

# Overview, statistics, clinical management and impact of Novel Coronavirus Disease (COVID-19) in Kenya up to 20/05/2020



Short Communication



David Muriithi Nyagah<sup>1</sup>, Rosemary Muchiri Ngunju<sup>2</sup> and Milcah Njoki Nyagah<sup>3</sup>

<sup>1</sup>MED-gate Pharmaceuticals, Kenya

<sup>2</sup>Mwatate Sub-County Hospital, Kenya

<sup>3</sup>School of Education, University of Embu, Kenya

Correspondence: [davipharm91@gmail.com](mailto:davipharm91@gmail.com)

<https://orcid.org/0000-0002-2754-4302>

## Article History:

Received: 2020-06-16

Revised: 2020-08-24

Accepted: 2020-08-28

Published: 2020-09-01

## Keywords:

clinical management, covid-19, impact, Kenya, prevention, statistics

## How to cite?

Nyagah, D. M., Ngunju, R. M., & Milcah Njoki Nyagah. (2020). Overview, statistics, clinical management and impact of Novel Coronavirus Disease (COVID-19) in Kenya up to 20/05/2020. *Research Journal in Medicine and Health Sciences*, 1(1), 7-16. Retrieved from <https://royalliteglobal.com/health-sciences/article/view/205>

Copyright © 2020 The Author(s)

Published in Nairobi, Kenya by Royallite Global in the **Research Journal in Medicine and Health Sciences**

## Abstract

**Background:** The 2019 Novel Coronavirus Disease (COVID-19) was first announced in Wuhan, China and was regarded as a worldwide security threat. As of 20<sup>th</sup> May 2020, there were 5,083,411 cases and 329,239 deaths reported by 212 nations. Kenya has affirmed 1029 cases, 50 fatalities and 366 recoveries since the Government of Kenya (GoK) confirmed its first COVID-19 case on 12th March 2020.

**Objective:** This short communication aimed to discuss the overview, statistics, clinical management and impact of COVID-19 in Kenya.

**Method:** The Ministry of Health (MOH) has executed border screening, activated laboratories in Namanga, Wajir and Busia, enacted multi-agency teams and the Nyumba Kumi initiative as key strategies to curb COVID-19 spread. Of the 47 Counties, 26 confirmed COVID-19 cases with 496 (48.2%) and 316 (35.1%) cases registered in Nairobi and Mombasa. Thus, within these counties, the MOH has launched mass testing at hot spots. To report cases and mental health issues, respectively, the Government introduced toll-free lines such as 719 and 1199. Here the data presented is from government agencies and media houses and focuses on statistics, prevention, clinical management, quarantine centers, donations and impact of COVID-19.

**Results & Conclusion:** As of 20/05/2020, the Government had screened 49,405 individuals with test kits in 20 approved laboratories and screening is still ongoing. Such data are first of their kind for the correspondence and save for future knowledge and coherent verification.

Scan & Read



## Introduction

In February 2002, a cluster of respiratory illnesses triggered by Severe Acute Respiratory Syndrome Coronavirus 1 (SARS-CoV-1) occurred in Guangdong province of China. SARS-CoV-1 is believed to originate from bats and infects pangolins, civets and humans. In July 2003, the SARS epidemic accounted for 8096 cases, 774 deaths with a Case-Fatality Rate (CFR) of 9.6%. In September 2012, in Saudi Arabia, a man infected with Middle East Respiratory Syndrome Coronavirus (MERS-CoV) presented with pneumonia and kidney injury. Infected camels transmit MERS-CoV to humans. By the end of 2019, the zoonotic virus occurred in 27 countries globally, accounting for 2494 infections and 858 deaths with a CFR of 34.4%. In December 2019, several cases of pneumonia reported in Wuhan, China were linked to the novel coronavirus. On 12th January 2020, the World Health Organization (WHO) named it the 2019 Novel Coronavirus. In February 2020, WHO named it Coronavirus Disease 2019 (COVID-19). COVID-19 is caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV-2). [1] Since the Government of Kenya reported its first COVID-19 case on 12th March 2020, the country has confirmed 1029 cases, 50 fatalities and 366 recoveries. As of 20<sup>th</sup> May 2020, COVID-19 has been reported by 212 countries globally, leading to 5,083,411 cases, 329, 239 deaths with 2,020,879 recoveries. [2]

Since China reported its first case on 31<sup>st</sup> December 2019, there have been more than 82,000 cases, 4,600 deaths and 78,000 recoveries. As of 20th May 2020, more than 1,530,000 cases, 94,000 deaths and 370,000 recoveries have been registered by the United States of America (USA). On 31st January 2020, the USA government declared COVID-19 a public health emergency. Countries with the most significant number of cases include Russia (308,705), Brazil (293, 357), Spain (279,524), the United Kingdom (U.K) (248,293) and Italy (227,364) making America and Europe the continents most affected. Africa has confirmed 96,990 cases, 3,010 fatalities and 39, 428 recoveries. The highest cases were confirmed in South Africa and Egypt with 18, 003 and 14, 229, respectively. [2]

The determine the magnitude of COVID-19 is assessed by the transmission rate, CFR and incubation period. The WHO estimated COVID-19's transmission rate ( $R_0$ ) as 1.4-2.5, which represents the number of new cases infected from a single case. Previous studies have recorded  $R_0$  of 2.24-4.0. As reported by the WHO, the CFR of COVID-19 is 2%, which reflects the number of people who die from COVID-19. COVID-19's incubation period is 2 to 14 days, which is the time taken to manifest symptoms. The risk of dying from COVID-19 increases with age group and people >60 years are at a higher risk. Compared with females, males are more likely to die if infected. New York City (NYC) Health data revealed that > 70% of the deceased patients had underlying conditions such as diabetes, asthma, hypertension, cancer, kidney and liver disease. As of 14th April, 61.8% and 38.2% of confirmed deaths were males and females, respectively. Among patients with underlying conditions, e.g. cardiovascular disease, diabetes, chronic

respiratory disease, hypertension and cancer, COVID-19 had a CFR of 13.2%, 9.2%, 8.0%, 8.4% and 7.6% individually. [2,3]

COVID-19 spreads to humans via respiratory droplet transmission when an infected person talks, coughs, or sneezes. Infection happens when droplets come into contact with the mucous membrane of healthy people's eyes, nose, mouth. Infection may occur by handshaking, hugging, or standing within 2 or 1.5 meters and touching SARS-COV-2 contaminated surfaces and objects. Previous studies have documented the airborne content of COVID-19. SARS-COV-2 Ribonucleic acid (RNA) has been found in ventilators and air samples extracted from rooms with COVID-19 patients. The probability of fecal-oral and bloodborne transmission is small; however, research to confirm these remain scarce. [1,3,4]

Coronaviruses are present in the order of nidovirales and categorized into four genera: alpha, beta, gamma and delta. Alpha and beta (MERS-CoV and SARS-CoV 1 & 2) genera are human coronaviruses. Coronaviruses are enveloped and contain positive, 27 to 32 kb long RNA strands. Their membranes studded with glycoprotein cover the genome and are derived from the host. They have a helical nucleocapsid when relaxed but spherical when in the virus particle. In particular, the coronavirus genome codes five proteins; M, N, S, E and hemagglutinin-esterase protein (HE). The structural protein (M) of the membrane assists in bud release, envelope formation and transport of nutrients. The nucleocapsid structural protein matrix (N) and the RNA genome form the nucleocapsid, which plays an imperative role in the synthesis of viral RNA and budding. The glycosylated spiked proteins (S) assist in the fusion and binding with the human membrane. The envelope (E), M and N proteins play an essential role in virus assembly and release. The HE helps to absorb the virus into the host membrane by binding to neuraminic acid through cleaving its acetyl groups. [1,5]

The host receptor for SARS-COV-2 is the Angiotensin-converting enzyme 2 (ACE-2). It is found in the lower respiratory tract of humans. The protein S binds to ACE-2 on the surface of the host cell. Upon fusion, the virus releases its RNA genome into the host cell cytoplasm. After uncoating, the RNA genome undergoes translation to form proteins pp1a and pp1ab. The two polyproteins encode non-structural proteins, which result in a replication-transcription matrix. The complex continually replicates producing nested mRNA molecule sets, which encode structural and accessory proteins in the host cytoplasm. After viral particle buds are assembled and formed, the virus fuses with the host cell plasma membrane to release the virus. [1,4,5]

The reverse transcription-polymerase chain reaction (RT-PCR) assay is utilized to diagnose SARS-COV-2 RNA. The assay amplifies and detects the structural proteins S, N and E to validate infection. Primary specimens in the RT-PCR assay are samples from the upper respiratory tract (nasopharyngeal/oropharyngeal swab or aspirate). Serological tests are used to identify prior COVID-19 infection by detecting the antibodies to SARS-COV-2. Chest X-ray and

C.T. scans are conducted to check bilateral lower lobes infiltrate and changes in ground glass. Hematological tests done include full hemogram, pro-calcitonin, D-dimers, C-reactive protein, blood urea and liver function tests. [4,6]

Several studies have described fever, dry cough and fatigue as the most significant signs and symptoms of COVID-19. Less common symptoms include; myalgia, sore throat, headache, disturbances of smell and taste, anorexia, conjunctivitis, abdominal pain, diarrhea rhinorrhoea, nausea and sputum production. Severe symptoms include shortness of breath, pain in the chest, and loss of movement or speech. Laboratory results reported lymphopenia, elevated markers of inflammation, e.g., C-reactive protein and ferritin, elevated levels of D-dimers, lactate dehydrogenase, aminotransferase and pro-calcitonin. Imaging revealed abnormal chest radiographs, lymphadenopathy, pleural effusions and thickening. There were also reports of dermatological symptoms such as vesicular eruptions and reticularis. [1,3,4]

SARS-CoV-2 causes air sacs to inflame and thus clog them, making it difficult for the body organs to get enough oxygen. The majority of New York COVID-19 patients in the intensive care unit presented with renal failure and needed dialysis, suggesting kidney damage. Evidence of COVID-19 patients with myocarditis, arrhythmias and cardiac injury has shown that SARS-CoV-2 targets the heart. Clinicians identified cytokine release syndrome in rheumatoid arthritis and cancer patients. The immune system releases excess cytokines to combat the virus, which causes multiple organ damage. Increased interleukin-6 levels confirmed the discovery among COVID-19 patients. This cytokine storm warrants ventilation and intensive care. Several COVID-19 patients in China developed acute viral hepatitis and presented with dark urine suggesting damage to the liver. In a Wuhan study, 20 patients developed pulmonary embolism, which indicates that SARS-CoV-2 causes blood clots in the legs. The results were confirmed by the increased use of blood thinners among COVID-19 patients. [7]

## Materials and Methods

Since the National Influenza Center (NIC) laboratory-confirmed Kenya's first positive case on 12th March 2020, the Kenya government has strengthened its preparedness, mitigation measures and capacity to prevent further transmission of the virus through the National Emergency Response Committee (NERC) and the MOH. The Government's preventive initiatives included; contact tracing, improving screening at Busia, Namanga and Wajir border points, halting prison visits for 30 days, all public meetings, school activities, traveling outside the country in addition to daily dissemination of up-to-date information regarding the pandemic. [8] The MOH opened a call center with a toll-free number (719) on 14th March 2020 to report COVID-19 incidents. President Uhuru Kenyatta ordered a daily national curfew from 27th March at 7 pm. To take care of the stretched household income, he also reduced Pay as You Earn

(PAYE), corporation tax, turnover tax and tax for people earning <24,000. Mutahi Kagwe, the Cabinet Secretary (CS) for health, advised people to practice social distancing, transact electronically, put on masks in public and to imposed a 14-day quarantine period for any foreign traveler arriving in Kenya. The President banned the movement in and out of Nairobi, Kilifi, Mombasa and Kwale by air, road or rail for 21 days on 6th April 2020. The four counties were epicenters and accounted for 96% of national cases. [9] Mandera county became the 5<sup>th</sup> county to have movement banned after eight people succumbed to COVID-19. The GoK trained more than 104,000 healthcare practitioners via an e-based program, distributed over 10,000 Personal Protective Equipment (PPEs) and aimed to screen at least 600 people a day. The Chief Administrative Secretary (CAS) Dr. Mercy Mwangangi announced on 11th April 2020 the Government's plan to roll out mass testing starting with frontline healthcare providers. To achieve mass testing, Kenya Pipeline Company and Rouge diagnostics sent 300,000 liters of sanitizers and testing kits to the Government, respectively. [10] NERC permitted eateries and restaurants to conduct business between 5 am and 4 pm if they keep tables 1.5 meters apart, accommodate four people per 10m<sup>2</sup>, discontinue buffets, install hand sanitizers at the entrance and existing points, monitor customer's body temperature and maintain 2 feet of physical distance in the food preparation area. The C.S. of health ordered cessation of movement in and out of Eastleigh in Nairobi and Old town in Mombasa on 6th May 2020. The C.S. reduced Mombasa's port workers from 6000 employees to 4000. A new ferry was launched to ensure physical distancing. The Government added 12 airlines to support the export of horticultural and floricultural products. Through the transportation ministry, the Government ordered truck drivers traveling across borders to be screened 48 hours before departure at border point labs. A COVID-19 certificate was issued to drivers and was subject to renew after 14 days [11] The Ag. Director of General Health Dr. Patrick Amoth directed the 47 counties to set aside one hospital to handle COVID-19 patients to ensure that other services will continue to be offered. Like India, Burkina Faso, Egypt and Haiti, Kenya launched cash transfer programs such as the COVID-19 Emergency Response Fund Board and Shikilia Initiative to assist the vulnerable. Anyone can donate on account number 2042554653, Absa bank, or Mpesa Paybill 999000 to Kenya COVID-19 fund. The national treasury pumped 10 million into the COVID-19 fund targeting > 1 million Kenyans, each of whom was expected to receive Kenyan shillings (Ksh.) 2000, after the Government suspended donations of food after two women died during a food supply stampede. [12,13]

## Results and Discussion

The Collected data are presented in table numbers 1 to 10.

**Table 1: COVID-19 cases, deaths, recoveries, active and new cases in Kenya as of 20/05/2020**

Cases		Fatalities		Recoveries	Active cases	New cases (last 24 hours)		
1029		50		366	613	66		
Female	Male	Female	Male			Female	Males	[14]
366	663	12	38			23	43	

**Table 2: Number of tested samples in Kenya as of 20/05/2020**

Total tested samples	New tested samples (last 24 hours)	Tested positive	Tested negative	
49,405	2,621	66	2,555	[14]

**Table 3: Case fatality and attack rates of COVID-19 in Kenya as of 20/05/2020**

Global Case Fatality Rate	Case fatality Rate- Kenya	COVID-19 specific attack rate	The age group most affected (Cases)	The age group most affected (Deaths)	
6.5%	4.9%	2.52%	30-39 years	>60 years	[14]

**Table 4: List of counties with COVID-19 cases in Kenya as of 20/05/2020**

	County	Cases		County	Cases
1.	Nairobi	496	14.	Taita Taveta	5
2.	Mombasa	361	15.	Machakos	3
3.	Kajiado	46	16.	Siaya	2
4.	Mandera	18	17.	Homa Bay	2
5.	Kiambu	17	18.	Bungoma	2
6.	Wajir	16	19.	Meru	2
7.	Migori	14	20.	Garissa	2
8.	Kilifi	10	21.	Kakamega	1
9.	Kwale	7	22.	Isiolo	1
10.	Nakuru	5	23.	Bomet	1
11.	Kitui	5	24.	Kisii	1
12.	Uasin Gishu	5	25.	Kirinyaga	1
13.	Busia	5	26.	Makueni	1

**Table 5: COVID-19 prevention measures in Kenya as of 20/05/2020**

Prevention measures	
1.	Wash hands regularly using soap and water for 20-25 seconds or alcohol-based hand sanitizer
2.	Do not touch your mouth, nose and eyes with unsanitized/unwashed hands
3.	Cover the mouth and nose with a handkerchief, tissue or bent elbow when coughing or sneezing and wash your hands immediately
4.	Do not hug, kiss, or shake hands; wave or nod.
5.	Physical distancing. Keep a distance of least two meters/6 feet between you and other people. [15]
6.	Wear a mask in public
7.	Thoroughly disinfect surfaces and objects at home or work regularly
8.	Avoid cash transactions; encourage digital payments
9.	If you experience fever, cough or difficulty in breathing, contact MOH on +254729471414 or +254732353535 or 719.

**Clinical management of Covid-19 cases in Kenya**

The main approaches used in COVID-19 clinical treatment are symptomatic management and supportive care. The CURB65 (Confusion, Urea nitrogen in blood >7mmol/liter, Respiratory rate greater than 30 breaths/ minute, Blood pressure ≤90/60mmhg, Age >65years criteria is used to determine the severity of COVID-19 among patients. Each positive is given one score.

**Table 6: Criteria to assess the severity of COVID-19 in Kenya as of 20/05/2020**

Score	Meaning
1	Low risk
2	Outpatient management/short hospitalization
3	Admission to hospital/intensive care unit
4	ICU management and treatment
5	ICU management and treatment

Use Paracetamol 500-1000gm thrice a day for mild asymptomatic treatment of fever in adults. Encourage frequent fluid consumption so minimize dehydration. Use Analgesics such as ibuprofen 400mg 3 times a day to treat myalgia. For non-steroidal anti-inflammatory drugs, use the lowest dose over a limited period. Use a teaspoon of honey for mild cough management, for distressing cough use codeine (15mg/ml) linctus or codeine phosphate (15/30mg) every 4 hours as the first choice and morphine sulfate solution (10mg/5ml) every four hours as the 2<sup>nd</sup>

choice. For severely ill patients with respiratory distress, shock, or hypoxemia, give 4l/min of oxygen to achieve SpO<sub>2</sub> between 90 and 95%. Prone positioning increases oxygenation. In patients without shock or tissue perfusion, fluids should be administered conservatively. Administer penicillin and macrolide antimicrobial combinations (amoxicillin 1gm thrice daily or amoxicillin-clavulanic acid 625mg twice daily + clarithromycin 500mg twice daily or azithromycin 500mg once daily or erythromycin 400 mg twice daily) for the treatment of underlying diagnostic pathogens. Do not routinely use corticosteroids to reduce inflammation in the lungs. In the event patients with respiratory distress fail to respond to oxygen therapy, increase nasal oxygen flow up to 60l/min. For severe hypoxemic respiratory failure, mechanical ventilation at a low tidal volume of 4-8ml/kg body weight is implemented for 12-16 hours daily. If the patient receiving high flow nasal oxygen or mechanical ventilation deteriorates after 1 hour, perform endotracheal intubation. Use 400 mg of hydroxychloroquine twice daily (first day) is rapidly deteriorating patients then 200mg twice daily (day 2-5).<sup>[16]</sup>

**Table 7: List of laboratories approved to test COVID-19 infections in Kenya as of 20/05/2020**

Medical laboratory	
1.	National HIV reference laboratory
2.	National influenza center (NPHLS)
3.	Pathologists lancet Nairobi
4.	KEMRI-Nairobi, Kisumu/KEMRI WRP-Kisumu/ KEMRI-HIV lab/KEMRI CDC-Nairobi/ KEMRI LMB ALUPE/Walter-Reed Laboratory-Kericho/ Welcome Trust-Kilifi <sup>[17]</sup>
5.	Laboratories at Kenyatta National Hospital, Moi Teaching and Referral Hospital, Nairobi Hospital, Nairobi-West Hospital, Aga-Khan University Hospital, Machakos level 5 Hospital, Wajir, Kitale, Busia county Hospital, Malindi Sub County Hospital, Coast General Hospital and Mediheal Group of Hospitals

**Table 8: Test kits approved for SARS-CoV-2 detection in Kenya as of 20/05/2020**

Test kit	Company
1. COBAS SAR-COVID-2	Roche Diagnostics
2. Xpert Xpress SARS-CoV-2	Cepheid <sup>[18]</sup>
3. Biofire COVID-19 Test	Biofire Defence LLC
4. Abbott	Abbot Molecular Inc

**Table 9: List of COVID-19 treatments in the World and Kenya as of 20/05/2020**

	Drugs	Manufacturing company	Available in Kenya	
1.	Chloroquine/Hydroxychloroquine (Approved)	Sanofi	Yes	
2.	Favilavir (Approved)	Zhejiang Hisun pharmaceuticals	No	
3.	Lopinavir/Ritonavir (Kaletra)	Cipla	Yes	
4.	Remdesivir (GS-5734)	Gilead Sciences	No	
5.	Actemra (Tocilizumab)	Roche	No	
6.	Galidesivir (BCX4430)	Biocryst Pharma	No	
7.	Monoclonal Antibodies 3048-3051 and Kevzara (Sarilumab)	Regeneron and Sanofi	No	
8.	SNG 001 (Inhalation)	Synaigen research	No	
9.	AmnioBoost	Lattice biologics	No	
10.	Sylvant (siltuximab)	EUSA pharma	no	
	Vaccines			[19]
11.	TJM2	1-Mab Biopharma	No	
12.	AT-100 (rhSP-D)	Airway Therapeutics	No	
13.	TZLS-501 (Monoclonal antibody)	Tiziana life sciences	No	
14.	OYAI 1	OyaGen	No	
15.	BP-002	Beyond Spring	No	
16.	INO-4800	Inovio Pharmaceuticals and Beijing Advaccine Biotechnology	No	
17.	NP-120 (Ifenprodil)	Algernon Pharmaceuticals	No	
18.	APN01	The University of British Columbia and APEIRON	No	

		Biologics		
19.	mRNA-1273 vaccine	Moderna and Vaccine Research Center	No	
20.	Ieronlimab (PRO 140)	CytoDyn	No	
	Herbal remedies			
21.	Covid-organics (CVO)	Malagasy institute of applied research	No	

**Table 9: List of approved quarantine facilities with the largest bed capacity in Kenya as of 20/05/2020**

No.	Facility Name	location	Bed capacity	
1.	Kenyatta University	Thika road	2000	
2.	KMTCs	KNH	500	
3.	Kenya School of Government		300	
4.	Pride Inn Hotel	paradise	234	
5.	University of Nairobi and BOMA Hotel	Lower Kabete and South C	200	[20]
6.	City Lodge Hotel	Two rivers	170	
7.	Pride Inn Hotel	Azure	162	
8.	Mombasa Beach Hotel	Mombasa	161	
9.	Hilton Garden Inn	Airport	150	
10.	Pride Inn Hotel	Flamingo	136	

**Table 10: Impact of COVID-19 Kenya as of 20/05/2020**

Impact of COVID-19	
1.	Contraction of the GDP growth from 6.2% to 3.4%
2.	Reduced food security, particularly for internally displaced persons (IDPs), refugees and low-income earners hence importation to increase food supply
3.	Decreased horticulture and flower export due to limited flights, low prices and reduced demand in target markets
4.	Laying off workers/ mandatory unpaid leave, pay cuts and job losses
5.	Weakening of the Kenyan shilling due to depletion of foreign currency
6.	Reduced revenue in the tourism, hospitality, manufacturing and entertainment sector <sup>[21]</sup>
7.	Reduced oil prices
8.	The decline of the stock market
9.	Higher rates of domestic violence, theft, pregnancies and mental illness
10.	Kenya-Tanzania border and Kenya-Somalia border closure affecting trade
11.	Restriction of movement, closure of schools and banned social events for instance weddings, burials
12.	Reduced income for farmers and livestock keepers due to decreased demand for farm produced by households and hotels
13.	Reduction of PAYE by 5%, 100% tax exemption for people who earn <24,000

**Table 11: Organizations with the highest contributions as of 20/05/2020 to the Kenya COVID-19 Emergency Response Fund**

	<b>Company</b>	<b>Donation</b>	
1.	World Bank Group	\$ 1.05 billion	
2.	International monetary fund (IMF)	Ksh. 78 billion	
3.	The Netherlands, Belgium, France, Germany, Sweden and Denmark	Ksh. 2.4 billion	
4.	Equity Group Foundation	Ksh. 1.1 billion	
5.	Safaricom	Ksh. 200 million	[22]
6.	KCB and The National Treasury	Ksh. 150 million each	
7.	Media Owners Association	Ksh. 150 million (Airtime)	
8.	NCBA bank Kenya and Co-operative bank	Ksh. 100 million	
9.	Hindu Council of Kenya	Ksh. 100 million (food supplies)	
10.	Devki Group	Ksh. 80 million (Oxygen supply) and Sh. 20 million	
11.	Absa bank	Ksh. 50 million	
12.	First Chartered Securities	Ksh. 25 million	

**Conclusion**

As Kenya continues to face the threat of COVID-19 numerous individuals around the country are starting to acknowledge it as a veritable national disaster. The numbers revealed above will rise if the residents will not stick to the strict preventive measures and rules sketched out by the MOH. In order to protect the lives of residents and resuscitate the economy, everyone should change their behavior and adapt to the new changes. With an end goal to alleviate the spread of COVID-19, the Kenyan Government extended the nationwide lockdown for 21 more days and ordered the closure of the Kenya-Somalia and Kenya-Tanzania border. As COVID-19 deaths reach the 50<sup>th</sup> mark, the NERC on COVID-19 stays cautious and has kept on putting stringent measures to curb the surge of COVID-19 cases. These insights are first of its sort for the correspondence and to save the coherent verification for future information.

**Acknowledgments**

We thank the WHO, GoK, MOH and C.S. of Health-Kenya for providing precise information and quality up to date correspondence on the COVID-19 pandemic. The writers thank all healthcare workers in Kenya for selflessly supporting and taking care of our affected loved ones. Finally, we would like to thank the police for reinforcing safety procedures during the outbreak.

**Abbreviations**

ACE-2: Angiotensin-converting enzyme-2

CAS: Chief Administrative Secretary

CFR: Case-Fatality Rate

COVID-19: Novel Coronavirus Disease 2019

C.S.: Cabinet Secretary

GoK: Government of Kenya

HE: Hemagglutinin-esterase protein (HE)

Ksh.: Kenyan shillings

MERS-CoV: Middle East Respiratory Syndrome Coronavirus

MOH: Ministry of Health

NERC: National Emergency Response Committee

NIC: National Influenza Center

PAYE: Pay as You Earn

PPEs: Personal Protective Equipment

RNA: Ribonucleic acid

SARS-CoV-1: Severe Acute Respiratory Syndrome Coronavirus

SARS-COV-2: Severe Acute Respiratory Syndrome Coronavirus 2

USA: United States of America

WHO: World Health Organization

## References

1. Yan-Rong G, Qing-Dong C, Zhong-Si H, Yuan-Yang T, Shou-Deng C, Hong-Jun J, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status. BMC. 2020;7(11). <https://doi.org/10.1186/s40779-020-00240-0>
2. Worldometer. COVID-19 Coronavirus Pandemic [Online]. 2020. Available from: <https://www.worldometers.info/coronavirus/#repro> [Accessed 22 May 2020].
3. World Health Organization. Health topics-Coronavirus [Online]. 2020. Available from: [https://www.who.int/health-topics/coronavirus#tab=tab\\_1](https://www.who.int/health-topics/coronavirus#tab=tab_1) [Accessed 22 May 2020].
4. UpToDate. Coronavirus disease 2019 (COVID-19): Epidemiology, virology, clinical features, diagnosis, and prevention [Online]. 2020. Available from: <https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19-epidemiology-virology-clinical-features-diagnosis-and-prevention> [Accessed 24 May 2020].
5. UpToDate. Coronaviruses [Online]. 2020. Available from: [https://www.uptodate.com/contents/coronaviruses?topicRef=3027&source=see\\_link](https://www.uptodate.com/contents/coronaviruses?topicRef=3027&source=see_link) [Accessed 24 May 2020].
6. Ruot GT, Charles OCL, Ader MA. COVID-19 Case Management. SSMJ. 2020;13(2):37-39. [http://www.southsudanmedicaljournal.com/assets/files/Journals/vol\\_13\\_iss\\_2\\_may\\_20/COVID-19%20Issue\\_Final.pdf](http://www.southsudanmedicaljournal.com/assets/files/Journals/vol_13_iss_2_may_20/COVID-19%20Issue_Final.pdf)
7. The Washington Post. Coronavirus destroys the lungs. But doctors are finding its damage in kidneys, hearts and elsewhere [Online]. 2020. Available from: [https://www.washingtonpost.com/health/coronavirus-destroys-lungs-but-doctors-are-finding-its-damage-in-kidneys-hearts-and-elsewhere/2020/04/14/7ff71ee0-7db1-11ea-a3ee-13e1ae0a3571\\_story.html](https://www.washingtonpost.com/health/coronavirus-destroys-lungs-but-doctors-are-finding-its-damage-in-kidneys-hearts-and-elsewhere/2020/04/14/7ff71ee0-7db1-11ea-a3ee-13e1ae0a3571_story.html) [Accessed 26 May 2020].
8. Ministry of Health. First Case of Coronavirus Disease Confirmed in Kenya [Online]. 2020. Available from: <https://www.health.go.ke/first-case-of-coronavirus-disease-confirmed-in-kenya/> [Accessed 27 May 2020].
9. Ministry of Health. Govt announces extra measures to prevent the spread of coronavirus Nairobi, Monday 6th April 2020 [Online]. 2020. Available from: <https://www.health.go.ke/govt-announces-extra-measures-to-prevent-spread-of-coronavirus-nairobi-monday-april-6-2020/> [Accessed 28 May 2020].
10. Ministry of Health. Government to undertake mass testing, CAS Health says Nairobi, Saturday 11th April 2020 [Online]. 2020. Available from: <https://www.health.go.ke/government-to-undertake-mass-testing-cas-health-says-nairobi-saturday-april-11-2020/> [Accessed 28 May 2020].

11. Ministry of Health. Government bans movement in and out of Eastleigh and Old Town Nairobi, Wednesday 6th May 2020 [Online]. 2020. Available from: <https://www.health.go.ke/7759-2/> [Accessed 28 May 2020].
12. Devex. Cash transfers lead the social assistance response to COVID-19 [Online]. 2020. <https://www.devex.com/news/cash-transfers-lead-the-social-assistance-response-to-covid-19-96949> [Accessed 29 May 2020].
13. Daily Nation. COVID-19 emergency board appeals for donations [Online]. 2020. <https://www.nation.co.ke/news/Covid-19-emergency-fund-appeals-for-contributions/1056-5515832-toi7rw/index.html> [Accessed 29 May 2020].
14. Ministry of Health. Press Releases [Online]. 2020. <https://www.health.go.ke/wp-content/uploads/2020/05/CamScanner-05-20-2020-15.32.51.pdf> [Accessed 21 May 2020].
15. Ministry of Health. COVID-19 Prevention [Online]. <https://www.health.go.ke/#1585097652527-b326b2cf-8e0c73d1-981a> [Accessed 23 May 2019].
16. Kenya Medical Association. Interim Guidelines On Management Of COVID-19 In Kenya [Online]. 2020. <https://kma.co.ke/Documents/Case%20management%20protocol.pdf> [Accessed 29 May 2020].
17. Ministry of Health. Approved Medical Laboratories for testing SARS-Cov-2 infections in Kenya [Online]. 2020. <https://www.health.go.ke/approved-medical-laboratories-for-testing-sars-cov-2-infections-in-kenya/> [Accessed 22 May 2020].
18. Ministry of Health. Govt sets aside a special isolation and treatment facility for healthcare workers Nairobi, Monday, 20th April 2020 [Online]. 2020. <https://www.health.go.ke/govt-sets-aside-a-special-isolation-and-treatment-facility-for-healthcare-workers-nairobi-monday-april-20-2020/> [Accessed 2 May].
19. Anamika P.K., Muralidharan P, Sandhiya V, Sankari E. Trends & Treatments of Corona -A Pandemic Disaster. Sch Acad J Pharm. 2020;9(4):128-140. [https://saspublishers.com/media/articles/SAJP\\_94\\_128-140.pdf](https://saspublishers.com/media/articles/SAJP_94_128-140.pdf)
20. Kenya Health Federation. List of quarantine Centres and Facilities in Nairobi and Mombasa [Online]. 2020. <https://khf.co.ke/quarantine-centres-2/list-of-quarantine-centres-and-facilities-in-nairobi-and-mombasa/> [Accessed 20 May 2020].
21. World Food Programme. Impact of COVID-19 outbreak on livelihoods, food security and nutrition in East Africa. Regional Bureau Nairobi. Published on 15th April 2020. <https://reliefweb.int/sites/reliefweb.int/files/resources/WFP-0000114452.pdf>
22. THE STAR. List of organizations with the biggest donations to the Covid-19 fund [Online]. 2020. <https://www.the-star.co.ke/news/2020-04-21-list-of-organisations-with-biggest-donations-to-covid-19-fund/> [Accessed 28 May 2020].