

## Science News

from research organizations

### Warmer temperatures lessen COVID-19 spread, but control measures still needed, study finds

*Date:* June 9, 2021

*Source:* Imperial College London

*Summary:* New research shows transmission of the virus behind COVID-19 varies seasonally, but warmer conditions are not enough to prevent transmission.

*Share:* [!\[\]\(17413706fd4997a1a4bdf85c6864eee1\_img.jpg\)](#) [!\[\]\(f419710cbe076aa30a9c6c031b5cbe84\_img.jpg\)](#) [!\[\]\(2726020a4107bdc9042b257034f90eb3\_img.jpg\)](#) [!\[\]\(9459655bf14a84f4d775e8d814cca8c9\_img.jpg\)](#) [!\[\]\(de47dbdca34225b222a4a87ac0e499b3\_img.jpg\)](#)

#### FULL STORY

New research shows transmission of the virus behind COVID-19 varies seasonally, but warmer conditions are not enough to prevent transmission.

The study, led by Imperial College London researchers and published today in *Proceedings of the National Academy of Sciences*, is the first to incorporate environmental data into epidemiological models of the transmission of SARS-CoV-2, the virus behind COVID-19.

The team show that temperature and population density are the most important factors determining how easily the virus spreads, but only in the absence of mobility-restricting measures, such as lockdowns.

First author of the study Dr Tom Smith, from the Department of Life Sciences at Imperial, said: "Our results show that temperature changes have a much smaller effect on transmission than policy interventions, so while people remain unvaccinated, governments mustn't drop policies like lockdowns and social distancing just because a seasonal change means the weather is warming up.

"However, our work also suggests that lower autumn and winter temperatures may lead to the virus spreading more easily in the absence of policy interventions or behavioural changes."

#### Quantifying seasonal variation

Seasonal variation has been a source of uncertainty in forecasts of SARS-CoV-2 transmission. Other viruses, like flu viruses and other coronaviruses, are known to be affected by environmental factors. For example, high temperatures and low humidity reduce the transmission of respiratory droplets, preventing the spread of flu. High temperatures are also known to inactivate other coronaviruses in the air and on surfaces.

However, quantifying the effects of environmental factors including temperature, humidity, and UV radiation (sunshine) on SARS-CoV-2 transmission has been difficult during the pandemic, since human factors like population density and behaviour have been the main drivers of transmission.

The differences in interventions and case-counting between countries and regions also makes comparing environmental factors on a global scale difficult, especially as some countries, like Brazil, India and Iran, have high transmission despite having warmer climates.

As a result, few epidemiological models have included environmental data, and those that do assume the response of SARS-CoV-2 is identical to other coronaviruses, as there is a lack of SARS-CoV-2-specific data.

To fill this gap, the team, from the Departments of Life Sciences and Mathematics at Imperial, as well as Imperial's MRC Centre for Global Infectious Disease Analysis, and Utah State University, compared transmission across the USA. The country has a large range of climates with comparable policies and case numbers, allowing the impact of environmental factors to be teased out.

They found strong evidence that lower temperature and higher population density are both associated with higher SARS-CoV-2 transmission.

The effect of temperature, although significant, was small. In the team's models, each degree Celsius of increase in temperature decreased the R number by approximately 0.04. That means that a 20°C difference, such as the difference between winter and summer temperatures, could equate to a difference in R of around 0.8.

However, any impact of weather can be negated by interventions like lockdown.

### **Policy and behaviour**

Lead researcher Dr Will Pearse, from the Department of Life Sciences at Imperial, said: "While temperature and population density do influence SARS-CoV-2 transmission, our findings re-confirm that the most important drivers are public policy and individual behaviour. For example, during lockdowns, there was no meaningful signature of temperature influencing transmission.

"This means, for example, that warmer regions should not expect to ease mobility restrictions before colder regions. This is especially true as warmer regions tend to have higher population densities -- for example, the population in Florida is more densely packed than in Minnesota."

The researchers are now extending their study to new variants, and say their environmental results should be incorporated into future forecasts to enhance predictions of disease spread.

Study co-author Dr Ilaria Dorigatti, from the MRC Centre for Global Infectious Disease Analysis at Imperial, said: "We found evidence that, in the early phases of the pandemic, places with colder temperatures were associated with higher SARS-CoV-2 transmission intensities. However, the effect of climatic seasonality on SARS-CoV-2 transmission is weaker than the effect of population density and in turn, of policy interventions.

"This implies that, as we move towards summer in the Northern Hemisphere, public health policy decisions remain of critical importance for epidemic control and adherence to recommendations will continue to play a key role against SARS-CoV-2 transmission."

---

### Story Source:

Materials provided by **Imperial College London**. Original written by Hayley Dunning. *Note: Content may be edited for style and length.*

---

### Journal Reference:

1. Thomas P. Smith, Seth Flaxman, Amanda S. Gallinat, Sylvia P. Kinosian, Michael Stemkovski, H. Juliette T. Unwin, Oliver J. Watson, Charles Whittaker, Lorenzo Cattarino, Ilaria Dorigatti, Michael Tristem, William D. Pearse. **Temperature and population density influence SARS-CoV-2 transmission in the absence of nonpharmaceutical interventions**. *Proceedings of the National Academy of Sciences*, 2021; 118 (25): e2019284118 DOI: 10.1073/pnas.2019284118
- 

### Cite This Page:

MLA	APA	Chicago
-----	-----	---------

---

Imperial College London. "Warmer temperatures lessen COVID-19 spread, but control measures still needed, study finds." ScienceDaily. ScienceDaily, 9 June 2021.  
<[www.sciencedaily.com/releases/2021/06/210609115549.htm](http://www.sciencedaily.com/releases/2021/06/210609115549.htm)>.

### RELATED STORIES

---

Face Masks Effectively Limit SARS-CoV-2 Transmission

May 21, 2021 — A new study shows how face masks reduce the effective reproduction number of COVID-19, and why their efficacy varies between different environments under virus-limited and virus-rich ...

## Advanced Simulations Reveal How Air Conditioning Spreads COVID-19 Aerosols

Feb. 9, 2021 — A restaurant outbreak in China was widely reported as strong evidence of airflow-induced transmission of COVID-19, but it lacked a detailed investigation about exactly how transmission occurred. ...

## Newer Variant of COVID-19-Causing Virus Dominates Global Infections

July 2, 2020 — New research shows that a specific change in the SARS-CoV-2 coronavirus virus genome, previously associated with increased viral transmission and the spread of COVID-19, is more infectious in cell ...

## Warmer Temperatures Slow COVID-19 Transmission, but Not by Much

June 1, 2020 — Researchers looked at the impact of temperature, precipitation, and UV index on COVID-19 case rates in the United States during the spring months of 2020. The findings reveal that while the rate of ...

### FROM AROUND THE WEB

---

*ScienceDaily shares links with sites in the TrendMD network and earns revenue from third-party advertisers, where indicated.*

### **The Seasonal End of Human Coronavirus Hospital Admissions with Implications for SARS-CoV-2**

Alan T Evangelista, JMIR Preprints, 2020

### **Covid-19: Four in 10 cases in Italian town that locked down early were asymptomatic**

Elisabeth Mahase, The BMJ: Research, 2020

### **Is SARS CoV-2 a new Frankenstein monster virus?**

Mohammed El-Magd, JMIR Preprints, 2020

### **Viewpoint\_SARS-CoV-2 Biology Suggests We Should Protect Our Young Population**

Laura Lafon-Hughes, JMIR Preprints, 2020

### **The Potential of Digital Symptom-based Screening to Reduce the Transmission of SARS-CoV-2: a Modelling Study**

JMIR Preprints

### **Temperature, Humidity, and Latitude Analysis to Estimate Potential Spread and Seasonality of Coronavirus Disease 2019 (COVID-19)**

Mohammad M. Sajadi et al., JAMA Network Open, 2020

**This page contains a comprehensive list of monographs for the treatment of viral infections including HIV, hepatitis, and influenza. Reviewed and updated by a team of pharmacists, our drug database contains over 4,000 concise product monographs for both prescription and over the counter (OTC) drugs. Each monograph includes indication, dose, contraindications, precautions, warnings, interactions, adverse reactions, manufacturer, and how supplied information.**

Cardiology Advisor

### **Cell-Free DNA May Be Involved in Disease Pathophysiology in Sickle Cell Disease**

Cardiology Advisor, 2020

## Free Subscriptions

---

Get the latest science news with ScienceDaily's free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

 [Email Newsletters](#)

 [RSS Feeds](#)

## Follow Us

---

Keep up to date with the latest news from ScienceDaily via social networks:

 [Facebook](#)

 [Twitter](#)

 [LinkedIn](#)

## Have Feedback?

---

Tell us what you think of ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

 [Leave Feedback](#)

 [Contact Us](#)

[About This Site](#) | [Staff](#) | [Reviews](#) | [Contribute](#) | [Advertise](#) | [Privacy Policy](#) | [Editorial Policy](#) | [Terms of Use](#)

Copyright 2021 ScienceDaily or by other parties, where indicated. All rights controlled by their respective owners. Content on this website is for information only. It is not intended to provide medical or other professional advice. Views expressed here do not necessarily reflect those of ScienceDaily, its staff, its contributors, or its partners.

Financial support for ScienceDaily comes from advertisements and referral programs, where indicated.

— [CCPA: Do Not Sell My Information](#) — — [GDPR: Privacy Settings](#) —