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Taiwan's COVID-19 strategy: successfully combining health priorities and democratic principles

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ON SECURITY AND DIPLOMACY

The Taiwan Program on Security and Diplomacy aims to provide a better understanding of the main issues in Taiwan and the Taiwan Strait, as well as the potential for cooperation between France, but also the European Union, and Taiwan, through the organization of conferences and the publication of articles, as well as interviews with policy makers and leading Taiwanese experts.

Taiwan is a densely populated island with over 600 people per square kilometer, located less than 200 km from the Chinese mainland – and thus from the origin of the epidemic – and connected to it by constant population flows¹. Despite these negative factors, as of 4 May 2021, 16 months after the start of the epidemic, the cumulative toll of COVID-19 in Taiwan since January 2020 was 1,153 confirmed cases, of which only about 10% were local infections, and 12 deaths in total. From January 2020 to April 2021, Taiwan did not need to impose any lockdown on its entire population or conduct a massive testing campaign². Schools were closed for a fortnight in February 2020 as a precautionary measure, in addition to the school holidays. No strong restraining measures had to be adopted on the economy during that same period, apart from temporary limitations on group meetings; but shops or restaurants were not closed, let alone offices or factories, allowing the island to enjoy a growth rate of over 3% in 2020, based on an already high level³.

In mid-May 2021, a community outbreak ended this virus-free period. Taiwan then had to adopt more general measures to restrict social interactions in order to reduce the circulation of the virus, although not to the extent of strict lockdowns of the type adopted in Europe. In two months (between mid-May and mid-July 2021), the number of infections, after peaking at nearly 600 per day at the end of May, was reduced to less than 20 cases per day by end-July, and less than 10 by end-August. The number of deaths, after peaking at 28 daily deaths in early June, has been reduced to less than one daily death by end-July (on a 7-day rolling average), a level which was maintained throughout August 2021.

The total epidemic toll in Taiwan as of 1st September 2021 therefore stands at 16,001 cumulative cases since January 2020, and 836 deaths. As a share of the population, the total number of deaths in the epidemic as of 1st September 2021 stands at 35 deaths per million inhabitants, compared with 1,950 in the United Kingdom, 1,700 in France, 1,100 in Germany or, for EU countries with the lowest overall number of deaths, 185 in Finland or 444 in Denmark⁴; Taiwan's death toll is slightly lower than that of Japan (128 deaths per million inhabitants), comparable to that of South Korea (45 deaths), or Australia (40 deaths), and slightly higher than New Zealand or Singapore (respectively 5 and 9 deaths per million inhabitants)⁵.

How did Taiwan manage to protect itself for 16 months, in spite of its proximity with China and high level of interactions with the rest of the world?⁶

One should not jump to conclusions about the weaknesses or errors of European responses in comparison. Many explanatory elements of this epidemic still elude us, and we do not know to what extent the relative success of Far Eastern countries in dealing with this crisis, compared to other regions of the world, may or may not have been facilitated by exogenous factors.

Possible hypotheses include: variants of SARS-CoV-2 that may have been less contagious or may have caused fewer symptoms in the early stages of the epidemic; a collective genetic makeup that may have made populations less susceptible to infection with the virus; a possible pre-exposure of populations to similar previous viruses that would have generated some degree of herd immunity; climatic or environmental conditions that may be less conducive to the development of symptoms or transmission of the virus, or more

¹ In 2019, on average, there were more than 180 daily flights and almost 30,000 passengers each day between the two sides of the Taiwan Strait (source: Civil Aeronautics Administration, Taiwan).

² Just over 500,000 tests were carried out in total during this period.

³ Taiwan is the world's 21st largest economy. Its GDP per capita ranks between that of Spain and Italy.

⁴ The EU average stands at close to 1,700 deaths by COVID-19 per one million population.

⁵ Statistics taken from: ourworldindata.org. Daily statistics expressed as a 7-day rolling average.

⁶ Much of the factual information used below on Taiwan's COVID-19 policies is taken from the Taiwanese Ministry of Health website, including <https://covid19.mohw.gov.tw/EN/mp-206.html>. A summary document, published in December 2020, entitled "The Taiwan Model for Combatting COVID-19" can also be found at <https://www.mohw.gov.tw/dl-66691-29017fe5-969a-4ab3-81af-2b92e2530368.html>

conducive to the individual immune response⁷. Physical conditions are also potentially relevant: Taiwan, for example, is an island, linked to the outside world by only a few major airports, which facilitates the control of international travelers' flows compared to mainland countries with open borders (although this island advantage has not benefited, for example, the UK).

All this being said, there are still important lessons to be learned from choices and practices that, in Taiwan, have proven effective over many months. Some of these lessons are not transferable when the number of infections is already very high in a given country, but are accessible only in the very early stages of an epidemic, when the number of infected people remains low as a proportion of the population, or, on the contrary, in a later phase of an epidemic, when infection numbers decline, if the goal is to move towards complete elimination of the virus, rather than to "live with it", or if vaccination alone is not sufficient to restore control.

Some of these lessons, therefore, while potentially coming too late to be of use in the face of COVID-19 in Europe, are still valuable for dealing with future epidemics, and they deserve to be taken into account in designing response plans for similar health crises in the years to come.

I. Strong epidemic vigilance tools and autonomous, proactive protective measures

I.1 Rapid access to reliable information from independent sources

At the very beginning of the epidemic, Taiwan benefited from the advantage of a very good understanding of the situation in mainland China, an advantage offered by the use of the same language of course, and by a permanent health vigilance activity, using contacts between health authorities on both sides of the Straits⁸, but using also independent sources, such as information from the Taiwanese community living in China⁹ and from the close monitoring of Chinese social networks, which were the first to report publicly the emergence of an epidemic in Wuhan, before being silenced. The Taiwanese press widely disseminated to the general public videos which circulated at the very beginning of the epidemic on these social networks, showing people collapsing in the streets in Wuhan. While they made a strong impression on the Taiwanese public opinion, these videos were not widely reported by the press in Europe, which mainly questioned their authenticity. The density of press coverage in Taiwan on the situation in mainland China from the start of the epidemic enabled the general public to become very quickly aware of the seriousness of the problem.

Taiwan informed and questioned the World Health Organization (WHO) about these concerns as early as 31 December 2019, although the island is not a member of the organization and its communications with the WHO remain informal and restricted to a few mechanisms in which Taiwan can participate.

In comparison, many countries had to make do with information provided by the WHO or by the Chinese authorities at the very beginning of the epidemic crisis, without always fully realizing that the information disseminated by the WHO, as by its member countries, often takes into account not only health criteria, but also political or economic criteria¹⁰.

It therefore seems essential, in order to be able to act as early as possible in the face of a pandemic risk, wherever it may come from, that health authorities at national and EU level be equipped with more effective tools for global health vigilance, with sources that are as independent and autonomous as possible, and that do not rely solely on the mechanisms of the WHO and the goodwill of its member countries. This does not require the creation of new structures, but rather the empowerment of existing institutions to better respond to the challenge of vigilance.

⁷ All these possible factors are hypothetical and we are not aware of any study that would analyze their actual role in the evolution of the epidemic in East Asia compared to the rest of the world.

⁸ Including sending of two Taiwanese experts on a field visit to Wuhan, from 15 January 2020.

⁹ About 400,000 Taiwanese residing in China, among whom a few hundred in Wuhan in early 2020.

¹⁰ Including for reasons that may seem legitimate at a given time, such as to avoid panic, or to preserve the economic exchanges necessary for the survival of populations.

I.2 Autonomy in public health decisions

As Taiwan is not a member of the WHO, it has made special efforts over the years to equip itself with more autonomous tools not only for vigilance, but also for health risk management. In the face of COVID-19, the island has therefore actually followed few of the WHO's recommendations, preferring a more cautious approach, which, paradoxically, has probably enabled it to better protect its population. This is notably the case on the following points:

- Travel restrictions. As early as 5 January 2020, the WHO recommended to its member states not to take any travel or trade restrictions in the face of the new coronavirus¹¹, and repeated this recommendation on several occasions¹². It was only on 16 March 2020 that the WHO began to cautiously backtrack on this position, in a joint statement with the International Chamber of Commerce, by recommending that companies restrict the travel of their employees. Taiwan instead took the first travel restrictions on 23 January 2020 with the suspension of flights from Wuhan¹³, followed in a short time-frame by several other measures targeting other areas of virus circulation (details below).
- A recommendation by the WHO not to implement quarantine on arrival of asymptomatic travelers from abroad¹⁴. This recommendation was eventually abandoned by WHO, but the organization never went so far as to positively recommend the use of routine quarantine for travelers from abroad, and continued, as of December 2020, to consider that travelers from abroad should not be considered as priority targets for testing for SARS-CoV-2 infection¹⁵. Taiwan, on the other hand, imposed the first strict quarantines on travelers who visited Hubei province on 27 January, before gradually extending this obligation to other regions and countries where the virus was actively circulating.
- A recommendation by the WHO, on 14 February 2020, that healthy people attending mass meetings should not wear respiratory masks, as well as anyone asymptomatic, under any circumstances¹⁶. The WHO only changed this position on 5 June 2020, when it recommended for the first time that the general public should wear masks "in specific situations and environments". The Taiwanese health authorities, while sharing the view at the beginning of the epidemic that the use of masks by the general public was not appropriate, nevertheless took steps to ration and systematically distribute surgical masks to the general public from 24 January 2020, before gradually imposing the obligation to wear masks in enclosed spaces, which was widely extended from the beginning of April 2020.
- A priority given, by the WHO Director-General at the beginning of the crisis, to fight stigma rather than to fight the virus. Tedros Adhanom Ghebreyesus declared at the Munich Security Conference on 15 February 2020: "The greatest enemy we face is not the virus itself; it's the stigma that turns us against each other". Taiwan, on the other hand, considered from the outset the epidemic risk as its number one priority. The hierarchy of risks proposed by the WHO Director-General does not, of course, appear relevant in hindsight, but it illustrates the coexistence of multiple objectives in the organization's agenda that can relegate public health to second place. Controlling flows of populations from epidemic areas or researching the origins of a virus should obviously not be considered as stigmatizing actions, but rather as public health tools which need to be available in the face of a pandemic.

¹¹ « WHO advises against the application of any travel or trade restrictions on China based on the current information available on this event. » Statement of 5 January 2020. All WHO statements are sourced from the organization's official website: <https://www.who.int/>

¹² WHO statements on 16 January 2020, 30 January 2020 and 27 February 2020 (the latter being a joint statement with the World Tourism Organization).

¹³ Actually, at that point, only mirroring the decision to impose lockdown on the city of Wuhan, including closing down its airport.

¹⁴ WHO, 14 February 2020.

¹⁵ WHO, 16 December 2020 document: « Interim Guidance - Considerations for implementing a risk-based approach to international travel in the context of COVID-19 » : <https://apps.who.int/iris/handle/10665/337858>

¹⁶ « For asymptomatic individuals, wearing a mask of any type is not recommended. Wearing medical masks when they are not indicated may cause unnecessary cost and a procurement burden and create a false sense of security that can lead to the neglect of other essential preventive measures. » WHO statement of 27 February 2020.

- Delays in the characterization of the pandemic risk by the WHO. The emergence of the new coronavirus was only recognized by the WHO Director-General as a "Public Health Emergency of International Concern" on 30 January 2020, after several days of procrastination (and in particular an explicit refusal to do so at the end of the meeting of the committee in charge on 23 January 2020). The WHO then did not recognize COVID-19 as a "pandemic" until 11 March 2020, when the virus was already circulating widely around the world¹⁷. Taiwan, for its part, introduced health checks on incoming flights from Wuhan on 31 December 2019, established an "epidemic response team" for the new coronavirus within the Ministry of Health on 2 January 2020, and activated a "Central Epidemic Command Center" on 20 January 2020.

The points raised above are not intended to be exhaustive, and they should not obliterate the actions on which the WHO has sought vigorously to fulfill its mission, for example in the field of access to vaccines against COVID-19, nor should they make us forget the essential role that the organization plays in the face of many other international health problems. But the few points above illustrate that the WHO issued several recommendations in the context of this pandemic that may have made it more difficult for its member states to control the epidemic, rather than easier. European countries followed the WHO on most of these points, while Taiwan often chose a different path.

This means that the WHO's recommendations must be taken more cautiously in the future, bearing in mind that the organization, by its very rules of operation, is under pressure from a variety of factors, including political ones, and that it is probably unwise to expect it to act solely on the basis of strictly health-related factors. One should therefore not forbid oneself to pursue autonomous public health policies at national level, and at European level in the case of the EU. It would also be useful for the international community to learn fully from the successes and failures of the WHO in dealing with this crisis¹⁸, and to implement the necessary reforms to the organization, as the need for an international body for global public health protection that can contribute effectively to the fight against health risks will only increase in the years to come.

2. Better public health expertise, and a more effective link between science, policy-making and society

2.1 Epidemic risk assessment and information of the population

The start of the epidemic in January-February 2020 was marked in Europe by a strong underestimation of the risk by health and medical research professionals. The vast majority of hospital and medical professionals, epidemiologists and health authorities commented on the beginning of the epidemic with reassuring messages towards the population and political authorities, both about the severity of the virus and about the capacity of health systems to deal with it. To their credit, almost all of these professionals admitted, after a few days or weeks, that they had been wrong in their initial assessments, leaving only a very small minority outside the scientific consensus on the seriousness of the epidemic, albeit with an unfortunately disproportionate media exposure.

Nevertheless, this collective error of judgment at the very beginning of the epidemic was not inevitable, and it was actually not committed everywhere in the world. In many East Asian countries, the medical consensus from the outset was that the new virus carried a serious epidemic risk. And the exceptional measures taken in China itself to combat the epidemic in Wuhan should also have alerted Europeans to the real gravity of the problem. It is therefore regrettable that European public health experts did not, as soon as the virus appeared, seek advice from their counterparts in Asian countries, whose competence and knowledge of epidemic risk now appear to be more solid.

¹⁷ By that date, more than 100,000 cases had been confirmed worldwide, as well as more than 4,000 deaths, and the virus was already present in more than 109 countries. Source WHO : <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200310-sitrep-50-covid-19.pdf?sfvrsn=55e904fb2>

¹⁸ Including taking into account, among others, the report of the Independent Panel for Pandemic Preparedness and Response, issued in May 2021.

In Taiwan, the concern that led to consensus in the medical community and therefore to the early health policy decisions regarding this virus was partly the result of a relatively recent episode, the SARS epidemic in 2003, which had left very bitter memories and a strong feeling of failure in medical circles¹⁹. This trauma was remembered, at the outset of the SARS-CoV-2 epidemic, as a counter-example that should be avoided at all costs.

In January 2020, the Taiwanese health authorities did therefore not seek to reassure the population but, on the contrary, took advantage of the instinctive reactions of fear and of the individual eagerness for personal protection to legitimize, from the outset, drastic decisions on border controls, quarantine and isolation, and to mobilize the population in the implementation of barrier measures. Authorities chose not to minimize the problem in their public communication, but to be transparent and educational about the risks involved and the means chosen to deal with them.

This approach has not been altered, in Taiwan, by a threefold fear that was prevalent in Europe at the same time: fear of collective panic, fear of public revolt in the face of the constraints imposed, and fear of people's inability to understand measures deemed complex (the idea, for example, that wearing a mask could give a "false sense of security"). However, in the following stages of the epidemic, the European populations, by complying with very strict containment measures, with very heavy economic consequences, demonstrated the extent to which they were in fact capable of understanding, effort, resilience, respect for rules and solidarity.

It would therefore be useful for the future if our medical, scientific and health policy communities were to maintain closer contact with their counterparts in Asian countries and draw more inspiration from the good practices that have been developed there. Furthermore, the Taiwanese example shows that in terms of public crisis communication, there is a way of communicating to the public in a transparent and educational way, without falsely reassuring them or necessarily leading them to panic.

2.2 Strengthening the basis for scientific and social consensus

The medical science community, which gave the impression of being very divided in Europe throughout this crisis, had great difficulty in reaching a consensus quickly enough to be useful in controlling the epidemic at the early stage. This same community then proved rather incapable of enforcing the minimum rules of scientific ethics within its own ranks, and of limiting the press coverage of researchers who broke with the most fundamental methodological principles. These unresolved divisions within the scientific community, without explaining everything or being the cause of all problems, left governments and public opinion quite helpless in terms of understanding the epidemic in the first few months at least, and contributed to the population's distrust of the measures adopted at the later stages of the crisis.

In Taiwan, the scientific consensus on the seriousness of the epidemic risk and on the measures to be implemented to deal with it was quickly reached and not much questioned even within the medical community. The Taiwanese press, no less free than its European counterparts, no less eager for debate and confrontation, and no less subject to the pressure of seeking an audience in a hyper-competitive market, did not, however, give voices that broke with the scientific consensus the prominence that the French press, for example, gave them. The Taiwanese press did of course report on the sometimes heated political debate between the government and the opposition on the interpretation of the risk and the means to be adopted to deal with the virus, but it did not largely broadcast messages that would have eroded the population's confidence in the scientific consensus around which the medical community had gathered.

This should encourage us to question the general training of European scientists in methodology and epistemology on the one hand, and the scientific training of journalists, as well as the level of scientific culture of citizens as a whole on the other. The effort to popularize science in Europe today is clearly too weak, and science is almost entirely absent from the information pushed to young users by social networks. Yet trust in science and rationality is

¹⁹ SARS-Cov-1 caused 73 deaths in Taiwan in 2003 out of 664 probable cases, and led to the lockdown of a Taipei hospital with all its patients and medical staff, resulting in a cluster of 150 cases and 35 deaths.

essential to build a minimum consensus in the face of any crisis. Democracies cannot wait until a crisis has taken hold and its consequences are already there, thinking that they will simply pick the consensus like a ripe fruit – in most crisis situations, this moment arrives just too late for actions to be efficient. Taiwan has shown that this capacity to create consensus before problems are in full bloom is by no means the prerogative of dictatorships or the Achilles heel of democracies.

2.3 Bringing closer together science and the political decision making process

The lack of articulation, or even the opposition, between science and policy-making has contributed to weakening the capacity of European governments to respond effectively to the epidemic. France, for example, set up an *ad hoc* scientific committee, giving its recommendations to the government and making them public. This committee was clearly presented as being independent of political decision-making, and indeed it regularly reminded people of this independence, even if it recognized that other factors, apart from the sole health criterion, legitimately came into play in the political decision-making on the pandemic – factors linked to the economy, the social situation, the popular acceptability of measures, etc. But the divergences sometimes appearing between the opinions of the scientific committee and the decisions taken by the political leaders, even if justified and legitimate, undermined the confidence that the population could have in the decisions taken.

In Taiwan, the management of the epidemic was unified from the outset, based on pre-existing contingency plans. The Central Epidemic Command Center (CECC), activated on 20 January 2020 under the command of the Minister of Health, brings together in a single structure the efforts of the various branches of the administration, the medical world, the scientific community and the private sector. It therefore also includes a scientific committee, integrated into the Centre's organization chart, placed under the hierarchical supervision of the Centre's Commander-in-Chief. Opinions of that scientific committee are not made public independently of the political decisions they underpin. The Minister of Health, Commander-in-Chief of the CECC, gives a daily press conference on the evolution of the epidemic and the measures taken, surrounded by four specialized collaborators to whom he gives the floor on specific subjects, depending on the questions asked by the journalists. The President of the Republic²⁰ made relatively few public speeches on the subject of the epidemic, compared with the Heads of State and Government of European countries who appeared on the front line; as a result, decisions taken in Taiwan appeared more collegial. The President therefore left most of the public communication to the Commander-in-Chief of the CECC²¹.

The information provided by the Taiwanese authorities to the population through the CECC mechanism was abundant, regular, transparent, and picked up daily by all the media, and thus emanated from a single channel, which ensured a high degree of coherence in public communication since the beginning of the epidemic, based on an institutionalized articulation between scientific logic and the logic of political decision-making.

3. Democratic use of tools to control the epidemic

3.1 Active management of supply shortages

The management of the mask shortage problem was particularly exemplary in Taiwan. In the early days of the epidemic, the official doctrine was not different from that advocated by the WHO, i.e. that masks were not recommended for the asymptomatic general public. However, two important differences quickly emerged as compared with the situation in Europe.

²⁰ Tsai Ing-wen, re-elected in January 2020, who has the reality of executive power on a model rather similar to the French Fifth Republic. The Vice-President of the Republic at the beginning of the epidemic, until May 2020, was Chen Chien-jen, an epidemiologist by training.

²¹ Chen Shih-chung, a dentist by training, Minister of Health and Social Security since 2017.

First, the official recommendation that it was not useful for the general public to wear masks clashed with the popular desire to wear them as much as possible, to protect oneself and the others, as the Taiwanese and many other Asian populations were already accustomed to doing in the case of a common cold or flu. In Europe, on the contrary, the official recommendation not to wear a mask was in line with public opinion, which was originally reluctant or even hostile to the mask. The Taiwanese authorities therefore knew from the outset that the demand for masks would be high and that public opinion would judge the government on its ability to meet this demand, which contributed to the very rapid decision, in the face of the imminent shortage, to regulate access to masks, organize their distribution and develop their production.

Second, the Taiwanese health authorities changed their position on the wearing of masks fairly quickly, without imposing them at once in all places, but by gradually making them compulsory in enclosed areas, shops, public buildings, public transport, at indoor and outdoor gatherings, and in open-air markets. All these obligations were fully in place by the beginning of April 2020. Adjustments to these regulatory constraints have since been made upwards or downwards, depending on the evolution of the epidemic risk; in practice, the wearing of masks has remained widespread, including outdoors in the streets of cities, as much by choice of the population than by legal obligation.

In terms of mask availability management, in the early days of the epidemic Taiwan had an actual production of less than 2 million masks per day, and a theoretical maximum production capacity of 4 million masks per day (running its lines 24 hours a day)²². With a population of 23 million, the island was relatively dependent on imports from mainland China (around 400 million masks imported from China in 2019). It was therefore decided on 24 January 2020 to ban mask exports, requisition all local production and stocks, massively increase production capacity²³, and ration sales to the general population.

Each person with a health insurance card²⁴ could go to the pharmacy of their choice and buy, at a fixed price (about 15 euro cents), initially 2 surgical masks per person per week, rising to 3 per week in early March, and then to 9 masks every 14 days as production expanded. A mobile phone app was developed within days, based on a non-governmental initiative but using open public data, to show, in real time, the stocks of masks available in each pharmacy.

This ensured that the entire population was equipped with masks, even during the first weeks, when local production was still insufficient. Exports were allowed again once production became sufficient to meet local demand. Taiwan then started, from 27 April 2020, to donate masks to a large number of countries, including European countries, by encouraging each Taiwanese to indicate, via a specific app on their mobile phone, whether they were ready to give up part of their mask quota to contribute to international aid.

While the global production of surgical masks has now reached levels sufficient to meet world demand without the need for rationing, this Taiwanese model of managing scarcity while developing local self-sufficiency in production remains a very valuable reference.

3.2 Isolating all confirmed cases, symptomatic or not

Since the beginning of the epidemic, and until May 2021 when the increase in the number of cases no longer allowed it, any patient who was a confirmed case of SARS-CoV-2 infection in Taiwan was automatically placed in isolation in the hospital, in a negative pressure room, whether or not the patient was symptomatic. This policy can only be followed during periods when the total number of cases remain low, and it obviously cannot be implemented with such rigor in the case of an already generalized epidemic, with several hundred or several thousand new cases per day, simply because of the lack of available isolation rooms. However, at the beginning of an epidemic, with few confirmed cases, and at the end of the epidemic, this complete isolation

²² Statistics on 31 January 2020.

²³ 92 new mask production lines were set up in two months, between the end of January and the end of March 2020. Production increased from 4 million per day to over 8 million in early March 2020, and finally stabilized at around 20 million per day in April.

²⁴ Taiwan has universal public health coverage, to which all inhabitants of the island are compulsorily affiliated. Everyone has a smart card that tracks their entitlements and can be read by health professionals.

in hospitals offers the best guarantees of non-contagion, and has probably played a crucial role in containing the virus in Taiwan.

Until January 2021, people infected with SARS-CoV-2 were only allowed to be discharged from isolation once they had tested negative twice within 24 hours by PCR test. Taking into account the latest state of science showing the unlikelihood of contagiousness of patients ten days after the onset of symptoms and presenting a PCR test with a cycle threshold (CT) value higher than 30²⁵, it has been decided since the beginning of 2021 to allow the release from isolation for patients whose symptoms have appeared for more than ten days and have disappeared for at least three days, and for whom two consecutive PCR tests have been either negative or positive with a threshold cycle higher than 34 (a figure brought down to 30 in May 2021).

These technical details are provided here to show that the criteria for deciding on isolation and its duration are based on objective elements, based on scientific knowledge of the virus and the disease: this therefore makes it possible to justify, in law, the deprivation of liberty constituted by isolation, and to limit it to what is strictly necessary.

Taiwan has 167,000 hospital beds (in 483 hospitals)²⁶, i.e. 41.9 beds per 10,000 inhabitants, of which approximately 7,000 are intensive care unit beds, i.e. 29 intensive care beds per 100,000 inhabitants²⁷. Hospitals were equipped with 1,100 beds in negative pressure isolation rooms at the beginning of the epidemic. As of 4 May 2021, 74 symptomatic and non-symptomatic SARS-CoV-2 positive patients were isolated in these rooms, representing all active cases at that date.

3.3 Identify and isolate contact cases

With regard to contact cases in Taiwan, it is important to emphasize the very meticulous search work carried out, using information provided by the patients themselves, but also, if necessary, the geolocation data from their mobile phones, provided by the telephone companies to the health authorities²⁸. Confirmed contact cases are either placed in isolation at home or are subject, for less close contact cases, to an individual vigilance protocol. Lists of places visited by an infected person during the period when he or she was considered potentially contagious are made public, and those who have visited the same places at the same times are asked to monitor their health and alert medical authorities in the event of symptoms. In some cases, at the beginning of the epidemic in March and April 2020 (for example after a cruise ship turned out to be infected, and its passengers had visited the island), the geolocation data of potentially infected people's mobile phones were matched with any other mobile phones in the immediate vicinity, which were then sent an alert and vigilance text message. However, this methodology, which targeted "potential contact cases" rather than "confirmed contact cases", has been relatively little used, due to its limited accuracy, the very large number of people to whom the alert was sent and because improved border control later made it less necessary²⁹.

²⁵ The cycle threshold value indicates the number of amplification cycles required in the laboratory for viral RNA in a sample to become detectable. It is therefore a marker of viral concentration, or in other words of viral load level. This concept, which is not well known to the general public in Europe, is relatively more familiar to the general public in Taiwan, because information made public by the authorities on individual cases detected is often accompanied by the cycle threshold value, which gives an approximation of the contagiousness and the history of this contagiousness during the days preceding the test.

²⁶ 2019 figures, sourced from « 2019 Taiwan Health and Welfare Report », Ministry of Health and Welfare: <https://www.mohw.gov.tw/dl-60711-55f2159f-11a6-4c38-8438-08c8367f0d53.html>

²⁷ 2015 figures for the intensive care bed number, sourced from C.-C. Lai, C.-H. Ho, C.-L. Chang, K.-C. Cheng, « Availability of critical care services in Taiwan under National Health Insurance », in British Journal of Anaesthesia, August 2017, [https://bjanaesthesia.org/article/S0007-0912\(17\)33304-4/fulltext](https://bjanaesthesia.org/article/S0007-0912(17)33304-4/fulltext)

²⁸ Health authorities only use geolocation data collected from operators' cell towers, which are relatively inaccurate but immediately available. Taiwan does not use mobile phone satellite geolocation (GPS) for epidemic control, although it is more accurate.

²⁹ Po-Chang Lee, Shih-Chung Chen, Tai-Yuan Chiu, Chi-Mai Chen, Chunhui Chi, « What we can learn from Taiwan's response to the covid-19 epidemic », 21 July 2020, blog of the British Medical Journal <https://blogs.bmj.com/bmj/2020/07/21/what-we-can-learn-from-taiwans-response-to-the-covid-19-epidemic/>

Extensive work is carried out on each case of proven SARS-CoV-2 infection to try to determine the origin and temporality of the infection, which then allows more effective identification of contact cases, both upstream and downstream of the infection. This work is based on three main data collected during testing:

- The genomic sequencing of the virus, which makes it possible both to know the variant (and therefore to draw conclusions about its contagiousness), and also to know whether the virus carried by the case under study comes from another known case, in order to trace the chain of contamination as accurately as possible;
- The threshold cycle value of the PCR test, which gives an idea of the concentration of the virus in the body, and thus provides an approximation of the date of contamination. Contact tracing can therefore focus on a relatively precise time window;
- The results of an antigenic serological test specifying the presence or absence of immunoglobulin M and G (IgM and IgG), the appearance of which is delayed in time after infection with SARS-CoV-2 and which therefore also gives an indication of the possible date of infection and thus helps to trace the history of contact cases more effectively.

Once contact cases have been identified, home isolation for 14 days is imposed in the majority of cases. This isolation is monitored by human and electronic means, based again on the geolocation of mobile phones. If the mobile phone moves away from the area defined for isolation, or is switched off, or if the isolated person does not respond to a message or phone call without delay, an automatic alert is launched by the system and an on-site visit is initiated within minutes. Automatic messages are sent daily, to be answered immediately. Messages or telephone calls by administrative or police staff are also sent at least daily, which also allow for human monitoring of the physical and mental health of the persons in isolation. Unannounced visits to the place of isolation may also take place for verification. Non-compliance with isolation as a contact case (or similarly with the quarantine of travelers from abroad – see below) is punished by heavy fines, ranging from 300 to 30,000 euros depending on the case. People forced to isolate as contact case can also be granted a financial assistance of 30 euros per day if they request it, as well as daily assistance with supplies or medical and other needs.

This sophisticated and stringent contact tracing and isolation methodology has been implemented systematically since January 2020, whenever Taiwan has experienced community transmission episodes, including on cohorts of several thousand people, demonstrating its validity on a large scale. The number of local infections could thus remain relatively low compared to the number of imported cases (about 100 locally transmitted cases for about 1,000 imported cases during this period) for 16 months until May 2021.

3.4 Effective border control and strict quarantines for travelers from risk areas

As of 31 December 2019, medical checks started to be systematically carried out on passengers arriving from Wuhan, upon arrival of flights in Taiwan and even before exiting the aircraft. Direct flights to and from Wuhan were suspended on 23 January 2020, with group travel to China banned from 25 January. The entry of nationals of the People's Republic of China from the affected areas into Taiwan was banned gradually from 26 January 2020; on 6 February, the ban was extended to the whole of China and then to any foreigner who had recently visited China. A strict 14-day home quarantine (followed by a 7-day personal medical follow-up period) was imposed on all travelers with a history of visits to Hubei from 27 January 2020, extended to the whole of China on 10 February 2020, and then progressively from 27 February 2020 to all other countries with active virus circulation. On 19 March 2020, the visa and quarantine-on-arrival requirement was extended to travelers from all countries, who were also required to present a negative PCR test certificate less than 3 days old before boarding. These measures remain in place to this day³⁰. Home quarantine was gradually

³⁰ A few adjustments were introduced, at times, for business travelers from low-risk countries and regions, whose quarantine could be reduced to 5 days or 7 days, subject to a negative PCR test at the end of the quarantine. As of 4 May 2021, only 12 countries and regions were considered low risk. These adjustments were repealed during the May-July 2021 local outbreak.

restricted to people living alone at home, and from June 2021, due to the increased contagiousness of the Delta variant, quarantine could only be carried out in a government center or dedicated quarantine hotel.

Taiwan's health authorities therefore acted more quickly than most of their counterparts in the rest of the world to impose health checks at borders, restrictions on entry from areas of active virus circulation, but most importantly by implementing a strict quarantine regime on arrival very early on, which was progressively strengthened as new, more contagious variants became more prevalent around the world. The methods used to control the implementation of quarantine by travelers are similar to those used to control the isolation of contact cases. The use of electronic means has made this control very effective, requiring relatively few staff to manage large numbers of individuals in quarantine. In particular, this has meant that the borders have not been completely closed and that Taiwanese people have been able to return to Taiwan or travel abroad if necessary, and that categories of foreigners essential to the Taiwanese economy have been able to continue arriving (technicians, business travelers, industrial or service workers, humanitarian situations etc.). As an example to illustrate the relatively large capacity of this very strict quarantine system, at the beginning of April 2020, the mobile phone tracking system was being applied to 55,000 people in quarantine at home or in quarantine hotels. The number of foreigners admitted is regulated through the number of visas issued, which has been reduced as the Delta variant was spreading worldwide.

Since the start of the pandemic, Taiwan has recorded about 100,000 passengers per month on inbound and outbound international flights, compared to more than 4 million international passengers per month before the crisis. This figure illustrates that it is still possible to effectively manage heavy and stringent quarantine requirements for a relatively large number of arriving passengers, if the appropriate means are used, without having to completely close the borders for a long period of time. European countries, which at the beginning of the crisis considered that closing or controlling borders, or imposing quarantines on arriving passengers, was not feasible, particularly between European countries, for practical reasons or as a matter of principle, may need to reflect on how to make such means available in the future, bearing in mind that the general lockdown measures imposed on the whole population of European countries for many weeks in a row constituted much heavier, longer and more universal travel constraints and deprivations of liberty than the 14 days of isolation, even if very severe, imposed only on infected people, contact cases and travelers from abroad.

3.5 Deprivation of liberty, restrictions on movement and use of personal data in a democratic setting

Taiwan is a vibrant and demanding democracy with an active parliamentary opposition, strong rule of law, independent judiciary, vigilant public opinion and free and diverse press. None of the measures put in place to combat the epidemic appeared to the legislator, the judge or public opinion to be contrary to constitutional and democratic principles, or disproportionate to the legitimate objective of protecting public health. None of these measures appear to be incompatible with the same principles in force in European countries, including in the specific way in which they have been reaffirmed on the occasion of this crisis, for example by the Constitutional Council in France when it was asked for its opinion on epidemic-related measures.

The deprivation of liberty constituted by the isolation of patients and contact cases or the quarantine of travelers coming from abroad, the restrictions on freedom of movement with foreign countries, or the access of public authorities to personal data to ensure the electronic monitoring of movements by means of the geolocation of mobile phones, are certainly exceptions to principles which, in normal circumstances, should not be compromised. But in this case, the Taiwanese experience has clearly illustrated that these exceptions were justified not only by their targeting and their proportionality in relation to the public health risk represented by the dispersal of such a virus in the population, but also, in hindsight, by their observed, actual effectiveness in achieving the objective of protecting the population.

On the issue of deprivation of liberty, Taiwan chose to impose very strong constraints, but on a limited and targeted number of individuals, for periods limited to 14 days, and with a high degree of effectiveness in preventing transmission of the virus to the community. In return, Taiwan was thus able to

avoid having to confine the whole of society for a long period of time, its economy was able to continue to function without hindrance for almost all its activities apart from those linked to international passenger traffic, and restaurants, theatres and cinemas were able to remain open (albeit subject to distancing and gauge measures) until May 2021. In other words, in exchange for heavy measures imposed on the few, the many were able to benefit from a high level of health and economic protection. The balance is therefore particularly positive, including in terms of deprivation of liberty, compared to the repeated and generalized lockdowns imposed on the populations of many countries, and this health success is therefore also a success in terms of democracy and individual rights.

Border control, which at the beginning of the epidemic, and in Europe in particular, came up against the principle of free movement, could legitimately have been introduced to isolate the first regions affected by the virus, in order to limit its spread. Such restrictions on freedom of movement would have been all the more legitimate, in retrospect, as much more severe restrictions were later often imposed on the populations as a whole, who were forced for weeks to stay within a few kilometers of their homes.

The reluctance of European societies to put electronic monitoring means at the service of collective health, in the context of use by public health authorities under the supervision of independent judicial systems, is all the less justifiable if one considers the vastly pervasive and poorly controlled use of these same personal data, made largely without the users' knowledge, by private companies pursuing profit objectives devoid of collective benefit. So, for example, the systematic collection of geolocation data by a large number of private online service providers would be perfectly acceptable to Europeans, but they should deny themselves the benefit of these same means to control an epidemic? Europeans have an interest getting their priorities in order in this respect.

Taiwan's experience on these three points (deprivation of liberty, restrictions on movement, use of personal data) clearly shows that democracy is in no way an obstacle to the fight against an epidemic, as long as the exceptional, derogatory means used remain proportionate to the ends.

4. A "zero virus" strategy which is difficult to maintain in the long term

Taiwan was confronted for the first time, from May 2021 onwards, with an episode of major circulation of the virus in the society. This community contamination was the result of a combination of factors: a relaxed quarantine regime for airline crews (the virus may have been introduced by a pilot); non-compliance with the rules by a quarantine hotel, which may have facilitated the escape of the virus; concealment of certain activities by infected persons (hostess bars clusters), which reduced the effectiveness of contact cases tracing; and finally, the increased contagiousness of the Alpha variant at the origin of the episode.

The strategy pursued until May 2021 therefore had to be adapted for a few weeks to a number of cases that no longer allowed for the complete tracing of upstream and downstream contacts of each confirmed case, and no longer allowed for the isolation in hospital of each confirmed case, even if asymptomatic. However, Taiwan chose not to impose the maximum constraint provided for in its epidemic control plan, i.e. general lockdown (alert level 4 of Taiwan's epidemic contingency plan), but to raise the alert to levels 2, then 3, which albeit restrictive for economic or social activities and individual freedoms, remains below the constraints imposed by containment measures used in Europe since the spring of 2020. Taiwan, for example, imposed no time constraints for going out, no curfew, and no geographical limitation or obligation to justify travel. The measures under level 3 focused on a ban on group gatherings (limited to maximum 5 people not belonging to the same family indoors and 10 people outdoors), the closure of schools (one and a half months of distance learning, followed by two months of summer holidays), a ban on eating in at restaurants, the closure of establishments receiving the public in closed environments (cinemas, museums, places of worship, etc.), the systematic wearing of masks outside the home, compulsory electronic registration of every visit to a shop or indoors public venue, for tracing purposes, and the encouragement of teleworking.

This strategy was successful and, as of mid-June 2021, it was possible to treat each new infection again as in the previous period, with an intense effort to trace and isolate contact cases. By the end of July 2021, the epidemic alert was lowered back to level 2, restaurants were gradually allowed to have dine-in customers and most public establishments could reopen. The authorities, however, considered that it was unlikely that a

return to a "zero contamination" situation would be possible before a high level of immunity could be reached through vaccination.

This local chain of infection occurred at a time when the population was still poorly immunized, as Taiwan had a hard time obtaining vaccine doses on the international market and locally developed vaccines were not yet ready. By mid-May 2021, less than 1% of the population had received a first injection. With the gradual delivery of orders placed by the authorities with manufacturers AstraZeneca, Moderna and local vaccine producer Medigen, and with donations of doses to Taiwan from Japan, the United States, Poland, the Czech Republic, Lithuania and Slovakia, the share of the population having received a first injection had risen to 42% by 1st September 2021, but the percentage of people fully vaccinated still remained at 4 %, lagging behind countries like New Zealand (26%), Australia (29%) or Japan (47%). The vaccination strategy first targeted the elderly as a priority, but also the populations potentially most exposed to the virus (health professionals, quarantine hotel managers, etc.), the most strategic sectors (wholesale markets, army, etc.), occupations most likely to transmit the virus (taxi or delivery drivers, etc.) and people in the vicinity of identified clusters. This targeted vaccination, in a context of shortage of doses compared to European countries, was thus intended not only to protect, but also to slow down the spread of the virus.

This outbreak, even though limited in scale compared to the waves that Europe has experienced, illustrates the precariousness of maintaining the objective of "zero contamination" by a society that does not want to completely close its borders, when the circulation of the virus in the rest of the world remains intense. Taiwan, by continuing to accept a relatively high number of travelers from abroad, has thus allowed an average of more than 2 people carrying the virus to enter its territory every day since January 2020 – a number which increased in recent months, reaching an average of almost 5 people carrying the virus into Taiwan from abroad every day in August 2021. The pressure of the looming infection has therefore never ceased, and it has worsened with the increase in the contagiousness of the new variants.

However, Taiwan, like other countries that initially chose a zero infection policy, managed to considerably limit the human, economic and social consequences of the epidemic since January 2020. Having gained more than a year to stay ahead of the virus, Taiwan was able to prepare itself, benefit from experience accumulated in the rest of the world, wait for vaccines in relative safety and finally begin its vaccination campaign with a much less unfavorable human toll to start with. It should also be noted that countries that have followed a zero infection policy will also have contributed, for the benefit of the rest of the world, to avoiding the emergence of new variants of the virus on their soil and their spread to other regions. Finally, their experience with SARS-Cov-2 provides a useful set of lessons for preparing to better deal with future epidemic threats, provided that their experience is effectively taken into account.

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