

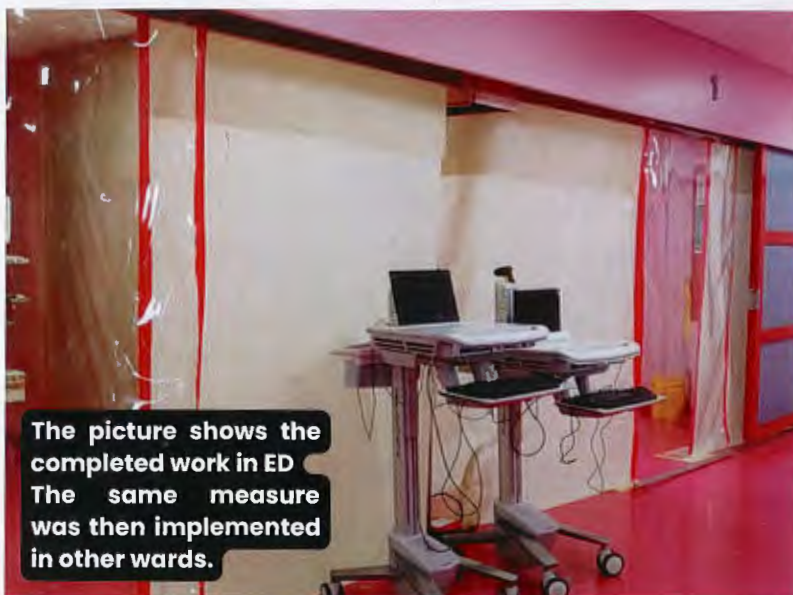
KEEPING OUR FRONTLINERS SAFE – AN ENGINEERING EFFORT

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ON THE
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The SARS-CoV-2 virus first reached our shore on the 25th January 2020, where four tourists from China who entered through the Singapore was found to be COVID-19 positive. On the same day, the Universiti Malaya Medical Centre received its first case of person under investigation (PUI). The taskforce was activated on the next day to discuss on the procedures and processes, and plan for the potential rise in the number of cases. However, the anticipation of the rise in the number of cases was not there and everything returned to normal soon after, until the first wave which started in late February 2020. The sudden rise in the number of cases and the lack of preparation led to the Government of Malaysia declaring the first movement control order on the 18th March 2020. There were 790 confirmed cases, with 60 recovered and two deaths recorded on that day.

During that period, UMMC started to look at ways on how to control the spread of the virus in the hospital environment. At that time, we have some understanding of how the virus behave from the news from Wuhan, and articles and guidelines from the World Health Organization (WHO) and the Centre for Disease Control and Prevention (CDC).



The picture shows the completed work in ED. The same measure was then implemented in other wards.

It is a virus and can spread through droplets and aerosols. At UMMC we understand that we **need to create not just an environment that is safe for our healthcare workers, but also communicate with them that we are doing all we can to ensure their safety.** This is because, healthcare workers need to feel safe at the workplace for them to be able to continue to deliver the services to the public.



The picture shows the construction of the anteroom connecting between the Phase 1 and Phase 2 of GICU.



The picture shows the completed anteroom.



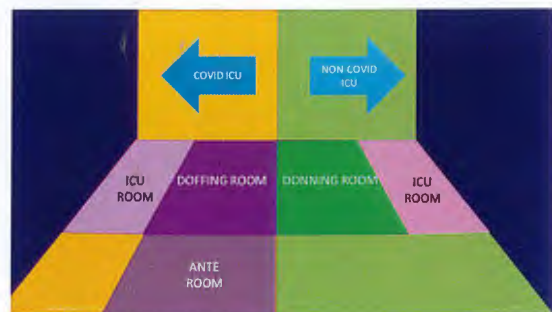
Picture showing the works being carried out in COVID-19 wards

I was tasked by the UMMC COVID-19 taskforce to work with the UMMC Engineering team to review the environmental measures in UMMC. The **first thing that we did was to review the environment and process at our Trauma and Emergency department (ED) who is the main frontline of the hospital.** They are the ones who receive all cases before the patients are transported to the wards. The first thing we identify was the Respiratory Ward in ED was an open ward with open cubicles. Patients who are COVID-19 positive and is on ventilator can generate aerosolised virus particles which can spread easily through the entire ward. The aim was to isolate the cubicle where the COVID-19 or PUI patients were being managed.

We surveyed the areas and found that if we were to use the plastic sheets and curtain rails, we can isolate the cubicles. However, due to MCO, all the hardware shops were closed and we were not able to get the materials. Hence, we looked around UMMC and found some plastic sheets which we could use to isolate cubicles. The staff at the engineering department started their work and we were able to create isolated cubicles in the respiratory ward.

The next thing that we tackle was the General Intensive Care Unit (GICU). The GICU which was located on the second floor of Menara Utama, has just been newly renovated. The GICU consists of two sections Phase 1 and 2. The issues that we encountered in the GICU is the limited number of negative pressure rooms available for COVID-19 patients. There was only a total of four rooms in the two phases of the GICU. With **the increasing number of patients requiring ICU beds, the GICU will be overwhelmed very quickly. We need to identify solution on how we could create more beds, while still ensuring that our healthcare workers can work safety and comfortably.** There were a lot of suggestions, however, after reviewing the mechanical and electrical drawing of the GICU, we found that there is two separate air handling units for Phase 1 and 2 of the GICU. Taking this into consideration, we decided to isolate the Phase 2 GICU and use the whole Phase 2 as the COVID-19 areas. This allowed us to increase the number of beds from 4 to about 10. We designed connecting anti-room and designed two of the rooms in the GICU as the donning and doffing areas for the personal protective equipment (PPE).

Picture showing the two zones - Phase 1 and Phase 2 GICU.



There are still a lot of effort that have been carried out by our very capable Engineering Team in UMMC. The lesson learned from this COVID-19 pandemic is that **every hospital needs an effective and efficient engineering team that can react to the situation.**