행정안전부

국민의 내일을 위한 정부혁신
보다 나은 정부

COVID-19 Tracking in Korea

1

Overview of self-quarantine measures

Contacts of a confirmed case + Foreign entries

Inbound travelers or epidemiological tracing	Designating a case officer	Quarantine notice & public official's visit to give an account	Monitoring during quarantine period	Quarantine release ※after 14 days
Health Ministry(MOHW), Local gov.	Local gov. (Dept. In charge)	Local gov. (Public health center)	Local gov.-Case Officers MOIS-Overall Management	Local gov. (Public health center)

Management System

Building overlapping management network

Case officers

- One-on-one management
- Delivering daily necessities & handling inconvenience
- Check symptoms and location (14days)

Quarantine Violators

- Self-Quarantine App + Safe Band
- Strengthening legal and institutional measures

Self-Quarantine App

- Location tracker + self diagnosis
- App for ❶ the Self-quarantined ❷ Designated case officers
- Foreign language service(8 languages)

IT Technologies

- GIS Situation Management System
- KI-PASS(Electronic Entry Logs)
- WPS(Wifi-Positioning)

Inbound travelers

- ❶ Quarantine exemption ❷ Facility Quarantine ❸ Self Quarantine
- Special Entry Procedure = Self-Quarantine App (Mandatory) + designation of a case officer

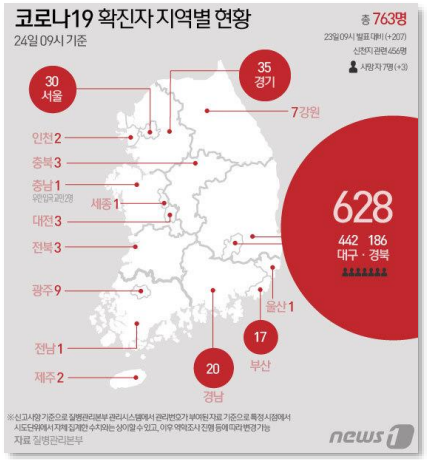
Facilities to assist quarantine

- Temporary living facilities for incoming overseas Koreans
- Temporary living facilities for short-term foreign nationals (7.13 , 68 units)
- Temporary living facilities by local gov.(7.13., 64 units)

1

Background of the Development of the Self-quarantine Application

Rapid increase in Covid-19 cases



› **Late Feb : A rapid increase in Covid-19 cases in Daegu and Nor. Gyeongsang Province**

※ An average of several hundred new cases per day from late Feb. to Mar.

※ About 90% of the confirmed cases were from Daegu and North Gyeongsang Province

› **Needs : Controlling the spread of the virus + More medical facilities**

※ The patients' movements were identified with epidemiological tracing, and contacts were promptly tested and quarantined

※ To prevent hospitals from reaching full capacity, more treatment facilities and sufficient supply of face masks for the public are necessary.

Management of the self-quarantined

› **Those who have been in close contact with confirmed cases**

› **=> mandatory self-quarantined for 14 days**

› **Case officers called each person to check their status**

› **The number of the self-quarantined increased rapidly when the virus spread quickly**

› **There was no way to confirm if people stay in a designated place**

1

Development of the Self-quarantine Mobile Application

Need for application development

› **To prevent the self-quarantined from leaving a designated location**

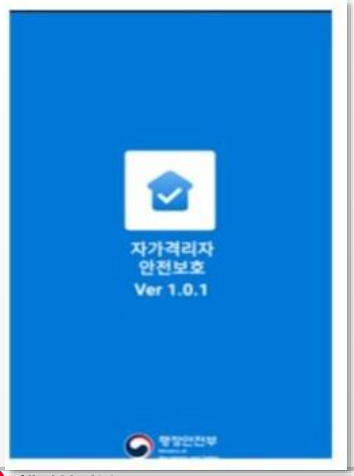
※ The location of those quarantined needed to be provided in real-time

› **To manage the self-quarantined in an effective manner**

※ Case officers needed support to monitor several people simultaneously

※ Quarantine guidelines, emergency contact information, etc. needed to be distributed

Timeline of the application development



› **Development of the self-quarantine application started on Feb.13**

※ MOIS officials visited public health centers to see how self-quarantined people were managed

› **The application for Android OS was released on Mar. 7**

(another version for iOS on Mar. 20)

※ Before release, a beta version was tested internally to discover and fix problems

※ A help desk for user support, user guidelines, etc. are provided

Utilization of GPS Technology for the Self-quarantine App

Use of GPS for location tracking

Image from gps.gov/cgsic/

› **GPS, cell-tower positioning, and Wi-Fi triangulation for location tracking**

※ Cell-tower and Wi-fi positioning were ruled out due to low accuracy and individual set-up requirements, etc.

› **Issues with GPS**

※ Significant location errors when a person is indoors (several hundred meters ~ more than 1km)

※ **False alarms could be triggered even when a person remained in a designated location**

Solution to GPS issues

Image from flaticon.com

› **Diverse options were reviewed to improve location accuracy**

※ Consultation with the ETRI and location-based service providers

› **The application was modified to assume certain parameters as users staying indoors**

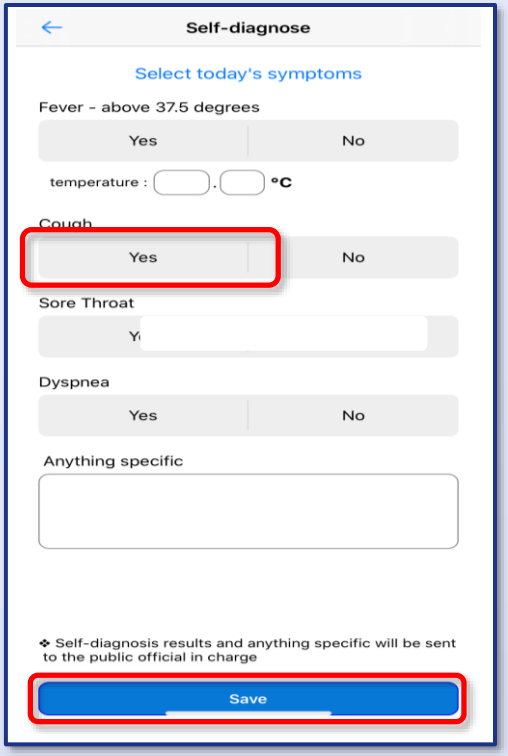
※ Various GPS parameters **(accuracy, PDOP, the no. of satellites, speed) are used to track smartphone location**

※ Certain conditions were applied to GPS parameters to determine if the user is staying indoors – the number of false alarms was reduced

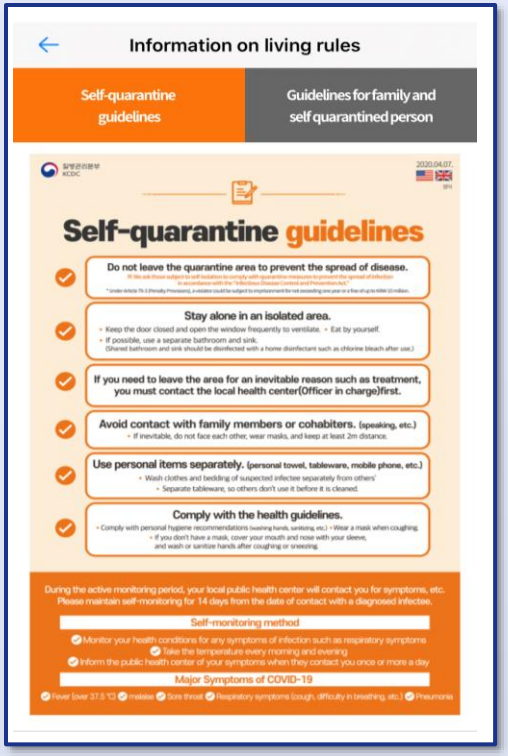
2 Self-Quarantine App : Features and Screen Shots

- A self-quarantined should conduct self-diagnosis twice a day on four items(fever, cough, sore throat, respiratory symptoms) and the case officer checks the health status.
- The app monitors the location information of the self-quarantined to check if he/she leaves the designated quarantine location and it will send a push notification in case of quarantine violation.

App for Self-quarantined persons

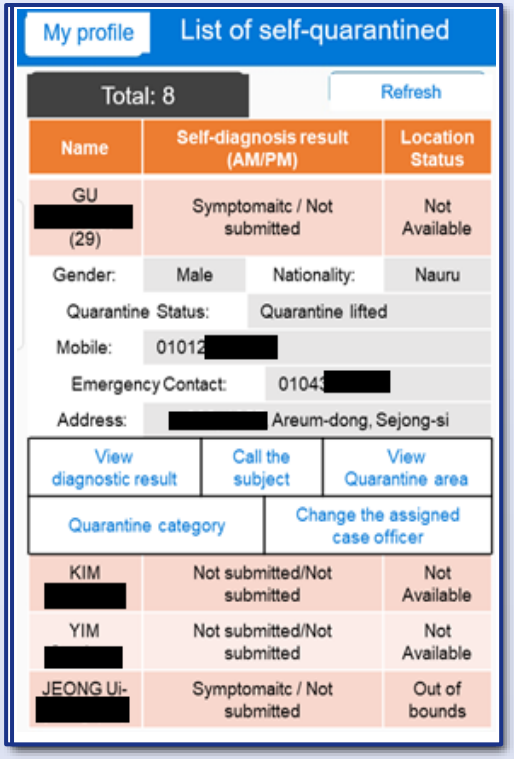


1 Self-diagnosis

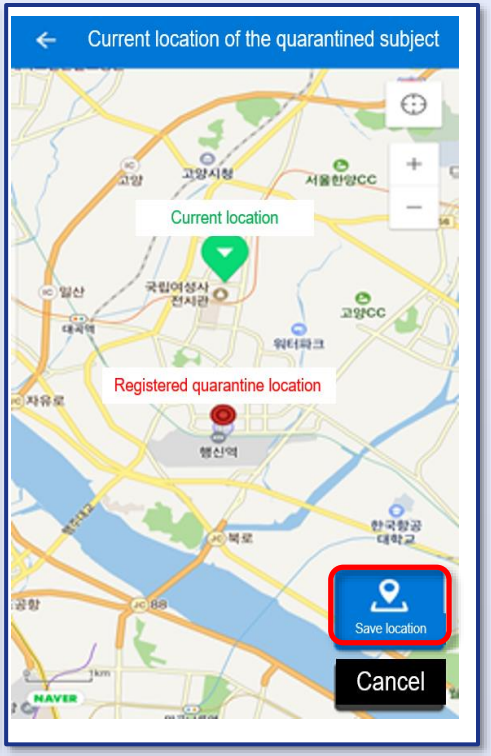


2 Living rules for the self-quarantined, their family and those living together

App for case officers



3 List of the designated Self-quarantined

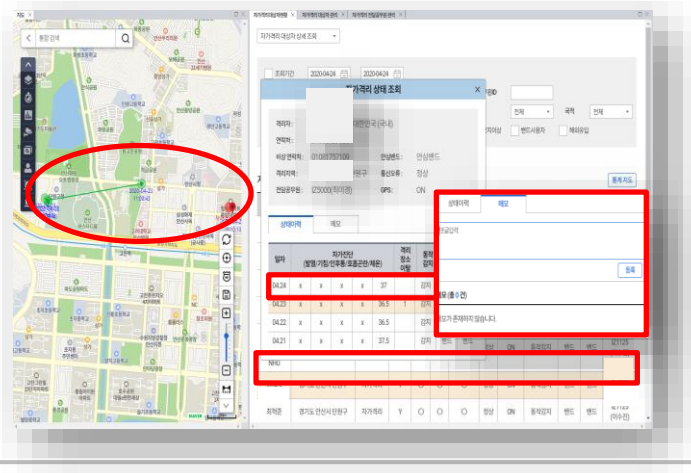


4 Location information of the self-quarantined

2

Self-Quarantine App : Additional Features and Support Systems

GIS Situation Management System



- Double checking system with the unified dashboard

※ Central Disaster and Safety Countermeasures Headquarters(Nationwide)
- Province/Metro City – City/Township - Public officials in charge

- Connected with App Server ➡ Real-time location
- Management of daily quarantine violation history and checking the routes of the self-quarantined.

Motion Sensor

- A measure to prevent the self-quarantined from leaving the designated quarantine location without the mobile phone
- Case officer will get push notifications on his/her phone if the self-quarantined does not use the phone for more than 2 hours.

※ Bedtime does not count

Motion Sensor

WPS(Wifi-Positioning System)

- Indoor positioning technique to improve the accuracy of GPS
- Identificatiom by comparing the value of the surrounding Wifi signals and previously stored signals

Positioning Error

GPS 300m ➡ WPS 100m

Outcomes in dealing with COVID-19 using ICT

The spread of COVID-19 and other infectious diseases are contained and managed by effective monitoring of those in self-quarantine at each local gov. level and thereby limiting their contact with others.

- Monitor those in self-quarantine with real-time information coming from the app, as opposed to checking one by one via phone
- All inbound travelers, daily in between two to three thousand, receive help with installing the Self-Quarantine app
- Case officers check whether self-quarantined people leave a designated place by using location monitoring
- Quarantined individuals' health status is conveniently managed