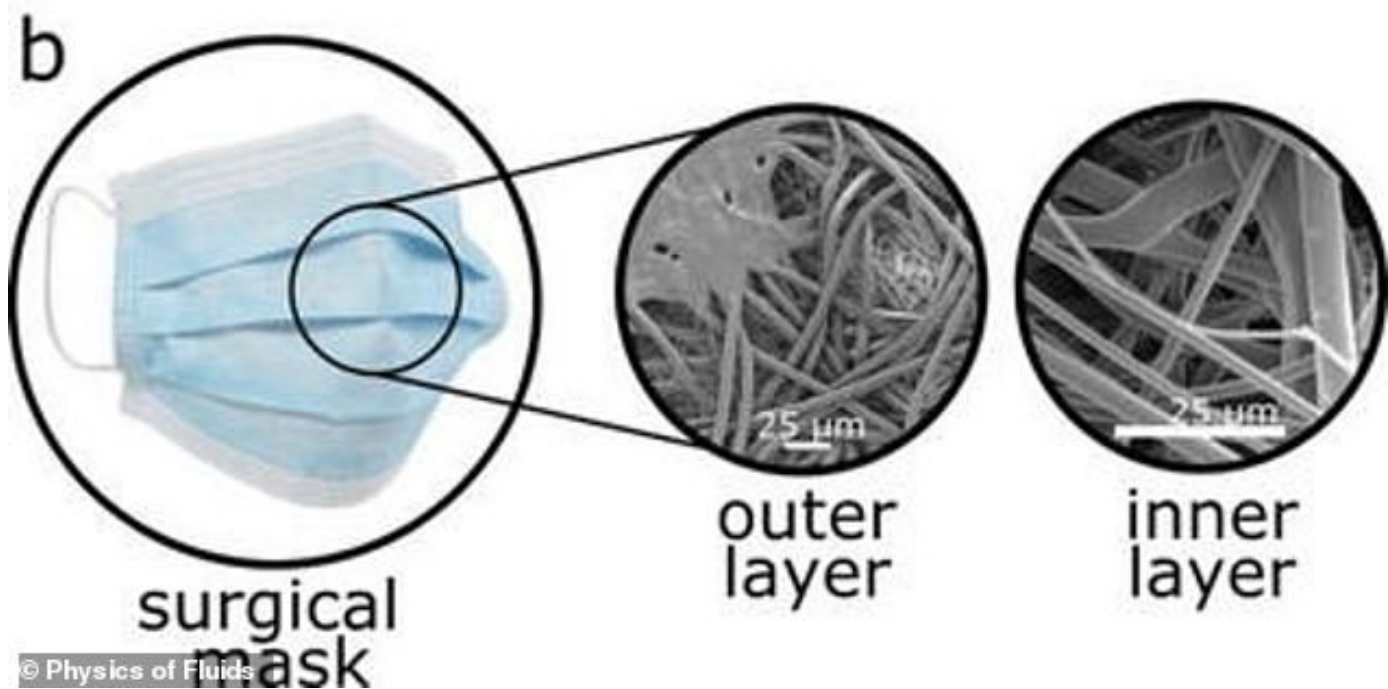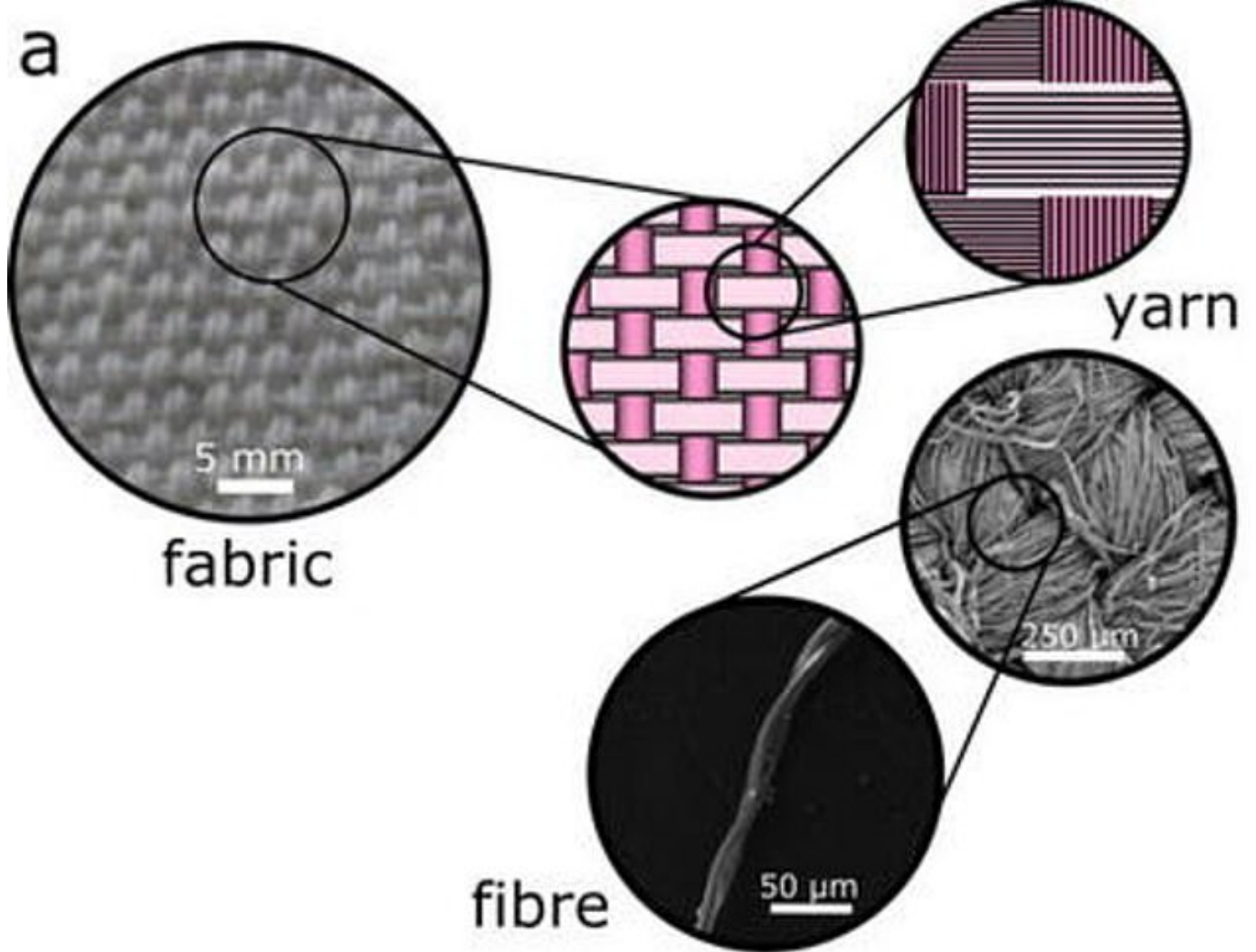# Cloth masks allow 90% of particles to filter through

Cloth masks do little to prevent the spread of [COVID-19](#), or other airborne diseases, a new study finds.

Researchers from the University of Bristol in the United Kingdom found that 90 percent of particles could get through cloth masks, making them effectively useless during the pandemic.

Cloth masks have been popular in the U.S., as they are easily reusable after washing and at some points were the most accessible due to shortages and high prices for surgical or N95 masks.

Now, though, experts have discovered that these masks were doing little if anything to actually stop the spread of the virus, and likely contributed to spread as people who believed they were acting safely were not doing so.

a

fabric — 5 mm

yarn

fibre — 50 µm — 250 µm

b

surgical mask

outer layer — 25 µm

inner layer — 25 µm

© Physics of Fluids

Researchers found that cloth masks only block an estimated 10 percent of all particles from getting through. Because cloth masks are made of tightly woven yarn (top) unlike surgical and other kind of masks that are made to filter particles (bottom) they are not as protective against Covid

Researchers do not recomend surgical masks either because they are not well fitting and often leave gaps that allow should-be filtered particles to escape

Researchers, who published their findings Tuesday in [Physics of Fluids](), built an airflow simulation using 3d imaging to gauge how well different masks used during the pandemic filtered particles.

They note that unlike N95 or surgical masks, cloth masks are not built using material made to filter out particles.

Cloth masks are made out of tightly woven fabrics. While not visible to the eye, small gaps in the fabric are enough to allow for a vast majority of particles to get through.
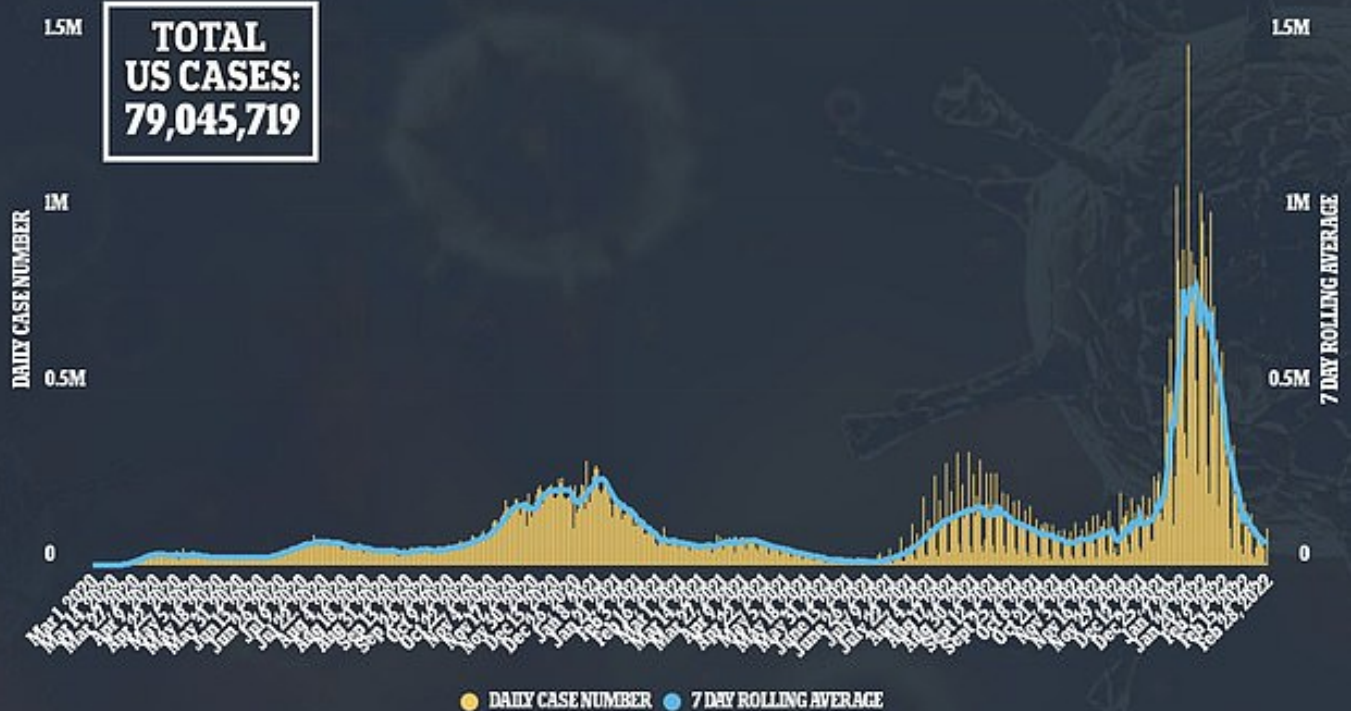
'Masks are air filters, and woven fabrics, such as cotton, make for good jeans, shirts, and other apparel, but they are lousy air filters,' Richard Sear, co-author of the study and physicist at Surrey University, said in a statement.

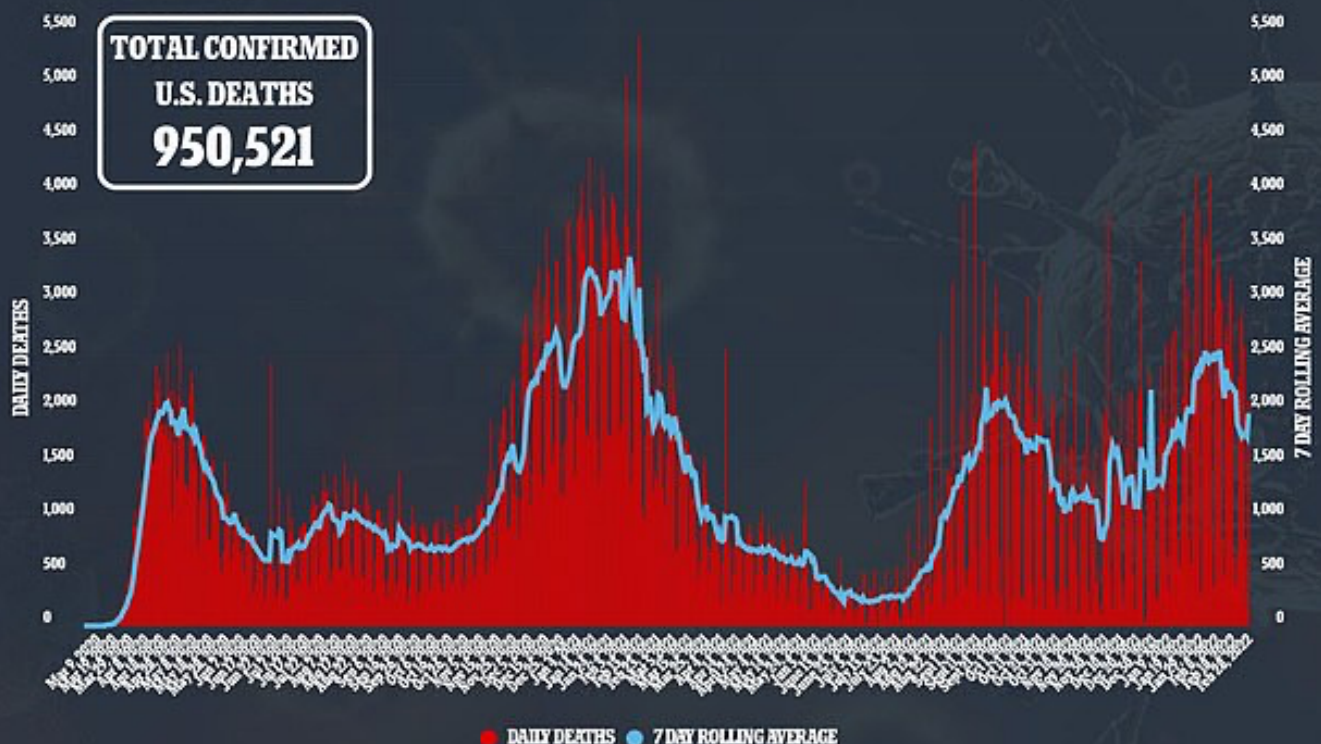KN95 masks are built to filter out particles, and have a standard filtration of 95 percent.

'The filtering layer of an N95 mask is made from much smaller, 5-micrometer fibers with gaps that are 10 times smaller, making it much better for filtering nasty particles from the air, such as those containing virus,' Sear said.

KF-94 masks are considered to be very effective as well, with the ability to filter out 94 percent of particles.

NUMBER OF NEW U.S. INFECTIONS PER DAY

TOTAL US CASES: 79,045,719

DAILY CASE NUMBER

1.5M

1M

0.5M

0

7 DAY ROLLING AVERAGE

1.5M

1M

0.5M

0

● DAILY CASE NUMBER ● 7 DAY ROLLING AVERAGE

NUMBER OF U.S. DEATHS PER DAY

TOTAL CONFIRMED U.S. DEATHS 950,521

DAILY DEATHS

5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0

7 DAY ROLLING AVERAGE

5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0

● DAILY DEATHS ● 7 DAY ROLLING AVERAGE

Filtration efficiency is not the only two benefits of those

masks, though. Fit is very important as well.

A mark should fit tightly around a person's face, almost hugging their nose, cheeks and chin.
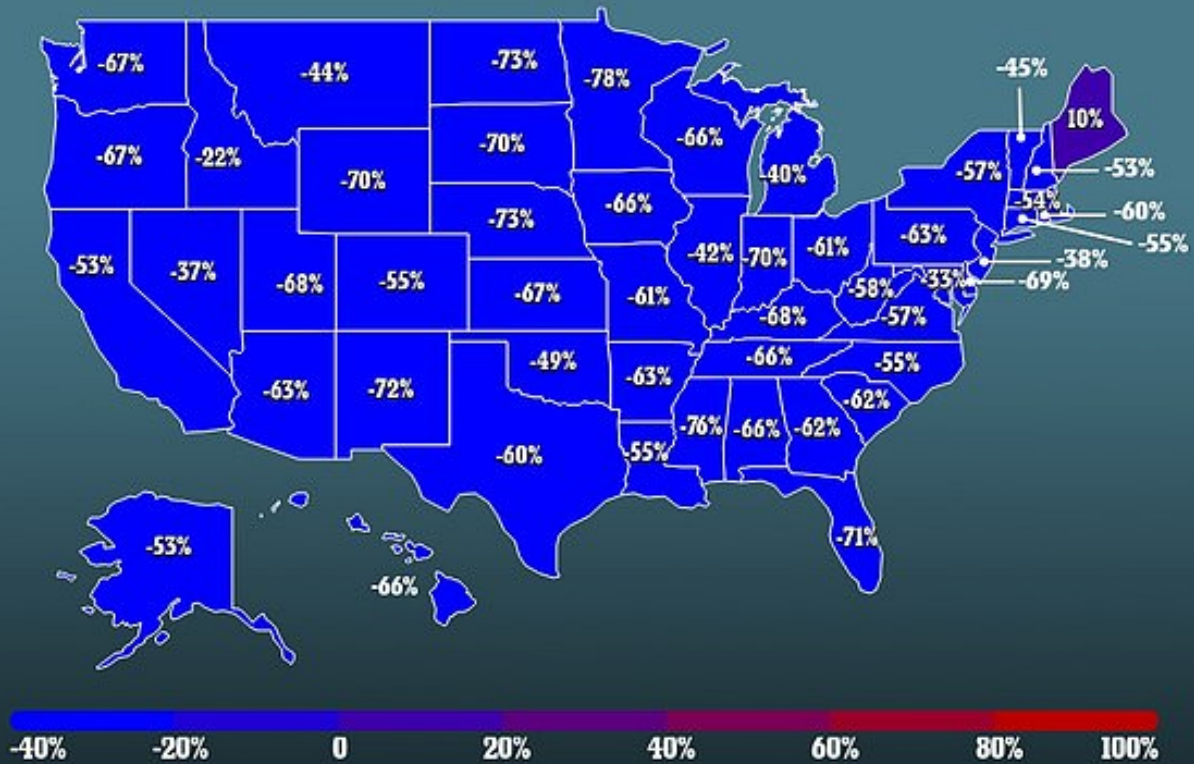
This is to avoid leaving gaps above or below the mouth and the nose where air can escape.

Even if a person does have a mask that can filter up to 95 percent of particles, if the mask isn't well fitting then the particles could just escape out of the side anyways.
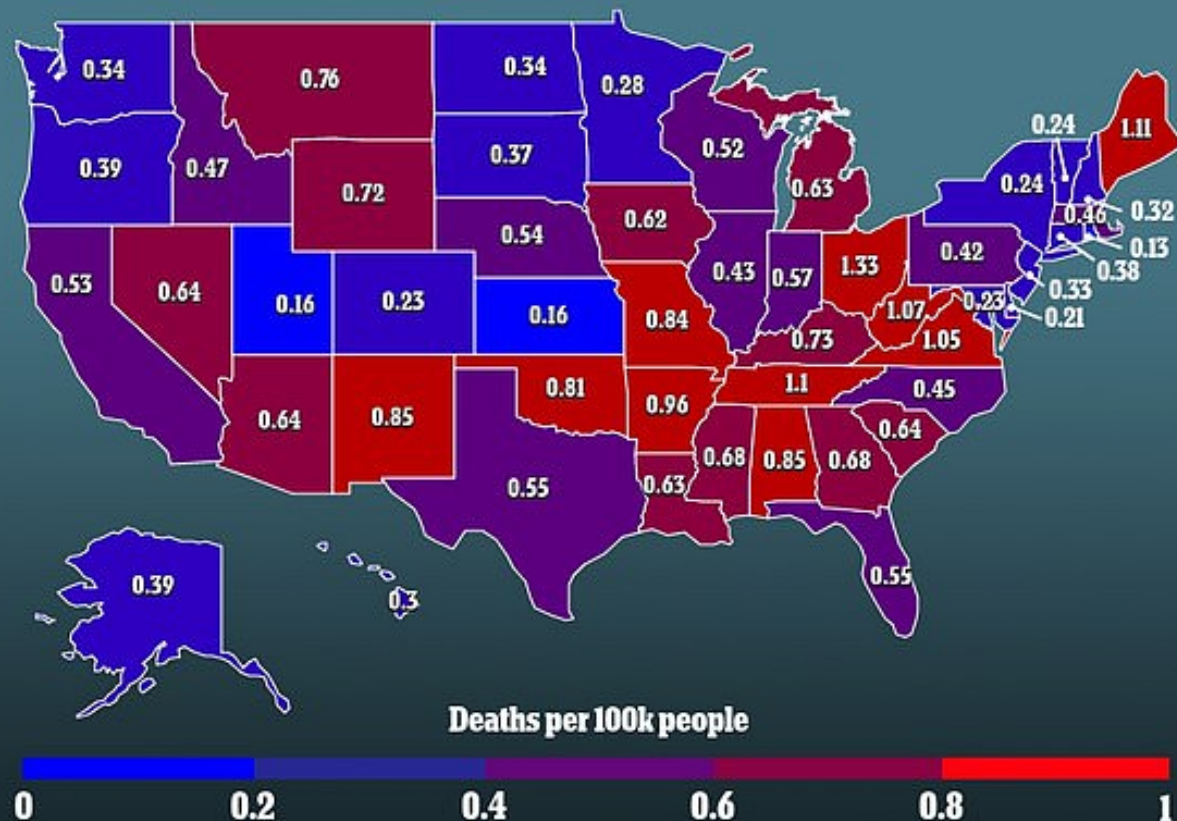
This is why Sear also does not recommend the use of surgical masks.

'Surgical masks fit badly, so a lot of air goes unfiltered past the edges of the mask by the cheeks and nose,' he said.

CHANGE IN COVID-19 CASES OVER THE PAST TWO WEEKS

US map showing change in COVID-19 cases over the past two weeks by state:
-67%, -44%, -73%, -78%, -45%, 10%, -67%, -22%, -70%, -70%, -66%, -40%, -57%, -53%, -53%, -37%, -70%, -73%, -66%, -42%, -70%, -61%, -63%, -54%, -60%, -55%, -68%, -55%, -67%, -61%, -58%, -33%, -38%, -69%, -63%, -72%, -49%, -63%, -68%, -57%, -66%, -55%, -62%, -76%, -66%, -62%, -60%, -55%, -71%, -53%, -66%

Scale: -40% -20% 0 20% 40% 60% 80% 100%

COVID DEATHS PER 100K PEOPLE IN EACH STATE

US map showing COVID deaths per 100k people by state:
0.34, 0.76, 0.34, 0.28, 0.24, 1.11, 0.39, 0.47, 0.37, 0.52, 0.24, 0.72, 0.63, 0.46, 0.32, 0.54, 0.62, 0.42, 0.13, 0.53, 0.64, 0.16, 0.23, 0.16, 0.43, 0.57, 1.33, 0.38, 0.84, 1.07, 0.23, 0.33, 0.73, 1.05, 0.21, 0.81, 0.96, 1.1, 0.45, 0.64, 0.85, 0.68, 0.85, 0.68, 0.55, 0.63, 0.55, 0.39, 0.3

Deaths per 100k people

Scale: 0 0.2 0.4 0.6 0.8 1

While this is only one study, based on a computer model, the implications are major when looking back on two years of the COVID-19 pandemic.

Many Americans wore cloth masks, almost exclusively, throughout the pandemic believing they were doing their part to stop the spread of the virus.

Wearing a mask also may have made people feel more comfortable about going out in public, believing the face coverings would protect everyone around them from the virus.

It could be the case that the cloth masks were providing little to no protection at all, and people believing the were taking proper virus mitigation measures were not doing so.

The Centers for Disease Control and Prevention recommends KN95 masks as the gold standard to stop the spread, but still recommends cloth masks as a valid face covering on its website.