

# LCQ1: Making good use of technologies to prevent and combat epidemics

Following is a question by the Hon Wong Ting-kwong and a written reply by the Secretary for Food and Health, Professor Sophia Chan, in the Legislative Council today (January 20):

Question:

On making good use of technologies to prevent and combat epidemics, will the Government inform this Council:

(1) whether it has compiled statistics on the losses so far caused by the epidemic to the local economy; if so, of the amount of money; if not, the reasons for that;

(2) how the Government has, since the outbreak of the epidemic, made use of technologies such as those in the areas of communications, testing and healthcare to help combat the epidemic;

(3) whether clear policies are in place to provide guidance on how to make use of local scientific research achievements to assist in preventing and controlling diseases as well as addressing the livelihood needs amid epidemics; if so, of the details; if not, the reasons for that; and

(4) whether it will formulate a set of comprehensive policies and relevant mechanisms in respect of the work of preventing and combating epidemics, and encourage scientific research institutes to further conduct applied research on areas such as communications, testing and healthcare, so as to assist the Government in enhancing its capability to cope with epidemics; if so, of the details; if not, the reasons for that?

Reply:

President,

In consultation with Innovation and Technology Bureau and Office of the Government Economist, my reply to the various parts of the question raised by the Hon Wong Ting-kwong is as follows:

(1) The COVID-19 epidemic evolved into a pandemic in early 2020 and severely hit global and local economic activities. It added pressures on the Hong Kong economy which had already fallen into recession, resulting in a sharp year-on-year contraction of 9 per cent in the first half of last year. As the global economy recovered and the local epidemic situation stabilised in the latter part of the third quarter, the overall economic performance saw some improvement, with the year-on-year decline in real GDP narrowing visibly to 3.5 per cent in the third quarter. However, the fourth wave of local

infections since the latter part of November has led to the re-tightening of anti-epidemic measures and posed renewed pressures on domestic economic activities. Economic contraction for 2020 as a whole will likely be close to the official forecast of -6.1 per cent as put out in November, which would be the most severe recession on record. It would also be the first time for Hong Kong to register two consecutive years of negative growth.

The pandemic's impact on certain economic segments was particularly apparent. Inbound tourism came to a standstill since February last year, with total visitor arrivals falling by 93.6 per cent for 2020 as a whole. Hotel room occupancy remained low for a long time last year. While the compulsory quarantine requirements in recent months and staycation activities by more local residents provided some cushion, the average hotel room occupancy in October and November combined was still at 55 per cent, 12 percentage points lower than a year ago. The operating environment of restaurants was very difficult amid the stringent social distancing measures, with the total restaurant receipts falling by a record 34.6 per cent in the third quarter. The retail sector was dealt a heavy blow as visitors virtually disappeared. In the first eleven months of 2020, retail sales volume fell drastically by 26.6 per cent year-on-year, though the situation in October and November noted some relative improvements.

The austere economic conditions also led to a sharp deterioration in the labour market. The seasonally adjusted unemployment rate surged from 3.3 per cent in the fourth quarter of 2019 to 6.6 per cent in the fourth quarter of 2020, the highest in 16 years.

To address the significant impacts of the COVID-19 pandemic on the Hong Kong economy, the Government has rolled out relief measures of unprecedented scale since early 2020, involving over \$300 billion in total or around 11 per cent of GDP. These measures have gone some way in supporting the Hong Kong economy and relieving people's financial burdens. The Government will maintain a countercyclical fiscal policy to mitigate the downward pressure on the economy and the impact on people's livelihood.

(2) to (4) The COVID-19 outbreak that has lasted for months has highlighted the importance of technology development and applications, and the potential in turning the "crisis" into "opportunities". Locally developed technology products and application solutions have all played an important role in the prevention and combat against this epidemic. As many large cities around the world are under lockdown, making good use of e-commerce and digitalising public services have become even more important. It also creates new opportunities for the I&T industries and expedite digitalisation.

Since the outbreak of the COVID-19 epidemic, the Government has endeavoured to make use of information and communications technologies to assist the public in the prevention from and fight against the epidemic. The relevant initiatives are as follows:

Support Mandatory Home Quarantine

To tie in with the mandatory home quarantine measures implemented in early February 2020 to prevent inbound travellers from outside Hong Kong spreading the virus in the community, we have successfully developed the StayHomeSafe system and electronic wristbands, which can effectively monitor whether a large number of persons under quarantine are staying at designated dwelling places while protecting their personal privacy. The system makes use of a Bluetooth Low Energy electronic wristband and a monitoring solution developed by a local research and development centre, complementing with the StayHomeSafe mobile app that adopts geo-fencing technology to detect electronic signals, including mobile communications, Wi-Fi and Bluetooth signals of electronic wristbands etc., around the dwelling places of persons under quarantine, and by means of artificial intelligence to analyse changes in various signal strength to monitor whether the persons under quarantine are staying at their designated dwelling places. To date, about 430 000 persons under quarantine have used electronic wristbands.

### "COVID-19 Dashboard"

To facilitate more comprehensive understanding of the latest situation of the COVID-19 epidemic by the public, the Government and the industry collaborated and with the use of relevant open data launched the "Interactive Map Dashboard on the Latest Situation of Coronavirus Disease in Hong Kong" (the Dashboard) in early February 2020. The Dashboard has so far recorded over 45 million views.

### LeaveHomeSafe mobile app

The Government launched the LeaveHomeSafe mobile app on November 16, 2020 to provide members of the public with a convenient digital tool that helps them form a habit of recording the time of their visits to different venues and taxi rides during the epidemic. The mobile app will notify a user if he or she is later identified to have visited the same venue that a confirmed patient has visited at about the same time or taken the same taxi that a confirmed patient has taken on the same day. In the unfortunate event of infection, the user's visit records can also assist the Centre for Health Protection in epidemiological investigations. At present, the number of downloads of the LeaveHomeSafe mobile app exceeds 440 000. Over 68 000 public and private venues have participated in the scheme to display the LeaveHomeSafe venue QR code for members of the public to scan and record their visits, of which about 14 000 are public venues and about 54 000 are private venues. Besides, the LeaveHomeSafe mobile app can also be used in about 18 000 taxis across the territory.

### "Return2hk Scheme"

Starting from November 23, 2020, Hong Kong residents in Guangdong Province or Macao who fulfil specified conditions could be exempted from the 14-day compulsory quarantine requirement when they return to Hong Kong under the "Return2hk Scheme". For completion of the electronic health declaration, residents returning to Hong Kong could transmit their valid negative nucleic acid test result to the electronic health declaration system of the

Department of Health through "Yuekang Code" or "Macao Health Code". So far, about 30 000 Hong Kong residents have returned to Hong Kong under the Scheme.

The Government is committed to promoting research and development. In addition to funding Research and Development (R&D) Centres, the Government also supports enterprises and universities with a variety of funding schemes to enable them to carry out more R&D work and technology transfer, or commercialise their R&D outcomes. The COVID-19 pandemic has highlighted the importance of developing and promoting technology application. Technology products and applications researched and developed locally have played important roles in the fight against the epidemic. A few examples are set out as follows.

With nanofiber technology, the Nano and Advanced Materials Institute (NAMI) has worked with a local manufacturer to develop the world's first nanofiber N99 facemask – NASK. It is a super breathable facemask with bacteria killing property and manufactured in Hong Kong, compliant with the FFP2 standard of the European Union and effective in removing most of the airborne contaminants. In the recent combat of COVID-19 pandemic, NASK has been adopted by the Hospital Authority.

In addition, an all-in-one nanofiber HEPA (High Efficiency Particulate Air) filter – multiHEPA has also been developed with NAMI's functionalised nanofibers. It is not only capable of filtering 99.97 per cent of particles at the most penetrating particle size of 300 nm, but also equipped with bacteria killing and volatile organic compound removal functions. MultiHEPA is integrated for trial onto a movable ventilation device specifically designed by the Electrical and Mechanical Services Department for the Hospital Authority.

Furthermore, in order to help members of the public combat the pandemic and to offer a more environment friendly alternative to disposable face masks, the Hong Kong Research Institute of Textiles and Apparel was tasked to develop the CuMask+™. Two of the functional layers of which CuMask+™ is made are specially made with small quantities of copper, capable of immobilising bacteria, common viruses and other harmful substances. The mask reaches the American Society for Testing and Materials F2100 Level 1 standard, and is effective for 60 washes.

We also introduced a special call under the Public Sector Trial Scheme in March 2020 to support product development and application of technologies for the prevention and control of the epidemic. A total of 63 projects out of 332 applications received have been approved with total funding of over \$102 million. The 63 approved projects fall under a number of categories, including COVID-19 virus detection or diagnosis methods, masks and other protective equipment, disinfection equipment and products, body temperature checking devices and virus transmission tracking devices. 57 public organisations are involved in the trials of the approved projects.

On the other hand, the Health and Medical Research Fund (HMRF) administered by the Food and Health Bureau has approved a total funding of

\$170 million to support the local universities to conduct 49 medical research studies on COVID-19 in order to combat the epidemic in April and August 2020. \$47 million was approved to support four local universities to conduct 11 studies relating to the testing methods, vaccines and antivirals for COVID-19.

The HMRF has supported research on COVID-19 to address transmissibility and infectability of the virus, effective detection, surveillance and prevention strategies, as well as development of treatments and therapies through the use of technology. Some of these research studies can provide early results. For instance, sero-epidemiological studies will help identify the number of asymptomatic people with COVID-19, map the emergence of population immunity and develop a transmission model of COVID-19; waste water surveillance from the sewage treatment facilities and housing estates can provide a complementary system to monitor virus activity in the community; genomic surveillance using whole virus sequence data can help identify the source of infection and untangle silent virus transmission in the community when combined with epidemiological investigations; and a Phase 1 clinical trial will determine the safety of a nasal spray COVID-19 vaccine developed by the Department of Microbiology, The University of Hong Kong in collaboration with researchers in Mainland China.

The HMRF will suitably allocate additional resources in a timely manner to support the use of technology to complement the Government's work in combating the epidemic. Also, the Research Fellowship Scheme under the HMRF aims to cultivate local talents and healthcare professionals and to enhance their skills in research in their area of expertise.