ITU-D Study Groups

Study period
2018-2021

Question 2/2
Telecommunications/ information and communication technologies for e-health

Annual deliverable
2020-2021

Telecommunication/ICTs for pandemics and suicide prevention

Executive summary

Since 1998, the ITU-D study groups have been researching eHealth support using ICT. In the four-year cycle from 2017, it was pointed out that new technologies (AI, Blockchain, 5G, satellite communication, etc.) will create new healthcare businesses, and relevant case studies and explanations were compiled in the final report. In this paper, new ICT technologies for COVID-19 are summarized. While these items seem to be independent from each other, they are closely related. Furthermore, a draft new Resolution proposal (APT-WTDC-3 INP-20) is provided in the annex section as a reference.

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1. Introduction

The most effective way to prevent the spread of the novel coronavirus infection (COVID-19) is to avoid direct contact between people. As a result, restaurants were closed, international flights were suspended, people were confined in their homes and were forced to live in melancholy. It goes without saying that ICT is one of the most promising means to overcome such an environment.

In fact, the global market for ICT-powered telemedicine is sensitive to people's movements, and the stock market is declining overall. However, stock prices of operators that provide online medical care system and software houses that develop contact applications have risen. With this novel coronavirus infection providing new opportunities, it is expected that expansion of the use of ICT technology in medical care will accelerate at a stretch, and that it will bring changes in work and life even after the infection has subsided.

Among the remote services utilizing ICT, telemedicine, which provides medical care between physicians and patients, or online medical care in other words, has been continuously introduced in ITU-D Study Group 2 (SG2) since 1998. Furthermore, after the infection from COVID-19 spread to all countries, online medical treatment at the first visit was lifted, although it is a timely and special measure. This physicians-patients relationship will continue to expand even after the infection has subsided. Behind this widespread use, each individual owns a mobile phone with a camera; wireless and wired broadband has greatly contributed to it. In other words, it is no exaggeration to say that development of communication infrastructure will create new businesses in medical care.

With this novel coronavirus infection providing new opportunities, it is expected that expansion of the use of ICT technology in medical care will accelerate at a stretch, and that it will bring changes in work and life even after the infection has subsided.

Online medical care, which has continuously been introduced in ITU-D SG2 since 1998, as well as studies that new communication technology brings new medical business, are already covered in the Final Report on Question 2/2 for the 2018-2021 study period[1]. So, they should not be reiterated in these "points to note".

From the perspectives that telecommunication carriers should be aware in relation to COVID-19, this report introduces the following new topics: “COVID-19 Contact-Confirming Application”, “Suicide prevention”, “Targeted antivirus prophylaxis” and “Mobile medical care vehicle in the period of COVID-19”.

In annex, a proposal for a draft new Resolution “Using information and communication technologies to combat pandemics such as COVID-19 infections”[2] is included.

2. COVID-19 Contact-confirming application (COCOA) on smartphones

The contact-confirming application is a smartphone application that enables a user to receive notifications about the possibility of contact with someone infected with the novel coronavirus (COVID-19). In order to prevent the spread of COVID-19, the Ministry of

[1] ITU. Final Report on ITU-D Study Group 2 Question 2/2 for the study period 2018-2021. Telecommunications/information and communication technologies for e-health. ITU, 2017. ITU-D Study Group 2 Final Report on Question 2/2, Study Period 2018-2021.

[2] ITU-D SG2 Document SG2RGQ/254 from the Co-Rapporteurs and Vice-Rapporteurs for Question 2/2. The draft new Resolution was also submitted by Japan to the 3rd Meeting of the APT Preparatory Group for WTDC-21, 5-8 October 2021.

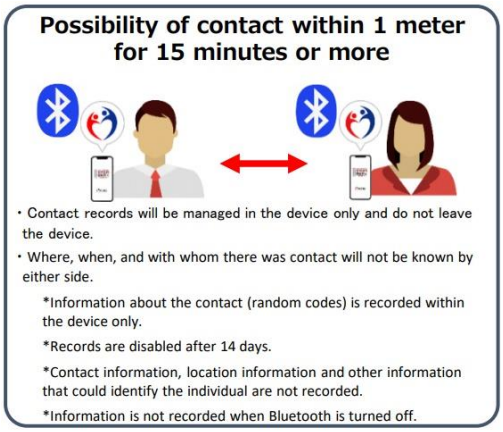
Health, Labour and Welfare of Japan released the COVID-19 contact-confirming application (COCOA) in June 2020. COCOA requires a large number of users to be effective, and trust operation in IT services is essential for acquiring users.

2.1. Mechanism

This application uses Bluetooth on smartphones upon user approval to receive notifications about the possibility of contact with a person who has been tested positive for the novel coronavirus, while ensuring anonymity and privacy. This application has been developed based on available application programming interfaces (APIs).

When a person, upon agreement, registers that he/she has been tested positive for the novel coronavirus, another user will be notified if there is a possibility that he/she was in close contact – within approximately 1 meter for 15 minutes or more – with that person in the last 14 days, as illustrated in **Figure 1**. Once the user receives the notice, if he/she fills in his/her own condition, contact information for the Outpatient Services for Returnees and Contact Persons, etc. will appear, providing guidance for care such as testing.

Figure 1: The mechanism of COCOA



Source: Ministry of Health, Labour and Welfare, Japan

2.2. Merits

Users can receive support sooner, such as testing from a public health centre, by knowing that they might have been in contact with someone who has been tested positive. The more users, the more effective it will be in preventing the spread of infection.

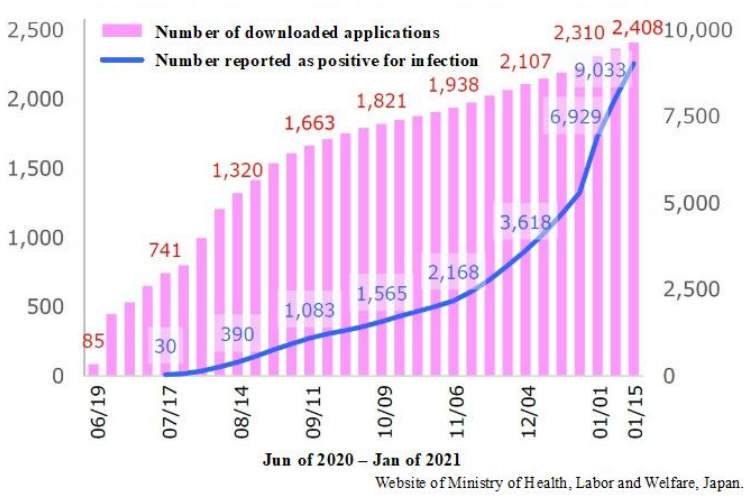
2.3. Protection of users privacy

Users are not asked to enter name, phone number, e-mail address or any other information that could identify them. Information on close contact with other smartphones is encrypted and recorded only in the user's smartphone and is automatically disabled after 14 days. Administrative agencies or third-party parties cannot use or collect contact records or personal information.

2.4. Penetration

In Japan, the penetration rate of COCOA is about 30% after half-a-year of operation. The number of downloaded applications and the number of persons reported as positive for COVID-19 over time is shown in **Figure 2**. Although there are various criticisms and evaluations, even one patient saved by this operation in the first year can be considered as an unwavering social achievement using ICTs.

Figure 2: Number of downloaded applications and number of persons reported as positive for COVID-19 over time



Source: Ministry of Health, Labour and Welfare, Japan

3. New devices for smartphones

3.1. CO2 sensor

A system which "visualizes" the number of people in the room and the ventilation status based on the carbon dioxide (CO_2) concentration was demonstrated. The system consists of a wireless communication line, a cloud environment for data analysis, and a web application for confirmation. A device in the system uses a CO_2 sensor to analyse to what extent a room is crowded with people and notifies the administrator if the room capacity is exceeded. Specifically, this device, called a CLIP IoT device, measures CO_2 concentration and sends the data to a cloud environment for analysis. The data can be read from a personal computer or smartphone through a web application.[3]

3.2. Laser sensor to check for droplets during conversation

In the context of a publicly offered research, the KDDI Foundation adopted the development of a laser sensor that examines droplets during a conversation. A small terminal placed on a desk emits a laser beam inside and counts smears entering a small window. When the droplets released during a conversation exceed a certain value, Bluetooth is used to alert the mobile phone. Although it is in the research stage at the time of this writing, the potential market size seems to be extremely large.

4. Targeted Antivirus Prophylaxis[4]

In a pandemic, many patients need to be treated at the same time, and it may be impossible for doctors to see, treat, and prescribe medication individually for each patient. Similarly, it may be very difficult to provide medication counselling and explain precautions to each patient face-to-face by pharmacists. In such cases, patients should take medications themselves without the benefit of treatment by a doctor or counselling by a pharmacist. This is called self-medication. Targeted Antivirus Prophylaxis (TAP) is a policy that allows suitable antivirus tablets to be distributed to citizens before the outbreak of a pandemic. It seems that TAP should be applied during future pandemics. Self-medication has a long history but involves substantial risks. What can be done to reduce these risks? Telemedicine over telecommunication can minimize these risks. TAP is a policy that allows people to purchase medicine before the outbreak of a disease. This does involve

[3] See https://www.nikkei.com/article/DGXMZO63094980X20C20A8000000 (in Japanese)
[4] ITU-D SG2 Document SG2RGQ/315 from Seisa University (Japan).

additional risks, so a pulse oximeter and prior drug knowledge that can be obtained via the Internet are essential. In addition, consultation (e.g., via telemedicine) with a medical institution is a prerequisite. There are several candidates for oral drugs that should be distributed by TAP, but they differ from country to country.

In a pandemic, many patients need to be treated at the same time, and it may be impossible for doctors to see, treat, and prescribe medication individually for each patient. Self-medication has a long history but involves substantial risks. Telemedicine over telecommunication can minimize these risks.

4.1. TAP supported by telemedicine

At the peak of the COVID-19 outbreak, very few, if any beds may be available for mildly ill patients, and there is need for a solution for individuals who prefer a calm and restful home as opposed to a crowded hospital. Death from mild cases is common with COVID-19, and a reliable and effective system/infrastructure for early detection is necessary. An essential component of any such system/infrastructure is a pulse oximeter that can be effectively used. Pulse oximetry can be used to obtain the ratio of haemoglobin in blood bound to oxygen (oxygen saturation). Pulse oximetry is used to measure the oxygen level (oxygen saturation) in the blood. Oximetry is based on the principles of spectrophotometry, which is the relative absorption of red (absorbed by deoxygenated blood) and infrared (absorbed by oxygenated blood) light of the systolic component of the absorption waveform correlates to arterial blood oxygen saturations. Haemoglobin absorbs red light when not bound to oxygen (deoxygenated blood) and does not absorb red light when bound to oxygen (oxygenated blood). Using this property, it is possible to measure changes of light absorption in oxygenated blood or deoxygenated blood, the ratio of which is called oxygen saturation (SpO2). SpO2 levels between 96% and 98% are normal, 100% indicates the hyperventilation syndrome, and 90% or less suggests respiratory distress. The average range of normal values decreases with aging, e.g., at 90 years, even 90% SpO2 is considered normal. It is important to measure arterial oxygen saturation (SaO2) on a daily basis.

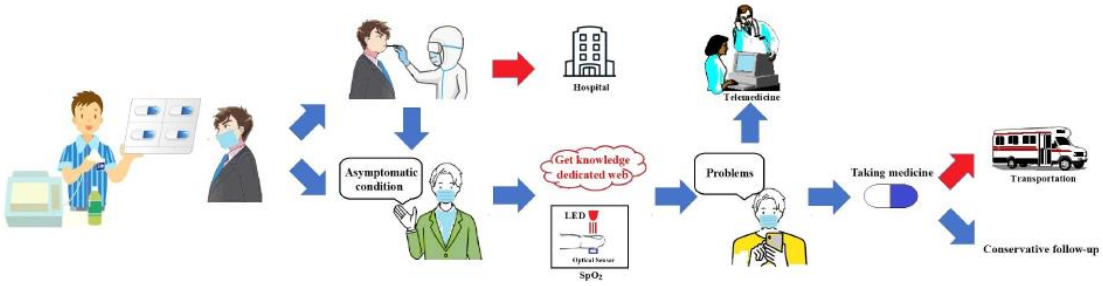
Most cases of COVID-19 infection are asymptomatic or extremely mild. Younger people tend to experience milder cases, whereas older cases tend to be more severe. The problem is that there are many asymptomatic cases that can lead to death from pulmonary oedema while the patient's progress is being monitored at home. In such cases, the proposed process and system can be used to prevent complications and death, in which ICTs play a vital role in saving as many lives as possible during the COVID-19 pandemic.

In the early stage of pulmonary oedema, the ventilation volume is maintained, so the concentration of CO2 in the blood does not rise. The difficulty of breathing reduces partial pressure of CO2 in the blood, but the patient does not have any complaints. Pulse oximeters can be used to detect pulmonary oedema at an early stage. If the pulse oximeter reading is more than 4% below the average, this may indicate pneumonia. In other words, even if there are no symptoms, but pulse oximeter reading is more than 4% below the average, self-treatment is not advisable, but instead, it is recommended to utilize telemedicine with a medical institution while medicine is taken at home.

If the pulse oximeter readings do not improve, an ambulance should be immediately called and the patient be admitted to a medical institution. When the pulse oximeter values do improve, the patient should take the prescribed medication for the required period and remain at home. The biggest advantage of this system is that the medical staff has no risk

of infection (**Figure 3**). When distribution of medicines at the height of a global pandemic is not possible, TAP policies should be implemented in advance.

Figure 3: Deployment of TAP with ICTs



5. Suicide prevention using ICT[5]

The outbreak of the coronavirus disease and the need for a social isolation forced healthcare providers to move to eHealth. Time revealed that eHealth services could be as effective as face-to-face care and are well accepted by patients. In some cases, connecting in the eHealth format is even preferable. This is the case of suicide behaviour.

Suicide is a global phenomenon. Every year >700 000 people take their own life. Many more try, unsuccessfully, to commit a suicide. Suicide is a tragedy, affecting both families and communities and having long-lasting effects on those who are left behind.

Although suicide occurs in all countries, over 77% of global suicides in 2019 were performed in low- and middle-income countries (LMICs). The major differences are that young adults and elderly women in LMICs have much higher suicide rates than their counterparts in high-income countries, while middle-aged men in high-income countries have much higher suicide rates than middle-aged men in LMICs. In addition, suicide is the fourth leading cause of death in 15-19-year-olds.

Who is in risk? Many suicides are performed impulsively in a critical moment. Yet, the link between suicide and mental disorders, such as depression or alcohol / drug use disorders, is well established. Suicide rates are also high amongst vulnerable groups, who experience discrimination. Research indicates that suicide may have a genetic contribution. The heritability for serious suicide attempts is estimated to be 55%.

The attempts to prevent suicides vary in a wide range and from country to country. In some societies, people with suicide behaviour are hospitalized, support groups are created to help suicide victims, in other countries suicide is neglected or criminalized.

eHealth could support suicide prevention through a number of measures, especially if more attention is paid to the broader application of virtual mental health services. eHealth provides means to identify individuals at-risk of suicide and to offer help through web interventions or to deliver proactive interventions in response to personal posts in social media.

eHealth could support suicide prevention through a number of measures, especially if more attention is paid to the broader application of virtual mental health services.

It is in line with the strategic goals of Q2/2 to focus, among all other topics, on eHealth application for suicide prevention. Q2/2 may include in its activities the following tasks:

[5] ITU-D SG2 Document SG2RGQ/316 from Bulgaria.

- Urging communities to extend their eHealth National Plans with applications supporting patients with mental health disorders and people at risk of suicide;
- Providing ITU members with information, data from research and best practice examples in order to increase their awareness of neurobiological aspects of suicidal behaviour and to stimulate research in this domain. Thus Q2/2, in cooperation with other Questions, may contribute in the decriminalization of suicide;
- Supporting ITU members to promote the extensive implementation of eHealth services to vulnerable groups at high risk of suicide, such as teenagers, citizens living alone, elderly, discriminated minorities (refugees bisexual, transgender, prisoners, …) etc.;
- To urge ITU Member States for the use of online screening for suicide and increase the effectiveness of Internet interventions. as well as to make more Suicide Prevention Mobile Apps available in national languages, etc.

Suicide prevention requires coordination and collaboration among multiple sectors of society, including the health sector, education, justice, police, and media. That is why, the first steps that Q2/2 could undertake may include raising the awareness of healthcare professionals, decision-makers, teachers, donors, providing references, good practice models, treatment protocols etc.

6. Mobile medical care vehicle that utilizes 5G during pandemics[6]

Telemedicine service that applies the 5th generation mobile communications system (5G) as a use case in the medical field can make use of its features such as ultra-high-speed communication. Telemedicine consists of a specialist / senior doctor in a remote location who provides support and guidance to medical staff in the same examination room / treatment room as the patient, while referring to various examination / diagnosis information transmitted via the telecommunication network. Therefore, it is important to reproduce the environment as if the specialist / senior doctor from the remote location were in the same examination room as the patient.

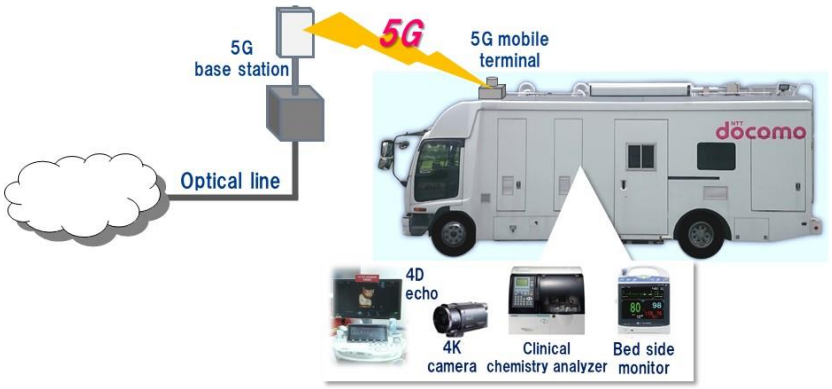
Telemedicine service that applies the 5th generation mobile communications system (5G) as a use case in the medical field can make use of its features such as ultra-high-speed communication.

Among the medical equipment used in various clinical departments, especially those that handle visual data (video, photo / still image), resolution has significantly been increased in recent years, and video has high definition such as 4K and 8K. If these medical data can be transmitted without deterioration or loss and with low delay, accurate and detailed diagnosis will be possible even in remote areas. In addition to examination / diagnosis information from medical equipment, high-resolution camera images for grasping the patient's condition at a remote location, and video conferencing are also useful for smooth communication between doctors. In order to collectively transmit this large amount of information to remote locations, a higher-speed, larger-capacity telecommunication network is required compared to a conventional system. By utilizing 5G, which is capable of high-speed communication about 10 times faster than 4G, it is possible to provide telemedicine services that meet those requirements. Furthermore, in such a telemedicine system, it is possible to take advantage of the characteristics unique to 5G mobile communication, that is, the ability to freely move within a wide service area and connect to a network at any time from a desired location. A specific example is the 5G mobile medical care vehicle, which is expected to be a new tool that can provide the same level

[6] ITU-D SG2 Document SG2RGQ/314 from Seisa University (Japan).

of medical care in a wide range of areas from urban areas to suburbs. A mobile medical care vehicle (**Figure 4**) equipped with medical equipment that supports general medical examinations and various medical examinations and connected to the network via 5G, can go to workplaces, various facilities, non-medical areas, disaster sites, etc. In those places, various medical examinations and telemedicine can be performed with the support and guidance of specialists.

Figure 4: Mobile medical care vehicle connected to the network via 5G[7]



Below, this case study introduces remote mobile medical care using mobile medical care vehicles operated in cooperation with clinics in regional medical care, as well as the remote pregnant women's medical examinations conducted by mobile medical car touring various areas. These are examples of specific usage scenarios of 5G mobile medical care vehicles in Japan, which were obtained as results of a survey.

6.1. Remote mobile medical care to support regional medical care[8]

In Japan, prior to the start of full-scale commercial service of 5G, "5G Field Trials" led by the Ministry of Internal Affairs and Communications (MIC) were carried out for three years from 2017. Participants from various fields participated in this, with the aim of creating new markets and new services and applications through the realization of 5G.

As a trial example of a service that utilizes 5G in the medical field, a telemedicine service was conducted by NTT DOCOMO together with a medical institution.

Among previous trials for this specific telemedicine service[9], a mobile medical care vehicle was introduced for remote medical care at local clinics. A new trial was carried out to realize advanced telemedicine services.

The scene verified in the trial assumes that a doctor, dispatched in a mobile medical care vehicle to the area where the clinic is located, receives advice and instructions from a specialist in a university hospital. The mobile medical care vehicle has a high definition and low-delay video conferencing system, a high-performance echo, a small 4K close-up camera, and medical equipment such as a bedside monitor with a 12-lead electrocardiogram function. In addition to images from the video conference and real-time medical images from the mobile medical care vehicle, past diagnostic images of patients can be transmitted simultaneously using 5G from clinics to university hospitals.

Two experimental 5G mobile terminals and two 5G base stations were used, and each 5G transmission was performed between the mobile terminal and the base station using the 100 MHz band (200 MHz band in total) at frequencies in the 4.5 to 4.7 GHz band.

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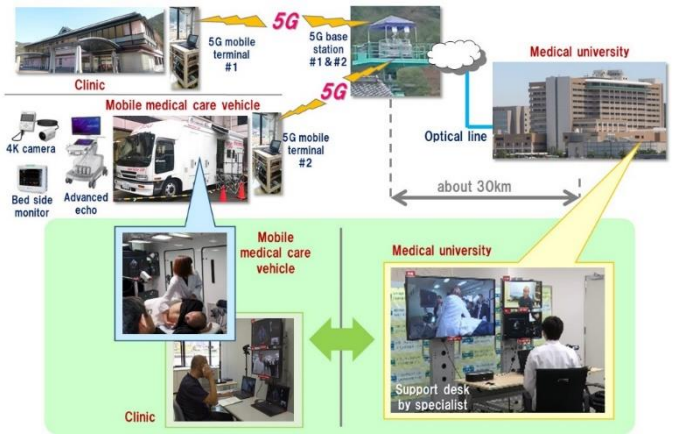
[7] M. Sugita and Y. Okumura, “Remote Medical Examination for Pregnant Woman utilizing 5G Mobile Medical Care Vehicle,” INNERVISION, vol.36, no.1, pp.62-65, Jan. 2021 (in Japanese).

[8] Y. Okumura, et al., “Field Trials of Telemedicine System utilizing 5G,” Magazine of IEICE Communications Society, no.55, pp.186-199, January 2021 (in Japanese).

[9] ITU-D SG2 Document 2/294 from Japan.

Transmission was performed between the base station and the university hospital using an optical line (**Figure 5**).

Figure 5: Remote mobile medical care by linking clinics and mobile medical care vehicles



In the actual trial, the following two scenes were conducted:

- [Scene 1] A doctor at the clinic was informed by a patient who had been visiting the clinic because of heart disease that he could not move because he had a severe cough and his whole body was sluggish. The clinic doctor immediately connects to a university hospital specialist via a 5G network, and transfers the "high-definition echo information (heart)" taken in the past to the specialist. The clinic doctor also informs the specialist that he is suspected of having myocardial infarction or heart failure. The specialist then decides to dispatch the mobile medical care vehicle to the patient's home area and to carry out telemedicine with the specialist (cardiologist).
- [Scene 2] After the mobile medical care vehicle that received the dispatch request arrives at the patient's home area and guides the patient into the vehicle, the doctor in the vehicle transmits diagnosis information such as "vital sign", "electrocardiogram", and "high-performance echo image (heart)" to the specialist. The specialist confirms the past echo image and the latest diagnosis information, and shares the diagnosis result and treatment plan with the mobile medical vehicle doctor.

The following opinions and impressions were obtained from the doctors who participated in this trial:

- (Specialist at a university hospital) Compared with diagnostic images that are usually seen in clinical practice, the images transmitted from remote locations do not show any deterioration, and the resolution of the diagnostic images is sufficient. In addition, since three types of images, a close-up camera, a bedside monitor, and an echo can be integrated and viewed at the same time, the patient's condition can be comprehensively grasped. The specialist can examine as if the patient were in the same room.
- (Mobile medical care vehicle doctor) Since the specialist doctor provides real-time support from a remote location, medical treatment can be performed without anxiety.
- (Observer doctor) Unlike still images such as MRI and X-ray images, echo images are dynamic images, and it is important to maintain quality when transmitting images. In this trial, the image quality was adapted for accurate diagnosis.

6.2. Remote medical examination to reduce the burden on pregnant women[10]

As another demonstration example of a mobile medical care vehicle equipped with 5G, the following is a trial of remote pregnant women's medical examination that can

[10] M. Sugita and Y. Okumura. Op. cit.

contribute to solving social issues such as eliminating regional disparities in medical care and responding to large-scale disasters.

Pregnant women are recommended to be examined every 4 weeks at the beginning, every 2 weeks after 22 weeks, and weekly after 36 weeks. In the past, pregnant women's medical examinations only checked the maternal blood pressure, weight, and urinalysis (urine protein / sugar), as well as the uterine floor (uterine size) for the foetation and listened to the heartbeat. Currently, to confirm the well-being of the foetation, ultrasonic diagnostic imaging method has been introduced as a foetal examination, and some obstetrics and gynaecology departments also use 4D ultrasound image with time elements added to 3D (three-dimensional) ultrasound image. However, now that the new coronavirus infection is prevalent, there are many voices of pregnant women saying, "I want to check the condition of the foetation frequently by medical examination, but I want to reduce the number of visits to the hospital as much as possible."

Therefore, NTT Medical Center Tokyo and NTT DOCOMO conducted a trial assuming that an obstetrician and gynaecologist in a remote location would perform a medical examination of a pregnant woman in a 5G mobile medical care vehicle.

In the first stage of trial, they conducted a simulated experiment of remote pregnant women's medical examination. A medical examination environment for pregnant women was reproduced by arranging medical equipment such as a 4D echo, a 4K close-up camera, a dry clinical chemistry analyser, and a bedside monitor in an indoor space simulating a mobile medical examination vehicle, while constructing remote support desks with examination video monitors and the Picture Archiving and Communication Systems (PACS), which is a medical image management system, in an indoor space simulating a hospital examination room. They also installed a 4K video conferencing system that connects both places (upper part of **Figure 6**). The inspection video from each medical device and video conference were collectively transmitted via the experimental 5G equipment and optical fibre. At the trial, a scenario was executed consisting of the following scenes that could actually occur for pregnant women:

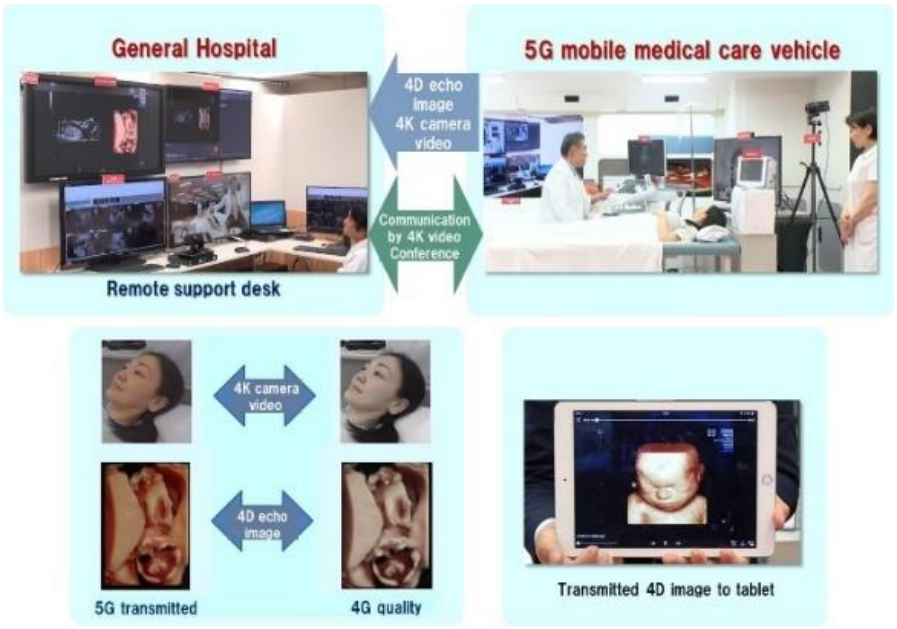
- [Scene 1] A pregnant woman who complained that "the baby does not move much" arrived at the mobile medical care vehicle, and the vehicle doctor contacted the hospital doctor and started a medical examination. First, the hospital doctor referred to the contents of the Mother and Child Health Handbook (brought by the pregnant woman) transmitted as a camera image, grasped the number of weeks and the weight gain status of the mother, and confirmed the smooth growth of the foetation.
- [Scene 2] Regarding the current state of the foetal, 4D echo examination images are transmitted in real time from the mobile medical care vehicle to the hospital, and the hospital doctor says that the BiParietal Diameter (BPD), which represents large lateral diameter of the foetal head, is equivalent to desired value of the number of weeks, and the heart is normal. It was confirmed that there was no problem with the foetation by confirming the smooth heartbeat and the smooth growth of the head, arms and legs. Furthermore, it was confirmed that the growth status was favourable even when compared with the inspection images recorded in the PACS during the past pregnancy examinations.
- [Scene 3] The vehicle doctor reported that the haemoglobin level may indicate anaemia based on the results of a blood sampling test performed by the pregnant woman on a mobile medical car, and transmitted the pregnant woman's complexion to the hospital using live images from a 4K camera. A hospital doctor who confirmed that the pregnant woman was anaemic pointed out that the anaemia may have weakened the foetal movement due to the lack of nutrition in the foetation. In addition, hospital doctors instructed pregnant women to eat separately and get proper nutrition.

The participants' evaluations of the above trial are shown below:

- (Hospital doctor) Compared to 4G, 5G transmits a clearer echo examination image and close-up camera image (lower left in **Figure 6**) to a specialist, and can accurately confirm the condition of the foetation and the condition of the complexion and skin of the pregnant woman. Furthermore, it is extremely useful because it is possible to have a medical examination while consulting with a hospital specialist in real time through a 4K video conference call.
- (Nurse) When a midwife cares for a pregnant woman on a remote island or in a depopulated area, access to a specialist is an issue, but with the introduction of a mobile medical care vehicle, it is possible to provide midwives and care for pregnant women at any time while accessing the specialist. 5G mobile medical vehicles are also very useful in the field of midwifery.
- (Pregnant women) There are few obstetrics and gynaecology clinics and hospitals in rural areas, and it is a heavy burden for pregnant women to take regular time to visit a distant obstetrics and gynaecology department. Therefore, it would be very helpful if a remote pregnant woman could be easily examined with a mobile medical care vehicle.

In this trial, the effectiveness of the service that transfers and displays the diagnostic video (4D echo output) file, which was sent to the hospital at the time of the medical examination and stored in the PACS, to the tablet of the family (lower right of **Figure 6**) was confirmed.

Figure 6: Remote pregnant woman medical examination using 5G mobile medical care vehicle

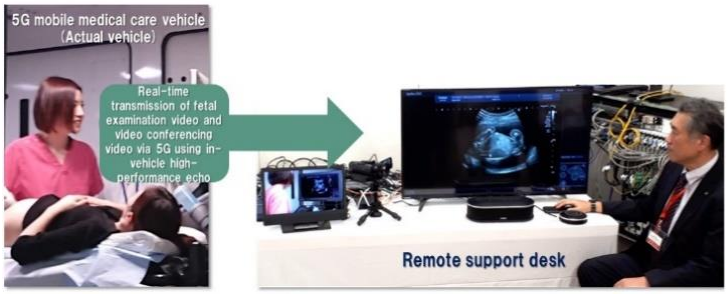


Following the first-stage trial, a second-stage trial was conducted using an actual vehicle (8-ton truck base) as a mobile medical care vehicle. To carry out verification by obstetricians and gynaecologists and demonstrations for medical personnel, an echo examination image of an actual pregnant woman in a mobile medical car and a 4K camera image showing the state of the pregnant woman were transmitted in real time to a remote support desk via an experimental 5G equipment (**Figure 7**). In this verification, it was confirmed that a mobile remote pregnant woman medical examination can be performed using an environment in which an ultrasonic examination device, an examination bed, and a 5G mobile terminal are installed in an actual truck vehicle. This showed the possibility of remote pregnant women's medical examinations in a wide range of areas using mobile medical vehicles. In addition, many medical personnel who visited the demonstration expressed their expectations for the realization of maternity medical examinations outside

clinics and hospitals. There was opinion that the early introduction of mobile medical vehicles in low populated areas would stop the population decline.

It was confirmed that a mobile remote pregnant woman medical examination can be performed using an environment in which an ultrasonic examination device, an examination bed, and a 5G mobile terminal are installed in an actual truck vehicle.

Figure 7: Demonstration experiment using an actual vehicle



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Annexes

Annex 1: Draft new Resolution xx (Addis Ababa, 2021) on using information and communication technologies to combat pandemics such as COVID-19 infections

Resolution xxx (Addis Ababa, 2021)

Use of Information and Communication Technologies to Combat Pandemics

The World Telecommunication Development Conference (Addis Ababa, 2021),

recalling

a) § 20 of Action Line C7 (E-environment) of the Geneva Plan of Action adopted by the first phase of WSIS, calling for the establishment of monitoring systems using ICTs to forecast and monitor the impact of natural and man-made disasters, particularly in developing countries, LDCs and small economies;
b) § 91 of the Tunis Agenda for the Information Society adopted by the second phase of the World Summit on the Information Society (WSIS);
c) Resolution 34 (Rev. Buenos Aires, 2017) of the of the World Telecommunication Development Conference, on the role of telecommunications/information and communication technologies in disaster preparedness, early warning, rescue, mitigation, relief and response;
d) Resolution 136 (Rev. Dubai, 2018) of the Plenipotentiary Conference, on the use of telecommunications/information and communication technologies for humanitarian assistance and for monitoring and management in emergency and disaster situations, including health-related emergencies, for early warning, prevention, mitigation and relief,

recognizing

a) the seriousness and magnitude of spread of infectious diseases, including outbreaks of pandemics such as coronavirus disease 2019 (COVID-19) infections;
b) the recent pandemic that clearly demonstrates the need for high-quality telecommunication/ICT infrastructure and for the availability and dissemination of information to assist public health and well-being;
c) the need to minimize risk to human life and to provide the necessary general public information and communication needs in such situations, and the use of telecommunication/ICT equipment and services is indispensable for the provision of effective and appropriate humanitarian assistance,

recognizing further

a) that there will be a continuing need to assist developing countries in the use of ICTs to preserve life by ensuring a timely flow of information to government agencies, consumers, humanitarian-oriented organizations and industry involved in the provision of medical assistance to those affected by pandemics such as COVID-19 infections;
b) that information needs to be accessible and available in local languages so as to ensure maximum impact;
c) that policy-makers need to create an enabling environment to leverage the use of telecommunication/ICT to provide infrastructure and information needs in emergency situations and to address pandemics such as COVID-19 infections;
d) that the contribution of the private sector is necessary in the prevention, mitigation and relief of pandemics such as COVID-19 infections;
e) that telemedical support plays an important role in providing mental telehealth services;

f) that a common understanding of the network infrastructure components is required in order to provide rapidly-installed, interoperable, robust telecommunication capabilities in humanitarian-assistance and disaster-relief operations for pandemics such as COVID-19 infections;
g) that the use of ICTs will be more prevalent post COVID-19 such as for working from home, electronic transactions, online learning and tourism,

considering

a) the United Nations General Assembly Resolution A/RES/74/270, on the global solidarity to fight the COVID-19;
b) that ICTs are critical for addressing all phases of pandemics such as COVID-19 infections;
c) that aspects of emergency communications associated with global pandemics such as COVID-19 infections include, inter alia, disaster prediction, detection, alerting and enabling the flow of information to keep individuals informed as to actions they can take to preserve life;
d) that the ITU Telecommunication Development Sector (ITU-D)'s role is designed to focus on the use of ICTs to empower communities and people,

noting

a) § 51 of the WSIS Geneva Declaration of Principles, on the use of ICT applications for disaster prevention;
b) that the unprecedented effects of the COVID-19 pandemic, including severe disruptions to societies and economies, has devastating impacts on the livelihood of people, which requires the use of telecommunication / ICTs to mitigate its impacts and recover from the pandemic,

resolves

to instruct the Director of the Telecommunication Development Bureau, in coordination with the other Directors

1 to develop guidelines and best practices on how ICTs can be used to identify the communications infrastructure needed to support the exchange of timely information on pandemics, such as COVID-19 infections;
2 to develop feasibility studies, project management tools and support to respond to and address pandemics, such as COVID-19 infections;
3 to promote efficient and timely information dissemination for developing countries based on standards of ITU-T and ITU-R,

to instruct the Secretary-General

1 to collaborate with all relevant stakeholders, including World Health Organization and other United Nations agencies, in order to define and engage in information and telecommunication development programmes to respond to and address pandemics, such as COVID-19 infections, in areas within the scope and mandate of ITU;
2 to implement measures aimed at mobilizing support from governments, industry and other partners to address the spread of pandemics, such as COVID-19 infections;
3 to support the development of broadband ICT infrastructure and communication technologies and extend to rural and remote areas including isolated remote islands of SIDS and villages of LDC and LLDC to bridge the digital gap so all may have access to detailed information relating to health-related emergencies, such as infection, epidemiological distribution, and side effects of materials in a timely manner,

invites Member States and Sector Members

1 to cooperate with ICT industries in the whole process of responding and mitigating global pandemics, especially in the area of telemedicine and telehealth and provide all possible assistant and support to consumers, humanitarian-oriented organizations and other stakeholders;
2 to promote regional, subregional, multilateral and bilateral cooperation to address the need to use ICTs as a tool to support responses to pandemics, such as COVID-19 infections, so that infrastructure and information can be provided to local communities, especially in local languages;
3 to protect and manage confidentiality of personal data/information collected by tracking technologies;
4 to develop and share online contents and platform related to telemedicine and telehealth which have multiple benefits during the pandemic by expanding access to care and reducing disease exposure, especially for developing countries;
5 to advise administrations on the use and development of innovative ICT tools, and platform to minimize the spread of future pandemic.