



Scientists do the math to show how large events like March Madness could spread coronavirus

March 12, 2020

By Maureen Downey

Georgia Tech prof and colleagues explain why and how large gatherings pose real risks

Critics who contend canceling March Madness and other large events to prevent the coronavirus is overkill may change their minds after reading the math behind it.

Joshua S. Weitz is a professor of biological sciences at the Georgia Institute of Technology and founding director of the Quantitative Biosciences Ph.D. program at Georgia Tech. His co-authors on this fascinating column are [Richard Lenski](#), National Academy of Sciences member from Michigan State University, [Lauren Meyers](#),

©2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). Learn about careers at [Cox Enterprises](#).

[Need Help?](#)



Here, they explain a mathematical model that illustrates why banning large events helps in the midst of an epidemic.

By Joshua S. Weitz, Richard E. Lenski, Lauren A. Meyers, Jonathan Dushoff

More than 75,000 fans were planning to travel from around the United States (and beyond) to crowd the Mercedes Benz stadium in downtown Atlanta on April 4 and April 6 to watch the NCAA Basketball Championship and the culmination of March Madness. But, on Wednesday, the [NCAA restricted](#) the presence of fans at all tournament games in light of the growing COVID-19 threat.

We believe this was a prudent decision and that similarly painful decisions will be made in the weeks ahead.

Credible reporting in incredible times. Support local journalism.

SUBSCRIBE NOW

It comes down to simple probability.

Even if only a few individuals have COVID-19, the collective chance that one (or more) infected people show up at a large gathering can rapidly approach 100%.

For context, as of March 11, 2020, the CDC reported a cumulative total of [938 confirmed COVID-19 cases](#) nationwide across 39 states including the District of Columbia. On the same day, health departments across the country reported a cumulative total of 1,100 lab-confirmed cases with more than 500 pending

©2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). Learn about careers at [Cox Enterprises](#).

[Need Help?](#)



Based on data from Wuhan, China and Italy, the number of new cases is expected to double approximately every week if social distancing and other control measures are not enacted. Hence, the 2,000 or so cases right now (assuming an approximately 2:1 undercount) may rise to 20,000 cases by early April.

Moreover, COVID-19 seems to be quite mild and possibly asymptomatic in some people, making their infections very hard to detect. Indeed, some experts (including [Alex Perkins](#) of Notre Dame University) speculate that cumulative incidence may be 20,000 cases already.

This would mean there may be upwards of 200,000 circulating cases nation-wide by early April. The super-spreading event at a recent [Biogen conference](#) in Boston (with more than 70 confirmed cases) provides a stark demonstration of potential risks of large gatherings. What then is the chance that one (or more) fans will enter an arena already infected with COVID-19 for a night of hockey, basketball, soccer, wrestling, or music?

To answer this kind of question, we actually calculate the opposite, returning to the example of March Madness and asking: what is the chance that none of the 75,000 attendees is infected?

Let's start by thinking about just one of them. If 20,000 of the 330 million people in the United States are sick, then each person has a 99.994% chance of being disease-free. In betting terms, the odds are 16,500:1 in our favor. While that sounds good from an individual perspective, the collective risk is very different.

©2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). Learn about careers at [Cox Enterprises](#).

Need Help?



certain odds. Sure, you'll win most of the bets. But the probability that you will win every single one of those bets is extremely low. To calculate it, we multiply the winning probability ($1-1/16500$) by itself 75,000 times and find that there is approximately a 1% chance that we win every time. In other words, the chances that one or more attendees would have arrived infected with SARS-CoV-2 is 99%.

To print the document, click the "Original Document" link to open the original PDF. At this time it is not possible to print the document with annotations.

All it takes is just one “losing” bet. The bigger the crowd, the more chances there are to lose. Given these odds, we believe the NCAA’s decision was warranted.

The negative impacts of cancelling large-scale events are real – and include social and economic hardships that are often disproportionately felt by those unable to

©2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). [Learn about careers at Cox Enterprises](#).

[Need Help?](#)



throughout the United States and beyond.

The recent cancellation of SXSW in Austin, suspension of the NBA season, and closures of several university campuses are among a growing list of costly measures taken to minimize risk locally and globally.

As the cases of COVID-19 continue to climb, the size of what is considered a tolerably “large” gathering will shrink. The basic math may point cities, communities and schools towards difficult and unpopular decisions to protect public health. At this point in the unfolding pandemic, the cancellation of large events will help to protect us and our loved ones and slow the global expansion of the disease.

We can all do our part by washing our hands, reducing the number and closeness of our social interactions, isolating ourselves if and when we feel sick, and stepping away from mass gatherings until we find ourselves on the other side of this epidemic threat.

Support real journalism. Support local journalism. Subscribe to The Atlanta Journal-Constitution today. [See offers](#).

About the Author



Maureen Downey

Maureen Downey has written editorials and opinion pieces about local, state and

©2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). Learn about careers at [Cox Enterprises](#).

[Need Help?](#)



National World News | 7 days ago

Tyler Perry says his longtime girlfriend will 'get her share' of his wealth

AJC

Looking for some family fun? Here are the most popular games for every age group

Radio & Tv Talk Blog | 18 hours ago

Jarard J laid off from Majic 107.5/97.5

Metro Atlanta State News | 18 hours ago

OPINION: Another victim of the Tokars murder, decades later

National World News | Yesterday

Black men wearing COVID-19 masks at store reportedly booted out for not removing

Leo Vegas | Sponsored

Casinos Don't Expect You to Do This. But They Can't Stop You

Loan Insurance Wealth | Sponsored

Chrissy Metz Is So Skinny Now And Looks Like A Model - We Can't Stop Staring

Daily Finance Stories | Sponsored

Honey Boo Boo Is So Skinny Now And Looks Like A Barbie

CHIP Reverse Mortgage Quotes | Sponsored

More Canadians 55+ are Qualifying for this Type of Mortgage in 2020

©2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). Learn about careers at [Cox Enterprises](#).

[Need Help?](#)



Jackpot Secrets | Sponsored

Canada Casinos Hate This Trick Because It Pays Millions To Burlington Players

InvestmentGuru | Sponsored

At 88, Barbara Eden Leaves Nothing To The Imagination

Better Be | Sponsored

Hilarious Ways Celebs Have Tried to Hide From Paparazzi.

Thegreatestlists | Sponsored

This house is only 32 m2, but the interior will amaze you

Total Battle - Online Strategy Game | Sponsored

Become a Mighty Chieftain in Strategy Game of 2020

NinjaJournalist | Sponsored

35 Resignation Letters That Are More Inspirational Than Anything

Stuff Answered | Sponsored

5 Luxury Cars So Amazing You Won't Believe They Cost Under \$50k

National World News | Yesterday

‘I was wrong’: Dr. Drew apologizes for dismissing the

Crime | Yesterday

Police shoot, kill suspect after 3 workers stabbed to death

1

Trend Chaser | Sponsored

Remember Meg Ryan? See Where She's Living Now

Solar Estimate | Sponsored

Check Out News Anchor’s Annual Salary

©2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). Learn about careers at [Cox Enterprises](#).

Need Help?



She sticks a rose stalk into a potato and look what happens a week later! Amazing!

Directexpose.com | Sponsored

35 Celebs Who Are Gay - No.15 Will Shock Men

Atlantic Mirror | Sponsored

This Is What Liza Minnelli's Derelict Beverly Hills Mansion Looks Like Inside

Anti-Snore Wristband | Sponsored

If You Snore, You Should Check Out This Device

Planet Capture | Sponsored

Play this new game for 1 Minute and see why everyone is addicted

History A2Z | Sponsored

Dad Takes Family Photo, Doesn't Notice Background

TheMostViral.com | Sponsored

What Is The Creepiest Abandoned Stadium In The Entire World?

Sky-Elite-News | Sponsored

Husband Illustrates Everyday Life With Wife In 19 Pictures

Skillnesse | Sponsored

How to Make Money Online Without Selling Anything

WorldHistoryMag.com | Sponsored

57 Vintage Photos That Took It Way Too Far

History Nut | Sponsored

©2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). [Learn about careers at Cox Enterprises](#).

Need Help?



Wayfair Canada | Sponsored

5 Pieces of Furniture You Need to Own Right Now

AJC

Atlanta. News. Now.

The Atlanta Journal-Constitution

About

Sign up for our newsletters 



Contact



Subscriptions



Products



© 2020 The Atlanta Journal-Constitution. All Rights Reserved. By using this website, you accept the terms of our [Visitor Agreement](#) and [Privacy Policy](#), and understand your options regarding [Ad Choices](#). [Learn about careers at Cox Enterprises](#).