs resulting in increased daily growth in cases) in 12 out of 16 comparisons (significantly positive in 3 of the 12, in Spain and in England compared with Sweden). The only country where the point estimates of the effects of mrNPIs were negative in both comparisons was Iran (-0.07 [95CI -0.21 - 0.07] compared with Sweden; -0.02 [95CI -0.28 - 0.25] compared with South Korea). The 95% confidence intervals excluded a 30% reduction in daily growth in all 16 comparisons.

Discussion

In the framework of this analysis, there is no evidence that more restrictive non-pharmaceutical interventions ("lockdowns") contributed substantially to bending the curve of new cases in England, France, Germany, Iran, Italy, the Netherlands, Spain, or the United States in early 2020. By comparing the effectiveness of NPIs on case growth rates in countries that implemented more restrictive measures with those that implemented less restrictive measures, the evidence points away from indicating that mrNPIs provided additional meaningful benefit above and beyond lrNPIs. While modest decreases in daily growth (under 30%) cannot be excluded in a few countries, the possibility of large decreases in daily growth due to mrNPIs is incompatible with the accumulated data.

The direction of the effect size in most scenarios point towards an *increase* in the case growth rate, though these estimates are only distinguishable from zero in Spain (consistent with non-beneficial effect of lockdowns). Only in Iran do the estimates consistently point in the direction of additional reduction in the growth rate, yet those effects are statistically indistinguishable from zero. While it is hard to draw firm conclusions from these estimates, they are consistent with a recent analysis that identified increase transmission and cases in Hunan, China during the period of stay-at-

home orders from increased intra-household density and transmission.[29] In other words, it is possible that stay-at-home orders may facilitate transmission if they increase person-to-person contact where transmission is efficient such as closed spaces.

Our study builds on the findings of overall effectiveness of NPIs in reducing case growth rate. This has a plausible underlying behavioral mechanism: NPIs are motivated by the notion that they lead to anti-contagion behavior changes, either directly through personal compliance with the interventions, or by providing a signal about disease risk, as communicated by policy makers, which is used in deciding on individual behaviors. The degree to which risk communications motivate personal behaviors has been used to explain South Korea's response to NPIs, where large personal behavior changes were observed following less restrictive NPIs.[30]

This analysis ties together observations about the possible effectiveness of NPIs with COVID-19 epidemic case growth changes that appear surprisingly similar despite wide variation in national policies.[31–33] Our behavioral model of NPIs – that their effectiveness depends on individual behavior for which policies provide a noisy nudge – help explain why the degree of NPI restrictiveness does not seem to explain the decline in case growth rate. Data on individual behaviors such as visits to businesses, walking, or driving show dramatic declines days to weeks prior to the implementation of business closures and mandatory stay-at-home orders in our study countries, consistent with the behavioral mechanisms noted above.[34–36] These observations are consistent with a model where the severity of the risk perceived by individuals was a stronger driver of anti-contagion behaviors than the specific nature of the NPIs. In other words, reductions in social activities that led to reduction in case growth were happening prior to implementation of mrNPIs because populations in affected countries were internalizing the impact of the pandemic in China, Italy, and New York, and noting a growing set of recommendations to reduce social contacts, all of which happened before mrNPIs. This may also explain the highly variable effect sizes of the same NPI in different countries. For example the effects of international travel bans were positive (unhelpful) in Germany and negative (beneficial) in the Netherlands (Figure 2).

While this study casts doubt on any firm conclusions about the effectiveness of restrictive NPIs, it also underscores the importance of more definitive evaluations of NPI effects. NPIs can also

have harms, besides any questionable benefits, and the harms may be more prominent for some NPIs than for others. For example, school closures may have very serious harms, estimated at an equivalent of 5.5 million life years for children in the US during the spring school closures alone.[37] Considerations of harms should play a prominent role in policy decisions, especially if an NPI is ineffective at reducing the spread of infections. Of note, Sweden did not close primary schools throughout 2020 as of this writing.

While we find no evidence of large anti-contagion effects from mandatory stay-at-home and business closure policies, we should acknowledge that the underlying data and methods have important limitations. First, cross-country comparisons are difficult: countries may have different rules, cultures, and relationships between the government and citizenry. For that reason, we collected information on all countries for which subnational data on case growth was obtainable. Of course, these differences may also exist across subnational units, as demonstrated in the case of different states in the US. Additional countries could provide more evidence, especially countries that had meaningful epidemic penetration and did not use mrNPIs for epidemic control. Second, confirmed case counts are a noisy measure of disease transmission. Testing availability, personal demand for or fear of getting tested, testing guidelines, changing test characteristics, and viral evolution all interfere in the relationship between the underlying infections and case counts. Because the location and timing of policies is endogenous to perceived epidemic stage, the noise in case counts is associated with the policies, making bias possible and very difficult to eradicate. The fixed effects approach provides unbiased estimates so long as the location or timing of policies is quasi-arbitrary with respect to the outcome. This may fail to hold in this assessment of NPI effects because the underlying epidemic dynamics are non-linear, and the policies respond to – and modify – the epidemic stage. This limitation also holds for all other empirical assessments of NPI effects.[18]

Third, our findings rest on a conceptualization, common in the literature, of NPIs as "reduced-form" interventions: an upstream policy has expected downstream effects on transmission. This allows us to use Sweden and South Korea as comparators, since they had applied less-restrictive interventions, which then enables netting out the combined effect of lrNPIs and the underlying epidemic dynamics. While contextual factors that mediate the effects of NPIs are important –

countries implemented different variants of the same NPI, and the population responded differently – many analyses examining the effects of NPIs have a similar "reduced-form" structure.[18,31,38] In that sense our comparison is positioned squarely within the literature on the effects of NPIs.

During the northern hemisphere fall and winter of 2020, many countries, especially in Europe and the US, experienced a large wave of COVID-19 morbidity and mortality. Those waves were met with new (or renewed) NPIs, including mrNPIs in some countries (e.g. England) and lrNPIs in others (e.g. Portugal) that had used mrNPIs in the first wave. The spread of infections in countries that were largely spared in the spring (e.g. Austria and Greece) further highlight the challenges and limited ability of NPIs to control the spread of this highly transmissible respiratory virus. Empirical data for the characteristics of fatalities in the later wave before mrNPIs were adopted as compared with the first wave (when mrNPIs had been used) shows that the proportion of COVID-19 deaths that occurred in nursing homes was often higher under mrNPIs rather than under less restrictive measures.[39] This further suggest that restrictive measures do not clearly achieve protection of vulnerable populations. Some evidence also suggests[40] that sometimes under more restrictive measures, infections may be more frequent in settings where vulnerable populations reside relative to the general population.[40]

In summary, we fail to find strong evidence supporting a role for more restrictive NPIs in the control of COVID in early 2020. We do not question the role of all public health interventions, or of coordinated communications about the epidemic, but we fail to find an additional benefit of stay-at-home orders and business closures. The data cannot fully exclude the possibility of some benefits. However, even if they exist, these benefits may not match the numerous harms of these aggressive measures. More targeted public health interventions that more effectively reduce transmissions may be important for future epidemic control without the harms of highly restrictive measures.

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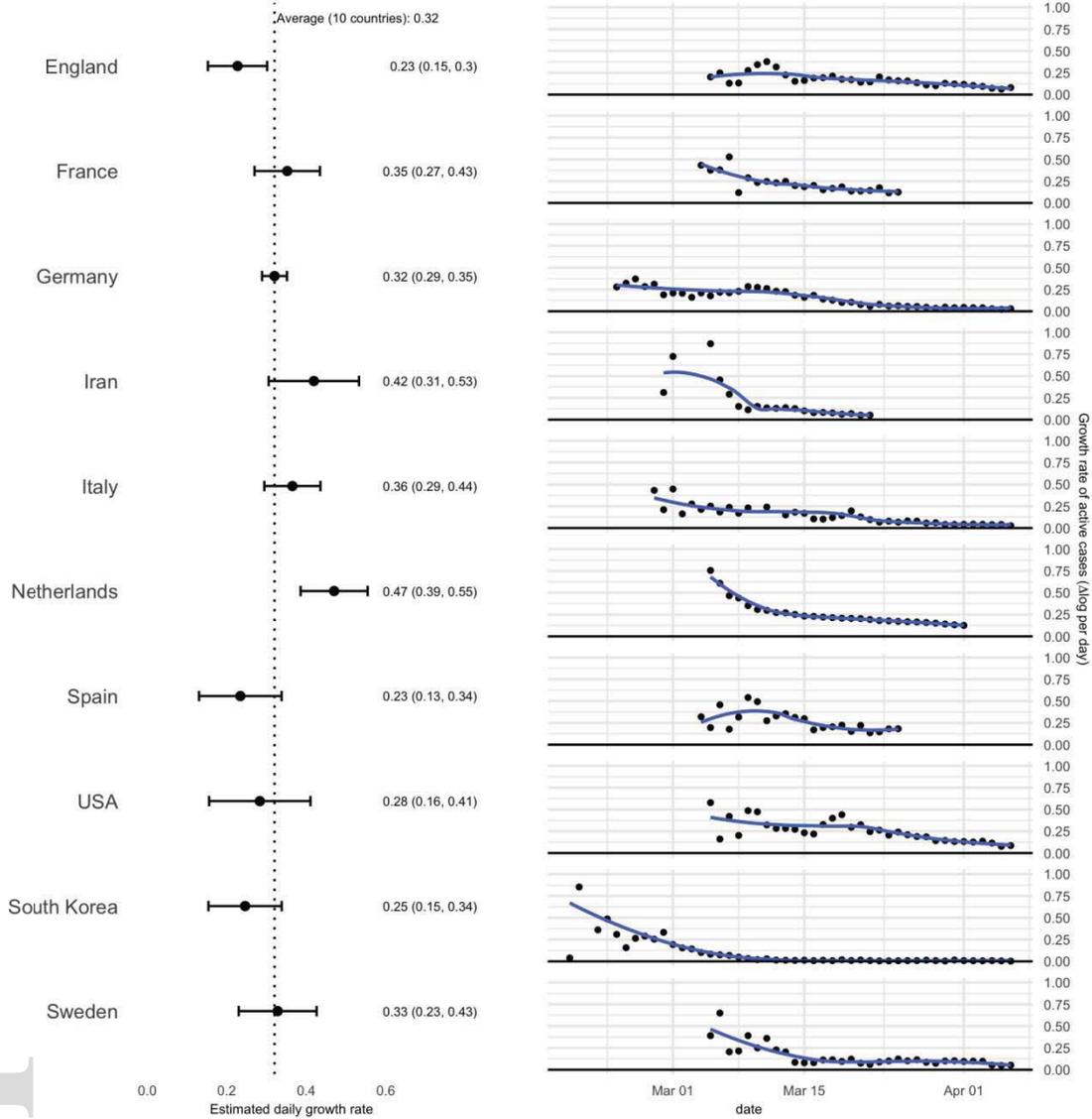
Figures

Figure 1: Growth rate in cases for study countries. The black bars demonstrate the average growth rate in cases in each subnational unit (95% CI) prior to any policies implemented. The figures to the right show the daily growth rate in cases for each of the countries and demonstrate the shared decline in case growth across all countries, including the countries that did not implement mrNPIs (South Korea and Sweden).
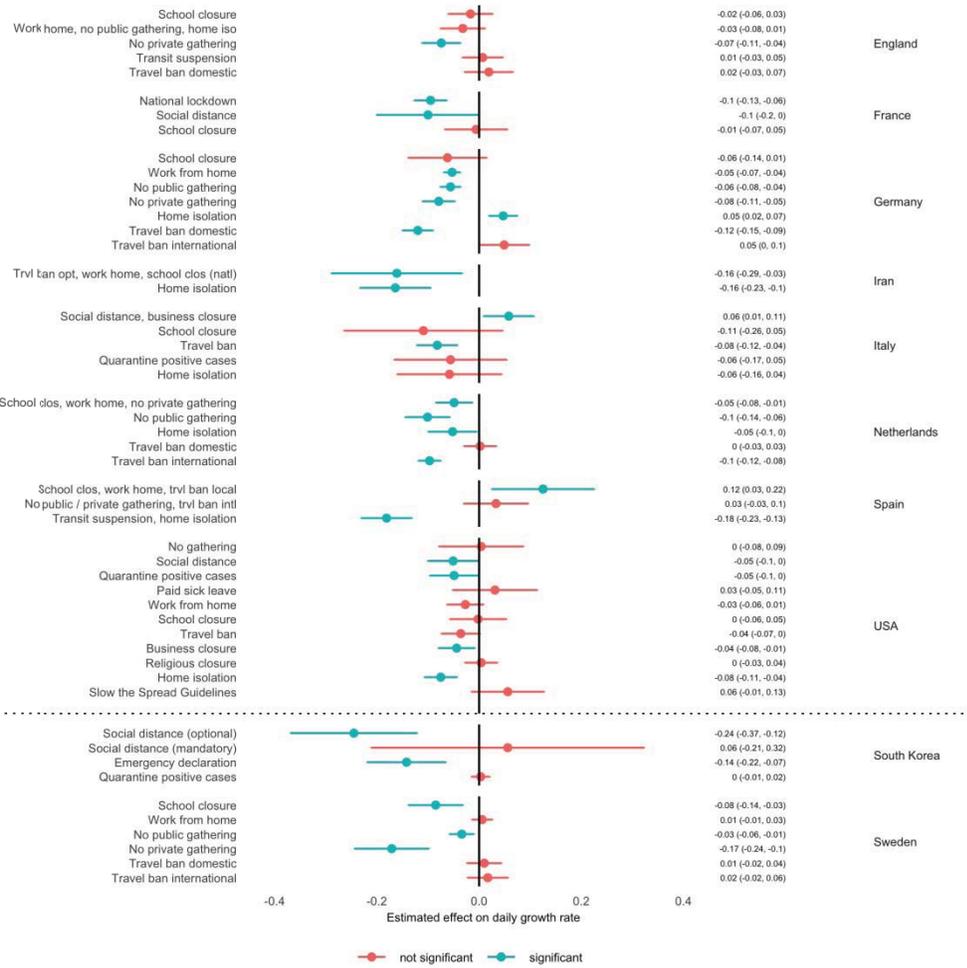
Figure 2: Effects of individual NPIs in all study countries. The variation in the timing and location of NPI implementation allows us to identify the effects of individual NPIs on the daily growth rate of cases. Where multiple NPIs were implemented simultaneously (in the same day) across all subnational units (e.g. school closure, work from home, and no private gatherings in Spain), their overall effect cannot be identified individually and is shown combined.
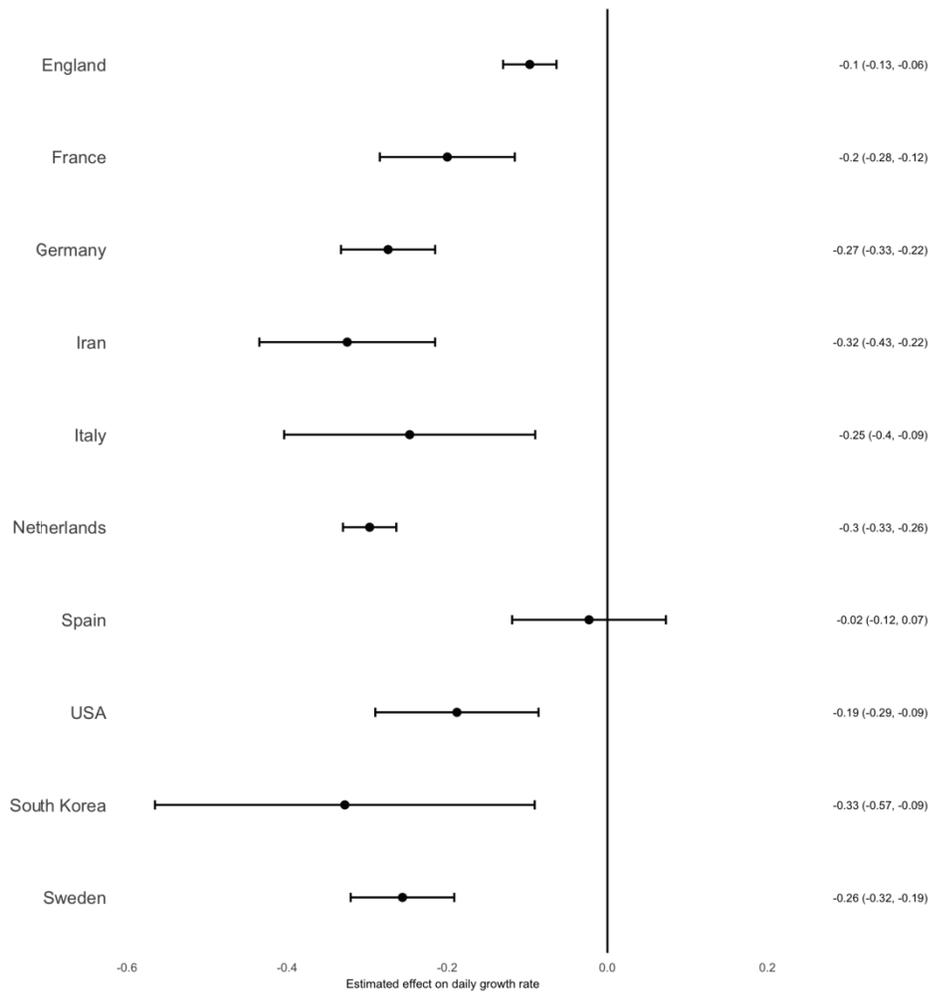
Figure 3: Combined effects of all NPIs in study countries. The point estimate and 95% CI of the combined effect of NPIs on growth rate in cases, estimated from a combination of individual NPIs. The estimates show significant effects in all countries except Spain, and range from a 33% (9-57%) decline in South Korea to 10% (6%-13%) in England. The point estimate of the effect in Spain is also negative but small (2%) and not significant.
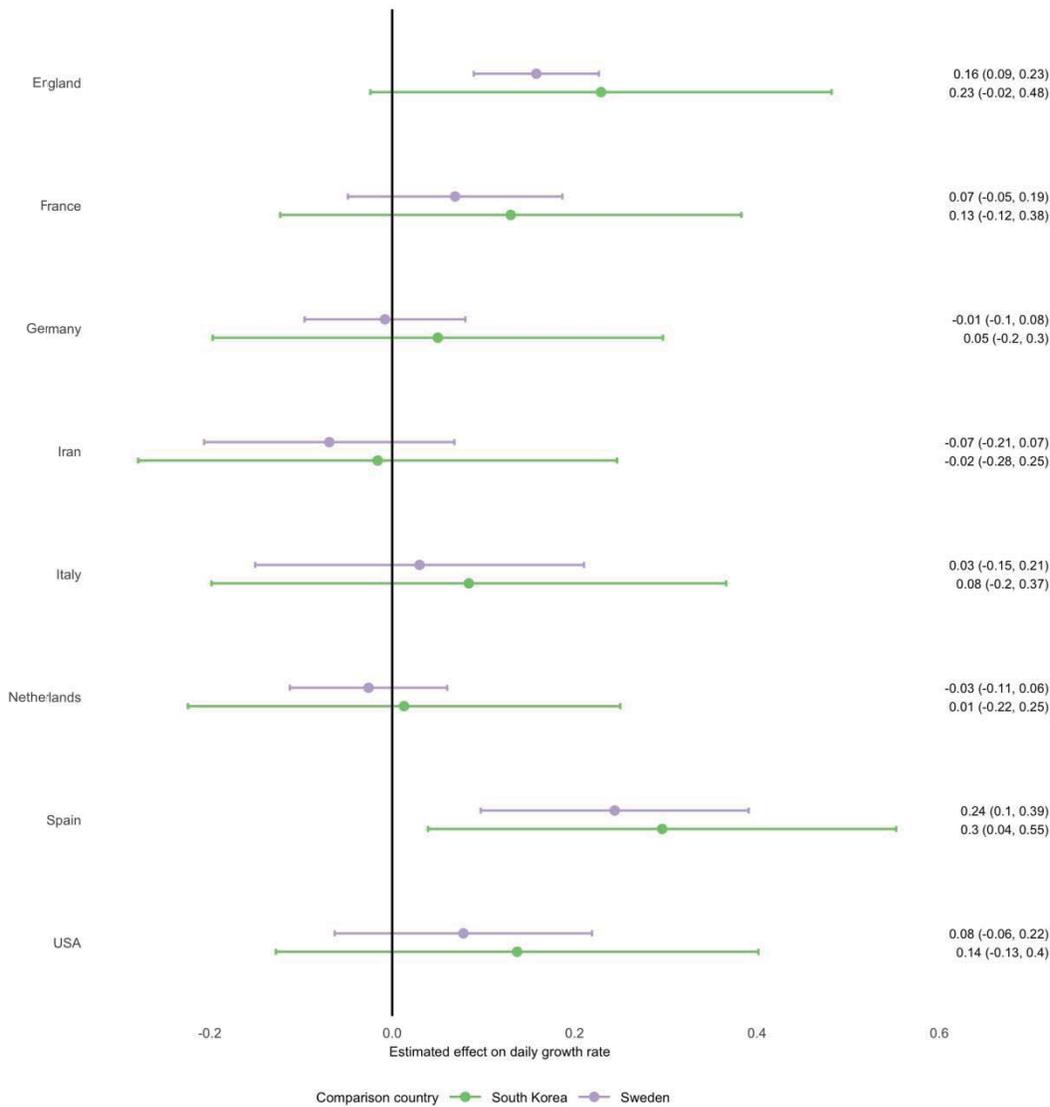
Figure 4: Effect of mrNPIs on daily growth rates after accounting for the effects of lrNPIs in South Korea and Sweden. Under no comparison is there evidence of reduction in case growth rates from mrNPIs, in any country. The point estimates are positive (point in the direction of mrNPIs resulting in *increased* daily growth in cases) in 12 out of 16 comparisons.