THE ASSESSMENT OF OCCUPATIONAL HAZARDS AND DEVELOPMENT OF ENGINEERING EQUIPMENT TO SUPPORT HEALTH WORKERS AGAINST COVID-19.

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Table of Contents

CORONAVIRUS (COVID-19)

WHAT IS COVID-19?

- The Covid-19 virus is an unknown strain of the novel corona virus family, the covid-19 virus is highly transmittable and is caused by severe acute respiratory syndrome coronavirus 2 also known as **SARs-CoV-2**, it first emerged in Wuhan, china and has spread remarkably to almost every continent in the world. Genomic analysis has revealed that SARs-CoV-2 is phylogenetically related to severe acute syndrome like bat viruses, thus indicating that bats could as well be the primary reservoir. The intermediate source of origin and transfer to humans is not known, however, the rapid human to human transfer has been confirmed widely. There is no clinically approved antiviral drug or vaccine available to be used against COVID-19. However, few broad-spectrum antiviral drugs have been evaluated against COVID-19 in clinical trials, resulted in clinical recovery.

- Since first being recorded late last year in China, the Covid-19 coronavirus has spread around the world, and been declared a pandemic by the World Health Organization. By early spring, Europe had become the worst-affected region, with Italy and Spain particularly hard hit. However, differences in testing mean that the number of cases may be understated for some countries.
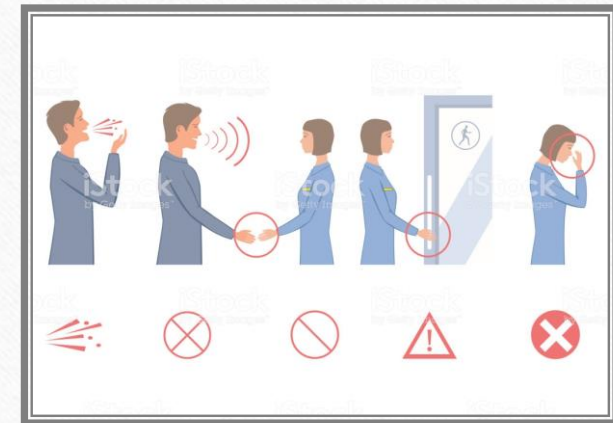
- It is most contagious during the first three days after onset of symptoms, although spread may be possible before symptoms appear and in later stages of the disease. The time from exposure to onset of symptoms is typically around five days, but may range from two to 14 days. The standard method of diagnosis is by real-time reverse transcription polymerase chain reaction (rRT-PCR) from a nasopharyngeal swab. The infection can also be diagnosed from a combination of symptoms, risk factors and a chest CT scan showing features of pneumonia.

CORONA VIRUS

The virus is mainly spread during close contact and by small droplets produced when those infected coughs, sneeze or talk. These droplets may also be produced during breathing; however, they rapidly fall to the ground or surfaces and are not generally spread through the air over large distances. People may also become infected by touching a contaminated surface and then their face. The virus can survive on surfaces for up to 72 hours.

ITS TRANSMISSION

- The virus is most contagious when people are symptomatic; while spread may be possible before symptoms appear, this risk is low. The European Centre for Disease Prevention and Control (ECDC) says while it is not entirely clear how easily the disease spreads, one person generally infects two to three others.

- Some details about how the disease is spread are still being determined. The WHO and the US Centers for Disease Control and Prevention (CDC) say it is primarily spread during close contact and by small droplets produced when people cough, sneeze or talk; with close contact being within 1–3 m (3 ft 3 in–9 ft 10 in). A study in Singapore found that an uncovered cough can lead to droplets travelling up to 4.5 meters (15 feet). A second study, produced during the 2020 pandemic, found that advice on the distance droplets could travel might be based on old 1930s research which ignored the protective effect and speed of the warm moist outbreath surrounding the droplets; it advised that droplets can travel around 7–8 meters.

SYMPTOMS OF THE VIRUS

• COUGH

• FEVER

• TIREDNESS

• DIFFICULTY BREATHING (SEVERE CASES)

SAFETY PRECAUTIONS

1. STAY home as much as you can

2. Keep safe distance

3. WASH hands often

4. COVER your cough

5. SICK? Call ahead.

A major underlying factor affecting the effective management of the covid-19 is the fear it brings to the community; people fear being isolated which is understandable as human beings if not anything are social creatures and the thought of one or a loved one being taken away with no assurance that he might ever see their family is disheartening to say the least and thus people then refuse to report any strange symptoms they find of the **COVID-19.**

Occupational Hazards associated with COVID-19

How employment has been affected worldwide

Share of global workforce living in countries with workplace restrictions

- — Required workplace closures
- — Recommended workplace closures

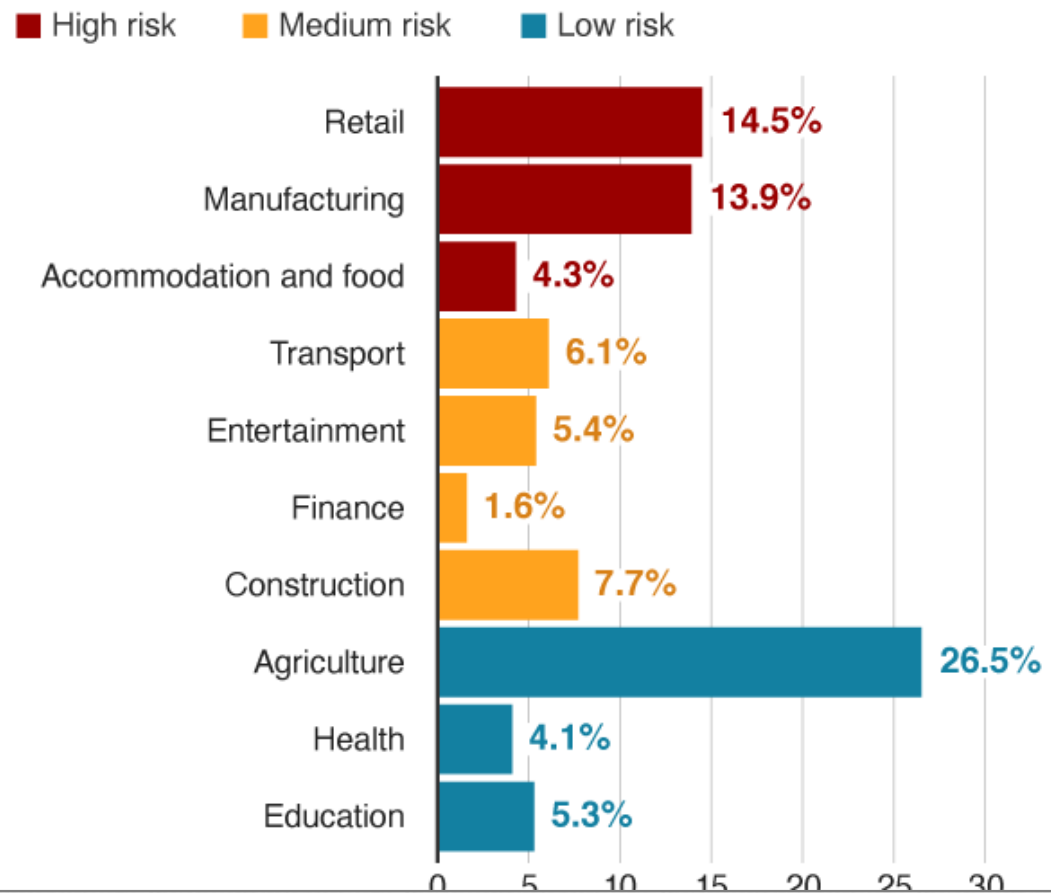Source: International Labour Organization

BBC

- The virus outbreak is in no small way affecting the various occupation in the world. Humans are forced to retreat at their homes and stay indoors at the expense of their career and that in turn might pose a threat to one's economy.

- As cases increased and required health care, health care workers (HCWs) were next recognized as another high-risk group to acquire this infection. In a case series of 138 patients treated in a Wuhan hospital, 40 patients (29% of cases) were HCWs. Among the affected HCWs, 31 (77.5%) worked on general wards, 7 (17.5%) in the emergency department, and 2 (5%) in the intensive care unit (ICU). There was apparently a super-spreader patient encountered in the hospital, who presented with abdominal symptoms and was admitted to the surgical department. This patient infected >10 HCWs in the department [7]. China's Vice-Minister at the National Health Commission said that 1716 health workers had been infected in the country as of Tuesday 11 February 2020, among whom 6 have died.

Sectors affected badly by the outbreak

- Different sectors of the economy have been hit in different ways by the sudden downturn in work.

- Not surprisingly, with travel at a minimum and social lives put on hold, the accommodation and food services industries are among those suffering most, along with manufacturing, wholesale and retail, and real estate and business.

- Together, they account for nearly 38% of the global workforce, with 1.25 billion people employed in these industries around the world.

Workers at risk by sector

Share in global employment by industry and risk level

- High risk
- Medium risk
- Low risk

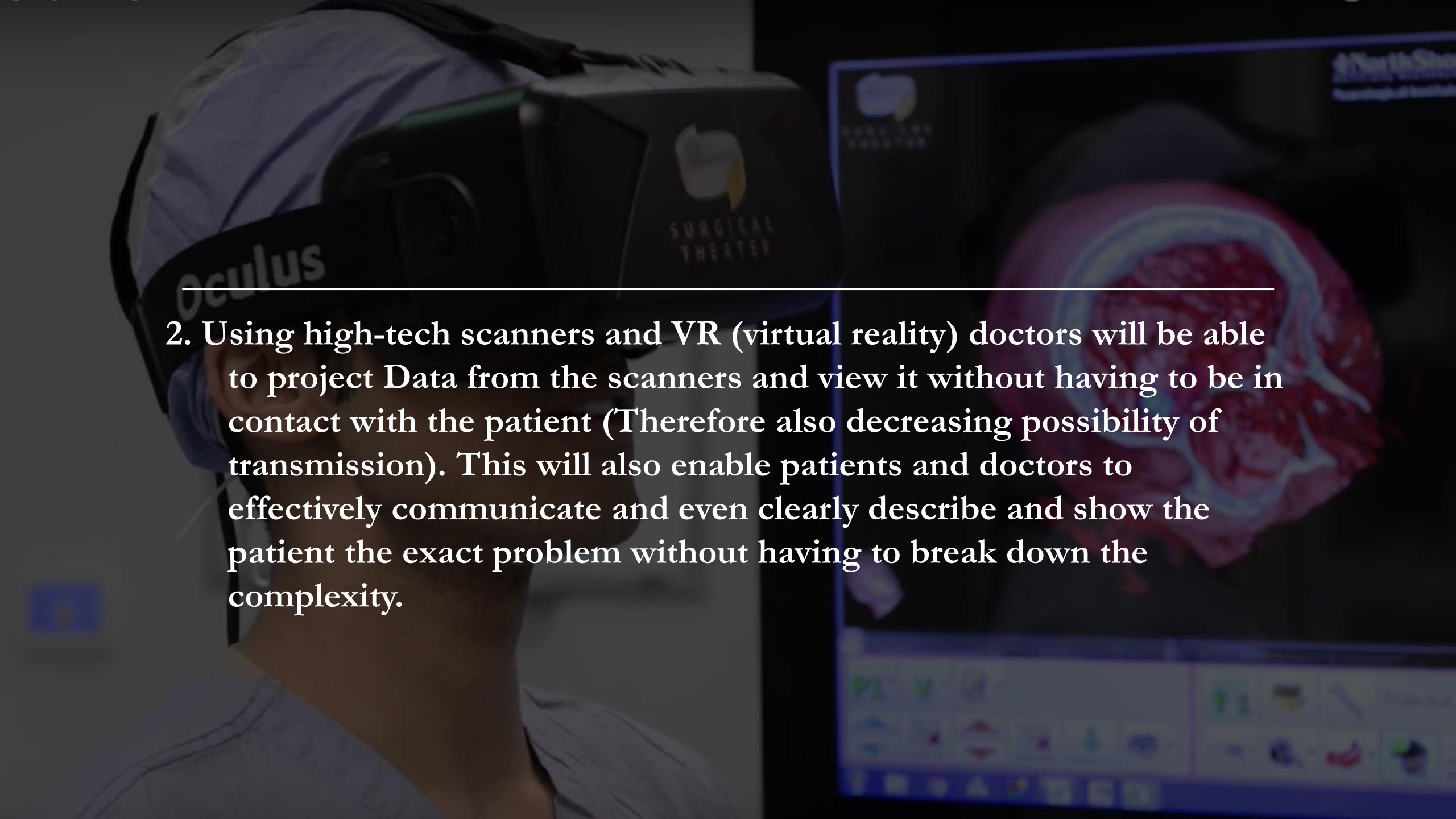| Sector	Value
Retail	14.5%
Manufacturing	13.9%
Accommodation and food	4.3%
Transport	6.1%
Entertainment	5.4%
Finance	1.6%
Construction	7.7%
Agriculture	26.5%
Health	4.1%
Education	5.3%

Development of engineering equipment's to support health workers against COVID-19

- *During an outbreak there are always risk associated with the control of the outbreak, most often than not these risks pose a greater threat to the medical practitioners. They are tasked with the preservation of human live and thus they must treat those who are infected, and this can sometimes lead to them getting infected. But there are ways which computer engineering can help a to reduce those risk.*

THESE ARE;

1. By the creation of safety AI's one can help limit the risk taken by doctors and surgeon as these AI's can monitor patients' vitals and alert the doctors of any abnormalities detected.

2. Using high-tech scanners and VR (virtual reality) doctors will be able to project Data from the scanners and view it without having to be in contact with the patient (Therefore also decreasing possibility of transmission). This will also enable patients and doctors to effectively communicate and even clearly describe and show the patient the exact problem without having to break down the complexity.

3. Creating high tech containment facilities these patients can effectively be kept in proper isolation thus reducing the risk of it spreading, these patients can be monitored within closed walls and effectively the health workers will be safer and protected from the virus.

4.   **Creation of software that can be specifically used to detect the virus, or rather disturbances in the human system, as we all know there are devices that are capable of detecting the heart rate and blood pressure of humans, and these are readily available to the public for purchase, by implementing software that can use a mobile phones built-in sensors, or create a device and an specially detect the deadly virus and make is consumer available, can drastically decrease fear and uncertainness of the public towards having the virus, and they can easily forward the results of the test to their personal or Nearest Public Doctor.**

CONCLUSION

- In Conclusion in such a difficult time as this firstly, we must endeavor to stay safe at all times, and avoid public gatherings, and we must also this free to boost out thinking and problem solving capabilities, for this will not only make us better engineers but will also benefit the society in general from our innovations and ideas. An Engineer is always analyzing and problem solving.

THE END