Clinical Study Results Summary



Study Sponsor:	Gilead Sciences
Treatment Studied:	Remdesivir, also known as Veklury
Study Purpose:	To see if remdesivir given for 5 or 10 days could improve the health of study participants with severe cases of coronavirus disease 2019 (COVID-19). The researchers also wanted to find out if the participants had any side effects during the study.

Thank you

Thank you to the participants who took part in this clinical study for remdesivir, also called Veklury or GS-5734. In addition, thank you to the families, friends, and caregivers of the participants. Gilead Sciences sponsored this study and thinks it is important to share the results with the participants and the public.

If you participated in the study and have questions about the results, please speak with a doctor or staff at a study site.

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Study Overview



What was the purpose of this study?

To see if remdesivir taken for 5 or 10 days could improve the health of study participants with severe COVID-19. The purpose of this study was also to see if any side effects happen in participants with severe COVID-19 when treated with remdesivir.



Who was in the study?

- 4,891 participants with severe COVID-19 in 14 countries around the world
- 53 participants who enrolled but did not take remdesivir were not included in the study results.



What treatments were studied?

There were 2 parts in the study, Part A and Part B.

- ▶ In Part A, participants received:
 - Remdesivir for up to 5 days plus standard of care
 - Remdesivir for up to 10 days plus standard of care
- ▶ In Part B, participants received:
 - Remdesivir for up to 10 days plus standard of care

Standard of care was the best treatment for COVID-19 that was available to doctors at the time they were treating each participant.

What were the results of the study?

In Part A, participants treated with 5 days and 10 days of remdesivir had similar outcomes.

Only Part A was used to evaluate the main results of this study. These results can be found in the "What were the results of the study?" section. Results from Part B are included in all other sections.

For the purpose of this summary, "side effects" are defined as medical problems that the doctors thought might be related to remdesivir. In Part A, serious and non-serious side effects happened in about the same number of participants in each group.



What was the purpose of the study?

What is COVID-19?

At the end of 2019, a new virus called severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) began to spread around the world. This virus causes coronavirus disease 2019, or COVID-19. The virus spreads through small droplets when infected people cough, sneeze, or breathe out. The symptoms range from mild to very severe and can cause death. Infected people can start having symptoms between 2 and 14 days after they get the virus, while some people have no symptoms. The most common symptoms are fever or chills, cough, difficulty breathing, feeling tired, and headache. Other symptoms include new loss of taste or smell, sore throat, runny nose, throwing up, and diarrhea. These are not the only symptoms of COVID-19.



COVID-19 is especially dangerous for older people and those with other medical problems, such as heart and lung diseases, being overweight, or diabetes. However, the virus is dangerous to everyone, even people who are young and healthy. COVID-19 may cause permanent damage to lungs and other organs. COVID-19 has caused many deaths around the world.

Since COVID-19 is a new disease, researchers are working to find treatments and medications to help people infected.

What is remdesivir?

Remdesivir is a prescription medicine used to treat patients with COVID-19 requiring hospitalization.

What were the main questions the researchers wanted to answer?

The main questions the researchers wanted to answer in this study were:

- Could remdesivir improve the health of people with severe COVID-19?
- Is there a difference in effectiveness when remdesivir is taken for 5 days or 10 days?
- What side effects did the participants have during the study, if any?



What kind of study was it?

Phase 3: The researchers wanted to learn how well remdesivir worked in a large number of participants with severe COVID-19. They also wanted to find out if the participants had any side effects during the study.

Open-label study: Each participant knew what they were taking, and the doctors and study staff also knew.

Part A

Randomized study: The researchers used a computer program to randomly choose the treatment each participant took in Part A. This helped make sure the treatments were chosen fairly. The participants had an equal chance of receiving treatment of remdesivir for 5 days or 10 days.

Part B

Non-randomized study: Participants were put into 1 of 2 groups based on if they needed life support to help them breathe.

Types of breathing help

There are several ways to help patients breathe. These include **oxygen** and **life support**.

- There are many ways to deliver oxygen noninvasively to help raise blood oxygen levels, such as high and low flow oxygen through the nostrils and masks.
- Life support is invasive because it puts tubes inside the body. Two types of life support that were used in this study are explained below.
 - **Mechanical ventilation** is a type of life support where a tube is placed in the throat and connected to a breathing machine (ventilator) that pushes air into the lungs.
 - ECMO, also called extracorporeal membrane oxygenation, provides heart-lung bypass support. It pulls blood out of the body, adds oxygen to it, then pumps the blood back into the body.



People took part in the study if they:

- Were 12 years of age or older
- Had COVID-19 confirmed by lab testing
- Were hospitalized
- Had a blood oxygen saturation level of 94% or less on room air (not on oxygen) or needed oxygen support
- Had injury to their lungs from COVID-19 that appeared on x-rays or computerized tomography (CT) scans

For Part A, only people who did not need life support to help them breathe could take part in the study. For Part B, people who needed life support to help them breathe could also take part in the study.

In total, 4,891 participants with severe COVID-19 from 14 countries around the world took part in this study.

Country	Number of participants (%)	Sex of participants
United States	3917 (80%)	
Spain	225 (5%)	Female 1831 participants
Italy	203 (4%)	(37%)
United Kingdom	183 (4%)	Male 3060 participants
Sweden	89 (2%)	(63%)
Singapore	60 (1%)	
Switzerland	59 (1%)	Age groups of participants
Netherlands	47 (1%)	25 years and older $12 - 17$ years
Germany	43 (1%)	122 participants (2%) (under 1%)
France	27 (1%)	
South Korea	22 (under 1%)	65 – 84 years 1525 participants
Hong Kong	6 (under 1%)	(31%)
Japan	5 (under 1%)	18 – 64 years 3232 participants
Taiwan	5 (under 1%)	(66%)

The researchers used a scale to keep track of each participant's clinical status. The clinical status included how each participant was doing and what type of treatment was needed.

Only Part A was used to evaluate the main results of this study. There were 4 participants who left the study before taking any study treatment. Here are the clinical status scores for 397 participants in Part A at the beginning of the study before they received remdesivir.

Part A participants at the beginning of the study						
Score	Clinical status scale	Clinical status scale (out of 200 participants)				
1	Death	0	0			
2	Hospitalized and on life support	4 (2%)	9 (5%)			
3	Hospitalized and on high-flow oxygen or other non-invasive breathing help	49 (25%)	59 (30%)			
4	Hospitalized and on low-flow oxygen	113 (57%)	108 (55%)			
5	Hospitalized and did not need life support or oxygen, but needed medical care	34 (17%)	21 (11%)			
6	Hospitalized but no longer needed medical care	0	0			
7	Not hospitalized	0	0			



The study started in March 2020 and ended in June 2020.

During the study, participants received:

• Remdesivir as an intravenous (IV) infusion (slow injection into a vein) plus standard of care.

Standard of care was the best treatment for COVID-19 that was available to doctors at the time they were treating each participant.

There were 2 parts to this study: Part A and Part B. There were 53 participants who left the study before taking study treatment: 4 participants in Part A and 49 participants in Part B. The tables below show how participants received treatment.

Part A			Part B		
Group	Treatment		Group	Treatment	
Remdesivir 5 days (200 participants)	Remdesivir IV infusion for 5 days plus standard of care • 200 mg on Day 1 • 100 mg on Days 2 - 5		Remdesivir 10 days Life support at baseline (844 participants)	Remdesivir IV infusion for 10 days plus standard of care • 200 mg on Day 1 • 100 mg on Days 2 - 10	
Remdesivir 10 days (197 participants)	Remdesivir IV infusion for 10 days plus standard of care • 200 mg on Day 1 • 100 mg on Days 2 - 10		Remdesivir 10 days No life support at baseline (3597 participants)	Remdesivir IV infusion for 10 days plus standard of care • 200 mg on Day 1 • 100 mg on Days 2 - 10	

During the study, all participants were checked each day to see how they were responding to treatment for 14 days or until they left the hospital. Their clinical status score was recorded each day. The researchers were most interested in how participants were doing and their clinical status score 14 days after they started the study.



What were the results of the study?

This is a summary of the main results from this study. Only Part A was used to assess the main results of this study. This included 397 participants who received remdesivir.

The main questions the researchers wanted to answer in this study were:

- Could remdesivir improve the health of people with severe COVID-19?
- Is there a difference in effectiveness when remdesivir is taken for 5 days or 10 days?
- What side effects did the participants have during the study, if any?

The researchers checked the clinical status for each participant 14 days after they began the study. The table below shows the clinical status scores on Day 14.

Part A participants on Day 14						
Score	Clinical status scale	Remdesivir 5 days (out of 200 participants)	Remdesivir 10 days (out of 197 participants)			
1	Death	16 (8%)	21 (11%)			
2	Hospitalized and on life support	17 (9%)	33 (17%)			
3	Hospitalized and on high-flow oxygen or other non-invasive breathing help	8 (4%)	10 (5%)			
4	Hospitalized and on low-flow oxygen	19 (10%)	15 (8%)			
5	Hospitalized and did not need life support or oxygen, but needed medical care	12 (6%)	12 (6%)			
6	Hospitalized but no longer needed medical care	8 (4%)	3 (2%)			
7	Not hospitalized	120 (60%)	103 (52%)			

Both 5 days and 10 days of remdesivir had a similar effect on how much the participants' clinical status improved.



What side effects happened during the study?

For the purpose of this summary, "side effects" are defined as medical problems that the doctors thought might be related to remdesivir. A side effect is considered "serious" if it results in death, is life-threatening, or considered by the doctor to be medically important. Side effects are also serious if they cause lasting problems or require hospital care. All other side effects are considered "non-serious".

The results from several studies are usually needed to help decide if a treatment actually causes a side effect.

There were 53 participants who did not take any study treatment. So, the results in this section only include 4,838 participants.

The table below shows how many participants had side effects during the study.

	Pai	τA	Part B			
	Number of participants (%)					
Overall side effects	Remdesivir 5 days (out of 200 participants)	Remdesivir 10 days (out of 197 participants)	Remdesivir 10 days Life support at baseline (out of 844 participants)	Remdesivir 10 days No life support at baseline (out of 3597 participants)		
How many participants had serious side effects?	3 (2%)	4 (2%)	10 (1%)	13 (under 1%)		
How many participants had non-serious side effects?	30 (15%)	36 (18%)	121 (14%)	427 (12%)		
How many participants died from side effects?	0	0	1 (under 1%)	0		
How many participants stopped taking the study treatments because of side effects?	5 (3%)	9 (5%)	39 (5%)	103 (3%)		

The table on the next page shows all the serious side effects that happened during the study in more than 1 participant. The most common serious side effect was increased level of liver protein in the blood, which can sometimes mean that the liver is injured or inflamed.

	Part A		Part B		
	Number of participants (%)				
Most common serious side effects	Remdesivir 5 days (out of 200 participants)	Remdesivir 10 days (out of 197 participants)	Remdesivir 10 days Life support at baseline (out of 844 participants)	Remdesivir 10 days No life support at baseline (out of 3597 participants)	
Increased level of liver protein in the blood (transaminases)	3 (2%)	2 (1%)	4 (1%)	2 (under 1%)	
Sudden kidney injury (acute kidney injury)	0	0	2 (under 1%)	2 (under 1%)	
Increased level of liver protein in the blood (aspartate aminotransferase)	0	0	0	2 (under 1%)	
High level of liver protein in the blood (hypertransaminasaemia)	0	1 (under 1%)	1 (under 1%)	0	

The table below shows the 5 most common non-serious side effects. Some participants may have had more than 1 non-serious side effect.

The most common non-serious side effects were increased level of alanine aminotransferase (ALT) and aspartate aminotransferase (AST), liver proteins in the blood. These happened in more participants taking remdesivir for 10 days compared with participants taking remdesivir for 5 days in Part A.

	Part A		Part B	
	Number of participants (%)			
Most common non-serious side effects	Remdesivir 5 days (out of 200 participants)	Remdesivir 10 days (out of 197 participants)	Remdesivir 10 days Life support at baseline (out of 844 participants)	Remdesivir 10 days No life support at baseline (out of 3597 participants)
Increased level of liver protein in the blood (ALT increased)	4 (2%)	14 (7%)	32 (4%)	106 (3%)
Increased level of liver protein in the blood (AST increased)	5 (3%)	11 (6%)	39 (5%)	73 (2%)
Feeling sick to the stomach (nausea)	9 (5%)	5 (3%)	4 (under 1%)	65 (2%)
Increased level of liver protein in the blood (transaminases increased)	2 (1%)	2 (1%)	22 (3%)	44 (1%)
Difficulty passing stools (constipation)	3 (2%)	3 (2%)	5 (under 1%)	25 (under 1%)



How has this study helped researchers?

The researchers learned more about the safety and effectiveness of remdesivir as a 5-day or 10-day treatment for people with severe COVID-19.

The results from several studies are needed to help decide which treatments work and are safe. This summary shows only the main results from this one study. Other studies may provide new information or different results. Always talk to a doctor before making any treatment changes.

Further clinical studies with remdesivir are planned.



Where can I learn more about this study?

You can find more information about this study on the websites listed below. If a full summary of the study's results is available, it might be on these websites:

- www.clinicaltrials.gov Once you are on the website, type **"NCT04292899"** into the search box and click **"Search"**
- www.clinicaltrialsregister.eu Once you are on the website, click **"Home and Search"**, then type **"2020-000841-15"** into the search box and click **"Search"**

Short study title: Study to Assess the Safety and Effectiveness of Remdesivir in People with Severe COVID-19

Full study title: A Phase 3 Randomized Study to Evaluate the Safety and Antiviral Activity of Remdesivir (GS-5734[™]) in Participants with Severe COVID-19

Gilead Protocol Number: GS-US-540-5773

National Clinical Trials Number: NCT04292899

EU Clinical Trials Number: 2020-000841-15

Gilead Sciences sponsored this study and has its headquarters at 333 Lakeside Drive, Foster City, CA 94404, USA.

The phone number for the Gilead Clinical Study Information Center is 1-833-GILEAD-0 (1-833-445-3230).

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This summary was created and approved by Gilead Sciences on 07 December 2020. The information in this summary does not include any information available after this date.

Thank You

Clinical study participants belong to a large community of people who take part in clinical research around the world. They help researchers answer important health questions and find medical treatments for patients.