NAME: MBELU CHUKWUDI MICHAEL

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ASSIGNMENT

1) **Question 1:**

(a) What is the relationship between health beliefs and accepted treatments?

(b) How are biological processes influenced by culture?

(c) What happens when Western medicine is introduced into a foreign culture?(use Nigeria as a case study)

**Question 2:**

In what ways has the Corona virus pandemic impacted  global health?  Lay emphasis on the influence of culture and response to disease treatment.

ANSWERS

1a) Positive patient–provider relationships have been associated with improved depression treatment outcomes. Little is known about how patient treatment beliefs influence patient–provider relationships, specifically treatment alliance and shared decision making in primary care (PC).

In the psychotherapeutic relationship, as theorized by Bordin ([1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4371891/#CIT0001)), the treatment alliance between a provider and individual consists of tasks (what needs to be done to reach a goal), goals (what the individual hopes to gain) and bond (formed from the belief that the task will bring the individual closer to achieving those goals). Although less understood in the context of physicians and patients, the patient–provider relationship, through the collaborative bond and shared decision making regarding depression treatment (treatment alliance), is a predictor of better treatment engagement, adherence and outcomes in psychotherapy ([2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4371891/#CIT0002)). Although providers may anecdotally identify factors that influence provider–patient relationship quality, how these relationships influence identification and use of mental health services in primary care (PC) is largely unexplored ([3](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4371891/#CIT0003)). Importantly, preliminary studies have suggested that factors in the patient–provider relationship may be as predictive of depression outcomes as treatment condition (psychotherapy, antidepressants, pill placebo) in PC ([4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4371891/#CIT0004)). The aims of this work were to examine how (i) patient beliefs about depression treatment and (ii) provider qualities influence treatment alliance and shared decision making. Findings can inform PC depression screening, treatment planning and care management and improve depression outcomes in PC.

b) Culture determines how productive a society is and how much people eat and what kinds of food. Diet impacts biology. Culture determies how stressed people are and when they sleep. These things impact cortisol levels. Culture influences how polluted the environment is, which impacts biology. Culture influences which drugs are likely to be used, which influences biology. It influences how many children people have and what age. It influences whether people get vaccinated and for what diseases. It influences whether people build sky scrapers and how successful they are in war. Culture influences everything. Another very obvious example is lactose intolerance. Our ancestors, like most mammals, lost the ability to digest lactose (a sugar found in milk) soon after weaning. However, at some point herders in Africa or the Middle East discovered that you could drink milk from cows. This is such a useful food source that it created a very strong advantage for the few mutants who didn't lose the ability to digest lactose, and now most individuals from cultures that used milk heavily (Europe, Africa, the Middle East) are able to. Other examples of culture influencing evolution include domestication, extinction, habitat loss/modification, antibacterial resistance, and HIV virulence.

As primates, we are *extremely* social individuals. We evolved by working in groups, being close with friends and family; so a very important part of our lives is to get accepted on social circles.

Our brains determine what’s important for us (an activity very complex in itself), and so it can rewire itself accordingly. For example, a failed social experience can be as traumatizing as physical injuries. That is because the huge importance social acceptance has.

Based on this principle, culture conveys a mix of cultural/biological issues: dress codes, behavior codes, parties, traditions, etc. But as you may imagine, most of them either have connection with food, friendship or love.

c) Western medicine was not formally introduced into Nigeria until the 1860s, when the Sacred Heart Hospital was established by Roman Catholic missionaries in Abeokuta. Throughout the ensuing colonial period, the religious missions played a major role in the supply of modern health care facilities in Nigeria. The Roman Catholic missions predominanted, accounting for about 40 percent of the total number of mission-based hospital beds by 1960. By that time, mission hospitals somewhat exceeded government hospitals in number: 118 mission hospitals, compared with 101 government hospitals.

Mission-based facilities were concentrated in certain areas, depending on the religious and other activities of the missions. Roman Catholic hospitals in particular were concentrated in the southeastern and midwestern areas. By 1954 almost all the hospitals in the midwestern part of the country were operated by Roman Catholic missions. The next largest sponsors of mission hospitals were, respectively, the Sudan United Mission, which concentrated on middle belt areas, and the Sudan Interior Mission, which worked in the Islamic north. Together they operated twenty-five hospitals or other facilities in the northern half of the country. Many of the mission hospitals remained important components of the health care network in the north in 1990.

The missions also played an important role in medical training and education, providing training for nurses and paramedical personnel and sponsoring basic education as well as advanced medical training, often in Europe, for many of the first generation of Western-educated Nigerian doctors. In addition, the general education provided by the missions for many Nigerians helped to lay the groundwork for a wider distribution and acceptance of modern medical care.

The British colonial government began providing formal medical services with the construction of several clinics and hospitals in Lagos, Calabar, and other coastal trading centers in the 1870s. Unlike the missionary facilities, these were, at least initially, solely for the use of Europeans. Services were later extended to African employees of European concerns. Government hospitals and clinics expanded to other areas of the country as European activity increased there. The hospital in Jos, for example, was founded in 1912 after the initiation there of tin mining.

World War I had a strong detrimental effect on medical services in Nigeria because of the large number of medical personnel, both European and African, who were pulled out to serve in Europe. After the war, medical facilities were expanded substantially, and a number of government-sponsored schools for the training of Nigerian medical assistants were established. Nigerian physicians, even if trained in Europe, were, however, generally prohibited from practicing in government hospitals unless they were serving African patients. This practice led to protests and to frequent involvement by doctors and other medical personnel in the nationalist movements of the period.

After World War II, partly in response to nationalist agitation, the colonial government tried to extend modern health and education facilities to much of the Nigerian population. A ten-year health development plan was announced in 1946. The University of Ibadan was founded in 1948; it included the country's first full faculty of medicine and university hospital, still known as University College Hospital. A number of nursing schools were established, as were two schools of pharmacy; by 1960 there were sixty-five government nursing or midwifery training schools. The 1946 health plan established the Ministry of Health to coordinate health services throughout the country, including those provided by the government, by private companies, and by the missions. The plan also budgeted funds for hospitals and clinics, most of which were concentrated in the main cities; little funding was allocated for rural health centers. There was also a strong imbalance between the appropriation of facilities to southern areas, compared with those in the north.

By 1979 there were 562 general hospitals, supplemented by 16 maternity and/or pediatric hospitals, 11 armed forces hospitals, 6 teaching hospitals, and 3 prison hospitals. Altogether they accounted for about 44,600 hospital beds. In addition, general health centers were estimated to total slightly less than 600; general clinics 2,740; maternity homes 930; and maternal health centers 1,240.

Ownership of health establishments was divided among federal, state, and local governments, and there were privately owned facilities. Whereas the great majority of health establishments were government owned, there was a growing number of private institutions through the 1980s. By 1985 there were 84 health establishments owned by the federal government (accounting for 13 percent of hospital beds); 3,023 owned by state governments (47 percent of hospital beds); 6,331 owned by local governments (11 percent of hospital beds); and 1,436 privately owned establishments (providing 14 percent of hospital beds see; [table 6](http://www.country-data.com/frd/cs/nigeria/ng_appen.html#table6), Appendix).

The problems of geographic maldistribution of medical facilities among the regions and of the inadequacy of rural facilities persisted. By 1980 the ratios were an estimated 3,800 people per hospital bed in the north (Borno, Kaduna, Kano, Niger, and Sokoto states); 2,200 per bed in the middle belt (Bauchi, Benue, Gongola, Kwara, and Plateau states); 1,300 per bed in the southeast (Anambra, Cross River, Imo, and Rivers states); and 800 per bed in the southwest (Bendel, Lagos, Ogun, Ondo, and Oyo states). There were also significant disparities within each of the regions. For example, in 1980 there were an estimated 2,600 people per physician in Lagos State, compared with 38,000 per physician in the much more rural Ondo State.

In a comparison of the distribution of hospitals between urban and rural areas in 1980, Dennis Ityavyar found that whereas approximately 80 percent of the population of those states lived in rural regions, only 42 percent of hospitals were located in those areas. The maldistribution of physicians was even more marked because few trained doctors who had a choice wanted to live in rural areas. Many of the doctors who did work in rural areas were there as part of their required service in the National Youth Service Corps, established in 1973. Few, however, remained in remote areas beyond their required term.

Hospitals were divided into general wards, which provided both outpatient and inpatient care for a small fee, and amenity wards, which charged higher fees but provided better conditions. The general wards were usually very crowded, and there were long waits for registration as well as for treatment. Patients frequently did not see a doctor, but only a nurse or other practitioner. Many types of drugs were not available at the hospital pharmacy; those that were available were usually dispensed without containers, meaning the patients had to provide their own. The inpatient wards were extremely crowded; beds were in corridors and even consisted of mattresses on floors. Food was free for very poor patients who had no one to provide for them. Most, however, had relatives or friends present, who prepared or brought food and often stayed in the hospital with the patient. By contrast, in the amenity wards available to wealthier or elite patients, food and better care were provided, and drug availability was greater. The highest level of the Nigerian elite frequently traveled abroad for medical care, particularly when a serious medical problem existed.

In the early 1980s, because of shortages of fuel and spare parts, much expensive medical equipment could not be operated. Currency devaluation and structural adjustment beginning in 1986 exacerbated these conditions. Imported goods of all types doubled or tripled in price, and government and public health care facilities were severely affected by rising costs, government budget cuts, and materials shortages of the late 1980s. Partly as a result of these problems, privately owned health care facilities became increasingly important in the late 1980s. The demand for modern medical care far outstripped its availability. Medical personnel, drugs, and equipment were increasingly diverted to the private sector as government hospitals deteriorated.

Government health policies increasingly had become an issue of policy debate and public contention in the late 1980s. The issue emerged during the Constituent Assembly held in 1989 to draft a proposed constitution. The original draft reported by the assembly included a clause specifying that free and adequate health care was to be available as a matter of right to all Nigerians within certain categories. The categories included all children younger than eighteen; all people sixty-five and older; and all those physically disabled or handicapped. This provision was, however, deleted by the president and the governing council when they reviewed the draft constitution.

**QUESTION 2**

The COVID-19 pandemic is considered as the most crucial global health calamity of the century and the greatest challenge that the humankind faced since the 2nd World War. In December 2019, a new infectious respiratory disease emerged in Wuhan, Hubei province, China and was named by the World Health Organization as COVID-19 (coronavirus disease 2019). A new class of corona virus, known as SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) has been found to be responsible for occurrence of this disease. As far as the history of human civilization is concerned there are instances of severe outbreaks of diseases caused by a number of viruses. According to the report of the World Health Organization (WHO as of April 18 2020), the current outbreak of COVID-19, has affected over 2164111 people and killed more than 146,198 people in more than 200 countries throughout the world. Till now there is no report of any clinically approved antiviral drugs or vaccines that are effective against COVID-19. It has rapidly spread around the world, posing enormous health, economic, environmental and social challenges to the entire human population. The coronavirus outbreak is severely disrupting the global economy. Almost all the nations are struggling to slow down the transmission of the disease by testing & treating patients, quarantining suspected persons through contact tracing, restricting large gatherings, maintaining complete or partial lock down etc. This paper describes the impact of COVID-19 on society and global environment, and the possible ways in which the disease can be controlled has also been discussed therein.

COVID-19 is a global threat that requires a global response involving all countries. Governments should be responsible for providing exact information to help the public face this novel infection. To decrease the damage connected with COVID-19, public health and infection control actions are immediately necessary to limit the global spread of the virus. Some Global strategies are discussed below to prevention and control COVID-19 disease.

**6.1. Restricting mass gathering**

Preventing SARS-CoV-2 transmission by restricting mass gathering is an important objective of public health care system. COVID-19 is spread from person to person through direct contact. Thus, the spread of respiratory illnesses during the mass gathering is a major public health concerns with the potential of distribution of these infectious diseases. Based on earlier knowledge of MERS and SARS infections, the WHO in order to reduce the general risk of transmission of COVID-19 has recommended some precautionary measures such as avoiding close contact with people suffering from acute respiratory illness, regular hand washing with soap & water or hand sanitizer particularly after direct contact with sick people or their environment, maintaining cough etiquette, and avoiding unprotected contact with farm or wild animals etc. Govt. of different countries postponed all types of religious, cultural, social, scientific, sport, and political mass gathering events in different parts of the world. Some international events such as Umrah, Hajj and the Olympic Games have already been suspended in order to avoid mass gathering. Media and information technology are providing significant support to the society for prevention and control of COVID-19 outbreak. So, restricting mass gathering could be the primary preventive strategy for COVID-19.

**6.2. Medicine**

The outbreak of COVID-19 has become a clinical threat to the common population and healthcare workers worldwide. Since this is a very new virus, much knowledge about this novel virus is therefore not available. So far, there are no exact antiviral treatments or vaccines for COVID-19 disease. Therefore, it is an urgent necessity of time to develop a safe and stable COVID-19 vaccine. Anti-viral drugs like Chloroquine and hydroxychloroquine have been found to be effective against COVID-19 in laboratory studies and in-vivo studies ([Rolain et al., 2007](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0085); [WHO, 2020](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0120)). A recent study by Wang et al. revealed that remdesivir and chloroquine were highly effective in the control of 2019-nCoV in vitro ([Wang et al., 2020a](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0100), [Wang et al., 2020b](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0105)). Since SARS-CoV-2 is an RNA virus, any vaccines, effective against other RNA viruses such as measles, polio, encephalitis B and influenza, could be the most promising alternatives ([Lu, 2020](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0055); [Liu et al., 2020](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0050)). So, research will continue to play an important role to discover new drugs or vaccines to prevent and control the COVID-19 infections.

**6.3. Forestation**

According to World Wildlife Fund, forests cover more than 30% of the Earth's land surface. The unstoppable growths in human population lead to deforestation for resources, industries and land for agriculture or grazing. Rising average temperature and ocean levels, and increased rate of extreme weather events affect not only the global land and ecosystem, but also human health ([Ruscio et al., 2015](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0090)). Deforestations are also linked to different types of disease due to the birds, bat-borne viral outbreaks ([Afelt et al., 2018](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0005); [Olivero et al., 2017](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0065)). COVID-19 is bat related epidemic. To prevent this outbreak, billions of dollars are being spent to developing diagnostic, treatment, and medicine. But we are neglecting the primary tools of prevention such as forestation and respecting wildlife habitats. It is therefore very much important for the world to realize the significance of the forests, and to encourage afforestation as much as possible throughout the world.

**6.4. Controlling human population growth**

Environment change is likely to have various impacts on human health. Environment change has been positively related to human influences ([IPCC, 2014](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0045); [Shindell et al., 2017](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0095)). A very important factor is rapid human population growth, which has been accompanied by enormous economic development and increasing sources of pollution such as vehicles and polluting industries. In China, the unstoppable increase in human population growth has lead to deforestation and the people eat different types of bats, frogs, snakes, birds, and animals. COVID-19 is reported as a bat related epidemic originated from China ([Fan et al., 2019](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0030)). Revealing exceedingly vulnerable populations to new pathogens by increased human relocation to previously isolated areas may bring together infectious diseases. Control of population growth is therefore very essential in this regard.

**6.5. Global ban on wildlife trade**

The starting point of COVID-19 outbreak was Hunan seafood market, Wuhan, China. China has temporary put a ban on wildlife markets where animals such as civet, bat, wolf pup, pangolin etc. are kept alive in small cages while on sale. 60% of emerging transferable diseases originate from animals, and 70% of these are supposed to originate in wild animals. So, the unrestricted wildlife trade might enhance the risks of emerging new viruses. Many scientists have urged different countries to permanently ban the wildlife markets and trades. These actions would help to protect human lives from future pandemics like COVID-19. Therefore, considering the national security, biosafety, and public health, it is essential to globally ban wildlife markets and trades.

## COVID-19 and global environment

From the very beginning of civilization, human beings gradually started manipulating the nature for its own benefit. In order to satisfy the demand of increasing population industrialization and urbanization became inevitable, and the obvious significance was proved to be detrimental on the global environment. Further, environmental concerns include air pollution, water pollution, climate change, ozone layer depletion, global warming, depletion of ground water level, change of biodiversity & ecosystem, arsenic contamination and many more ([Bremer et al., 2019](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0020); [Coutts et al., 2010](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0025)). Global warming is a result of the increasing concentration of greenhouse gases (CO2, CH4, N2O etc). Out of the desire to drive the nature as per their own whims and desire, human beings started destroying the nature in numerous ways. As an inevitable consequence environment pollution has become a big issue of the present day.

But, due to the unusual outbreak of COVID-19, almost every big and small cities and villages in the affected countries like China, Taiwan, Italy, USA, France, Spain, Turkey, Iran, Germany, S Korea, U.K, India, Australia and many more, is under partial of total lockdown for a long period of time ranging from a few weeks up to a few months. All local and central administrations worldwide have literally put a ban on free movement of their citizens outside their home in order to avoid community transmission The various religious, cultural, social, scientific, sport, and political mass gathering events like, Hajj, Olympics etc. are cancelled. Various types of industries are not functioning, all types of travels are cancelled. Meanwhile, efforts to restrict transmission of the SARS-CoV-2, by restricting the movement have had an outstanding environmental effect. Due to non-functioning of industries, industrial waste emission has decreased to a large extent. Vehicles are hardly found on the roads resulting almost zero emission of green-house gases and toxic tiny suspended particles to the environment. Due to lesser demand of power in industries, use of fossil fuels or conventional energy sources have been lowered considerably. Ecosystems are being greatly recovered. In many big cities the inhabitants are experiencing a clear sky for the first time in their lives. The pollution level in tourist spots such as forests, sea beaches, hill areas etc. is also shrinking largely. Ozone layer has been found to have revived to some extent. The pandemic has displayed its contrasting consequence on human civilization, in the sense that, on one hand it has executed worldwide destruction, but created a very positive impact on the world environment on the other hand.

## COVID-19 and global health

The relationship between human health and disease is neither a new concept, nor a new subject. The emergence COVID-19 in China at the end of 2019 has caused a large global outbreak and is a major public health issue. This virus is highly infectious and can be transmitted through droplets and close contact. The human to the human spreading of the virus occurs due to close contact with an infected person exposed to coughing, sneezing, respiratory droplets or aerosols ([Fig. 4](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "f0020)). These aerosols can penetrate the human body (respiratory system) via inhalation through nose or mouth ([Phan et al., 2020](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0070); [Riou and Althaus, 2020](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0080)). The clinical spectrum for individuals with COVID-19 infection ranges from mild or non-specific signs and symptoms of acute respiratory illness such as fever, cough, fatigue, shortness of breath, to severe pneumonia with respiratory failure and septic shock, which are very similar to other coronavirus diseases ([Backer et al., 2020](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0015)). The presenting features of COVID-19 disease in adults are pronounced. It is a matter of great importance to clarify the correlation between COVID-19 and immune-rheumatologic patients. Taking into consideration the quick and frantic spread of the epidemic, health of rheumatic patients is a matter of prime concern. COVID-19 being a respiratory disease, damage of the tissues of Lungs is quite obvious, but there is report that other organs and tissues may also be affected. Since viral shedding in plasma or serum is common in respiratory tract infections, there is a possibility of transmission of coronaviruses through the transfusion of labile blood products. COVID-19 is a major public health concern for the world's population and is a leading cause of hospitalization and death, particularly for middle and old age people in the affected countries.

## COVID-19 and economy

Loss of lives due to any pandemic causes definite irretrievable damage to the society. But apart from this, COVID-19 has severely demobilized the global economy. In order to restrict further transmission of the disease in the community, many of the affected countries have decided to undergo complete lock down. Major international flights and also all types of business transports have been deferred amid different countries. Due to lockdown all domestic flights, railway service (except goods trains), bus, truck, and vehicles transports are suspended with special exemption to those associated with essential commodities. In almost all the COVID-19 stricken countries, entire educational, commercial, sports and spiritual institutions are closed. Industries are suffering a lot as many of these excepting those related to essential amenities, are closed for a long time in many countries. People belonging to the tourism and transportation industry are also facing utmost difficulties. Production level has gone very low. Economy of many so called powerful countries are now facing the threat of high inflation and increasing unemployment as a result of lack of productivity and excessive expenditure for the treatment and rehabilitation of the COVID-19 victims and their families ([OECD Interim Economic Assessment, 2 March 2020](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "bb0060)). Lockdown will directly affect the GDP of each country in the major economics ([Fig. 5](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "f0025), [Fig. 6](https://www.sciencedirect.com/science/article/pii/S0048969720323998" \l "f0030)). For each month there will be an approximate loss of 2% points in annual GDP growth. The tourism sector alone faces an output decrease as high as 50% to 70%. According to World Trade Organization (WTO) and Organization for Economic Cooperation and Development (OECD) have indicated COVID-19 pandemic as the largest threat to global economy since the financial emergency of 2008–2009. Some of the experts are even saying that human civilization has not faced such an unprecedented emergency after the World War-II. So, COVID-19 has undoubtedly put forth a remarkably bad effect on the day to day life of the entire human society and also on the world economy.

**RESPONSE TO TREATMENTS**

As the [COVID-19 pandemic](https://theconversation.com/coronavirus-where-do-new-viruses-come-from-136105) continues to spread across the world, killing thousands and bringing economies to their knees, doctors, scientists and governments are on the lookout for safe and effective treatments to help those who are sick. And yet a large issue with COVID-19 is that there is, as yet, no cure.

Though there are treatments that can alleviate the symptoms – such as difficulty breathing – they do not address the underlying cause: the virus. The idea is that treating the symptoms will help prolong a patient’s life and buy time for their own [immune systems](https://theconversation.com/regular-exercise-has-long-term-benefits-for-immunity-its-important-to-stay-active-135836) to kick in and remove the infection.

While research into related coronaviruses over the last few decades has brought some [promising looking drugs](https://theconversation.com/drug-companies-should-drop-their-patents-and-collaborate-to-fight-coronavirus-135241), only large [clinical trials](https://theconversation.com/covid-19-treatment-might-already-exist-in-old-drugs-were-using-pieces-of-the-coronavirus-itself-to-find-them-133701) on patients with COVID-19 will be able to reveal precisely whether these interventions are safe and effective. Unfortunately, these kinds of large trials take time to carry out, but they are ongoing.

The [World Heath Organization](https://www.sciencemag.org/news/2020/03/who-launches-global-megatrial-four-most-promising-coronavirus-treatments) (WHO) announced it has helped to launch four “mega trials” against COVID-19 and there are countless more smaller ones coordinated in countries worldwide.

The WHO-backed trials are focusing on drugs that are thought to directly block SARS-CoV-2 – the virus strain that causes coronavirus COVID-19 – from replicating inside our lungs. Below are some of the main drugs these trials are looking at.

## Remdesivir

This is an intravenous antiviral drug that was developed to block infection with related coronaviruses and even Ebola, and is one of the drugs the WHO is helping to investigate.

[Remdisivir](https://www.nature.com/articles/s41422-020-0282-0) has already been shown to work against SARS-CoV-2 in cells in a dish in a lab as well as in mice infected with the virus. Remdesivir specifically targets key viral proteins involved in making new copies of the virus and prevents them from working.

Remdesivir has already been used in some COVID-19 [patients in the US](https://www.nejm.org/doi/full/10.1056/NEJMoa2007016) and appears safe, but large trials are needed to really know if this is the case.

## Lopinavir/ritonavir

This is a drug combination used against viruses like HIV. It works in a similar way to remdesivir by blocking key viral proteins called “proteases”.

[Lopinavir/ritonavir](https://www.nejm.org/doi/full/10.1056/NEJMoa2001282) has also been shown to be effective against SARS-CoV-2 in lab cells as well as in mice and is being tested alongside an antiviral drug called interferon beta. This is currently used to treat Multiple sclerosis and can enhance the natural defences of the body’s cells against COVID-19.

## Chloroquine and hydroxychloroquine

Both of [these drugs](https://theconversation.com/chloroquine-and-hydroxychloroquine-no-proof-these-anti-malarial-drugs-prevent-novel-coronavirus-in-humans-134703) are currently used to treat malaria and the autoimmune disease lupus. [Chloroquine](https://theconversation.com/could-chloroquine-treat-coronavirus-5-questions-answered-about-a-promising-problematic-and-unproven-use-for-an-antimalarial-drug-134511) has been tested against lots of different infections because in the lab it can block viruses – including SARS-CoV-2 - from getting inside cells placed in a dish and so prevent infection.

Outside the lab, chloroquine has not been demonstrated to have a profound effect at preventing disease and there is limited evidence so far that it can work for COVID-19, despite receiving [a lot of hype from President Donald Trump](https://www.sciencemag.org/news/2020/03/insane-many-scientists-lament-trump-s-embrace-risky-malaria-drugs-coronavirus). But again, large trials are needed and the WHO is supporting these.

Caution should be observed with chloroquine as it can have significant side effects in certain people and may even block the immune response – the desired result in lupus treatment.

## Two other options

The above potential treatments all work by blocking some key element of the virus infection machinery using small molecules. Two other kinds of treatments are also being explored in trials that work in a different way.

The first is [passive immunisation](https://www.jci.org/articles/view/138003) which is the transfer – or transfusion – of potential protective antibodies from someone who has been infected and recovered from COVID-19 to someone who is at high-risk or is suffering from a SARS-CoV-2 infection.

This so-called “[convalescent sera](https://www.jci.org/articles/view/138003)” (which is a purified blood product from someone who has recovered from COVID-19) can block SARS-CoV-2 in cells in a dish in the lab and has the potential to help develop treatments. Passive immunisation for COVID-19 is being tested in trials across the world and so far results seem to [suggest it is safe to use](https://jamanetwork.com/journals/jama/fullarticle/2763983).

Another kind of possible treatment works by blocking parts of our own immune system that are likely overreacting to SARS-CoV-2 infection and [contributing to the damage in our lungs](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30628-0/fulltext).

In the limited studies that have been conducted on COVID-19, it seems that in some severe cases our immune response goes into overdrive without being able to clear the infection and this can increase the severity of the disease. When this happens, high levels of inflammation is found in the lungs.

Potential treatments that look at blocking the immune components linked to this severity [have begun](https://www.thelancet.com/journals/lanrhe/article/PIIS2665-9913(20)30092-8/fulltext). That said, extreme caution must be taken when manipulating the immune response during an infection as in the absence of other therapies we rely on our immune response to limit the virus replicating.

So although specific treatments for COVID-19 are not yet available, drugs are being tested and clinical trials and starting to yield results. This, combined with the further knowledge that scientists are gaining about SARS-CoV-2 will help massively until a vaccine becomes available.

**7. Conclusion**

Environment change is one of the biggest and most vital challenges of the 21st century. In spite of all their efforts to restore the nature during the last few decades, humans could only move a few steps forward. But during the last few months, consequences of the pandemic have successfully recovered the environment to a large extent that should definitely set positive impact on global climate change. Whatever be the cause or origin, the occurrence of COVID-19 has emphasized to improve the mutually-affective connection between humans and nature. At this point of time, it is indispensable to control the source of disease, cut off the transmission path, and use the existing drugs & means to control the progress of the disease proactively. Like all the preceding disasters on the earth, let all be optimistic enough that, human beings will definitely win over the pandemic in due course of time, but they should know the limits to which they can thrust nature, before it is too late.