

Reviews that gave a lower rating to conference proceedings or were submitted close to the deadline, and those whose authors were least likely to respond to rebuttals, were most likely to contain these adjectives, and therefore most likely to have been written by chatbots to some extent, the study found.

“It seems like when people have a lack of time, they tend to use ChatGPT,” says Liang.

The study also examined more than 25,000 peer reviews associated with manuscripts that had been accepted for publication across 15 Nature Portfolio journals between 2019 and 2023, but didn’t find a spike in usage of the same adjectives since the release of ChatGPT.

A spokesperson for Springer Nature says the publisher asks peer reviewers not to upload manuscripts into generative AI tools, noting that these still have “considerable limitations” and that reviews might include sensitive or proprietary information. (*Nature’s* news team is independent of its publisher.)

Springer Nature is exploring the idea of providing peer reviewers with safe AI tools to guide their evaluation, the spokesperson said.

### Transparency issue

The increased prevalence of the buzzwords Liang’s study identified in post-ChatGPT reviews is “really striking”, says Andrew Gray, a bibliometrics support officer at University College London. The work inspired him to analyse the extent to which some of the same adjectives, as well as a selection of adverbs, crop up in peer-reviewed studies published between 2015 and 2023. His findings, described in a preprint published on 25 March, show a significant increase in the use of certain terms, including ‘commendable’, ‘meticulous’ and ‘intricate’, since ChatGPT surfaced (A. Gray Preprint at arXiv <https://doi.org/mq9d;2024>). The study estimates that the authors of at least 60,000 papers published in 2023 – just over 1% of all scholarly studies published that year – used chatbots to some extent.

Gray says it’s possible peer reviewers are using chatbots only for copy-editing or translation, but that a lack of transparency makes it difficult to tell. “We have the signs that these things are being used,” he says, “but we don’t really understand how they’re being used.”

Weber-Wulff doesn’t think tools such as ChatGPT should be used to any extent during peer review, and worries that the use of chatbots might be even higher in cases in which referee reports are not published. “Peer review has been corrupted by AI systems,” she says.

Using chatbots for peer review could also have copyright implications, Weber-Wulff adds, because it could involve giving the tools access to confidential, unpublished material. She notes that the approach of using telltale adjectives to detect potential AI activity might work well in English, but could be less effective for other languages.

## Bird flu outbreak in US cows: why scientists are concerned

**A virus that has killed hundreds of millions of birds has now infected cattle in eight US states, but the threat to humans is currently low.**

Researchers are closely monitoring the spread of a worrisome strain of avian influenza to cattle – and one person – at farms in eight US states.

These infections represent the first widespread outbreak of bird flu in cows. The outbreak is concerning because humans frequently come into contact with cattle on farms, giving the virus ample opportunity to spread to people, says Daniel Goldhill, an evolutionary virologist at the Royal Veterinary College in Hatfield, UK.

Health officials have said that the overall threat to people remains low, for now, but they are watching the situation closely. “There’s always a worry that viruses will surprise us,” Goldhill says. “We don’t know what they’ll do next.”

**“There are a lot of questions and, so far, not a lot of answers.”**

Scientists are scrambling to assess how well candidate vaccines and antiviral drugs will work against the circulating strain and to update diagnostic kits for quickly identifying infections in people. They are also trying to understand whether the cows were infected by birds or another source, and are on the alert for any changes that could raise the risk for humans.

“There are a lot of questions and, so far, not a lot of answers,” says Florian Krammer, a virologist at Icahn School of Medicine at Mount Sinai in New York City.

### Where was the virus found previously, and what’s happening now?

In 1996, the influenza strain called H5N1 was first detected in birds in China. It has been spreading ferociously in birds since 2021, killing hundreds of millions of domestic and wild birds around the world. It has also occasionally infected mammals, including seals and bears, which have become “accidental hosts” of what is mostly an avian virus, says Kanta Subbarao, director

of the World Health Organization (WHO) Collaborating Centre for Reference and Research on Influenza in Melbourne, Australia.

Since 25 March, US health officials have detected H5N1 in cows from at least 18 herds across eight states – a number that is likely to increase as surveillance is stepped up. Researchers have previously documented<sup>1</sup> sporadic infections of cows with flu viruses closely related to H5N1, but no widespread outbreaks had been detected until now.

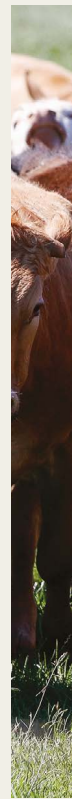
The more mammalian species the virus infects, the more opportunities it has to evolve into a strain that is dangerous to humans, Goldhill says. One dairy worker in Texas has been infected, but the US Centers for Disease Control and Prevention (CDC) says that the person is recovering. The worker’s only symptom was eye inflammation and viral levels in their nose were low, suggesting that they don’t have a respiratory infection, according to the CDC.

The virus that the worker contracted is closely related to the strains found in dairy cattle in Texas, with one notable distinction: the worker’s variant has a mutation that is linked to more-efficient spread in mammals. Goldhill says the presence of the mutation in the human sample was not surprising; it has appeared many times, including in foxes<sup>2</sup> and cats<sup>3</sup> infected with H5N1.

### Is the virus spreading between cows, and why does that matter?

A key question for researchers is how the cows are getting infected. The answer will be important for containing H5N1’s spread to other farms and people. “This is a controllable situation, we just have to understand how this virus is getting around,” says Richard Webby, a virologist at St. Jude Children’s Research Hospital in Memphis, Tennessee.

Of particular interest is whether the virus is passing from infected cows to uninfected ones, because that would suggest it has become more adept at transmission in mammals. Given that the virus has been detected at several farms across the United States, epidemiological data make it “pretty clear now we’re seeing cow-to-cow spread”, and that wild birds are not necessarily involved in viral spread in the farms, says Webby. But there aren’t enough viral sequences of animals infected later in the outbreak for genomic data to confirm cow-to-cow spread, he says.





**Cattle in several US states have been infected by a bird-flu strain.**

If the virus is spreading between cows, it will be important to work out precisely how, Webby says. Evidence so far suggests that virus levels are highest in the animals' milk, according to a report in *Science* (see [go.nature.com/3txtrah](https://go.nature.com/3txtrah)). That suggests that H5N1 might not be spreading between cows through the air, a transmission pathway that would be difficult to control and could allow for relatively quick spread, Webby says. If cows are becoming infected through contact with contaminated surfaces, such as milking machines, the virus would be transmitted more slowly than if it is airborne.

Gathering evidence to address these questions could help to answer why infections have only recently cropped up in cattle, and only in the United States, despite the virus's global spread in the past few years. Marion Koopmans, a virologist at Erasmus University Medical Center in Rotterdam, the Netherlands, wonders whether there is something unique about how US cattle are kept, for example, or whether the virus has gained new abilities to persist in the

environment. Addressing these questions will offer insights into how widespread bird flu infections could be in cattle globally, she says. It will be important for health officials

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outside the United States to start looking for evidence of overlooked outbreaks, Krammer says.

**What would increase researchers' concern?** Scientists say that, although bird flu is unlikely to spread widely in people, they are closely monitoring samples of H5N1 globally for mutations known to signal that it is becoming better at spreading in mammals. The virus has not spread widely in humans in part because it can't readily enter the cells that line the nose and mouth. But it would be problematic if the

virus developed mutations that would help it to gain entry to these cells, Goldhill says.

Krammer says he would look specifically for changes to the section of the viral genome that encodes a type of enzyme known as a polymerase. A portion of this enzyme is known to be “a hotspot for adaptation to mammals”. Researchers are also looking out for mutations that would make the strain less susceptible to antiviral drugs, says Webby.

The animal that no virologist wants to see a flu outbreak in is the pig. Pigs host many influenza A viruses, making them a ‘mixing vessel’ in which strains of avian and mammalian viruses can mix and match and become more efficient at transmitting to people, says Krammer.

#### **How well do existing vaccines and drugs work against this strain?**

The WHO maintains a list of vaccines that provide protection against H5N1 and that could be mass-produced. And some countries, including the United States, maintain a small stockpile of vaccine doses should they need to vaccinate at-risk populations, such as front-line workers.

The CDC has reported that the viral strain isolated from the infected person is closely related to two strains targeted by a vaccine. Webby says that his team has confirmed in laboratory studies that the WHO vaccines can protect against viral samples collected from cows early in the outbreak, and they will continue to test new samples as the outbreak progresses. Specifically, the vaccine includes antibodies produced against a human H5N8 virus isolated in Russia and an avian H5N1 virus isolated in the United States. They can “recognize this cow virus very, very well”, says Webby.

It would be useful to get more information on how much immunity these candidate vaccines produce against the circulating strain, especially because people don't have pre-existing protection against H5N1 and closely related viruses, says Subbarao.

**By Max Kozlov & Smriti Mallapaty**

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2. Bordes, L. *et al. Microbiol. Spectr.* **11**, e02867-22 (2023).
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