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Moving on to the response or the perspective on technology, we will now have two aspects, one linked to medical technology and the other to the information technology that supports the environment. We will start with Sung-Woo on medical technologies.

Kim Sung-Woo

Thank you for giving me a great opportunity to discuss these human health issues. I would like to focus on three issues: 1) medical prevention versus treatment, 2) massive screening of diseases in laboratories versus point of care tests (POCT) in fields on site, and 3) expansion of innovative POCT to ubiquitous healthcare.

The National Institute of Health (NIH) of the USA invested huge amounts of money for drug development over 50 years. However, they found that they could not make significant progress. The ratio of the patients was almost the same even after the huge investment. They made a decision to change their policy to focus on prevention rather than treatment. Subsequently, many pharmaceutical and diagnostic companies followed the same direction for their future investment. The prevention of diseases through efficient diagnosis is expected to be so effective before active progress of disease symptoms.

In the beginning of last year, the WHO announced that Covid-19 became pandemic rapidly over the world. Many diagnostic companies instantly generated efficient accurate PCR diagnostic kits to detect Covid-19 for massive screening. However, there was a critical problem in sampling and transportation of human samples. After collecting samples from the potential patients at hospitals and/or sampling sites, those samples must be safely transported to PCR test laboratories. It usually took at least 3-6 hours. This raised critics due to expensive cost for special three-layer packaging for safe transportation of the samples. Otherwise, any leak of samples during the transportation can cause spreading the virus to the public. It is also possible that samples may be mistakenly mixed up during the collection processes and/or transportation, leading to wrong reports. Therefore, rapid accurate detection using POCT system is requested to reduce these kinds of risks by handling the fresh samples on site without any leaking or mix-up. More reliable data can be obtained quickly even without any additional costs or time loss. This will provide a satisfactory solution. However, this kind of detection system is not available. We are currently developing a proto-type of the efficient diagnostic system and keep going on to generate more reliable form of compact, accurate and inexpensive system. We hope we can release it in the beginning of next year.



If this kind of POCT system can be used at home or hospital, the diseases at different seasons and locations can be efficiently supervised by control towers of governments or international institutes, even with or after coronavirus period. To accelerate adaption of this kind of efficient system, I think governments or global institutes should introduce special policies to support innovative companies strongly. Generally, many innovative technologies come from small startup companies. These companies need to concentrate on rapid development of new diagnostic system using their unique innovative technologies with the help of big companies or government. Strong support with investment will accelerate to make fast, accurate, compact and inexpensive POCT systems that fit to use at home or anywhere in the field, collecting the data onsite and sending the results to hospitals or control towers. The control towers will be able to run tele-diagnostic system with the collected big data and artificial intelligence (AI) program. This will provide a great model system of the tele-diagnostics for supervising and controlling diseases that emerge in different seasons and at different locations over the world. Therefore, I would strongly emphasize on supporting roles of big companies, government and global institutes to adapt the innovative technologies rapidly. In the near future, I think we will be able to use a handheld or wearable size detection system at home or personally, check our health condition, transfer the results to hospitals and get doctor's direction quickly. In this way, tele-diagnostics will be popular. As the same way, government and/or global institutes will be also able to supervise and control specific diseases at different locations at different season. We hope we can enter into the ubiquitous healthcare era with this kind of innovative tele-diagnostic system in the near future.

We have worked with the Institute of Pasteur in Senegal to make a model system as described above. We are combining our innovative technologies and their abundant clinical samples collected from their country for supervising and controlling various diseases as well as Covid-19. We are currently expanding our applications with the WHO and USA CDC to generate a better tele-diagnostic system, too. We hope that we can provide excellent solutions for human healthcare.

Patrick Nicolet

Thank you, Sun-Woo for the practical proposition. In the previous panel we heard that one of the lessons from the crisis was the need for better anticipation and preparation. If I understand correctly, here you are proposing as a priority that the preparations should lead to ubiquitous or instantaneous healthcare. This also requires the sort of infrastructure you described and that definitely cannot be built overnight. Thank you for this input.