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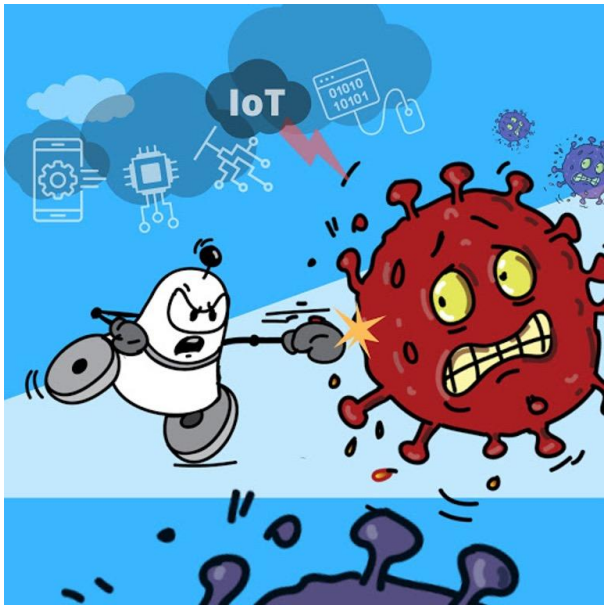
Eyantra Fighting Covid-19 Hackathon



TOPIC: COVID HOME MANAGEMENT OF MILD AND MODERATE INFECTIONS

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COVID HOME MANAGEMENT

Introduction

The ongoing pandemic is a reason of terror, fear and much more to do with human health. This is caused by **Coronavirus disease 2019** (**COVID-19**), also known as **the coronavirus**, or **COVID** which is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019.

It is transmitted through direct inhalation of infected droplets by infected person and direct contact with surfaces and fomites soiled by infected respiratory secretions.

Exact duration of viability of virus on surfaces may be few hours to few days; the survival duration is likely to be considerably low at higher temperature and low humidity condition.

Median (IQR) incubation period has been assessed to be 5.1 (4.5, 5.8) d while 101 in 10,000 patients may develop symptoms after 14 days.

Mild or Moderate COVID-19 (key clinical points)

- Covid-19 has a range of clinical manifestations, including cough, fever, myalgias, gastrointestinal symptoms, and anosmia.
- Diagnosis of Covid-19 is commonly made through detection of SARS-CoV-2 RNA by PCR testing of a nasopharyngeal swab or other specimens, including saliva. Antigen tests are generally less sensitive than PCR tests but are less expensive and can be used at the point of care with rapid results.
- Evaluation and management of Covid-19 depend on the severity of the disease. Patients with mild disease usually recover at home, whereas patients with moderate disease should be monitored closely and sometimes hospitalized.
- Remdesivir and dexamethasone have demonstrated benefits in hospitalized patients with severe Covid-19, but in patients with moderate disease, dexamethasone is not efficacious (and may be harmful) and data are insufficient to recommend for or against routine use of remdesivir.

- Infection control efforts center on personal protective equipment for health care workers, social distancing, and testing.

At-Home treatment

Most people who become sick with COVID-19 will only experience mild illness and can recover at home. Symptoms might last a few days, and people who have the virus might feel better in about a week. Treatment is aimed at relieving symptoms and includes rest, fluid intake and pain relievers.

However, older adults and people of any age with existing medical conditions should call their doctor as soon as symptoms start. These factors put people at greater risk of becoming seriously ill with COVID-19.

Follow the doctor's recommendations about care and home isolation for yourself or your loved one.

It's also important to consider how caring for a sick person might affect your health. If you are older or have an existing medical condition, such as heart or lung disease or diabetes, you may be at higher risk of serious illness with COVID-19. You might consider isolating yourself from the sick person and finding another person to provide care.

Emergency Warning Signs

Carefully monitor yourself or your loved one for worsening symptoms. If symptoms appear to be getting worse, call the doctor.

The doctor might recommend use of a **home pulse oximeter**, especially if the ill person has risk factors for severe illness with COVID-19 and COVID-19 symptoms. A pulse oximeter is a plastic clip that attaches to a finger. The device can help check breathing by measuring how much oxygen is in the blood. A reading of **less than 92%** might increase the need for hospitalization.

Call 112 or your local emergency number if the sick person can't be woken up or you notice any emergency signs, including:

- Trouble breathing
- Persistent chest pain or pressure
- New confusion

- Bluish lips or face
- Inability to stay awake
- Pale, gray or blue-colored skin, lips or nail beds — depending on skin tone

Protecting Others if someone's ill

If you're ill with COVID-19, you can help prevent the spread of infection with the COVID-19 virus.

- ➢ Stay home from work, school and public areas unless it's to get medical care.
- ➢ Avoid using public transportation, ride-sharing services or taxis.
- ➢ Stay isolated in one room, away from your family and other people, as much as possible. This includes eating in your room. Open windows to keep air circulating. Use a separate bathroom, if possible.
- ➢ Avoid shared space in your home as much as possible. When using shared spaces, limit your movements. Keep your kitchen and other shared spaces well ventilated. Stay at least 6 feet (2 meters) away from your family members.
- ➢ Clean often-touched surfaces in your separate room and bathroom, such as doorknobs, light switches, electronics and counters, every day.
- ➢ Avoid sharing personal household items, such as dishes, towels, bedding and electronics.
- ➢ Wear a face mask when near others. Change the face mask each day.
- ➢ If wearing a face mask isn't possible, cover your mouth and nose with a tissue or elbow when coughing or sneezing. Afterward, throw away the tissue or wash the handkerchief.
- ➢ Frequently wash your hands with soap and water for at least 20 seconds, or use an alcohol-based hand sanitizer that contains at least 60% alcohol.

Protecting ourself while caring for someone with COVID-19

To protect yourself while caring for someone with COVID-19, the U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) recommend:

- **Keep your hands clean and away from your face.** Frequently wash your hands with soap and water for at least 20 seconds, especially after being in close contact or in the same room as the sick person. If soap and water aren't available, use a hand sanitizer that contains at least 60% alcohol. Avoid touching your eyes, nose and mouth.
- **Wear a face mask.** If you need to be in the same room with the person who is ill and he or she isn't able to wear a face mask, wear a face mask. Stay at least 6 feet

(2 meters) away from the ill person. Don't touch or handle your mask while you are using it. If your mask gets wet or dirty, replace it with a clean, dry mask. Throw away the used mask and wash your hands.

- **Clean your home frequently.** Every day, use household cleaning sprays or wipes to clean surfaces that are often touched, including counters, tabletops and doorknobs. Avoid cleaning the sick person's separate room and bathroom. Set aside bedding and utensils for the sick person only to use.
- **Be careful with laundry.** Don't shake dirty laundry. Use regular detergent to wash the sick person's laundry. Use the warmest setting you can. Wash your hands after putting clothes in the dryer. Thoroughly dry clothes. If you are handling clothing that has been soiled by the sick person, wear disposable gloves and keep the items away from your body. Wash your hands after removing the gloves. Place dirty gloves and masks in a waste bin with a lid in the sick person's room. Clean and disinfect clothes hampers and wash your hands afterward.
- **Be careful with dishes.** Wear gloves when handling dishes, cups or utensils used by the sick person. Wash the items with soap and hot water or in the dishwasher. Clean your hands after taking off the gloves or handling used items.
- **Avoid direct contact with the sick person's bodily fluids.** Wear disposable gloves and a face mask when providing oral and respiratory care and when handling stool, urine or other waste. Wash your hands before and after removing your gloves and mask. Don't reuse your mask or gloves.
- **Avoid having unnecessary visitors in your home.** Don't allow visitors until the sick person has completely recovered and has no signs or symptoms of COVID-19.

Ending Isolation or Quarantine

Talk to the doctor about when to end home isolation, especially if you have a weakened immune system. The CDC recommends the following guidelines for ending home isolation after you think or know you had COVID-19.

- **If you won't have a test to determine if you're still contagious,** you can leave your sick room or home if at least 10 days have passed since your symptoms started, at least 24 hours have passed with no fever without the use of fever-reducing medicine and other symptoms are improving. Loss of taste and smell might last for weeks or months after recovery but shouldn't delay ending isolation.

- **If you'll be tested to determine if you're still contagious,** your doctor will let you know when you can be around others based on your test results. Most people don't need testing to decide when they can be around others.

The CDC also recommends that, as the sick person's caregiver, you quarantine for 14 days and watch for common signs and symptoms of COVID-19, such as fever, cough or shortness of breath. Other options may include ending quarantine after 10 days if you don't have symptoms and won't get tested or ending quarantine after 7 days if you receive a negative test result on day 5 or later. But continue to watch for symptoms for 14 days.

However, if you've been caring for someone with COVID-19, you don't need to stay home if:

- You've been fully vaccinated and have no symptoms of COVID-19.
- You've had COVID-19 within the last three months, recovered and remain without symptoms of COVID-19.

Coping with Caregiving Stress

If you have a mental health condition, such as anxiety or depression, continue with your treatment. Contact your doctor or mental health professional if your condition worsens.

To care for yourself, follow these steps:

- Maintain a daily routine, including showering and getting dressed.
- Take breaks from COVID-19 news, including social media.
- Eat healthy meals and stay hydrated.
- Exercise.
- Get plenty of sleep.
- Avoid excessive use of alcohol and tobacco.
- Stretching, breathe deeply or meditate.
- Focus on enjoyable activities.
- Connect with others and share how you are feeling.

Caring for yourself can help you cope with stress. It will also help you be able to support your loved one's recovery.

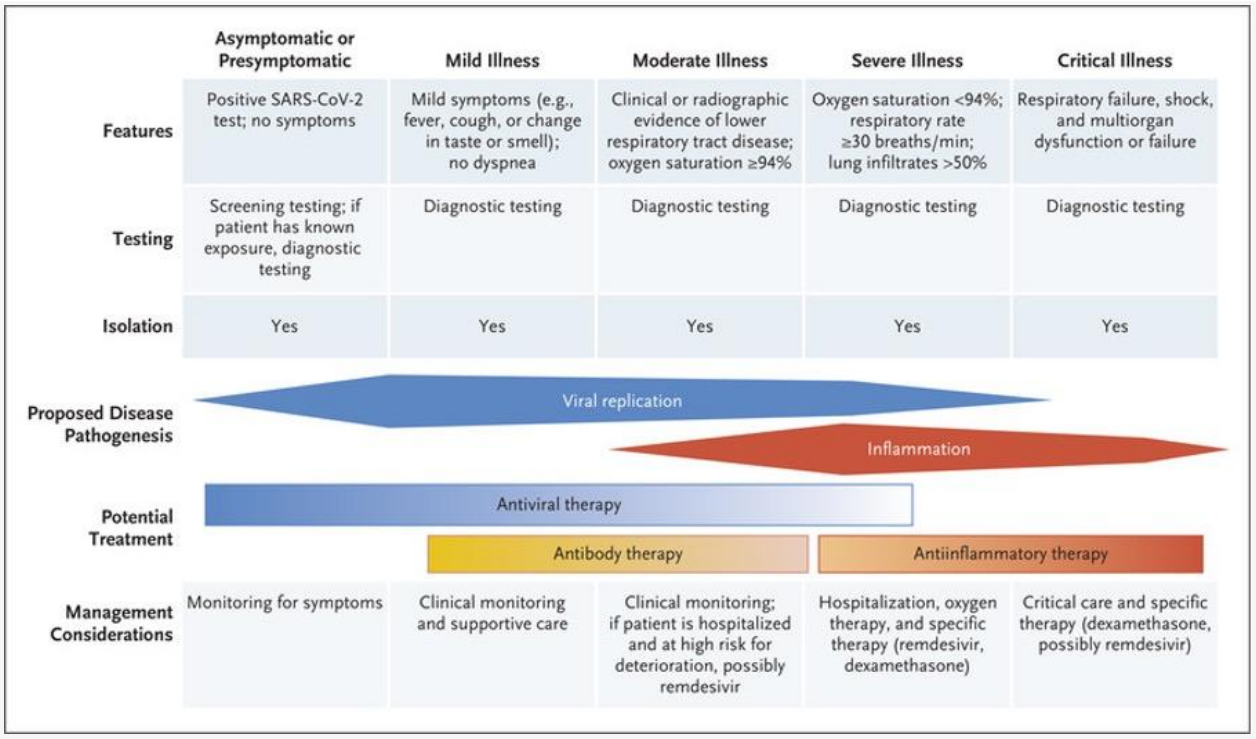


Figure 1. Characteristics, Diagnosis, and Management of Covid-19 According to Disease Stage or Severity. [3]

Covid Management of Children

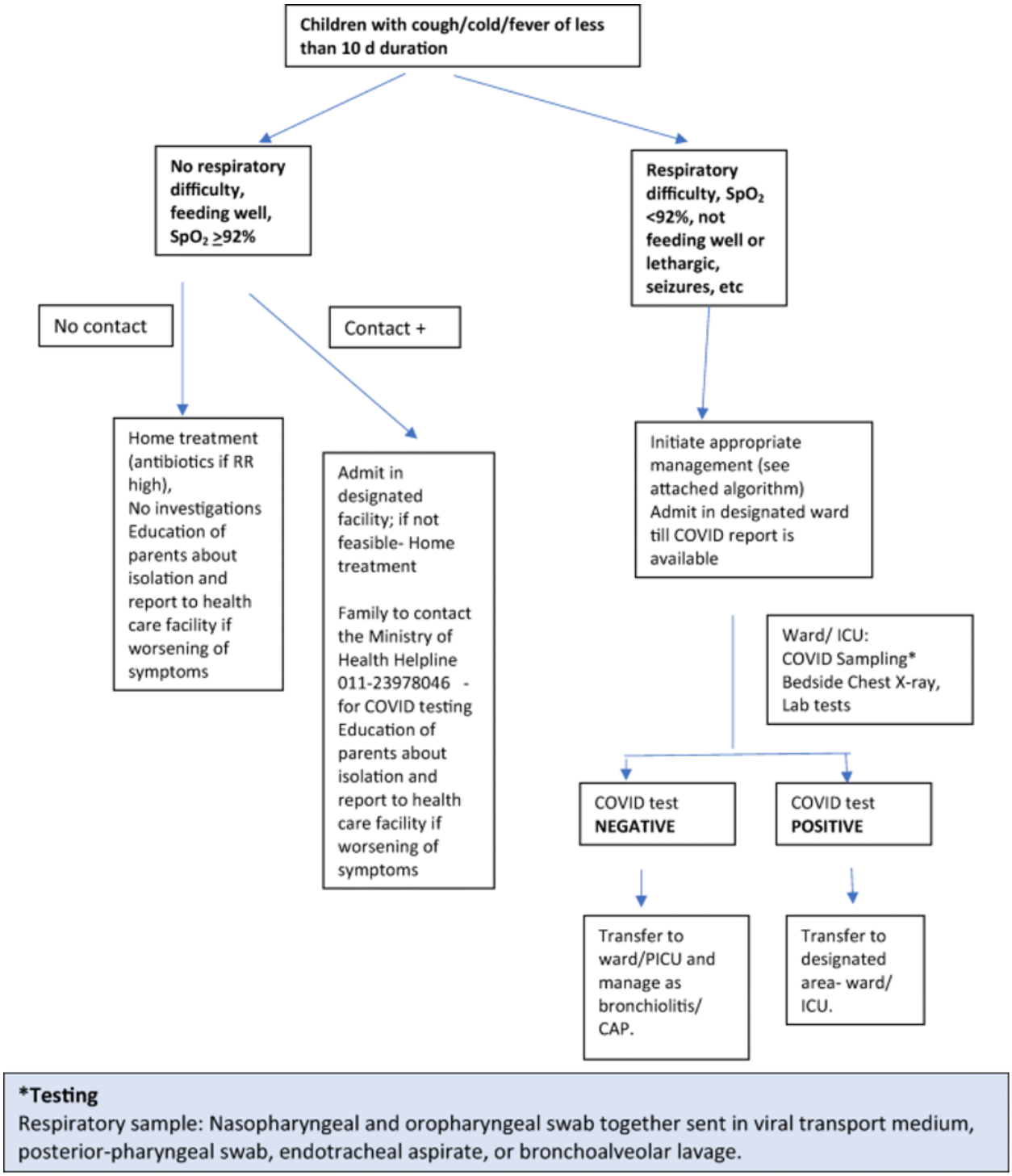


Fig 2: Approach to a child with acute respiratory symptoms during COVID-19 pandemic.

Covid management of Older patients

Key principles for the care of older people in the COVID-19 pandemic

Proactive assessment by a general physician or family nurses to evaluate.

Development of typical COVID-19 symptoms, such as sudden changes in cognitive status, onset of behavioral disturbances or decline in functional status which may lead to suspect infection carving treatment of chronic diseases.

1. If COVID-19 is suspected provide visit at home performing rapid swab test.
2. start pharmacological treatment and evaluate oxygen need.
3. Evaluate frailty, multimorbidity, geriatric syndromes, and side effects of treatments.
4. Evaluate family members to manage isolation and protect the patients.
5. Assess the need of hospitalization.

Older in Hospital

1. Establish patients' prognosis on admission and define the need of low, medium or high intensive care implement protocols for the prevention and treatment of delirium, manage behavioural and functional complication, provide supportive and palliative care.
2. Plan the care after discharge.

Older living in long term care facilities

If typical or atypical symptoms of COVID-19 :

1. Perform confirmatory tests.
2. Isolate positive cases.
3. Provide specific and supportive treatement.

Evaluate the need of hospitalization for the as well as the LTC ability to accomplish the goals of the care involve patient family in therapeutic choices.

Provide PPEs and monitor the COVID-19 presence among care professionals.

AMBULANCE NETWORKING

Introduction

With regard to health, a few seconds and some small acts can make all the difference; particularly when it comes to emergencies, the emergency defining itself by the endangerment in the near future - the hour or half-day - the physical integrity or the life of a person. As well, all that the patient might consider or feel as urgency is also considered to be an emergency.

In general, the emergency care is a challenge for health systems and particularly for those developing countries. Much of these emergencies is associated with the occurrence of trauma outside health-care centers and requires pre-hospital care and services, that is to say, before getting to hospital. The data on an international scale is alarming. According to the World Health Organization, the injuries account for 16% of the overall disease burden. The burden of death and disability related to it is even more important in middle-income countries or of low income: 90% of the total burden of their responsibility. A person with trauma has 6 times less chance of survival in low-income areas than in high-income ones. The organization has made a health priority globally and has become worse during this pandemic situation. This means, among other things, the establishment of structures and special mechanisms outside the health institutions, but in conjunction with them.

Even if the ambulance services manage much of the emergency and trauma, this, even those that occur in health institutions. To do this, these services are regulated by laws, should meet specific standards and are supported by multiple associations and financial mechanisms. Other strategies of collection of information such as national surveys of emergency, reports of ambulance services and reform of pre-hospital services, enable a continuous improvement of services and a higher rate of reduction of sequelae. The development of the ambulance sector is gradual and requires not only political will but also the inclusion of all the sectors.

There is a sense of urgency of a more structured medical transport, more comprehensive, taking into account the realities of the country (highland therefore reduced access in certain areas, for example) and can help to increase the number of saved lives, the time to get to the nearest health institution and the most suitable in terms of management capacity during pandemic.

Documentary analysis

The urgency has no time or predetermined shape. Once known and reported, it should be managed as soon as possible to minimize the risk of injury or death. Pre-hospital services come into play and to intervene for the duration of the recovery, before arriving at the fixed point of delivery, at the place of occurrence of the emergency to the health institution. It then becomes important to invest in the establishment or improvement of an emergency management system

Many studies show the benefits related to the existence of such a system. Thus according to the above quoted, deaths about thousands in a year in, and also those caused by respiratory and diarrheal diseases in children or those caused by non-communicable diseases such as hypertension or diabetes.

With a capacity of resuscitation in the ambulance, 300 lives can be saved.

In a population of one million people, it is necessary to expect about 1100 deaths related to the cases of myocardial infarction and approximately 200 deaths suites obstetric complications and far more due to COVID-19. The use of ambulance services saves 400 lives: in whom obstetric emergencies and heart disease. This makes a grand total of 700, when we add the lives saved from traumas.

Similarly, these types of interventions are beneficial to pregnant women for who is, when at risk, impossible to determine in advance at which emergencies will be realized. The respiratory complications also have a better chance of arriving at the hospital when the ambulance is improved (Facilitating emergency respiratory care through transportation and communication).

The World Health Organization's report from 2002 "Reducing Risks, Promoting healthy life," notes that the percentage of overall mortality from trauma is 21.7, a figure that reached 31.1% in terms of years of losses life disability adjusted. The same report states that in most cases, these injuries occur in a young and resilient population and on which adequate emergency care have a favorable effect.

In addition, according to the document Health and economic benefits of Improved injury prevention and trauma care worldwide, it would be possible to save 72 million lives in the underdeveloped and developing countries with decreasing mortality from trauma via an investment in terms of trauma care (which would also include ambulance care).

It has been shown that the laity people trained in first aid care are effective to give an appropriate response in situations of trauma with decreased trauma related mortality, doubled by ambulances reduce the incidence of pre-hospital deaths (Low-cost improvements in pre-hospital trauma care).

Methodology and Data

In this document, we propose a literature review on the question of the organization of pre-hospital services. In doing so, the first research was done on the website of the World Health Organization (WHO) with the input of the group of words *trauma care*, the results for hospital services were discarded in favor of guides establishing the guidelines of trauma services with emphasis on those under the pre-hospital field. The references of the first document served to find other electronic documents on this issue. This work helped to identify the best interventions and underlying assumptions during this pandemic.

The statistical data of population result from the online database of the World Bank.

The choice of interventions presented in this document is made on the basis of a cost-benefit analysis.

Intervention "Development of national network" - Costing

For calculating the costs of the urban network, we shall keep the same hypothetical considerations of the first intervention. To those, for the rural network are added the following hypotheses:

- prepositioning of ambulances to reduce considerably the time, knowing that in rural areas many road infrastructures are lacking;
- 3 times more ambulances per million inhabitants in urban areas, giving a total of 99 ambulances per million population;

Academic Summary

- **Goal:** To develop the system and network of paramedics in India, taking into account country- specific factors, the need to save as many lives as possible, and to have an efficient response.

- **Methodology:** Three interventions have been identified: the development of the urban network, that of the national network and increased use of the "first responders". The costs and benefits have been calculated by considering all household spending. The analysis was carried out on the basis of a costs-benefit ratio that considers the different effects of such an intervention on three aspects: trauma, ischemic cardiac disease and COVID emergencies. That has demonstrated that whatever the scenario, and by combining 3 elements of action, the ratio reaches up to 25. This represents a definite gain; avoided deaths and disability-adjusted life years. Taken individually, the availability of intervention proposing the use of first responders produces more advantages, about 1 and a half times more than the development of the city network and 5 times of the development of the national network (rural and urban).

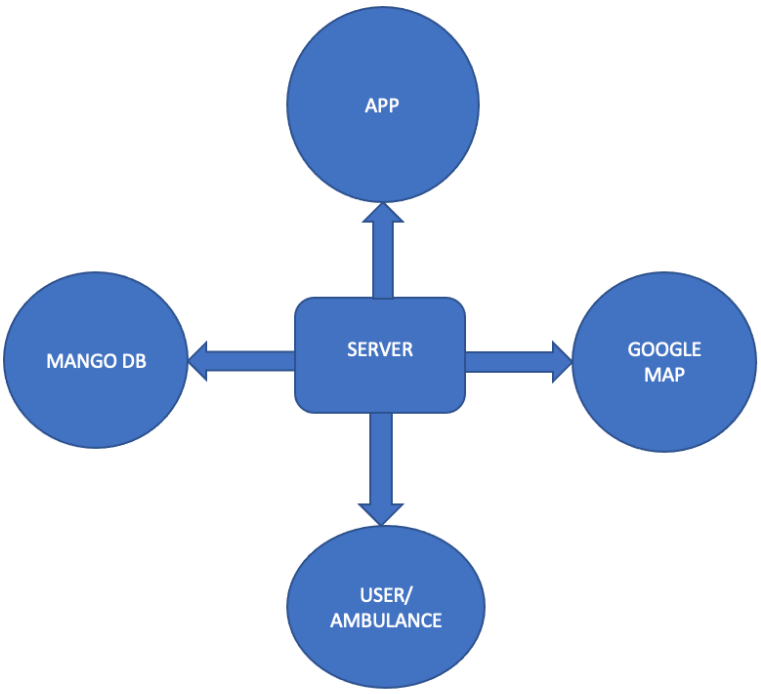
- **Conclusion:** The intervention using the "first responders and paramedics" should be combined with the development of the urban network. This collaboration provides a strong way to better care and more lives saved at the medical transport of different emergencies throughout the national territory. It remains a safe choice.

TECHNICALITIES

The software architecture contains 5 modules which are as follows:

1. **Server:** Here all the main activities take place. It is the brain of the application. The language used is node.js. Communication between all the modules take place through server. Some of the jobs of the server are accepting request from the user, communicating with the nearby ambulance, finding the nearest ambulance with the help of Google Maps, storing the user and ambulance information in the database, assigning the nearest ambulance to the user etc.
2. **MongoDB:** MongoDB is a cross platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with schemata. We use MongoDB to store user and ambulance information. Once the ambulance is assigned to the user, the user id, their location, ambulance id and its initial location is stored in the database for future reference.
3. **Google Maps:** The Google Maps API allow for the embedding of Google Maps onto web pages of outside developers, using a simple JavaScript interface. Some of the APIs used in our applications are Maps JavaScript API, Distance matrix API and Directions API. Server sends the location of all nearby ambulance to the Google Maps which finds the nearest ambulance using distance matrix API and sends it back to the server. After the ambulance assignment ambulance request for the navigation, which shows the shortest distance to reach its destination i.e. the user.
4. **User:** This is where the user requests for ambulance. Initially a socket connection is established between the user and the server. Then when user presses the Get Ambulance button, a unique ID is generated for the user. This ID and the location of the user is sent to server. Once the ambulance is assigned to the requested user, the real time location of the ambulance is sent to the user so that they can track the location of the ambulance.
5. **Ambulance:** Ambulance module sends its location to the server and wait for the assignment of the user. Server finds the nearest ambulance and sends the location of the user to the ambulance. Once the user has been assigned, using Navigation it reaches the user and its real time location is sent to user to the user can track the ambulance.

System Architecture:



WORKING OF THE ENTIRE SYSTEM: Both hardware and software module's implementation can be combined as follows: When the user opens application on his device and taps on the button "Get Ambulance", the server finds the nearest ambulance to the user and assigns it to him. Now the user can track the ambulance as it arrives to the user's destination. Simultaneously, because the RFID technology installed in our system, it automatically changes the Traffic signal in the ambulance's path to green to reduce the delay time. Along with this, the navigation provides the shortest path for the ambulance to reach the destination.

FUTURE SCOPE: This system can be extended to send the patient's vitals to the hospital once the patient has been picked up by the ambulance. This can be achieved by monitoring the health of the patients using different sensors and sending the data collected by the sensors to the hospital. The hospital staff can use this information to provide medical assistance to the patient without any delay. There are many other high priority vehicles like ambulance which requires to reach its destination without any hindrance. Some of high priority vehicles are fire engines, police vehicle etc. Our application to can be extended to these High Priority Vehicles also.

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