

<https://healthpolicy-watch.news/covid-19-may-have-been-occurring-as-early-as-august-2019-study-of-wuhan-hospital-traffic-online-searches-of-symptoms/>

## COVID-19 May Have Been Circulating From August, 2019 – Study of Wuhan Hospital Traffic & Online Keyword Searches

[Disease Surveillance](#) 09/06/2020 • [Elaine Ruth Fletcher](#)

A novel study [published in preprint form by Harvard University](#) suggests that cases of the novel SARS-COV-2 virus that has caused a global pandemic may have begun appearing in Wuhan hospitals as early as August 2019 – several months before China officially admitted that a new coronavirus was circulating.

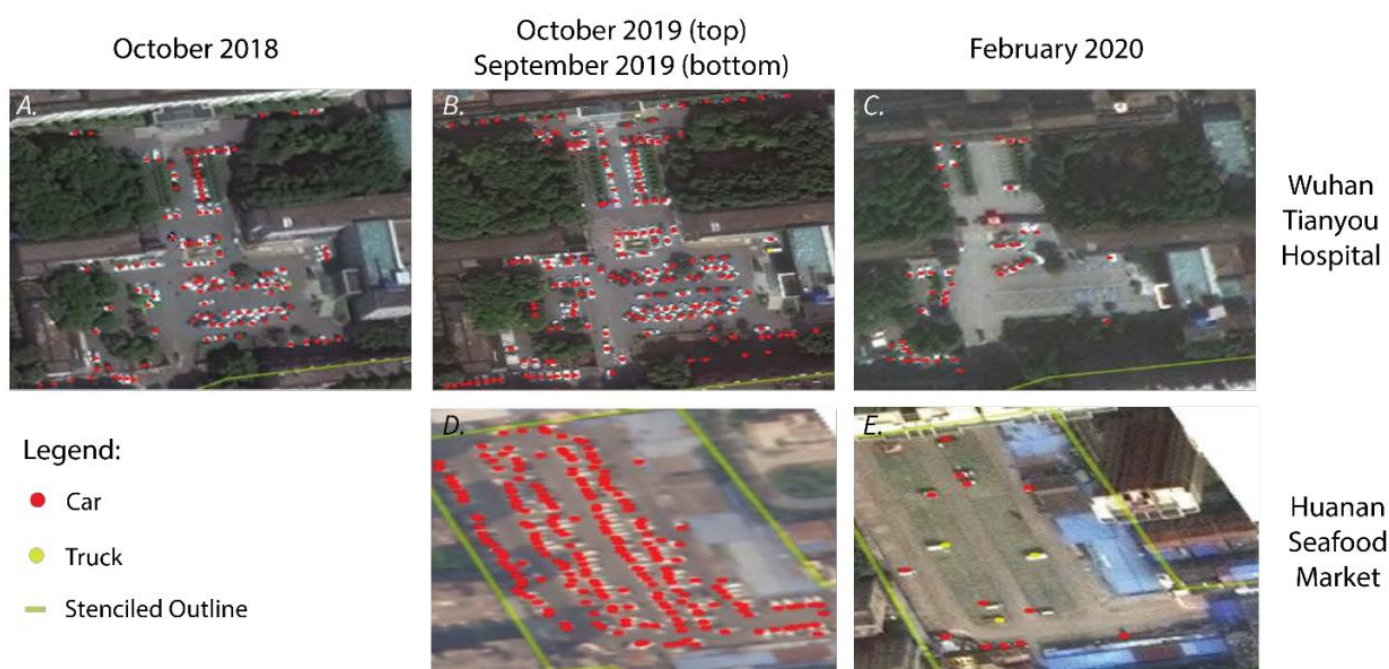
The study Tuesday found an unusual uptick in traffic at several Wuhan hospitals in the late summer and early fall 2019, as compared to the year before, as well as a significant increase in online searches in China for diseases related to “cough” as well as “diarrhoea” – the latter symptom a distinctive feature of early COVID-19 onset.

Analysis of hospital traffic in Wuhan China indicates shows high number of visitors, compared to the same time, in the year before

“We observe an upward trend in hospital traffic and search volume beginning in late Summer and early Fall 2019. While queries of the respiratory symptom “cough” show seasonal fluctuations coinciding with yearly influenza seasons, “diarrhea” is a more COVID-19 specific symptom and only shows an association with the current epidemic.

### Figure 1: Parking lot volume in a Wuhan, China hospital and control site

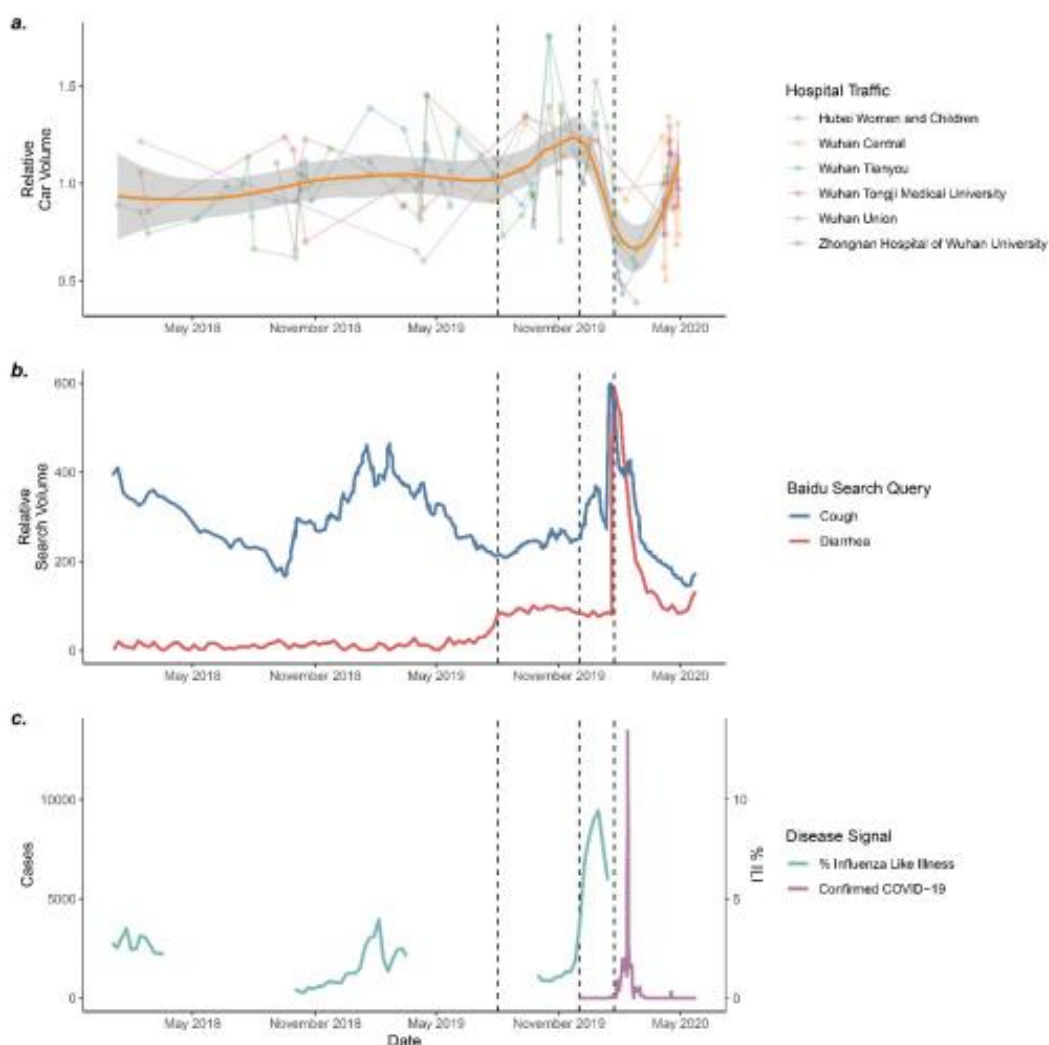
Satellite images and counts of cars (red) and trucks (yellow) in 2 Wuhan, China, parking areas. Top panel is Wuhan Tianyou Hospital pre-epidemic (A), October 2019 (B) and during the height of the COVID-19 outbreak (C). Lower panel is the Huanan Seafood Market, a high-volume control site, in September 2019 (D) and February 2020 (E).



“The increase of both signals precede the documented start of the COVID-19 pandemic in December, highlighting the value of novel digital sources for surveillance of emerging pathogen,” says the preprint study, published on [Harvard’s DASH repository](#), and authored by four experts in computational epidemiology and biomedical informatics at Harvard Medical School, Boston University School of Public Health and Boston Children’s Hospital.

**Figure 2: Time-series of different ILI, symptoms and surveillance signals, January 2018 - May 2020**

Daily parking lot volume normalized to the same hospital’s baseline (weekday, Saturday or Sunday) for 6 Wuhan, China Hospitals (**a**) from January 2018 - April 2020 and a fitted loess regression (**a**, orange) with standard errors. Relative Baidu search query volume is shown for the terms “cough” (**b**, blue) and “diarrhea” (**b**, red) between January 2018 - May 2020. Three yearly influenza-like-illness cycles (**c**, turquoise, right side axis) from two Wuhan hospitals plotted alongside confirmed COVID-19 case counts (**c**, purple, left side axis) extracted from open-source disease data. Date annotations (vertical dashed lines) on all three panels representing August 1, 2019 (rise in traffic and diarrhea signal), December 1, 2019 (date of first confirmed COVID-19 case) and January 23, 2020 (implementation of the Wuhan public health lockdown).



## **Study Strengthens Theory That Virus Emerged From Source Outside Wuhan Seafood Market**

The authors said that their findings strengthen the theory that the novel coronavirus may have already been circulating in Wuhan, a city of 10 million people, prior to the identification of a large cluster of infected people associated with the Huanan Seafood Market.

While it has been suggested that the original source of the virus was a wild animal in the market, where mammals, reptiles and other animals were kept in crowded, contained spaces in close proximity to market workers and shoppers, no direct connection to the market has been found for the first 14 individuals who became infected with the virus. Nor have virology samples taken from wildlife at the market been linked to SARS-CoV-2, the study notes, “leaving open the possibility of alternate points of origin and infection.”

“Here we consider that SARS-CoV-2 may have already been circulating in the community prior to the identification of the Huanan Market cluster. This hypothesis is supported by emerging epidemiologic and phylogenetic evidence indicating that the virus emerged in southern China, and may have already spread internationally, and adapted for efficient human transmission by the time it was detected in late December.”

Hospital traffic and Covid-19 symptoms search queries both rise sharply in autumn, 2019

The study examined satellite images of traffic patterns at six Wuhan hospitals as well as several other control sites, to draw its conclusions. Along with that it searched terms in the Chinese “Baidu” search engine, noting that the same method has been used to estimate influenza trends in China.

Between September and October 2019, 5 of the 6 hospitals studied show their highest relative daily volume of traffic in the series of images that were analysed, the study found. “coinciding with elevated levels of Baidu search queries for the terms “diarrhea and cough”. While searches for cough alone are typical of the influenza season, diarrhea has been one of the more distinctive symptoms marking onset of Covid-19.

Speaking at a press briefing on Tuesday, China’s foreign ministry spokeswoman Hua Chunying rejected the study’s findings, saying, “I think it is absurd, actually extremely absurd, to draw this kind of conclusion based on superficial observations such as traffic volume.”

Other experts also urged caution in interpreting the study’s results: “It’s important to remember that the data are only correlative and (as the authors admit) cannot identify the cause of the uptick,” said Paul Digard, a virologist professor at the University of Edinburgh. “By focusing on hospitals in Wuhan, the acknowledged epicentre of the outbreak, the study forces the correlation. It would have been interesting (and possibly much more convincing) to have seen control analyses of other Chinese cities outside of the Hubei region,” he said.

The study is still in its preprint form, and had not undergone peer review, they also noted. This seemed apparent from one obvious error in the preprint PDF, which refers to a: “large decrease in hospital [traffic] volume and search query data, following the public health lockdown of Wuhan on January 23, 2019” – an apparently erroneous reference to the lockdown of January 23, 2020.