

VISUAL INVESTIGATIONS

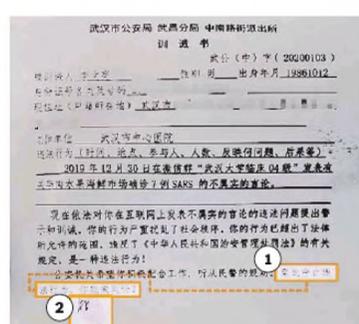
The Final Days of a Chinese Doctor Who Sounded

Leaked to the Public ▶ Dr. Li Wenliang is working as an ophthalmologist at Wuhan Central Hospital. In late 2019, he sends some messages to friends in a private group chat warning them of an emerging virus. He also sends a photo of a virus sequencing report with the words “SARS-like coronavirus.” These messages leak to the public on Dec. 30, 2019, and immediately set off concern.



Dr. Li Writes An Apology Letter Even as the number of people infected with the virus increases, officials are trying to control the message. Dr. Li's employer makes him write a formal apology letter for sending the messages. In the letter, the content of which was obtained by The Times, he writes that he deeply regrets the negative impact he has caused.

DEC. 31
27
OFFICIAL CASES



JAN. 3 Local Police Reprimand Dr. Li Police in Wuhan reprimand Dr. Li, and make him sign a statement promising to never spread rumors again. The same day, Wuhan health authorities publicly insist this new virus is not known to transmit between humans.

DEC 30
0
OFFICIAL CASES

DEC 2019 ————— JAN 2020



No New Official Cases Between Jan. 11 and Jan. 16, Wuhan health authorities do not report a single new case of people infected with the emerging virus. Internal documents obtained by The Times show that there is a confusing process in place for hospital staffers. Approvals to report new cases are subject to shifting instructions from district-level, city-level and provincial-level bureaucracies.

JAN. 16
41
OFFICIAL CASES

JAN. 19 “Depressive State” Records show that Dr. Li has a severe illness and requires oxygen support. He is also struggling mentally, and is described as being in a “depressive state.” The diagnosis does not attribute his condition to any specific cause but notes he has trouble sleeping and has lost his appetite.



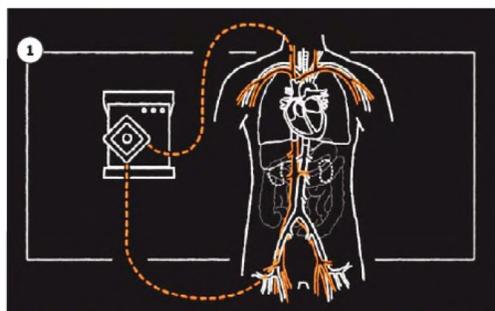
JAN. 27
4,515
OFFICIAL CASES



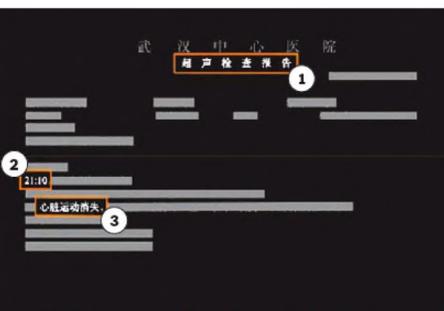
Dr. Li Speaks Out Dr. Li gives an anonymous interview to a prominent Chinese newspaper from his hospital bed, describing how he was reprimanded by authorities. A few days later, he reveals his identity on social media. Many people are angered by how the authorities treated him and see him as a folk hero.

Time	Test Name	Result
2020-02-05 09:42	血气分析+动脉血氧+电解质+血红蛋白+红细胞压积(明晨)	0.2
2020-02-05 09:48	阿比多尔(1g)(口服)	
2020-02-05 14:20	血气分析+动脉血氧+电解质+血红蛋白+红细胞压积(加急)	1
2020-02-05 14:21	肌酐检测	20
2020-02-05 14:58	心脏超声(床旁超声)	
2020-02-05 14:58	十二导联同步心电图检查+心电图事件记录	2
2020-02-05 14:58	DR床旁单次曝光胸片	
2020-02-05 14:58	0.9%氯化钠注射液	50
2020-02-05 14:58	甲泼尼龙注射液(甲强龙)	40
2020-02-05 14:57	奈布美酮注射液(加效)	3
2020-02-05 15:00	呼吸内镜	
2020-02-05 15:00	一女性患者(呼吸衰竭)	
2020-02-05 15:00	特殊导管 呼吸衰竭治疗 接口	
2020-02-05 15:00	一体温测量+雾化吸入+鼻导管 留产	
2020-02-05 15:03	胺碘酮注射液(爱博)	0.4
2020-02-05 15:07	彩色多普勒超声检查(腹部)	
2020-02-05 15:07	床旁彩色多普勒超声检查	4
2020-02-05 15:07	心脏彩超、心电图、血常规检查	
2020-02-05 18:54	血常规检查+五分类	

FEB. 5 Deteriorating Condition According to Dr. Yuan Jin (right), a pulmonary and critical care doctor at Good Samaritan Medical Center in Brockton, Mass., Li Wenliang's medical team ordered several tests for his lungs and heart, indicating they were responding to a worsened condition on this day. Dr. Wu Yuanfei (left), a virologist at Chan Medical School at the University of Massachusetts who also reviewed the documents for The Times, said his illness started acutely and developed very fast.



9:00 PM. Dr. B, a doctor at Wuhan Central Hospital, arrives at the I.C.U. around this time. He asked to remain anonymous because he fears reprisal from the Chinese government. According to Dr. B, sometime after he arrives, hospital leaders ask the medical team to put Dr. Li on ECMO, an invasive life support system, even though doctors in the room say the procedure is too late to be useful. He says Dr. Li was already dead when he arrived.



9:10 PM. An echocardiogram conducted around this time shows that Dr. Li's heart has stopped.

A Times investigation sheds light on the death of Dr. Li Wenliang, 34, a national hero who faced censorship and then fell ill himself.

This article is by Muye Xiao, Isabelle Qian, Tracy Wen Liu, Chris Buckley, Drew Jordan and Jeff Bernier.

In early 2020, in the Chinese city of Wuhan, Dr. Li Wenliang lay in a hospital bed with a debilitating fever. He was no ordinary patient, and even then — before Covid had its name — he feared that this was no ordinary ailment.

Dr. Li was widely regarded in China as a heroic truth-teller. He had been punished by the authorities for trying to warn others about the virus, and then, in a terrible turn, had become severely sickened by it. Weeks later, he would become China's most famous fatality of the emerging pandemic. He was 34.

His death set off an outpouring of grief and anger on a scale and intensity rarely seen in China. More than two years later, Dr. Li remains a galvanizing figure, a symbol of frustration with the government's suppression of independent voices. His profile on the Chinese social media site, Weibo, regularly receives hundreds of comments a week, and has become a place where people pay tribute and share their personal stories.

A government investigation into the circumstances around Dr. Li's death concluded in a report that the Wuhan Central Hospital had spared no effort to try to save him. But a more complete picture of his medical care and his treatment by the authorities has remained elusive.

The New York Times's Visual Investigations team has now filled in some of these gaps with an ex-



Wuhan Central Hospital, where Dr. Li Wenliang, an ophthalmologist, started hearing of a SARS-like virus in late 2019.

clusive interview with one of Dr. Li's colleagues. He provided a firsthand account of Dr. Li's final hours, describing the resuscitation measures that were used and discussed. He is referred to only as Dr. B because he is afraid of reprisals from the Chinese government. The Times talked to Dr. B via video, and verified his identity with public information.

The Times also obtained and examined internal memos from Wuhan Central Hospital and Dr. Li's medical records, some of which backed up Dr. B's account. The medical records have been verified by experts and contain details that match publicly available information. Eight U.S.-based Chinese medical experts, who have experience treating Covid patients or have practiced in Chinese hospitals, reviewed the medical records for The Times.

The investigation found no evidence that Dr. Li's medical care was compromised. But these documents, along with Dr. B's account and experts' analysis, reveal im-

portant new details about his illness and treatment.

Taken together, they show how Dr. Li spent his last 39 days fighting a deadly virus — and navigating government attempts to censor him.

An Acute Illness

In early 2020, the virus was spreading rapidly in Wuhan, the city in China where the pandemic first took hold. Dr. Li checked into the hospital on Jan. 12 with a fever, a lung infection and other symptoms. According to several of the doctors who reviewed his medical records for The Times, by the third day, Dr. Li was seriously ill and required oxygen support.

“He was infected with an early variant of the virus, so the illness started acutely, its course was life threatening and it developed very fast,” said Dr. Wu Yuanfei, a virologist at the Chan Medical School at the University of Massachusetts, in Worcester.

The experts said that based on the records, the treatment Dr. Li received, in general, followed the norms of that time for managing the symptoms of coronavirus patients.

A little over a week into Dr. Li's hospital stay, his doctors wrote that he was struggling mentally and diagnosed him as being in a depressive state, a detail that has not been reported. The record did not attribute his emotional condition to any specific factors, but noted that Dr. Li had lost his appetite and couldn't sleep at night.

He was kept in an isolation ward, allowed to communicate with his family only via video chat. He had just weeks earlier been disciplined by the police for warning friends in a private group on WeChat, a Chinese social media service, about the new virus that was spreading through the city. His employer — Wuhan Central Hospital, where he worked as an eye doctor — had made him write a letter of apology, the content of which was obtained by The Times.

Despite the official warnings, on Jan. 27, 2020, Dr. Li gave an anonymous interview to a prominent Chinese newspaper, describing how he had been reprimanded for trying to raise the alarm. Eventually, he revealed his identity on social media, and instantly became a folk hero. From his hospital bed, he took more interviews and said he hoped to recover soon to join medical workers fighting the outbreak.

Deterioration

But on Feb. 5, Dr. Li's condition deteriorated severely — his pneumonia grew worse, and his breathing became extremely labored.

That afternoon, Dr. Li's doctors ordered several tests of his lungs



Claire Fu contributed research. Elsie Chen contributed reporting from Seoul.

an Early Alarm on Covid-19

JAN. 11
41
OFFICIAL
CASES

定全力救治。二是深入开展流行病学调查，及时发现患者，早发现、早诊断、早隔离、早治疗，集中专家和资源全力救治。三是深入开展流行病学调查，及时发现患者，早发现、早诊断、早隔离、早治疗，集中专家和资源全力救治。四是配合国家卫生健康委及世界卫生组织等通报疫情信息。自2020年1月3日以来未发现新发病例。目前，**未发现医务人员感染**，**未发现明确的人传人证据**。我市将继续加强患者救治、流行病学调查，深入开展爱国卫生运动，做好防病知识普及，维护人民群众身体健康。

当前，正处于冬春季传染病高发季节，公众要保持室内空气流通，尽量避免到封闭、空气不流通的公众场合和人群集中地方，必要时可佩戴口罩。如有发热、呼吸道感染症状，特别是持续发热不退，要及时到医疗机构就诊。（来源：武汉市卫生健康委）

“No Medical Workers Infected”

Authorities release a statement insisting that there is no evidence the virus is transmissible among humans and no medical worker has been infected. Neither is true. On this day, Dr. Li has a fever. A CT scan shows he has a lung infection. The next day, he checks into Wuhan Central Hospital.

1. No medical workers are infected;
2. No clear human-to-human transmission;
3. Multiple sites of infection.



- 印象：
1. 双肺多发感染，纵膈复常；
 2. 双肺少许纤维灶；
 3. 肝及轻度脂肪肝。

LEFT AND ABOVE: BEIJING YOUTH DAILY; INSET: EXPRESS VIA REUTERS CONNECT

nytimes#l@l.l

nytimes#l@l.l

JAN. 20
291
OFFICIAL
CASES

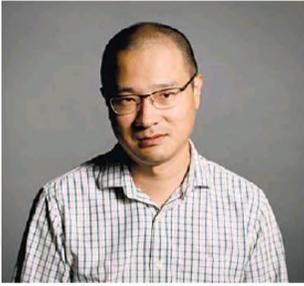


A Turning Point

For the first time, the government acknowledges that there is clear evidence the virus is contagious among humans. Wuhan hospitals soon become overwhelmed by the number of people infected.

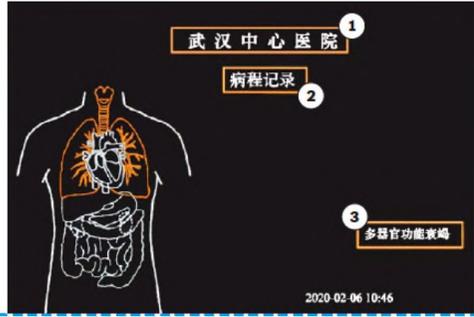
JAN. 23
830
OFFICIAL
CASES

The entire city of Wuhan goes into lockdown.



FEB. 6 **HOUR BY HOUR** ▶
10:46 A.M. Doctors write in the daily progress notes that Dr. Li's lungs are severely damaged and he is at risk of multiple organ failure. Experts who reviewed his records for The Times say his doctors should at this point, or before it, consider intubation.

1. WUHAN CENTRAL HOSPITAL;
2. PROGRESS NOTE;
3. Multiple organ failure



7:20 P.M. Around this time, Dr. Li goes into cardiac arrest and starts receiving CPR. His pupils stop responding to light.

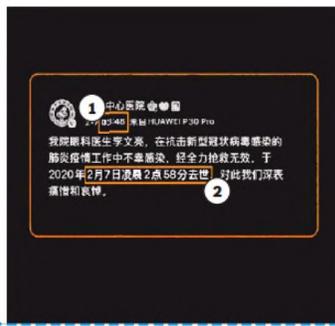
2020-02-06 10:46



10:40 P.M. “Life Times,” a state-owned media outlet, publishes an article that says Dr. Li's time of death was 9:30 P.M. The article is later contradicted by other media outlets. Throughout the evening, conflicting messages about Dr. Li's condition generate confusion.

1. Passed away at 9:30 P.M.

11:58 P.M. An entry in the daily progress notes from this time says the medical team has put Dr. Li on ECMO. But there is no record of ECMO in the doctor's notes — a set of documents listing exams, medications and procedures. This is the only discrepancy The Times found in the medical records. Dr. B leaves the I.C.U. around this time. According to him, ECMO has not been used, because an instrument needed for the procedure is not available.



FEB. 7 3:48 A.M.
Wuhan Central Hospital releases a statement that Dr. Li Wenliang has died. The official time of death is 2:58 A.M.

1. 3:48 A.M.; 2. Passed away at 2:58 A.M. on February 7.

nytimes#l@l.l



Mourners gathered at a vigil for Dr. Li in New York City on Feb. 9, 2020. His death set off an outpouring of grief and anger on a scale and intensity rarely seen in China.

and heart, his medical records show. According to Dr. Yuan Jin, a pulmonary and critical care doctor at Good Samaritan Medical Center in Brockton, Massachusetts, these exams suggest that his medical team was responding to a worsened condition.

By the morning of Feb. 6, doctors wrote in the progress notes that Dr. Li was at risk of multiple organ failure. Several physicians we spoke to said that his condition was so serious that his medical team should have at this point, or before it, considered intubating him and placing him on a ventilator — a higher level of oxygen support.

The records indicate that Dr. Li had earlier been given oxygen through a nasal tube, and then an additional oxygen mask. His medical team also tried to use a noninvasive ventilator on Jan. 19, but wrote that “the patient could not tolerate.”

It is unclear why Dr. Li was not intubated. Some doctors are more reluctant to intubate young patients; sometimes the patients themselves refuse it. To this day, there is no consensus on when invasive ventilators should be used on Covid-19 patients.

On Feb. 6, Dr. Li went into cardiac arrest at around 7:20 p.m. Though his daily progress note did not explicitly say that his heart had stopped, it recorded that the medical team started performing CPR — a procedure that is applied

in such an emergency. They intubated him at that point, a common practice during resuscitation. The note said his pupils were not responding to light.

According to the medical records, doctors tried to revive Dr. Li for more than seven and a half hours, but his heart never restarted.

The government investigation said doctors placed Dr. Li on extracorporeal membrane oxygenation. Also known as ECMO, it is a last resort, invasive treatment involving a machine that siphons blood out of the patient, runs it through an oxygenator and pumps it back into the body.

According to Dr. B, who arrived at Dr. Li's intensive care ward around 9 p.m., about two hours after Dr. Li entered cardiac arrest, the hospital's leadership pushed the medical team to use ECMO because it wanted to show the public that no effort had been spared.

But several doctors in the room argued that by that point it was too late for it to have been of any use, an assessment that six physicians we talked to agreed with. Dr. B also said putting Dr. Li on ECMO, given its invasive nature, would have been an “insult to his body.”

Dr. B left the room around midnight. He said ECMO had not been used because an instrument to perform the procedure was not available. It is unclear whether it was ultimately used after he left.

There is also no indication in the doctors' orders from that night that the procedure was ever administered.

But for some reason, the daily progress notes say ECMO was used. It was the only discrepancy of this kind found in the medical records.

The Death of Dr. Li
That night, conflicting messages about Dr. Li's condition — some released by state media outlets, then deleted — generated confusion. At 10:40 p.m., a state-run publication, Life Times, said that he had died at 9:30 p.m.

It was nearly 4 a.m. the next morning, Feb. 7, when the hospital finally announced Dr. Li's death. It said he had died at 2:58 a.m. The government's investigation cited an electrocardiography performed at this time that showed he had flatlined.

The Times's investigation found that among the records was an echocardiogram report from around 9:10 p.m. the previous evening that showed that his heart had stopped beating.

“I think Dr. Li Wenliang had already died by the time I saw him around 9 p.m. on Feb. 6,” Dr. B said. He added: “The normal process at this point would have been to pronounce him dead.”

“They dragged their feet for so long over the announcement. It's like the hospital really did not treat us as human beings,” he said. For Dr. B, going public with his version of events was an attempt to get his story out and honor Dr. Li's legacy.

The Times made multiple attempts to contact Dr. Li's medical team, but none agreed to answer questions. The press office of Wuhan Central Hospital told The Times that it was not accepting interviews from international media outlets. China's National Supervisory Commission, the country's top disciplinary body investigating Dr. Li's death, did not respond to requests for comment. The Chinese Embassy in Washington, D.C., did not respond to requests for comment.