





Test, test, test: COVID-19 and HIV testing updates



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Test, Track, Isolate and Treat: The End of COVID-19, Round I, in South Korea

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South Korean model

- Preparation (MERS, 2015)
- Command Control Communications
 - Clear command from PM to districts
 - Transparent, decisive, data-driven decisions
 - Clear messages reinforced frequently
 - No lockdown – voluntary compliance – use of information, tracking etc
- Test-isolate-track-treat

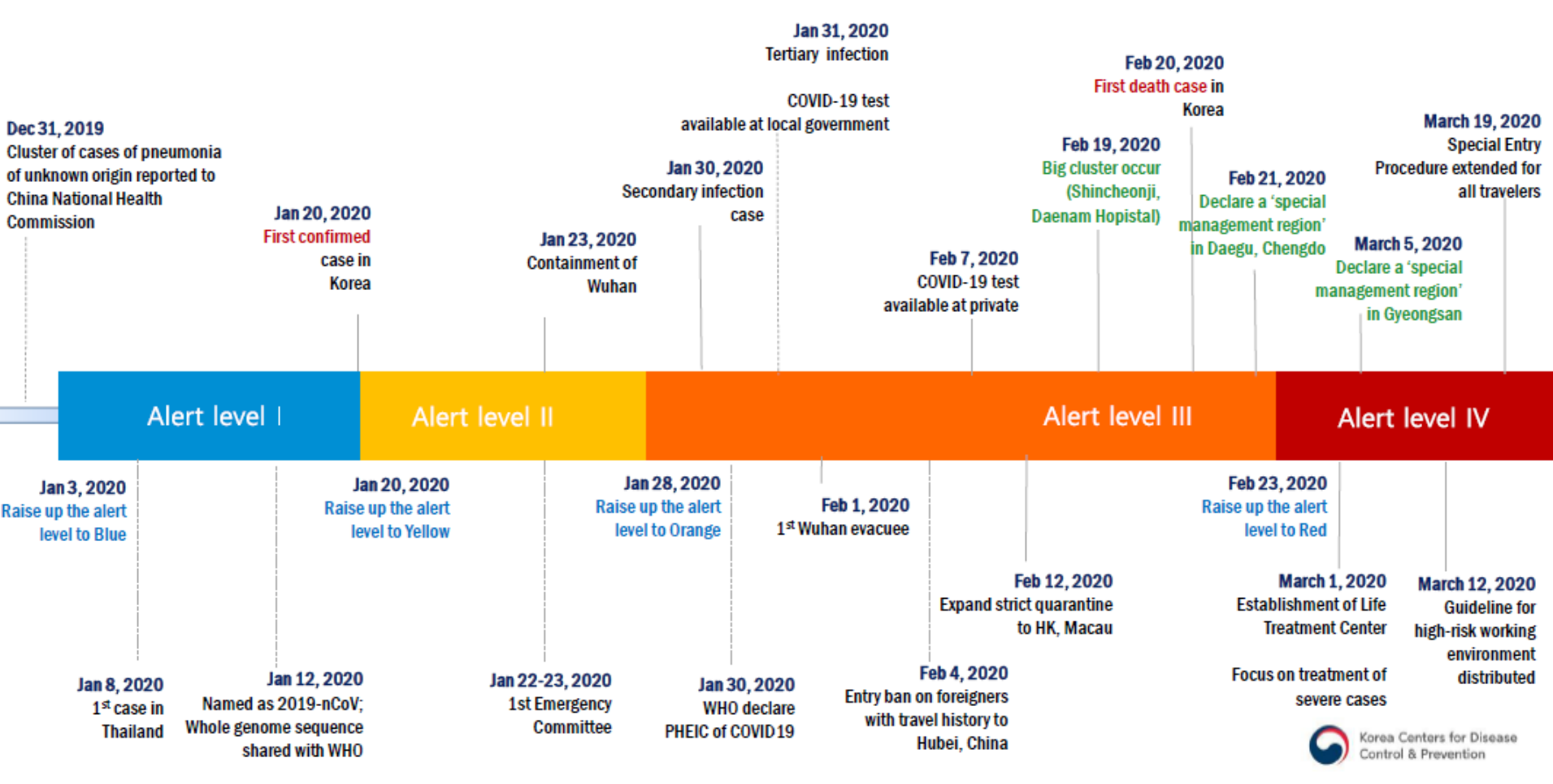


Preparation for release

- 14-21 days at negative slope or “threshold” of ?deaths, cases
- Hospital capacity
- Supplies, personnel, test kits & surveillance for test, isolate, track and treat
- Piloting?
- CCC → TITT

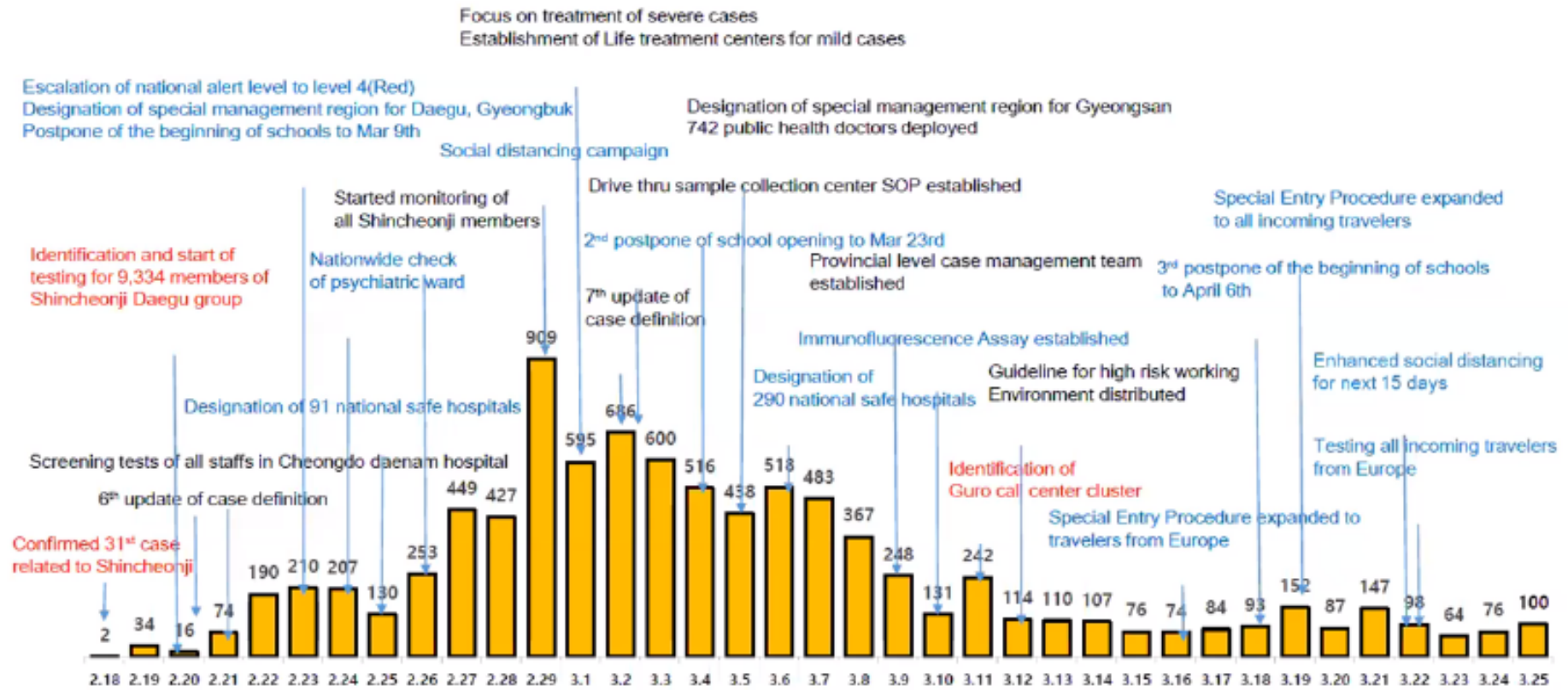


Evolution of the S. Korean response to Level IV





Timeline of the Korean COVID-19 Outbreak: Round 1





Testing in S. Korea

- Availability of kits (Fig 1)
- Use of kits: is there a magic number? (Fig 2)
- Ease of access (Fig 3)
- Issues with kits: PCR positivity \neq infectiousness (Fig 4)

Figure 1



Figure 3



Figure 2

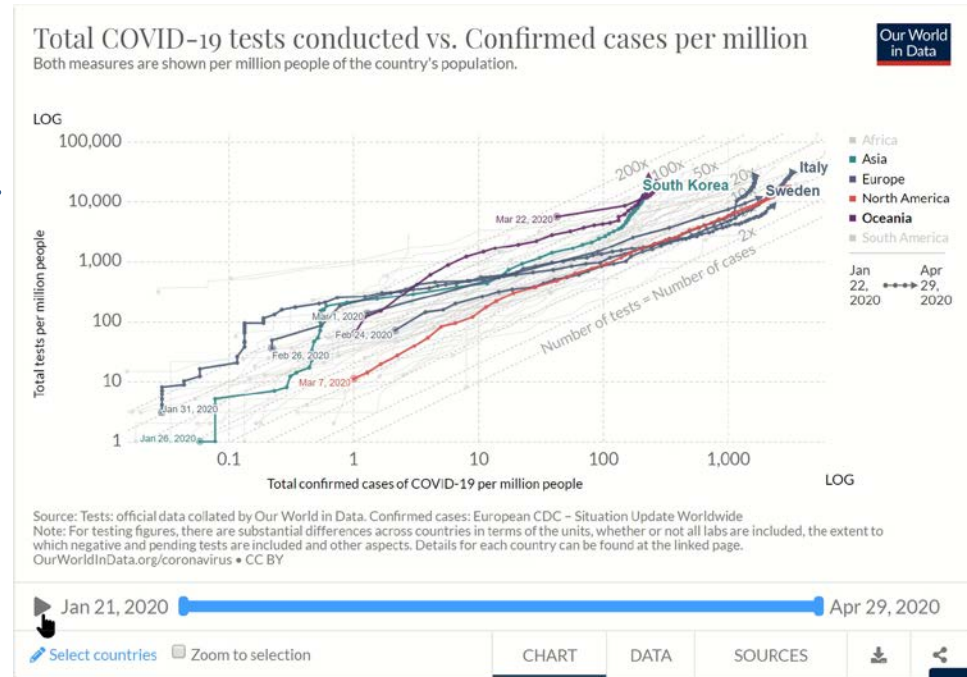
Doubts cast on Covid-19 reinfections

Some coronavirus patients in Korea who tested positive for Covid-19 after recovery — sparking alarm about possible reinfections — probably did so because the country's sensitive testing procedure detected "dead" virus fragments within their bodies.

A clinical committee for new infectious diseases within the state-backed National Medical Center said Wednesday in a press briefing that there was a low chance that those people were actually reinfected with Covid-19 and said the country's RT-PCR testing method seemed to have confused a dead virus fragment with an active one.

Fears of reinfection arose after the Korea Centers for Disease Control and Prevention reported cases of recovered patients testing positive for Covid-19 again. By Monday, there were at least 277 people who fell into that category.

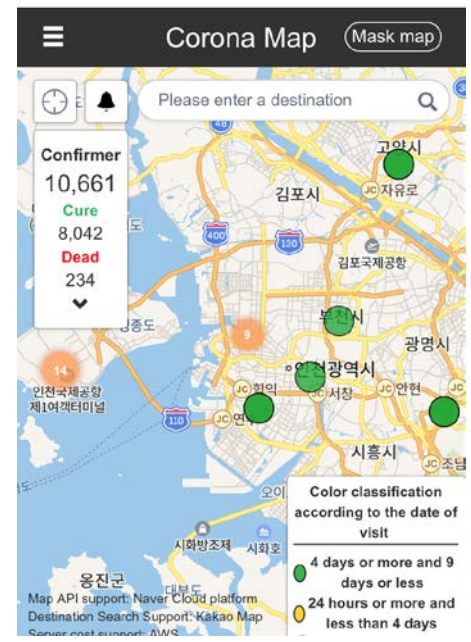
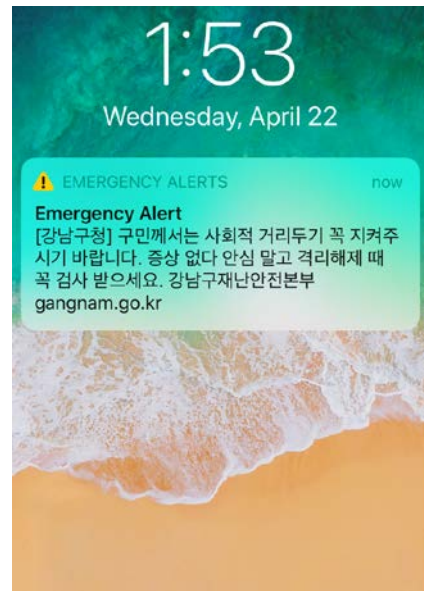
Figure 4





The use of information technology was key

- Government provided free apps for mobile phones
- Emergency information
- Social distancing reminders
- Latest information on testing, identification of hotspots and location of cases
- Referral to national and local government websites for additional information





Other government measures included

- Temporary approval of telemedicine
- Wireless base for low income families
- Educational content on TV
- Self diagnosis & tracking app for travelers (in-bound)
 - URL / QR codes at airport
 - If you don't respond you are called, if you don't respond you are visited
 - If you are caught violating quarantine there are penalties that include a fine, expulsion from Korea (non residents), and/or mandatory quarantine

Daily Self-diagnosis

Choose the symptoms you have today (今日の症状を選択してください)

No symptoms (無症状)

Fever - above 37.5 degrees (37.5度以上の発熱)

YES (はい) NO (いいえ)

Cough (せき)

YES (はい) NO (いいえ)

Sore Throat (のどの痛み)

YES (はい) NO (いいえ)

Dyspnea (呼吸困難(息切れ))

YES (はい) NO (いいえ)

SUBMIT (提出)

Daily self diagnosis





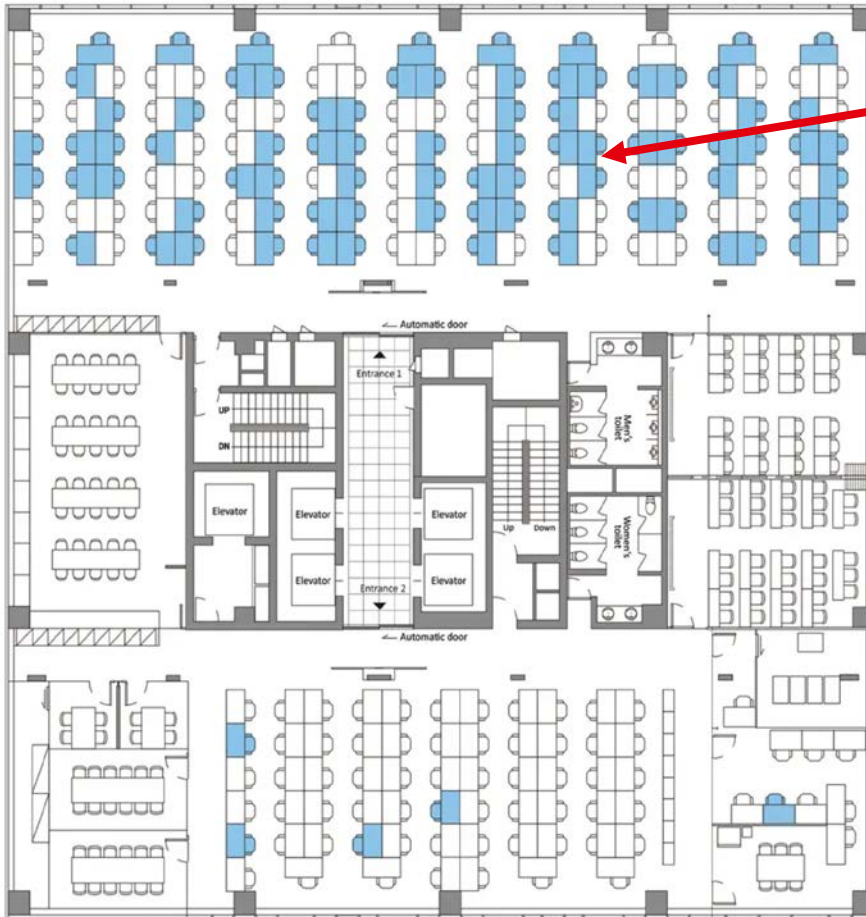
Self-quarantine safety app

- From 7 March for people who were under quarantine
- Monitors symptoms and location
- Government case officers had a complementary app to track the people under their watch
- The government officer calls periodically and does home visits at random

List and Status of Self-quarantined Subjects	Out of Bounds Alerts																																				
<p>My profile List of self-quarantined</p> <p>Total: 8 Refresh</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Self-diagnosis result (AM/PM)</th> <th>Location Status</th> </tr> </thead> <tbody> <tr> <td>GU Chang-gyu (29)</td> <td>Symptomatic / Not submitted</td> <td>Not Available</td> </tr> <tr> <td>Gender: Male</td> <td>Nationality: Nauru</td> <td></td> </tr> <tr> <td colspan="2">Quarantine Status: Quarantine lifted</td> <td></td> </tr> <tr> <td colspan="2">Mobile: 01012340000</td> <td></td> </tr> <tr> <td colspan="2">Emergency Contact: 01043210000</td> <td></td> </tr> <tr> <td colspan="3">Address: 602, 1367, Aneum-dong, Sejong-si</td> </tr> <tr> <td>View diagnostic result</td> <td>Call the subject</td> <td>View Quarantine area</td> </tr> <tr> <td colspan="2">Quarantine category</td> <td>Change the assigned case officer</td> </tr> <tr> <td>KIM In-geon</td> <td>Not submitted/Not submitted</td> <td>Not Available</td> </tr> <tr> <td>YIM Gyu-hyun</td> <td>Not submitted/Not submitted</td> <td>Not Available</td> </tr> <tr> <td>JEONG Ui-young (29)</td> <td>Symptomatic / Not submitted</td> <td>Out of bounds</td> </tr> </tbody> </table>	Name	Self-diagnosis result (AM/PM)	Location Status	GU Chang-gyu (29)	Symptomatic / Not submitted	Not Available	Gender: Male	Nationality: Nauru		Quarantine Status: Quarantine lifted			Mobile: 01012340000			Emergency Contact: 01043210000			Address: 602, 1367, Aneum-dong, Sejong-si			View diagnostic result	Call the subject	View Quarantine area	Quarantine category		Change the assigned case officer	KIM In-geon	Not submitted/Not submitted	Not Available	YIM Gyu-hyun	Not submitted/Not submitted	Not Available	JEONG Ui-young (29)	Symptomatic / Not submitted	Out of bounds	<p>Current location of the quarantined subject</p> <p>JEONG Chang-hyun has left the registered quarantine area. Please check.</p> <p>OK</p>
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<p>Current location of the quarantined subject</p> <p>Current location</p> <p>Registered quarantine location</p> <p>Save location</p> <p>Cancel</p>	<p>Self-diagnosis report</p> <p>오늘 발생한 증상을 선택하세요.</p> <p>열(37.5°C 이상) 또는 발열감</p> <p>아니요</p> <p>JO Gyung-hwan reported having a fever, a cough, a sore throat and respiratory difficulties.</p> <p>OK</p>																																				



Testing and Tracking: Synergies



- 10th floor of Bldg X in Seoul, call-in center, index case in room at top
- 97 of 811 occupants of the building were infected (in blue), 94 sat on the same floor, 79 in the same section.

KCDC – in Business Insider, 29 Apr 20

This investigation highlights the importance of testing and tracking – just knowing the index case is not enough - and reinforcing that contact and/or duration/intensity of exposure are important.



But practically



Taking exams, 1620 Joseon dynasty



Line for polling station 66% turnout for National Assembly

Masks, gloves & sanitizer



Even the quarantined voted



BACK UP SLIDES

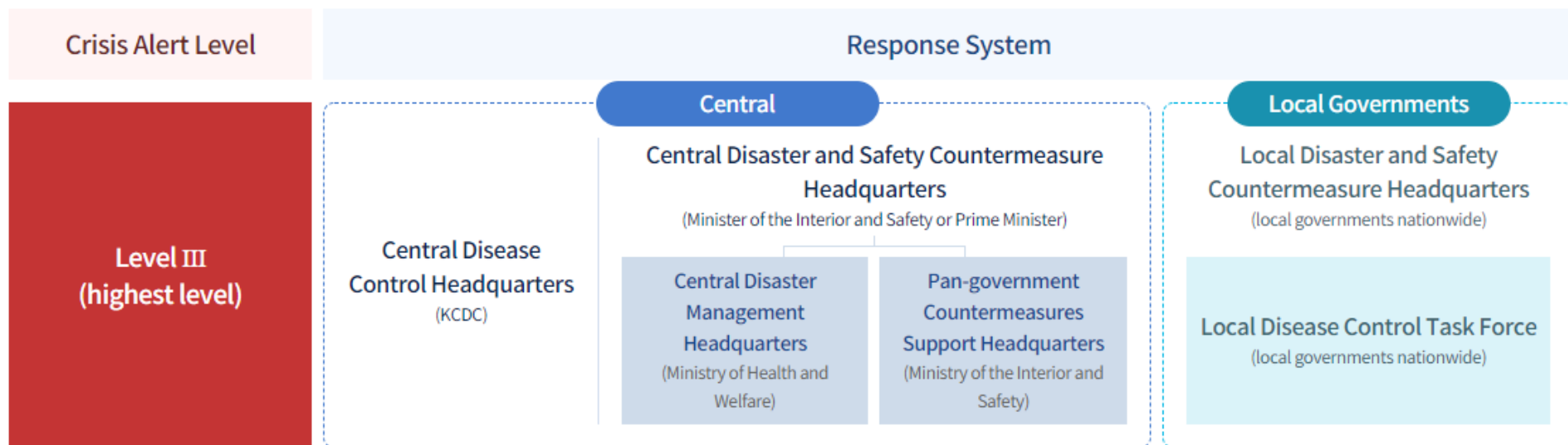


Infectious Diseases Prevention and Control Act, 2010

- Amended 2015, 2017 after MERS outbreak
- Blue – interest, Yellow – case in Korea, Orange – local spread, Red – national spread
- Certain powers and responsibilities of the state, local governments and medical personnel, in addition to the rights and duties of the people
- When an infectious disease harmful to citizens' health is spreading, the Minister of Health and Welfare shall promptly disclose information with which citizens are required to be acquainted for preventing the infectious disease, such as the movement paths (GPS data), transportation means, credit card transactions, medical treatment institutions, and contacts of patients of the infectious disease without a warrant



Central control, defined roles and responsibilities



Red alert

- **Central disaster and safety countermeasures HQ**
- **At highest level of alert, responsibility shifts to Prime Minister**
- **Government can send extra resources to an area**
- **Can forcibly close schools and other organizations**



Information that can be collected

Collection item*	Purpose and use	Advantages	Limitations	Related branch and institution
History of using medical facilities	<p>(Purpose) Identify the clinical symptoms and date of initial onset of symptoms of the patient</p> <p>Obtain medical records and evaluate the date of onset of symptoms</p>	<p>Obtain objective data about the clinical symptoms of the patient</p> <p>Specify medical facilities that were visited during the time of exposure</p>	<p>Long time needed to review the medical records</p> <p>If there are no related symptoms because the medical facilities were visited for a different illness, it is impossible to obtain related information</p>	National Health Insurance Corporation Health Insurance Review and Assessment Service
GPS (cell phone location)	<p>(Purpose) Identify the route of the patient</p> <p>Verify the consistency of the patient claims</p> <p>Additionally check the previous route</p> <p>Use phone GPS (latitude and longitude) data</p>	<p>Evaluate the consistency of the patient route identified via interview</p> <p>Obtain additional information about the route that the patient does not remember</p>	<p>There are limitations to specify accurate location information because mobile phone locations are used</p> <p>Errors if the name on the phone and location of purchase (overseas) are different</p> <p>Long time needed to view the information if there is a large difference between the time of patient confirmation and date of symptom onset</p>	National Police Agency
Card transaction log	<p>(Purpose) Identify the route of the patient</p> <p>Verify the consistency with the patient claims</p> <p>Specify a location for defense against infectious diseases</p>	<p>Specify the visited location, and use it to select the scope of contact investigation</p> <p>Monitor detailed route within a location</p>	<p>If a card with the patient's name is not used, the transactions of another person are mixed and need reclassification</p>	Financial Services Commission
CCTV	<p>(Purpose) Identify the route of the patient</p> <p>Identify patient's clinical symptoms</p> <p>Evaluate the exposure risks of contacts</p>	<p>Check whether the patient was wearing protective gear (e.g., mask) and the patient's clinical condition at the corresponding location</p> <p>Help evaluate the risk of exposure if there is a large unspecified number of contacts</p>	<p>Long time needed to check the CCTV</p> <p>There are limitations to clearly identify if there is no internal CCTV or blind spots are present</p>	National Police Agency

*Related basis (Infectious Disease Control and Prevention Act Article 76 Section 2 (request to provide information), Infectious Disease Control and Prevention Act Article 32 Section 2 (information that can be requested to be provided).

GPS = global positioning system; CCTV = closed-circuit television.