

How did Korean democracy tame Covid-19?

Analysis and narrative
January 10, 2020 – April 15, 2020

Part I. Tracing, Isolation, Therapeutic Consensus, and Deconfinement

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Summary

South Korea contained Covid-19 by placing its Korean Center for Disease Control (KCDC) at the heart of the health crisis response. By law, the KCDC is mandated to manage the totality of health operations and enjoys for the purpose of its mission exceptional executive powers, with authority over the police and judiciary. All actions against the pandemic (screening, tracing, isolation, hospitalisation, etc.), as well as all the necessary administrative and legal tools, are thus placed under a single management. This remarkable cohesion has enabled a very rapid and vigorous response. Finally, currently under the direction of a woman, a Professor of medicine who had experience in fighting the previous epidemic, the KCDC enjoys a relatively independent authority recognized by all, as it is based on scientific knowledge, professionalism as well as transparent actions and communication. Being perceived as a politically independent body, its action has remained away from one-sided political criticism.

The rapid and massive implementation of the now well-known screening-tracking and isolation doctrine was made possible by this original legal and political context, not forgetting the mobilization of the health industry for the design of the tests in the first half of January, approved for marketing on February 4, i.e. 14 days before Covid-19 explodes in South Korea. The tracing of persons only concerns individuals who are proven to be carriers; it is strictly retrospective and only concerns the two weeks prior to the test. Apart from the telephone health follow-up, twice a day, of any person who tests positive during two weeks of isolation, there is no procedure for tracing, neither particular nor general. The database, hosted outside the government, is subject to a strict access control; all requests for information are recorded and will be destroyed at the end of the Covid-19 crisis. This April 15, 2020, the day of legislative elections under high health protection, no lifting of the measures in force has been announced. The school system is completely closed, and courses are gradually being switched to online or television. No re-opening is planned, and tens of thousands of digital tablets have been given to the children of families who have no internet accesses. As long as a vaccine or therapy do not exist, the KCDC will continue its role of pilot and keep its exceptional powers. To prepare for life during this waiting period, the Korean government is working with the companies and the education system in order to imagine more acceptable temporary and consensual *modus vivendi* yet refusing to compromise with the anti-Covid-19 doctrine.

The following is an account of a personal experience of the epidemic in South Korea. From first-hand documents and witnesses collected on site, it provides an in-depth analysis of the epidemiological, legal and medical tools implemented against Covid-19, as well as prospects for "exit".

The author is a French researcher who, after his work at the Institut Curie (Paris), has been pursuing his research for almost five years at a Korean public university.

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Introduction

South Korea, one of the world's poorest nations sixty years ago, threw off the yoke of dictatorship just before the turn of this century to build a vibrant democracy, and today it is giving us proof that it is possible to protect the health of citizens from the ravages of a devastating pandemic. Without putting anything in the way of democracy, without restricting individual freedoms for 99.98% of the population, without ever closing the borders, the government and the 51 million Koreans managed in four weeks to tame the daily flow of newly infected people. The number of Covid-19 victims deplored each day never exceeded ten. The stark contrast with the ravages of the pandemic in most of the rich countries of the West should inspire our nation, France, with sincere and profound political humility, but above all should imperiously awaken in us an indispensable curiosity. We all now know that the first battle against the virus was won in Korea thanks to a very rigorous doctrine: mass screening, tracing of individuals carrying the virus, and isolation. Before we understand why we failed, it is very urgent to understand what these key words mean in practice, as they now resonate as self-evident facts. Living in Korea, my duty to seek to understand is leading me to write a report, the first of which is presented below. In the pages that follow, I analyze the Korean "solution" in the light of several questions, which in France today are critical:

- How to break the chains of contamination by rigorous tracing of contaminant contacts?
- What are the legal guarantees in the face of intrusion into privacy, and how can the data collected be used?
- How to treat in an emergency, without scientifically established certainty on therapeutic tools?
- How can an acceptable therapeutic consensus be developed as quickly as possible?
- How can we "get out" of confinement with maximum health safety?
- How can this exit be made consensual?

It is extremely likely that the Korean solutions would have very positive effects in France, but they pose a problem of scale, because the number of infected people is probably a hundred times higher in France. Fortunately, this is not yet the case overseas, where these solutions should make it possible to contain the epidemic, because it is not too late. They must therefore be transposed there without delay. For metropolitan France, despite the considerable scale of the pandemic, these solutions are qualitatively very useful, and should guide our actions from tomorrow morning.

Many misconceptions about Korea, combined with a superiority complex fuelled by ignorance, lead some people to believe that Korean solutions cannot be applied here because of the great differences between the two countries. In the second part, to be published shortly, I will respond to this objection by analysing the following points: the cultural, political and epistemological bases of mutual trust between the State and the population; the legal and political organisation of the response to the pandemic disaster; strategic planning and maintenance of health monitoring; industrial strategy and extremely rapid mobilisation of the health industries; logistics of tests and

masks; maintenance of high-level health infrastructures; and lastly, the link between health, economic and diplomatic issues.

1. Retrospective tracing of virus carriers

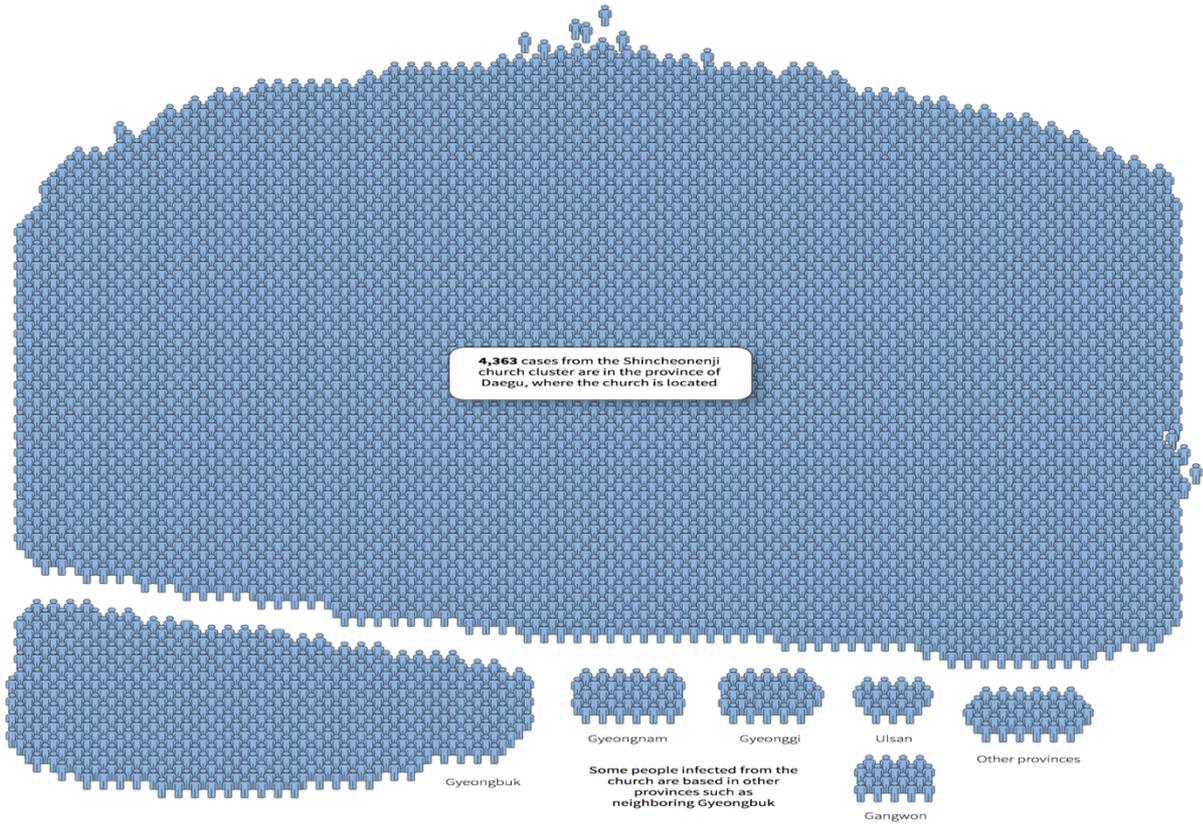
In the law drawn up after the MERS epidemic in 2015, the core of the doctrine rests on two pillars:

- identification of all infected individuals;
- Strict isolation of all asymptomatic patients, and hospitalization at the first symptoms.

Thanks to this doctrine, viral contagion has been effectively contained, without ever resorting to the widespread containment implemented almost everywhere else, in nearly all countries whether or not they are democracies. In South Korea, where the memory of the dictatorship is less than 30 years old, the concern not to violate the fundamental freedom of movement plays an important role. The personal data protection regime is, moreover, close to our DPRK¹, and any intrusion into privacy requires judicial authorisation. In the context of non-democratic neighbouring countries, Korea is very much committed to its model of democracy; we will discuss more about this detail in the second part of this report. However, the memory of the previous epidemic, even though it affected only 186 people and caused only 35 deaths, has convinced us of the relevance of an exceptional law, which will be seen as a necessary intrusion into privacy. The entire isolation system is presented in the following section, and here we discuss the tracing system through which the health system has an extremely fine and almost complete vision of all infected individuals. The following two figures provide a perfect illustration.

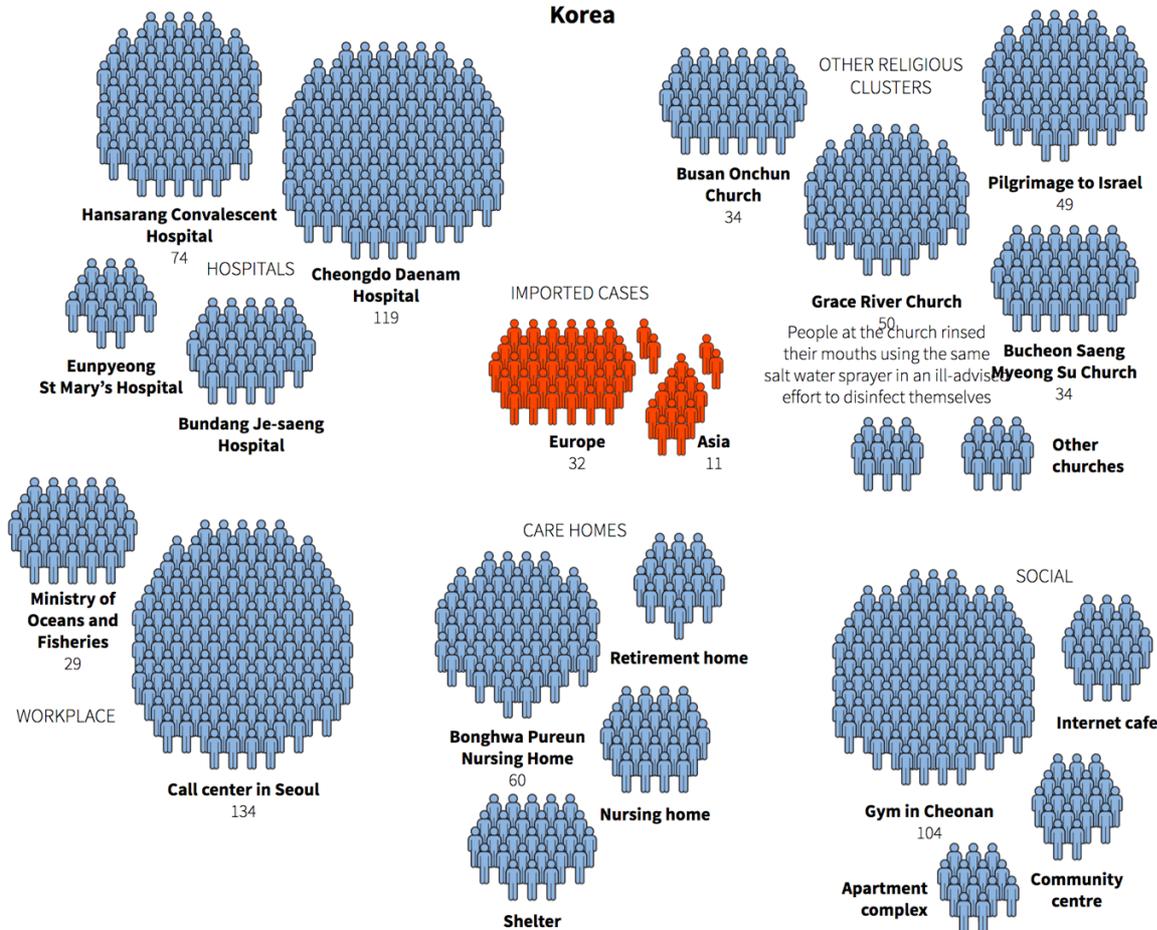
¹ General Regulation on data protection.

March 18
The Shincheonji church cluster
5,016 infected



Detailed situation and geographical sub-groups of the chain of contamination initiated on 18 February in Daegu in the Shincheonji sect by patient 31 (situation on March 18). This cluster now accounts for 50% of the people tested positive in Korea.

Other clusters in South Korea



As of March 18, here is the geographical distribution of almost all the Covid-positive people, asymptomatic patients placed in isolation, symptomatic patients admitted to hospital. Imported cases have increased considerably and now represent 350 individuals.

1.1 Individual contamination investigation procedure

This very fine knowledge of the demography and geography of proven Covid-positive cases is the result of very meticulous investigative work, the organisation of which is provided for in detail in the 2015 law on the control and prevention of infectious diseases. It allows for epidemiological surveillance that is as rapid as it is rigorous and is unambiguously based on an intrusion into the privacy of positive individuals. The legal basis for this intrusion into privacy is Article 76-2 of the Act, which, in a serious health crisis, gives the KCDC judicial and police powers to initiate tracing investigations without the need for judicial authorization. The Minister of Health also has this exceptional power.

The investigation is triggered compulsorily, as soon as an individual is positive on the RT-PCR SARS-CoV2 test. If the test result is negative, it is automatically sent by sms to the person tested. If the test is positive, the subject is compulsorily sent to the containment or hospital. At the same time, the subject is taken care of by an epidemiology officer, a non-medical staff recruited for its experience and trained to conduct investigations. This official then becomes the patient's "contact person" for all investigative and surveillance operations.

His or her first role will be to obtain the initial "consent" of the individual concerned, which is more a matter of pedagogy or politeness, since refusal is punishable by law. Indeed, the law on the control and prevention of infectious diseases, passed in 2011 and amended in 2015 and 2016, gives importance to this link between coercion and pseudo-consent. I interpret this symbolic approach as an opportunity for citizens to confirm their personal adherence to the law democratically established by the national community. Based on a strict legal framework of the conditions for the use of the information that we will discuss below, the vast majority of Koreans adhere to this law, because the individual and collective benefit of effective epidemiological protection is considerable. The sensitivity of Koreans to the protection of privacy has led the legislator to organise the collection of information in a very artisanal way, by telephone calls and emails, to avoid the suspicion created by the algorithms used to collect information. However, in face with the scale of the Covid crisis, about 50 times greater than that of MERS 2015, it was quickly realised that it was not possible to mobilise a civil servant for about a day to investigate a single person.

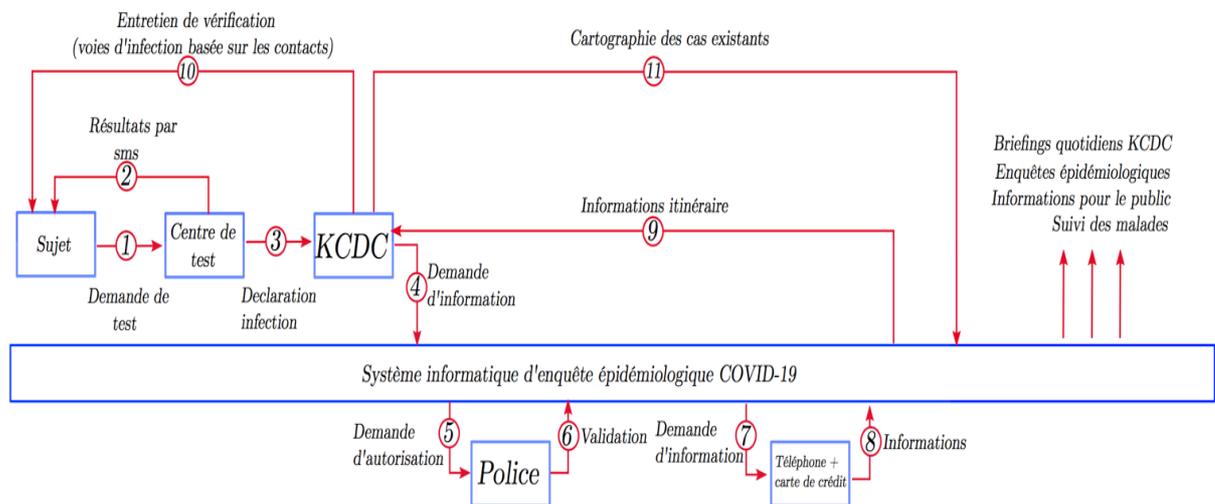


Diagram of the contact retrospective tracing survey carried out for every person tested Covid+ by PCR. The means implemented are based on the exceptional executive powers granted by law to the KCDC in the event of a major health crisis. These powers give it authority over the police and the judiciary for all the needs related to its mission.

The database is hosted by a body outside the State, with access rules governing its use by the State.

This database is provisional, with a legal obligation to destroy it at the end of the Covid crisis.

To save time in the investigation procedures, the law was therefore modified during the epidemic. Since March 16, the procedure takes 10 minutes instead of one day. The principle remains that each person is treated by a single epidemiology officer, but his investigative role is limited to collecting the initial "consent" and immediately transferring the identifying information collected during the test to the KCDC. The KCDC records the case on its servers and then on the large Covid database of epidemiological information. In this temporary database, which exists only during the crisis, the investigation continues automatically. The system is responsible for requesting the police to authorize the investigation, which is then used to collect all relevant personal data. It was developed along the way through collaboration between the national police, the Credit Finance Association, Korea's three mobile operators, and the 22 credit card networks.

In addition to the basic elements (name, identity number, address, telephone numbers, etc.), this personal data includes all card banking transactions and the succession of telephone terminals

contacted by telephone. It also includes medical information (prescription, medical file)², immigration or emigration history for limited periods of time, and other information governed by presidential decree.

GPS data are excluded from this collection. It may be added at a later stage, and on a voluntary basis, when a person in isolation agrees to replace twice-daily telephone monitoring with a portable application. Strictly speaking, and apart from the coarse triangulation allowed by the telephone terminals, there is therefore no real fine geographical tracing. That said, the universality of credit card payment means that almost all purchases, transport, restaurants, hospital visits, pharmacy visits, etc. can be tracked.

The automatic investigation thus makes it possible to trace a rather rough route, but not to identify the contacts precisely. It is in a second stage, with the treating epidemiological officer, that the investigation becomes more precise. The latter receives via the KCDC the itinerary established by the database algorithms, and asks the positive subject to confirm his itinerary, to search his memories to clarify it, and above all to identify as many people as possible. At this stage, the surveillance camera recordings can be mobilized. Refusal to co-operate exposes the offender to a maximum penalty of one year's imprisonment and a fine of 150,000 Euros. After verification and subjective additions to the automatic investigation, all the information is sent back to the database via the KCDC. New algorithms are then implemented to draw up the complete chain of all the sites visited and all potentially contaminated persons and cross-reference this data in space and time with all the information in the database. Leaving nothing to chance, the KCDC also carries out post-mortem PCR tests. Despite the problems posed by these particular conditions, a positive response also leads to a tracing investigation.

1.2 Data storage and legal safeguards

For fear that the government might use the data for political purposes, or without democratic control, the law provides that all personal data collected by the KCDC should be consolidated in a large database hosted by a body outside the state, and even outside the KCDC. It was difficult for me to know more about this point, as to the exact links between the hosting structure and the state. We could imagine in France entrusting this role to INRIA, or any professional IT organization, with sufficient independence to ensure that access to data does not derogate from the provisions of the law. It seems to me that the holding of this database by the Ministry of the Interior or the Ministry of the Economy, Finance and Industry would not be sufficient to guarantee that access to the data does not contravene the provisions of the law. Thus, any citizen can challenge the facts recorded in the database and disseminated to the authorities, and the Ministry of Health is obliged to correct them if necessary. Other measures have been taken: authorization given to the Ministry of Health to question the National Health Insurance, new sanctions in case of refusal to cooperate in the individual investigation, sanction in case of false declaration, possibility to limit exports of sanitary goods in shortage, obligation of PCR testing for public officials...

² In my personal experience, medical file is not among the most precious elements in the private life in Korea, and the related protection seems to me very relative.

As several ministries and administrations have access to the Covid database, the law includes provisions to prohibit the misappropriation of personal data. The Ministry of Health and the KCDC have the right to transmit information to other administrations or local authorities only if it is relevant to their missions, and only within the time frame of the epidemic and for the purpose of containing it. All administrations that have received information from the database are obliged to destroy it once the relevant mission has been accomplished. The KCDC has publicly announced its intention to destroy all personal information collected to fight Covid-19 at the end of this epidemic. The fulfilment of this commitment will be worth observing. It is very likely, however, that health authorities, the medical community and researchers will prefer this database to be completely anonymised for later epidemiological studies.

1.3 Measures arising from tracing

The first exploitation of the routes is of course to identify all persons who may have had close contact with the subject declared positive. All these contact persons will be notified as soon as possible by the local health authorities of their place of residence of the risk they have incurred. All such contacts will be subject to mandatory testing and isolation, according to the procedures described below.

Another set of measures concerns the places through which the Covid-positive subject has passed. Any place visited by a contact subject must be disinfected. An entire university building was condemned as a result and then disinfected. It was reopened when the subject concerned was found to be negative. Otherwise, the municipal authorities would have simply closed the university for the duration of the quarantine. The same is true for the companies. Any industrial or commercial establishment is closed as soon as it is recognized to have been visited by a Covid+ subject, and protective equipment is needed everywhere in the workplace (masks, gels, gloves). With this threat of closure and the rigour with which personal protection is applied in the workplace, the Korean economy has for the most part continued to operate without exposing anyone to health risks. In the same spirit that protection of individuals takes precedence over production, Vietnam has put in place strong disincentives for any employer who would put its employees at risk³.

³ Here is the testimony received from a French business man, on April 13, established in Vietnam the last 30 years « Since the second week of April, all companies of more than 10 employees must fill out a self-evaluation form of the epidemic risk. Different teams from all state agencies (police, army, veterinary services and food security, customs...) met personally with the CEOs to help them fill a self-evaluation form and calculate their level of risk. More than 80% of the company is closed on spot, from 30% to 50%, 3 business days were given to go below 50% before the closing. When it is between 30 and 50%, the company stays open but under surveillance. The risk is accepted under 20% threshold and good under 10%. At the end of the form, the CEO signs and acknowledges his civil and penal responsibility in case of employees contaminated by Covid-19 because adequate means were not put in place. (The French « Code du Travail » is stricter in theory). The company is closed without the signature of the provision of acknowledgement of the required means. Covid has been very well contained in Vietnam, and the GDP is still growing
https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_vietnam

1.4 Dissemination of tracing data

An obligation of transparency and disclosure has also been enshrined in articles 6 and 34-2 of the law, so that the public at large can follow the evolution of the epidemic. These provisions respond to the right to know, for which Korea is often ranked first internationally with its concept of "open government". The obligation of disclosure requires local authorities to publicly disseminate information useful to the citizen. Much more than a transparency operation, this is one of the very purposes of KCDC investigations: to protect citizens.

Alert messages are thus disseminated, by sms and possibly by e-mail, allowing everyone to position themselves in space and time in relation to the itinerary of a person carrying the virus. The radius of diffusion is about 5-10 kilometres here, but much tighter in dense urban areas. For example, the document below was sent by e-mail from the Covid cell at the University. Everyone also receives a less detailed sms intended for the general local population. In all the places really close to the route of the positive individual, the information is disseminated through posters. I was thus warned on Sunday morning, February 16, by a poster in the elevator of my residence, of the passage in the vicinity of the famous patient 31 probably at the origin of the explosive contagion by the secret Shincheonji sect. I thus checked that I had not taken the same TGV as her! Please specify here, that the announcement concerns a subject of which it is said neither the age, nor the sex, nor anything other than its positivity. It is therefore difficult to identify the carrier of the virus. In Taiwan, on the other hand, the publication of these details has much more intrusive effects.

This publication strategy is a double-edged sword, as it can provoke anxiety or maintain fear. Transparency has been chosen, although the fear generated can be a bad counsellor. Experience proves otherwise, and no one has reported any panic attacks to me. On the contrary, the conditioning maintained by this information contributes to making visible a threat whose invisible nature perhaps partly explains the catastrophic consequences of the virus in the West.

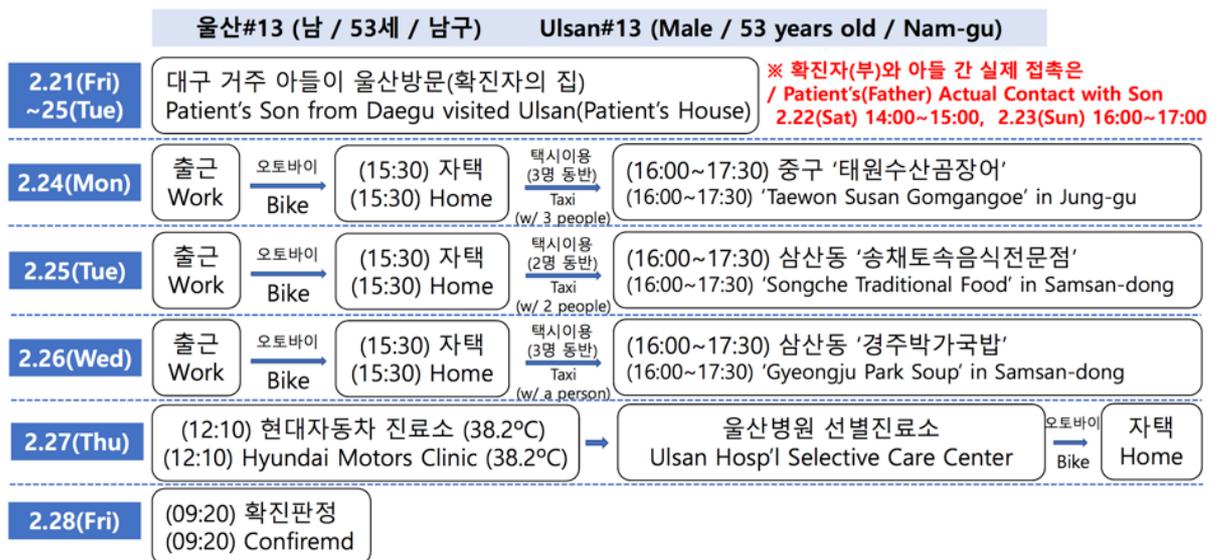
In line with the policy of transparency, the government has opened up free access to all the anonymised information in the database. This initiative allows the work of researchers, but also that of developers who are therefore able to propose applications for different purposes very quickly. A group of students from my university now offers a tool for real-time monitoring of the epidemic in my region, and all researchers are now able to study this epidemic with all the finesse of the information collected. Since March 16, a link has been in operation between the epidemiological database and a broader initiative called the "Smart City Data Hub", run by the Ministry of Transport and Infrastructure and the Ministry of Science and Technology. The aim is to further strengthen the digitisation of the city. As an example, there is now an application to find out which pharmacy in one's neighbourhood still has masks in stock⁴.

⁴ The distribution of masks is today regulated, it is 2 masks per week per person for the public. The purchases of masks are done once a week, based on the birth year. We will develop the question of masks in the second part of the report.

1.5 Resistance and adhesion

Has there been resistance to the deployment of this tracking system, which was introduced during the current pandemic? Yes, but it was limited to the very particular case of the church of Shincheonji, with 320,000 members according to the authorities, and recognised here as a sect because of the prohibition on its members revealing their membership⁵. As a result, the sect has refused in principle to reveal the identity of its members, even after the revelation of patient 31, who returned from Wuhan with the virus, and who massively spread it during a very popular service. The attitude of seeking consent rather than forceful passage delayed the operations and led the government to authorize vigorous legal action on March 4. After this episode, 60% of positive cases were detected out of 210,000 members tested, and the "Shincheonji" cluster in Daegu accounts for 80% of positive cases in Korea. These events, and the fact that the epidemic was largely confined to this sect, probably helped to demonstrate the benefit of legal measures of exceptional intrusion into privacy and reinforced the massive support of the population.

코로나 19 울산 #13 확진자 이동 경로 COVID-19 Ulsan Confirmed Patient's #13 Moving Route



For each new case confirmed COVI positive, this information is disseminated, here with an English translation for the international staff of my university, UNIST.

In the European public debate on this issue, I think it is essential to realise that words are ambiguous, and their translations make it even more confusing⁶. None of these words makes sense if it is not specified. Nothing could be further from the truth than to say that the Koreans have agreed to be "followed" in real time, through their GPS, their phone, or their bank bills. The only thing they have democratically consented to, is a "retrospective" survey, covering their past travel during the two weeks prior to discovery of their carrier status. I have therefore called this measure

⁵ https://fr.wikipedia.org/wiki/%C3%89glise_Shincheonji_de_J%C3%A9sus

⁶ In France, one encounters the words *traçage*, *postage* in French, or *tracking*, *tracing* in English.

"retrospective tracing", to distinguish it from all the mechanisms put in place to monitor "forthcoming" actions. During compulsory isolation, health monitoring twice per day with a questionnaire, is conducted with a telephone conversation or a mobile application, excluding of any mandatory GPS locator. Upon release from isolation or hospital, positive subjects are considered cured, and there is no longer any obligation on them, nor any threat to their privacy. There is no invasion of privacy only in retrospect, and only during the contact tracing survey.

The second element of the debate is as follows. The database is not only temporary, with an obligation of legal destruction, but it is housed outside the State, with controlled and traceable access.

2. Medical response: isolate and treat

The Korean population has not been subject to any collective measures of containment, nor has there been any general obligation to wear masks, nor any restriction of movement. Even at the peak of the epidemic, the city of Daegu, the epicentre of the disease, was not confined. On the other hand, all those who tested positive were, without exception, subjected to isolation measures and hospitalised as soon as the first symptoms appeared, as described here.

2.1 Clinical stages: definitions and initial orientation

As stated above, any person may voluntarily submit to a PCR test, without any restriction, with or without a prescription. It is of course automatically prescribed to any person whose tracking system establishes that he or she has had contact with an infected person. The test is also compulsory for anyone coming from abroad. If the test is positive, the collection centre calls the patient, but if the test is negative, the answer is sent by SMS. The issues related to screening will be described in detail in the second part of the report to be published shortly (history, production, access, price and reimbursement...).

The classification of patients in four stages is done after confirmation of the PCR result, directly by the collection centre if the patient waited for the result on site (4-6h waiting time). If the patient has gone home waiting for the result and is positive, the referring hospital closest to the home performs the classification and declares the patient to the KCDC with his or her gravity stage. In response, the KCDC bed management unit contacts the referring hospital to say which hospital to admit the patient to, or which isolation centre to isolate the patient. The contact tracing process is initiated in parallel, beginning with the collection of consent to the electronic analysis of social interactions as described above.

1. Mild: asymptomatic.
2. moderate.
3. severe.
4. critical.

In comparison, according to current French recommendations, the evocative paucisymptomatic presentation in epidemic phase is no longer an indication to make a diagnosis. On

the basis of this suspicion, syndromic surveillance can be carried out in town, leading to a clinical diagnosis without PCR, which escapes the statistics.

i. Risk factors of severe forms:

- Age > 65 years old (70 years old in France according to the College of General Medicine 20/03/20).
- Chronic pathology: diabetes, renal or hepatic failure, chronic respiratory pathology, cardiovascular disease.
- Treated cancer.
- Immunosuppression: immunosuppressive therapy, treated malignant haemopathy, HIV infection, transplantation.
- Special cases: morbid obesity, pregnancy, dialysis, tobacco (any smoker testing positive has been hospitalized since April 4).

ii. Hospitalization:

It concerns all persons except those with a slight impairment. The treatment is obligatorily carried out in one of the 69 hospitals designated Covid-positive, via special medical transport under negative pressure. As will be specified below, the hospital system is partitioned with Covid-positive establishments and a majority of Covid-negative establishments.

iii. Non-hospitalization:

This route concerns all mild or asymptomatic cases without risk factors, which represent the majority of Covid+ patients. They are referred according to two routes:

- entry into a living treatment center or isolation center.
- quarantine and home surveillance: self-isolation.

The following Table details the orientation between the two routes and their respective vascularity.

Mode of isolation	
Living treatment center or isolation center	Home self-isolation
<ul style="list-style-type: none"> • After initial hospitalization - patient discharged from hospital after improvement of symptoms but not negative PCR tests <ul style="list-style-type: none"> • In direct admission if: - difficult to maintain at home: it is impossible to be isolated from the other occupants of the home, no fixed abode, presence of an occupant with serious risk factors (see above). - decision of the responsible physician, for example, when faced with the risk of not respecting home confinement.	<ul style="list-style-type: none"> • After initial hospitalization - patient discharged from hospital after improvement of symptoms but not negative PCR tests <ul style="list-style-type: none"> • After initial hospitalization if: - home isolation possible (bedroom only, toilet and specific bathroom). - possible supply of food and basic necessities. - a home with no other occupant with severe risk factors.
Patient follow-up	
- 2 times a day monitoring by the nursing staff; - symptomatic therapy; - in case of a pejorative evolution, a chest X-ray is done, usually in a dedicated ambulatory clinic, and the patient is taken to hospital in a negative pressure ambulance if necessary.	- monitoring 2 times a day by a dedicated mobile application or by a telephone conversation with the nursing staff (temperature and symptoms, various needs) with the local referring hospital; - symptomatic treatment; - transfer to referring hospital if symptomatic worsening.

It should be noted here that persons subject to home confinement, through twice-daily contact with their KCDC correspondent ("epidemiology officer"), can receive material assistance if necessary (shopping, various needs, etc.).

2.2 Therapeutic recommendations, hydroxychloroquine, informal trials

From stage 2, i.e. from the first symptoms, all patients are treated in one of the 69 hospitals designated Covid+. The first systematic step is a CT-scan. As the disease is still very poorly understood, without a duly recognized treatment through a rigorous but slow process of evidence-based medicine, current therapeutic practice in Korea is based on a consensus that is freely developed through the gradual accumulation of scientific and therapeutic data. In the land of mobile phones with ubiquitous digital communications, practitioners are indeed very closely connected to each other through various "social network" type communication tools. Their rallying points are the KCDC, but above all two learned societies, the KSID and the KATRD ("Korean Society for Infections Diseases" and the "Korean Academy for Tuberculosis and Respiratory Diseases"). Without government interference, these learned societies are at the forefront of consensus building and publication of recommendations.

In the current state of the consensus published on March 13 by the KSID, it is proposed that patients be placed on [lopinavir/ritonavir] (Kaletra) or [hydroxychloroquine](Oxiklorin) for 10-14 days as a first-line treatment. In Korea, doctors are not accustomed to prescribing hydroxychloroquine, and initially preferred the antiviral. But, with the Chinese article published on March 18 in NEJM (Cao

et al.) showing no efficacy of lopinavir/ritonavir on 199 patients, and with the results suggested by Prof. Raoult in France almost at the same period, Korean practitioners turned to hydroxychloroquine. To date, both are globally used. This alternative [lopinavir/ritonavir] or [hydroxychloroquine] is currently preferred to other antiviral drugs, without formal proof, but a clinical trial is currently underway. Some practitioners combine azithromycin with West Nile Plaque, but the antibiotic appears to cause toxicity without significant additional benefit. Remedication is apparently approached with less enthusiasm despite its proven good clinical tolerance, even though it has been included in an ongoing clinical trial. As for a differentiated recommendation for hydroxychloroquine according to the age of patients and their comorbidities, no information is available.

Strictly speaking, there is no second line of treatment, but only specific antibiotic treatments in case of superinfections, especially bacterial ones. On the question of hydroxychloroquine, which is so much debated in France, the majority medical attitude is to prescribe it from the paucisymptomatic phase of the disease, with little hope of an effect in the advanced stages of Covid-19. Cure is recognised after two negative PCR tests, 24 hours apart, as for asymptomatic patients. We should mention here what could be a second line, i.e. intravenous plasma administration to convalescent Covid+ patients. After 10 days and 6 days on hydroxychloroquine and then Lopinavir/Ritonavir respectively, with a critical deterioration of their condition, two patients (71/67 years old) saw a marked improvement in their clinical picture within 1 to 3 days, by transfusion of plasma from immunized patients⁷. These two patients are now cured.

Given the current lack of therapeutic evidence for hydroxychloroquine in all countries, the attitude of the Korean health authorities is placed in prescribing physicians. In any event, no controversy has developed here on the subject, and everyone is working from the bottom up, from practitioners to the authorities, to find a therapeutic consensus on the disease as quickly as possible. Korean medicine is conducting full-scale clinical trials there, under high collective supervision. In order to achieve this goal as quickly as possible, no molecule is banned, and all restrictions are lifted on. To achieve this goal as quickly as possible, no molecules are banned, and all restrictions are lifted on drug reimbursements. This exceptional situation is the opposite of the usual practice, which is based on an extremely strict control of the volume of prescriptions and prices agreed with pharmaceutical companies. Bona fide therapeutic trials have been launched in parallel, in accordance with the rules of the art. But the rules of the art themselves seem to be the subject of debate, and the medical profession will have to live with the frustration of controversies that are difficult to settle.

The position of the Korean health authorities raises several questions, including whether it is dangerous to trust doctors on the front line? In the urgency of having to act without knowing, is it ethical to act without proof that one will do more good than harm?

At the main focus of the epidemic on Korean soil, the city of Daegu and its 2.5 million inhabitants account for more than 80% of the people with SARS-Cov2 in Korea, and a large proportion of the people have been hospitalized in a triangle of three very important hospitals. A publication will very soon give a relatively complete account of the clinical experience of the 10,000 symptomatic cases monitored locally.

⁷ Ahn and al April 13, Korean journal of medical science. <https://jkms.org/DOIx.php?id=10.3346/jkms.2020.35.e149>

Sources: personal communications, Prof. Oka- MD-PhD - internist and respiratory medicine. Kosmin University.

<http://www.koreabiomed.com/news/articleView.html?idxno=7359>

<http://www.koreabiomed.com/news/articleView.html?idxno=7506>

<http://www.koreabiomed.com/news/articleView.html?idxno=7522>

2.3 Isolation facilities to contain Covid-19

Living treatment centres are temporary facilities run by the state. They are various types of places (hotels, residences, etc.) whose usual destination is housing, or any place that the State requisitioned (building, unoccupied dwelling, office, public or private conference room) to make it "habitable". Certain locations are designated in advance in the contingency plans that the KCDC is responsible for preparing and maintaining up to date. In the city of Daegu, the sudden explosion in the number of contaminated people on 18 February led to the immediate mobilization of this emergency housing facility. According to my information, the major industrial groups participated in this mobilization and in the construction and providing equipments to these temporary accommodation facilities. Shortly after the viral outbreak, Samsung donated \$25 million to the National Disaster Relief Association in the form of living equipment and everyday accessories. A similar scheme was set up in Seoul. For tourists, isolation is sometimes ordered in a hotel room. Airports have also recently introduced similar containment facilities for the reception of travellers awaiting test results. The border control procedure has now been strengthened, with the systematic isolation of all travellers entering the country, regardless of nationality. The procedure is described below.

These isolation centres receive only pauci- or asymptomatic patients for simple monitoring, but no medical treatment is provided. They aim to relieve the hospital of patients requiring isolation without medical care. The basic equipment are only the ones necessary for simple monitoring (pulse oximetry device, thermometer, tensiometer) and staff protection. There are kits of individual basic necessities (underwear, hygiene kits, etc.), as well as a pharmacy for non-specific symptomatic treatments (antipyretics, antitussive...). There is also a sampling capacity for PCR screening, but without the PCR analysis itself. In the event of hospital overload, they can accommodate medical staff and heavier medical equipment (chest X-ray machine, etc.).

This notion of "isolation centre" is a novelty introduced by the law born out of the MERS 2015 crisis. It is an essential element of the emergency system implemented by the KCDC, which allows :

- Relieve the Covid+ hospitals, while keeping the majority of the hospital network in Covid-negative mode.
- guarantee strict isolation conditions for patients not requiring care, to limit the spread of disease,
- active exercise, paramedical surveillance enabling the immediate transfer of a patient requiring close supervision or even intensive care.



Kits provided the first day of the 14 days of isolation (Mrs SungSoon Kim).

2.4 Management and obligations of Covid+ patient contacts

Anyone who knows they have had contact with a person diagnosed with Covid+ (contact case) must undergo PCR screening. This same obligation is automatically notified to any person identified as a target of a potentially contaminating contact, through the database populated by the KCDC in-depth investigations described above. If the result is negative, the "contact case" is nevertheless obliged to isolate himself at home with the entire household, with active surveillance for 14 days. This confinement is lifted the day after the 14th day, after a second negative PCR test is performed no earlier than 13 days after the last contact. The end of monitoring is decided by the local reference Covid centre, after which the KCDC's centralized information centre lifts the monitoring of its system.

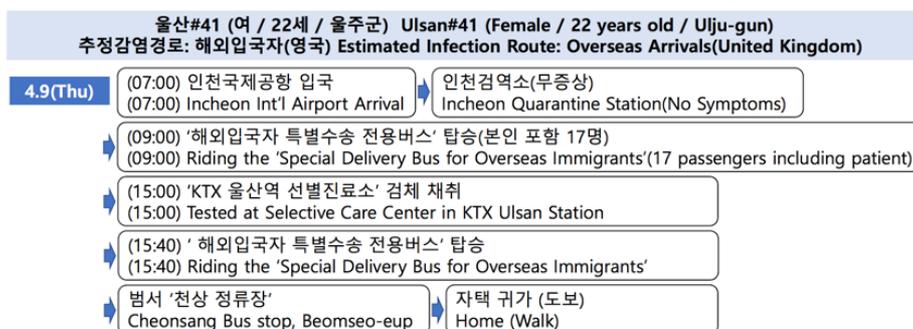
2.5 Systematic isolation of all travellers entering the territory

Korea has never closed its borders and has decided to remain active in international cooperation and trade, despite the fact that the Facility had ordered it to do so. Through President Moon's exemplary political will and courage, he opposed the majority of the medical corps, the health authorities, and a large section of the population on this point. Keeping the sea and air borders open is not an easy solution because it implies an additional organisational effort and an extra workload for the health forces. The system put in place is based on the rigorous implementation of very simple principles.

- 1- No symptomatic person may board a scheduled flight to Korea;
- 2- All travellers, wherever they come from, and whatever their nationality, Korean or not, are obliged to respect a strict isolation period of 14 days;
- 3- On the basis of a questionnaire filled in during the flight, any person who has had any of the Covid symptoms within the past 3 weeks, or who has taken medication against these symptoms, will be tested at the airport itself. They will have to wait there for the test result, with accommodation provided if necessary. Otherwise, the scenario is different for travellers coming from a risk area (Europe/USA);
- 4- Coming from a non-risk area, the obligation of isolation comes without the obligation of testing, and the transfer to the place of isolation is done by special transport, without contact with the population. A test will be prescribed as soon as the slightest symptom appears during isolation;
- 5- For areas at risk, the passenger is subjected to a PCR test carried out at the airport, where he must wait for the result;

6- For all incoming travellers, without exception, isolation is carried out in the same way as for the general population, at home or in an isolation centre if there is any risk of domestic contamination. The same twice-daily health surveillance is carried out by an official of the health service, with transfer to the local referral hospital as soon as the slightest symptom occurs.

코로나 19 울산 #41 확진자 이동 경로
COVID-19 Ulsan Confirmed Patient's #41 Moving Route



In this example that I received on April 13, this traveller from a non-risk area tested positive near the TGV station near my home. As for any person who tested positive, his itinerary is made public in the area concerned.

For those arriving from risk zones, the procedure is as follows. Passengers are put aside before baggage retrieval and then tested. Whether the person is negative, or positive but asymptomatic, the health service (bus) or a voluntary and specially equipped taxi (disinfected at each rotation) will take the person free of charge to his or her place of isolation, where he or she will receive a whole isolation kit (15 masks, thermometer, two boxes of sanitary gel, special garbage bag to separate from the others, gloves...). For all these people arriving from abroad, the entire care is free of charge, including the needs for everyday supplies.

2.6 Criteria for release from isolation and subsequent rules

The same criteria apply regardless of the place of isolation (home, isolation centre, hospital) and the conditions of entry.

- For patients diagnosed Covid+ and symptomatic:

They are allowed to leave the hospital only if the following clinical and biological criteria are met:

- Clinical criteria: no fever without taking antipyretic drugs (T<37.5°C), and improvement of symptoms.
- Biological criteria: two negative PCR tests at least 24 hours apart on oro/nasopharyngeal samples.

If only the clinical criteria are met, the patient may be discharged from hospital to return to home or to an isolation centre. The lifting of the quarantine is prohibited without viral negatigation proven by two successive PCR tests.

As the disease is still poorly understood, no risk is taken in releasing a potentially contagious patient.

It should be noted here that PCR-proven viral shedding negativation is also required for hospital discharge in Germany. In France, it is not yet required, due to the shortage of tests (source: https://solidarites-sante.gouv.fr/IMG/pdf/covid-19__rt-pcr-ambulatoire-fiche-ars.pdf).

- For patients diagnosed Covid+ and asymptomatic:

Not until a minimum isolation of 7 days after the date of Covid+ confirmation by initial PCR.

Only the biological endpoint is required at D7, with two negative PCR tests 24 hours apart.

If the test remains positive, it will be repeated at D10 and then D14, until negative.

This criterion for negativation of viral excretion is not required in France or Germany.

In France, the cure criteria required for hospital discharge and a fortiori for the lifting of isolation are: to be at least 8 days after the onset of symptoms, the disappearance of fever (rectal T < 37.8°C) without taking antipyretic drugs, and to be at least 48 hours after the disappearance of any dyspnoea. No recommendation is made to verify the negativation of viral excretion by PCR.

Source: <https://solidarites-sante.gouv.fr/IMG/pdf/arbre-simplifie-pec-patient-covid-19.pdf>

- Recommendations on release from isolation :

- Avoid overcrowded public spaces, social distancing;

- Avoid contact with fragile people;

- Avoid public transport;

- Wash your hands, respect good gestures in case of cough;

- Wear a mask to avoid infection or respiratory superinfection;

- Respect a distance of two meters with any individual, and wear a mask if close contact;

- Inform your doctor if you are travelling abroad;

- Call 1339 in case of aggravation (Covid emergency).

A very important point in the follow-up of Korean patients is to have two privileged interlocutors. The first person is a KCDC official in charge of the follow-up of the patient in isolation through two daily conversations (monitoring, temperature reading, need for help...). The second person is a Covid referring doctor, who is not the usual attending physician. In France, no monitoring is generally carried out systematically, and the interlocutor was first to call the phone number 15 for everyone, before receiving a toll-free number for the non-serious case. Some cities have set up a system for monitoring patients at home, with a mobile application (Covidom with the APHP in Paris) or by telephone calls (from external medical practitioners in Dijon). Unfortunately, these systems only concern the small number of people screened.

The traumatic memory of the MERS-2015 epidemic, in which the majority of the 186 cases of infection were contracted in hospitals, has led South Korea to design a strict system to partition its hospital infrastructures. This unfortunate MERS experience was repeated in a more catastrophic way in Italy in February, where the mayor of Bergamo, for example, found, even before the more massive introduction of TCR tests, that many patients and staff members had contracted Covid through

nosocomial cross-transmission and then spread the virus outside the hospital to the local population⁸. Nor did the Italian experience serve to prevent the same phenomenon in Spain a few weeks later, where the hospital sometimes acted as a relay for the spread of the virus.

In Korea, hospital treatment of Covid patients is strictly carried out by one of the 69 hospitals designated for this purpose. As of March 27, Korea had 337 Covid-free hospitals. To further enhance patient safety, hospitals have been required to isolate the circuit of "regular" pneumology and ENT patients from that of other patients. This obligation concerns Covid+ hospitals, but especially the 337 Covid-free hospitals. In addition, the government has allowed all patients without respiratory symptoms to consult their doctor by telephone and to receive their prescriptions electronically. All patients with respiratory symptoms must routinely undergo PCR SARS-CoV2 testing prior to hospital admission. In the emergency department, any suspicion of Covid leads the patient to a specific circuit. For all hospitals, patient and public access requires temperature control and the wearing of a surgical mask, provided if necessary. Any member of the nursing staff presenting with symptoms such as fever or cough is sent home for 14 days, and of course subject to PCR testing. Each hospital must designate a person responsible for the implementation and respect of all safety instructions (mask, gels...). In the same spirit of protection of hospital infrastructures, the sampling operations for screening are carried out in the same way. In the same spirit of protection of hospital infrastructures, sampling for screening is almost systematically carried out in autonomous places, or in facilities adjoining hospitals and equipped with isolation chambers, so that potentially contaminated persons do not have to enter hospital buildings.

Source: document "Tackling Covid-19 - Health Quarantine and economic measures" - 31 March 2020 - KCDC and MOHW

2.7 Protection of the elderly

Although the practice of nursing homes is less widespread than in France, Korea also deal with a difficulty in controlling COVID in institutions for the elderly, and a major focus of the epidemic in Daegu was precisely such an institution. The protection rules enacted from the beginning of the crisis were as follows:

- for the staff:
obligation of 14 days quarantine on return from risk areas,
Do not come to work if you have a fever or respiratory symptoms,
obligation to screen for symptoms;
- for residents:
isolation and screening in case of fever or respiratory symptoms;
- for visitors:
prohibited in the same cases as for staff, wearing a mask is mandatory, limitation to one visit per person per day, visitor registration (name, contact details).

⁸ <https://www.statnews.com/2020/03/21/coronavirus-plea-from-italy-treat-patients-at-home>.

In its note of March 20, the Korean Geriatric Society further strengthened its recommendations:

- visits limited to the maximum;
- visits are allowed only in specific and isolated areas;
- wearing of masks, hand disinfection and temperature check at the entrance for all visitors;
- daily temperature control of all employees and nursing staff;
- work stoppage and screening of staff at the onset of fever or respiratory symptoms.

Each establishment remains free to decide whether or not to ban all visitors, for example in the event of a declared COVID+. Thanks to the link with the KCDC from the beginning of the crisis, staff and residents were subject to the same close surveillance as the general population, with massive screening at the slightest suspicion, and the screening of all persons contacted. The elderly were cared for in hospital, and suspicious deaths in these facilities were also subject to Covid testing⁹.

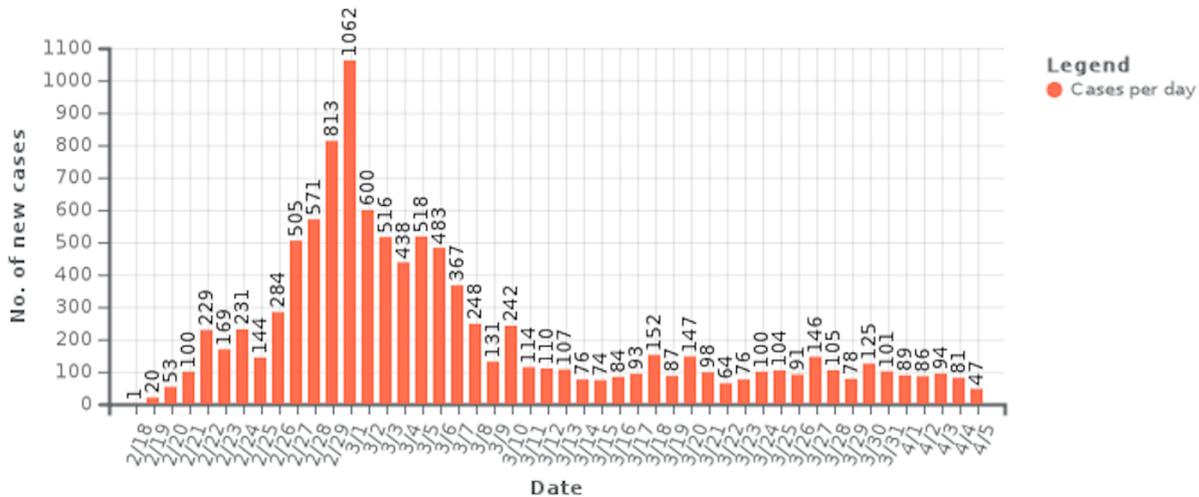
2.8 Were hospitals overcrowded, lack of tests or masks?

At the peak of the epidemic during the first week of March, and even though the number of daily deaths never exceeded 10, there was a brief overload of the hospital system, especially since almost all cases were concentrated in one city, Daegu. 1600 people on March 1, then 2300 on March 4, were thus waiting for a hospital bed or for an isolation accommodation. However, it should be remembered that 80% of these people have moderate symptoms, while only 20% require urgent treatment. But all of them must be hospitalized according to the current policy of hospitalization at the first signs of symptoms.

The situation lasted about a week, with the installation of a 200-bed military hospital, a few hundred patients transported to other cities, and above all with the very rapid equipment of the isolation centres and the extension of COVID beds in a greater number of hospitals, thus designated COVID+. In this tense week, President Moon Je-In spoke on Tuesday, March 3, to declare war on the virus, and to apologize for the shortage situation. In the same vein, there has been a temporary shortage of protective masks, but it has only affected the public, not the health system. For this other shortage, President Moon, who has been in power since May 2017, also apologized to the nation. At the same time, numerous articles appeared in the opposition press violently denouncing his responsibility for starting the epidemic and his incompetence in managing the health crisis. As for the piloting of health operations, there is no ambiguity in the opinion that the KCDC is leading the maneuver. The government's role concerns logistical support, industrial and academic mobilisation, the commitment of the army - particularly with its disinfection tools - and international coordination. It does not take any part in health decisions or medical debates, but it is in the front line for any criticism of inefficiency on the subjects under its responsibility¹⁰.

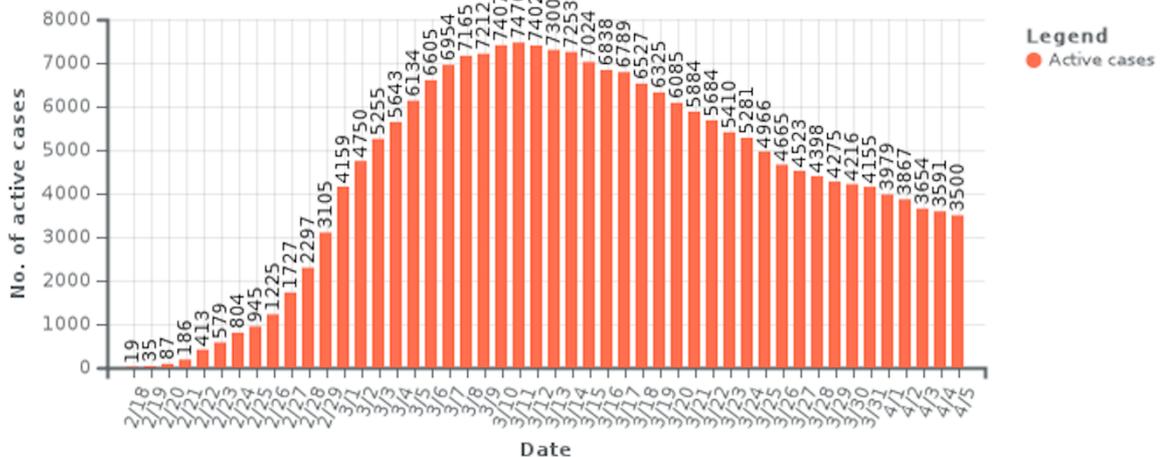
⁹ This situation differs from France where Covid victims in the nursing homes were taken into account at a late stage.

¹⁰ We will show in the second part of the report to what extent the democracy stays very much alive and the political confrontations very vivid, without affecting in any sense the health system which is under the exclusive management of health professionals, without the political intervention of ministers or the President.



Two weeks after the birth of the Daegu cluster, the number of daily cases reached a peak of about 1000 individuals, very quickly brought under control, and fell back about a week later to a sustainable plateau of about 100 cases per day.

Given the wide range of the tested population this dynamic reflects the extreme effectiveness of the method in limiting contagion.



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3. Therapeutic trials in progress

In most countries that have the capacity to do so, many clinical trials have been launched under the more or less diligent supervision of the regulatory authorities. In Korea, the diligence is extreme, as the law has provided for the tools of regulatory decision-making tools to be placed in a state of maximum mobilization, in the same way as all the players in the health sector. The most

striking recent example is that of the Pasteur Institute of Korea, which received, on the evening of Saturday, March 28, a favorable opinion on its request filed the previous day to test the Alvesco/Ciclesonide asthma therapy on 141 patients. A good number of therapeutic approaches were suggested, as early as February 24, in the WHO report, as to the molecules that it would be judicious to reuse or reposition against Covid-19, or new approaches to be explored.

Immediate Goals	Intermediate Goals	Long-term goals
Diagnostics: RNA assays, antibody & antigen assays, point of care detection	Diagnostics: Multiplex diagnostic platforms	Diagnostics: Prognostic markers
Therapeutics: Remdesivir, favipiravir, chloroquine, plasma, TCM	Therapeutics: intravenous immunoglobulin (IVIg)	Therapeutics: Innovative approaches (CRISPR-CAS; RNAi; Cell-based; positive hits from library screening)
Vaccines: Development of animal models	Vaccines: mRNA candidates and candidate viral vectors	Vaccines: inactivated candidates and subunit candidates

Source: Table 1, p.35, Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (Covid-19)

3.1 Hydroxychloroquine formal test

To date in South Korea, the health authorities have not issued any recommendations or bans on the use of hydroxychloroquine. However, a formal clinical trial has been authorized.

Authorization on March 27, 2020: Hydroxychloroquine vs. lopinavir/ritonavir trial.

At present, the recommendation of the learned society KSID is a first line of treatment with Kaletra (lopinavir/ritonavir) or Oxiklorin (hydroxychloroquine) for patients in moderate to severe stages. But this consensus is, at this stage, based on feedback and not on clinical evidence. Based on the results of Chinese and Marseilles clinicians, this trial aims to compare the efficacy of hydroxychloroquine with that of the two antivirals (lopinavir/ritonavir) used against HIV in developing countries. This trial is restricted to patients with few symptoms, with a regimen of Oxiklorin alone vs. Kaletra alone vs. placebo alone in an open label trial. These 3 arms are identical to those of the Discovery trial coordinated in Europe by Inserm¹¹. The trial remains modest, with 150 patients for results expected at the end of May. It is led by one of the most reputable hospitals, the Asan Medical Center (AMC), which is based on a private foundation.

However, this clinical trial is controversial, as lopinavir (a protease inhibitor), in combination with another antiviral, ritonavir (another protease inhibitor), has proved disappointing against HIV due to major side effects. Although the targeted HIV protease works quite differently from coronavirus proteases, some object that there is no serious basis for attempting to reposition lopinavir/ritonavir against CoV2-SARS. Moreover, the recent publication of a randomized open-label trial of lopinavir/ritonavir alone vs. "standard treatment" indicates no benefit, with strong side

¹¹ <https://presse.inserm.fr/lancement-dun-essai-clinique-europeen-contre-le-covid-19/38737/>

effects (Cao et al. March 18, 2020¹²). Despite this uncertain context, it was approved by the Korean authorities one week after this Chinese publication.

Source: <http://www.koreabiomed.com/news/articleView.html?idxno=7810>

3.2 The Pasteur Institute in Seoul: drug repositioning with Ciclesonide (Alvesco)

Authorized March 28, 2020. Ciclesonide test (Alvesco).

The prestige of the Pasteur Institute led the Korean government to propose the establishment of a Pasteur Institute in Seoul (IPK), which was done in the early 2000s. This institute is very different in its statutes and functioning from the member institutes of the large international network of Pasteur Institutes. After a few ups and downs, it has become an active centre for the research of new molecules of pharmaceutical interest, particularly in the field of infectious diseases. Today, the IPK has several libraries of molecules and a large capacity for high throughput cellular tests. By mobilizing this tool as soon as the SARS-CoV2 strain was isolated, the IPK has tested 3000 molecules, 1500 of which have already been approved by the FDA. After a few weeks, 24 molecules appeared to be effective against the virus ($0.1 \mu\text{M} < \text{IC}_{50} < 10 \mu\text{M}$), including two already approved: niclosamide and ciclesonide (Jeton et al.¹³).

Niclosamide (commercial name Nicoline) is an antihelmintic already known for its antiviral properties, and very powerful in vitro against SARS-CoV2 ($\text{IC}_{50}=0.28 \mu\text{M}$, Institut Pasteur results). Ciclesonide (Alvesco) is a corticosteroid used against asthma and allergic rhinitis, and its anti-inflammatory properties are potentially useful against Covid-19. Its in vitro antiviral activity is much less potent ($\text{IC}_{50}=4.33 \mu\text{M}$), but is directed against a direct target, a viral RIB endonuclease. These two anti-inflammatory and direct antiviral properties with a known mechanism of action, make ciclesonide a priori the best candidate in this study. Without waiting for proof of efficacy in animals, as tolerance is reputed to be good, a request for authorization of a clinical trial was submitted on Friday 27 March by the Pasteur Institute of Seoul and accepted on Saturday 28 in the evening by the KCDC the MOHW. This ciclesonide trial is multicentric, with 141 patients in 11 centres and a control group. Similar results have been obtained in Japan, apparently with a parallel clinical trial.

Source : <https://www.biorxiv.org/content/10.1101/2020.03.20.999730v3>

3.3 Other clinical trials

- February 21, 2020. VSF immunotherapy trial.

The Immune Company associated with Seoul National University has a seemingly classic humanized antibody technology that it has been authorized to deploy as one of the first clinical trials against Covid-19.

Source: <http://www.koreabiomed.com/news/articleView.html?idxno=7596>

¹² 11. Cao et al. le 18 mars 2020 : <https://www.mejm.org/doi/full/10.1056/NEJMoa2001282>

¹³ 12. 3 Mars 2020 <https://pubs.acs.org/doi/10.1021/acsinfecdis.0c00052>

- March 3, 2020. Essay remdesivir (also in Discovery)

The Gilead Company has contacted many practitioners and hospitals directly, offering its antiviral drug re-servicing either in randomized trials or by direct prescription without going through trials. This molecule is a nucleoside analogue effective in vitro against Ebola, which is well tolerated, but has never clearly proven its efficacy in patients with this disease. However, it had shown in vitro and in vivo activity against the first SARS and MERS. Gilead has launched a phase 3 randomized placebo-controlled trial in the US, and is also trying to reposition its molecule with the Chinese authorities. The Korean KCDC and MOHW (Ministry of Health) have authorised this phase 3 trial, and the learned society KSID wrote in its note of March 13 that redesivir is only authorised for this clinical trial.

Much more research is in progress, and multiple trial applications are currently pending or have been refused: <http://www.koreabiomed.com/news/articleView.html?idxno=7807>.

<http://www.koreabiomed.com/news/articleView.html?idxno=7744>

More will be presented on this point in the second part of the report, with the mobilisation of Korean research and industry.

4. What to do once the curve is inflected?

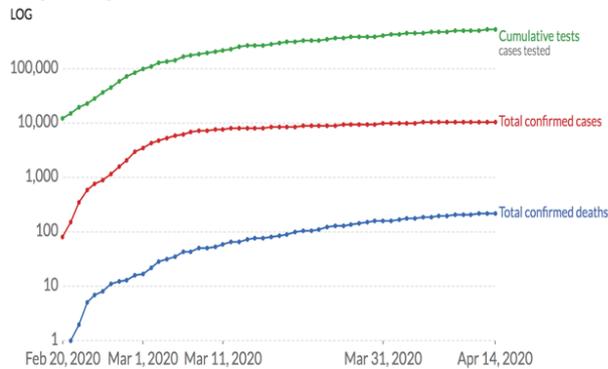
4.1 Covid-19's track record in Korea

The Covid balance sheet on April 15 is simple¹⁴. For a population of 51 million inhabitants, 225 people died, 3 more than yesterday, with 534,552 people tested including 7114 in the last 24 hours. Only 1.98% of those tested were positive, which represents 10,591 people affected, who were placed in strict isolation or hospitalized at the slightest symptom. Recovery, whether after isolation or hospitalization, is reported on the basis of two negative mandatory PCR tests. With this criterion, 7616 people are cured, while 2975 cases are still active, contributing to the very low number of daily deaths mentioned above. The cumulative mortality rate is 2.12%, and the number of daily deaths, even at the height of the crisis, never exceeded ten (see figure below), and only one person died among the health personnel, for every 120 contaminated. The cumulative history is shown in figures below.

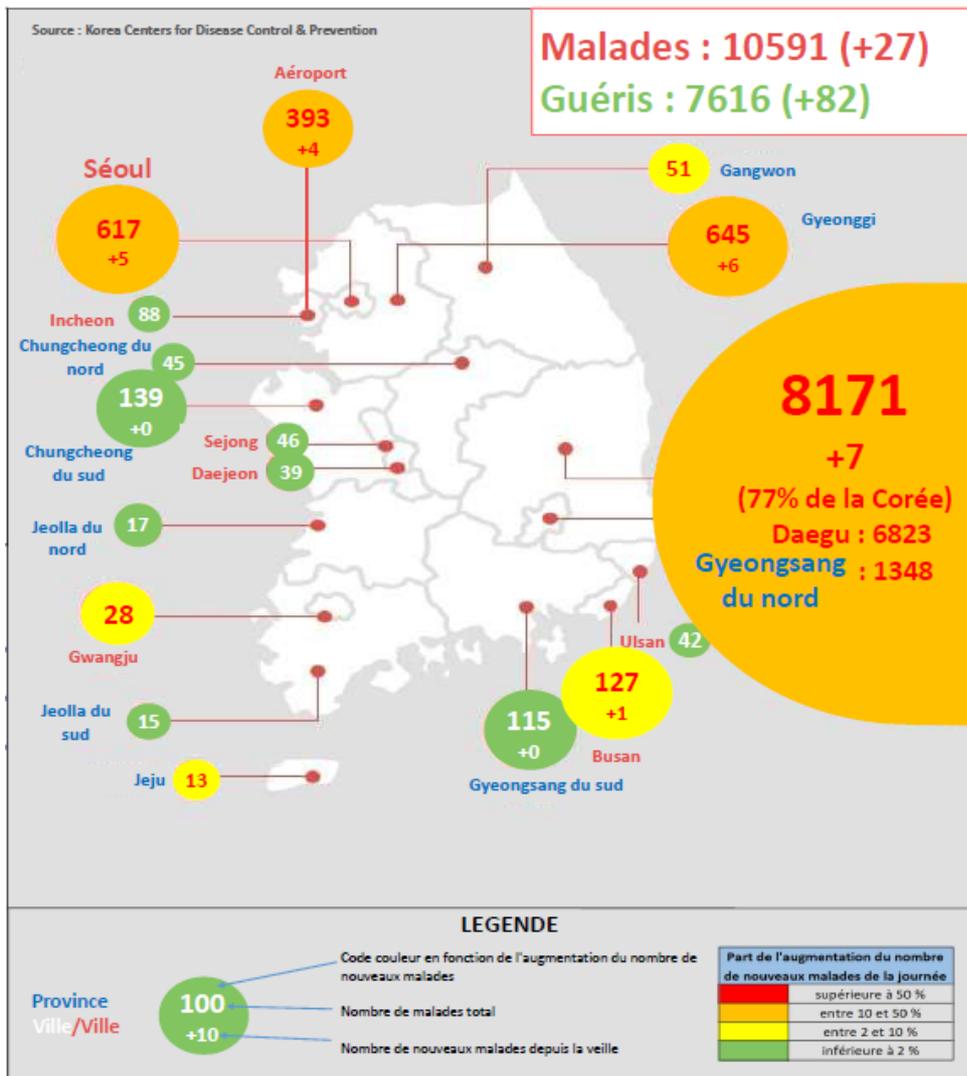
¹⁴ <https://coronaboard.kr/en/>

COVID-19: Tests, confirmed cases and deaths, South Korea

The confirmed counts shown here are lower than the total counts. The main reason for this is limited testing and challenges in the attribution of the cause of death.



Source: Official data collated by Our World in Data; European CDC - Situation Update Worldwide - Last updated 6th April, 12:00 (London time)
OurWorldInData.org/coronavirus • CC BY

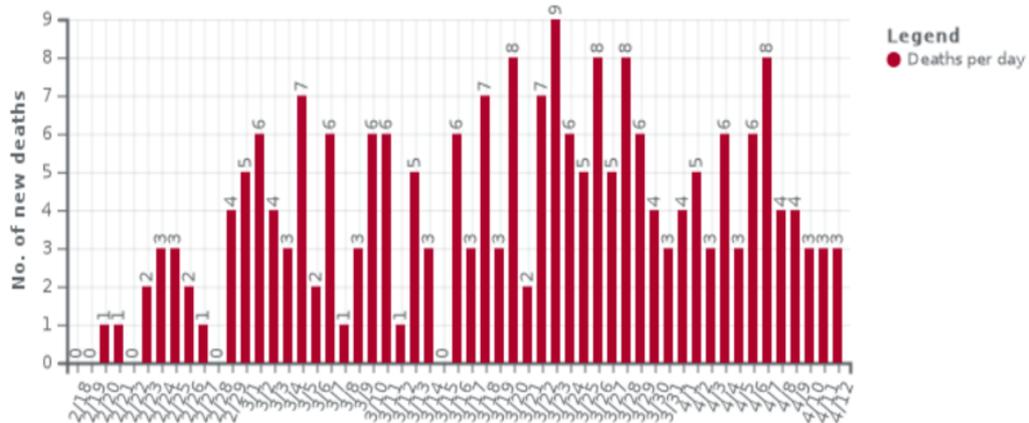


Cumulative digital balance sheet and geographical distribution of Covid19 on 15 April 2020, for 51 million inhabitants. Sources: Dr Masy and <https://ourworldindata.org>

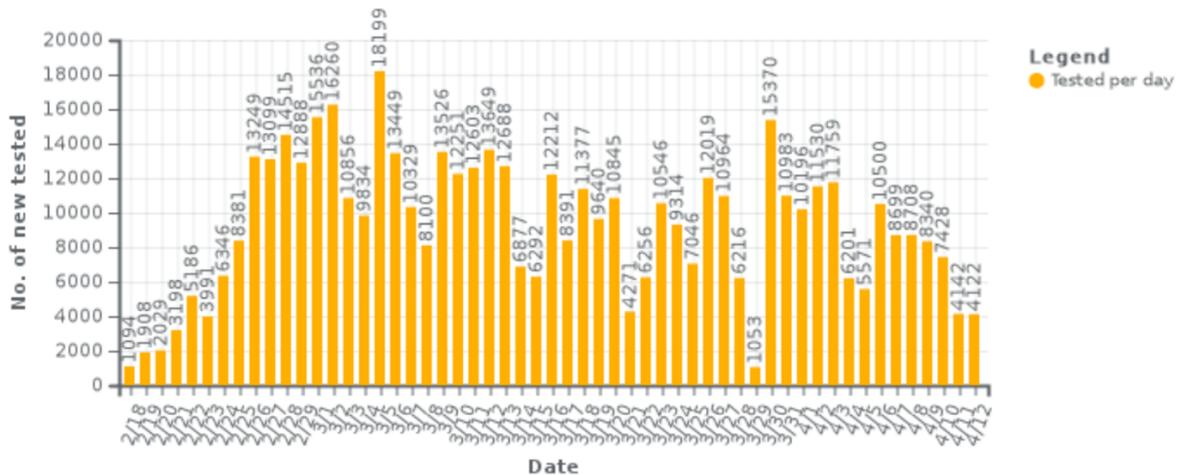
Such a record is remarkable in many respects, when we know that it was achieved without any deprivation of liberties for 99.98% of the population, in a political context that was initially unfavourable to the President, and with a challenge that has never ceased. It can be explained by a combination of several factors:

- the nation's respect for the knowledge of doctors, scientists, and industrialists,
- a strong political and administrative organisation based on an appropriate legislative framework,
- the central role of the KCDC and its exceptional executive powers
- respect for the specific role of each person in the overall operation

I will come back to all these factors in detail in the second part of this report, to mention just one point. As early as January 10, the day of the unofficial publication of the viral genome by the Shanghai Public Health Clinical Center, the Kogene company began on its own initiative to develop an RT-PCR test to detect the SARS-CoV2 virus. On January 16, the day the PCR test developed in Berlin by Prof. Drosten was validated, Seegen followed its competitor's lead. Thanks to an accelerated approval protocol provided for by law, the two companies received on 4 February, from the KCDC and the Ministry of Health, the authorisation to market their test. Everything was therefore ready for a massive response when the unexpected and unfortunate accident occurred with the explosive contagion caused by the Shincheonji sect on 18 February.



These two figures show respectively the daily flows of the number of deaths and the number of PCR tests performed.



The curves above¹⁵ show the extent of PCR testing with more than 100,000 people tested in the first 2 weeks. The number of new cases per day reached a peak of 1000 individuals only two weeks after the birth of the Daegu cluster, which was very quickly brought under control and dropped less than two weeks later to a plateau of around 100 cases per day. We are entitled to consider that this dynamic is the very probable result of the strategy of testing, tracing, and systematic isolation. The cumulative number of active cases, mostly asymptomatic or with few symptoms, began to decrease as early as the third week, without ever increasing either. The number of daily Covid deaths never exceeded 10 per day. One possible reason for this low mortality is that the sect from which the majority of patients stem from, mainly recruits its followers from students and young people, but the total number of deaths to date, 225, is too low to draw any significant conclusion. Another simpler explanation, especially in comparison with the high mortality in France ($\approx 13-14\%$), is that the number of positive cases in relation to the number of deaths is reported is considerably higher in a country that has tested massively. In this respect, it can be noted that Iceland has an even lower mortality rate than Korea. Does this mean that the KCDC nets did not identify all positive cases? Another characteristic of the Covid-19 pandemic here is that the national effort made it possible to strongly confine the virus to the city of Daegu, without quarantining the city or confining its inhabitants, as was the case in Wuhan, and today in many European countries.

Despite this apparent success, the KCDC's exceptional measures have not yet let down their guard, and they consider that they have not yet emerged from the crisis, as the threat is still very present. The data show a residual number of daily deaths in the order of 3-4 people, and a number of new cases per day that has remained at the level of 100 people per day for 2-3 weeks, falling recently to around 50. This residual level is fed these days at 50% by travellers from abroad, all of whom, as we saw above, are without exception subjected to PCR testing, and to 14 days of isolation.

Entry into the country is currently the most important point of vigilance, as the threat is now largely external. The issue is politically sensitive, as the current President has faced very strong opposition on this point. His decision to keep the borders open has been very strongly criticised, and some even accuse him today of being responsible for the epidemic. The voice at the ballot box today said the opposite.

4.2 Daily life today: freedom and vigilance

For the vast majority of Koreans, daily life is almost normal: no traffic obstructions, active public transport, most businesses and administrations at work, restaurants and shops open. But educational institutions remain closed and the instructions put in place at the beginning of the epidemic have not changed: barrier gestures, social distancing of 2 meters. Several devices have been installed, such as the protection of lift buttons, the covering of door handles for collective use with protective fabrics, or an agent posted at the entrance to supermarkets to disinfect the hands of customers and the handle of their shopping trolley. Wearing a mask has never been compulsory in

¹⁵ <https://coronaboard.kr/en/>; https://en.wikipedia.org/wiki/2020_coronavirus-pandemic-in-South-Korea

public areas, but only in professional environments, and it is a simple recommendation in situations of dense contact.

On this April 15, how better to illustrate the Korean spirit and method than through the example of the parliamentary elections held today, halfway through President Moon's term of office. Since this country fought in the 1990s to establish democracy, with many victims, particularly among students, the cancellation of an election has a strong symbolic value and represents a challenge without common measure with the French situation. The President therefore hesitated, but the decision was taken to organise these elections, through an extremely controlled mechanism, in close cooperation with the KCDC. Voting was spread over 3 days. The first two, combined with a postal vote, initially enabled 30% of the 44 million voters to participate. In order to enable people in isolation centres to vote, some of the 14,000 polling stations were set up in these places, while people in home isolation were individually accompanied to their polling station by volunteers with all the necessary health precautions. It should also be remembered that all persons in isolation are asymptomatic! Finally, polling station staff were in protective clothing, with the task of continuously cleaning the voting booths, taking the temperature of each person, and monitoring the flow of voters and compliance with security measures (masks, distance, gels). Democracy is alive and well, thanks to a remarkable organizational effort, even if the campaign meetings had all been banned.

On April 2, five weeks after the peak in the number of daily cases, the Prime Minister made it clear that it was not on the agenda to change the monitoring arrangements and the rules of exception. By an amendment to the law, the penalties were even increased from April 5 onwards for those who do not comply with a segregation measure. However, these rules have only a very limited impact, and the Korean economy is largely functional. However, it could soon face the serious consequences of the slowdown in world trade for its exports. Academic life has been organised on a long-term basis, based on online courses, with the start of the first cycle postponed to September. The question arises of replacing the current system with a lighter, sustainable system. This issue is the subject of an original democratic process, and the government will announce the measures and their timetable once the plan has been drawn up in detail. There is also a great deal of caution on the surveillance side, with the maintenance of a high level of stocks to cover any eventuality of accidental resumption. Thus, it was planned to order, until June 2 million per month of complete protective equipment (FFP2/N95 masks, goggles, gowns, gloves), and half of that amount in the following months.

4.3 Consensual development of a sustainable modus vivendi

The Korean authorities consider that the danger will be averted only with the arrival of a vaccine or a proven treatment. Until then, a socially acceptable and accepted way of life must be developed. The notion of a way out of a crisis is therefore inappropriate, as it is a transition to a temporary lifestyle. The context is fundamentally different in France, whose fundamental problem is now that of lifting a confinement, applied since March 16. Conversely, the level of immunization in Korea is certainly considerably lower than in France. Unfortunately, it is likely that the French problem will not be solved until we have a massive and real stock of PCR tests, until we set up an effective system of testing and selective isolation of all positive people without distinction of

symptoms, and until all protective measures are vigorously extended to the world of work, "whatever it costs".

Despite the highly selective nature of isolation, exceptional measures continue to apply to the general population, with significant effects on social life: slow school and university life, avoidance of meetings and prohibition of mass gatherings, and the issue of travel. Koreans can no longer leave the country without being compelled to submit to strict isolation on their return, whether it is for business or pleasure. And the country "locks up" all foreign visitors for two weeks, which is very detrimental to vital exchanges (cooperation, students, business, diplomacy, tourism...). This question of borders is certainly one of the most critical. In fact, since every person is tested on entry into the territory and at the end of his isolation, we know precisely this influx, the cumulative effect of which represents 352 individuals to date. This influx weighs about 50% of the 30 or so new cases detected daily this week.

The question of the school and university system is also at the heart of the Korean response. The entire education system has been closed since the days following the massive contamination of Daegu, and it is out of the question for the government to bring anyone back to school before the summer or September. After the suspension of the start of the school year here in early March, all the actors in the system have mobilized to organize the continuity of service. As of mid-March, teachers and students began to communicate through online courses. In this month of April, primary and secondary education are going online. To fight against the injustices linked to the digital divide also present in Korea, the government has simply decided to equip every schoolchild who needs it with a digital tablet¹⁶, as well as to organize school lessons on television. In a society dominated by fierce school competition, however, the thorny issue of exams remains, with equity being a very sensitive point.

What *modus vivendi* should be adopted that is more compatible with the normal life of citizens, institutions and the economy, without compromising the health of each and every individual? It is not part of the KCDC's mission to carry out epidemiological modelling or prospective studies, unlike, for example, the German Robert Koch Institute. Developing a temporary way of life therefore falls outside the scope of the KCDC's own missions, whose role and powers of exception will most likely not be changed until a vaccine or treatment arrives. Nevertheless, the KCDC is closely linked to the current debate, for which the Prime Minister, Chung Sekyun, has set up a so-called social consensus agency¹⁷.

This new agency has apparently not been provided for by law, and its mission will last much longer than the initial phase of the epidemic. Its mission is to deal, in conjunction with the KCDC, with all aspects of social and economic life in the coming transitional period. Given the technical, social, economic, and health complexity of the problem, and the absolute need for a widely accepted consensus, this agency will make extensive use of opinion polls. It had to bring together a wide range of expertise from the field, with people from the worlds of medicine and epidemiology, education, sociology and economics, as well as representatives of civil society. Its composition was published on

¹⁶ To start with, 36 000 digital tablets have been distributed to poor family children.

¹⁷http://ncov.mohw.go.kr/en/tcmBoardView.do?brdId=12&brdGubun=125&dataGubun=&ncvContSeq=353817&contSeq=353817&board_id1365&gubun=

April 10¹⁸, with 18 members, including 3 from the KCDC, under the co-chairmanship of the Minister of Health and the President of the National Centre for the Management of Competitions and Examinations. A first popular consultation was launched without delay. The first task of this committee is to elaborate a consensual *modus vivendi* for the whole society, in the best interest of the general interest and health imperatives, before translating it into a timetable for implementation. In a second phase, this agency will be responsible for monitoring the system and making any necessary adjustments, again with the KCDC as an organic link.

Conclusion

These lines are the result of a survey initiated as a matter of urgency, and carried out thanks to many encouragements, opinions and contributions: the Institut français de Seoul, ChooYoung Baek, Guillaume Graciani and Dahye Lee, Spencer Shorte, Tobias Martin, HeeYoung Chae, Jong Bhak, Antoine Bondaz, Corinne Bernardeau, Benjamin Joineau, Yves Charpak, Jean-Christophe Thalabard, Christian Bréchet, Jean-Jacques Grauhaar, and Frederic Ojardias, Pierre Léna. Each in a particular role has contributed, but none is in any way responsible for the errors contained in this report, nor for the personal opinions expressed or implied therein.

I hope that I have provided material that will enable the reader to neutralize many misconceptions about Korea, and prejudices that often quench our curiosity. Korea's success in the fight against the pandemic is not due to the cultural or political peculiarities of this faraway country, but to the fact that it was ready to respond, with laws adapted to coherent and very rapid action, with a solid health infrastructure, and with a powerful industry. But that is not all, the practical implementation of these tools has been successful because of the massive support and cooperation of civil society with regard to the whole range of exceptional health measures. In accordance with the democratic spirit, this popular and transparent adherence was all the more natural and effective because action for the general interest was guided by medical and scientific knowledge, and with a fixed course of action under the command of health professionals. Political actors also played a very important role, which will be analysed in the second part of this report, to be published shortly. This recipe is perfectly in line with the original spirit of our Western democracies, and with the respect for scientific knowledge that has underpinned the economic development of the West. So how can we think for a moment that it could not be transposed to France? Why wait longer to do better ?

¹⁸ 17. The composition of the committee of reflexion (social consensual agency) being in charge of the organization of the society while waiting for a vaccine or a therapy:

- 3 members of KCDV (including the health minister, co-resident)
- The president of the national center of management of exams and contests (co-president)
- 7 medical doctors, 3 infectiologists, (pediatric, adult, nosocomial infections), 2 public health, 2 occupational medicine
- 2 specialists in economy: KDI (=think thank on economy) +1 specialist in economy of health
- 2 specialists in sociology: 1 sociologist + 1 specialist in health communication
- 1 member of KIHASA: think thank on health
- 2- 2 representatives of civil society, as consumer association and YWCA (woman organization)

<https://docs.google.com/forms/d/e/1FAIpQLSeo5ghParzqRXjhHk6TCrRuizCeubLYE-u8neZFizGfeBWmw/viewform>