**SR & BGNR GOVT. ARTS & SCIENCE COLLEGE, KHAMMAM**
**DEPARTMENT OF MICROBIOLOGY**
**STUDENT STUDY PROJECT**
**2020-2021**

## Title of the Project

"COVID -19 Impact on Human health "

**Submitted By**

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# COVID-19 IMPACT ON HUMAN HEALTH

Submitted by


II BSC Microbiology

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## ACKNOWLEDGEMENT:

I here take this opportunity to acknowledge all the people to kept the forward to helping hand in successfully completing this project. First of all I would like to acknowledge Smt.J Anithakumari, HEAD OF THE INDUTRIAL MICROBIOLOGY, who has being supportive towards the students and the helped them whenever possible. I also would like to acknowledge DR.MD.ZAKEERULLA, Principle of the SR&BGNR College (Khammam) for not only putting forward a valuable program like student of the project but also allowing us an insight in research field through the medium of the program.

Mostly I would like to thank my guide for project success Smt. J.Anithakumari, who has always being there during the entire project for a teacher it is difficult to take out time out of lectures and other works however she has always being flexible enough towards to me and helped me out in whatever way possible and above all she made learn things. I would have never learn otherwise.

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## PREFACE :

In not even a year after the discovery of COVID-19, several vaccines have been licensed and hundreds of millions of people will be vaccinated within months. Soon the number of severe COVID-19 cases will plummet, people at risk will no longer die, and after the vaccination of younger people, Long COVID will retreat too.

Seventeen years ago, in the middle of the outbreak, we decided to write a short medical text about the ongoing SARS drama, presenting the scientific data and providing real-time updates. After publishing three editions in 6 months, a concluded that our *SARS Reference* was "not fancy", but presented "plenty of information". When we became aware of the new coronavirus epidemic in mid-January 2020, we immediately felt that time had come to repeat our millennium exercise.

While COVID - 19 seems under control in China, the epidemic is moving west briskly. What only weeks ago seemed an impossible feat – imposing and enforcing strict quarantine measures and isolating millions of people – is now a reality in many countries. People all over the world will have to adapt and invent new lifestyles in what is the most disruptive event since World War II.

We believe that the current situation needs a new type of textbook. Humanity is confronting an unknown and threatening disease which is often severe and fatal. Health care systems are overwhelmed. There is no proven treatment and vaccines will not be available soon. Such a situation has not existed since the flu pandemic in 1918.

## ABOUT THE PROJECT:

This project basically part of the student of the project for BSc students.This project is basically aims at the impact of COVID -19on human health. Further it also aims at to know the clear cut understanding of covid 19 in a scientific way.

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## OBJECTIVE:

1. To acquire the scientific knowledge of Covid-19- pathogenesity, epidemiology, diagnosis & treatment
2. To understand the impact of coivid 19 on our health.
3. To

Risk Communication and Community Engagement (RCCE) is an essential component of your health emergency preparedness and response action plan. This tool is designed to support risk communication, community engagement staff and responders working with national health authorities, and other partners to develop, implement and monitor an effective action plan for communicating effectively with the public, engaging with communities, local partners and other stakeholders to help prepare and protect individuals, families and the public's health during early response to COVID-19.

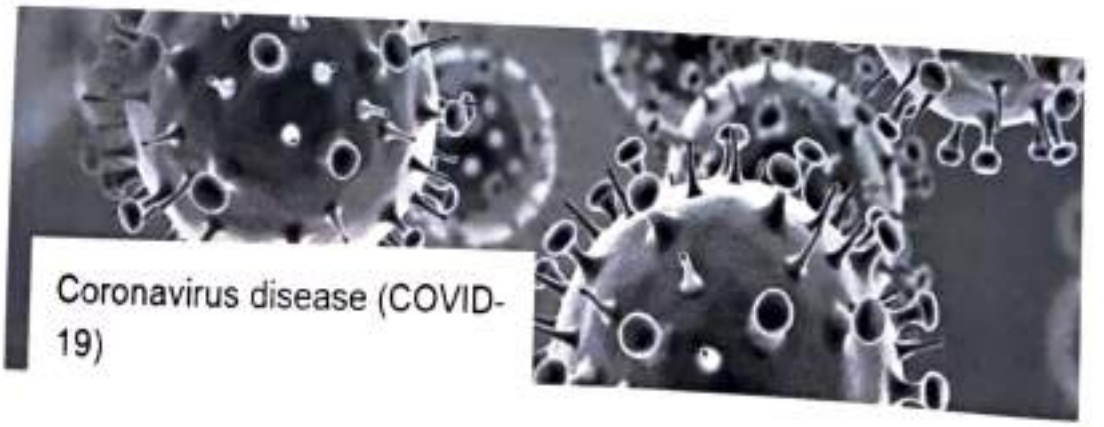
1. "The Key Steps" to developing a COVID-19 RCCE plan.
2. A related planning template for countries to fill in related to each step.
3. Seven annexes provide additional guidance and resources: an audience assessment questionnaire, a process for identifying objectives and audiences, a method for identifying key information needs about COVID-19, and a list of sources for existing content and messaging.

## THEORY:

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.

## INTRODUCTION:

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus.Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age.



Coronavirus disease (COVID-19)

## CASITATIVE AGENT:

The virus that causes COVID-19 is in a family of viruses called Coronaviridae. Antibiotics do not work against viruses.

Some people who become ill with COVID-19 can also develop a bacterial infection as a complication. In this case, antibiotics may be recommended by a health care provider.

There is currently no licensed medication to cure COVID-19. If you have symptoms, call your health care provider or COVID-19 hotline for assistance.

## MORPHOLOGY:

The structure of SARS-CoV-2 is found to be similar to SARS-CoV with **virion size ranging from 70 to 90 nm**. Spike, membrane, and envelope surface viral proteins of coronavirus are embedded in host membrane-derived lipid bilayer encapsulating the helical nucleocapsid comprising viral RNA

## CULTURAL CHARECTERSTICS:

One important way that CDC has supported global efforts to study and learn about SARS-CoV-2 in the laboratory was by growing the virus in cell culture and ensuring that it was widely available. Researchers in the scientific and medical community can use virus obtained from this work in their studies.

CDC is using SARS-CoV-2 in various ways, including the following:

- To test serum collected from people who have recovered from COVID-19 to look for antibody that might block viral infections
- To determine when people shed live virus during the disease.external icon This information has shaped CDC's guidance on when to discontinue transmission-based precautions for patients.

SARS-CoV-2 strains supplied by CDC and other researchers can be requested, free, from the Biodefense and Emerging Infections Research (BEI) Resources Repositoryexternal icon by established institutions that meet BEI requirements. These requirements include maintaining appropriate facilities and safety programs, as well as having the appropriate expertise. BEI

supplies organisms and reagents to the broader community of microbiology and infectious disease researchers.

Some areas of COVID-19 research that public and academic institutions may study with the SARS-CoV-2 strains include:

- **Antiviral research:external icon** This includes research aimed at testing the ability of existing or experimental antiviral medications to treat or prevent infection with SARS-CoV-2.
- **Vaccine development:**external icon Scientists in public, private sector, and academic institutions continue to work together to develop safe and effective COVID-19 vaccines. Learn more about currently authorized vaccines in the United States.
- **Pathogenesis research:** This includes research to determine the various ways the virus can be transmitted to a host, the severity of illness it causes in a host, how much virus is produced in the body, and what organs the virus can spread to within the body.
- **Virus stability research:external icon** This is research that indicates how long the virus can survive under certain conditions, such as how long the virus can survive and remain infectious on surfaces, and the temperatures at which it can survive.

## EPDOMOLOGY:

Globally, during the week of 21 through 27 February 2022, the number of new COVID-19 cases and deaths continued to decline by 16% and 10% respectively, as compared to the previous week. Across the six WHO regions, over 10 million new cases and over 60 000 new deaths were reported. As of 27 February 2022, over 433 million confirmed cases and over 5.9 million deaths have been reported globally.

At the regional level, the Western Pacific Region reported a 32% increase in the number of new weekly cases while all other regions reported decreases. The number of new weekly deaths increased in the Western Pacific (+22%) and the Eastern Mediterranean (+4%) Regions, whilst a decreasing trend have been reported by the Regions of Africa (-59%), South-East Asia (-18%), Europe (-13%) and Americas (-8%).

In this edition, we provide updates on the geographic distribution of circulating SARS-CoV-2 variants of concern (VOCs), including the spread and prevalence of the Omicron variant.

Pathogenesity

**Stage #1: Asymptomatic state (Initial 1–2 days of infection)**

The inhaled virus SARS-CoV-2 likely binds to epithelial cells in the nasal cavity and starts replicating. ACE2 is the main receptor for both SARS-CoV2 and SARS-CoV *In vitro* data with SARS-CoV indicate that the ciliated cells are primary cells infected in the conducting airways However, this concept might need some revision, since single cell RNA indicates low level of ACE2 expression in conducting airway cells and no obvious cell type preference There is local propagation of the virus but a limited innate immune response. At this stage the virus can be detected by nasal swabs. Although the viral burden may be low, these individuals are infectious. The RT-PCR value for the viral RNA might be useful to predict the viral load and the subsequent infectivity and clinical course. Perhaps super spreaders could be detected by these studies. For the RT-PCR cycle number to be useful, the sample collection procedure would have to be standardised. Nasal swabs might be more sensitive than throat swabs.

**Stage #2: Upper airway and conducting airway response (Next few days)**

The virus propagates and migrates down the respiratory tract along the conducting airways, and a more robust innate immune response is triggered. Nasal swabs or sputum should yield the virus (SARS-CoV-2) as well as early markers of the innate immune response. At this time, the disease COVID-19 is clinically manifest. The level of CXCL10 (or some other innate response cytokine) may be predictive of the subsequent clinical course]. Viral infected epithelial cells are a major source of beta and lambda interferons . CXCL10 is an interferon responsive gene that has an excellent signal to noise ratio in the alveolar type II cell response to both SARS-CoV and influenza . CXCL10 has also been reported to be a useful as disease marker in SARS .Determining the host innate immune response might improve predictions on the subsequent course of the disease and need for more aggressive monitoring.

For about 80% of the infected patients, the disease will be mild and mostly restricted to the upper and conducting airways. These individuals may be monitored at home with conservative symptomatic therapy.

**Stage #3 Hypoxia, ground glass infiltrates, and progression to ARDS**

Unfortunately, about 20% of the infected patients will progress to stage 3 disease and will develop pulmonary infiltrates and some of these will develop very severe disease. Initial estimates of the fatality rate are around 2%, but this varies markedly with age. The fatality and morbidity rates may be revised once the prevalence of mild and asymptomatic cases is better defined. The virus now reaches the gas exchange units of the lung and infects alveolar type II cells. Both SARS-CoV and influenza preferentially infect type II cells compared to type I cells. The infected alveolar units tend to be peripheral and subpleural .SARS-CoV propagates within type II cells, large number of viral particles are released, and the cells undergo apoptosis and die (fig. 1). The end result is likely a self-replicating pulmonary toxin as the released viral particles infect type II cells in adjacent units. I suspect areas of the lung will likely lose most of their type II cells, and secondary pathway ways for epithelial regeneration will be triggered. Normally, type

II cells are the precursor cells for type I cells. This postulated sequence of events has been shown in the murine model of influenza pneumonia. The pathologic result of SARS and COVID-19 is diffuse alveolar damage with fibrin rich hyaline membranes and a few multinucleated giant cells. The aberrant wound healing may lead to more severe scaring and fibrosis than other forms of ARDS. Recovery will require a vigorous innate and acquired immune response and epithelial regeneration. From my perspective, smilar to influenza, administrating epithelial growth factors such as KGF might be detrimental and might increase the viral load by producing more ACE2 expressing cells . The elderly individuals are particularly at risk because of their diminished immune response and reduced ability to repair the damaged epithelium. The elderly also have reduced mucociliary clearance, and this may allow the virus to spread to the gas exchange units of the lung more readily .

**DIAGONISIS:**

The symptoms of COVID-19 – fever, cough, difficulty breathing and muscle pain – can resemble those of many other diseases, such as influenza, making diagnostic tests therefore essential for identifying people who actually have COVID-19. In addition to this, these tests can also help determine who has recovered from COVID-19, as well as improve our understanding of how the virus spreads and help monitor the effectiveness of control measures. So what kinds of tests are there and what challenges do they present.

Some test for the virus itself, by looking for the RNA (the genetic blueprint) of the SARS-CoV-2 virus that causes COVID-19. When carried out properly, a result that the virus has been detected is extremely reliable. However, these tests are not very helpful for determining whether someone has recovered from the virus, and moreover can potentially miss the virus if it is present in extremely low levels in a patient's body

Other tests look for antibodies to the virus – evidence that the body has produced an immune response to it. It takes time for such antibodies to be created, so antibody tests are not much use in confirming if someone has COVID-19 in the first few days of infection. However, in contrast to the RNA tests, they can be extremely useful in determining whether someone has previously been infected with the new coronavirus, but no longer has the virus present.

## PREVENTION AND TREATMENT:

**Wash your hands thoroughly with soap and warm water or with an alcohol-based hand sanitizer.** Take hot shower or steamy shower to relieve sore, scratchy throat and cough. Keep your hands and fingers away from your eyes, nose, and mouth. Setup humidifier in your home.

The COVID-19 Treatment Guidelines Panel (the Panel) recommends COVID-19 vaccination as soon as possible for everyone who is eligible according to the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices **(AI)**.

The Panel recommends using **tixagevimab 300 mg plus cilgavimab 300 mg (Evusheld)** administered as 2 consecutive 3-mL intramuscular injections **(BIII)** as SARS-CoV-2 pre-exposure prophylaxis (PrEP) for adults and adolescents (aged ≥12 years and weighing ≥40 kg) who do not have SARS-CoV-2 infection, who have not been recently exposed to an individual with SARS-CoV-2 infection,

Are moderately to severely immunocompromised and may have an inadequate immune response to COVID-19 vaccination; *or*

Are not able to be fully vaccinated with any available COVID-19 vaccines due to a history of severe adverse reactions to a COVID-19 vaccine or any of its components.

## RESOURES:

www.google.com

www.worldhealthorg.com

www.wikipidia.com

## ABOUT THE GUIDE:

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