Resolution for Pandemics Approved by the International Telecommunication Union Plenipotentiary Conference [Past Related Activities and Future Challenges]

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ABSTRACT
The ITU adopted a new resolution at its PP Conference held in 2022 in Bucharest, Romania to utilize ICT to combat pandemics and new infectious diseases. In this paper, we have investigated infectious disease-related contributions and declarations at the ITU-D up to the most recent resolution for pandemics, pointed out issues, and offered a concrete outlook. We are pleased that the new resolution on pandemics has been issued, but the specific details regarding infection detection, efforts to prevent infection (PP-22 Resolution 215), and technology content remain insufficient. The risk of highly pathogenic avian influenza infection and the global spread of Ebola virus disease cannot be eliminated. ICT plays a major role in social infrastructure, and its use in health care is rapidly expanding into fields of application. At the next PP Conference, we would like to request that ITU begin to focus on saving more lives by making full use of AI and ICT technology.

Keywords: Avian influenza, Ebola virus disease, eHealth, Pandemics.

1. Introduction

1.1. Purpose and Background
Plenipotentiary (PP) Conference held in Bucharest, Romania, in September–October 2022, a new resolution was adopted on the use of information and communication technology (ICT) to combat future emerging infectious diseases and pandemics. This article begins with a summary of the adoption of Resolution 41 (Resolution for eHealth) at the 2002 ITU-World Telecommunication Development Conference (WTDC) in Istanbul, Turkey, followed by research on eHealth in developing countries centered on Study Group 2 (SG2) of the ITU Development Sector (ITU-D) and tracking of avian influenza outbreaks. Furthermore, we investigate trends in Ebola and coronavirus disease 2019 (COVID-19), which caused a widespread pandemic starting in 2020. In addition, we analyze the pandemic countermeasures that can be read from the new resolution adopted in Bucharest and the challenges for future implementation from the healthcare perspective. Please note that this research represents the personal views of experts belonging to universities and research institutes, and does not represent the views of any specific government, the ITU, or ITU Member States.

1.2. Definitions of Terms at the ITU

1.2.1. eHealth
e-Health is a healthcare service that makes effective use of ICT. This is interpreted in a broad sense, including communication lines, the Internet, computers, accumulation methods in storage media, and statistical or artificial intelligence analysis of those data.

In the 1990s, the ITU used the term “telemedicine”, but this limited its use to between medical personnel and doctors, between patients and doctors, and between doctors. For this reason, at the SG2 Q14 Rapporteur’s meeting, the term “telemedicine” was replaced with “eHealth” and described in the next 4-year activity plan, which was subsequently adopted at the SG2 meeting in Caracas, Venezuela. However, in changing the term “telemedicine” to “eHealth”, many objections were expressed at the Telecommunication Development Advisory Group meeting, which is the upper-level meeting of SG2, in Geneva in December 2001.
Ultimately, it became not only a 4-year activity plan, but also the title of the WTDC 2002 Resolution for eHealth, and since then, the term “eHealth” has been used in United Nations (UN) agencies. By changing the term to “eHealth”, electronic medical records can be shared with multiple medical institutions via communication lines, patient information can be shared among multiple medical institutions, and endoscopic images can be transmitted. For example, it has progressed to a technology that suggests the endoscopic operator and provides green guide light beaming to the part of the erosion by learning of massive number of past images of gastric cancers, and taking a picture of the suspicious part in real time. For example, it has progressed to a technology that teaches at real time the endoscopic operator the part of the erosion by deep learning of massive past images of gastric cancers, and takes a picture of the suspicious part in real time. In addition, using 5G, etc., robot surgery has become possible in a stable state with little delay. If we had stuck to the term “telemedicine”, ITU’s current activities would have been extremely limited. The word term “eHealth” was first published in a specialized journal in 2001 [1].

Just after the publication of this Journal, in September 2001, ITU-D SG2 Q14 put on the term “eHealth” in the next 4 years action plan.

The definition was agreed upon by the TDAG Dec 2001, SG2 rapporteur’s Group was officially started to use the term “eHealth” towards WTDC 2002 of ITU-D Sector.

1.2.2. Resolution

One of the decisions adopted by the ITU PP and its lower level conferences WTDC and WATS (World Telecommunication Standardization Assembly) was the resolution. However, the resolution of the PP Conference, the highest level conference of the ITU, becomes effective after being ratified by the ITU Membership, just like other PP’s decisions. However, the ITU respects the sovereignty of member countries and does not impose so-called penalties on the membership for not complying with the resolution.

1.2.3. Recommendations

The recommendations and resolutions of the ITU Standardization (ITU-T) and ITU Radio communication (ITUR) sectors are at a lower level than those of the PP; however, radio regulations (RR) of the Radio sector are same level as PP’s resolutions and decisions. Membership is recommended to follow. They will be published by the ITU in the same manner as the ITU constitution and convention. Member states are recommended to follow, for example, the recommendations regarding eHealth standards agreed by ITU-T SG16.

1.3. Beginning of the eHealth Resolution

1.3.1. ITU

Resolution 41 (Resolution for eHealth) was adopted at WTDC 2002 in Istanbul, Turkey [2], ahead of any UN agencies. This resolution states that ITU-D’s eHealth survey research and the Telecommunication Development Bureau’s eHealth pilot study will be developed and supported in developing countries. Furthermore, in WSIS2003, eHealth service activities are specified in C-7. In ITU-T SG16, the standardization of eHealth terminals was adopted and many other related recommendations were agreed and adopted.

1.3.2. World Health Organization (WHO)

Three years after the ITU, in May 2005, the WHO adopted the eHealth resolution at World Health Assembly (WHA) 58.28 [3]. Instead of eHealth policy, this declaration, which is considered a conservative approach, describes policy considerations regarding the development of eHealth services in each country. Since then, several eHealth-related resolutions have been adopted. The WHO does not directly intervene in eHealth services in developing countries but rather adopts a policy of jointly supporting eHealth services together with the ITU. It is based on the fact that the WHO cannot raise funds from the private sector and launch projects under the WHO, and that the WHO’s main work is preventive medicine; medical care and implementations are the sovereign responsibility of each country.

2. Research

2.1. Research on Infectious Diseases and ICT

Avian influenza is a type A influenza virus highly infectious to humans. Most human infections are associated with close contact with infected poultry, their droppings, carcasses, or organs. This virus is highly contagious and lethal, and has been pointed out as having the potential to cause a widespread pandemic. Three avian influenza pandemics have been recorded in the past: Spanish influenza (A/H1N1 subtype) in 1918–1919, Asian influenza (A/H2N2 subtype) in 1957–1958, and Hong Kong influenza (A/H3N2 subtype) in 1968–1969. Currently, the mortality rates for A(H5N1) and A(H7N9) avian influenza are extremely high (e.g., the fatality rate for H5N1 is 60% [4, 5]), and therefore attracting increasing attention. If the mortality rate is low, the influenza is treated like a seasonal flu as opposed to a pandemic.

In addition, Ebola hemorrhagic fever, which was thought to be endemic in Africa and Democratic Republic of the Congo, has a high fatality rate of 70%, and if the virus were to acquire immunity through mutation, it could cause a global pandemic. It is referred to as “Ebola hemorrhagic fever” by the general public, but in the medical community generally, it is known as “Ebola virus infection”. With the development of airline services, patients have been seen not only across Africa but also in the US and Europe. The initial symptoms include fever, headache, vomiting, diarrhea, and abdominal pain. Complaints of these “nonspecific” symptoms often occur in the early stages of typhoid fever and malaria. On the other hand, there are four known types of coronaviruses that routinely infect humans, causing 10%–15% of all colds (35% during epidemics). Most children experience infection by the age of 6 years, but unfortunately, the immune response is not perfect, so they can be infected with these viruses multiple times throughout their lives. Because these four types of viruses tend to cause only mild symptoms, they have not
become a substantial problem at the social level. In addition, although many experts considered it “impossible” for a coronavirus to cause a pandemic, SARS (Severe Acute Respiratory Syndrome) and MERS (Middle East Respiratory Syndrome), which cause severe pneumonia derived from cytokine storms, have caused epidemics in limited areas. For nearly 15 years, the ITU-D has studied and contributed to knowledge of these infectious diseases, and has submitted Liaison Statements to the ITU-R as important agenda items. In this paper, we report on the investigations of this matter.

2.2. Contributions to Tracking Avian Influenza

Highly pathogenic avian influenza has had a tremendous impact on the poultry industry because of its high contagiousness and lethality among poultry. In wild birds, infection with highly pathogenic avian influenza viruses has led to reports of mass deaths among bar-headed geese (2005, China), rare Cape penguin species (2019, Southern Africa), white-tailed grebe (2021, China), black cranes (2021, Israel), and among others. According to the WHO, cases of human infection through close contact have also been reported. Although it is not possible to embed all wild birds with radio-frequency identification (RFID) or the ARGOS System, attaching an RFID tag to about 1 in 200 birds and tracking the flock could reveal the movement range of wild birds, and in the event that a large number of carcasses were found, we could suspect the possibility of other infected groups through the same pathway.

The contribution from Tokai University to the ITU-D SG2 Q14 conference held in Tokyo in 2008 was that it is possible to deduce which groups are in contact with others. In response to this, in the Rapporteur group on Q14 (e-health), the Tokyo Declaration on ICT Utilization for Avian Influenza was adopted, and the Rapporteur issued a liaison statement to the ITU-R (Box-1) [6]. The ITU-R has responded to this, saying that it has a technical response and will investigate the matter further in the future. Also, in recent reports, it has been possible to measure the cardiac output and breathing patterns of poultry without contact using transmission microwaves. Infectious disease experts agree that avian influenza is the most likely pandemic to occur next.

Box 1. Outline of the Liaison Statement

**TITLE: PROPOSAL FOR AN INTEGRATED ICT NETWORK TO MONITOR THE AVIAN INFLUENZA**

The avian influenza virus is transmitted to human beings by domesticated animals, chiefly fowls, infected by virus-carrying birds. While demonstrating regional tendencies, strains of the virus have in the past made their way into far-flung corners of the world with explosive impact, leaving many of the infected either dead or in serious or critical condition. The strain (A/H5) associated with the most serious transmission is characterized by rapid mutation, which portends great difficulty in devising successful vaccine- or antibody-based prevention schemes. This strain could have a grave human toll in the not-so-distant future.

Specifics concerning the avian species (i.e., migratory birds afflicted with silent infections) that carry the avian influenza virus have yet to be learned or their migration routes positively identified. In the absence of an effective system of information exchange—a global network through which specialists around the world could exchange information on the transmission of the virus to human beings—it is proving difficult to curb the avian influenza. In addition to helping monitor the spread of the avian influenza A/H5 and prevent virus infections around the globe, the creation of a worldwide, integrated information network for avian influenza would help ensure the sound, symbiotic existence of birds and human beings in the 21st century and ultimately help preserve the global environment.

Following the technical work to be undertaken by the three sectors of ITU, an instrument such as an MoU or other form of international agreement could be developed to facilitate the implementation of the new network at the national, regional and world levels.

2.3. Ebola Virus Disease

<RESOLUTION 202 [7] Using ICT to break the chain of health-related emergencies such as Ebola virus transmission>

The ITU is closely monitoring outbreaks of Ebola virus disease together with the WHO and other supporting organizations. In response, the 2014 Plenipotentiary Conference (PP-14) worked with consumers, humanitarian organizations, and industries involved in ICT, including those in relation to man-made disasters and emergency response, to provide all possible help and support, as well as telecommunications infrastructure. However, at this point, patient tracking, the epidemiological Susceptible, Infected, Recovered (SIR) model, and spatial patient distribution have not been considered. For this reason, a medical aspect was added to the existing resolution (PP-18, Dubai, UAE, 2018), but this resolution (Resolution 202) was scrapped in 2017 (PP-17) with the subsiding of Ebola virus infection.

Box 2. Part of Resolution 202

**To instruct the Secretary-General:**
1 to collaborate with all relevant parties, including United Nations agencies and in particular the World Health Organization, in order to define and engage in programmes to respond to and address health-related emergencies such as Ebola virus transmission in areas within the scope and mandate of ITU;
2 to implement measures aimed at mobilizing support from governments, industry and other partners to break the chain of health-related emergencies such as Ebola virus transmission.

**Invites Member States and Sector Members**
1. To cooperate and offer all possible assistance and support to consumers, humanitarian-oriented organizations, and industry involved in ICTS, including for disease tracking and natural and man-made disaster and emergency response, rescue and recovery operations;  
2. To promote regional, subregional, multilateral, and bilateral projects and programmes to address the need to use ICTs as a tool to support responses to different types of disasters such as Ebola, so that life-saving infrastructure and information can be provided to local communities, especially in local languages.

2.4. PP-22 (Resolution 215)

The ITU adopted a new resolution at its PP Conference held in 2022 in Bucharest, Romania to utilize ICT to combat pandemics and new infectious diseases. The Resolution 215 was a compilation of draft declarations submitted to the WTDC (World Telecommunication Development Conference) of ITU-D (Development), WRC (World Radiocommunication Conferences) of ITU-R (Radio), and the WTSA (World Telecommunication Standardization Assembly) of ITU-T (Telecommunications). As will be explained later, the content output by APT-WTDC was also reflected.

The general remarks are as follows:
1. Cooperation with WHO and other UN agencies and stakeholders.
2. Introduction of ICT and implementation of programs to respond to the pandemic.
3. Mitigation and risk avoidance.

Specific instructions are Instructions to the Director of Telecommunication Standardization and Development and Secretary General, in addition, for member countries (Box-3) [8].

Invites the Secretary-General

To continue to reinforce the ITU’s efforts, within its remit and in partnership with WHO and other agencies and organizations, in collaboration with stakeholders to strengthen the resilience of telecommunication/ICT networks to meet the challenges posed by the COVID-19 pandemic and increase pandemic preparedness and response.

Invites Member States
1. To cooperate to raise awareness, build capacity and share best practices and lessons learned in using existing, new and emerging telecommunications/ICTs to act to quickly address the global COVID-19 pandemic, as well as future pandemics;
2. To consider potential engagement with stakeholders, including telecommunication/ICT providers, to support jobs, especially for small and medium enterprises, and continue education during the COVID-19 pandemic, so as to mitigate its adverse social and economic consequences;

3. To participate actively in the implementation of this resolution.

3. Considerations

3.1. Examining the Term “Global” in the PP Declaration

From a lexical definition, the public health emergency of international concern declaration made by the WHO in January 2020 stated that the transmission of COVID-19 was a regional epidemic [9], [10]. Subsequently, the epidemic spread worldwide and was declared a “pandemic” [11], [12]. “Pan”, which is derived from Latin, means “global”. The use of “global” as an adjective for “pandemic” may be used in the tabloids, but not in studies of infectious disease studies. For this reason, although the original text uses the term “global”, the present author does not, and this term has been deleted from the notations in this paper.

3.2. “Infectious Disease”

< Proposal on the new WTDC resolution on the “Use of Information and Communication Technology to Combat Pandemics” (WG1, PRELIMINARY APT COMMON PROPOSAL)

There is no mention of eHealth even though it is an infectious disease in the new resolution of the PP-22 resolution. But the following specific notations, such as eHealth using ICT, are recognized in the APT-WTDC WTDC 21-4/OUT-06 28 January 2022. On the other hand, we mention it many times, there is no mention of eHealth in the new PP-22 resolution (Box-3).

In APT-WTDC 21-4/OUT-06 (28 January 2022), the following specific notations, such as eHealth using ICT, are recognized (Box-4) [13]. This contribution was finally approved by the Asia-Pacific Telecommunity (APT) member governments and is currently being proposed for WTDC 2022. Due to extenuating circumstances, it was never submitted to the 2022 Plenipotentiary Conference (PP-22). There is a strong possibility that the next pandemic will be avian influenza, and various approaches using ICT, including microwaves and satellite systems, are being researched. In addition, during the COVID-19 pandemic, a national-level epidemiological patient data collection system (in Japan, this system called HER-SYS) and a Bluetooth distance measurement function installed in mobile phones were used. Devices such as contact confirmation applications (in Japan, the COVID-19 Contact-Confirming Application) that are technically unsatisfactory exist on a global level and have become a social issue. However, we cannot find any mention of such devices in the new PP-22 resolution. But in the first place, is health not the starting point of an infectious disease pandemic? For this reason, we would like to see these items added and included in the next PP Conference.

Box 4. Main Body of the Proposal on a New WTDC Resolution on the “Use of Information and Communication Technology to Combat Pandemics”
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 assistance and support to consumers, humanitarian-oriented organizations and other stakeholders;

2. To promote regional, sub-regional, 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.

3.3. Understanding Pandemic Trends Using Artificial Intelligence (AI)

Regarding AI, which was rejected at the previous PP (2018), two proposals for the adoption of a new resolution were also submitted to PP-22. The African region emphasized the necessity of introducing AI in developing countries to achieve the UN Sustainable Development Goals.

The US has long opposed ITU discussions on AI, but as a result of such discussions, the ITU decided to continue research work on existing AI within the scope of the ITU mandate and core competence. This is reflected by the title of “Artificial Intelligence (AI) Technology and Telecommunications/ICT”. In the future, trends in infectious diseases (SIR model) will be based on epidemiological patient aggregate data [14], [15], and forward prediction of outbreaks on a time axis, spatial distribution, the correlations between patient distributions on maps and railway routes, etc., will be obtained using deep learning. It is believed that many lives can be saved by combining AI and ICT, and that the ITU PP resolution can play an important role in the future.

4. Conclusion

The ITU adopted a new resolution at its PP Conference held in 2022 in Bucharest, Romania to utilize ICT to combat pandemics and new infectious diseases. In this paper, we have investigated infectious disease-related contributions and declarations at the ITU-D up to the most recent resolution, pointed out issues, and offered a concrete outlook. We are pleased that the new resolution on pandemics has been issued, but the specific details regarding infection detection, efforts to prevent infection, and technology content remain insufficient.

At the next PP Conference, we would like to request that ITU begins to focus on saving more lives by making full use of AI and ICT technology.

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Conflict of Interest

The authors declare they do not have any conflict of interest.

References


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