May 4, 2020

Governor David Ige
State Capitol, Fifth Floor Executive Chambers
Honolulu, HI 86813

Aloha e Governor Ige:

Hawai`i has responded well to the pandemic. We have not seen exponential growth in community transmission, but the recent outbreaks in Maui and Hawaii Island show spread will likely continue for months, and we need to be prepared to contain it.

The challenge is this: How do we ensure that the current economic shutdown does not cause more damage than the virus itself?

There are good roadmaps for us to follow: Taiwan, Hong Kong, and South Korea have all responded to the virus successfully without employing broad stay-at-home orders or near total economic shut downs. Their success shows we must:

- Continue to require people to wear face masks in public spaces.
- Develop a more robust public health response capable of managing the epidemic during a phased reopening of the economy.
- Engage in more frequent, effective communication with the community.

We have the first in place. Now, we must focus on the other two. Having a more robust public health response is the most important step. It requires:

1. **Widespread Targeted Testing.** We cannot fight the epidemic if we don’t know where it is. We cannot treat patients appropriately if we don’t know they are infected. We need to expand testing to include asymptomatic people who are in the targeted “high risk” groups, including close contacts and exposed healthcare workers.

2. **Rapid and Thorough Contact Tracing.** We need more resources to track down potential cases, test them, and contain outbreaks. Contact tracing is a central and essential component of an effective containment intervention and its expansion is critical for success. Expanded contact tracing capacity needs to precede re-opening to prevent explosive outbreaks as we re-open.

3. **Effective Voluntary Isolation and Quarantine.** We need more effective and available quarantine and isolation measures that prevent transmission in large multi-generational households common in Hawaii, that keep front-line health workers from exposing their families, and that keep visitors inside their hotel rooms for 14 days.

4. **Special Plans for Groups in High-Density Housing.** These include Homeless Families, Multi-Generation Families, Long-Term Care Facilities, Skilled Nursing Facilities, Nursing homes, Community Care Homes, Prisons, and Public Housing Developments. These are the highest risk citizens who must receive special attention if we are to avoid catastrophic outbreaks. Singapore was among the successful responders to COVID19
until recently, when outbreaks resurfaced with a vengeance among its most vulnerable communities.

5. **More agile, better-resourced public health leadership at the State level.** We need leaders who will respond rapidly and effectively to outbreaks. They must be empowered to extinguish brush fires quickly and prevent the exponential growth in new cases. We recommend that they draw on private resources, e.g., nurses and social workers at managed care organizations.

Each month the shutdown continues, we will have 175,000 people not working and untold human suffering. The DOH must get whatever resources are necessary to avoid another month of heavy losses. If the DOH cannot do the job, we recommend that you pursue other public and private options for increasing core public health services that allow us to incrementally and safely reopen the economy.

**The second essential step is more aggressive and effective community outreach.** We need more compelling messaging that wins buy-in from all of Hawaii’s various communities. As we have all seen, DOH does not have the skills or flexibility to do the required messaging rapidly and effectively. Hence we strongly urge you to enlist skilled, independent, public relations/marketing companies for this purpose. Appealing to our sense of kākou is critical to controlling Hawaii’s epidemic and allowing us to stay safe as our economy reopens!

How do we strengthen our public health response and reopen safely? The Executive Summary to the Murphy, Miller, Meyer, Derauf, and Dworkin paper provides an outline. An additional three papers included with this letter expand on these ideas.

In the spirit of aloha and `ohana, we are here to help you and your hardworking staff. Please call on us.

Yours Sincerely,

EPIC `Ohana (Laurie Tochiki, PhD, JD, President & CEO)
Friends of the Children’s Justice Center of Maui (Paul Tonnessen, Executive Director)
Hawai‘i - American Nurses Association (Katie Kemp, BAN, RN-BC, President/Hawai‘i - ANA)
Hawaii Children's Action Network (Deborah Zysman, MPH, Executive Director)
Hawaii Health & Harm Reduction Center (Heather Lusk, MSW, Executive Director)
Hawaii Public Health Institute (Jessica Yamauchi, MA, Executive Director)
Hawaii Youth Services Network (Judith F. Clark, MPH, Executive Director)
Hep Free Hawaii (Heather Lusk, MSW, Co-Director)
Holomua Hawaii Hospitalists (Angela Payumo, MD, Co-Owner)
Kokua Kalilhi Valley (David Derauf, MD MPH, Executive Director)
Lanai Community Health Center (Diana M V Shaw, PhD, MPH, MBA, FACMPE, Executive Director)
Mental Health America of Hawai‘i (Bryan Talisayan, Executive Director)
Na Pu‘uwai (Kamahanahokulani Farrar, MHRM, Executive Director)
Parents And Children Together (Ryan Kusumoto, President & CEO)
Save Medicaid Hawaii (Doris Segal Matsunaga, MPH)
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Executive Summary

Hawaii has responded well to the pandemic. We have not seen exponential growth in community transmission so far. There are still concerns regarding Maui Island and Hawaii Island that await testing results due in this week. However, the risk of spread of the virus will likely continue for months ahead. We cannot continue with the economic shutdown much longer or the health impacts and damage to society from the economic disaster will outstrip damage from the virus itself. So we need a measured strategy to recover while preventing large outbreaks.

Several island states have handled the virus very well without employing broad stay at home orders or near total economic shut down, e.g. Taiwan, Hong Kong, Singapore, and South Korea (effectively an island due to a hard border). What did they have that we lack? They appear to have had a more robust public health system, more wearing of face masks, and frequent, transparent communication with the community. It seems reasonable that if we could implement the missing pieces in Hawaii, we could largely, reopen our economy. How do we do this safely? Here is an outline of considerations, with expanded ideas below. The idea is to stimulate a broad and careful discussion of how to do this safely yet quickly.

What still needs to be done for epidemic control?
1. More Robust but Appropriately Targeted Testing. You can’t fight a fire if you don’t know where it is.
2. More Rapid and Thorough Contact Tracing, the necessary extension to testing. To track it down.
3. More Effective Isolation and Quarantine. To prevent spread.
4. Special plans for High Density Housing groups, e.g. Homeless, Multi-Generation Families, Long Term Care Facilities, Skilled Nursing Facilities, Nursing homes, Community Care Homes, etc. Highest risk!
5. More people using Face Masks when out in society. Reduces spread yet low tech and cheap.

What can we do now to safely reopen the local economy?
1. Get the above 6 items in place, and we can start to open up. Let’s move on this!
2. Reopening should be gradual and step wise, measuring the response and responding appropriately.
3. State public health system must develop the ability and will to respond quickly and effectively to outbreaks. Putting out brush fires quickly to prevent exponential growth.
4. Businesses, including manufacturers, stores, and restaurants, to develop plans for maintaining physical spacing (social distancing) while serving customers.
5. Recreational facilities to open while maintaining physical spacing.

What should be started to reopen the tourist industry?
1. Explore testing and screening of travelers before boarding aircraft to Hawaii.
2. Secondary screening of all travelers upon arrival, with Quarantine decisions based upon level of risk.
3. Tourist groups to be capped at maximum number per group.
4. Explore ways to monitor tourists while they are here for symptoms/fevers.
5. Explore monitoring of tourist industry personnel for symptoms/fevers as they will be sentinels.

How is this done?
First, two observations:
A. We cannot eradicate this virus without a vaccine, so it would be economic disaster to try.
B. We need a measured strategy to recover while preventing large outbreaks.
B. We need sustainable solutions so we can continue to live with the virus yet still thrive.
1. Shelter at home is principally to stop exponential growth in cases. We do not have this.
2. But we cannot just do nothing. Death rate would be too high including with non-Covid patients.
3. We relax interventions in a science and data driven way. We will have to test various interventions.
4. Specific minimum criteria must be met before we relax interventions. This must be discussed.
5. We must respond rapidly to any flare ups. Quick testing, tracing and quarantine essential!
6. We must study the results and learn from what works and doesn’t and then adapt. We get better at it.
7. An advisory council should be set up to counsel the General and the Governor comprising experts in Public Health, Epidemiology, Infectious Disease, Hospital Management, Economics, Business Leaders, and Volunteer Organization Leaders.

Perspective. We have used a powerful but very blunt, hammer-like intervention, having everyone shelter-at-home, and the epidemic curve has so far been controlled. The transmission rate of the virus is currently low, at least O‘ahu and Kaua‘i. Now we enter a phase where more precision and finesse will be required. We must gradually open society back up, maintaining just enough measures to keep transmission of the virus low and controlled. Because of the chaotic and unpredictable nature of clusters and flare-ups, both the public health response and the hospital capacity must be present to contain but if necessary treat the casualties of a major epidemic. This risk can be reduced but not entirely eliminated, at least for the foreseeable future.

The Balance Between Benefit and Cost. We do not yet know how many of the available interventions will be required to do this, nor do we know the actual cost of each intervention, so we must use judgment to balance the effectiveness of the interventions with the cost to society. We need to make a list of the available interventions with an estimate of their contribution to decreasing spread of the virus. Then we need to rank them based upon their cost including economic and downstream health impacts. The most costly and damaging interventions should be removed first, while retaining the correct number of less costly and easier interventions to control spread of virus. There should be a forum for discussion among physicians, epidemiologists, economists, and business leaders, as well as politicians to devise a specific plan and to adapt the plan over time. Total shut down, the most expensive and damaging intervention, should be avoidable if we get the other interventions effectively working.

To do now:
1. Conduct a thorough inventory and assessment of our public health capabilities: capacity for testing and tracing, situational analysis, information flow, response capability to outbreaks, SOPs, quarantine laws and facilities, and community outreach capabilities. We need to know the true response capacity both on O‘ahu and on neighboring islands.
2. Quickly, greatly expand surveillance, rapid contact tracing, and quarantine capabilities, with surge capability to respond to outbreaks. Train and Use volunteer labor. Buy computer and phone gear.
3. Develop an organized testing system with short turnaround, reporting immediately to initiate contact tracing. Delays in test results destroy tracing effectiveness. Capacity > 1000 tests per day each county.
4. Ask Federal legislature for emergency exception to the Jones Act so we can get supplies shipped directly to Hawai‘i without going through mainland ports, which causes delays and increased costs.
5. Aggressively investigate and contain the outbreak at Maui Memorial Medical Center and any Long Term Care Facilities with cases. All staff and patients should be tested in high transmission settings.
6. Roll out vigorous, friendly community outreach messages on traditional and social media.
More Detailed List of Public Health Measures to be Considered

What still needs to be done for epidemic control?

To provide the robust public health response that would be required to open up society and the economy, there needs to be much more and better targeted **testing**, more rapid and thorough **contact tracing**, and more effective compliance with **quarantine**. These capabilities need to be able to respond to a surge in cases to contain an outbreak. These tasks require supplies and manpower, but supplies are becoming available, and the State has an abundance of volunteer labor, much of it from idle health care workers who could be readily trained and enfranchised into the State’s public health response. Individual entrepreneurs and volunteer groups should be encouraged, supported, and brought into a collective, state collated data base to get the job done, rather than isolated and ostracized. Individual fiefdoms need to be relaxed, and silos broken down. We must pull together to get the job done.

1. More Robust but Appropriately Targeted Testing.. *This is key! You must know where the disease is to control it.*

   a. We need to continue to **increase capacity for testing** in three sectors: state lab, hospital labs, and private labs. The state will need all the help it can get and should **encourage hospitals and private physician groups** to provide more testing and report results to the DoH system.

   b. Priorities for testing have been set by CDC and DoH, but now that we are in community spread and are trying to contain clusters, **priorities need to change**. In situations where there can be rapid spread or super-spreading, **both symptomatic and asymptomatic persons should be tested**. Examples are shipboard, hospital, nursing home, and homeless shelter outbreaks.

   c. There is good evidence now that **a significant percentage of test POS people have NO symptoms** at the time they are tested (47% on one cruise ship) and many will never develop symptoms (18% on a cruise ship). High numbers like this may also be seen in crowded settings.

   d. DoH should do representative sampling of populations throughout the state to get a feel for prevalence of the virus in the community as the epidemic progresses. This could be **active surveillance** instead of merely relying on passive samples submitted through influenza screening system.

   e. Acquisition of a reliable **serology test** to measure antibodies to the virus will be very helpful and **should be deployed strategically and rapidly**. It should be initially used together with PCR to verify that those with antibody are also not shedding the virus. Then it can be used to clear people from isolation and quarantine. It can be used to get health care workers (HCW) and other employees back to work. And it should be used to assess prevalence of antibodies throughout the population.

   f. Testing will need new platforms, some of which are just being created.

   g. Mayors, governors, other critical State leaders and their immediate staff to be tested.

   h. Develop strategy for testing of asymptomatic health care workers and first responders taking care of high risk patients.

   i. Increase the yield of actionable data by devising more effective testing strategies.

   j. Develop a strategy for testing travelers and travel workers for the Port Authority (see below).
2. More Rapid and Thorough Contact Tracing, the necessary extension to testing. *To track down the disease.*

   a. Effective contact tracing is necessary to realize the full benefits of testing. All positives should be interviewed to acquire names and contact information of people whom they might have exposed from 3 days before they became symptomatic until screened.

   b. Then *all contacts needs to be tracked down and interviewed* as much as possible. This is time consuming. All contacts who are symptomatic should be tested and many asymptomatic contacts should be tested too depending upon the level of risk. E.g., anyone in a high density situation should be tested, symptomatic or not.

   c. Contact tracing data should be **recorded in a database** and available for quarantine monitoring and follow up.

   d. There are numerous volunteers within the state who could help with this, including nurses who could be trained very quickly to do it, augmenting the DoH.

   e. **Effective contact tracing must be fast.** Each day of delay makes containing the virus more difficult. Some models say that all contacts will need to be run down in a day to contain Covid outbreaks. Various apps are being invented to assist with this. Staffing will be critical and surge capacity must be at the ready.

   f. Contact tracing must get beyond bootstrap, and include digital technologies that permit rapid, same day identification of index cases and contact lineages. Contact tracing also will need to be linked to a “care hostel” for infectious persons unable to “home isolate”

3. More Effective Isolation and Quarantine. *This is necessary to contain the disease.*

   a. Isolation of known positive cases is paramount. Isolation can be done at home, but for those who have high risk family members at home or who live in large group settings and for those who do not have the option of their own room, they should be isolated at a **hotel set up for the purpose.** Consideration should be given to Quarantining an entire household when one person in the household is under isolation or quarantine there.

   b. Quarantine can also be done at home, but there needs to be another **hotel set up for this purpose** for the same reasons as above. Quarantined people should NOT be housed with known positives.

   c. Quarantined and isolated persons **should be tracked.** There are cell phone apps to do this. It could be a condition of getting tested that you accept the app on your phone.

   d. Quarantine and isolated persons should be **monitored at least by phone.** The apps would help, but telephone follow up should be done by a team of people trained to do this.

   e. There needs to be some enforcement of officially isolated or quarantined people. Quarantine laws should be activated for this purpose with due process. If people violate quarantine or turn off their phones, police can be called to check up on them. People putting the public at risk by going to bars, large groups, while isolated or on quarantine should be arrested.

   f. Health care workers exposed to Covid POS patients who have high risk family members at home, should have the option to stay in a special hotel for them or perhaps in a hotel being used for quarantine, but on a different floor. While there, they should observe the quarantine rules except for going and returning from work.
4. Special plans for High Density Housing groups, e.g. Homeless, Multi-Generation Families, Long Term Care Facilities, Skilled Nursing Facilities, Nursing homes, Community Care Homes, etc.

*The infection spreads rapidly in these conditions and the case fatality rate is also high.*

   a. These populations have been the source of re-emergence of the disease in areas where it had been contained. These populations also have the highest case fatality rates. Special attention and protocols must be worked out.

   b. The basic principle is to spread people out. People who share the same air handling systems and toilet facilities will be at risk for spreading to each other.

   c. The principle of cohorting Covid POS persons away from persons at high risk means that we would not wish to send POS persons or those being discharged from hospital after being POS into SNF or NH with NEG residents. One solution to this is to use hotels and bring in nursing staff to the hotel to help with this. I understand NY is working on this.

   d. Homeless people should not be isolated or quarantined in shelters. Hotels should be used where they would be in their own room and in a separate building.

   e. People who live in multigenerational homes with high numbers of people sharing rooms and bathrooms are also problematic. Certainly these are not ideal places for isolation and quarantine which could also be done in hotels.

5. More people using Face Masks when out in society. *These reduce spread and therefore the R.*

   a. Face Masks should be **required in any public setting**, such as using public transportation, taxis, in stores, or waiting in lines.

   b. Use of face masks should be **encouraged by numerous advertisements**, public health announcements, social media posts, etc.

   c. Make is cool to mask. Hawaiian-ize masks with designs. **Explain to the community how this helps us re-open the economy.**

6. Better Community Outreach with more messaging to win buy-in of the community. *Kākou, not just me. Very important especially in a free society to explain to people why their help is important.*

   a. One of the ways that Taiwan got good buy-in was friendly, through, repetitive community outreach through frequent radio, TV, and social media ads, announcements, videos, and reminders. Ours have not been sufficient to get full buy-in from the community.

   b. Creative ads that are also technically correct could be used. Have public health and medical personnel craft the message content, but then have media experts craft the technique.

   c. Emphasize our *kuleana* to our community. Talk about *malama our kupuna*. Make it Hawaiian.

   d. Government leaders such as Governor, LG, and Mayors could call community leaders such as CEOs of corporations and Pastors of churches and other *Kuhuna* to request their help in using their leadership to improve community buy-in.
What can we do now to safely reopen the local economy?

1. Get the above 6 items in place, and we can start to open up. *We need to catch up.*
   a. The steps listed above under “What still needs to be done...” are requisites for safely opening up the economy. **The sooner we implement them the better.**
   b. Assess deficits in the 6 items above. *It is not clear whether we are ready.*
   c. It will take Government too long to implement them effectively, so we need to enlist volunteers and the private sector to accomplish them. People need to let go of their fiefdoms and the traditional silos that inhibit effective response to a crisis.
   d. Many of the steps above are already partially accomplished, so the goal of HIEMA should be to **speed up** their implementation by better coordination, communication, and cutting of red tape.
   e. **Anyone who can help is an ally.** Certain quarters should stop trying to shut down community actors who can help. *Strive to work toward common goals and attempt to keep differences from becoming destructive of our goals.*

2. Reopening should be gradual and step wise, measuring the response and responding appropriately.
   a. The most costly and damaging interventions should be removed first, while retaining the less costly and easier interventions. How to do this should be a topic of discussion among physicians, epidemiologists, economists, and business leaders, as well as politicians.
   b. The first step should be to remove the stay-at-home order that has almost frozen both society and the economy. This hammer has not been universally required but may be needed in the future if a flare up gets out of hand. The public should be made aware of this so they cooperate with the lesser restrictions that will be retained.
   c. Critically review sectors of society and business that can be part of first phase of opening.
   d. Get most businesses and manufacturing going again but retaining physical spacing and mask wearing.
   e. Schools K-5 might be opened with some physical spacing, after testing demonstrates early school age not involved in amplifying transmission. This begins to restructure an integral social component. If successful, advance to middle school grades 6-8. This has multiple benefits.
   d. Gradually we could experiment with restaurants and recreational programs.
   e. Large gatherings and events would need to be restricted for a while, but trials of groups of 5, 10, 20, 50, etc. could be made over time.
   f. One needs a time period of about 14 days to begin to see the effect of a major intervention on transmission. Thus, leaders must measure the response but allow sufficient time between major changes to properly asses their effects.
   g. Careful plans must be n place to continue to guard our most vulnerable populations as we open up.
3. State public health system must develop the ability and will to respond quickly and effectively to outbreaks. Putting out brush fires quickly to prevent exponential growth.

   a. This is key. Each step out of lock down is an experiment. If there are outbreaks, they must be contained quickly. To do this we must have aggressive testing, tracing, and quarantine of outbreaks. But this is better than lock down!

   b. Public health authorities and Government must respond intelligently to what we learn from what works and what does not work, adjusting policies as necessary. Flexibility, agility of public health regs to changing circumstances with clear messaging to public.

4. Businesses, including manufacturers, stores, and restaurants, to develop plans for maintaining physical spacing (social distancing) while serving customers.

   a. Unleash the creativity of business leaders and employees. Encourage each business to experiment with techniques.

   b. Appoint a few contacts within public health or HIEMA who could be advisors to businesses in developing their interventions.

   c. Hand cleaning stations at doors, elevators, shopping carts.

   d. Employees and customers to wear masks. Mask up!

   e. Businesses to develop plans, including work flows with expanded digital and online social interactions for maintaining social distancing while serving customers, including phone in with delivery services when practical.

   f. Frequent cleaning of door handles of cabinets and things people touch or breath on.

   g. Temperature sensors at entrances to identify fevers with response by staff.

   h. Manufacturers to implement physical spacing within factories. This is already underway in the mainland. Spacing out work stations, mask wearing at work, hand wash stations, etc. and we can make things again.

   i. Restaurants should consider new structures in operation. Take out ordering service could get many functioning while maintaining physical spacing: patrons would receive food and many restaurant employees would have jobs restored. Restaurants could redesign layout to serve customers in more spread-out fashion. Staff could wear masks, as in Japan. Tables could be placed with 6 foot distancing. More outside, al fresco dining, enjoying our weather. Proper dishwashing methods, which should be in place already. Prices will need to go up to cover the reduced volume. But better than no ono grinds.

5. Recreational facilities to open while maintaining physical spacing.

   a. Outside recreation could largely resume. Wear masks if around others.

   b. Common use outdoor gym equipment is not a good idea. Off limits for now unless could be cleaned between users.

   c. Inside gym equipment could be cleaned between customers, and customers could wear masks.
d. Traditional Hawaiian ocean activities could continue, although congregating on beach would be limited initially to a max number.

**What should be started to reopen the tourist industry?**

1. **Explore testing and screening of travelers before boarding aircraft to Hawaii.**
   
a. The old Yellow Card that was used for vaccination against yellow fever, cholera, and plague in former days might be used again for SARS-CoV-2 testing.

   b. Travelers to Hawaii could required to show either immunity by serology test or a recent, < 3d old PCR test prior to boarding a flight. (If persons are rejected at entry for failure to follow rules, they would be flown back at airline expense, so airlines would verify this for us.)

   c. TSA might be able to help with health screening as part of their security checks.

   d. Messaging: Do NOT travel if you have a respiratory illness.

2. **Secondary screening of all travelers upon arrival, with Quarantine decisions based upon level of risk.**
   
a. Travelers would be screened upon arrival with 100% screening of arrivals by questionnaire, temperature measurement, and symptoms check.

   b. Those possibly ill would be separated, tested and quarantined pending test results.

   c. A specially identified van would be used to transport quarantined persons to a designated quarantine hotel. *No public busses or private taxis/ubers/lyfts if you are Quarantined.*

   d. An App would be placed on their phones for tracking.

3. **Tourist groups to be capped at maximum number per group.**
   
a. Perhaps 5 per group initially, with gradual increases as data shows safety.

   b. Masks would be required for all workers and guests in tour groups.

   c. Tourist industry personnel would be encouraged to develop plans for physical spacing within tour groups such as snorkeling, diving, bus tours, etc., and disinfection of gear.

   d. DoH to sample both ill and asymptomatic travelers to assess how many POS are getting though.

4. **Explore ways to monitor tourists while they are here for symptoms/fevers.**
   
a. Tourists without antibody levels documented could be subject to screening and possible testing on about day 4 of their visit to catch people who were incubating and became viremic during their stay. This may be impractical.
5. Explore monitoring of tourist industry personnel for symptoms/fevers as they will be sentinels.

   a. Tourist industry personnel would be tested prior to entering on duty and then screened for symptoms and temperature daily, initially. Anyone with symptoms would be tested and quarantined.

How is this done?

First, two observations:

A. We cannot eradicate this virus without a vaccine, so it would be economic disaster to try.

   i. Because this virus is quite transmissible, there are many asymptomatic carriers, there is very low herd immunity at present, and it can mutate, it will continue to spread through our population.

   ii. Our goals are to prevent the medical system from becoming overwhelmed which would lead to more death, to protect our most vulnerable populations as long as we can, hoping for better treatments and a vaccine, keep incidence at a low rate, and quickly control outbreaks when they occur.

B. We need sustainable solutions so we can continue to live with the virus yet still thrive.

   i. The damage to the economy and our society including the health of the population from the current measures will soon become unacceptable. It is a high price to pay and not necessary in a setting where the epidemic is not undergoing exponential expansion. Therefore, we need to release the stay-at-home order as soon as appropriate control measures are in place and test with less damaging interventions, learning from our experiences.

   ii. Since we will be living with this virus for months to years, the interventions we choose must be sustainable.

1. Shelter at home is for exponential growth and out of control situations. We never had this.
2. But we cannot just do nothing. Death rate would be too high including with non-Covid patients.
3. We relax interventions in a science and data driven way. We will have to test various interventions.
4. Specific minimum criteria must be met before we relax interventions. This must be discussed.
5. We must respond rapidly to any flare ups. Quick testing, tracing and quarantine essential!
6. We study the results and learn from what works and doesn’t and then adapt. We get better at it.
7. An advisory council should be set up to counsel the General and the Governor comprising experts in Public Health, Epidemiology, Infectious Disease, Hospital Management, Economics, Business Leaders such as Mr. Oshiro, and Volunteer Organization Leaders.

Discussion

Models have so far not been able to adequately explain or predict the epidemic in Hawaii. Each island may well have a different epidemic curve, with outbreaks at different times and of different sizes. We may not have enough information yet to calculate precisely the reproduction number (R) on each island, due to lack of systematic community testing. There is controversy over the conditions that should trigger an opening up of society, with some thinking we never needed a stay-at-home order in the first place.
and others who would keep us locked down until the last virus is exterminated from the archipelago. Most seem to agree that the release from lock down, when it occurs, should be measured, step wise, and assessed for safety as we go forward. The decision will ultimately be the Governor’s, but those with expertise and experience in the relevant fields might try to develop a consensus to advise him. It is in this spirit that this paper is written.

So far in Hawaii (and some other places) the epidemic seems to exist as mostly isolated cases and small clusters easily extinguished. Most of the cases in Hawaii so far have been related to travel, either returning residents or to a lesser degree visitors. The problem is that occasionally, as has happened elsewhere in the world, a small outbreak can flare up into exponential community spread resulting in a major epidemic. Predicting this is somewhat like predicting hurricanes, i.e. there is a mix of pattern and chaos. As we carry on living with this virus, preventing the flare up into an epidemic will require constant vigilance through a robust and amplified public health system, quick and thorough response to outbreaks and even individual cases, especially in settings ripe for exponential transmission such as nursing homes, long term care facilities, homeless shelters, hospitals, ships, and group homes.

Hawaii should make a list of all the possible interventions, estimate their effect on transmission and their cost, and then rank them by cost. Starting with the most costly and disruptive of society, we release them in steps, pausing for a fortnight or so to measure the effects. If we do well, more are released. If flare ups are too frequent, more interventions are replaced.

We do not yet know what interventions will be required to control the spread of the virus. Even societies that had initial success, such as Singapore, are having to vary their responses as we go forward in time. Only experience will determine what combination of interventions is actually best. As we try various combinations of interventions, we must maintain careful vigilance for outbreaks. Thus, intese testing, contract tracing, and quarantine measures must increase and continue, even as we relax stay at home requests and business shut downs.

The advent of the antibody test for SARS-CoV-2 will dramatically increase our understanding of and ability to control Covid-19. However, this test needs to be validated clinically. The initial 100 tests done here should be run simultaneously with RT-PCR testing of the same patient. We must assess the correlation between presence of antibodies and presence of virus. Ideally there would be a near perfect negative correlation, but this is not guaranteed. There are a few viruses where development of antibodies does not imply non-infectiousness, e.g. Hepatitis C, Herpes viruses, and HIV. However, if the presence of a positive on a qualitative antibody test correlates with a negative RT-PCR, then the antibody test will help rule out infectivity. If the correlation is less than perfect, persons with antibodies but who still have presence of viral RNA may or may not be infectious, and further study will be needed to elucidate this. An intelligent approach to the use of these tests in required.

Discussion among medical, public health, and economic leaders should decide upon the “gate” required to be passed to allow reopening of the economy. CDC Guidelines suggest these should include at least: establishing a robust public health system with ability to test, trace, and quarantine as appropriate; a surveillance system for Influenza-Like Illnesses that can predict Covid outbreaks; sufficient PPE stocks and ICU capacity for a surge, and effective plans implemented to protect vulnerable populations such as nursing homes, rehabilitation hospitals, care homes, foster homes, homeless shelters, mass transit workers, health care workers, and essential workers. We must adapt that guidance to our state’s specific situation.
Conclusions

The keys to getting out of economic collapse safely and quickly are: aggressive testing, thorough contact tracing, effective isolation and quarantine, use of face masks, and full buy-in by the community achieved through transparency and frequent messaging. We can do this!

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(Thanks for help with this via discussions with John C Quinley, MD, DrPH; Mark Wallace, MD; and others.)
Disclaimer: This work represents the personal opinions of the authors and does not purport to represent the policy of the Department of Defense, the University of Hawaii, or any medical system.

References:

Fineberg HV. When to restart the economy. 14 April 2020. Excellent perspective of how to think about opening up.

La Croix S, Brown T. How to control Hawaii’s coronavirus epidemic and bring back the economy: the next steps. UHERO East-West Center, 2020. Excellent discussion of the big picture factors that Hawaii should consider in making the plan for opening up.


Moriarty LF, Plucinski MM, Marston BJ, et al. Public health responses to Covid 19 outbreaks on cruise ships – Worldwide, February – March, 2020. MMWR 2020;69, early release (pub 23 MAR 2020). This is critical: 47% of people who tested positive for SARS-CoV-2 on first pass were asymptomatic when tested. Over the course of the quarantine, 18% of positives NEVER had symptoms. We must test ALL persons in high density outbreaks such as ships, hospitals, nursing homes, homeless shelters, etc.


Tomas Pueyo article on concept of the Hammer and the Dance. Pertinent now is last 1/3 of this paper. This gives a method of conceptualizing how to rank the effectiveness of various interventions with respect to both transmissibility measured as basic reproductive rate (R) versus cost of the intervention.


Summary of Singapore’s response.


JAMA article on Taiwan’s response.

https://jamanetwork.com/journals/jama/fullarticle/2762689


News report of Taiwan’s response.


Interview with S. Korean minister on their response.


END
By Sumner La Croix and Tim Brown

I. INTRODUCTION

In our first policy brief (uhero.hawaii.edu, 25 March 2020), we sketched out a possible plan for control of the novel coronavirus in Hawaii. The plan is loosely based on the successful responses to date in places like Singapore, Hong Kong, and Taiwan and considers the current state of the epidemic in Hawaii and our unique geographical isolation. It has four steps: 1) stem the influx of new infections; 2) rapidly slow the spread of the epidemic in the local population; 3) conduct comprehensive testing of those with symptoms and at elevated risk, proactively trace contacts of all cases, and isolate those who have been exposed or are infected; and 4) based on active monitoring of the testing done, set triggers to reimpose shelter-in-place orders if the epidemic resurges.

Our main goals in this report are to review how the state has implemented steps 1 and 2 and to flesh out steps 3 and 4 more fully. We spell out in more detail how increased testing, comprehensive historical contact tracing, and isolation of exposed and infected individuals can lead to a rapid reduction in new infections and hospitalizations. Once this system has been put in place and has operated successfully for several weeks, we may begin to approach several measurable targets—number of new infections, number of new hospitalizations, capacity of the health care system to treat newly infected or exposed individuals—that would enable Governor Ige to gradually relax his stay-at-home order and for individuals to gradually relax some social distancing restrictions.

II. HAWAII HAS ALREADY TAKEN TWO BIG STEPS

Hawaii has three circumstances that facilitate effective implementation of a coronavirus control plan: Our geographic isolation (2,300 miles to the U.S. West Coast), our small population (1.4 million people), and the very small numbers of governments (4 counties and 1 state government) in the state. These circumstances reduce the costs and raise the benefits to close coordination between governments, private organizations, individuals, and households to both control the epidemic and to minimize economic damage. Have Hawaii governments and organizations taken actions to leverage these circumstances to Hawaii’s advantage?

The first step in implementing an effective coronavirus control plan in Hawaii was to restrict travel between Hawaii and overseas destinations and between each of the Hawaiian islands. This has largely been accomplished. Passenger arrivals on international flights began a steep decline on March 1 while arrivals on domestic flights did not begin their steep decline until March 13. By March 22/23, international and domestic arrivals had each fallen by 80–90 percent. As residents became increasingly aware that most people testing positive for the coronavirus had been infected while on overseas/mainland travel, pressure grew for the state government to restrict this travel more tightly. On 23 March 2020, Governor Ige imposed a mandatory 14-day quarantine on all incoming visitors and returning residents from the U.S. mainland and foreign countries. One week later (March 30), Governor Ige imposed a mandatory 14-day quarantine on virtually all interisland travelers, including Hawaii residents, that began on April 1. The interisland quarantine is expected to lead to a sharp decline in the number of daily flights and to eliminate all but essential interisland travel. Both travel quarantines are slated to last until April 30. It would not be surprising to see the overseas quarantine be extended into May given that many of the destinations from which Hawaii receives tourists are unlikely to have their epidemics under control by the end of April.
The quarantine on overseas and mainland travel has contributed to a further decline in daily tourism arrivals at Hawaii airports, from roughly 2,000 people on March 25 to just 121 people on March 30. However, even this level of arrivals places additional burden on public health officials and resources in the state and counties, leading Honolulu Mayor Caldwell to ask President Trump to prohibit all nonessential travel to Hawaii. We expect the number of arrivals to decline further as more potential visitors become aware of the 14-day quarantine, the stay-at-home restrictions that apply to visitors after their quarantine period, the closure of virtually all indoor and outdoor tourist destinations, and the rapidly shrinking daily schedule of flights to and from the Islands.

The state has taken a number of measures to monitor and enforce the travel quarantine. If there are significant violations, monitoring and enforcement measures could be tightened. Current efforts are already straining our existing public health capacity for monitoring and contact tracing and it may be time to begin serious discussion of using electronic means for monitoring compliance and the implementation of social distancing. New arrivals could be monitored during the quarantine by electronic medical bracelets, as is currently done in Hong Kong, phone apps could monitor their location and isolation from other visitors and residents, or an expanded Department of Health monitoring program could ask about their location and their isolation. Publicizing Hawaii’s 14-day quarantines in locations continuing to send tourists to Hawaii is an option if significant tourism flows continue from particular cities/countries. Another option to further restrict discretionary travel is for the state to request that airlines and travel booking agencies and websites inform all potential travelers about the state and interisland quarantines prior to travelers booking their itineraries.

Reducing travel to very low levels is important for control of this epidemic because it allows all parties in Hawaii—governments, organizations, individuals, and households—to focus on controlling community transmission. Tracking of Hawaii cases shows community transmission to be a source of 12% of 186 cases classified as travel or community acquired through March 31st, but another 26% of these cases are residents whose source of exposure remains unknown. Community transmission is clearly underway in the Islands. The quarantine on interisland travel should severely reduce the possibility that travelers from islands with a bigger percent of infected residents will bring the virus to islands with a smaller percent of infected residents. Restrictions on interisland travel are also important as they allow state and county governments to impose (and relax) restrictions that are tailored to the state of the epidemic on each island. This is important because it is possible that the state could relax its stay-at-home and social distancing orders faster on islands with fewer cases per capita and which institute effective control measures and strong contact tracing.

The second step in implementing an effective coronavirus control plan in Hawaii was for county mayors and the governor to order all residents and visitors to stay at home and to take social distancing measures when in public places. Such measures, if implemented effectively, can radically reduce community transmission. Between March 4 and March 25, the four county mayors imposed a variety of restrictive orders and voluntary recommendations that varied enormously across the four counties. On March 25, 2020, Governor Ige moved to standardize restrictive measures across the state by imposing a state-wide order to stay at home and to engage in social distancing. The measures were instituted to help achieve two goals: (1) to slow transmission of the virus between individuals and (2) to reduce the burden on the state’s health care providers that would result if there were to be a big surge of very ill individuals requiring intensive care.

The governor’s stay-at-home order was well received by most state residents and visitors but was pointedly ignored on March 28 by multiple groups of family and friends who gathered at private homes to enjoy the beautiful weather on March 28 and by a very large group who gathered in Waianae, Oahu to watch cock fighting matches (Hawaii News Now, 3/28/2020). Nonetheless by March 31, streets, public areas, and
private yards look increasingly deserted, with most people in nonessential jobs staying home and observing guidelines.

Violations of social distancing have also been observed in grocery stores and in lines outside grocery stores. Long lines of people have been seen outside some grocery stores on Oahu thirty minutes prior to opening. Customers have commented on a lack of social distancing near the check-out areas. Behavioral economics teaches us that “small nudges” can lead to big changes in consumer behavior. Simply putting marks six feet on the floor near grocery checkout stations can remind people to observe social distancing. We urge that these businesses take measures, including small nudges, to ensure that it is possible for customers inside and outside the store to maintain social distancing. Limiting the number of people in the store, placing distance markers on store floors, and taking on-line appointments for times to enter the store are all possible options to make social distancing more feasible. Grocery stores should require staff and customers to wear “do-it-yourself” DIY masks in the store (see discussion below). Expanded delivery services for on-line orders is another important option for reducing crowding inside stores. The State of Hawaii might also consider requesting or paying some grocery stores to stay open for longer hours to ease long lines at store opening.

Strong warnings against such behavior are preferable to heavy-handed enforcement, as it is critical for government to maintain the trust of citizens during a time when its decisions impose such substantial costs on people. Much more needs to be done to educate people how social distancing measures benefit a broad array of people in the community rather than by imposing punishments on those who violate them. The Hawaii state government and private health organizations should consider a massive publicity campaign to publicize the gains from staying at home and social distancing both to the person taking these actions and to others in the community, including the elderly, health workers, and people with compromised immune systems. Professionally produced and informative commercials, social media messaging and news stories could highlight the possibility of asymptomatic transmission locally, make clear that the coronavirus is circulating in our community, and build a sense of social solidarity in protecting our communities, especially our kūpuna.

Targeted publicity around large clusters of virus outbreaks and deaths observed both locally and in other places might help to reduce the number of gatherings in clear violation of both stay-at-home and social distancing orders. Examples of such outbreaks are abundant: the 24 family members who tested positive after a funeral in Albany, Georgia; the 46 choir members who tested positive after a 60-person choir practice in Mount Vernon, Washington; the 25 of 50 guests who tested positive after a 40th birthday party in Westport, Connecticut; and the 80 people who tested positive days after a conference at the bio-tech firm Biogen in Cambridge, Massachusetts. Reporting local clusters and what links them can also help people to understand their own and their families’ risk. The Singapore Ministry of Health routinely reports the clusters they have identified. In their March 27th report, they found clusters centered on workplaces, dinner functions, gyms, churches and preschools. As contact tracing in Hawaii identifies local clusters, DOH officials should report the types of locations, e.g., supermarkets or parties, that give rise to them so that people get a clearer picture of the risk in Hawaii. For legal reasons, they may not be able to name specific locations, but they can inform the public of the general categories of places where clusters are arising to allow people to take steps to protect themselves and their ‘ohana.

Another immediate measure that can be taken to reduce transmission is to encourage everyone to use masks when in public settings. Just a few weeks ago CDC and WHO had both recommended against the general public using masks, but recent findings on the COVID-19 virus have called this advice into question. CDC is currently reconsidering its guidance. Extensive testing for coronavirus in the population of Iceland has found that only about 50% of those who test positive are symptomatic at the time of testing. Meanwhile, contact tracing reports from Singapore, Germany and China have documented transmission from
asymptomatic or pre-symptomatic people. In fact, modeling studies of outbreak clusters done for Singapore and Tianjin, China have estimated that almost half of the transmission occurred from pre-symptomatic persons.

Given these findings, use of facemasks for reducing coronavirus spread in the Hawaii community is essential. While the past CDC and WHO guidance has been taken from the viewpoint of preventing infection of the uninfected person using the mask, we would maintain that it should be taken from the viewpoint of protecting other members of the community from asymptomatic and mildly symptomatic individuals who may not even know they are infected. There is no debate about the use of facemasks by those with the flu to reduce transmission to others; they reduce the transfer of droplets containing virus to the environment. Similarly, there should be no debate about the use of facemasks to prevent those with asymptomatic or pre-symptomatic coronavirus transmitting to others. In addition, new studies have shown there is also a protective effect of facemasks worn by those who are not infected. While they do not confer complete protection, which has been the objection to recommending their widespread use, they can significantly reduce an individual’s chance of contracting or spreading an infection, especially when combined with social distancing and frequent hand washing. Reviews of numerous studies have shown facemasks to be protective for health care workers against both influenza and SARS, another coronavirus. While those in the public might be less likely to use them as correctly as health workers, they should still confer some protection by reducing exposure to environmental contamination with coronavirus, thereby reducing their risk of infection.

Should the Hawaii state government mandate or strongly recommend mask wearing in public? Most of the places in Asia that had serious outbreaks with the SARS epidemic in the early 2000s were already prepared with ample supplies of masks for both healthcare workers and the public. However, requiring people in Hawaii to wear approved surgical masks or N95 masks in April 2020 would obviously be counter-productive in the short term, as healthcare and other workers facing daily exposure have been unable to obtain adequate supplies of N95 masks and surgical masks. They must clearly be prioritized to receive the masks they need as their risk is the greatest. Numerous scientists argue that even basic DIY masks put together from cut-up T-shirts can be effective in reducing transmission and templates exist online for making them. As such, strongly recommending or requiring the public to wear DIY masks until a greater supply of conventional facemasks can be provided could prove beneficial today while surgical masks are in short supply. Guidelines from the CDC outlining what makes for an effective DIY mask would be useful for home sewers and on-line buyers. However, public messaging on use of masks, whether DIY or surgical, must be done carefully – it must emphasize that use of the mask is in addition to self-isolation, social distancing and frequent hand washing, not a substitute for them. The combined effect of these combined measures should push community transmission close to zero.

Has social distancing been effective in reducing community transmission in past epidemics in the United States? One hundred years ago social distancing saved lives in US cities during the 1918 Spanish Flu epidemic. Required social distancing measures included bans on public gatherings, isolation and quarantine, and school closings. Photos from big US cities in Fall 1918 show crowds of people wearing masks while out in public. Two careful studies found that social distancing was most effective in saving lives when US cities introduced it early in the 1918 epidemic and did not remove it too soon (Bootsma and Ferguson, 2007; Markel et al., 2007). Most importantly, a new (preliminary) study finds that U.S. cities that introduced social distancing measures earlier and more aggressively not only experienced lower mortality during the epidemic but also had stronger economic growth after the epidemic (Correia, 2020).

Has social distancing been effective 100 years later in reducing community transmission of the coronavirus? The San Francisco Bay Area and King County in Washington took some of the earliest and most aggressive social distancing measures. The result? New cases have been rapidly falling. For
the United States as a whole, the best preliminary evidence comes from an app developed by the U.S. technology firm, Kinsa. Kinsa produces “hi-tech” thermometers that send an individual’s temperature information to an app which compiles temperature readings by counties across the United States. (Unfortunately, Hawaii is not included in the Kinsa fever maps.) Kinsa's fever map shows that “fever clusters” have been declining across the United States during the last two weeks in March, with the largest reductions concentrated in areas that adopted social distancing measures from mid-March (https://www.kinsahealth.co). The bigger fever outbreaks are found in Florida, one of the last big population states to adopt a stay-at-home order.

III. APPROACHING THE THIRD STEP: HAWAII’S PLAN FOR TESTING, CONTACT TRACING, AND ISOLATING

The third step to control the coronavirus epidemic is the most challenging and fortunately is already underway. The third step is for the Hawaii state government and private health organizations to expand availability of testing in each of the four counties; routinely test all individuals with respiratory symptoms or fevers for coronavirus; for the Hawaii State Department of Health to proactively trace the contacts of all found infected with coronavirus; and enforce isolation and arrange for or provide care to ill and exposed people until the disease has run its course.

Expanding and Coordinating Testing in Hawaii.

Hawaii is already among the top three states in per capita testing for the coronavirus even though we rank among the lowest ten states for cases per capita. Many of the initial limitations in testing capacity have been remedied and the State is now able to conduct about 1,500 antigen tests per day (Star-Advertiser 3/30/2020) with most of those tests conducted in private labs and positives being reconfirmed in the State lab. To date over 10,000 tests have been conducted and 285 positives detected.

The testing system must serve several essential purposes in building a strong response:

• To improve patient care and allow appropriate precautions to be taken in health care settings to protect health care providers and other patients (antigen tests);

• To identify those health care workers and other essential workers whose jobs require extensive community interaction who have already recovered from coronavirus infection and may have immunity (antibody tests);

• To identify close contacts of all positive cases so that contact tracing can be done to track down and isolate or quarantine those exposed to prevent the infection from spreading further (antigen tests);

• To surveil the number of cases in the community so that trends in the epidemic can be determined and used to guide important decisions on lifting social distancing measures and travel restrictions (both antigen and antibody tests).

What needs to be done in Hawaii to make sure our testing system can fill each of these essential purposes?

The ramping up of private sector and state testing capabilities has allowed the testing of all symptomatic patients in hospitals and those identified as potential cases by clinicians to be done, but there is still a delay in reporting results. It will be valuable to work toward obtaining rapid point-of-care tests as they become
available to speed diagnoses and improve care. This will also allow contact tracing activities to be initiated more promptly, which will contribute to averting further community transmission.

Because the coronavirus manifests symptoms in most infected individuals within 14 days, testing of those with clinical symptoms can detect many of the infections in the community. Many of those with milder infections are likely to show up in outpatient settings or at doctors’ offices. At present, however, only a limited random subset of specimens in the influenza surveillance system are being tested for coronavirus surveillance. If we are to implement strong enough contact tracing to detect most active coronavirus cases in Hawaii and temporarily remove them from the population so they cannot infect others, this testing should be expanded to cover the entire symptomatic population that meets an appropriate clinical definition. Of course, this must be coupled with active contact tracing for all cases. As pointed out earlier, coronavirus infection clusters can be large and grow quickly, so prompt, aggressive action is needed if we are to arrest the spread of the virus in the community. Extensive testing has been a hallmark of the Singapore response, where most cases meeting a symptomatic case definition were tested in primary care, hospital and private care settings. In addition, they now test every contact of a COVID-19 patient. Comprehensive contact tracing has been undertaken for all positives, and, as reported earlier, these efforts have identified many large clusters of infection.

The data system around testing should be enhanced to ensure essential information to guide the response is gathered for every test conducted, whether in the State labs or private labs. This should include important variables such as age, gender, occupation, ethnicity and travel history. For those testing positive, extensive interviews should be done to identify close contacts and others who may have had significant exposures. The goal of this data collection is to provide actionable intelligence about the epidemic. These data can be analyzed regularly to identify whether certain ages or occupational categories are experiencing elevated coronavirus cases, which can trigger stronger public health messaging toward those groups. Coupled with more complete descriptions of clusters as described earlier, this information could keep the public better informed and motivate them to enhance protective measures.

Eventually, cross-sectional application of antibody tests will make it possible to determine what fraction of the population has already had the coronavirus. When these tests become available, this should become an additional component of the coronavirus surveillance system. Knowing the proportion of people in the community who have some immunity to reinfection will guide decisions about stay-at-home and social distancing orders and will also provide a direct measure of how effective they are. It will also determine the susceptibility of the population to a resurgent epidemic if coronavirus is reintroduced at some future date. If new symptomatic cases under an expanded testing regime are under control or the population prevalence of past exposures is low, this population testing can be done less frequently. If antibody testing is made available on a wider basis, it could also help to alleviate people’s concerns about their own status or help them determine if it is safe to return to work.

**Comprehensive Contact Tracing**

Contact tracing is vital to the control of the coronavirus crisis in Hawaii. What does contact tracing normally involve? When a person tests positive for the coronavirus, a public health worker contacts that person by telephone, text, or video conference and asks the person to provide information on all of the people with whom they were in close contact over the last three weeks. These include household members, intimate partner(s), individuals providing care in a household without using recommended infection control precautions, and individuals who had close contact (< 6 feet) for a prolonged period of time. Public health officials then use this information to contact these potentially exposed people. They are asked to report their temperature by phone or to show it to them via video conference, and are asked to self-isolate for...
If they are showing symptoms, they are asked to get tested to determine their own coronavirus status. Self-isolation ensures that potentially exposed people do not themselves expose other people in their households or workplaces while testing can help to confirm positive cases in people already showing symptoms.

How productive can a good contact tracing system be in finding other people infected with COVID-19? Much depends on how rapidly DOH staff can contact people potentially exposed to a particular case, as rapid contact and subsequent isolation of the exposed person reduces the chance that the exposed person will spread the virus to other people. Singapore, which has a very aggressive contact tracing system, tracked down 53 of its first 100 cases via contract tracing. Contact tracing is most productive when the number of cases is a small percent of the population. As the number of cases rises, it becomes much more difficult for a fixed number of contact tracers to do their jobs. Consider that for its first 432 confirmed cases, the Singapore Ministry of Health identified 10,346 close contacts who were all asked to enter into a 14-day quarantine. Once exposed contacts are in quarantine, the Singapore government monitors people in quarantine with a phone app that verifies their location. Quarantined people are required to upload pictures of themselves in their place of quarantine every few hours.

Health ministries in some countries have turned to non-traditional contact tracers as the needs have outpaced their staff capacity for dealing with the crisis. Iceland's National Crisis Coordination Center has turned to several dozen experienced police detectives to conduct in-person contact tracing. Additional staff helped the Center find exposed contacts of new cases incredibly quickly and place them under a 14-day quarantine. Hawaii's caseload has grown more than ten-fold over the last two weeks, growing from 26 cases on March 19 to 285 cases on April 2. Tracing contacts on the new cases has dramatically increased the load on the Disease Outbreak Control Division of the Hawaii DOH. With the number of new cases expected to expand considerably as more testing is conducting, the DOH needs to consider how it might scale up its contact tracing workforce. Perhaps the DOH could follow the lead of Iceland and consider using now underemployed city and county police detectives. (Crime has fallen during the epidemic.) Cooperation between county and state governments and employee unions might facilitate this. Or, if use of police raises civil liberty concerns, perhaps the DOH could look to training teachers from the Hawaii State Dept. of Education to assist. They are currently underutilized, given the suspension of public school instruction.

Will Hawaii still need a large contact tracing group once the epidemic becomes more under control later this year? Once Governor Ige decides to relax the stay-at-home order and people begin to interact with each other more often, the probability increases of a sporadic outbreak of new coronavirus cases. Such an outbreak would occur at a time when Hawaii has likely been successful in shielding most of the population from becoming infected. The large pool of uninfected people provides a fertile environment for a few new cases to quickly explode into large clusters of new cases. This could be prevented if the Hawaii DOH had large numbers of experienced employees in its contact tracing system who could quickly react to the new cases by identifying exposed contacts and moving to isolate them quickly. Such actions have great potential for containing any sporadic outbreak and keeping the number of new cases from rising to a level that might necessitate imposition of a new stay-at-home order and other restrictive measures.

Local Isolation and Quarantine.

Testing and contact tracing are only effective when people with the virus isolate themselves until the disease has run its course and people exposed to the virus isolate until they obtain test results. Isolation is facilitated when there are facilities to which people with the virus or exposed to the virus can turn. The Gottlieb Report (p. 6) recommends that “[c]omfortable, free facilities should be provided for cases and their contacts who prefer local isolation, quarantine, and treatment away from home. For example, a member of a large household may wish to recover in a hotel room that has been repurposed rather than risk infecting
family members. Isolation and quarantine away from home should not be mandatory or compelled by force.” In Hawaii, where many families live in small apartments or condominiums, isolation or quarantine within the home is difficult and poses a risk to other family members.

The State of Hawaii needs to identify facilities on each island where exposed people can be isolated and cared for. Potential candidates include hotels in tourist districts and neighborhoods or vacant military housing, such as Kilauea Military Camp. The state might focus first on state- and county-owned facilities where it does not need to negotiate with private owners for their use. That said, the state is already negotiating with hotel operators to use their hotels as quarantine facilities for people exposed to the coronavirus or as treatment facilities for people infected with the virus.

**Use of technology to improve tracking, isolation and quarantine**

Given the high burden that contact tracing is imposing on the DOH, closer consideration should be given to using digital technology to assist these essential efforts. Mobile phones can assist in several ways. In Singapore, a voluntarily downloaded mobile app called TraceTogether uses Bluetooth to log other phones that have been in close proximity for some duration, collecting only their mobile number. If someone with this app tests positive, public health workers can use this data to rapidly identify and call close contacts. In several countries that have seen slow epidemic growth, mobile phones are being used to track compliance with isolation and quarantine orders. If the person under a quarantine order departs their quarantine location, they are contacted by public health workers to improve compliance. In addition, as maps in the New York Times on April 2 showed on a nationwide basis, anonymous data from cell towers can be used to monitor population compliance with stay-at-home requirements over time. This same approach could be easily applied in a state setting, providing valuable intelligence on the effectiveness of this important policy. Comparing this with the trend in reported cases could provide one more indicator of expanding community transmission. Obviously, in adopting any of these approaches in the United States, consideration needs to be given to privacy needs and legal requirements; but even privacy-conscious Europe is now considering adopting some of them (New York Times, 3/30/2020).

**IV. GRADUALLY RELAXING STATE-IMPOSED RESTRICTIONS: BASIC PRINCIPLES**

The fourth step in controlling the coronavirus epidemic is for the state to gradually relax stay-at-home and social distancing recommendations and orders and allow some economic activities that involve groups clustered in a location, e.g., a workplace, to resume. However, this must be done with extreme caution. Both modeling work on COVID-19 and the experience with the 1918 flu have demonstrated that once social distancing measures are discontinued, there is a serious risk of virus resurgence, that is, the epidemic rapidly begins again. A successful shelter-in-place order plus practicing social distancing when leaving home to obtain food or supplies is extremely effective at protecting people from contracting the coronavirus. However, it still leaves them susceptible to the virus, creating the potential for the epidemic to resurge should people return to their old ways of congregating in groups. Therefore, there are two important requirements for relaxing restrictions: 1) they should only be lifted once we have a strong monitoring system in place that can rapidly detect a resurgence in the epidemic; and 2) restrictions must be released gradually and the effect of removing them monitored to insure the epidemic remains contained. If the epidemic resurges, we must be prepared to reimpose restrictions immediately. An effective and widely distributed vaccine will make restrictions unnecessary, but as Dr. Anthony Fauci has pointed out that is 12-18 months out in an optimistic scenario.

Until an effective treatment or vaccine is developed or antigen and antibody testing become cheap, accurate, fast and widely available, some economic activities will not resume. This section focuses on
activities that could restart once they have been reorganized in ways that increase the safety of providers and customers.

When will the Hawaii epidemic have declined sufficiently to relax some government restrictions? The Gottlieb Report (p. 6) presents four measures of epidemic severity that could be used as criteria by the State of Hawaii to identify when conditions warrant a gradual lifting of stay-at-home orders. The Gottlieb Report’s criteria, edited a bit to fit Hawaii’s specific circumstances, follow:

• When the State of Hawaii reports a sustained reduction in the number of new cases for at least 14 days i.e., one incubation period;
• Hospitals in each county are safely able to treat all patients requiring hospitalization (for both COVID-19 and other serious medical conditions) without resorting to crisis standards of care and use of overflow facilities, such as arenas and convention centers, to provide hospital care to patients;
• The State of Hawaii identifies sufficient public and private capacity to test all people with coronavirus symptoms;
• The Hawaii State Department of Health has the capacity to conduct active monitoring of all people with coronavirus symptoms, who should remain quarantined, and to trace close contacts of virus carriers.

Once the four criteria have been achieved, Governor Ige can consider removing the stay-at-home and social distancing orders in a phased manner. The first phase is to remove the stay-at-home order for those not at high risk for serious COVID-19 outcomes, while maintaining or strongly recommending the more vulnerable (older individuals or those with pre-existing conditions that expose them to higher COVID risk) remain at home or only return to work if workplace social distancing can be guaranteed. As the stay-at-home order is lifted, additional regulations to maintain social distancing in public and workplace settings to the extent possible should be put into place. Singapore, for example, is marking every other seat in restaurants and cafes as off limits to increase social distancing in these settings. Hong Kong is requiring restaurants to operate at no more than half capacity with no more than 4 people per table and a guaranteed 1.5m spacing between tables. Depending on the workplace setting, different regulations might be adopted to sustain social distancing protocols to the extent possible. Everyone should still be asked to wash hands frequently and to maintain their distance from others, even in the workplace. All businesses and workplaces should be required to provide hand sanitizers in heavily trafficked areas. In short, every conceivable means to reduce the presence of highly contagious coronavirus in the environment should be taken.

Housing facilities with vulnerable populations may want to relax restrictions on visitors and resident mobility within facilities more slowly. The Gottlieb Report (p. 8) recommends that “[s]pecial attention should be paid to long-term-care facilities and nursing homes. These facilities will need to maintain high levels of infection prevention and control efforts and limit visitors to prevent outbreaks.” Vulnerable populations “should continue to engage in physical distancing as much as possible until a vaccine is available, an effective treatment is available, or there is no longer community transmission.” These cautionary notes apply strongly to Hawaii where more than 18 percent of the 2018 population was 65 years or older.

In addition, as these orders are modified, the Governor might want to consider tightening the state’s recommendation to wear masks in public and extend it for several more months. If our recommendations provided above are implemented, all Hawaii residents will have been wearing DIY basic masks in public since early April 2020. However, once supply constraints on surgical masks have been relieved AND the state’s stay-at-home order is removed, then it will become even more important for everyone to use more
effective surgical masks in public spaces to compensate for the additional risk that comes with more social interactions. As more people leave their homes more frequently, there will be increasing infringements on social distancing and higher potential for a surge in new infections, albeit in an environment with a lower percent of coronavirus infected people than today. Requiring people to wear surgical masks in public spaces for several months after stay-at-home orders are relaxed could help to prevent asymptomatic transmission, reduce the amount of coronavirus in the air and on surfaces, and ensure that the epidemic does not quickly reemerge.

**Restarting the Non-Tourism Economy**

Let’s consider reopening Hawaii’s non-tourism economy first. Reopening the non-tourism economy is critically important, as it accounts for 77 percent of Hawaii’s GDP. Once the Governor’s stay-at-home order is lifted, which closed or partially shut-down businesses will resume operations and how will they reorganize to facilitate social distancing? One temporary measure that businesses should take (until a vaccine is developed) is to find employees with positive coronavirus antibody tests to take jobs that require close contact with other workers or customers. The Gottlieb Report (p. 9) suggests that people with positive antibody tests could “return to work, serve in high-risk roles such as those at the front lines of the health care system, and serve in roles that support community functioning for people who are still physically distancing.” Emanuel (2020) suggests that antibody-positive people could staff and manage retail stores and restaurants. All that said, there are ongoing concerns regarding the strength of immunity protection provided by the coronavirus antibody and the period of time for which the protection lasts (WSJ, 4/2/2020). Research in this area must be monitored closely and policies changed as needed.

We anticipate that almost all businesses will reorganize operations at least to some extent to increase the safety of customers and employees. The Gottlieb report (p. 8) agrees, arguing that “general physical distancing precautions would still be the norm after stay-at-home precautions are relaxed, including teleworking (as much as possible), maintaining hand hygiene and respiratory etiquette, wearing a mask in public, regularly disinfecting high-touch surfaces, and initially limiting social gatherings to fewer than 50 people.” The capability for businesses to reorganize to accommodate worker and customer safety demands varies tremendously. Some will radically reorganize their entire operations, many will make changes to ensure social distancing, and others will find such changes untenable and close their doors. Industries with a high cost of providing customer safety will decline in size if consumers can easily find substitute products (think movie theaters and large lecture classes), but could expand in size if customers find the industry’s products to be essential and are willing to pay the high costs required for workers to produce these goods and services safely for consumers (think home construction). Other industries with a low cost of providing additional customer and worker safety will expand and thrive (think online services). At the end of the day, the demand for additional safety measures by workers and consumers will be a drag on the Hawaii economy that could persist for several years, while in the longer run the changed circumstances of firms, customers, and workers will encourage waves of innovation that will place the economy and society onto paths unknowable today.

When the stay-at-home order is ended, businesses that rely on large numbers of people gathering together in crowded spaces will have to rethink their business model until the Hawaii population is vaccinated. Examples include bars, clubs, some restaurants, conventions, conferences, large university lecture classes, sports events, concerts, theatre performances, and museums. One option for these venues is to allow fewer people into their space, thereby allowing all customers to practice social distancing. Consider now how a restaurant might react to the stay-at-home orders being lifted. Let’s assume that the requisite extra space between customers can be achieved by removing half of the restaurant’s tables. This will cut some of the restaurant’s costs that vary with the number of customers, such as waiters, busboys,
cooks, and food costs, but will still leave restaurants grappling with how to pay the rent and other fixed costs with fewer customers. Two federal programs have been set up to aid restaurant owners and workers through spring 2020.

It is hard to imagine how events involving large crowds, such as a UH football game or a UH Wahine volleyball game could be safely held until a vaccine is developed. It is easier to image 50,000 fans staring at a television in their home, watching a football or volleyball game played without fans in the stands. For this to happen, player and staff safety issues would need to be resolved. Consider that when the National Basketball Association (NBA) learned that one star player, Rudy Gobert of the Utah Jazz, had tested positive, it immediately shut down its season. Similar issues will haunt any attempt to play the NFL or college football seasons. Or UH Wahine volleyball.

We may see large conventions—which rely on many people engaged in events in crowded hotel or convention center spaces—moving to an online model with online plenary sessions, online small-group sessions, and even online cocktail parties. Unfortunately, such online conferences will offer little comfort to the large number of workers in Hawaii who provide lodging, meals, and entertainment to convention visitors who no longer actually visit.

There are many businesses and occupations that rely on close personal contact—hair salons, massage, dentistry, optometry services, health services—and others where customers repeatedly use the same equipment, such as gyms. Whether these businesses will be able to restart successfully before a vaccine becomes available is an open question and is likely to depend on the particular circumstances of each business and their clientele. Businesses could consider monitoring the daily temperature of workers who have contact with multiple customers.

What about K-12 schools? It is very likely that Governor Ige’s stay-at-home order will be in effect long enough to prevent the completion of the 2019-2020 school year for public and private K-12 students. If the stay-at-home order is lifted in late spring or early summer, the state could consider working with the Hawaii State Teachers Association to find a way to finish up the current school year during the summer. Ensuring that children do not fall behind in their instruction should be a priority of the state and teachers. When public and private schools restart in-person instruction, administrators would need to make provisions for immune-compromised children and for older teachers and other staff who would be especially vulnerable to a new outbreak of the epidemic among their younger students. One option to minimize exposure for older vulnerable teachers is to temporarily assign them to teach online classes and to temporarily assign younger less vulnerable teachers to in-person classes. In the absence of a vaccine, there could be virus outbreaks within a school. To minimize their impact requires that all staff, teachers, and students maintain social distancing, that ill students are kept at home, and that any cases are followed up with aggressive contact tracing and testing. Virus outbreaks within schools might be reduced if school staff took the temperature of each student and teacher daily.

How will social distancing be maintained in the crowded classrooms found in Hawaii’s public and private schools? One idea is to hold twice-a-day sessions with half of the students attending in the morning and half in the afternoon. This will allow for increased seat spacing between students, albeit at the cost of less in-person class-time with the instructor. Lost in-person instruction time could be partially made up with on-line instruction time during the other half of the day. Lack of access by students from low-income families to home computers and home internet connections will need to be remedied for this plan to work. Wearing of masks for various activities within particular schools is another option to reduce the chances of an infection outbreak.

Should the University of Hawaii and the state’s private universities restart in-person classes once the stay-at-home order is lifted? From early March in the spring 2020 semester, the University of Hawaii
required its faculty and students to transition from in-person classes to on-line classes. UH recently decided to offer all 2020 summer session classes on-line, a decision made easier by increasing percentages of students choosing to take on-line summer session classes over the last decade. UH administrators will need to decide by early June 2020 whether to offer Fall semester classes entirely on-line. Moving all classes for the Fall semester online is a risky decision. Out-of-state undergraduate students could balk at paying UH-Manoa's high non-resident tuition for an exclusively online instructional program. Graduate students in most fields will likely balk at an exclusively on-line program, as in-person mentoring, laboratory work, and peer interactions are big components of most graduate programs. In the Arts, many classes involve one-on-one instruction or small ensembles of 10 or less students. It is worth remembering that we are in the midst of a global pandemic and that universities throughout the world are facing the same issues.

How risky is it be for UH or private universities to offer in-person instruction in the Fall 2020 semester? If the State of Hawaii implements the right policy measures to control the epidemic, then by mid-summer Hawaii could be one of the safest places for undergraduate and graduate students to be educated. Students, of course, making their enrollment decisions during the month of April. Committing UH to in-person instruction in the Fall semester involves its own risks, the main one being whether the epidemic is brought sufficiently under control by August to allow in-person instruction to proceed. Students from foreign countries and the U.S. mainland will surely need certified antigen/antibody test results or have completed the state's 14-day visitor arrival quarantine to be enrolled at UH. Older more vulnerable faculty might prefer to teach online. If UH offers in-person instruction, it should require that all staff, teachers, and students maintain social distancing, self-isolate and test if becoming ill, and that all coronavirus cases are followed up with aggressive contact tracing and testing.

**Restarting the Tourism Economy**

The tourism economy will take longer to restart than the non-tourism economy. This is because tourism from overseas will only resume when either (1) a vaccine is developed or (2) the coronavirus epidemic is brought completely under control in areas sending tourists to Hawaii or (3) rapid, same-day antigen tests become available to pre-screen potential visitors at their doctor's office, an urgent care facility or home airport within a day of leaving for Hawaii. A pessimistic forecast for the resumption of substantial tourism flows from overseas is 12-18 months, the time likely to be required for vaccine testing, production, and widespread vaccination of the Hawaii population to occur.

So, if 12-18 months is the pessimistic forecast for tourism to restart, what is the most optimistic forecast? Tourism could resume quickly if two necessary conditions are met: (1) Potential tourists perceive Hawaii to be a safe place to visit and (2) Hawaii residents can be assured tourists are free of the coronavirus. The first condition could be satisfied sometime this summer if Hawaii builds on its already considerable achievements by moving ahead with the testing, contact tracing, isolation, and mask policies recommended in this report. The second condition could also be satisfied this summer if rapid antigen and antibody tests become readily available to people wanting to vacation in Hawaii. Travelers will take a rapid antigen test within a day of boarding their flight to confirm that they do not carry the coronavirus. A second antigen test might be required in Hawaii within a day of the passenger's flight home. With a positive antibody test, a traveler would not need to take the antigen tests. New antigen and antibody tests are being rapidly developed, and it is possible that an antigen test capable of detecting the virus in asymptomatic carriers will become available over the next few months with a relatively narrow window period, i.e., the period during which a person with the virus still tests negative. Abbott labs is currently rolling out an antigen test that provides results within 5-15 minutes; this test could potentially be used at airports sending passengers to Hawaii. In the best-case scenario, when the state lifts its stay-at-home order later this spring or early this summer, it will also waive its 14-day travel quarantine for visitors with a certified antigen test or with a
positive antibody test. It is possible, but far from certain, that Hawaii will become particularly attractive as a vacation destination later this year if it is one of the first global visitor destinations to have its epidemic under control.

There are numerous factors that could and probably will dampen the optimistic scenario. Many potential tourists, particularly ones from vulnerable populations, may decide to postpone taking a vacation until a vaccine becomes available. Why take an unnecessary risk? Others may decide to substitute cheaper vacations closer to home to save money or may decide not to take a vacation due to declines in household income and wealth. Some may continue to perceive long-distance travel itself to be potentially dangerous. Others may find that the destination is less attractive because it does not allow large gatherings, e.g., big conventions. In this intermediate scenario, we could see only a limited resumption of tourism until US and foreign populations are vaccinated. Finally, Japanese tourism has typically restarted very slowly after other political and economic crises. A slow return of Japanese and other foreign tourists would weigh heavily on Hawaii’s tourism-oriented businesses as these tourists tend to spend more than U.S. tourists.

Could cruise ships resume cruises between the Hawaiian Islands if all passengers and crew members on the ship presented certified antigen or antibody test results at boarding? The documented rapid spread of coronavirus on cruise ships leaves this in doubt. Concerns will remain that one or more passengers or crew will inadvertently slip through the testing screen and that the crowded environment of a cruise ship will amplify coronavirus transmission. Residents in Hawaii cruise destinations (Hilo, Kahului, Lihue, and Honolulu) could also be worried about the health status of disembarking passengers and crew even if they have been certified to be free of the virus. In sum, it is difficult to envision cruise ships resuming service between the islands or between Hawaii and overseas destinations until a vaccine is developed and all passengers and crew have been vaccinated.

When could inter-island travel restrictions be relaxed or lifted? Travel restrictions between any pair of islands could be relaxed when both islands have met the four conditions (set out above) for relaxing county/state stay-at-home orders. We note that islands with smaller populations, such as Kauai, might be more worried about a surge in visitors from an island with a much larger population, such as Oahu. Inter-island travel by residents for vacations or family visits is also likely to be somewhat limited due to big reductions in incomes and wealth for most Hawaii households.

VI. CONCLUSION

Increased antigen and antibody testing, comprehensive historical contact tracing, mandated mask use, and isolation of exposed and infected individuals are the most vital measures that the state can take to control the coronavirus epidemic. Once several measurable targets are achieved, we expect that Governor Ige will be able to lift his stay-at-home order and this will facilitate the reopening of much of the state’s non-tourism economy. Unfortunately, reopening the state’s tourism industry depends on two factors mostly outside our control: The speed with which a vaccine can be developed, produced, and distributed and the speed with which rapid-response antigen and antibody tests can be deployed at foreign and domestic airports sending visitors to Hawaii. What’s important is that we focus on the measures that are under our control—travel quarantines, social distancing, testing, contact tracing, and isolation. Implementation of these measures is entirely feasible with the cooperation of the public, businesses and non-profit organizations, and our state and county governments. What is needed for the state to control the epidemic is the will to move quickly on testing and contact tracing and to undertake a strong and sustained public relations campaign communicating to the public the essential principles for controlling an epidemic. In an epidemic that has brought the economy to a standstill, moving quickly and decisively to contain the virus is the fastest path to economic recovery.
REFERENCES


The views expressed in this article are those of the authors and do not represent the views of the East-West Center or the University of Hawaii.

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Crush the Curve

Urgent Steps Hawai‘i Can Take to Contain the Covid-19 Pandemic

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Summary

In order to contain the Covid-19 pandemic, which will not only save lives but is necessary to restart the economy, Hawai‘i needs to redouble and accelerate its public health response. In addition to better physical distancing, the state government needs to:

- Significantly increase testing for SARS-Cov-2, the causative agent of Covid-19 disease;
- Augment its contact-tracing capacity by adding significant personnel;
- Isolate every individual who tests positive in hotel rooms at government expense. Hotel capacity should also be deployed to house front-line, at-risk workers and other groups of especially vulnerable persons.

Instead of following the overly cautious recommendations of U.S. authorities, Hawai‘i should emulate regional governments like South Korea, Taiwan, Singapore, Hong Kong, and New Zealand, which have at least initially contained the virus through aggressive public health responses.

Introduction

In confronting the Covid-19 pandemic, Hawai‘i has both weaknesses and strengths. Among our vulnerabilities are continued flight connectivity to numerous hot zones, an economy dependent on tourism, an aging population, and large, multigenerational households. Yet Hawai‘i also brings advantages to the field: geographic isolation and tourist/military infrastructure. The emergency housing capacity of hotels is particularly important.

The key to successfully containing Covid-19—to saving lives and gradually restoring economic activity—is to press our advantages and mitigate our weaknesses.
Introduction
Continued

We need to look to the Asia-Pacific nations that have shown preliminary success. Deployed every public health technology at their disposal. Despite promising efforts, Hawai‘i has not yet adopted best practices to confront Covid-19. If we wish to avoid catastrophe, we must do so.

First Steps

Since the World Health Organization began tracking an outbreak of unusual respiratory infections in Wuhan, China in late December 2019, Hawai‘i has acted more assertively than many U.S. states. On March 5, 2020, Governor Ige declared a state of emergency and soon after closed public schools. Preceded by the mayors of Maui and Oahu, the governor issued stay-at-home orders on March 25, and the next day instructed all visitors to self-quarantine for 14 days—a restriction on domestic travel not imposed anywhere else in the United States.
First Steps Continued

Although testing everywhere in the United States was marred by error, mismanagement, and delay, Hawai‘i’s diagnostic capacity has steadily increased, with more than 20,000 tests conducted by April 15. In per capita terms, this puts Hawai‘i in the top tier among U.S. states—though still far short of what is needed to understand the full scope of infections, their epidemiological patterns, and the variable course of the illness.

Comparatively early action by state and local government—combined with Hawai‘i’s geographic isolation, public cooperation, and perhaps a little luck—have prevented countless infections and many deaths. Closures and isolation have also bought Hawai‘i time. At this early stage of the pandemic, Hawai‘i has a vital opportunity to slow the virus and perhaps even to contain it. We must not squander it.

To fully contain the outbreak, we must continue working our way through the public health playbook. We have to deploy practices that have proven effective against every pandemic since 1918. These include four basic efforts, which have to be undertaken in concert and in haste:

1) Slowing the pace of infection through physical separation;

2) Diagnosing new cases and analyzing patterns of contagion;

3) Investigating the social interactions of each infected person in order to find new cases and prevent new infections;

4) Quarantining front-line workers and especially vulnerable individuals and isolating everyone infected with SARS-CoV-2, regardless of symptom presentation.

Thus far, Hawai‘i has taken assertive action in only two of these areas, social distancing and, belatedly, testing. If we are to contain the virus, we must also undertake comprehensive contact tracing and strict quarantines. If Hawai‘i leaders take a wait-and-see approach, they do so at our peril.

At this early stage of the pandemic, Hawai‘i has a vital opportunity to slow the virus and perhaps even to contain it. We must not squander it.
Research Approach

This report urges swift, concerted implementation of the basic practices of public health: physical distancing, testing, contact tracing, quarantine, and isolation. We have devised these urgent recommendations based on a survey of emerging scholarship on public policy responses to Covid-19 and also on interviews with UH researchers and state government and community experts in a variety of fields: epidemiology, public health, virology, geriatrics, primary care medicine, biology, economics, law, history, and political science. When possible, we have also consulted with public officials, community leaders, and private-sector experts to check our assessments and to ensure that our recommendations are viable. We have consulted widely, but all the ideas offered here are our own and in no way speak for any other individuals or for the University of Hawai‘i. This is a dynamic crisis, and these recommendations are based on incomplete knowledge. They represent our best effort but are by no means final or definitive. Most of these ideas are not new, but we hope state and municipal decision makers will find it useful to have them in one report.

If Hawai‘i leaders take a wait-and-see approach, they do so at our peril.
Recommendations

Physical Distancing
Diagnostic Testing
Contact Tracing
Quarantine and Isolation
Physical Distancing

Because so little is known about this novel pathogen, the best way to limit its spread is for people to stay apart. Epidemiologists and clinicians believe that most cases of Covid-19 are mild, but severe cases have already caused hundreds of thousands of hospitalizations and more than 125,000 confirmed deaths worldwide. Slowing the growth rate of infections is therefore essential to save lives and avoid overloading the health care system. Unless Hawai‘i maintains and improves compliance with stay-at-home orders, Island residents will continue to experience infection, hospitalization, and death.

Following the lead of municipal authorities, state government have imposed a variety of facility closures and stay-at-home orders. Island mayors have experimented with nighttime curfews, beach and park sweeps, audio warnings from drones, and police checkpoints. In just a month, we find ourselves working from home and sheltering in place, decreasing non-essential transportation, fabricating and wearing masks in public, avoiding public congregation, and interacting with many loved ones only on screens. Thus far—and at considerable sacrifice—Hawai‘i has risen to this historic occasion.

In order to slow the rate of infection, however, experts agree we need to do more. Aggregate traffic data shows that Hawai‘i drivers have reduced their daily driving distance and non-essential stops by 55-70%, but this may be insufficient to arrest community spread. To encourage better compliance with stay-at-home orders, local and state authorities should judiciously intensify enforcement while also endeavoring to maintain public trust.

Next steps:

1) Launch a multi-platform public education campaign, funded by state and local governments and supplemented by philanthropy, to underscore the importance of physical distancing. Attention should be directed to local minority languages and target populations less easily reached by national media.

2) Focus police resources on activities most likely to result in infections, e.g., non-essential congregate worksites and social gatherings. Authorities should strive for enforcement that is visible yet selective, logical, and restrained.

Hawai‘i has risen to this historic occasion. Yet experts agree we need to do more.
The consensus of public health experts is that Covid-19 cannot be contained—and therefore economic activity cannot return to anything like normal—without a dramatic increase in testing. Diagnostic testing on a different order of magnitude is imperative for a variety of reasons:

- It will allow us to identify and isolate asymptomatic and mildly symptomatic persons, who can unknowingly infect others.
- It will help us protect vulnerable state residents, as well as health care workers, first responders, and essential employees.
- It will enable us to more accurately assess the spread of the disease and model its future, providing critical information to policy makers.
- It will facilitate epidemiological and clinical research on the disease, helping us better understand symptom presentation, patterns of transmission, variable demographic impact, and interaction with comorbidities.

Physical Distancing Continued

3) Use vacant hotel space, at government expense, to provide single-room or family-unit accommodation for at-risk persons, including residents of long-term care facilities who do not require constant care, as well as elderly inmates on compassionate release.

4) Substantially reduce the inmate populations in state and local corrections facilities with the aim of providing single-cell housing for the duration of the outbreak.9

5) Increase temporary housing for individuals and families without homes. To avoid becoming incubators of infection, these facilities must allow sufficient space for sleeping and eating at safe distances. They must provide for adequate hygiene and adequate security. Hotels in some instances can provide temporary emergency housing.10

6) Streamline and scale up, at government expense and with philanthropic support, programs to provide individual hotel accommodation to front-line, at-risk workers, including health care workers and first responders. Front-line workers are standing up for all of us, and we should have their backs.
Public officials have advised us all to wear masks, not blindfolds. Without testing, we cannot see how this epidemic is unfolding, and we cannot mount a robust response. Our recommendations:

1) Increase the pace of diagnostic testing. Because we know that SARS-Cov-2 can cause mild symptoms or even no symptoms at all, Hawai‘i needs to loosen criteria for testing. As test kits, swabs, personnel, and PPE become more available, health officials should ramp up testing in several areas: (a) among individuals with milder symptoms, like loss of smell or a light cough; (b) among especially vulnerable populations like nursing home residents; and (c) among at-risk essential workers, including prison guards, first responders, health care workers, nursing home staff, grocery and pharmacy employees, and restaurant and delivery workers. In order to determine the extent of community spread, Hawai‘i also needs to undertake enhanced surveillance testing, especially among in populations with higher rates of poverty and morbidity.

2) Designate a single, high-ranking public official to take charge of the state’s overall testing effort. This official’s team should identify any obstacles to increased testing (e.g., equipment supply, lab capacity, personnel shortages) and work directly with the governor and state and federal emergency officials to clear them.

3) Collect, centralize, and release more granular data on testing subjects and results. Health authorities elsewhere have demonstrated that it is possible to safeguard individual privacy while sharing detailed case data. Regularly posted information on both positive and negative tests should include, in anonymized form: ethnicity, gender, age, symptoms, and more precise residence information—with variables added as the research evolves. To the extent that disclosures of such information is prohibited under current privacy regulations, authorities should invoke emergency powers for the purposes of epidemic control.

If funding or staffing are needed, they should be provided, through activation of additional National Guard units if necessary and, later, through emergency hires.
Rapidly and substantially increase personnel assigned to contact tracing. Hawai'i's emergency staff at DOH and HI-EMA are working overtime, but they cannot possibly keep up. In the short term, National Guard units and reassignment of idled state workers could close the gap, but coping with this disease over many months will require a large pool of new employees, numbering in the hundreds. To put this in perspective, a former director of the CDC estimates that to match China's effort, the US would have to deploy 300,000 contact tracing employees in short order.

Are Native Hawaiians, who suffered catastrophic loss of life in epidemics over the course of two centuries, suffering greater rates of infection and mortality than other population groups, as are African Americans on the continent? We don’t know because we lack basic information.

Contact Tracing

The basic detective work of public health is contact tracing. This involves gaining the trust of individuals who test positive and working with them to map their recent movements and communicate with their close and prolonged contacts. The aim is to identify exposed and infected persons, so that they too can be tested and isolated, and the chain of infection can be broken.

Contact tracing for Covid-19 presents challenges because the disease can be asymptomatic or mildly symptomatic and also quite contagious. Accordingly, contact tracing for this pandemic requires hard work, long hours, phone calls, site visits, and regular follow up—every step multiplied by a case load that can increase exponentially. Contact tracing is resource and personnel intensive. Yet without comprehensive contact tracing, the pandemic cannot be turned back and businesses will remain closed. Without contact tracing, more of us will die. Our recommendations:

1) Rapidly and substantially increase personnel assigned to contact tracing. Hawai'i's emergency staff at DOH and HI-EMA are working overtime, but they cannot possibly keep up. In the short term, National Guard units and reassignment of idled state workers could close the gap, but coping with this disease over many months will require a large pool of new employees, numbering in the hundreds. To put this in perspective, a former director of the CDC estimates that to match China's effort, the US would have to deploy 300,000 contact tracing employees in short order.
Contact Tracing Continued

2) Take advantage of new technology and large data sets to supplement traditional contact tracing. In pursuit of private profit, big technology companies have been aggregating and selling our location and contact data for years, but public health bureaus have been slow to adopt new tools for public good.\textsuperscript{15}

Two possibilities:

a) Encourage residents and travelers to install an existing Covid contact-tracing app on their personal electronic devices. In South Korea, Singapore, Taiwan, and elsewhere, personal apps have been used successfully to notify exposed individuals, rapidly identify new cases, and advance research.\textsuperscript{16}

b) Health authorities in several afflicted countries have also taken advantage of large private datasets to assist with contact tracing, including cellphone GPS data. Immediate action at the state level could be challenging in this arena, but state health authorities and the AG’s office should draft plans and open discussions with technology companies about data sharing and contact notifications.\textsuperscript{17}

Extensive contact tracing will be expensive, but we must build out our public health infrastructure if we are to make it through not just this round of contagion but the next. Until widespread vaccination, effective treatment, or antibody tests present other pathways, traditional public health practices are our only way forward.
Quarantine and Isolation

The last tools in the public health box are quarantine and isolation. These are tried-and-true responses to emerging infectious diseases, developed first in the 14th century and used effectively against recent outbreaks of SARS, MERS, and Ebola.18

Hawai‘i has so far taken halting steps to isolate the infected and quarantine the potentially infected. All visitors arriving to the islands are required to self-quarantine for 14 days, and individuals who test positive are asked to do the same. This has led to a dramatic drop in daily airport arrivals, but enforcement for travelers who do arrive has been spotty—this despite grave risk.

In China, epidemiologists concluded that most transmissions occurred through close, prolonged contact with symptomatic individuals and that most clusters of infection originated in families.19 This finding suggests special risks for Hawai‘i because of our high proportion of large and multigenerational households.20 In Hawai‘i, advising someone who tests positive to self-isolate at home often means putting vulnerable family members at risk.

We can do better. Although Hawai‘i’s household structure presents vulnerabilities to Covid-19, we also have one great asset at our disposal: more than 50,000 full-service hotel rooms, most of them currently empty.21

Our recommendations:

1) Provide free, voluntary isolation for anyone who tests positive for the full course of illness.22 State authorities should seek federal assistance to cover costs but should guarantee funding so that hotel isolation can begin without delay. Prices, meal delivery, and work conditions should be negotiated both with hotel management, using federal lodging and per diem rates as a starting point, and with hotel worker unions, so that employees have a voice in determining staffing levels, cleaning schedules, benefits, and use of protective equipment.

2) Strengthen quarantine provisions for all arrivals to the islands, with exceptions only for workers essential to the Covid response. Every traveler arriving in Hawai‘i, resident or non-resident, should be required to submit to supervised quarantine in hotels at their own expense for 14 days.

To balance public safety with compassion and flexibility, there should be exception for residents who can prove they have the ability to truly self-isolate at home without placing any household members at risk. There should also be assistance for residents who can demonstrate financial hardship.
Conclusion

Implementing the above recommendations in short order will not be easy. But experts in a range of fields agree these are necessary steps to contain the outbreak, and prerequisites for resuming economic activity.

Aggressive application of traditional public health practices can also buy us still more time: more time for treatments to evolve, equipment and supply shortages to be resolved, antibody tests to become widely available, and vaccine development to proceed. More time to address social problems that endanger us all, like homelessness, prison overcrowding, health insurance gaps, and lack of employee sick leave. Robust intervention now will save lives and also better position Hawai’i for recovery.

In developing this briefing, we have considered alternative viewpoints, and we would like to address two counterarguments here:

- **Cost**: With the collapse of tourism and much of the service economy, state revenues will decline markedly in the coming months. This will indeed present long-term challenges, but now is not the time to shortchange our emergency response. Although Hawai’i’s state budget rules require expenditures to match revenues, there are exceptions allowed for emergencies, and this is indeed an emergency. Austerity across the board will only worsen the crisis, most economists agree, and this is particularly true when interest rates and inflation are low, federal relief dollars are in the pipeline, and the Federal Reserve is promising to buy state debt.

- **Caution**: Since Hawai’i has not yet experienced an exponential growth of cases, we might conclude that our efforts thus far have paid off and that we should pause before taking additional steps. But delay poses a real and present danger. There is no human immunity to SARS-CoV-2. There is no proven treatment. The virus has spread rapidly, yet only a small portion of the world’s population has so far been infected, which means that almost everyone on Earth remains at risk. We can therefore predict additional waves of infection. Until a vaccine can be administered widely, Covid-19 will continue to pose a threat in Hawai’i and everywhere else.

The road ahead will be difficult. Yet if Hawai’i leverages its resources and strengths—particularly in committing necessary spending, adding personnel, and making urgent use of idle hotel space—we may still have a chance to escape what Covid has wrought elsewhere. With good fortune and thoughtful action, Hawai’i could even emerge as a model for effective, reasoned, responsible crisis response, a success story for multicultural democracy.
Conclusion
Continued

At the height of the epidemic in Europe, Italians captured the internet by sending dire messages to their past selves. They railed against their complacency and implored themselves to heed public health advice. They warned themselves (as a dramatic way of warning us) that the virus was serious, that the virus was coming, and that the virus would tear life asunder.

Two weeks, two months, or even two years from now, we too will have the opportunity to look back and assess our present actions. Will we look back with weary regret, scolding our past selves for inaction and delay? Or will we look back with pride, knowing that we pulled together and defended Hawai‘i when it mattered most?

That is our choice.

This is our chance.
Citations


2. See Governor David Ige, Fourth Supplementary Proclamation (March 31, 2020).

3. Hawai‘i data, COVID Tracking Project (updated April 15, 2020).


11. Joe Hasell, et al., “To understand the global pandemic, we need global testing,” Our World In Data (March 31, 2020).


Citations Continued

14 Tom Frieden, “I Used to Run the C.D.C. Here’s What It Can Do to Slow This Pandemic,” New York Times (April 12, 2020); Maggie Fox, “‘We need an army’: Hiring of coronavirus trackers seen as key to curbing disease spread,” STAT (April 13, 2020).


20 Anita Hofschneider. “This Hawaii Multi-Generational Family of 7 Worries As Coronavirus Spreads,” Civil Beat (March 26, 2020).

21 2019 Hawai‘i Hotel Performance Report, Hawai‘i Tourism Authority (2020).

