PACIFIC FORUM

Brief

Re-opening Hawaii's economy: Lessons from the Asia-Pacific

By

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Pacific Forum

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1. About this Brief

This brief aims to analyze successful Covid-19 response measures in selected Asia-Pacific states and assess whether they can be replicated in the state of Hawaii. These include countries such as Singapore, New Zealand, Taiwan, and South Korea, which have so far been able to "flatten the curve" at a much greater scale than most other countries.

Hawaii has taken effective steps to manage the pandemic, with 736 confirmed cases (as of June 15) and one of the lowest death rates in the United States. Its relatively low population density and geographical feature of being a small archipelago are also distinct advantages in containing the virus, particularly because it was able to cut its connection with the US mainland and the rest of the world. Nonetheless, as Hawaii state officials have often emphasized, it is a fragile status quo that leaves no room for complacency. Easing restrictions is likely to cause a spike in new cases if precautionary measures and systems are not carefully designed and enforced.

The main goal has been to reopen Hawaii's non-tourism economy, which accounts for 77 percent of its GDP. As Hawaii prepares to resume local medium- and high-risk activities, the focus is now shifting toward reopening the tourism economy. Removing the 14-day quarantine for incoming travelers is a complex matter that depends heavily on the evolving circumstances in the countries and U.S. states of departure. It also requires additional resources for contact tracing and widespread testing at the local level.

Various factors have contributed to some Asia-Pacific countries' successes. These include past experience with epidemics like SARS and MERS. The experiences have resulted in better timeliness and preparedness and have impressed upon the public the importance of following guidelines from relevant authorities. States with this experience have been able to recognize the danger and act quickly, deploying pervasive testing systems as well as tailored technological solutions and community measures. This brief will focus exclusively on the components of Covid-19 response strategies that have had a significant impact in containing the spread in Asia-Pacific countries *and* that could be directly implemented and enforced by Hawaii's governing body as the state aims to reduce transmission and reopen its economy. Of course, these measures require the cooperation of the public and businesses. They are meant to complement existing efforts toward reopening Hawaii's economy in a timely and prudent manner in areas such as social distancing, screening, contact tracing, quarantines, and organizational structure.

A comprehensive list of policy insights for Hawaii can be found here.

2. Community Measures and Social Distancing

2.1 Singapore

Despite early virus chains of transmission, Singapore has experienced no exponential rise in new cases for about three months until a recent surge took place, forcing the country to enter a "circuit breaker" (lockdown) period starting on April 7. Nonetheless, Singapore has been able to keep life going on as normal without taking extreme measures for a sustained period of time. How did it do it and what went wrong? Can this model be applied to Hawaii and its mistakes avoided or corrected? These are the different measures that have been adopted at the community and social level:

- In the workplace, employees have been encouraged to constantly monitor their temperature and health, and institutions to adjust their business continuity plans, such as allowing employees to telecommute where possible and having segregated teams. For example, employers are supposed to stagger their starting hours across at least three one-hour blocks, and have "no more than 50% of total employees reporting to work" within each block. For example, if the normal working hours are from 9am to 6pm, employers could stagger employees' reporting times at one-hour intervals between 7:30am and 10.30am (e.g., 7:30am to 8:30am, 8:30am to 9:30 am and 9:30am to 10:30am) to reduce congregation at entrance/exit, with corresponding staggered timings for end of work.
- Advisories to avoid large-scale events of more than 1,000 people have been in place, while ongoing events were advised to take precautions such as health screening and turning away ill individuals.
- Schools remained open and implemented precautionary measures such as reduction of mass assemblies and inter-class and inter-school activities, and staggered meal times.
- Mass fever screening through thermal temperature scanners is widely instituted at entry to public buildings, such as offices, hotels, community centers and places of worship.
- In "hawker centers" and food courts, alternating seats were marked to remind customers to respect social distancing.
- At ticketing machines in subway stations and checkout counters in supermarkets, lines on the floor are spaced about 1 meter apart as a cue for where to wait.
- Restaurants were expected to keep at least 1 meter of distance between tables, and limit groups of diners to 10 people at the most.

Note that mask wearing was limited and not particularly encouraged for healthy people (that has changed since the country went into lockdown), and limited entry or lines for entry into supermarkets were not particularly enforced. Although some of these measures reduced people's freedoms, daily life largely went on as normal. Notably, Singapore kept schools open throughout and did not adopt extreme social distancing measures, mostly due to low infection rates among children. Lawrence Wong, the national development minister, claimed that distancing measures are "the third line of defense" after entry restrictions and contact tracing. Singapore's experience therefore suggested that it is possible to avoid major social disruptions and contain the spread of Covid-19 over an extended period of time.

What went wrong? Singapore's new cases surged significantly by the second week of April, with an alarming exponential rise centered around Singapore's migrant worker population - the more than 300,000 men from countries such as Bangladesh, India, and China employed in construction, shipping,

and maintenance – jobs that pay below minimum wage and in which social distancing is practically impossible. These workers are required by law to live in dormitories - privately-run facilities which host from 12 to 20 men per room, with shared bathroom, cooking and social facilities. A single dormitory, such as the S11 Punggol facility, can host up to 14,000 workers across different four-story buildings. As of April 22, about 80 percent of all cases have been linked to these dormitories. In addition, thousands have returned to Singapore from countries which were not as proactive in their response measures. Among them, more than 500 people brought the virus back with them. While it was mandatory for returnees to isolate themselves for two weeks, other people in their household were told that they could go on with their lives as normal (as long as no one showed any symptoms), enhancing the risk of asymptomatic spread.

2.2 New Zealand

New Zealand appears to be the only "western" nation following an elimination strategy with the goal of completely ending transmission of Covid-19 within its borders. In late March, with only 102 reported cases and no deaths, Prime Minister Jacinda Ardern announced that New Zealand was rapidly escalating levels of physical distancing and travel restrictions, reaching the level of a full national lockdown on March 26. All non-essential businesses closed down and everyone had to stay at home for four weeks unless they had an essential job, such as health care, or were going to the supermarket or exercising near their home. Social distancing measures included school closures and bans on swimming and surfing. Grocery stores required people to line up six feet apart while waiting to go in. The strategy seems to be working as new cases started falling after only 10 days from the start of the lockdown.

2.3 Insights for Hawaii

Singapore showed that it is possible to contain the spread of Covid-19 over the long term when the right systems are in place and without major social disruptions. Several options on how to adequately organize society in light of these challenges are explored in detail in the latest UHERO/EWC's brief "How to Control Hawaii's Coronavirus Epidemic and Bring Back the Economy: The Next Steps". These include precautionary measures that can be adopted at the workplace and educational institutions. To avoid the mistakes made by Singapore, the State of Hawaii could carefully analyze the situation on its territory regarding co-living spaces with shared facilities and make sure that the right precautionary measures are being adopted. This includes university dormitories, nursing homes, prisons, as well as its large homeless population located in homeless shelters and large encampments—especially as officials brace for a "big surge" of new homeless people during this time of crisis. Particularly concerning are the 2,400 unsheltered homeless people in Honolulu and more than 7,000 state-wide. Some suffer from severe mental health issues and cannot realistically be expected to fully comprehend or abide by social distancing measures. These people mostly rely on public park restrooms for basic hygiene needs, including washing hands. Considering this, CDC guidelines say restroom facilities should remain open 24 hours a day to the homeless with working water taps and kept stocked with hygiene materials, including toilet paper, soap and drying materials. These materials were lacking in Honolulu restrooms even before the pandemic started but should be provided at this critical time given that these facilities are largely shared. Singapore's experience shows that avoiding these measures is likely to give rise to new clusters, especially if the people using these facilities are later relocated to shelters or encampments, exposing other individuals. Also, it is less likely for a sudden

surge to take place in Honolulu or Oahu (the island with the most cases) to the same extent it did in Singapore, given Oahu's small population and low population density. Whereas Singapore's population density is 20,144 people per square mile, Honolulu's is 5,813, and Oahu's is only 1,636.

In its efforts to further reduce transmission rates, Hawaii could consider some social distancing measures adopted by New Zealand. Similar to Hawaii, New Zealand is also an island with a small population of under 5 million. New Zealand managed to see a decrease in new cases after only 10 days since implementing a full lockdown. Among the main differences in the approaches between the two islands is the way essential services operate, such as grocery stores/supermarkets. These are particularly risky for many reasons: the virus spreads more easily in confined spaces, they are attended by higher-risk age groups, and there is a frequent touching of objects (products, produce, shopping carts, etc.). As reported by the WHO, it is not certain how long the virus that causes Covid-19 survives on surfaces, but studies suggest that coronaviruses may persist on surfaces for a few hours or up to several days. While it is impossible to completely eliminate these risks, they can be mitigated. In New Zealand (as well as in some European countries), grocery stores require people to line up six feet apart while waiting to go in one at a time, limiting the total number of people shopping at the same time. As of today, some major such chains in Honolulu do not impose any measure to reduce congregations at entrances/exits. Hawaii might benefit from this approach even - and especially - after the stay-at-home order is lifted and the non-tourism economy starts reopening to prevent a large number of people from going into confined spaces at the same time. To facilitate this process, some countries are working on the development of an app that lets you "book" your grocery store entry time directly from your smartphone, reducing the stress and virus exposure that comes from standing in line for a prolonged amount of time. Finally, another limitation imposed by New Zealand is limiting access to all water activities. While it is unclear if this can or should be done in Hawaii, it cannot be ignored that there a significant number of people go to surfing spots like Waikiki Beach on a daily basis. By the very nature of the sport and the location, it is often difficult to maintain social distancing due to a large amount of people competing for limited space where a wave breaks, which more often than not requires a prolonged amount of time sitting still waiting for the next wave.

3. Personal Protective Equipment (PPE)

3.1 South Korea & India

South Korea has developed inexpensive kiosks for mass collection of samples for Covid-19 to face the high demand for testing. These are called "walk-in sample kiosk" (Wisk), and are made in such a way to not require operators to wear PPE.

Photograph: P. Ravikumar/Reuters

As shown in the picture above, each Wisk resembles a telephone booth made of glass with integrated gloves, which can be used by healthcare workers to collect samples safely through the throat swab. The glass structure serves as a protective shield between healthcare professionals and potential coronavirus patients. Their main advantage is that health workers can perform tests by wearing less PPE and collect samples quickly.

India has deployed some of them in early April in the Ernakulam district in the state of Kerala. Each Wisk cost around 40,000 rupees (approx. $529) and can be assembled in as little as two days, according to local officials. As explained by Dr. Ganesh Mohan of the Kalamassery Medical College where six Wisks were deployed, "in an hour, we can test around 40-50 samples. This drastically reduces the need for PPE kits and protects the medical practitioner and the patient."

3.2 Insights for Hawaii

During the session of the Senate Special Committee in April 10, the Incident Commander of the Hawaii Emergency Management Agency (HIEMA) K. Hara claimed that HIEMA is struggling to meet the health care workers' need for PPE. The Chair of Department of Health, Dr. B. Anderson later addressed the case of the recent outbreak at the Maui Memorial Hospital, identifying the lack of enough PPE for the staff as one of the main problems.

Wisks could be helpful in Hawaii to address the shortage of PPE, redirecting to other areas some of the PPE that is currently used for testing.

4. Contact Tracing

4.1 Singapore

The Government Technology Agency of Singapore (GovTech) and the Ministry of Health (MOH) developed a mobile app called "TraceTogether" to aid the efforts of contact tracing teams to reduce the spread of Covid-19. It is not mandatory but citizens are strongly encouraged to install it. The app works by exchanging short-distance Bluetooth signals between phones to detect other users in close proximity, as well as enabling contact tracers to inform TraceTogether users who have been in close contact to identify Covid-19 cases more quickly. Traditionally, when somebody tests positive, the contact tracing team will interview them, find out individuals the infected person has been in close physical contact with, then notify those people about their exposure (mostly through phone calls). Digital contact tracing through mobile apps aims to automate part of this process: they constantly track people we come close to, and if one of those will test positive, we will receive a notification letting us know of our potential exposure.

TraceTogether does not track the user's location, but instead uses Bluetooth to determine if the user has been in close proximity with another user of the app. GovTech has also published assurances about its privacy friendly principles related to data storage, retention and consent. In particular:

- It stores limited data (mobile number and a random anonymized User ID)
- It does not collect data about GPS location
- It does not reveal personal identities to either the government or third parties
- All data collected is stored locally on the user's phone and encrypted
- When a person is confirmed to be infected with Covid-19, the government will then request for her/him to upload the data to facilitate contact tracing of his/her close contacts.
- It automatically deletes data older than 21days if a user does not come into close contact with an infected individual.

TraceTogether has also been made open source to enhance trustworthiness, allowing experts worldwide to review the code and confirm the app works as described. The government has also published a list of "mythbusters" addressing the most frequent misperceptions of the app's functions.

The contact tracing teams are further aid by the use of "Safe entry app," a national digital check-in system developed by GovTech, which logs individuals' entry into a venue. Individuals only need to scan a QR code on their mobile devices and provide some personal details, such as their name and mobile number. It is deployed at all public venues and operating businesses, and contact tracers can use its information should there be a confirmed case at a given location.

4.2 South Korea

Under South Korea's Infectious Disease Control and Prevention Act, health authorities, with the approval of the police and other supervising agencies, can collect and analyze smartphone GPS data, credit-card payment information, and travel and medical records. As of March 26, this data is used by the government as part of its Epidemic Investigation Support System to retrace and map out a patient's recent movements in less than a minute. This information is then sent out to the public, so that people

can learn whether they have been exposed to an infected individual - and self-isolate or request testing as a result. The impact of these practices can potentially spill over into other areas, such as small businesses. For example, the business of a small coffee shop in South Korea nearly collapsed after being reported among one of the visited places by an individual who later tested positive for Covid-19.

Two different mobile apps have been used to identify outbreak locations: Corona 100m and Corona Map. Corona 100m collects data from the government database and sends a push notification to users if they come within 100 meters of an infected person, specifying the patient's diagnosis date, nationality, age, gender, and previous locations. Corona Map, on the other hand, plots the location data collected from patients on a map to make it easier for users to avoid these areas.

4.3 Japan

Japan has followed a cluster-based model developed around a hypothesis formulated in the aftermath of the case of the Diamond Princess cruise ship that entered the port of Yokohama on February 3. In particular, as explained by the political scientist Kazuto Suzuki, "this hypothesis accounts for the many passengers who were not infected with the new coronavirus despite having had close contact with infected persons. It posits that the explosive increase in infected persons is a result of the high transmissibility of certain infected individuals, which forms a cluster. Infected individuals with even higher transmissibility appear from these clusters to form more clusters and infect many others." In other words, the rate of virus transmissibility among individuals can vary, and a key part of this effort is to track down and isolate the individuals who can infect a larger amount of people. Testing is then limited to potential members of each cluster, as opposed to conducting widespread testing of the population. On February 25, the Japanese Ministry of Health, Labor and Welfare established a "Cluster Response Team" comprising public health experts and data analysts to track down individuals who are potentially linked to clusters and the locations associated with them. The government also releases information regarding the locations of clusters so that the public can avoid these areas.

Japan has been able to keep the operations of factories and other economic activities open for a sustained period of time - facing a linear growth in new cases - until a national state of emergency was declared in mid-April due to a surge in new cases. King's College London global health scholar Kenji Shibuya blamed this situation on a limited access to testing based on a strategy focusing too heavily on clusters, which can be hard to apply in big and densely populated urban areas. Hokkaido University epidemiologist Hiroshi Nishiura, who is part of an expert group advising the health ministry on the cluster strategy, also claimed that it was "not very successful in urban locations."

4.4 New Zealand

On May 20, the Ministry of Health released the NZ COVID Tracer app to support contact tracing in New Zealand as a key component of the country's reopening strategy after two months of strict lockdown measures.

NZ Covid Tracer is completely voluntary and allows users to create a digital diary of places they have visited by scanning official QR codes, which will help contact tracers to quickly identify and isolate anyone who may have been exposed to Covid-19. The app also notifies users if they have come into close contact with someone who has tested positive, and will soon allow them to self-report symptoms.

All businesses and organizations are strongly encouraged to create their own QR code posters through a new self-service process managed by the Ministry of Health. Customers, staff and visitors to a given premise will be able to scan QR codes using the app to register that they have visited that premise at a given date and time.

To ensure the privacy of users, the Ministry of Health has consulted with the Privacy Commissioner. According to the app website, all information is stored on a user's phone and the contact alert process does not involve transmitting any additional personal information besides location details recorded on the digital diary. It also emphasizes that individuals are in full control of their data and that all information is automatically deleted after 31 days.

4.5 Insights for Hawaii

Under the Sentinel Surveillance Program, the current contact tracing methodology in Hawaii involves the following steps: 1) interviewing individuals with Covid-19 to identify their contacts in the days before and during symptoms; 2) classifying contacts as high, medium or low risk depending upon the distance and duration of the interaction; 3) recommending isolation for those at high risk; 4) monitoring high and medium risk contacts for symptoms; 5) if Covid-19 positive, determine their contacts and repeat the procedure. Managed by the Hawaii Department of Health (DOH), the current contact tracing team has 80 investigators. In the long term, this program may need hundreds of staff members to keep the tracing program going and manage the spread of Covid-19. The contact tracing team has also limited office space and technology.

How well does this process work? As things stand at present, it is up to each patient to report whom they have come in contact with, which is the first essential step in revealing the web of infection she/he may be connected to. Then, the people identified through this initial step are monitored as they home quarantine and isolate - but not tested unless they develop symptoms. Nonetheless, not everyone will necessarily be able to remember who they have been in contact with for more than 10 minutes and closer than six feet during the previous 10-14 days - as requested by investigators - since this might well include strangers people inadvertently came in contact with (while waiting to check out at grocery stores or riding the bus, for example). State Health Director B. Anderson explained that throughout this process "you need to be able to conduct an interview and tease out sometimes very nuanced information. It's not just about a straight questionnaire. Sometimes in the course of asking questions they [interviewed people] remember something else that could be really critical". Digital contact tracing through a mobile app could play an important role in facilitating this process, as our phone will track all people we come close to and notify us if they test positive. This would compensate the inaccuracies of imperfect memory and lack of knowledge of strangers' contact information.

At a recent presentation to the House Select Committee on Covid-19 Economic and Financial Preparedness, the Hawaii Medical Service Association (HMSA) CEO M. Mugiishi talked about the importance of technology, emphasizing the role of GPS-enabled apps, such as those used in South Korea. With regards to GPS-enabled devices, it is important to keep in mind the level of intrusiveness and infringement of privacy rights these measures can bring about. A 2019 study by researchers at Imperial College London and Belgium's Catholic University of Louvain revealed there is a way to re-identify 99.98 per cent of individuals with just 15 demographic characteristics using location data. Other studies have come to similar conclusions that individuals can be identified based on aggregate data sets

with relative ease. In addition, it is unclear whether measures with this level of intrusiveness would be allowed in the first place, due to privacy laws in the United States. Voluntary Bluetooth-enabled apps, such as TraceTogether, are a better option for safeguarding privacy-friendly principles related to data anonymity, storage, retention, and consent. In April, Apple and Google announced the creation of a contact tracing system that allows users to share data through Bluetooth Low Energy (BLE) transmissions. It has been officially released in May, meaning public health agencies can start building this system into mobile apps. Users will be able to report if they have tested positive for Covid-19 and the system will notify people if they were in close contact with an infected person. Public health authorities will get access to this data. Apple and Google said that 22 countries and 3 US states (Alabama, South Carolina, and North Dakota) have received access to this system. The two companies consulted with several public health groups for the creation of this system, including the CDC Foundation, the Centers for Disease Control and Prevention, and the Association of Public Health Laboratories. Hawaii could consider complementing human tracers with a Bluetooth-enabled mobile app by taking advantage of the system created by Apple and Google.

Nonetheless, people also need to be willing to voluntarily install the app, since epidemiologists estimate that at least 60 percent of the population is needed to have it on their phone if it is to be effective in breaking the local epidemic. The percentage using an app has reached various levels in different countries, ranging from a low 17 percent in Singapore to more than 40 percent in Iceland. To be effective, the launch of such technology would have to be complemented by a robust incentive scheme through public-private partnerships (e.g. discounts, credits) and a transparent information campaign that emphasizes a) the privacy-friendly properties that will safeguard citizens' sensitive data, and b) the enormous benefits that the app would bring in mitigating the outbreak and returning to "normal" life. The European Union (EU) is working toward the development of similar tools.

Smartphone contact-tracing is just one part of a broader infrastructure that must be built to track down Covid-19 faster than it can spread through the population. As explained by *The Economist*, this technology will not be worth much unless ways of testing and diagnosing people on a large scale are also rolled out: "without these, there will be no information to feed back into the app network about who may be spreading the virus. Apps and phones can certainly provide location and proximity data, but only human tracers can bring human intelligence to bear on the matter". This is particularly relevant to Hawaii, as State Health Director B. Anderson recently claimed that the contact tracing team is understaffed, and that they "can't rely on volunteers forever." He added that the department looks forward to doubling its contact tracing capacity. As it expands its workforce, Hawaii could also consider deploying data scientists to conduct cluster analysis as part of its contact tracing process. Cluster analysis would help identify individuals with higher rates of transmissibility and the cluster locations associated with them before they grow too large. Following the infection clusters identified at Maui Memorial Hospital and at two McDonald's in Kona, HIEMA Incident Commander General K. Hara emphasized the importance of reacting quickly to clusters of infections. Therefore, clusters must be identified as soon as possible. Hawaii benefits from a low population density – with the exception of Honolulu County – and its geographical feature of being a small archipelago, which makes it relatively easier to contain a cluster before it expands. Nonetheless, clusters can pose several challenges if they develop in places like hospitals, as happened in Maui. A cluster analysis approach based on the Japanese model could prove beneficial if part of a wider system that includes widespread testing, social distancing

measures (especially in crowded and confined spaces), as well as a more effective enforcement of quarantine compliance orders - to avoid importing new cases that are hard to trace back to the source.

5. Travel Quarantine

5.1 Taiwan

People placed under quarantine in Taiwan are tracked through mobile phones to ensure that they stay home during the incubation period. The monitoring system in Taiwan is described as a "digital fence," whereby anyone required to undergo home quarantine has their location monitored via cellular signals from mobile phones. This was initially carried out by handing out government-issued phones to limit intrusiveness, then changed to tracking people's personal mobile phones as cases increased. Leaving the quarantine-designated area triggers the alert system and calls and messages are sent to the individual in question to ascertain her/his location. Anyone caught breaching their quarantine can be fined $33,000.

The system tracks the quarantined individual by triangulating the location of their phone relative to nearby cell towers by means of a partnership with Taiwan's five major telecom companies. As explained by J. Hong-wei, director general of Taiwan's cybersecurity department, "each telecom company has a different way of calculating the location of the phone, including how far it is from the cell reception tower and its direction in relation to the tower. As long as the phone is turned on, we can figure out the location. And if the phone is turned off, we'll know that, and we can send a message to front line administrative or police officers so they can follow up". Mr. Jyan added that the system has been very accurate, with only about 1% of alerts being false alarms.

In addition, if someone leaves the quarantine-designated area and leaves her/his phone at home to avoid being tracked, the Taiwanese police has deployed the so-called M-Police system, which gives officers access to numerous databases - including a database of individuals under quarantine orders. The police will go to popular gathering places to see if anyone matches up with the list of quarantined individuals. Officers have been able to catch multiple quarantine offenders through this type of operations. In total, Taiwan is tracking about 55,000 people in real time.

To alleviate the costs of isolation, Taiwan has also been providing essential services to quarantined individuals, such as food delivery and garbage disposal.

Finally, arriving travelers are not allowed to take public transportation and must use "epidemic-prevention taxis" to go from the airport to their quarantine-designated area so they do not expose others. The taxis are disinfected after each trip.

5.2 Singapore

Singapore has striven to make its 14-day mandatory quarantine system simple for travelers. It does so by presenting new arrivals with a pre-designated quarantine itinerary and utilizing existing infrastructure like empty hotels. Relevant authorities and hotels where individuals are isolating enforce compliance with quarantine orders. The main concern for the city-state is scaling up quarantine resources as it lifts restrictions on incoming travelers.

Singapore has implemented a system whereby quarantined individuals are required to click on links contained in SMS messages from health authorities that report their cellphones' location, thus confirming they are complying with the quarantine order. These are sent at random times during the day and confinees have to respond within one hour. This system is complemented by video calls at least three times a day.

5.3 Hong Kong

In order to enforce quarantine orders to all arriving travelers, Hong Kong started requiring the use of electronic wristbands connected to a smartphone app called "Stay Home Safe" to track people's coordinates within their quarantine-designated area. The Hong Kong government said it has more than 60,000 wristbands that can be used, and anyone who is found contravening or knowingly giving false information can be fined $5000HKD ($644) and imprisoned for up to 6 months.

5.4 Australia

Initially, travelers returning to Australia were allowed to self-isolate in their own homes after signing a legal document at their airport upon returning stating that they would comply with the 14-day isolation requirement. However, when it became clear that new cases were starting to spike, the government moved to mandatory isolation of returnees in state-run quarantine centers, which often involved hotels. These requirements are managed and enforced by state and territory governments with the support of the Australian Defence Force and Australian Border Force. All travelers are transported directly from the airport of arrival to their quarantine-designated areas. The exact procedures and quarantine arrangements vary by state and territory. In New South Wales (NSW), room service meals, sanitary items, and other essential services are provided for by the government free of charge.

5.5 South Korea

When individuals receive an order from their medical center to quarantine, they are prohibited from leaving their quarantine-designated area (homes or hotels) or coming into contact with other people, including family members. To track compliance, the Ministry of the Interior and Safety has developed the "Self-quarantine Safety Protection" mobile app, which all Koreans and long-stay foreigners are required to install. The app uses GPS to track subjects' location to make sure they are complying with the quarantine order. Each individual can report the development of any symptom directly through the app, or to a government case officer who calls twice a day for a health status update. Leaving the quarantine-designated area without permission triggers an alert system which notifies both the subject and the case officer, and the subject may be penalized with hefty fines and/or imprisonment for up to one year. A brief user manual for the self-quarantine app can be accessed here.

5.6 Insights for Hawaii

Since late March, all travelers on incoming international and domestic flights to Hawaii are required to complete a 14-day quarantine. The orders are clear: proceed directly from the airport to your designated quarantine location, remain in your designated quarantine location for a period of 14 days or the duration of your stay in the State of Hawaii (whichever is shorter), and you can only leave your designated quarantine location for medical emergencies or to seek medical care. Despite these

restrictions, visitors keep arriving into the islands, and more than 5,500 visitors have flown to Hawaii since quarantine began. While this is a very low number for Hawaii's tourism standards during normal times, it is a high one in the effort to slow the spread of Covid-19. In addition, there are loopholes in this system and compliance is hard to enforce, as discussed below.

The staff members of the Hawaii Tourism Authority (HTA) and the Department of Transportation (HDOT) have been calling hotels to alert them that they have visitors arriving who must quarantine. DHOT has deployed a total of about 50 employees to track quarantine compliance of travelers. To this end, state officials will call visitors to make sure they are in their quarantine location and ask them health questions. An online program is also in place asking travelers to provide their information and where they will be staying, requiring them to check daily into this program to attest they are at their quarantine location and to answer questions about their health. Nonetheless, these methods are not infallible, and can be outwitted. While some visitors have been caught and arrested violating quarantine orders in the last few days, and more than 400 warnings and citations have been issued, it is hard to estimate the overall rate of noncompliance (comprehensive statistics have not been made available). Moreover, Hawaii does not have a program in place to provide the same level of scrutiny for residential addresses as it does for hotels, or even to verify that visitors registered a real address in the first place. In fact, the actual residence address is not being verified other than by checking the government-issued identification, such as a driver's license. When pressed by the Senate Special Committee, Department of Taxation Director Ms. Rona Suzuki confirmed that they do not know if people are complying with the quarantine order. The Senate Special Committee itself then expressed concerns that the state may not have the resources to ensure compliance at the present time.

At the moment, HTA is working with other state agencies to come up with a plan to randomly track travelers. This might not be enough given the large number of them arriving on a daily basis. The Senate Special Committee measures has inquired about other measures, such as whether the state could implement a surcharge on visitors coming to Hawaii, to which Attorney General Ms. C. Connors responded that such actions would likely be prevented by federal law. Ms. Suzuki is also working with the Attorney General to enable the use of location services, and Gov. Ige recently said the state was studying the possibility of adopting a smartphone app that would allow for the capture of location information. While these measures can be applied to both residents and visitors - or to anyone at all - is still uncertain. If the legal criteria are met, the Taiwan "digital fence" model would be a successful example to follow, allowing for an effective monitoring system, a more efficient allocation of HTA, HDOT, and HPD resources, and ultimately better and provable compliance. Ideally this would be implemented by means of government-issued electronic devices to limit the intrusiveness into people's own mobile phones. Alternatively, an even less intrusive option would be Singapore's model which, while still GPS-enabled, does not track quarantined individuals in real-time. Hong Kong's use of wristbands may instead be considered too intrusive according to US privacy standards.

In addition, Hawaii could consider adopting different cost-reducing and precautionary measures for visitors and returning residents. Currently, visitors in mandatory isolation have to incur all costs (including food) of quarantine and cannot leave their designated area at any moment, except for medical needs. To further incentivize quarantine order compliance, Hawaii could consider partially alleviating the costs of isolation of visitors by providing essential services, such as food delivery and garbage disposal. This could complement the assistance program established by the Visitor Aloha

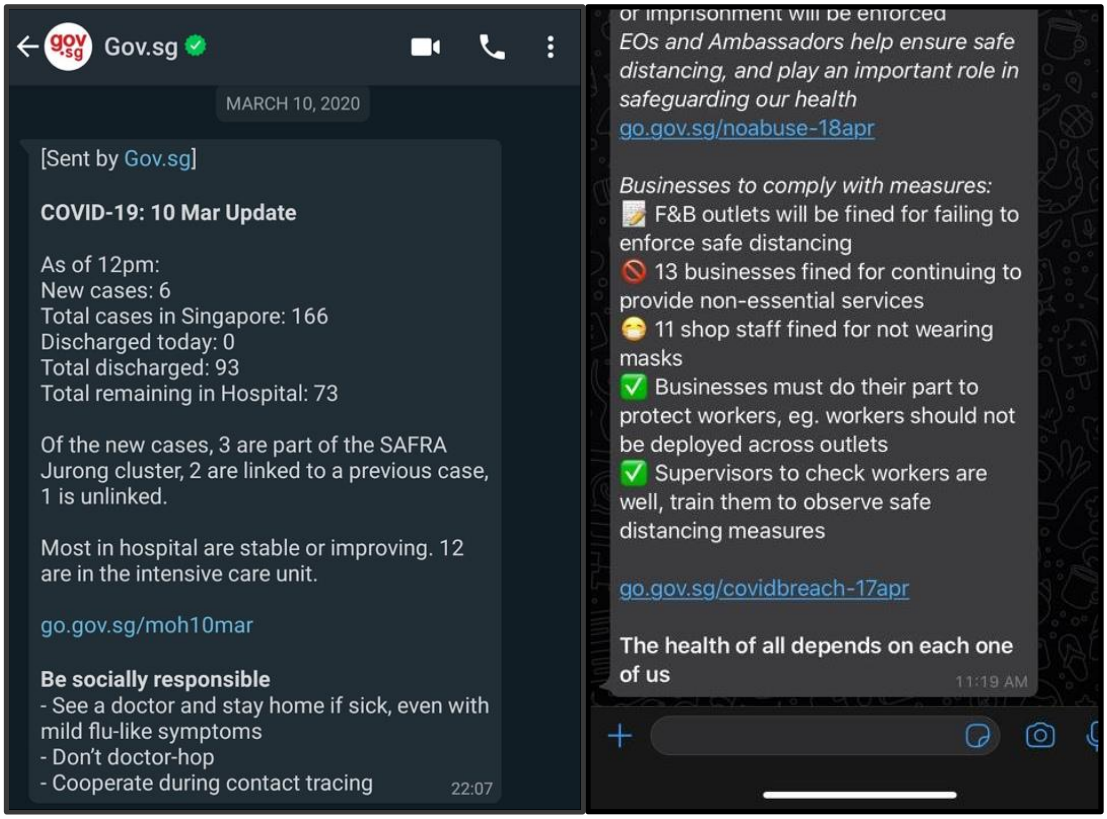
Society of Hawaii (VASH) – which has been paying for flights to return travelers who cannot meet the costs of quarantine (such as lodging and food) and potentially alleviate its burden by making it less likely for people to feel the need to request money to fly back due to a lack of resources to comply with quarantine orders. With regard to returning residents, the State of Hawaii could consider following Australia's model of using hotel rooms as quarantine-designated areas and covering the entire cost, including the provision of essential services, such as food delivery and sanitary items. The difference in policy between visitors and returning residents is key in this context, given that returnees often self-isolate with other household members who, though they are exposed to Covid-19 as a result of living with returnees, they are not subject to the same restrictions of movement even if they pose the same level of threat. In Australia, about 80 percent of cases have come from returnees or people who have been in contact with them.

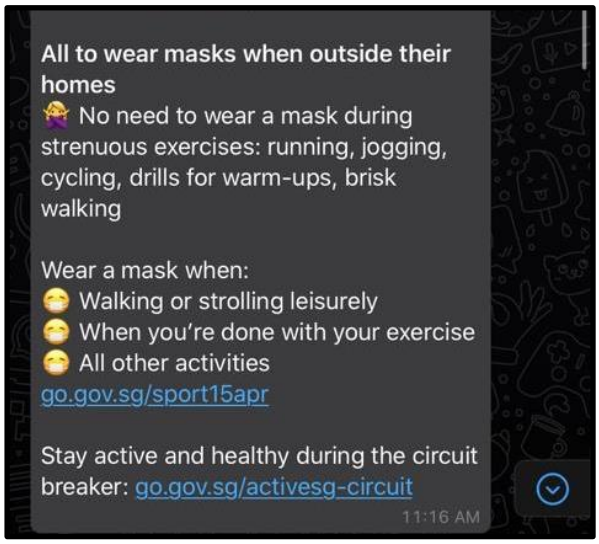
6. Communication

6.1 Singapore, South Korea & New Zealand

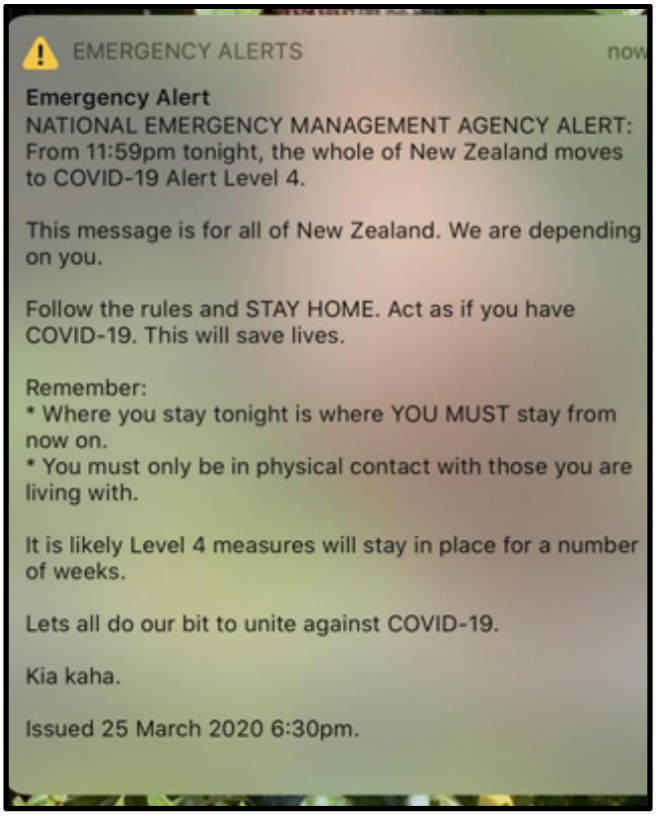
Alongside daily press conferences and leaders' updates and statements, Singapore, South Korea and New Zealand have been sending concise, important information to their citizens directly through SMS. This includes information such as daily updates on new cases, details of new regulations, etc. Experts in security and emergency preparedness believe this could be vital in helping inform populations and control the virus. Dr. F. Muench, president of the US-based Center on Addiction who has conducted extensive research on digital messaging for public health, claimed that "Overall, SMS campaigns for public health are the most effective medium for mass dissemination due to their reach, immediacy, opportunity for data collection and personalization, ability to tailor and adapt information, and opportunity to link to other sources. We found that personalizing and adaptively tailoring text messages has the largest effects compared to other types of messages". Screenshots of these SMS messages in Singapore and New Zealand are included below.

Singapore:



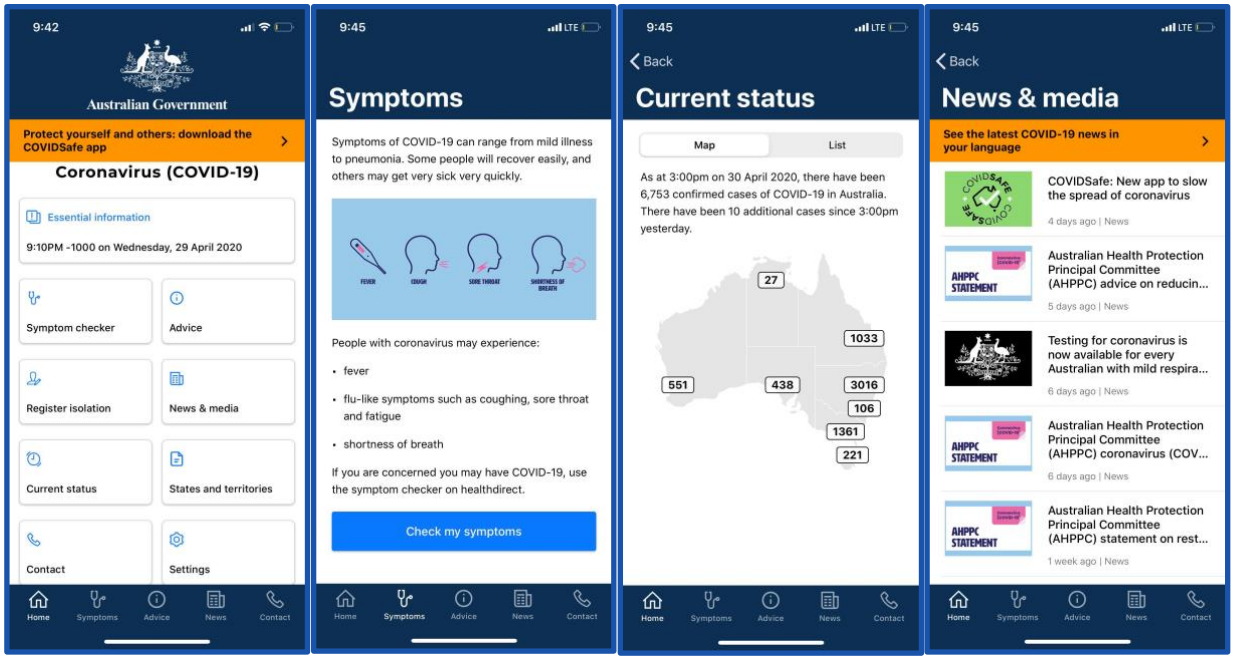

All to wear masks when outside their homes
No need to wear a mask during strenuous exercises: running, jogging, cycling, drills for warm-ups, brisk walking
Wear a mask when:
Walking or strolling leisurely
When you're done with your exercise
All other activities
go.gov.sg/sport15apr
Stay active and healthy during the circuit breaker: go.gov.sg/activesg-circuit
11:16 AM

New Zealand:


EMERGENCY ALERTS
now
Emergency Alert
NATIONAL EMERGENCY MANAGEMENT AGENCY ALERT: From 11:59pm tonight, the whole of New Zealand moves to COVID-19 Alert Level 4.
This message is for all of New Zealand. We are depending on you.
Follow the rules and STAY HOME. Act as if you have COVID-19. This will save lives.
Remember:
* Where you stay tonight is where YOU MUST stay from now on.
* You must only be in physical contact with those you are living with.
It is likely Level 4 measures will stay in place for a number of weeks.
Lets all do our bit to unite against COVID-19.
Kia kaha.
Issued 25 March 2020 6:30pm.

6.2 Australia

While relying less on SMS-based information, the Australian government has created a "Coronavirus" mobile app, which gives users quick access to different services, such as essential information and advice on measures adopted nation-wide, broken down for its different states and territories. The app also includes a "symptom-checker", relevant news articles, a map with the current status of cases, important contacts, and a – voluntary – option to collect information on individuals that are self-isolating. Screenshots of some of its main features are included below.



6.3 Singapore

Singapore has set up many website services to provide essential information on different matters ranging from where to find masks (MaskGoWhere.sg) and financial aid (AidHubSG.com) to available services (CanIGo.sg) and cocktail delivery (Cocktail.GoWhere.sg). The government also provides maps with information on crowd levels in malls, supermarkets, post offices, and public parks.

6.4 Insights for Hawaii

There is no SMS-based information system in Hawaii at the moment. Given the rapidity through which new measures are implemented every week, changing circumstances, and the overwhelming amount of Covid-19 related information online that is hard to filter through and keep up with, it might be beneficial to implement an information campaign which includes sending SMS to residents containing relevant information (without requiring an opt-in option) and/or a relevant mobile app. The Senate Special Committee has been requesting to implement targeted messaging for a few weeks, with the latest official statement going back to March 31.

There are two main ways to implement an SMS information system in the US:

1) The first option is the cell broadcast service used by the US where the government uses network operators' cellular towers and radio cells to push out a message in a matter of seconds, without officials needing access to any specific information on SIM cards or phone numbers.
2) The second option, called SMS location-based messaging, can target people based on a specific location, get more information on them and interact with them.

In Hawaii, SMS location-based messaging could be implemented by facilities such as the Hawaii Emergency Management Agency (HIEMA), which is able to send emergency-related text alerts, or by partnering with local phone companies. A recent display of this system's functions is the early-morning alert that was (mistakenly) sent to cellphones across Hawaii in 2018 to alert people of an incoming ballistic missile from North Korea.

A mobile app could also be created, to give users quick access to important information in view of the reopening of the economy, such as: a detailed timeline with the sectors of the economy that will be reopening and what social distancing measure they should implement; important contacts for medical assistance (including mental health and domestic violence hotlines), a "symptom-checker" akin to Australia's; a concise list of orders and measures adopted at the local and state level, etc. These could be broken down by island.

7. Screening

7.1 Singapore

Health Minister G. K. Yong emphasized that temperature screening is part of Singapore's collective measures to tackle Covid-19. Despite its limited effectiveness due to the fact that not all patients develop a fever, several infectious diseases experts said it remains a useful precautionary measure. This is due to the fact that even if not all patients develop a fever, a sizable proportion of them do (the CDC considers a reading of 100.4 degrees Fahrenheit a fever). Temperature checks are conducted in various sites in Singapore, such as restaurants and tourist attractions.

7.2 Insights for Hawaii

There is no widespread screening practice in place in Hawaii at the moment. It has been proposed by HMSA President and CEO, M. Mugiishi during a presentation to the Economic and Financial Preparedness House Select Committee on April 13, even though the details of its proposed implementation are not yet clear (when, where, who, the process, etc.).

8. Facility Management

8.1 Taiwan

The Taiwanese government has prepared a backup plan to handle a sudden jump in cases if that should happen despite precautions. This includes maintaining a high bed-per-capita ratio, making more isolation rooms available, and reconfiguring existing rooms. The staff size within medical facilities was also reduced by as much as two-thirds, lowering the risk of community spread within a hospital treating infected patients (as was the case at Maui Memorial Medical Center). Measures were also adopted to control the flow of patients and visitors into hospitals. Shih Chung-Liang, a top official for Taiwan's Central Epidemic Command Centre (CECC), announced that hospitals were setting up separate entrances and exits to help prevent the spread of infection via regular hospital traffic. This included patients passing through a temperature checkpoint and showing IDs before admittance.

8.2 Insights for Hawaii

Hospital beds and equipment have so far been able to keep up with the increase in hospitalizations. On June 15, the status of hospital bed and equipment was as follows:

Hospital Beds: 2,773 total
Currently in use: 50%

ICU beds: 244 total
Currently in use: 44%

Ventilators: 459 total
Currently in use: 12%

(Source: https://www.hawaiidata.org/covid19)

As Hawaii eases restrictions, medical facilities should consider planning for a worst-case scenario of a sudden increase in cases, reducing the size of their staff and maintaining a high bed-per-capita ratio in more isolated rooms where possible (data on current situation is not available). Making separate entrances and exits for in- and out-patients to help prevent the spread of infection via regular hospital traffic could also be considered. This is particularly relevant given the recent outbreak within the Maui Memorial Medical Center where required precautionary measures - such as requiring visitors to undergo temperature checks, wearing masks upon entering the building, and providing staff with enough personal protective equipment – were not fully implemented.

9. Travel

9.1 Australia & New Zealand

These countries have been discussing the possibility of implementing a "Trans-Tasman Bubble," i.e., open travel between Australia and New Zealand, as early as September. Travelers would not be required to undergo 14-day quarantines because both countries have been successful at flattening the curve.

This plan is currently being elaborated by the Trans-Tasman Safe Border Group, an alliance of more than 40 airports, airlines, health specialists and governments, in an effort to resume air travel as soon as possible. Critical aspects being studied for implementation include assessment of passengers' pre-flight health requirements and eligibility, protection onboard planes, passengers' movement through airports, and contact tracing requirements once travelers reach their destination.

9.2 Hong Kong

Hong Kong has been allowing some business travelers to apply for quarantine exemption since May 4. Applicants must prove that their travel is related to manufacturing operations which contribute to Hong Kong's economic development. Airports in Hong Kong have also been testing all international arrivals since April.

9.3 Japan

The head of the Japan Tourism Agency recently announced that the government has created a plan called the "Go To Travel" initiative, which aims to boost tourism by subsidizing a portion of travelers' expenses. The proposed program includes covering a portion of hotel expenses up to a maximum of 186 USD per day. Travelers will also be able to purchase prepaid vouchers for up to 20% off the price of meals at participating restaurants. Some entertainment events would also be discounted by 20% if purchased through certain travel sellers. If confirmed, this plan will only apply to domestic travel starting in July.

9.4 Vietnam

Vietnam has been the first country in Southeast Asia to start reopening its tourism economy thanks to its successful containment of Covid-19. Domestic flights resumed in April and the country is now considering opening its borders to international visitors, considering potential travel bubbles with Japan, South Korea, and Taiwan. While these agreements do not envisage long quarantines for tourists, testing will likely be required before departure and at arrival.

Vietnam's reopening is likely to be divided in different areas, prioritizing those that have been better able to contain the spread of Covid-19, such as holiday islands and resort towns.

9.5 Insights for Hawaii

Visitors arrivals to Hawaii declined 99.5% in the month of April compared to the previous year, due to Covid-19 fears and 14-day travel quarantines mandated by the State for all incoming travelers, including across the Hawaiian islands. Most tourists traveling to Hawaii each year come from the US west and

east coasts and Japan. Resuming travel to restart the tourism economy will largely depend on the evolving circumstances in these areas.

Lt. Gov. J. Green recently claimed he is hopeful that travel could be resumed with Australia, New Zealand, and Japan as early as July, exempting travelers from 14-day quarantine requirements. Japan recently lifted its Covid-19 emergency controls but significant restrictions remain on domestic and international travel. As described in section 9.1, Australia and New Zealand are currently discussing the possibility of implementing a "Trans-Tasman Bubble," i.e., open travel between the two countries without requiring travelers to undergo 14-day quarantines. Yet if approved, this bubble scheme will not start until September. Although the countries identified by Lt. Gov. J. Green are still at an early stage of lifting travel restrictions, Hawaii could start engaging in talks to negotiate comprehensive agreements with them in light of its low number of infections. The State could further work toward the creation of a "Pacific bubble" inclusive of other countries, such as Micronesia, Nauru, Solomon Islands, Tuvalu, Tonga, Kiribati, Vanuatu, and Palau, which satisfy specific public health criteria, such as a low number of cases and/or effective contact tracing and testing systems in place.

Building on Japan's "Go To Travel" initiative, Hawaii could also consider subsidizing some of hospitality and/or entertainment costs to incentivize interisland travel to the areas in Hawaii that have been most hard-hit by the lockdown.

To resume travel safely, it is key to have an effective testing system in place for incoming travelers. Representatives G. Ward and B. McDermott have recently released a publication to the House Select Committee on Covid-19 emphasizing airport testing procedures as the main step to restart the tourism economy. The document specifies that all incoming travelers should be tested up to 72 hours prior to their departure to Hawaii. Following Hong Kong's example, local airport testing should also be available for those who arrive without being tested.

10. Policy Insights for Hawaii: Recap

Overall, Hawaii has taken effective measures to manage the pandemic, with 736 confirmed cases (as of June 15) and one of the lowest death rates in the United States. The insights below are meant to complement existing efforts toward reopening its economy in a timely and prudent manner.

Community Measures and Social Distancing

1) **Control flow of people in confined spaces offering essential services, such as grocery stores/supermarkets**. In New Zealand (and several EU countries), grocery stores required people to line up six feet apart while waiting to go one in, one out, limiting the total number of people shopping at the same time. Read more here.

2) **Oversee compliance of social distancing measures during water activities.** For example, entrust lifeguards (e.g., in Waikiki) with monitoring water safety and breaking up crowds where they form. This could include surfing, where it is often difficult to maintain social distance due to the combination of a large amount of people and the competition for limited space where a wave breaks. Read more here.

3) **Analyze the current situation regarding co-living spaces with shared facilities and make sure that the right precautionary measures are being adopted.** This includes university dormitories, nursing homes, prisons, as well homeless shelters and large encampments. Read more here.

4) **Implement precautionary measures in workplaces, schools, restaurants, and other crowded places.** Useful guidelines for such measures in Hawaii are contained within the UHERO/EWC report. Read more here.

Personal Protective Equipment

5) **Consider establishing Walk-in Sample Kiosks (Wisks).** Address the current shortage of PPE, redirecting to other areas some of the PPE that is currently used for testing. Read more here.

Contact Tracing

6) **Complement human tracers with a Bluetooth-enabled mobile app.** Facilitate the contact tracing process through a more efficient allocation of resources and more rapid identification of cases. To incentivize citizens to install the app, its launch could be complemented by an incentive scheme through public-private partnerships (e.g. discounts, credits) and a robust and transparent information campaign that emphasizes a) the privacy-friendly properties that will safeguard citizens' sensitive data, and b) the enormous benefits that it would bring in mitigating the outbreak and returning to "normal" life. Read more here.

7) **Consider providing additional resources to the Department of Health**. These include hiring additional investigators to enhance the efficiency and effectiveness of the contact tracing process. Read more here.

8) **Deploy data scientists to conduct cluster analysis as part of Hawaii's contact tracing process**. This will help identify individuals with higher rates of transmissibility and the cluster locations associated with them before they grow too large. Read more here.

Travel Quarantine

9) **Explore possibilities to adopt a digital fence monitoring system, such as Taiwan's.** This will ensure better and provable compliance with quarantine orders. This could be implemented by providing government-issued devices to limit intrusiveness into people's personal mobile devices. Read more here.

10) **Designate "epidemic-prevention taxis."** Arriving passengers could use special vehicles to go from the airport to their quarantine-designated area to reduce the chances of infecting others. Read more here.

11) **Consider implementing different cost-reducing and precautionary measures for visitors and returning residents.** This could be done by a) partially alleviating the costs of isolation of visitors by providing essential services, such as food delivery and garbage disposal; and b) using hotel rooms as quarantine-designated areas for returning residents and covering the entire cost, including the provision of essential services, such as food delivery and sanitary items. Read more here.

Communication

12) **Initiate an information campaign that includes sending text alerts to residents containing concise relevant information (without requiring an opt-in option).** SMS alerts will inform residents on daily updates on new cases, details of new regulations, etc. Read more here.

13) **Create a mobile app to give users quick access to important information in view of the reopening of the economy.** This could include the following features: a detailed timeline with the sectors of the economy that will be reopening and what social distancing measure they should implement; important contacts for medical assistance (including mental health and domestic violence hotlines), a "symptom-checker" akin to Australia's; a concise list of orders and measures adopted at the local and state level, etc. These could be broken down by island. Read more here.

14) **Develop visual mapping tools to report information on crowd levels in high risk locations.** This could be done using real-time aggregate data provided by mobile phone location services to monitor shopping malls, supermarkets, post offices and public parks.

Screening

15) **Adopt temperature screening policies.** Temperature checks could be carried out before entering restaurants, hospitals, and other potentially crowded/high-risk environments. Read more here.

Facility management

16) **Plan for a worst-case scenario of a sudden increase in cases**. Medical facilities could consider reducing medical work group sizes and maintaining a high bed-per-capita ratio in more isolated rooms where possible. Read more here.

Travel

17) **Negotiate comprehensive travel agreements with New Zealand, Australia, and Japan.** Travelers could be exempted from 14-say quarantines in light of these countries' and Hawaii's very low number of new infections. Hawaii could further work towards the creation of a "Pacific bubble" including other countries that satisfy specific public health criteria. Read more here.

18) **Implement a voucher scheme to incentivize interisland travel.** Subsidize some of the hospitality and/or entertainment costs to incentivize interisland travel to the areas in Hawaii that have been most hard-hit by the lockdown. Read more here.

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Appendix A: Document Review and Updates

Below is a comprehensive list of the document updates in chronological order:

Date	Section	Description
June 14, 2020	4.4	New Zealand in "Contact Tracing"
June 14, 2020	9.4	Vietnam in "Travel"
May 28, 2020	10 (17)	Travel agreements in "Policy recommendations"
May 28, 2020	10 (18)	Voucher schemes in "Policy recommendations"
May 28, 2020	9	Added "Travel" chapter
May 18, 2020	10 (14)	Visual mapping tools in "Policy recommendations"
May 18, 2020	6.3	Singapore in "Communication"
May 12, 2020	10 (10)	Epidemic-prevention taxis in "Policy recommendations"
May 12, 2020	5.5	South Korea in "Travel Quarantine"
May 5, 2020	4.3	Japan in "Contact Tracing"
May 5, 2020	5.4	Australia in "Travel Quarantine"