

Information Technology Solutions Supporting Measures for Handling Pandemics

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Abstract

This article introduces information-technology-based solutions supporting measures for handling pandemics. The threat of the 2009 Swine Flu epidemic and occurrences of other worldwide pandemics have led to various business continuity measures being advanced in industry and in national and local governments. The basic strategy is to systematically reduce and restrict the amount of business and activity, limiting the rate of infection within and outside companies and bringing an end to the pandemic and a return to normal business activity as soon as possible. This is to be done in conjunction with discussions of appropriate measures for continuing and supporting societal functions, while planning and coordinating with industry and national and local governments.

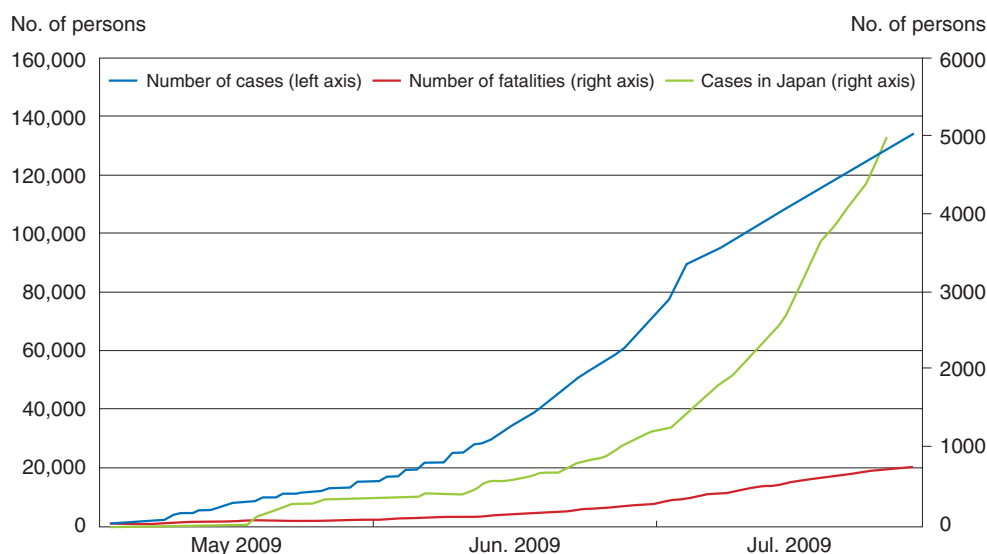
1. Introduction

The first case of infection from Swine Flu (H1N1 strain) in Japan was confirmed in Osaka on May 9, 2009. This outbreak has spread to over 100 countries around the world, not only threatening peoples' lives, but also providing a reminder of the huge effect that infections can have on our daily activities. In Osaka and Hyogo prefectures, schools were closed, events were suspended, and residents were asked to stay home and limit their movements. This has greatly affected many people and businesses. Companies asked employees to wait at home for further instructions and prohibited business trips overseas and to the Kanto area of Japan, which had a major impact on business activities. If the infection spreads even further, the situation could deteriorate further, and full-blown measures from the national and local governments to prevent the spread of the infection will require employees to refrain from going to work over long periods of time. Many people have become concerned about how their companies will be able to carry on their business in such a situation.

As of July 31, 2009, there have been over 4986 cases of infection in Japan and 134,503 confirmed cases worldwide, with 816 fatalities (**Fig. 1**). The World Health Organization (WHO) [1] defines the spread of influenza in terms of six phases [2], [3]. Phases 4 and above require companies and regions to take measures.

- In Phase 4, infection is limited to a small area. To contain the infection to the affected area, the authorities may recommend self-imposed restrictions on travel and other activities and may strengthen quarantines at national borders (for both entry and departure). This affects the distribution of goods, and companies with overseas offices may need to take measures, such as arranging the emergency return of employees' families to Japan.
- In Phase 5, people in cities become infected, the infection spreads via public transportation, especially during peak commuting hours, and infected people pass it on to family members and the scale of infection in each area rises. To prevent the spread of infection, the authorities may implement voluntary restrictions on gatherings, school closures, and staggered commuting to reduce passenger densities on crowded trains

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Source: Infectious Diseases Surveillance Center (IDSC), Infection information web page.

Fig. 1. Swine Flu infection rates and fatalities.

and buses.

- In Phase 6, the government (in Japan, the Minister of Health, Labor and Welfare) declares a state of emergency. There are likely to be restrictions on all non-essential business activities.

These measures also have economic effects, which we describe using examples from past pandemics in Section 2. Then, in Section 3, we describe business continuity plans (BCPs) and business continuity management (BCM) solutions available from NTT IT.

2. Pandemics and their economic impact

2.1 Economic impact of pandemics

New strains of influenza that have caused pandemics in the past have recently been recognized as seasonal influenza (Fig. 2). For example, Spanish Flu (influenza A strain subtype H1N1), which raged in 1918 resulting in over 40 million fatalities, is now recognized as a type of seasonal influenza. According to the World Bank, the decrease in worldwide gross domestic product caused by an influenza pandemic is estimated to be:

- approximately 0.7% if the damage is minor (comparable to Hong Kong Flu),
- approximately 2.0% if the damage is moderate (comparable to Asian Flu), and
- approximately 4.5% if the damage is major

(comparable to Spanish Flu).

The actual scale of damage depends on the virulence and infectiousness of the virus and cannot be estimated. The spread of SARS (severe acute respiratory syndrome) in China in 2002 and 2003 is estimated by the Asian Development Bank to have caused losses of US\$60 billion throughout Asia.

2.2 Lessons learned from Spanish Flu

With Spanish Flu, there were major differences in mortality rates between the cities of Philadelphia and St. Louis in the USA, as shown in Fig. 3. In Philadelphia, a parade was held after the flu had started to spread, but before it was well recognized. In contrast, in St. Louis schools were closed and prohibitions on going out were instituted around the same time. This shows the importance of gathering accurate information, analyzing it carefully, and implementing thorough, public, and appropriate measures. It also shows that reducing direct contact between people is a highly effective measure.

2.3 Characteristics of pandemics

When an actual pandemic occurs, the work absentee rate can reach 40% due to employee illness, family illness, and fear. Furthermore, factors such as home quarantine, school closures, and panic can raise it to 50% or 60%. There are significant differences between pandemics and other natural disasters, such

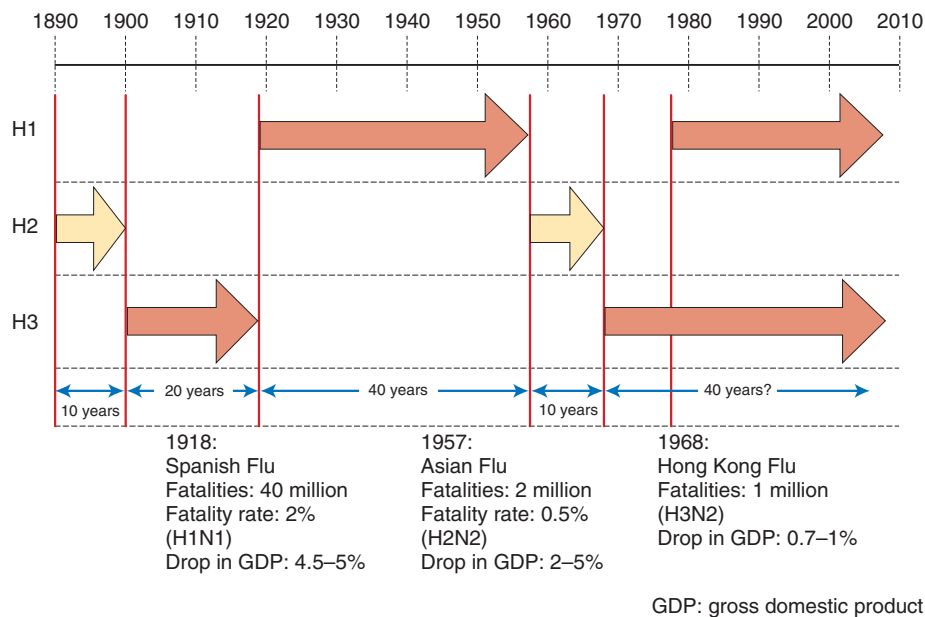
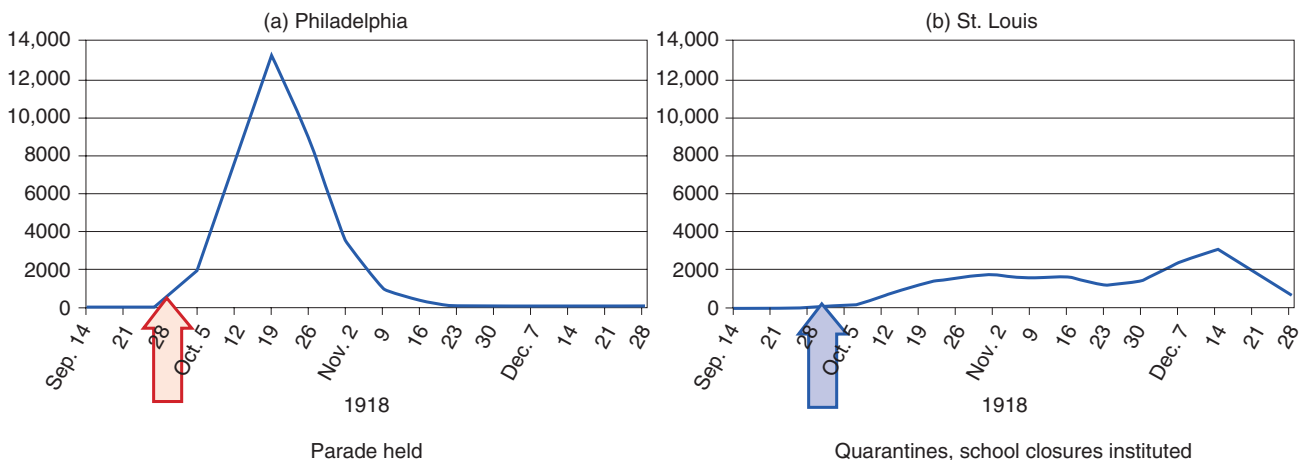


Fig. 2. Past pandemics and their economic impact.



Source: National Institute of Infectious Diseases Infectious Disease Surveillance Center (USA).
 Authors: M. Lipsitch, R. Hatchett, and C. Mecher.

Fig. 3. Spanish flu fatalities by city (USA).

as earthquakes, hurricanes, flooding, and forest fires (Table 1). Specifically, pandemics can affect all societies globally (they are not local phenomena), and there is a possibility of stopping the domino effect of pathogen arrival. The physical infrastructure is not destroyed, but the circulation of goods can stop. The first wave can continue for six to eight weeks, though Spanish Flu actually persisted for about seven

months. Everyone suffered equally, with the crisis threatening the lives of individuals. According to one report, about 30% of the population contracted the disease (40% among school-aged children and 40% among adults).

Table 1. Comparison of influenza with other natural disasters.

Factor	New strains of influenza	Natural disaster
Period of damage	Difficult to estimate due to high uncertainty (Spanish Flu lasted more than six months)	Can be estimated to a degree from past occurrences (most are from one week to one month)
Type of damage	People (also on businesses in the longer term)	Societal infrastructure (facilities, equipment, etc.)
Geographic scope	National or global (work or support through alternative facilities is difficult)	Local (work and support through alternative facilities is possible)
Disaster occurrence and damage	Damage level is affected by countermeasures. Time is required for medical intervention such as vaccines.	Occurs without warning Extent of damage cannot be controlled after the fact
Effects on business	Decline in customers for service industries over long period of time causing concern over decreased business performance	Business performance should recover when businesses recover
BCPs	Decide level of business continuity in consideration of risk of infection, social responsibilities, and management issues	Plan for business continuation and rapid recovery to the extent possible

Source: IDSC New Influenza countermeasure guidelines, Edition 1.3.

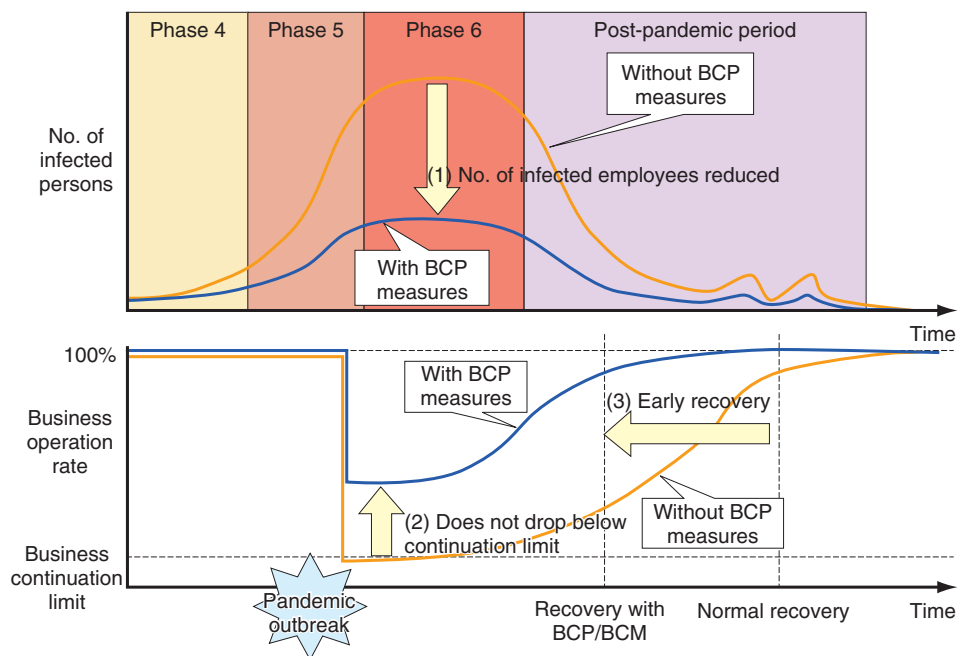


Fig. 4. Comparison of business activity with and without BCP measures.

3. BCPs and BCM solutions for pandemics

A BCP for pandemics should aim to decrease the infection rate among employees, ensure limits for business continuation are maintained, and achieve early recovery. Measures to achieve these objectives (Fig. 4) include BCPs that assume 40–60% absence

from work; established methods for gathering, analyzing, and distributing information; established methods for reducing direct contact between people; and education and training during non-crisis times. NTT IT offers four BCM solutions for pandemic measures (Figs. 5 and 6).

(1) EasyCommunicator [4] is an emergency man-

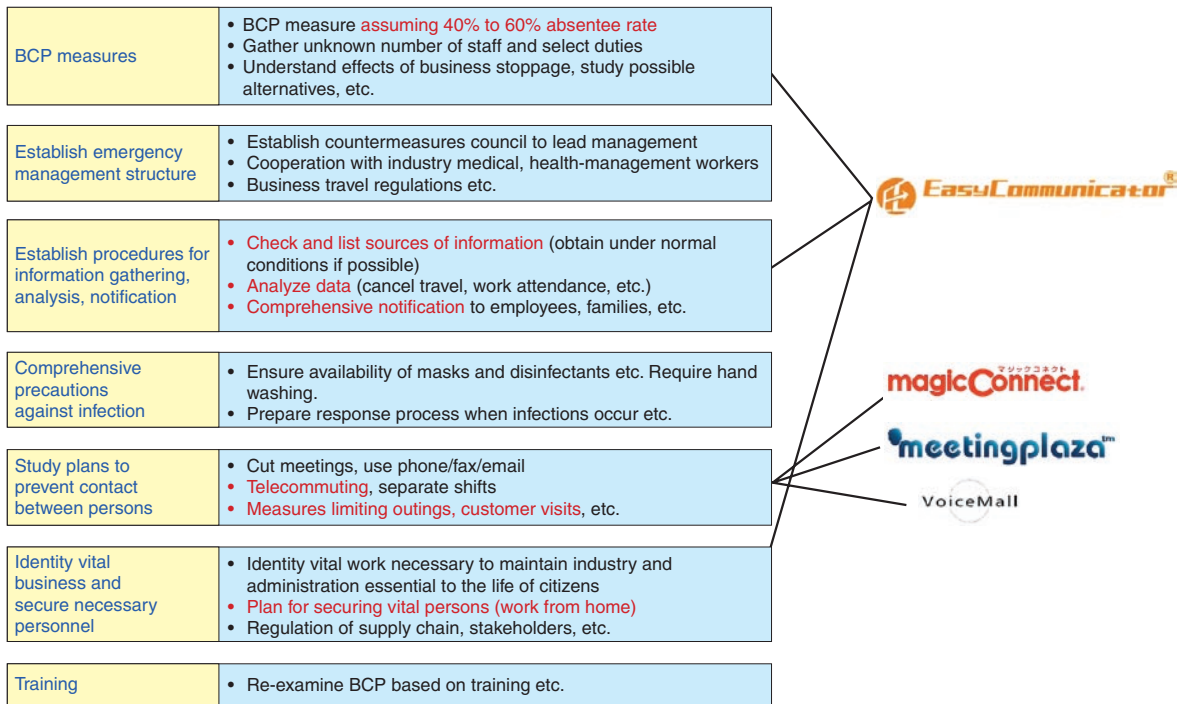


Fig. 5. Placement of pandemic measure solutions from NTT IT.

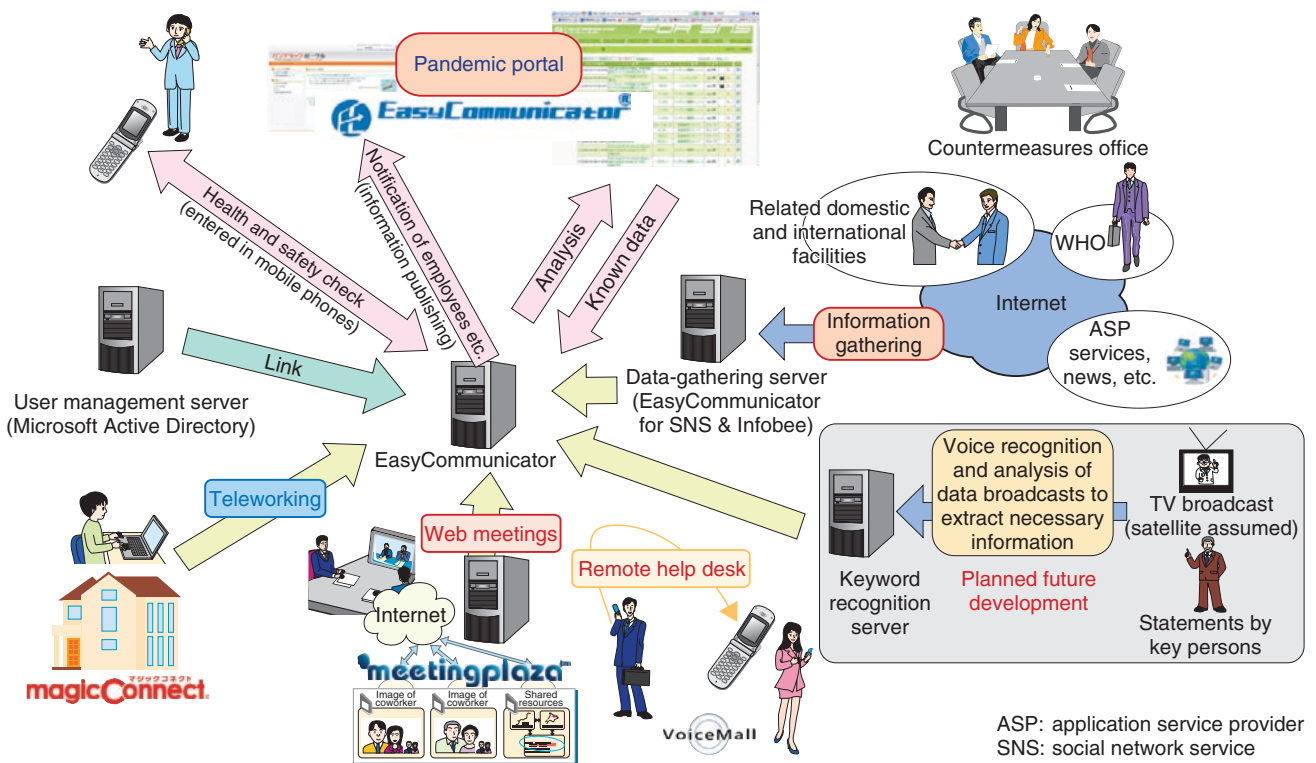


Fig. 6. Pandemic measures solutions from NTT IT.

agement/business continuity solution that provides unified gathering and distribution of information, health status management, and safety checking.

- (2) MagicConnect [5] provides a teleworking environment that avoids direct contact between employees.
- (3) MeetingPlaza [6] provides a web-based meeting environment for meetings without any direct contact between participants.
- (4) VoiceMall [7] provides a remote help-desk environment that allows employees to answer customer calls to company phones from home when attendance at the office is prohibited.

EasyCommunicator can automatically gather relevant information posted on the web pages of sources such as WHO and Japan's Ministry of Health, Labor and Welfare. Members of the emergency management team can analyze this information and create a mash-up of the content, which is then automatically posted on the web on a pandemic portal to notify employees. It is also distributed by email to employees via their mobile phones or home personal computers (PCs) at the same time. The system can also confirm the reception of notifications, so the state of employee health and safety can also be checked through PCs or (i-mode) mobile phones.

MagicConnect and MeetingPlaza support employees in continuing their work from home. MagicConnect enables continuous access to company systems and data, allowing work to continue. MeetingPlaza enables work conducted in teams to continue to proceed by providing multipoint web meetings that can include employees at home and in branch offices. Contact with customers and partner companies is also possible via only an Internet environment.

The number of contracts for and installations of these services is currently on the increase. NTT IT provides one-stop consulting for pandemic measure solutions [8]. We provide services and systems that can be used every day, and not just in the event of an emergency.

References

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