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Malaysia responds to COVID-19 threats through frugal innovations

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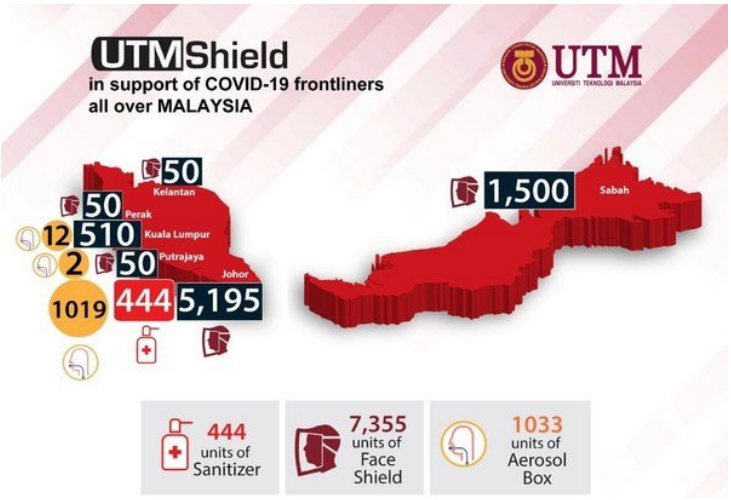
An emergent, innovative, mixed-method research strategy and tried-and-tested processes were employed to ensure effective solutions for the frontliners and healthcare personnel.



Researchers from Universiti Teknologi Malaysia (UTM) have swung into action to respond to the threat posed by COVID-19 pandemic. Frugal innovations and inventions were developed to improve efficiency and quality in creating relevant and adaptable solutions for the healthcare industry.

Health workers and doctors from hospitals and medical institutions in Johor, Klang Valley and other states in Malaysia are using the inventions described below:

I3S Cubicle for COVID-19 Screening

The I3S Cubicle which is based on Isolate, Examination, and Sampling concept can reduce the risk of infection as it does not require any face-to-face contact between health workers and those getting screened.

The space inside of the cubicle is only for the health worker to avoid the transmissions of air contamination from the patient. The cubicle can also reduce the dependency of the frontliners' personal protective equipment (PPE) while implementing the screening process.

MCK19 Delivery Robot

MCK19 or "Makcik Kiah" is the first Malaysian-made delivery robot designed to assist the delivery of healthcare to COVID-19 patients. The use of MCK19 to deliver foods and medications to patients' rooms on its own can reduce the exposure of health workers from isolated patients who may be highly contagious. It can be instructed via its touchscreen interface, laptops, phones, or tablets. An LCD screen enables health checks to be done remotely through teleconferencing.

Aerosol Box or Intubation Box for Intubation Procedure

An intubation procedure for a COVID-19 patient is performed in Aerosol Box with video laryngoscopy to prevent virus infections toward the health workers from the possible occurrence of aerosol generated by the patient's airway. It is used to ensure the safety of medical frontliners.

Over 1,000 units of these Aerosol Boxes were successfully distributed to hospitals and medical centres inJohor, Pahang, Negeri Sembilan, Melaka and Selangor to be used by the health workers.

Ventilator and Splitter Kit

Ventilators are equipment that take over the body's breathing process when the patients no longer can breathe on their own. UTM in collaboration with the Ministry of Health (MOH) Malaysia has developed a ventilator prototype using 3D printing technology to give patients infected with coronavirus chances to survive. A splitter kit prototype that enables a standard ventilator unit to be shared by two patients from the same settings while receiving breathing assistance was also developed in collaboration with a private company.

3D Printed Face Shields & Hand sanitizer

UTM community members made use of 3D printers around the campus for the production process of the 3D printed face shield.

Hand sanitizers were produced in-house using various expertise and facilities available on campus which were distributed for students, security unit, and health workers around the campus.

The development of these frugal innovations was done while collaborating with health professionals, researchers from other universities, and private companies for the benefit of the country.

The Deputy Vice-Chancellor of Research and Innovations who is now the Acting Vice-Chancellor of UTM, Prof. Datuk Ts. Dr. Ahmad Fauzi bin Ismail said, " the UTMShield project which was launched on 11 April 2020 is one of our contributions to the country to help fight the COVID-19 pandemic with product innovations. We are proud to be able to contribute to making an impact on society."