



Review

COVID-19: What We Have Learnt and Where Are We Going?

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Abstract

The COVID-19 pandemic resulted in high morbidity and mortality, as well as severe social and economic disruption globally. Since the pandemic began in 2019, the severe acute respiratory syndrome, coronavirus 2, has undergone numerous changes, resulting in the emergence of new variants and subvariants. The emergence of new variants of the virus poses a challenge to scientists. There is currently no SARS-CoV-2 variant meeting the criteria of variants of concern, whereas the only variant of interest is JN.1, and there are six variants under monitoring: LP8.1, NP1.8.1, XEC, KP.3, KP.3.1.1 and the latest, XFG (Stratus). Although the latter appears to be more transmissible than the others, genomic evidence indicates that it is less aggressive than some recent variants. Nevertheless, continuous genomic surveillance of COVID-19 is still important to detect any new variants that could threaten public health. Numerous therapeutic strategies, such as drugs, vaccines, and nutritional supplements, are being used to treat COVID-19. This narrative review is an overview of COVID-19 and its various facets, from the number of cases to the therapies used, the current variants, and the ongoing clinical trials, specifically focusing on the most recent studies.

Keywords: SARS-CoV-2; variants; acute respiratory infections; COVID-19



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1. Introduction

COVID-19 (Coronavirus Disease 2019), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), does not require introduction because it is a disease well known throughout the world, just as its disastrous effects are well known. It is a disease generally more dangerous for older people, especially those who are unvaccinated or incompletely vaccinated, or for individuals with underlying diseases which are especially prone to severe disease [1]. On 31 July 2025, the WHO reported that there had been about 780,000,000 confirmed cases of COVID-19 [2]. There have been more than 7,000,000 deaths so far (Figure 1) [2]. Moreover, post-COVID syndrome, which affects multiple body systems, may persist for months; the most common and representative post-COVID manifestations are fatigue/muscle weakness; cognitive dysfunction; newly developed or exacerbated medical conditions, such as diabetes; cerebrovascular events; and autoimmune diseases, all conditions that can impair patients' quality of life. In addition, the pandemic worsened with the contraction of more diverse diseases such as obesity [3,4], infectious diseases including those caused by dangerous pathogens (belonging to the ESKAPE and ESKAPEE Groups: *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter* species; in ESKAPEE, *Escherichia coli* is also included) [5], and cancer.

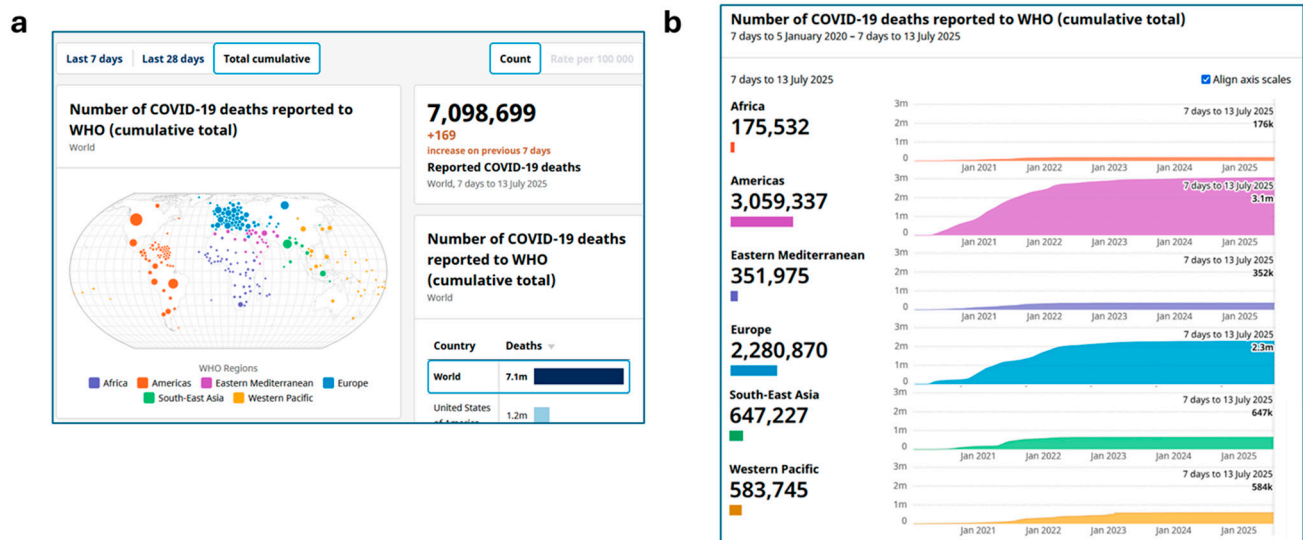


Figure 1. COVID-19 death cases worldwide (a) cumulative total; (b) cumulative total (WHO regions) [6].

In addition, in the post-COVID-19 era, the presence of COVID-19 drugs in the environment has garnered significant attention. Removal techniques are used for those drugs that persist in aquatic environments [7]. Unlike MERS and SARS-CoV-1, which remained geographically limited, SARS-CoV-2 spread worldwide and continues to circulate in humans, with the continuing emergence of new variants. Every 4–6 months, there are new emerging variants with different mutations, which are immediately studied and analyzed [8]. Researchers try to understand as soon as possible whether the current therapies and vaccines in use are still effective for the new mutations [9,10]. In 2024, the WHO launched a WHO Coronavirus Network (CoViNet) to facilitate the early and accurate detection of coronaviruses and variant tracking including coordinating risk evaluations [11]. Fortunately, new cases are decreasing, and above all, deaths from COVID-19 are decreasing, and the later variants are generally less dangerous than the previous ones. Statistics on new cases in each country, continents, and worldwide, along with the number of administered vaccines, are updated every day, week, or month (Figure 2). The significant heterogeneity in epidemiological outcomes is related to climatic/meteorological and environmental variables, such as humidity, wind speed, and UV radiation, as well as population density and human mobility [12,13]. However, nowadays, many, and perhaps most cases are no longer reported, perhaps out of laziness or because there is no longer a pressing need for it. This narrative review provides an update on COVID-19, focusing on new variants, drugs, vaccines, and other strategies used to curb this disease. It also summarizes recent clinical trials. Literature databases (PubMed/MEDLINE, Scopus, and Google Scholar) and other websites that are scientifically recognized by official governments were used as sources to search the literature, referring to the last five years. Medical journals with a low impact factor and/or h index were excluded from this review.

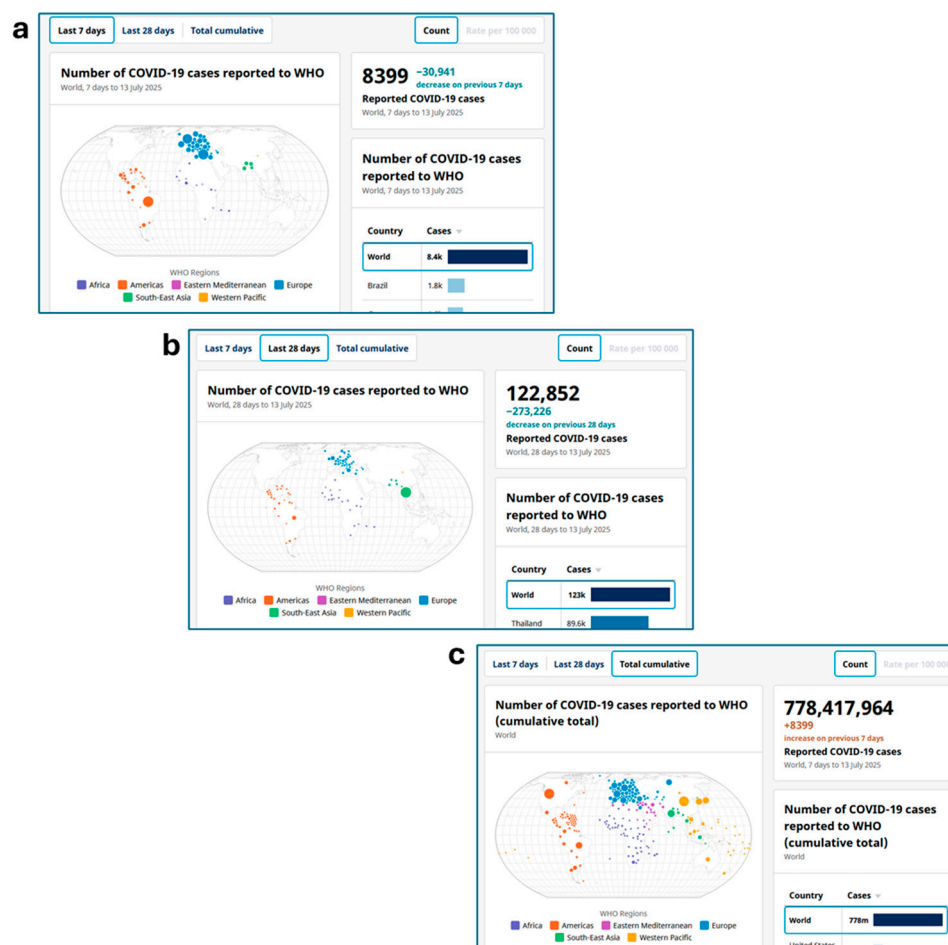


Figure 2. Number of COVID-19 cases reported by the WHO on 31 July 2025: (a) last 7 days; (b) last 28 days; (c) cumulative [14].

2. Update on Recent Variants

The new Omicron subvariants belonging to Variants Under Monitoring (VUMs) all descend from JN.1 and have been extensively and clearly schematized recently by Guo et al. (2025) [15]. The epidemiological differences among SARS-CoV-2 variants have been vastly described and recently reviewed [16]. Table 1 summarizes the currently existing VUMs. During the past five years, viral attenuation in the human population manifested as declining COVID-19-related mortality even with high prevalence of infections [17]. The latest VUMs are less dangerous than the previous. NB1.8.1. did not exhibit the characteristics of a high-risk variant [18]. The two newly emerged Omicron subvariants—XFG and XFC—are the most recent, having appeared in 2025 [19]; both were detected in Bangladesh [20,21]. The latter (XFC) has not been listed as a VUM yet [19,21].

Table 1. Updated list of Variants of Monitoring (VUMs).

VUM	Name	Date of Collection of the Earliest Example or Detection of Lineage	Date of Assignment to VUMs [22]	Ref.
XEC		16 May 2024	24 September 2024	[8,23–25]
LB.1		26 February 2024	28 June 2024	[26]
KP.3		11 February 2024	3 May 2024	[27]
KP.3.1.1		27 March 2024	19 July 2024	[18]
LP.8.1		5 March 2025	January 2025	[28–30]
NB1.8.1	Nimbus	22 January 2025	23 May 2025	[18]
XFG	Stratus or Frankenstein	27 January 2025	25 June 2025	[31–33]

3. Current Management Practices

Most common practices to combat COVID-19 are the use of drugs and vaccines [34–36], often taking advantage of nanotechnology-based approaches [37]. Antiviral therapeutics for COVID-19 [38,39] may have diverse targets: (1) drugs that target how the virus enters the cell: Evusheld, REGEN-COV, bamlanivimab and etesevimab, bebtelovimab, sotrovimab, arbidol, and nitazoxanide; (2) drugs that prevent the virus from replicating: paxlovid, molnupiravir [40], remdesivir and its prodrug obeldesivir, favipiravir, ribavirin, and Kaletra; nirmatrelvir, ibuzatrelvir-inhibiting SARS-CoV-2 M^{Pro} (reversible covalent reaction), and ensitrelvir (noncovalent interactions); (3) drugs that interfere with protein trafficking and post-translational processing: nitazoxanide and ivermectin; and (4) drugs that target immune response regulation: interferons and anti-inflammatory drugs such as dexamethasone [41]. Some new-generation adamantane derivatives, such as opaganib, are studied for their activity against the SARS-CoV-2 E-protein, a viroporin [42]. The remdesivir analog VV116 (JT001), is an oral nucleoside drug specifically designed for SARS-CoV-2 infections, which was first approved in December 2021 in Uzbekistan and then in January 2025 it received regular approval in China [43]. Recently, SARS-CoV-2 inhibition through mRNA delivery using engineered extracellular vesicles displaying the spike protein has been suggested [44]. New pharmacological strategies and various repurposing drugs have been studied for their efficacy on COVID-19 [45,46]. Repositioning from antiviral drugs acting against other viruses was the first option considered [47]. Today, new anthelmintic [48] and antimalarial drugs [49] are being tested for use against COVID-19, after the World Health Organization (WHO) banned the use of chloroquine and hydroxychloroquine in COVID-19 patients [50]. Treatments for mild or moderate COVID-19 [51] and severe SARS-CoV-2 pneumonia have been recently summarized [52]. In most countries, no antiviral option is approved for treatment of mild-to-moderate COVID-19 in non-hospitalized individuals without risk factors for progression to severe disease [53]. Moreover, it is known that the susceptibility and severity of the disease may be increased by a compromised immune system. Therefore, strengthening the immune system is considered to combat COVID-19. Moreover, complementary and alternative medicine offers several approaches to the prevention and treatment of COVID-19, including herbal therapies [54], nutraceuticals (melatonin, quercetin, curcumin, prebiotics, and probiotics) [55], edible mushrooms [56], mind–body practices, and traditional medical systems such as traditional Chinese medicine and Ayurveda [57]. Recently, biocompatible nanoparticles consisting of selenium and chitosan derivatives have been suggested as promising candidates for industrial use in the fight against COVID-19 [58]. Finally, physical activity and nutrition remain cornerstones in the management of COVID-19, as in all other diseases.

Therapies for COVID-19

The most common therapies used for COVID-19 are summarized in Table 2. Some of them received approval for the treatment of COVID-19 by the US FDA and are categorized in this reference [59]. Others have not been approved but have only received emergency use authorization (EUA) by the FDA and are detailed below. They are called “EUA drugs”, that refers to drugs authorized under EUAs [60]. Other drugs are under clinical studies for COVID-19. Anti-inflammatories such as paracetamol and other over-the counter drugs, such as diverse NSAIDs, are not reported in Table 2.

Table 2. Drugs for COVID-19.

Name (Administration Route)	Category	Approval	Ref.
Paxlovid (oral)	Ritonavir + nirmatrelvir (antivirals)	Approved by US FDA (Mild to moderate infection)	[40,61]
Kaletra® or Aluvia® (oral)	Ritonavir + lopinavir (antivirals)	Not authorized for COVID-19 treatment	[62]
Ensitrelvir (Xocova) (oral)	3CL protease inhibitor (antiviral)	Approved in Japan (2022–2023); Singapore (2023) EUA by US FDA	[63–65]
Remdesivir (Veklury®) (IV)	Antiviral (nucleoside analog)	Infection with high risk to develop severe infection. Approved by US FDA	[66,67]
Ribavirin (Rebetol®) (oral)	Antiviral (prevents viral RNA synthesis and mRNA capping)	Not authorized for COVID-19 treatment	[68]
Favipiravir or T-705 (Avigan®) (oral)	Antiviral (nucleoside analog)	Not authorized for COVID-19 treatment	[69]
Molnupiravir (Lagevrio) (oral)	Antiviral (nucleoside analog)	Mild to moderate infection EUA by US FDA	[40,70]
Mindeudesivir (VV116 or JT001) (oral)	Antiviral (nucleoside analog)	Not authorized for COVID-19 treatment Mild to moderate infection	[71]
Obeldesivir (GS-5245 or ATV006) (oral)	Antiviral (nucleoside analog)	Phase 3 clinical studies	[72,73]
Sofosbuvir (oral)	Antiviral (nucleoside analog)	Not approved by FDA for COVID-19 Phase 3 clinical studies	[74,75]
Galidesivir (BCX4430 or Immucillin-A) (IM, IV)	Antiviral (nucleoside analog)	Not approved by FDA for COVID-19	[35]
Anakinra (Kineret) (IV)	Interleukin-1 receptor antagonist	Not approved by FDA for COVID-19 EUA by US FDA	[76,77]
Baricitinib (Olumiant) (oral)	Anti-inflammatory: Janus kinase (JAK1/JAK2) inhibitor	Not approved by FDA for COVID-19	[78]
Ruxolitinib (oral)	Anti-inflammatory: Selective Janus kinase [JAK]1/JAK2 inhibitor	Phase 3 (for emergency treatment of COVID-19-associated cytokine storm in patients eligible for hospitalization)	[79]
Sabizabulin (oral)	Anticancer: Microtubule inhibitor	Phase 3 trial (≈408 patients)	[80]
Umifenovir, brand-name Arbidol (oral)	Antiviral: Fusion inhibitor	Not authorized for COVID-19 treatment	[81]
Leritrelvir (RAY1216)	Antiviral: SARS-CoV-2 M ^{Pro} inhibitor	Not authorized for COVID-19 treatment	[82]
Evusheld (IM)	anti-Spike monoclonal antibodies: tixagevimab and cilgavimab	Pre-exposure prophylaxis (PrEP)	[41,83]
Regen-CoV (Ronapreve®) (IV, SC)	IgG1j monoclonal antibodies: casirivimab and imdevimab	Not authorized for COVID-19 treatment (mild-to-moderate infection)	[84]
Bebtelovimab (LY-CoV1404) (IV)	Human IgG1 monoclonal antibody	Not authorized for COVID-19 treatment (mild-to-moderate infection)	[85]
Sotrovimab (VIR-7831 or GSK4182136) (Xevudy®) (IV, IM)	IgG1j monoclonal antibody	Not authorized for COVID-19 treatment (mild-to-moderate infection) US EUA phase 2 clinical trial	[86–88]
Tocilizumab (Actemra) (IV)	IL-6 receptor monoclonal antibody	US FDA approved for hospitalized adults on systemic steroids and oxygen/ventilatory support. WHO-recommended for severe/critical cases.	[89]
Pemivibart (Pemgarda™/VYD222) (IV)	Monoclonal antibody	Not authorized for COVID-19 treatment EUA FDA	[90]

IM = intramuscular; IV = intravenous; SC = subcutaneous.

Vaccines prevented tens of millions of deaths and hospitalizations worldwide and led to the control of the pandemic, along with other strategies [91,92]. Several vaccines have been used for SARS-CoV-2 and others are under study [93]. However, the downside is that vaccines may have caused side effects [94]. The most frequently reported side effects related to COVID-19 vaccination are fever, pain at the injection site, cephalaea, muscle pain, and fatigue [95]. There is a possibility of rare autoimmune diseases, such as autoimmune glomerulonephritis, autoimmune rheumatic diseases, autoimmune hepatitis, swollen lymph nodes, anaphylactic shock, and sarcoidosis occurring after the COVID-19 vaccination [96]. Moreover, the benefit of repeat dosing, particularly among low-risk persons who may have previously received multiple doses of COVID-19 vaccines, had multiple COVID-19 infections, or both, is uncertain. The US vaccination policy differs from that of European nations, as it has adopted a one-size-fits-all regulatory framework and has granted broad marketing authorization to all Americans over the age of 6 months, whereas all other high-income nations confine vaccine recommendations to older adults (typically those older than 65 years of age), or those at high risk for severe COVID-19. The new COVID-19 philosophy of the FDA will be the approval of vaccines for high-risk persons and, at the same time, the demand for robust, gold-standard data on persons at low risk [97].

Nutritional status, including the role of vitamins and minerals (D, C, E, zinc, and selenium) is crucial in modulating immunity and mitigating the severity of COVID-19 infections [98].

Finally, physical activity likely contributes to the prevention and treatment of COVID-19, alleviates post-acute COVID-19 syndrome, and improves patients' psychological well-being [99,100]. Yoga is an ancient practice used for strengthening the body and mind. There are several studies that focus on yoga's benefits for stress management, even though few studies are focused on COVID-19 [101].

4. Clinical Trials Related to COVID-19

Several clinical trials have been carried out for the treatment of COVID-19. However, some of them failed and others are now undergoing [102]. Table 3 summarizes the recent clinical studies [103] involving studies related to the use of drugs in COVID-19 patients.

Table 3. Recent clinical trials on drug therapies for the treatment of COVID-19 patients.

Name of the Clinical Trial	Topic of the Study	NCT Number (Status)	Completion Date
A Study to Learn About the Study Medicine Paxlovid (Nirmatrelvir + Ritonavir) in Adults Aged 60 and Older Living in Korean Long-term Care Hospitals Who Have COVID-19	Antivirals (Nirmatrelvir/Ritonavir)	NCT07089680 (Recruiting)	30 November 2025 (Estimated)
A Study to Learn About Effects of Living With COVID-19 and the Use of the Medicines Nirmatrelvir-Ritonavir in Treating COVID-19	Antivirals (Nirmatrelvir/Ritonavir)	NCT06085924 (Recruiting)	31 December 2025 (Estimated)
Study Understanding Pre-Exposure Prophylaxis of Novel Antibodies (SUPERNOVA) Sub-study	mAb (Sipavibart)	NCT05648110 (Completed)	11 February 2025
A Study to Learn About the Study Medicine Ibuzatrelvir in Adults With COVID-19 Who Are Severely Immunocompromised	Antiviral (Ibuzatrelvir)	NCT07013474 (Recruiting)	6 May 2027 (Estimated)
Evaluation of Direct Antiviral Treatments Against SARS-CoV-2 in Immunocompromised Patients with COVID-19. A G2i Study, National Multicenter Observational and Retrospective from June 2023 to April 2024 (COVID)	Antivirals	NCT06683937 (Not yet recruiting)	1 June 2025 (Estimated)
Finding Treatments for COVID-19: A Trial of Antiviral Pharmacodynamics in Early Symptomatic COVID-19 (PLATCOV)	Antivirals	NCT05041907 (Recruiting)	January 2027 (Estimated)

Table 3. *Cont.*

Name of the Clinical Trial	Topic of the Study	NCT Number (Status)	Completion Date
Efficacy of Colchicine in Improving Clinical Outcomes in Patients with Mild-to-Moderate COVID-19 Pneumonia in Lahore: A Randomized Control Trial (Colchicine)	Anti-inflammatory (Colchicine)	NCT06847204 (Recruiting)	24 June 2025 (Estimated)
To Evaluate the Safety, Efficacy, and Pharmacokinetics of Orally Administered Prolectin-M	Gal-3 antagonist (Prolectin-M)	NCT05733780 (Not yet recruiting)	February 2024 (Estimated)
A Study on the Effects in Healthy People of a New Drug Called PDI204 for Treating COVID-19 (PHONIC)	Human IgG mAb (PDI204)	NCT06965751 (Not yet recruiting)	31 December 2025 (Estimated)
A Study of the Efficacy of Troxerutin in Preventing Thrombotic Events in COVID-19 Patients	Bioflavonoid (Troxerutin)	NCT06355258 (Recruiting)	March 2025 (Estimated)
Efficacy and Safety of Nitazoxanide 600 Mg in the Outpatient Treatment of COVID-19 and Influenza	Antiparasitic (Nitazoxanide)	NCT06817096 (Recruiting)	June 2027 (Estimated)
T Cell Therapy Opposing Novel COVID-19 Infection in Immunocompromised Patients (TONI)	Coronavirus-specific T cell (CST)	NCT05141058 (Recruiting)	15 December 2027 (Estimated)

Clinical studies on the use of COVID-19 vaccines are summarized in Table 4. Moreover, studies regarding the use of dietary supplements and physical practices, as well as the early detection of this infection, which are not less important than the previous, are also reported. Finally, also studies in long-COVID are described.

Table 4. Recent clinical trials on COVID-19 regarding vaccines, dietary supplements and physical practices; studies on long-COVID.

Name of the Clinical Trial	Topic of the Study	NCT Number (Status)	Completion Date
A Study of mRNA-1283 Injection Compared With mRNA-1273 Injection in Participants ≥ 12 Years of Age to Prevent COVID-19 (NextCOVE)	Vaccines	NCT05815498 (Completed)	12 April 2025
Open-label, Multi-center, Non-Inferiority Study of Safety and Immunogenicity of BIMERVAX for the Prevention of COVID-19 in Adolescents From 12 Years to Less Than 18 Years of Age	Vaccines	NCT06234956 (Recruiting)	30 December 2024 (Estimated)
A Randomized Trial Evaluating a mRNA-VLP Vaccine's Immunogenicity and Safety for COVID-19 (ARTEMIS-C)	Vaccines	NCT06147063 (Completed)	27 March 2025
A Trial of a Next Generation COVID-19 Vaccine Delivered by Inhaled Aerosol (AeroVax)	Vaccine delivery	NCT06381739 (Recruiting)	January 2027 (Estimated)
Study to Investigate the Immunogenicity, Reactogenicity, and Safety of mRNA-1083 Vaccine (SARS-CoV-2 [COVID-19] and Influenza) in Adults ≥ 50 Years of Age	Vaccines	NCT06694389 (Active, not recruiting)	10 December 2025 (Estimated)
A Clinical Study to Investigate the Safety and Immunogenicity in Relation to Product Attributes of mRNA-1083 (Severe Acute Respiratory Syndrome Coronavirus 2 [SARS-CoV-2] and Influenza Vaccine)	Vaccines	NCT06508320 (Active, not recruiting)	17 September 2025 (Estimated)
A Study to Assess Long-term Outcomes of Myocarditis Following Administration of COVID-19 mRNA Vaccine (SPIKEVAX)	Vaccines	NCT06189053 (Active, not recruiting)	31 October 2028 (Estimated)
A Study on the Clinical Course, Outcomes, and Risk Factors of Myocarditis and Pericarditis After Moderna COVID-19 Vaccine	Vaccines	NCT06113692 (Active, not recruiting)	30 June 2025 (Estimated)
Post-marketing Surveillance (PMS) Use-Result Surveillance with SPIKEVAX BIVALENT and SPIKEVAX X Injection	Vaccines	NCT06333704 (Recruiting)	10 December 2028 (Estimated)

Table 4. Cont.

Name of the Clinical Trial	Topic of the Study	NCT Number (Status)	Completion Date
A Study to Investigate the Immunogenicity, Reactogenicity, and Safety of mRNA-1083 (Influenza and COVID-19) Vaccine in Adults ≥ 18 to < 65 Years of Age	Vaccines	NCT06864143 (Recruiting)	3 September 2025 (Estimated)
A Study to Evaluate the Safety and Immunogenicity of the mRNA COVID-19 Vaccines in Healthy Children Between 6 Months to Less than 6 Years of Age	Vaccines	NCT05436834 (Recruiting)	27 October 2025 (Estimated)
A Study to Evaluate the Immunogenicity and Safety of mRNA-1283 COVID-19 Variant-containing Formulations	Vaccines	NCT07089706 (Recruiting)	11 September 2025 (Estimated)
A Study to Learn About COVID-19 RNA-Based Variant-Adapted Vaccine Candidate(s) Against SARS-CoV-2 in Adults, Including Those at Higher Risk of Severe COVID-19	Vaccines	NCT07069309 (Recruiting)	6 January 2026 (Estimated)
A Study to Learn About How the Flu and COVID-19 Vaccines Act in Healthy People	Vaccines (in combination with flu vaccine)	NCT06821061 (Recruiting)	22 December 2025 (Estimated)
Evaluation of COVID-19 Immune Barrier and Reinfection Risk (COVID)	Vaccines and reinfection	NCT05774093 (Recruiting)	31 July 2027 (Estimated)
COVID-19: Early Detection of Worsening by Voice and Respiratory Pattern Characteristics (COVOICE)	Early Detection of COVID-19	NCT05892549 (Recruiting)	July 2026 (Estimated)
A Study of Post COVID-19 Mechanisms for Chronic Lung Sequelae	Post COVID-19	NCT06006884 (Recruiting)	August 2027 (Estimated)
Ensitrelvir for Viral Persistence and Inflammation in People Experiencing Long COVID (PREVAIL-LC)	Ensitrelvir in long-COVID patients	NCT06161688 (Active, not recruiting)	31 December 2025 (Estimated)
Medical Herbs Inhibit Inflammation Directing T Cells to Kill the COVID-19 Virus (COVID)	Dietary Supplements	NCT04790240 (Recruiting)	30 May 2027 (Estimated)
Breathing Techniques and Meditation for Health Care Workers During COVID-19 Pandemic	Breathing Techniques and Meditation	NCT04482647 (Active, not recruiting)	30 April 2027 (Estimated)
Comparison of Cardiopulmonary Fitness Level with Normal Values After COVID-19	Cardiopulmonary Fitness Level Study	NCT04753346 (Recruiting)	1 January 2024 (Estimated)
CU-COMMITS: COVID-19 Care in Black and Latino Communities and Households. Clinical and Molecular Outcomes of SARS-CoV-2	Long-term Outcomes of COVID-19	NCT05467930 (Recruiting)	May 2027 (Estimated)

5. Conclusions

Almost six years after the outbreak of COVID-19, it is time to take stock. This disease caused more than 7 million deaths worldwide and continues to affect many people. However, we will probably never have complete data on the number of infections, since many mild forms of the disease are still not accounted for. Over the past years, SARS-CoV-2 has successfully adapted to the human host and established human reservoirs for long-term coexistence with humanity. So far, drug discovery efforts for COVID-19 have led to the FDA authorization of few antiviral drugs. Most drugs received approval in other countries or have received EUA by the FDA, which is significantly different from a marketing approval and is based on a different standard of evidence. Effective therapeutic strategies to address COVID-19 are still needed, including those that can counter drug resistance related to emerging variants. It was estimated that COVID-19 vaccination during the 2020–2024 period saved more than 2.5 million lives for 15 million life years. The FDA policy will be the approval of vaccines for high-risk persons. Numerous clinical trials are under study to investigate the safety and efficacy of drugs and vaccines, as well as the effects of dietary supplement and the usefulness of physical activity for COVID-19 and Long-COVID.

6. Future Perspectives and Challenges

In my opinion, countries must draw on lessons learnt from the COVID-19 pandemic. The latest VUM, Stratus, is likely less dangerous than the previous ones. However, rapid advances in antiviral drug discovery, spurred by the COVID-19 pandemic, have shed new light on the imperative of developing effective treatments against a wide spectrum of coronaviruses. The hope is that with prior knowledge of all drugs and vaccines studied so far, new cases of COVID-19 infections will be reduced and that the possibility of the arrival of new variants, or even new pandemics, can be easily avoided. The rapid and sustained spread of new coronaviruses can have devastating consequences in the absence of effective and specifically targeted treatments. Finally, given the minor aggressive nature of the latest VUMs, is it still necessary to wear respiratory protection devices (surgical mask or FFP2) when meeting other people?

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