HTA in Asia Post-COVID-19

2021 VIRTUAL ASIA POLICY FORUM

04:30 a.m. – 07:00 a.m. UTC on December 6, 8, & 10, 2021
Welcome

Dear Colleagues,

It is with great pleasure that I welcome you to the 9th HTAi Asia Policy Forum, which due to COVID-19 will be a virtual Forum. This is the second year that we have had to hold the Policy Forum in a virtual setting, and the 2020 meeting, in fact, was held as a 3-part virtual series in later 2020/early 2021 which would have been in Tokyo, were it not for the COVID-19 epidemic.

The 3-part virtual series covered several topics including ‘Real-World Data in Asia’, which highlighted the need for the development of RWD in Asia as the representation of Asian people in clinical trials for new drugs and technologies is much lower than in other continents. Hence the need for supplementary RWD to assist the HTA process. We were also privileged to have an overview of the vaccine scene internationally at that time, and this was extremely informative and helpful to participants. We also were one of the first virtual meetings to have a presentation on the second wave of COVID from Malaysia and the impact on health care systems, the community and HTA. Since that time, most nations in Asia have experienced second and third waves of COVID. Although the title ‘HTA in Asia Post COVID’ was selected for this year’s meeting, it is evident that COVID will be with us for several years to come and with the development of vaccines, and in particular, the use of booster vaccines plus other public health measures, such as social distancing and mask-wearing and other treatments, Asia is beginning to learn to live with COVID-19 whilst re-opening economies and maintaining the health care system.

This year’s meeting will explore the impact of COVID-19 on health care systems, and there will be key presentations from the Japanese health care system and its impact on HTA given that the meeting was originally planned as a face-to-face meeting in Tokyo. We will also hear from India on the enormous challenges being faced by that system, and we will also hear how HTA has changed with COVID-19 in Asia.

A comprehensive background paper has been prepared which details the development of COVID and the impact on HTA. A survey of both industry and agencies will also be presented. The aim of the Policy Forum is for representatives from industry and health technology agencies in Asia to come together to discuss mutual problems and issues in a respectful way to enhance the implementation of universal health coverage in the Asian region. As well as the background material and keynote presentations, there will be ample opportunity for breakout groups to explore issues and report.

At the end of the meeting, a brief communiqué will be produced, followed by a publication for the International Journal of Technology Assessment in Health Care (IJTAHC) and a proposed panel session at the HTAi Annual Meeting in 2022.

Finally, I would like to thank all of those on the Organizing Committee and the Secretariat who have contributed to the development of the meeting program and the organization of the meeting and those who presented, facilitated, or reported for the breakout groups. Special acknowledgement goes to Linda Mundy for the background paper.

This will be my last meeting as Chair of the HTAi Asia Policy Forum and I wish to thank all of you for your continued interest and contribution and to wish you all future success as I hand over to the next Chair, Professor Guy Maddern.

Yours sincerely

[Signature]

Professor Brendon J. Kearney
Chair, HTAi Asia Policy Forum
Meeting Information

The 2021 HTAi Virtual Asia Policy Forum will take place virtually from 04:30 a.m. – 07:00 a.m. UTC on December 6, 8, & 10, 2021.

(Please click here to find the correct time in your time zone)

Please connect to the meeting using the following details:
HTAi ASIA POLICY FORUM – December 6, 8, & 10, 2021
https://zoom.us/j/94396236221
Meeting ID: 943 9623 6221

We prefer all attendees join using a PC or other personal device to ensure functionality of breakout groups, however if you require a toll-free dial in number please contact us at policyforum@htai.org

Social Media information

HTAi would like to encourage Forum members to share their thoughts and experiences on social media. However, please keep in mind the HTAi 2021 Virtual Asia Policy Forum is held under the Chatham House Rule, so neither the identity nor affiliation of the speaker(s), nor that of any other participant, may be revealed.

Official hashtag: #2021APF

Social media handles:
- Twitter: @HTAiOrg
- LinkedIn: Health Technology Assessment International (HTAi)
- Facebook: @HTAiOrg
Networking Reception

The 2021 HTAi Asia Policy Forum networking reception will take place virtually on December 6, 2021 at 06:35 a.m. – 07:35 a.m. UTC.

(Please click here to find the correct time in your time zone)

Please connect to the meeting using the following details

HTAi ASIA POLICY FORUM – Networking Reception – December 6, 2021
https://zoom.us/j/94396236221
Meeting ID: 943 9623 6221

We prefer all attendees join using a PC or other personal device to ensure functionality of breakout groups, however if you require a toll-free dial in number please contact us at policyforum@htai.org

Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Facilitator(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>06:35 – 07:35 UTC</td>
<td>Tea and Chocolate Tasting</td>
<td>Monarch Tea</td>
</tr>
</tbody>
</table>
Tea and Chocolate Tasting

Networking Reception Suggestions:
For a smooth class, please keep your microphone on mute, unless you have a question or we are in a discussion period. This helps prevent feedback and a clearer call. You are welcome to have video on throughout the class so we can all see each other and have an interactive workshop.

Please make a mug of each tea by scooping 1-2 tsp of each tea into the biodegradable “fill your own” tea bags in your welcome kit. If you do not have a temperature controlled tea kettle, here is a general rule of thumb:

Green tea: let the kettle go to a boil, then lift the lid off and let cool down for about 5 minutes to bring it to the 165/175 degree ideal temperature. Let 1 tsp of tea steep for 2-3 minutes.

Black Tea, Herbal & Rooibos: Let 1 tsp of tea steep for 3-4 minutes at 200 degrees F, just under the boil.

Bring all mugs to a comfortable spot where you will be accessing the call on a computer. Have your box of chocolates ready to go nearby. You may want to cut each chocolate in half, or have a knife nearby, to have some chocolate to save for later.

You can use a plate or saucer over the mugs to keep the tea hot while we are in class.

If you have extra leaves leftover, please shake a bit of the leaf onto a plate. We will be examining the dry leaf and tea during class, as well as drinking the tea steeped tea. I’ve attached a photo below of my personal set up to give you perspective!

In summary, before class you should have:

1. All teas steeped and ready to go in their mugs, with a plate on top of each to keep hot during class and chocolates nearby with a napkin/ knife if desired
2. Dry leaf from each tea on a plate to observe during class
3. Optional notebook/ pen
4. Optional glass of water to stay hydrated/drink between teas
5. Zoom set up and open, microphone off, camera on.
6. Be ready for optional participation and discussion on the teas. No previous knowledge of tea is required. This is a fun, lighthearted way to connect with others over what teas you liked and which ones you didn’t as well as discuss tasting notes. Participation is optional and no one will be put on the spot!
How to Participate in a Zoom Meeting

Using the “Attendee Controls”
https://support.zoom.us/hc/en-us/articles/200941109-What-Are-the-Attendee-Controls-

About
When you join a Zoom meeting hosted by another user, you are considered an attendee. The user who scheduled the meeting or was selected as the alternative host (if the host is unable to join) will have host controls, including muting audio, using video, sharing your screen and more.

Join a Meeting
Join a meeting by clicking on a Zoom link provided by the meeting host => follow the prompts to download and run Zoom => enter the meeting ID if prompted => click to join the audio conference. When you’re in the meeting, you may click on the Start Video button to start your video.

Mute/Unmute & Audio Settings
You can mute and unmute your microphone. The host also has the ability to mute you. If you click on the arrow next to the mute button, you will have additional options for audio settings. You can change your microphone, leave the computer audio or access the audio options.
**Start/Stop Video & Video Settings**

You can turn your camera on or off with the Start/Stop Video button. By clicking on the arrow next to the start/stop video button, you can change webcams, access your Zoom video settings, or select a virtual background (if enabled).

![Select a Camera](image)

**Participants**

If you click on Participants, you can see who is currently in the meeting. The participants list also gives you the option to raise your hand or rename yourself.

- **Raise Hand** - notifies host and shows a prompt to simulate hand raise
- **Rename** - hover over your name to change it as it is seen in the participants list and video window

**Share Screen**

If the host allows, you can [share your screen] in the meeting. The host will have the ability to stop your screen share.

**Chat**

Chat with individuals or everyone in the meeting. Click [Chat] to open up the chat window and chat with other participants or view chat messages. Select the drop down next to To: to change who you are chatting with.

**Record (if host has given permission)**

The host will need to give you permission to record the meeting. If you try to click on this before the host has given permission, you will receive the following message.

![Please request record permission from the meeting host](image)

Note: the host is not notified that you have requested recording permission. You will need to ask them through the chat or audio to give you recording permission (available in their Manage Participants list).
Choose video layout
At the upper right of the Zoom window, you can switch between active speaker view and gallery view. You can also switch between a shared screen and the video by clicking on a button available in this location during a screen share.

Enter/Exit Full Screen
At the top right of the Zoom window, you can enter or exit full screen mode. You can also exit full screen by clicking Esc.

Pin video
Pin video makes a user the primary speaker for you, instead of switching between the active speaker video. You can pin a video by right-clicking on the video of the person you want to pin or double click on their video window.

Co-annotate on screen share
If the host allows, you can annotate on their shared screen or share whiteboard. To do this, click on View Options at the top of your screen and choose Annotate.

Leave Meeting
You can leave the meeting at any time by clicking on the Leave Meeting option at the lower right corner of the Zoom window.
For More Information

Contact Technical Support:
https://support.zoom.us/hc/en-us/articles/201362003-Zoom-Technical-Support

Zoom Help Center:
https://support.zoom.us/hc/en-us

Getting Started:
https://support.zoom.us/hc/en-us/categories/200101697-Getting-Started

Tutorials:
https://support.zoom.us/hc/en-us/sections/201740096-Training

Mobile:
https://support.zoom.us/hc/en-us/sections/200305413-Mobile
## Agenda

**Monday, December 6, 2021, 04:30 UTC**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker(s)/Facilitator(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>04:30–04:35 UTC</td>
<td><strong>Welcome from APF Chair, Housekeeping and Opening of the Forum</strong> (5 min)</td>
<td>Prof. Brendon Kearney, Chair, HTAi Asia Policy Forum&lt;br&gt;Dr. Wija Oortwijn, President, HTAi</td>
</tr>
<tr>
<td>04:35–04:45 UTC</td>
<td><strong>Presentation — WPRO Issues and Priorities</strong> (10 min)</td>
<td>Dr. Socorro Escalante, Coordinator WHO Western Pacific</td>
</tr>
<tr>
<td>04:45–05:05 UTC</td>
<td><strong>Presentation — Japanese Health System Reforms</strong> (20 min)</td>
<td>Dr. Takashi Fukuda, Department Director, National Institute of Public Health</td>
</tr>
<tr>
<td>05:05–05:10 UTC</td>
<td><strong>Insights — Japanese Health System Reforms</strong> (5 min)</td>
<td>Mr. Jim Crompton, Director, New Business Development, Market Access Asia Pacific at The Janssen Pharmaceutical Companies of Johnson &amp; Johnson</td>
</tr>
<tr>
<td>05:10–05:25 UTC</td>
<td><strong>Q &amp; A</strong> (15 min)</td>
<td>Dr. Socorro Escalante, Coordinator WHO Western Pacific&lt;br&gt;Dr. Takashi Fukuda, Department Director, National Institute of Public Health</td>
</tr>
<tr>
<td>05:25–05:35 UTC</td>
<td><strong>Coffee Break</strong> (10 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>05:35–06:15 UTC</td>
<td><strong>Breakout Group Discussions</strong> (40 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>06:15–06:30 UTC</td>
<td><strong>Report Back</strong> (15 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>06:30–06:35 UTC</td>
<td><strong>Conclusion of Day 1</strong> (5 min)</td>
<td>Prof. Brendon Kearney, Chair, HTAi Asia Policy Forum</td>
</tr>
<tr>
<td>06:35–07:35 UTC</td>
<td><strong>Tea and Chocolate Tasting</strong> (1 hour)</td>
<td>All attendees</td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Speaker(s)/Facilitator(s)</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>04:30-04:35 UTC</td>
<td>Opening, Summary of Day 1 (5 min)</td>
<td>Prof. Brendon Kearney, Chair, HTAi Asia Policy Forum</td>
</tr>
<tr>
<td>04:35-04:55 UTC</td>
<td>Presentation – HTA in a Post-COVID Era (20 min)</td>
<td>Professor Tracy Merlin, Interim Head, School of Public Health; Managing Director, Adelaide Health Technology Assessment</td>
</tr>
<tr>
<td>04:55-05:15 UTC</td>
<td>Presentation – Healthcare Innovations, HTA and Policy: COVID-19 and Beyond (20 min)</td>
<td>Professor Kanchan Mukherjee, Centre for Health Policy, Planning and Management, School of Health Systems Studies, Tata Institute of Social Sciences, Mumbai, India</td>
</tr>
<tr>
<td>05:15-05:30 UTC</td>
<td>Q &amp; A (15 min)</td>
<td>Professor Tracy Merlin, Interim Head, School of Public Health; Managing Director, Adelaide Health Technology Assessment &amp; Professor Kanchan Mukherjee, Centre for Health Policy, Planning and Management, School of Health Systems Studies, Tata Institute of Social Sciences, Mumbai, India</td>
</tr>
<tr>
<td>05:30-05:40 UTC</td>
<td>Coffee Break (10 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>05:40-06:20 UTC</td>
<td>Breakout Group Discussions (40 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>06:20-06:35 UTC</td>
<td>Report Back (15 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>06:35-06:40 UTC</td>
<td>Conclusion of Day 2 (5 min)</td>
<td>Prof. Brendon Kearney, Chair, HTAi Asia Policy Forum</td>
</tr>
</tbody>
</table>
### Friday, December 10, 2021, 04:30 UTC

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker(s)/Facilitator(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>04:30–04:35 UTC</td>
<td>Opening, Summary of Day 2 (5 min)</td>
<td>Prof. Brendon Kearney, Chair, HTAi Asia Policy Forum</td>
</tr>
<tr>
<td>04:35–04:45 UTC</td>
<td>Fireside Chat: APF Past and Future (10 min)</td>
<td>Prof. Brendon Kearney, Chair, HTAi Asia Policy Forum &amp; Prof. Guy Maddern, Incoming Chair, HTAi Asia Policy Forum</td>
</tr>
<tr>
<td>04:50–05:00 UTC</td>
<td>“What’s Keeping Me Up at Night” overview (15 min)</td>
<td>Prof. Guy Maddern, Incoming Chair, HTAi Asia Policy Forum</td>
</tr>
<tr>
<td>05:05–05:10 UTC</td>
<td>Coffee Break (5 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>05:10–05:50 UTC</td>
<td>Breakout Group Discussions (40 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>05:50–06:05 UTC</td>
<td>Report Back (15 min)</td>
<td>All attendees</td>
</tr>
<tr>
<td>06:05–06:10 UTC</td>
<td>Wrap Up and Topic Selection Summary (5 min)</td>
<td>Prof. Brendon Kearney, Chair, HTAi Asia Policy Forum &amp; Prof Guy Maddern, Incoming Chair, HTAi Asia Policy Forum</td>
</tr>
</tbody>
</table>
HTAi Asia Policy Forum
Background Paper

HTA in Asia Post-COVID

Virtual meeting
December 2021
Executive summary

Since being declared a global pandemic by the WHO, SARS-CoV-2 has spread to 223 countries with almost 245 million confirmed cases, and more than 4.9 million deaths (case fatality rate of approximately 2%) reported globally. COVID-19 has triggered both health and economic crises in many countries. Deficiencies have been exposed, with the health system struggling to provide adequate treatment for large numbers of COVID patients with a lack of facilities, equipment, and medical staff. Non-COVID related health care has been deferred, and although health service utilization is increasing, levels are still reduced compared to pre-pandemic numbers. At this point in time, the long-term effect of missed care on morbidity and mortality remains unknown, but there may also be potential benefits to health systems and patients from reductions in low-value diagnostic tests and treatments. COVID-19 has provided an opportunity and incentive to rethink and reexamine the level of care routinely provided by many health systems, with fundamental behavior change by both patients and health care providers prioritizing high-value over low-value care.

COVID-19 has had a devastating negative impact on health, health services, the economy, and livelihoods, and this impact is likely to extend well past the end of the pandemic. However, COVID-19 has also offered up opportunities for health systems to rethink how health care is delivered and embrace new models of care, such as the digital transformation of health and hospital-in-the-home.

Pre-pandemic, HTA was used to identify the most efficient allocation of scarce healthcare resources. During the pandemic, emergency use authorizations by regulators sidelined normal HTA processes. Policymakers, under pressure to provide rapid solutions, made provisional approvals of COVID public health measures, diagnostics, therapeutics and vaccines primarily based on limited safety and efficacy results of clinical trials, with little assessment of clinical or cost effectiveness.

Over the course of the pandemic, HTA agencies have had to adapt to using new and challenging methodologies such as ultra-rapid reviews and “living HTA”, synthesizing large volumes of rapidly emerging evidence associated with high levels of uncertainty. Developing methodologies to assess the clinical effectiveness and value of virtual approaches to health care is a future challenge for HTA. One positive measure to come from COVID has been increased collaboration with HTA assessments, guidelines and data being shared globally. One of the greatest challenges in the Asia region pre-COVID was the availability and quality of data. The proliferation of data during COVID has demonstrated the value of having reliable, connected data sources that can be analyzed in real time. COVID has also emphasized the need for collaboration between all healthcare stakeholders, including industry and patients, with HTA embracing a broader, societal perspective where appropriate.

HTA has been an integral part of assessing the value add of new innovations, and the COVID-19 pandemic is no different. HTA can play a critical role in connecting science, innovation, technology, and health policy. Multidisciplinary HTA, using a technology lifecycle and systems approach is needed, rather than just HTA for technology adoption or cost containment. HTA systems need to be better positioned to weather future crises, and have flexible frameworks in place for agile prioritization, evidence generation and assessment, and reassessment.
**Introduction – the COVID-19 timeline**

In December 2019, a small cluster of patients (n=59) were hospitalized with viral pneumonia of an unknown origin in Wuhan, the capital city of Hubei province in China, with symptoms and clinical presentation resembling that of severe acute respiratory syndrome coronavirus (SARS-CoV). In early January 2020, sequencing of a specimen isolated from the lower respiratory tract of an infected patient in Wuhan revealed the highly contagious infectious pathogen to be a novel enveloped RNA betacoronavirus2, which has since been named SARS-CoV-2. Sequencing enabled the development of a diagnostic test for SARS-CoV-2, with the presence of the virus in respiratory specimens detected by real-time RT-PCR using primers that targeted the envelope gene of the virus. Testing of the 59 suspected cases in Wuhan found that 41 had a confirmed SARS-CoV-2 infection. The genetic sequence of the novel coronavirus was shared by China on 12th January 2020, in so doing enabling the global development of the gold standard PCR diagnostic test, in addition to antibody and rapid antigen tests.8-10 In late January 2020, with the number of cases continuing to increase and spread to other countries8, the World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) a public health emergency of international concern. During this time, China introduced public health measures aimed at reducing virus transmission, including the lockdown of Wuhan, preventing travel in and out, as well as restricting movement within the city. Other cities in China were soon to follow, with as many as 60 million people placed into lockdown.8

By 11th March 2020, with more than 80,000 laboratory-confirmed cases documented globally and a mounting death-toll, the WHO declared COVID-19 a global pandemic. By mid-March 2020, many countries were faced with critical shortages of personal protective equipment (PPE) for healthcare workers, as well as ventilators and medications to treat critically ill patients. Full and partial lockdowns were implemented in many countries with measures including social distancing, mandatory mask wearing, stay-at-home orders including the closure of schools, and travel advisories were put in place to mitigate transmission of the virus.11 Countries such as South Korea, Japan and Singapore put in place strict border controls that required any visitors to undergo mandatory COVID-19 testing and 14-day quarantine, either at home or designated facilities.1

In the early phase of the pandemic, the implementation of these measures was successful in many countries in the Asia region in reducing the exponential rise and limiting the spread of infection (what was quickly termed “flattening the curve”). Countries in the region fared better in their initial response to COVID-19 in comparison to those in Europe or the Americas, with experience of previous epidemics, such as SARS and MERS, standing them in good stead in terms of preparedness for a pandemic.12 Experience with acute respiratory syndrome (SARS) and Middle East respiratory syndrome saw countries such as Hong Kong, South Korea and Singapore with sufficient stockpiles of PPE and ventilators, as well as having well trained staff who knew how to appropriately work with infectious diseases in PPE, protecting the health workforce from infection. This was especially important as the number of infected patients grew rapidly, putting pressure on staffing numbers. In addition to health system preparedness, previous SARS and MERS epidemics prepared the public for an increase in health surveillance, with people being more accepting of the tradeoff between personal rights and the greater public good.1

In January 2021, the Lowy Institute from Australia released an interactive report that analyzed publicly available data on how over 100 countries managed the SARS-CoV-2 pandemic. A weighted average of the rankings across the following indicators was calculated for each country to produce a score from 0 to 100: cases, deaths, cases per million people, deaths per million people, cases as a proportion of tests, and the number of tests per thousand people (Figure 1). Several countries from the region were listed in the top 10 global performers, including Vietnam, Taiwan, Thailand, Singapore and South Korea.12

---

*a RT-PCR = reverse transcription polymerase chain reaction allows the use of RNA as a template

*b Thailand was the first country outside of China to record a case with the virus detected in a woman who had travelled directly from Wuhan to Bangkok8 Allam (2020)*
Despite this early success, by mid-2020, some countries in the region were experiencing a severe 2nd wave, and by the beginning of 2021, were battling a 3rd wave of even greater proportions. The surge in the number of cases in many countries enduring a second or third wave can be attributed in part to the emergence of viral variants of concern. However, much of the surge can be attributed to the early relaxation of the public health measures that were initially so successful due to a reluctance by governments to curtail travel and religious practices (resulting in a lack of social distancing) as well as pressure on the economy to get workers back to the workplace (resulting in movement of workers, especially those in low paid employment with no capacity to work from home). In addition, the lack of technical capacity to test, track and trace, and importantly, a lack of capacity and preparedness in the healthcare system overwhelmed many countries in the region.

By October 2021, with the spread of the Delta variant, case numbers in the region were again rising rapidly in Malaysia (2.36 million cases, 27,681 deaths), Indonesia (4.23 million cases, 142,848 deaths), the Philippines (2.69 million cases, 40,221 deaths) and Japan (171 million cases, 18,063 deaths) (see Figure 2 and Figure 3). The country most severely affected in the region has been India (34.02 million cases, 451,814 deaths), where although case numbers are still high, the average number of daily cases has decreased significantly since the peak in May 2021.

From the outset of the pandemic, an unprecedented global effort has been undertaken to identify effective therapeutics to prevent the high rates of morbidity and mortality associated with SARS-CoV2 infection. Despite hundreds of clinical trials and many promising drugs being identified as potential treatments, few therapeutic drugs have so far been identified that have any effect on COVID-19 symptoms or been proven to prevent COVID-19 hospital admissions. Remdesivir, a broad-spectrum antiviral agent that binds to viral RNA polymerase, inhibiting viral replication, was an early therapeutic frontrunner. Although remdesivir has been approved for use in as many as 48 countries, there is still a lack of data about the benefits (or lack thereof) in certain subgroups. Remdesivir has demonstrated clinical benefits such as decreased time in the hospital and reduced progression to mechanical ventilation; however, its impact on mortality remains unclear. One successful drug repurposed for the treatment of COVID is dexamethasone, a corticosteroid that has both an anti-inflammatory and immunomodulatory effect. Results from clinical trials such as the RECOVERY

---

**Figure 1**  Weighted average scores of global regions 40 weeks after the 100th case. A higher score indicates a better overall performance  

---

c  Variants of concern: Alpha (B.1.1.7): first described in UK Dec 2020, Beta (B.1.351): reported in South Africa Dec 2020, Gamma(P.1): reported in Brazil Jan 2021 and Delta (B.1.617.2): reported in India Dec 2020. Note: high levels of circulating virus results in higher rates of viral mutation.  

d  As of 13th October 2021  
[https://ourworldindata.org/coronavirus#coronavirus-country-profiles](https://ourworldindata.org/coronavirus#coronavirus-country-profiles)
**Figure 2** Daily new confirmed COVID-19 cases per million people (rolling 7-day average) \(^{14}\)

**Figure 3** Cumulative confirmed COVID-19 cases per million people \(^{14}\)
trial reported that dexamethasone (alone or in combination with the monoclonal antibody tocilizumab) administered to severely ill hospitalized patients in the hyperinflammatory phase significantly reduced time spent in hospital, the need for mechanical ventilation and the risk of death or severity of disease. Selected monoclonal antibodies that bind to the virus, preventing it from entering host cells and to combat already infected cells, have been given emergency use authorization by the Food and Drug Administration (FDA) for use in patients with mild to moderate non-hospitalized COVID-19 patients who are at risk of clinical deterioration and progression to severe disease. These include the use of sotrovimab alone, or combinations of casirivimab with imdevimab or bamlanivimab with etesevimab. It should be noted that most of these drugs, aside from dexamethasone, are expensive with a short course of treatment estimated to cost in excess of $2,000 USD, and are therefore out of the reach of most countries, especially those with high COVID case numbers.

Parallel to the search for effective COVID therapeutics was the early focus on the development of a SARS-CoV-2 vaccine to create broad, worldwide immunity against COVID-19. This task was particularly challenging as, until this point in time, there has never been an RNA-based vaccine, let alone one developed against a coronavirus. The outbreaks of SARS in 2003 and MERS in 2012, both caused by a novel coronavirus, were over before vaccines could be developed and funding into their development was redeployed elsewhere. By April 2020, the Global Alliance for Vaccines and Immunizations (GAVI) partnered with the Coalition for Epidemic Preparedness Innovation (CEPI), the Bill and Melinda Gates Foundation, the Wellcome Trust, and the European Commission amongst others to provide a platform supporting the research, development and manufacture of COVID-19 vaccine candidates, and to provide equitable global access to these vaccines. Aside from needing the technological capability and infrastructure to manufacture and distribute vaccines, vaccine development requires a level of funding that can only be provided by wealthier countries. Companies such as Moderna benefited from tax-payer funding via the US National Institutes of Health. At the same time, work on the University of Oxford/AstraZeneca vaccine was boosted by funding from the United Kingdom (UK) Government under the proviso that the vaccine was provided by AstraZeneca on a not-for-profit basis for the entirety of the pandemic, and in perpetuity to low- and middle-income countries. Companies such as Pfizer had the confidence to develop a vaccine knowing that there would be a willing global market to purchase it if efficacious against SARS-CoV-2.

The development and regulatory approval of several SARS-CoV-2 vaccines in such a short time frame raised concerns that the development process had been too rapid to ensure not only vaccine efficacy but more importantly, vaccine safety. However, the urgent need for a vaccine saw usually risk-averse manufacturers “gamble” by overlapping the normally stepwise phases to shorten the development time, at the same time as manufacturing candidate vaccines before clinical efficacy had been confirmed (Figure 4).

According to the WHO’s vaccine tracker, there are currently 114 vaccines in clinical development, including those already with regulatory approval such as AstraZeneca’s ChAdOx1-S, Pfizer/BioNTech and Moderna’s mRNA vaccines, and 185 in pre-clinical development. Inequitable distribution and access to all vaccines remain a critical issues for low-to-middle income countries (Figure 5). In November 2020, 50% of vaccine pre-orders were filled by the five wealthiest nations plus the European Union (27 countries purchasing as a block), despite these countries representing only around 13% of the global population. Many low-income countries have been left to rely on vaccine supply from doses promised to the COVAX initiative. In September 2021, GAVI issued a statement describing the significant global commitment to COVAX, with more than US$10 billion raised and legally-binding commitments for up to 4.5 billion doses of vaccine, which had
already translated to 240 million doses being delivered to 139 countries in just six months. Despite this, access to COVID-19 vaccines remains unacceptably low, with only 20% of people in low- and lower-middle-income countries (LMICs) having received a first dose of vaccine compared to 80% in high- and upper-middle-income countries. The distribution of vaccines to LMICs is being hampered by ‘vaccine nationalism’ - the prioritization of deals by manufacturers with high-income countries, with these countries prioritizing vaccinating their residents over their agreed commitments to COVAX, described by the WHO as a ‘catastrophic moral failure’. This inequity may worsen with the spread of the Delta variant, reports of waning vaccine efficacy and countries such as the UK and USA calling for booster shots to be administered. Israel started a booster shot program in July 2021 despite little being known about the need for COVID-19 vaccine booster shots. What is known is that a spike in antibody levels occurs after vaccine administration, and antibody titers fall over time with reduced antibody production by the memory B-cells. What is currently unknown is; however, whether the natural decline in antibodies will reflect a decline in protection against COVID-19. Several trials are underway to determine whether a third vaccine dose will lead to a more robust immune response, resulting in high levels of antibodies and T cells. Fortunately for global vaccine supplies, the FDA almost unanimously rejected mass population booster shots, approving them for use in only vulnerable immunocompromised individuals.

The key COVAX milestone of two billion doses released for delivery is now expected to be reached in the first quarter of 2022.

Supply is not the only issue hampering the access to vaccines in LMICs. Other challenges, especially in countries with poor infrastructure outside of major cities, include the logistics of storage and transportation of vaccines, including access to electricity and special storage equipment to keep vaccines at the correct

---

Figure 4  Comparing traditional vaccine development to that of accelerated development during a pandemic

---

temperature, such as the ultra-low temperatures required by the Pfizer vaccine. In addition, many countries have also experienced high levels of misinformation around the virus and vaccines, which requires the formulation of education and awareness strategies to combat.  

Globally, after a slow start, China is now leading the way with its vaccination program, primarily using the Sinopharm and Sinovac (CoronaVac) vaccines, both of which use whole inactivated virus. The use of the more traditional method of producing vaccines using an inactivated virus is more time consuming than using mRNA technology, as it first requires large-scale viral growth in living cells grown in large bioreactors. This large-scale production effort has likely been leveraged on China’s existing production capacity for viral diseases such as influenza and hepatitis A. Clinical trials of CoronaVac reported an efficacy of 51% against symptoms of COVID-19 and higher protection against severe disease and death, whereas the Sinopharm vaccine has demonstrated an efficacy of 79% against symptomatic disease and hospitalization. In May 2021, the WHO authorized the Sinopharm vaccine for emergency use globally, allowing access to many LMICs to a vaccine through the COVAX initiative. By June 2021, China had supplied 350 million doses of the two vaccines to more than 75 nations, mainly in Latin America and Africa.

As of November 2021, China has administered 161 doses per 100 people (Figure 6), indicating that more than half the population is fully vaccinated, having received two doses. In June 2021, China was reported to be delivering up to 20 million doses per day, accounting for more than half of the people around the world receiving a COVID-19 shot each day. It is likely, however, that this rate will slow once vaccination programs move from larger cities and urban areas to the harder to reach rural and remote areas of China. Of concern are countries in the region with large populations, such as Indonesia and the Philippines, where vaccination rates remain low.

Large-scale population vaccination is critical to reducing pressure on health systems. Real-world data has demonstrated vaccination to be effective in reducing transmission of COVID-19 and severity of disease, and in so doing, significantly reducing COVID-19–associated hospitalization rates, intensive care admissions and death.
Since being declared a global pandemic by the WHO, SARS-CoV-2 has spread to 223 countries with almost 245 million confirmed cases, and more than 4.9 million deaths (case fatality rate of approximately 2%) reported globally.

The 2021 Asia Policy Forum (APF) will examine how the role of health technology assessment (HTA) has changed during the pandemic in the Asia region, especially in the rapid approval of SARS-Cov-2 diagnostics, therapeutics and vaccines. Discussions will be informed by pre-meeting surveys of both agency and industry attendees of the APF, describing their experience during the pandemic.
HTA in pre-pandemic Asia

To frame the discussion around the future role of HTA in health care post-COVID-19, it is necessary to reflect on what HTA in the region looked like pre-pandemic. The adoption of HTA in Asia has been relatively slow and is intricately linked with the development and implementation of universal health coverage (UHC) in the region. It is no surprise that countries with well-developed UHC were also early adopters of using HTA as a priority-setting tool, including Malaysia, the first Asian HTA agency to be established in 1995, followed by Thailand in 2007 and South Korea in 2006. Although they are yet to achieve UHC, countries in the region such as Indonesia, the Philippines, and Vietnam are committed to working towards achieving UHC, one of the core tenets of the United Nations’ Sustainable Development Goals. Many factors need to be considered when formulating UHC benefit packages and getting the balance between provision of services, addressing the greatest need and protecting individuals from financial risk all at the same time as providing value for money to the health system. The implementation of UHC in combination with other considerations, including ageing populations, the transition from communicable to non-communicable diseases and the demand for high-cost technologies, has led to the urgent need to develop robust priority setting tools to ease the pressure on health system funding.

HTA is a well-recognized health policy and resource allocation tool used in high-income countries such as Australia and the UK, where the assessment of clinical effectiveness and cost-effectiveness of new health interventions is a prerequisite for the support of public reimbursement and coverage decision-making. Given the diversity of the political, administrative, and healthcare systems not only across but within countries, not to mention differences in population size and ability to fund health care, it should be expected that there would be great variation in HTA systems in the Asia region. Many countries in the region have limited technical HTA capacity, and this, combined with a lack of access to local epidemiological data, means that benefit packages are often not informed by evidence-based decision-making. In the long-term, disregarding the evidence-base when developing benefit packages may result in inefficient and inequitable healthcare systems, which is opposite to the desired goals of UHC. This is demonstrated by the fragmented and inconsistent use of HTA in decision making in China, where unlike countries such as Australia and the UK, no single HTA organization has oversight for the entire country. HTA in China is often used only for some (usually high-cost) technologies, with local authorities deciding on the scope of the benefit package based on local needs and available resources, rather than the evidence-base. The HTA landscape in China is slowly changing, and since 2017 China’s national drug reimbursement policy has adopted an evidence-based, value-driven approach rather than the previous ad hoc approach, requiring HTA or a pharmacoeconomic evaluation to be conducted before a new drug can be covered. Although China is building HTA capacity, health policy is still reliant on experience rather than using an evidence-based approach, with HTA not a mandatory component embedded in the decision-making process. In contrast, countries such as Malaysia, Taiwan, Thailand, Singapore and South Korea have achieved UHC and have extensive benefit packages, the content of which is evidence-based and developed by HTA agencies with direct links with, or embedded in their respective country’s health departments. These comprehensive benefit packages provide primary, secondary and tertiary health care, preventative care including screening programs and immunization, mental and oral health care, ophthalmology and rehabilitation services, as well as access to some pharmaceuticals.

As discussed during the 2019 APF, HTA can be used as a two-sided priority setting tool for investment and/or disinvestment. HTA is most commonly used to inform benefit package coverage decisions by assessing the safety, effectiveness and cost-effectiveness evidence of new health technologies that represent value for money and will result in better patient outcomes. A good example of this at work is the 2015 assessment of cochlear implants conducted by Taiwan. After a full HTA process and consultation with patient groups, it was found that unilateral cochlear implants are effective, but there was uncertainty around the incremental

---

k In 2019, the Asia region average for the UHC essential health services index was 61% compared with 46% in 2010. WHO (2021)
benefit of bilateral implants at a significantly higher cost. As a result, funding was approved only for unilateral rather than bilateral cochlear implants, delivering patient benefits at the same time as conserving scarce health system funds. By contrast, HTA can be used to identify existing clinical practices or health technologies that are ineffective, inefficient or do not represent value for money. Countries like Indonesia look to HTA to provide more reliable, evidence-based coverage decisions to better define its existing benefit package. When Indonesia introduced UHC, the health system was faced with supplying and financing a broad benefits package with very few exclusions, presenting organizational and financial capacity issues when trying to deliver benefits to the whole population. The addition of trastuzumab (Herceptin) to the publicly funded Indonesia National Health Insurance (INHI) formulary is a well-documented example of this. The INHI only funded 8 cycles of trastuzumab over 6-months, with patients having to pay out-of-pocket to complete the 12-month, 16-cycle course. Many women could not afford the out-of-pocket payments, and so did not complete the 12-months of treatment. A comparison of outcomes; however, found that although trastuzumab therapy for 12 months reduced the recurrence rate in post-operative HER-2 positive breast cancer women, it did not significantly reduce mortality compared to women treated for only 6-months. This example demonstrated the use of HTA to inform value-based decision-making using real-world local outcome and affordability data in order to identify and disinvest from a high-cost and/or ineffective drug such as trastuzumab, delivering savings that could be used elsewhere in the health system. Although the real-world data suggested that the clinical benefits of trastuzumab were not being realised, and that there was a significant budget impact associated with its use, there still remains political reticence to adopt this decision due to advocacy by patient groups who want access to trastuzumab.

Strengthening priority setting by building HTA capacity in the region has been identified as critical for the formulation of benefit packages that can deliver equitable, high-quality and affordable health care for all. Capacity building requires political will to implement HTA processes into everyday decision-making, funding the training, development, and retention of professional staff with the necessary expertise. In addition, the generation, collection, and analysis of, and access to local real-world data/evidence (i.e. data from clinical trials conducted in Asian populations) has consistently been identified as an issue for the successful integration of HTA into health decision-making policy. A great deal of collaborative work by international and regional organizations is ongoing, providing methodological guidance and training in order to build HTA capacity in the Asia region.

One of the most important initiatives has been the establishment of the collaborative network HTAsiaLink in 2011, which facilitates countries across the region to share their HTA experiences, learnings and resources, reducing duplication of effort. As of 2021, the network has grown from its original three founding members to now include 34 HTA agencies and organizations from 17 member countries. The key determinants to the success of the network has been the ability to harness elements from each member organization, including their social, cultural, philosophical and educational ethos, as well as team resources, administrative support and communication/coordination mechanisms. Most important of all; however, is the interpersonal relationships among the collaborators, such as willingness to collaborate, mutual trust, respect, and communication. HTAsiaLink facilitates collaboration at all levels of HTA agencies, providing all staff and students, especially junior researchers, not just the senior experts, the opportunity to attend and present at the annual conference, enabling networking opportunities in a collegiate and safe environment. Unlike global HTA conferences, registration is free, with funding for regional travel and accommodation paid by the member agency. Pre-conference workshops given by global HTA experts in conjunction with local experts provide an opportunity to share technical and methodological experiences.
Other capacity building initiatives include the partnership between the UK’s National Institute for Health and Care Excellence (NICE) International and Thailand’s Health Intervention and Technology Assessment Program (HITAP). In 2008, NICE International was established to offer: “Advice on building capacity for assessing and interpreting evidence to inform health policy and on designing and using methods and processes to apply this capacity.” Together HITAP and NICE developed a framework that would promote structures and processes to guide health policy and build HTA capacity in countries in the region that were moving towards UHC. By developing HTA capacity where it was lacking and informing better decision-making, the framework aims to enable the more effective, efficient and equitable use of health resources, which will ultimately result in better health outcomes for the population as a whole. This initiative aims to foster the transfer of expertise and knowledge to several countries in the region with the goal of exposing decision makers and technical officers to the concept of evidence-informed policymaking concept and practice rather than embedding HTA as a national decision-making mechanism. Successful projects using this approach include those in Myanmar (to improve maternal and child health), the Philippines (expanded immunization program) and Vietnam (stroke management). In the past, several factors were identified as critical for the success of developing HTA capacity, including political will, the involvement of stakeholders at all levels, and technical and financial support from international partners. However, the success of collaborative capacity building should also be demand-driven with a focus on local policy agendas and incorporate building links not only across institutions but between institutions and health policy makers.66

Another important initiative in the region has been the formation of the ISPOR Asia Consortium, which has promoted the use of HTA to inform and guide healthcare policies and practices, providing a forum to share HTA expertise (especially pharmacoeconomic methodology) and capabilities in the region.72

HTA is not a perfect priority-setting tool but should be just one of many considerations in the coverage decision-making process. Shortcomings of HTA include that it is usually reactive, rather than proactive, and often conducted as a snapshot in time, with technologies and subsequent decision-making considered in isolation, rather than using an integrated approach that considers the overall value of a technology not just in an economic or financial context but including factors such as socioeconomic, cultural, ethical impacts, as well as implementation or organizational concerns.49

HTA in post-pandemic Asia

The advent of the COVID-19 pandemic has offered the opportunity to not only rethink the way that health care is delivered, but the way health policy is developed in the Asia region, including how HTA is conducted and used by health systems. Potential talking points for the 2021 APF Forum, especially during the breakout sessions, in relation to the challenges and opportunities that have been presented by the COVID-19 pandemic in the Asia region include:

- International Society for Pharmacoeconomics and Outcomes Research
Opportunities presented by the COVID-19 pandemic:
• demonstrate the value and benefit of HTA in priority-setting;
• greater emphasis on hospital-based HTA;
• increased national, regional and international collaboration;
• expand the lifecycle approach to HTA and the use of real-world evidence;
• shift the focus to prioritizing public health needs rather than technology-driven demand; and
• shift to new models of care e.g. virtual care and artificial intelligence (challenge and opportunity).  

Challenges presented by the COVID-19 pandemic:
• lack of HTA capacity;
• HTA bodies have had to evaluate and approve many COVID-19 related interventions with limited evidence within a short timeframe;
• impact of delays in treatment and concerns around equity of access;
• impact on health budgets;
• rapid regulatory approvals overriding normal HTA processes;
• speed versus rigor – the use of rapid reviews and lower levels of evidence;
• lack of political will;
• misinformation from mainstream and social media; and
• shift to new models of care, e.g. virtual care and artificial intelligence (challenge and opportunity).  

In addition, discussions during the second session of the 2021 virtual series of APF meetings will be guided by a pre-meeting survey of industry and agency attendees around ways in which regulation and HTA has adapted to support pre- and post-pandemic health systems. Unfortunately, the results of this survey were not available by the time this background paper was going to press, and therefore they will be presented as an addendum to this paper during the meeting. The survey questions can be accessed in Appendix 1.

The changing health care landscape - challenges

There is no doubt that COVID-19 has triggered both health and economic crises in many countries, some of whom were already operating under significant budget constraints before the pandemic. COVID-19 exposed deficiencies in health systems across the world, especially the capacity to provide adequate treatment for extremely large numbers of patients with a lack of facilities (especially intensive care), equipment (ventilators, PPE), and well-trained workforce. In addition, the effect of national lockdowns on manufacturing and distribution meant that many countries experienced a disruption in the supply chain for drugs and other health products, limiting the ability to provide a continuum of non-COVID essential care. The enormous financial burden that COVID-19 has placed on health systems also represents an opportunity cost – COVID has diverted valuable resources away from other care, the effect of which may not be known for years. Pressure on health systems in conjunction with strict lockdown measures, often combined with financial stimulus packages, highlighted the connection between health and economic stability. In short, COVID-19 has had a devastating negative impact on health, health services, the economy, and livelihoods, and this impact is likely to extend well past the end of the pandemic. Put simply, for countries to improve their economic output and recovery, they need to decrease the impact of COVID on individuals.

COVID-19 and deferred care

Since the beginning of the pandemic, many countries have reported large reductions in non-COVID-related health care at all levels of the health system (primary, secondary and tertiary care), primarily due to changes in patient and provider behaviors. Patients have missed care for many reasons, with the most obvious one being the inability to access care due to lockdown and restricted movement policies being in place. In addition, many healthcare facilities reallocated resources to deal with a surge of COVID-19 patients, and cancelled services to limit the number of face-to-face interactions and to preserve precious stocks of PPE.
Many patients expressed fear of contracting infection whilst visiting a health facility, cancelling appointments, often for necessary care such as diabetic clinics,51 cancer treatment52, 53 and preventative services such as immunizations and cancer screening,54-56 or delaying or deferring urgent acute care such as that required for suspected stroke, heart failure or appendicitis.5 In addition, the large scale reassignment of healthcare staff from non-COVID to COVID has affected services such as elective surgery (e.g. hip and knee replacements), rehabilitation, chronic disease management and preventive care, which will have a long-term impact on the health of the population.56

The WHO has conducted two surveys of 132 countries from all the regions and all income brackets (high, middle and low income) in order to track the level of disruption to essential health services in the context of the COVID-19 pandemic (Figure 7).5 The second survey, published in April 2021, reported that 94% of countries experienced a disruption to health services, with more disruption reported in low- and middle-income than in high-income countries.50

A recent systematic review of health care utilization pre- and post-pandemic found that the majority of services (95.1%) reported a median decrease in total health service delivery of 37.2% (IQR -50.5% to -19.8%). A median 42.3% decrease in the number of actual healthcare visits or presentations (ranging from a 49% increase to a 86% decrease) was reported, with the largest decrease observed in children under 10-years of age (-72%). Although many centers reported sharp increases in COVID-related admissions, there was overall a median 28.4% decrease in non-COVID admissions such as admissions for acute coronary syndrome, with

Figure 7 Reasons given for global health service disruption (January-March 2021)50

p The WHO have developed a dashboard to track the continuity of essential health services which can be accessed here

q 81 studies reporting on 17.9 million services across 20 countries

r IQR = interquartile range
an associated decrease in the number of coronary procedures. A median decrease (29.6%) in therapeutic and preventative services was also reported (ranging from 27% increase to 80% decrease), and all of the 81 studies included in the review reported a decrease in utilization of diagnostics and imaging procedures (median decrease 31.4%).

The majority of the studies included in the Moynihan et al (2021) review were from the USA or Europe, with only five studies from three countries in the Asia region being included (Taiwan, Hong Kong, and China). In addition, most of the included studies were snapshots in time, reporting on single specialties such as cardiovascular or imaging services. Two large studies from the Asia region that examined the impact of COVID-19 on all levels of health service utilization in China, did, however, reinforce Moynihan’s findings. Xiao et al (2021) conducted a systematic analysis of all-cause health facility visits and inpatient volumes in China for the four years before the pandemic, compared to the first six months of the pandemic in 2020. Health facility visits and inpatient volumes both decreased significantly during COVID (-23.9% and -21.6%, respectively). Reductions were significantly greater were greater in hospitals than in primary health care settings (p<0.0001), and significantly reduced urban regions compared to rural (p<0.0001), avoidance behavior that reflected stricter lockdown measures and higher rates of COVID-19 transmission in higher density populations. Xiao et al estimated a total cumulative loss of 1,020.5 (95% CI [951.2–1,089.4], p < 0.0001) million or 23.9% (95% CI [22.5–25.2%], p < 0.0001) health facility visits, and 28.9 (95% CI [26.1–31.6], p < 0.0001) million or 21.6% (95% CI [19.7–23.4%), p < 0.0001) inpatients in China during the first six months of 2020. Utilization figures were lowest at the beginning of the reporting period, and had increased towards the end of the study but had not recovered to pre-pandemic numbers, possibly due to factors that include continued patient fear combined with the implementation of clinical redesign measures. These findings were confirmed by Zhang et al., (2020) who used national and regional healthcare expenditure data to compare utilization before, during and after the Spring Festival in 2019 and 2020, as well as before, during and after the outbreak of COVID-19. Unique to China, financial transactions using China UnionPay (CUP) bank cards are categorized by type of industry (retail, medical and financial), with CUP cards being the most common form of payment for non-reimbursable healthcare services in China. Total healthcare expenditure and utilization declined by 37.8% and 40.8%, respectively, despite per capita expenditure increasing by 3.3%. Like Xiao et al., Zhang found that healthcare utilization decreased significantly in highly populated cities compared to less dense population centers regardless of the level of COVID-19 risk. Although a proportion of the decrease can be attributed to stricter lockdown measures and a reallocation of resources to COVID, some of the decrease was due to patient avoidance due to fear of contracting infection.

Missed care during COVID-19 mirrored the situation reported in West Africa during the 2014–2015 Ebola epidemic, where facility-based health care, maternal and child health care, vaccination services and essential HIV/AIDS treatment all declined. Similarly during the MERS in 2012, reductions in emergency admission services of 33% were reported, with a 14% and 17% decrease in acute care admissions for myocardial infarction and ischemic stroke, respectively, often with fatal results.

Moving forward, data describing the global decrease in healthcare utilization should be examined to not only identify the effect of missed care on morbidity and mortality but also any potential benefit to health systems and patients from reductions in low-value diagnostic tests and treatments.

The long-term impact of missed care on morbidity and mortality remains unknown, and more research is required to fully measure its effect not only on an individual’s health but on the health system and downstream healthcare costs. Many countries have noted that the pandemic has disproportionately affected minorities (women, ethnic minorities, people with disabilities, the poor etc.), further exacerbating disparities in access to health care. Future pandemic planning needs to recognize the importance of strengthening all levels of the health system in order to minimize the disruption of routine and preventative care. The WHO have reported that many countries are actively monitoring health utilization data to track essential health services. To mitigate reductions in, and to ensure continuity of access to essential services, many countries have adapted their service delivery model to include remote triaging to prioritize patients, provision of home-based care and the use of digital health care (e.g. telemedicine). Since 2020 the WHO has reported a 20%
increase in countries that have defined a list of essential health services that must be maintained during the COVID-19 pandemic; however, it is unclear which countries have achieved this.50

The changing health care landscape - opportunities

Clinical redesign – COVID-19 as a disrupter

Although largely seen as a threat to health systems already dealing with financial and economic uncertainty, COVID-19 has also offered up opportunities for health systems to rethink how health care is delivered and embrace new models of care, often with limited resources. The adoption of new models of care such as telemedicine or hospital-in-the-home may lower costs for patients by reducing travelling time, travel costs and waiting times.65 Initially, costs may increase for health systems, with investments needed in hardware, software and the employment and training of IT support staff. However, long-term, new models of care may deliver savings to the health system by delivering improved efficiencies, and in so doing, provide funds to increase access to those in need.66 Increasing thought must be given to the integration of healthcare services, and the need to develop and leverage public-private partnerships to improve healthcare delivery. Establishing the link between the health of the population and economic stability, COVID-19 may provide the impetus for countries to invest more in health care rather than signal fiscal restraint. In short, COVID-19 may have disrupted healthcare services but moving forward into the post-pandemic period, COVID may be an accelerator of change for good in the healthcare landscape.

Digital health care - telemedicine

As stated above, given both patient and clinician reluctance to continue face-to-face health care and the need to prevent transmission of the COVID virus, the pandemic has provided the impetus for health services to adopt digital health care solutions including telemedicine, which can encompass telephone, virtual or video consultations, artificial intelligence (AI), wearable devices, mobile applications (e.g. track and trace apps such as Singapore’s TraceTogether) and even chatbots.67 Despite advances in the technology needed to deliver digital health care, especially to more remote regions, including widespread broadband internet availability, the uptake of smartphones and the availability of 4G/5G networks, the digital transformation of health did not occur.67, 68 It has taken a pandemic, along with the relaxation of telemedicine regulations and appropriate funding mechanisms, to break down many of the previously identified barriers to virtual care adoption for patients, clinicians and policy-makers alike to finally achieve the rapid uptake of the technology.5, 65

There are well documented advantages and challenges associated with the use of digital health care, especially during extreme events such as a global pandemic, which Shen et al (2021) have summarized in Figure 8. The degree to which digital care is rolled out into routine clinical practice may depend on future HTA that may elucidate which digital solutions are effective, which ones are patient preferred, and which ones can deliver efficiencies in the health system and therefore represent value for money.

Digital health care in the region

In regions with limited health care resources, telemedicine was considered an important disaster response tool after the outbreak of COVID. Hong et al (2020) described the setting up of a telemedicine network in Sichuan, China using the 5G infrastructure. The hub and spoke network covered provincial (n=5), municipal (n=24) and county (n=179) level hospitals, with a median distance of 319 km (range 20 to 1,191 km) between each spoke and the central hub. Multidisciplinary consultations of patients were conducted by real time video telemedicine, concentrating on those patients vulnerable to severe COVID disease (i.e. the elderly, pregnant women and patients with comorbidities). In only the first two months of the pandemic, a total of 9,085 online consultations had been conducted by 137 clinicians, of which 293 patients were screened for suspected COVID-19. In addition, 31,905 patients had received prescriptions or medicines through the service. At a time of high stress and anxiety, telemedicine reduced the number of face-to-face visits, protecting both clinicians and vulnerable patients, at the same time reducing crowding in hospital and conserving precious stocks of PPE. The initial training of clinicians and the investment in the technological infrastructure to ensure accessibility were instrumental in the success of this large regional network.69
Telemedicine has been used to great effect for routine clinical visits for patients with chronic disease such as remoting monitoring of diabetes and hypertension, rather than for complex medical conditions that require a physical examination.\textsuperscript{3, 70} Onishi et al (2021) described the impact of the COVID-19 pandemic on a Tokyo diabetes clinic. Compared to the same period in 2019, almost half the number of patients visited the clinic for face-to-face routine diabetic care during the 8-week emergency period in April 2020 (1,163 versus 2,574 patients). Prior to the pandemic, patients would visit the clinic every 1-2 months for HbA1c, blood glucose and BMI checks, as well as receiving prescriptions for insulin and other medications. Early in the pandemic, Japan's Ministry of Health approved clinics to fax or mail prescriptions after consulting with patients remotely. In addition, patients were given advice to check their body weight, maintain an exercise program and to ensure they did not overeat while staying at home. Despite what seem to relatively gentle telemedicine reminders, glucose control during the emergency period improved even in patients with poor glucose control (HbA1c ≥7.0%). Although the limitations of this study were that it was retrospective and for only a short period, it did demonstrate that telemedicine diabetic care was feasible.\textsuperscript{51} These results are supported by the earlier findings of Zhai et al., (2014), who conducted a systematic review of 35 randomized controlled trials (duration ranged from 3 to 60 months) of telemedicine in Type 2 diabetics receiving either insulin or oral diabetic drugs (e.g. metformin). Although these studies were not conducted under the stress of a pandemic, pooled results from these studies revealed a small but statistically significant decrease in HbA1c following telemedicine compared to usual care.\textsuperscript{71}

During the pandemic, telemedicine has offered patients the opportunity to access routine clinical care in the home. However, as the number of COVID-19 patients surged in the second and third waves, hospitals were overwhelmed and lacked capacity to care for all patients and telemedicine was proposed as part of the COVID-19 response to alleviate the stress on hospitals. Firstly, telemedicine can be used to triage patients into those that need acute care, and those with milder symptoms, who could be isolated and cared for in the home, with COVID symptoms monitored daily. Hospital-in-the-home is not a new concept. Integrated care is an approach used by many health systems to reduce presentations to emergency departments, admissions and readmissions to hospitals, and improve the capacity of outpatient clinics for conditions such as diabetes, chronic obstructive pulmonary disease, and stroke. Integrated care requires a coordinated multidisciplinary approach with partnerships, collaboration, communication and data linkage between all levels of the health system. However, integrated care is more about personal care in the home, with coordinated in-person visits by general practitioners and other services as required, such as nurses, pharmacists, allied
health professionals such as dietitians and physiotherapists.\textsuperscript{72} Hospital-in-the-home for COVID-19 requires technology to enable remote home-based real-time monitoring and transmission of data back to a central clinic. Technology may include wearable devices for frequently measuring temperature, portable oxygen saturation monitors and blood pressure monitors.\textsuperscript{3}

To date, there has been little evaluation of hospital-in-the-home for monitoring patients with non-acute COVID-19 infection, and the cost and availability of home monitoring technologies is a limiting factor in its rollout, making it more suitable for high-income countries. Many health services have been forced to conduct manual checks on infected patients isolated at home, using daily phone calls to check on their status and whether symptoms had worsened. South Korea used a slightly different approach in response to a surge in cases very early in the pandemic (March 2020). A number of dormitory-style “Community Treatment Centers (CTC)” were created, which were independent buildings outside of hospitals, where that patients with mild symptoms could be isolated to prevent transmission and enable active surveillance. CTC patients were required to self-report their daily temperatures via a phone-based app with any change in symptoms monitored remotely by clinicians. During the first two weeks of one CTC operating, a total of 309 patients were admitted, with seven patients transferred to hospital due to worsening symptoms and 107 patients discharged without complication after consecutive negative results. Adherence to disease status monitoring was 80%.\textsuperscript{73} An Australian study reported on the early experiences of an existing virtual care unit associated with a large tertiary hospital in New South Wales, that was rapidly adapted for treating COVID patients in the home. Access to a smartphone, tablet device, or personal computer with an internet connection and video capability was required. Respiratory rate, oxygen saturation, pulse rate, and temperature were monitored at home, with the patient contacted three times per day at pre-arranged times. Monitoring included a video consultation with the patient twice every 24 hours to enable assessment of any signs of deterioration. As well as clinical measures, patients were asked if they had a fever or chills, shortness of breath or a cough. In addition, their psychological well-being was assessed with questions about how they were coping with home isolation. A total of 162 patients were enrolled in the virtual care program. The median length of stay was 8 (range 1-17) days, with patients contacted a median of 16 (range 1-30) times during this period. The majority of consultations were via video (n=1,902, 66.3%). Care escalation rates were low, with an ambulance attendance rate of 3% (n=5), emergency department attendance rate of 2.5% (n=4), and a hospital admission rate of 1.9% (n=3). No deaths were recorded. Although this study concluded that virtual COVID care was feasible, several limitations were noted. In March 2020, the New South Wales health system was not under undue stress, with (in comparison to global numbers) relatively few COVID cases. In addition, the success of this pilot project was due in part to the repurposing of an existing successful virtual care system, which was established to treat cystic fibrosis and chronic obstructive pulmonary disease patients in the home.\textsuperscript{74}

Several issues have been identified in the adoption of digital health care. Although internet access is widespread in most countries, the quality of the hardware, software and internet connection/coverage may not be sufficient to support an effective consultation. Another major issue is a lack of digital literacy, with many patients being inexperienced or uncomfortable with technology (e.g. the elderly or less educated), or not having access to technology either due to cost or because they live in rural or remote areas. This may have the effect of increasing rather than decreasing healthcare inequity, with some patients being enabled to access more care and others less.\textsuperscript{1, 70} Medico-legal concerns have been raised around the need for greater regulation of digital technologies, such as privacy and security of track and trace apps.\textsuperscript{70} The lack of training for clinicians in delivering safe and effective patient care using appropriate communication has also been identified as an issue.\textsuperscript{75} The use of telephone consultations rather than video calls also means that clinicians miss seeing patient’s facial expressions and non-verbal body language, which are often important when making an effective diagnosis/assessment.\textsuperscript{76} Concerns have also been raised that an increase in primary care virtual consultations may result in an increase in antibiotic prescriptions, exacerbating antibiotic resistance. A recent systematic review reported both over- and under-prescribing of antibiotics during virtual consultations when compared to face-to-face consultations; however, this review was limited by the inclusion of only English language studies.\textsuperscript{77} In addition, patient preference for physical interactions with their clinician, which often incorporates emotional as well as clinical care, cannot be ignored. Virtual care may work better for patients who already have an established relationship with their clinician compared to new patients who do not have a shared history.\textsuperscript{3}
More research should be conducted to determine which medical encounters are necessary, if more indications could benefit from a virtual approach (e.g. cancer care, orthopedics, ophthalmology), the optimal number of face-to-face consultations that could be replaced by telemedicine, patient preferences and, importantly, the cost-effectiveness of digital health care. In a post-COVID health system, a balance between the provision of virtual and in-person care will need to be found. It is unlikely that patients will want to go back to predominantly in-person care; however, it is equally unlikely that uptake of telemedicine will remain as high as that observed during the pandemic.

Digital health care - artificial intelligence

Pre-COVID, artificial intelligence, like telemedicine, had been on the verge of widespread adoption in health care but deemed to be not quite ready for mainstream use, with patients and health workers alike finding the concept of AI difficult to understand and trust. AI is best defined as “a collection of interrelated technologies used to solve problems autonomously and perform tasks to achieve defined objectives without explicit guidance from a human being.” Machine learning, where computers learn without explicit programming, is at the heart of AI when combined with other technologies such as robotics, computer vision or natural language processing.

AI is already being developed and applied to a number of indications in health care:

- robotic surgical applications where AI control algorithms improve precision and efficacy;
- the digitization of histopathology sections, especially in cancer, to screen for predefined morphological findings, standardizing diagnosis and classification;
- dermatological applications, especially the ongoing classification of skin lesions to monitor patients over time for melanoma. This application combines telemedicine with AI, with patients uploading images, which are then classified using AI as a clinical decision support tool, monitored by clinicians; and
- ophthalmology – an ideal application due to its many image-based investigations, where digital images are used to diagnose or monitor conditions such as diabetic retinopathy, age-related macular degeneration, and glaucoma. This is especially useful for populations living in rural and remote locations.

During COVID, AI has been used to great effect for the diagnosis and screening, and smart phone apps have enabled patients to upload daily data for clinicians to remotely monitor for both COVID and non-COVID conditions. AI algorithms, based on the large datasets of COVID-19-positive cases from China, have been developed and used as an initial tool for screening suspected cases. The answers to questions about symptoms, exposure to confirmed cases and travel history (e.g. overseas travel or travel from a known hot spot) would identify persons at risk of being COVID positive, who could then be isolated while undergoing confirmatory testing. In China, AI has been used as a risk-stratification tool to predict severity of disease progression in COVID patients five, 10 and 30 days post-infection.

One of the more innovative uses of AI during COVID has been the widespread adoption of “conversational agents” or chatbots, which have the advantage of being available any time of the day to answer questions with up-to-date information, and unlike clinicians, can speak with millions of people at the same time in local languages and dialects. Chatbots use machine learning (training models with data enabling prediction) and natural language processing (enabling recognition and analysis of verbal and written language) to provide predetermined answers to human input that can be accessed via phone, mobile, online platforms or social or media messaging platforms such as WhatsApp and Facebook. Pre-COVID, chatbots used as a support tool for health services, reducing the need for face-to-face contact of patients and clinicians for indications such as triage, counseling, treatment support and at-home health management. Chatbots developed during COVID had applications that could be broadly classified for use in disseminating transmission-reducing messages such as hand washing and social distancing; self-triage and personal risk assessment; preventing the spread of the virus; monitoring exposure and notifications; monitoring symptoms; and importantly for many countries, combating misinformation and fake news. It should be emphasized that the design of effective chatbots...
chatbots requires input from medical and public health experts. In addition, translating medical information into advice for public consumption requires expertise. One interesting aspect of chatbot use is that it ‘depersonalizes’ the health encounter, with many people, especially those who usually avoid seeking health care, being more willing to disclose sensitive personal symptom information to a chatbot than to a human.\textsuperscript{85}

Although many countries developed their COVID chatbots that cater to local cultural sensitivities, language and dialects (e.g. the ZINI chatbot developed in India), one of the most popular chatbot was developed by the WHO (Figure 9). In its first month of operation in 2020, the WHO chatbot reached more than 12 million people via WhatsApp, and by the end of 2020 it was in use by 4.2 billion people.\textsuperscript{84} Few countries have evaluated the impact, if any, of chatbots on the pandemic. Yoneoka et al (2020) evaluated the use of a chatbot-based healthcare system, COOPER\textsuperscript{A} very early in the pandemic (March 2020) in Tokyo, using one of Japan’s largest mobile messenger application providers (covering 65% of Japan’s total population). COOPERA was primarily designed to support monitoring and follow-up of high-risk people and potential cases of COVID-19, as well as providing support for patients with mild symptoms. During the 25 days of the study, interactions of 206,218 participants were analyzed (mean age 44.2 ± 13.2 years). Although no symptoms were reported by 96.93% of participants, the proportion of participants with self-reported fever significantly correlated with the number of COVID-19-positive cases after 0 to 3 days.\textsuperscript{86} Further evaluation of the usefulness and impact of chatbots on COVID-19 is required.

![Figure 9 Examples of COVID chatbots rolled out by WHO and ZINI in India](image)

Lastly, AI applications such as natural language processing have also been applied to track the vast amount of research data and information produced during COVID, including the epidemiology of the virus, potential treatments, the economic impact, as well as the anticipated impact of missed care.\textsuperscript{87} Importantly, by analyzing large data sets, AI played a role in accelerating the development of COVID vaccines, and can promote intelligent manufacturing of large scale vaccine production. Moving into the future, based on accumulated epidemiological data, predictive AI algorithms will be able to predict future outbreaks and enable a more rapid public health response.\textsuperscript{82}
The changing HTA landscape – challenges

Whereas HTA was at the forefront in health decision-making prior to COVID-19, during the pandemic, the normally transparent HTA processes were sidelined in favor of emergency use authorizations from regulators operating under the ‘rule of rescue’. Pre-pandemic HTA was used to identify the most efficient allocation of scarce healthcare resources; however, when approving public expenditure on COVID-19 technologies during the pandemic, especially in high-income countries, value for money was bypassed in favor of direct price negotiation and procurement.\(^6\) Policymakers, under pressure from the public and healthcare workers to provide rapid solutions, made provisional approvals of COVID public health measures, diagnostics, therapeutics and vaccines primarily based on limited safety and efficacy results of clinical trials, with little assessment of clinical or cost effectiveness.\(^4\) A good example of this was the hasty promotion of hydroxychloroquine (HCQ), previously used to treat rheumatoid arthritis or systemic lupus erythematosus, into clinical practice for the prevention and treatment of COVID-19. With the assessment of a large volume of real-world data, it was found that HCQ did not reduce mortality from COVID or reduce the number of COVID-19 patients who required ventilation, and the risk of adverse events was much higher in those patients treated with HCQ compared to those treated with standard therapy. As such, HCQ was not recommended for clinical use beyond its original remit.\(^88\) Similarly, emergency authorization was given to remdesivir by the USA, UK and the European Medicines Agency in June 2020 despite limited evidence of clinical effect (no significant mortality benefit and only a marginal clinical benefit in less severely ill patients). Although the original cost of a 5-day treatment program was US$4,460 was later revised down to US$2,340 after reports of limited benefit, remdesivir would be unlikely to be cost-effective if a traditional HTA was conducted.\(^89\)

The flurry of approvals for off-label use of therapeutics in high-income countries led to many low-income countries understandably wanting access despite the lack of a local assessment of effectiveness. This non-evidenced based demand was led in part by patient expectations, pressure from clinicians in the face of a highly infectious virus and rising COVID-19 case numbers, and political leaders who wanted to be seen to be doing something.\(^90\) The need for local/regional evidence and assessment was highlighted by the emergency approval of dexamethasone in the UK. Clinical trials in the UK demonstrated a reduction in mortality when COVID-19 patients on oxygen were administered the relatively low-cost dexamethasone. However, these results would unlikely be replicated in many low-income countries due to the lack of access to ventilators and high-flow oxygen.\(^89\)

In addition, HTA agencies could have played a greater role in combating COVID misinformation, or the “infodemic”, by providing evidence-based information on all aspects of COVID-19: viral transmission, prevention, treatment and importantly, COVID vaccination. In the absence of a single central authoritative source of information regarding COVID, and combined with high levels of anxiety, misinformation, much like the epidemic itself, spreads exponentially, especially via social media and has impacted every country in the world.\(^91\) The WHO realized that although an infodemic cannot be entirely eliminated, management strategies could be put in place to reduce its effect. In June 2020, the WHO organized a global online consultation on managing the infodemic, which involved 1,483 participants from 111 countries and territories joining discussions over two days. A policy framework was developed covering six overarching policy areas, which individual countries could adapt to suit their national context and practices.\(^92\) HTA can play a role in conducting more research (“infodemiology”) tracking and analyzing the social determinants of COVID-19 misinformation spread, what types of misinformation spread fastest, and whether there are differences or similarities between countries. Research such as this informs the development of strategies and interventions that may be useful in future epidemics.\(^91\)

Another challenge for HTA and regulatory agencies is how to continue investment in, and foster new and innovative technologies moving forward? As discussed, COVID has certainly been the driver of much innovation – necessity being the mother of invention. It is likely that COVID will result in delayed investment in, or launch of, new non-COVID related health technologies. This may be due in part to a lack of willingness of investors to finance new products being developed by small manufacturers or companies. In addition, regulatory bodies have cancelled meetings or delayed decision-making on non-COVID technologies unless they are deemed to be critical (i.e. some cancer treatments).\(^93\)
Finally, one of the greatest challenges facing HTA agencies in the future is around the methodology of assessing these new approaches to health care. There is an urgent need to provide policy-makers with evidence-based assessments of the clinical effectiveness and value of virtual approaches to health care that takes into account the views of all stakeholders, including patients and clinicians.

The changing HTA landscape - opportunities

While significant COVID-related challenges remain, the pandemic has not only offered the opportunity to rethink healthcare delivery but also the way in which HTA is conducted and used in the long-term by laying the foundation for value-based healthcare assessment. HTA needs to have a more pronounced post-COVID role in interactions with regulatory bodies, particularly in the areas of pre-post marketing surveillance and the reassessment process after the generation of real-world evidence.\(^5\)\(^6\) HTA agencies have responded to the demands of COVID-19 by adapting existing methodologies to provide policy-makers timely information in a climate of rapidly changing and complex scenarios. A recent survey confirmed that HTA agencies have had to adapt their processes during COVID, with the majority of agencies surveyed (77%) reporting a change in methodology when assessing COVID-19 technologies, with most (62%) not conducting cost-effectiveness on these technologies. Although many HTA practitioners feel that many of these changes will be here to stay post-COVID, others warn against setting methodological precedents, and that COVID-19 technologies should be assessed in the same way as any other healthcare technology.\(^4\)

Over the course of the pandemic, many agencies have conducted ultra-rapid reviews with timelines of 5-10 days instead of the 3-6 months taken for a full HTA. Rapid reviews enabled the prioritization of healthcare interventions despite high levels of uncertainty. Some agencies reported that they found the rapid review methodology challenging, with greater pressure, high levels of uncertainty and rapidly emerging (often changing) evidence. Unlike full HTA, rapid reviews were conducted along the lines of horizon scanning, using a limited number of databases, AI search strategies and usually only a single reviewer. A collaborative project initially launched in 2016 by British Medical Journal, BMJ Rapid Recommendations in partnership with MAGIC (Making Grade the Irresistible Choice), has been active in this space. The collaboration has developed the MAGICapp, a platform that enables the rapid update and dissemination of COVID guidelines without requiring any software installation, and is freely available to organizations that are unable to pay a license fee.\(^v\) The EUnetHTA website is also a repository for rapid reviews on COVID-19 diagnostics and therapeutics. Another initiative, COVID-END (COVID-19 Evidence Network to support Decision-making), has brought together a network of technology-assessment and guideline-development groups from around the world, producing rapid reviews (horizon scans for emerging issues) and living evidence syntheses (see next paragraph). This initiative summarizes evidence that covers the full gamut of responses to the pandemic, including public health measures, clinical management, health-system organization, economic and social responses, and includes low-, middle- and high-income countries. ‘Rapid HTA’ methodologies such as horizon scanning have been adapted to the new COVID landscape, with agencies such as the UK’s NIHR\(^w\) developing freely available databases identifying new and innovative COVID-19 diagnostics and therapeutics.

In addition, HTA agencies are conducting rolling reviews, or ‘living HTA’, of technologies that have been given fast track approval. Living HTA, where new evidence and information is incorporated as it becomes available, is not a new concept, but rather it embraces the life cycle approach to HTA, where approved technologies are continuously reassessed in light of real-world data becoming available. Cochrane Reviews are an example of “living HTA”; where, in the past, updates would be conducted every few years as evidence came online. During the pandemic, the concept of a “living HTA” itself was updated, with reassessments occurring every few months rather than years. A great example of this is the Cochrane Review of convalescent plasma as a COVID therapeutic, which was first reviewed in May 2020, then updated in July and October 2020, and more recently in May 2021.\(^9\)\(^4\) To avoid redundancy and duplication, EUnetHTA is also acting as a central coordinating body.

\(^v\) https://magicevidence.org/

\(^w\) National Institute for Health Research Innovation Observatory https://www.io.nihr.ac.uk/
for Rolling Collaborative Reviews for COVID therapeutics.

These initiatives highlight another aspect of the pandemic: increased regional, national and cross border collaboration, especially the sharing of data and the rapid formulation of COVID guidelines. Prior to COVID, one of the greatest challenges in the Asia region was not only the availability and quality of data, but access of industry to data collected by health systems, and vice versa, with data linkage an issue in most countries. COVID has demonstrated the value in having reliable, connected data sources that can be analyzed in real time, which may have implications for health care moving forward. Collaboration should also be extended to engagement with other important healthcare stakeholders, including industry and patients, with HTA embracing a broader, societal perspective where appropriate.5,6

Lastly, COVID-19 has provided an opportunity and incentive to rethink and reexamine the level of care routinely provided by many health systems, with fundamental behavior change by both patients and healthcare providers prioritizing high-value over low-value care.3 Since its inception HTA has been an integral part of assessing the value add of new innovations, and the COVID-19 pandemic is no different. HTA can play a critical role in connecting science, innovation, technology, and health policy. There appears to be general acceptance that multidisciplinary HTA using a technology lifecycle and systems approach is needed, rather than just HTA for technology adoption or cost containment.7
Appendix 1

Table 1  Payer agencies COVID-19 survey

<table>
<thead>
<tr>
<th>COVID tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Since COVID-19 was declared by the WHO as a pandemic in March 2020, has your country fast-tracked regulatory approval of any SARS-COV2 tests?</td>
</tr>
<tr>
<td>If yes, please specify how many and which tests</td>
</tr>
<tr>
<td>Before regulatory approval, did any of these tests undergo</td>
</tr>
<tr>
<td>• Traditional HTA process</td>
</tr>
<tr>
<td>• Rapid HTA process</td>
</tr>
<tr>
<td>• No HTA process</td>
</tr>
<tr>
<td>If HTA was undertaken, was your agency involved?</td>
</tr>
<tr>
<td>If tests were approved, were they</td>
</tr>
<tr>
<td>• Diagnostic</td>
</tr>
<tr>
<td>• Antibody (non-diagnostic, indicating past infection)</td>
</tr>
<tr>
<td>• Both</td>
</tr>
<tr>
<td>If diagnostic tests were approved, were they</td>
</tr>
<tr>
<td>• Molecular (e.g. RT-PCR)</td>
</tr>
<tr>
<td>• Rapid antigen POCT</td>
</tr>
<tr>
<td>• Both</td>
</tr>
<tr>
<td>If rapid antigen tests have been approved, are they for use</td>
</tr>
<tr>
<td>• By health professionals only</td>
</tr>
<tr>
<td>• Home use</td>
</tr>
<tr>
<td>• Both</td>
</tr>
<tr>
<td>• Only in areas of high prevalence</td>
</tr>
<tr>
<td>• Other (please specify)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COVID therapeutics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has your country fast-tracked regulatory approval of any therapeutics for the treatment of COVID-19?</td>
</tr>
<tr>
<td>If therapeutics were approved, were they (tick all that apply)</td>
</tr>
<tr>
<td>• Remdesivir</td>
</tr>
<tr>
<td>• Chloroquine/hydroxychloroquine</td>
</tr>
<tr>
<td>• Dexamethasone</td>
</tr>
<tr>
<td>• Toculuzamab</td>
</tr>
<tr>
<td>• Convalescent plasma</td>
</tr>
<tr>
<td>• Other immune modulators (please specify)</td>
</tr>
<tr>
<td>• Other anti-virals (please specify)</td>
</tr>
<tr>
<td>• Other technology (e.g. devices such as ventilators please specify)</td>
</tr>
<tr>
<td>Before regulatory approval, did any of these therapeutics undergo</td>
</tr>
<tr>
<td>• Traditional HTA process</td>
</tr>
<tr>
<td>• Rapid HTA process</td>
</tr>
<tr>
<td>• No HTA process</td>
</tr>
<tr>
<td>If HTA was undertaken, was your agency involved?</td>
</tr>
</tbody>
</table>
### COVID vaccines

Has your country fast-tracked regulatory approval (Emergency authorization) of any SARS-COV2 vaccines?

If vaccines were approved, were they (tick all that apply)
- Pfizer-mRNA
- Astra Zeneca ChAdOx1
- Moderna mRNA
- Novavax
- Sinovac
- Sinopharm
- Sputnik V
- Other (please specify)

If yes, before regulatory approval, did any of these vaccines undergo
- Traditional HTA process
- Rapid HTA process
- No HTA process

If HTA was undertaken, was your agency involved?

### COVID horizon scanning

Since the beginning of the pandemic, has your agency conducted horizon scanning to identify new and emerging COVID technologies?

If yes, were you aware of the NIHIRO COVID technologies horizon scanning data base prior to attending the March 2021 APF webinar?

If you have utilized the NIHIRO COVID technologies horizon scanning data base, has it been useful for providing policy advice?

### Rapid HTA

Since the beginning of the pandemic, has your agency conducted rapid HTA on COVID technologies?

Since the beginning of the pandemic, has your agency been requested to conduct rapid HTA on non-COVID technologies in order to set health care priorities post-pandemic?

Since the beginning of the pandemic, has your agency collaborated with other agencies in the region to develop protocols or guidelines/advice for SARS-COV2?

Since the beginning of the pandemic, has your agency been requested to identify disinvestment opportunities to fund health care for COVID?
Table 2 Industry representatives COVID-19 survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| Since COVID-19 was declared by the WHO as a pandemic in March 2020, has your company been involved in bringing any COVID-related technology to market? | • Pathology test  
• Therapeutic (pharmacological, cellular therapy or device)  
• Vaccine  
• Medical consumable (e.g. PPE)  
• Other (please specify) |
| If yes, was the regulatory approval process the same as pre-pandemic?     | If yes, did your product(s) undergo  
• Traditional HTA process  
• Rapid HTA process  
• No HTA process |
| If different, please specify how it was different (e.g. different levels of evidence required) | Has your company tried to bring other non-COVID products to market since March 2020? |
| Did the regulatory process for the same COVID-related product(s) differ across jurisdictions? | If yes, was this technology a  
• Pathology test  
• Therapeutic (pharmacological, cellular therapy or device)  
• Vaccine  
• Medical consumable  
• Other (please specify) |
| If yes, was the regulatory approval process the same as pre-pandemic?     | If different, please specify how it was different (e.g. different levels of evidence required) |
| Did the regulatory process for the same COVID-related product(s) differ across jurisdictions? | Did the regulatory process for the same COVID-related product(s) differ across jurisdictions? |
| If yes, have you experienced any regulatory approval or HTA-related issues bringing new non-COVID product(s) to market? e.g different levels of evidence required (higher, lower?) than in past |
References


56. van Weert, H. (2020). 'After the first wave: What effects did the COVID-19 measures have on regular care and how can general practitioners respond to this?'. *Eur J Gen Pract*, 26 (1), 126-8.


Mr. Rob Abbott
Executive Director
Health Technology Assessment International (HTAi)
✉️ rabbott@htai.org

Rob Abbott is a pioneering strategy and social responsibility catalyst in Canada; a much sought-after facilitator, moderator and content-weaver; a coach to entrepreneurs and executives; and a professor of global management and strategy. Rob’s experience in medical life sciences includes appointments as a member of the Board and Executive Committee of the Canadian Genetic Diseases Network (CGDN), and the Canadian Gene Cure Foundation. He subsequently became CEO of CGDN, a role that required him to regularly discuss advances in gene-based medical research on the one hand, and the translation of that research into practical diagnostics and therapeutics on the other. He has also advised provincial and federal health authorities in Canada and abroad on a wide variety of issues, including the role of artificial intelligence and advanced robotics in the delivery of health care. Rob writes and speaks on strategic environmental issues regularly, and is the author of Uncommon Cents: Thoreau and the Nature of Business; Conscious Endeavors: Business, Society and the Journey to Sustainability; and co-author of the forthcoming book, The Future of Mining: 7 Steps to a Globally Sustainable Industry. Rob is also working on a book, called Walking Toward the Edge: From Heartbreak to Hope in an Age of Loss. Rob has taught courses and delivered lectures at several universities in North America including the University of Toronto, the University of British Columbia, and Harvard. He has also taught at universities in China, Thailand, and Mexico.

Dr. Jeonghoon Ahn
Professor
Ewha Womans University
✉️ ahnjeonghoon@ewha.ac.kr

Dr. Jeonghoon Ahn is a full professor at the Ewha Womans University (Seoul, Korea) and an adjunct fellow at the National Evidence-based healthcare Collaborating Agency (NECA), Seoul, Korea. He is an expert on health technology assessment (HTA) and health economics. He worked 7 years in NECA and served in various decision making and advisory committees of public agencies such as the Health Insurance Review and Assessment Services (HIRA) and the Korean Centers for Disease Control (KCDC). Professor Ahn has graduated the Seoul National University Department of International Economics for undergraduate and master program. He also received a PhD in Economics from the University of Southern California (USC) and was an assistant professor of pharmaceutical economics and Policy at the USC. Dr. Ahn has served on many international professional organizations such as ISPOR, HTAi, INAHTA, and HTAsiaLink. He is the Chair of the ISPOR Asia Consortium (2020-2022) and was a president of ISPOR Korea Chapter (2012-2014). Dr. Ahn was elected as a board director of the Health Technology Assessment International (HTAi) (2014-2016) and a board director for the International Network of Agencies for Health Technology Assessment (INAHTA) for three times (2012-2016). He also contributed to form a regional Health Technology Assessment agency network, the HTAsiaLink (www.htasialink.org), along with other experts in the region.
Dr. Maria Carinnes Alejandria
Core Committee Member
Doh-h-tac
✉️ mcallejandria@ust.edu.ph
🔗 CarinAlejandria

Dr. Maria Carinnes P. Alejandria is the lead of the Social Health Studies Unit (Research Center for Social Sciences and Education) and a professor at the Department of Sociology, Faculty of Arts and Letters, University of Santo Tomas. She has authored books and journals on health, disaster, and aging.

Dr. Toshihiko Aranishi
Research Scientist
Eli Lilly Japan K.k.
✉️ aranishi_toshihiko@lilly.com
🔗 www.linkedin.com/in/toshihiko-aranishi-92720437/

7 years experience as a biostatistician, followed by 7 years experience as an HTA specialist. A member of board meeting of ISPOR Japan.

Mr. Perry Bridger
Vice President, Market Access, Japan, Asia and Pacific
Edwards LifeSciences
✉️ perry_bridger@edwards.com

Perry Bridger is Vice President, Market Access, Japan, Asia and Pacific at Edwards Lifesciences. In this capacity, Perry has responsibility for the company’s market access activities across the region and leads a team of health economics and reimbursement experts. Previously, Perry oversaw the global value, payer access, and public policy work across Edwards’ portfolio of technologies and led the strategy for the company’s Transcatheter Aortic Heart Valve global market access initiatives. Prior to joining Edwards he was Senior Vice President and Director of the Reimbursement Practice at Avalere Health, a leading strategic advisory company in the healthcare field. In this role he also served on the firm’s Executive Committee. Previously, he served as a Health Policy Analyst at The Centers for Medicare & Medicaid Services and has extensive experience in healthcare policy, health technology assessment, and medical technology coverage policy evaluation. He holds an undergraduate degree in history from Brandeis University, and a master’s degree in Health Policy and Management from the Johns Hopkins Bloomberg School of Public Health.
Dr. Tom Butt
Senior Director, Health Economics & Outcomes Research
Biomarin

Dr Thomas Butt is Senior Director, Health Economics & Outcomes Research at BioMarin. He is responsible for the global health economics function, developing evidence to demonstrate the value of BioMarin’s pipeline and marketed rare disease portfolio. His research interests are in methods of value assessment and he has published 20+ peer reviewed articles in the field. Thomas holds a PhD degree in health economics from University College London (UCL) in the United Kingdom and conducted postdoctoral research at Peking University in Beijing, China.

Ms. Carolyn Cameron
Director, Centre for Observational and Real-World Evidence, Asia Pacific
MSD

Experienced strategic market access leader in the pharmaceutical and device sector with a record of achieving excellent commercial results. Strong people leadership skills and a record of supporting patient access to therapies through optimising value demonstration and advocacy with real world evidence. Experience includes working for global companies in multiple therapy areas, influencing across functions to achieve alignment on a cohesive access strategy and building positive collaborative cultures.

Ms. Sarah Chan
Manager
Edwards LifeSciences

Sarah is a registered pharmacist trained in public health. She is experienced in health economics and outcomes research work across public and commercial sectors, and is currently a market access professional with a medtech.
Mr. Ying-Li Chen
Center For Drug Evaluation

✉️ ylchen908@cde.org.tw

Bs Pharmacy, National Taiwan University; MHS Health Economics, Johns Hopkins University. Pharmacist, NTU Hospital; Data Manager, Firma Clinical; HTA Researcher, Center for Drug Evaluation

Prof. Yingyao Chen
Director
Key Lab of HTA, Fudan University

✉️ yychen@shmu.edu.cn

His academic interests focus on health technology assessment, health policy, health economics, and hospital management. He was a PI of several projects funded by the World Health Organization, World Bank, China Medical Board, Ministry of Health, Ministry of Science and Technology, National Natural Science Foundation of China, and provincial health authorities.

Dr. Miyoung Choi
Director Of Clinical Evidence Research
National Evidence-based healthcare Collaborating Agency

✉️ mychoi@neca.re.kr

Prof. Americo Cicchetti
Professor
Università Cattolica Del Sacro Cuore

✉️ americocicchetti@unicatt.it

Full Professor of Healthcare Management at Università Cattolica del Sacro Cuore, Faculty of Economics and Director of the Advanced School of Health Economics and Management.
Mr. Jim Crompton
Regional Director, Market Access, NBD
Johnson & Johnson
✉️ jcrompto@its.jnj.com
LinkedIn www.linkedin.com/in/jim-crompton-3a23b351/

Uncertain of question being asked

Breanne Dickhout
Project Coordinator, Events
Health Technology Assessment International (HTAi)
✉️ bdickhout@htai.org

Breanne Dickhout has worked in the Hospitality industry for the past 10 years with a focus in the event industry. Breanne attended Niagara College to complete her Tourism and Event Management Program. Throughout her career she has planned many Weddings, and Social events in the Canadian Rockies, at various venues.

Dr. Takashi Fukuda
Director
Center for Outcomes Research and Economic Evaluation for Health, National Institute Of Public Health
✉️ fukuda.t.aa@niph.go.jp

Takashi Fukuda is Director of the Center for Outcomes Research and Economic Evaluation for Health (CORE2-Health; C2H) at the National Institute of Public Health, Japan. He received his PhD degree from the Graduate School of Medicine, The University of Tokyo, majored in Health Sciences. After his career as Assistant Professor of Health Administration at the Graduate School of Medicine, the University of Tokyo during 1995-2000, he worked as Associate Professor of Pharmacoeconomics at the Graduate School of Pharmaceutical Sciences, the University of Tokyo during 2001-2006. In 2007 as the School of Public Health was opened, he became Associate Professor of the Department of Health Economics and Epidemiology Research, the School of Public Health, The University of Tokyo. From November, 2011, he works for the National Institute of Public Health, which is the governmental research institute. He became Director of the Department of Health and Welfare Services in 2015. As new Center for Outcomes Research and Economic Evaluation for Health was opened in 2018, he was appointed as the first director of the center. His major research areas are health care economics, health care administration, and pharmacoeconomics.
Dr. Jo Carol Hiatt
VP, Health Economics And Patient Value
MDIC
✉️ jchiatt@mdic.org

As VP of Health Economics and Patient Value (HEPV), Dr. Hiatt will facilitate efforts among the MDIC, CMS, private payers and patient advocacy groups to empower medical device companies to better understand the evidence they will need to support efficient CMS review, with the ultimate aim of increasing patient access to innovative medical devices and reducing the cost associated with commercializing these technologies. She joins MDIC following her most recent tenure leading teams to review new technologies to inform evidence-based clinical technology options for Kaiser Permanente, one of America’s leading health care providers and nonprofit health plans. She is a general surgeon and partner emeritus with the Southern California Permanente Medical Group (SCPMG).

Kate Holliday
Chief Executive
Centre for Community-Driven Research
✉️ holliday@cc-dr.org
🔗 CCDR_GLOBAL

The Centre for Community-Driven Research (CCDR) is a charity established in 2012 to support community engagement in decisions about health and research. CCDR are leading the development of a repository of patient experience data and host the National Patient Organisation Network (NPON program. CCDR operate in 18 countries with offices in Perth (Australia), Geneva (Switzerland) and Bristol (United Kingdom). CCDR is led by Kate Holliday who is a nurse and researcher. Her education includes a Bachelor of Nursing degree, a graduate diploma in nutrition, a Masters in Health Promotion, a Masters in Health Science and her PhD thesis investigates the relationship between research and how to translate results into policy, clinical practice and population health. She has worked in the health sector for more than 20 years. Kate was recently listed on the 100+ Outstanding Women Nurse and Midwife Leaders by Women in Global Health, World Health Organisation and partners. Her clinical work has focused on community-based case management and health system navigation in rare, genetic and complex conditions, and she has worked as a nurse in Australia and the USA. Kate developed and tested a model of community-based nursing care that in 2019 was expanded into a pilot program across 10 disease areas. This is through the Patient Pathways program funded by the Australian Federal Department of Health. Kate has significant experience working with government, industry, not-for-profit organisations as well as research and international organisations including working in Geneva, Switzerland with the GAVI Alliance. She has also worked in leadership roles including Head of Research at Cancer Council NSW Australia and Head of Policy and Strategy at the Kinghorn Cancer Centre. Kate is a Board Director at Health Technology Assessment International (HTAi) and Chief Executive at the Centre for Community-Driven Research.
Dr. Li Ying (Grace) Huang is a director of the Division of the Health Technology Assessment, Center for Drug Evaluation, Taiwan (CDE/HTA). Before joining CDE/HTA in 2008, she worked for around ten years as a clinical pharmacist in a leadership role in the department of pharmacy in one of the major medical centers in Taipei. She completed her Ph.D. degree in Graduate Institute of Health Policy and Management, College of Public Health, National Taiwan University and Master’s degree in pharmaceutical science from the National Taiwan University as well. She has authored and co-authored articles published in several international journals and also serves as a reviewer of manuscripts. Her current research focuses on comparative efficacy of new drugs, applying mixed treatment comparison methods, patient involved HTA and therapeutic inertia among adult DM patients in Taiwan. In 2020, Dr. Li Ying (Grace) Huang currently serves on the board of Directors for the International Board of Directors for the HTAi. Grace has been a member of the Board for the following terms: Director 2016-2018 and 2019-2021.

Ms. Denise Hung
HTA Researcher
Center For Drug Evaluation

I am a trained pharmacist in Taiwan. After receiving a Master degree in pharmaceutical evaluation and policy in University of Arkansas for Medical Sciences, I joined Taiwan CDE as a HTA researcher.

Ms. Yoko Ishiguro
Reimbursement/heor Manager
Medtronic Japan

I am a trained pharmacist in Japan. After receiving a Master degree in Health Economics and Policy in University of Oxford, I joined Medtronic Japan as a reimbursement manager.
Keiji Iwashita
Head, Market Access & Public Affairs
Takeda Pharmaceutical Company
✉️ keiji.iwashita@takeda.com

Keiji has worked at Takeda for over 30 years and is now the Head of Market Access & Public Affairs, JPBU. After graduated from Kyushu University in economics in 1988 and joined Takeda the same year. When he was the Senior Manager in the Administrative Management Department, he created current PMP. He was a member of the National Policy Unit, Government of Japan from 2009 to 2011, and he also served as the Assistant to the Chairman of Japan Association of Corporate Executives from 2011 to 2015.

Dr. Hong Ju
Senior Lead Specialist
Agency for Care Effectiveness
✉️ JU_Hong@moh.gov.sg

Dr Hong Ju, Senior Lead Specialist, leads the medical technology evaluation team in ACE, Singapore. Dr Ju is a clinician-trained epidemiologist who has worked in various settings (eg. government, university, private sectors) conducting HTA for both drugs and non-drug medical technologies in different countries. Her interest spans through the lifecycle of HTA from horizon scanning to mainstream HTA for reimbursement decision to disinvestment.

Mr. Masafumi Kato
Associate Director, Market Access & Public Affairs, Japan Pharma Business Unit
Takeda Pharmaceutical Company Limited
✉️ masafumi.katou@takeda.com

Masafumi Kato is an associate director in Market Access & Public Affairs Group in Takeda Pharmaceutical Company Limited in Japan. He joined this group in May 2018. Mr. Kato has abundant experience as a biostatistician in the research & development department for over 10 years. He is currently engaged in several projects as a health economics specialist, and is especially in charge of the cost-effectiveness evaluation in the drug pricing system in Japan. Mr. Kato holds a master’s degree in statistics.
Professor Brendon Kearney
Chair
HTAi Asia Policy Forum
✉ Brendon.Kearney@sa.gov.au

Professor Kearney presently works as a Clinical Professor in the Faculty of Medicine, University of Adelaide, practicing as a Consultant in the Haematology Unit of the Royal Adelaide Hospital (RAH) Cancer Service with a private practice based at the Royal Adelaide Hospital. He also has management responsibilities for pathology services at the RAH. Professor Kearney has chaired numerous committees including the Health Policy Advisory Committee on Technology (HealthPACT) since 2003. For 10 years, he was the Deputy Chairman of the Medical Services Advisory Committee (MSAC), Australia’s Health Technology Assessment committee for the assessment and recommendations on procedures, devices and diagnostics. This involved the establishment of policies and systems for HTA assessment linked directly to reimbursement decisions. He has also served on the National Health and Medical Research Council for twelve years and has held various senior policy and management roles in the Australian Health System. He is a past-Chair and current Board member of EuroScan International and is a current Board member of HTAsiaLink. Professor Kearney has been awarded the Sydney Sax medal for services to health and an Order of Australia for contribution to emergency services and health research.

Alison Keetley
Head Of Market Access, Sea
Johnson And Johnson
✉ akeetley@its.jnj.com

Sukyeong Kim
Senior Research Fellow
National Evidence-based Healthcare Collaborating Agency
✉ sukyeong.kim@neca.re.kr

Dr. Sukyeong Kim is Senior Research Fellow and International Cooperation Advisor of National Evidence-based Healthcare Collaborating Agency (NECA), Korean governmental agency for Health Technology Assessment. She plays the leading role in the field of health policy regarding local evidence generation and RWE, HTA system, R&D planning, optimal use of drugs, and patient safety. Recently, she plays role in directing health industry policy researches regarding medical device industry, biopharmaceutical industry, and health care service industry in Korea Health Industry Development Institute (KHIDI).
Mei-Chi Lai
Researcher
Center for Drug Evaluation, Taiwan

Hi I am Mei-Chi Lai, I am a researcher. I did with the HTA department of CDE in Taiwan.

Mrs. Nathalie Largeron
Head of Health Technology Assessment
Sanofi Pasteur

Nathalie Largeron is Head of Global Health Technology Assessment (HTA) Strategy within Sanofi. In this role, she leads Sanofi efforts on HTA strategy and internal alignment. She also represents the company on HTA related topics with external stakeholders, including HTA bodies and policy organizations, industry associations and public health institutions. Nathalie has a strong understanding of the role of market access, health economics, and HTA in clinical drug development process, pipeline strategy and life-cycle management. She joined Sanofi in 2017 and led the Global Health Economics and Value assessment team within Sanofi’s Vaccines Business unit for 4 years. She notably supervised the development and the execution of evidence generation plan to maximize the value propositions of sanofi’s vaccines. Before joining Sanofi, she has been working 14 years in several European roles, in the field of market access and outcomes research at Sanofi Pasteur MSD, a joint venture between Sanofi and Merck & Co. During that period, she successfully submitted several dossiers to health technology assessment authorities in Europe. She published more than 35 peer-reviewed papers and is a reviewer of several peer-review journals. She is a member of ISPOR & HTAi and contributes to the Access group within Vaccines Europe. Nathalie is a pharmacist, hold a master’s in health economics from the University of Lyon, France and a post-graduate degree in epidemiology.
Dr. Sang-soo Lee
Sr. Director, Health Care Economics And Government Affairs
Medtronic North Asia (Korea And Japan)
✉️ sang.soo.lee@medtronic.com
LinkedIn www.linkedin.com/in/sang-soo-ss-lee-ph-d-mba-02903339/

Sang-So (SS) Lee holds a PhD from the Seoul School of Integrated Sciences & Technologies, an MPH (diploma) from the Seoul National University, an MBA from the Helsinki School of Economics and Business Administration and a Bachelors in Genetic Engineering from Sung Kyun Kwan University. He is currently the Senior Director for Health Care Economics and Government Affairs in Medtronic North Asia (Korea and Japan), the head of Center of Expertise (COE), Health Care Economics and Government Affairs, Medtronic APAC, and serves as Chair for KMDIA’s Reimbursement Committee, ISPOR’s Asia Consortium Industry Committee and APACMed’s Market Access Working Group. He also holds the position of Vice Chair for ISPOR Korea Chapter and is a member of the board of directors of the Korean Association of Health Technology Assessment (KAHTA). He also serves as an adjunct professor at the Graduate School for Medical Device Management and Research, Samsung Advanced Institute for Health Science and Technology (SAIHST), and Sung Kyun Kywan University and Graduate Program of Industrial Pharmaceutical Sciences, Yonsei University, Seoul, South Korea.

Ms. Pattara Leelahavarong
Researcher
Siriraj Health Policy Unit, Faculty of Medicine Siriraj Hospital, Mahidol University
✉️ pattara2124@gmail.com

Pattara Leelahavarong, Ph.D. (Health Economics) Researcher Address: Siriraj Health Policy Unit, Faculty of Medicine Siriraj Hospital, Mahidol University Email: pattara2124@gmail.com Pattara Leelahavarong, a researcher at Siriraj Health Policy Unit, graduated with a Ph.D. in health economics from the University of Glasgow, United Kingdom, in 2018; a Master's degree of science in pharmacy (pharmacy administration); and a Bachelor’s degree of science in pharmacy from Mahidol University. She has experienced working on Health Technology Assessment (HTA) using economic modelling in pharmaceutical, medical devices, and health promotion programs for a wide range of health policy process since 2008. She involved in the national policy decision-making process as a member of the Health Economic Working Group and Price Negotiation Working Group under the Subcommittee of National List of Essential Medicine.
Dr. Jun Li
HEOR Leader
BD
jun.li5@bd.com

Senior Manager, Lead, Health Economics and Outcomes Research, BD

Viva Ma
Director, Strategic Access
BD
viva.ma@bd.com
sg.linkedin.com/in/viva-yan-ma-66261238

Dr. Ma has dedicated her career to improving the affordability and patient access to innovative diagnostic and therapeutic technologies in the Asia Pacific region. As an Executive Committee member for the International Society for Pharmacoeconomics Outcomes Research (ISPOR) Singapore, she is a catalyst in building the health economics and outcomes research capacity for the Asia Pacific region. Through her leadership role in HTAi Asia Policy Forum and AmCham Singapore, she is actively driving value-based healthcare, as well as cross-sector dialogue and partnerships in the healthcare eco-system. Dr. Ma is an Adjunct Faculty at the Carey Business School, Johns Hopkins University. Prior to BD, she worked in Johnson & Johnson and Edwards Lifesciences in several corporate functions including health economics & market access, reimbursement and supply chain. She holds a MPH and a MBA degree from the Johns Hopkins University, a PhD degree from the University of Wyoming, and a Postdoctoral Certificate from Yale University School of Medicine.
Professor Guy Maddern is the RP Jepson Professor of Surgery at the University of Adelaide, Director of Research at the Basil Hetzel Institute for Translational Health Research at The Queen Elizabeth Hospital and Director, Surgical Research and Evaluation (incorporating ASERNIP-S) of the Royal Australasian College of Surgeons. He was trained at the University of Adelaide and became a Fellow of the Royal Australasian College of Surgeons in 1989. His clinical interests include the development of techniques to manage metastatic hepatic disease and hepatic approaches to optimise resection options. He has also published widely on new surgical techniques and their introduction into surgical practice. He has over 500 publications in scientific journals, has contributed to over a dozen surgical texts and attracted $65 million of research funding. The evaluation of new technologies and in particular surgical technologies is another area of focus and interest. Under his supervision, ASERNIP-S has been responsible for assessing these technologies before exposing the Australian population to them and has provided this service to the Australian and International community for the past 20 years, and is recognised, nationally and internationally, as the premier surgical innovation assessment group. He is a past President of HTAi and a past Chair of INAHTA and incoming Asia Policy Forum Chair of HTAi.

Maya Mamiya
Sr. Manager
Eli Lilly
✉️ mamiya_maya@lilly.com
Ariosto Matus  Policy and external affairs lead, Asia-Pacific Roche  Ariosto Matus is the Policy and External Affairs Lead for the Asia-Pacific at Roche. He has 20 years’ experience in policy in the private and public sectors, starting as a social policy adviser in the Mexican Senate and later joining the public administration as Director of Health Program Evaluation in the Ministry of Health. After graduating from the Leaders in International Health Program, at the Pan American Health Organization (PAHO-WHO), he continued in the public sector as the Deputy General Director of Health Policy in the Office of the Mexican President. He has also been a lecturer in social policy at the Ibero-American University in Mexico City. He joined the pharmaceutical industry with a role in market access for Abbott, and then worked at Bristol-Myers Squibb as public affairs director before moving to Roche in 2017 as the Health Systems and Policy Lead for Latin America. He took up his present role in 2019. Mr Matus holds an MPA degree in Economic and Public Policy from the London School of Economics, a Master’s degree in Health Policy, Planning and Financing from the London School of Hygiene and Tropical Medicine and is currently candidate in the Global Healthcare Leaders Program from Harvard Medical School.

Michelle Medeiros is the Health Policy & Patient Access at Roche Diagnostics for APAC. Her background combines extensive experience in leading patient access thought leadership and strategic communications programs in several markets and proven ability to catalyze and help people to connect with the organization’s vision and purpose, combined with a passion for inspiring and engaging external audiences. Prior to Roche, Michelle held a number of key corporate roles in Technology, Banking and Public Relations industries. Michelle holds a bachelor degree in Social Sciences and Public Relations from FAAP and Master of Science in Corporate Communication from Rotterdam School of Management, Erasmus University.
Prof. Tracy Merlin

Professor / Director, AHTA; Interim Head, School of Public Health
Adelaide Health Technology Assessment (AHTA), University of Adelaide
◆ tracy.merlin@adelaide.edu.au
◆ merlin_tracy

Professor Tracy Merlin is the Chair of the International Network of Agencies for Health Technology Assessment (INAHTA) – representing 50 HTA agencies across 31 countries. She is also the current Head of the School of Public Health and is the co-creator and Director of Adelaide Health Technology Assessment (AHTA) at the University of Adelaide. AHTA is an HTA agency that, over 20 years, has conducted health technology assessments for the Australian federal and state governments that have had multi-million dollar impacts on the Australian health system and significant clinical impacts on patient health. AHTA have determined the safety, effectiveness and cost-effectiveness of a range of different health interventions, across the technology lifecycle – from horizon scanning to disinvestment. Tracy has also worked with the World Health Organisation and the Singapore Ministry of Health evaluating a range of different technologies. Tracy is a clinical epidemiologist and methodologist with an international reputation in evidence synthesis, evidence-based health policy and clinical practice guideline development. She also Chairs the English Editorial Board of the HTA Glossary. She has created a number of HTA methodologies used in Australia and elsewhere, including the assessment of co-dependent technologies (or personalised medicines) and of tumour agnostic therapies. She also led the development of the latest methodological guidelines for public funding submissions to the Medical Services Advisory Committee (MSAC) and to the Pharmaceutical Benefits Advisory Committee (PBAC) in Australia.

Dr. Dominique Milea

Value Evidence & Outcome Regional Head
Glaxosmithkline Pte Ltd
◆ dominique.x.milea@gsk.com

Dominique Milea has more than 25 years of experience in the pharmaceutical and healthcare environment both in Europe and Asia. She has worked in the areas of health economics and real world evidence in support of market access for the past 15 years, arriving in Singapore in 2012. She is currently Senior Director for Value Evidence & Outcomes for Asia Pacific at GSK. In this role, Dominique is responsible for developing regional evidence plans to demonstrate the value of GSK assets and for guiding the development of local reimbursement and access strategies. Dominique holds a pharmacy degree from university of Paris V in France, a master degree in Public Health from University of Paris XI, France and a PhD in Health Economics from University of Lyon II, France.
Dr. Izzuna Mudla Mohamed Ghazali

Deputy Director
Ministry of Health Malaysia

.drizzuna@moh.gov.my
MaHTASMalaysia
.linkedin.com/in/izzuna-ghazali-89983a58

Dr. Izzuna is the Deputy Director of Medical Development Division, Ministry of Health Malaysia and the Head of Malaysian Health Technology Assessment Section (MaHTAS). She is a Public Health Physician and has been involved in HTA field since 15 years ago. She set up horizon scanning activity under MaHTAS, involved in development and implementation of Clinical Practice Guidelines and has assessed many health technologies over the years. Dr. Izzuna participated actively in advocating value-based practice in Malaysia. She is also active in activities related to innovation and a working group member of emerging technology cluster at the National level.

Jani Mueller

Senior Researcher
CMeRC

.dbmueller7@yahoo.de
.www.linkedin.com/in/debjani-b-mueller-4726884/

Debjani Mueller is a Senior Researcher at the University of Pretoria. Jani continues to focus her effort on promotion, collaboration, and raising awareness of sustainable Health Technology Assessment (HTA) development and implementation in LMICs. Her main research interests are on assessment of medical devices, diagnostics, and digital health technology. She is currently a board member of Health Technology Assessment International (HTAi) and is a founding member of South African HTA Society, SAHTAS. She is an Associate Editor of International Journal of Technology Assessment in Health Care (IJTAHC).
Dr. Kanchan Mukherjee  
Professor, Centre for Health Policy, Planning and Management, School of Health Systems Studies, Tata Institute of Social Sciences  

[Email] kanch@tiss.edu  
[LinkedIn] www.linkedin.com/in/drkanchanmukherjee/

Dr. Kanchan Mukherjee is a Professor at the Centre for Health Policy, Planning and Management in the School of Health Systems Studies. Prof. Mukherjee completed his MBBS from Seth GS Medical College and KEM Hospital, Mumbai and MD in Preventive and Social Medicine (PSM) from Lokmanya Tilak Municipal Medical College and Sion Hospital, Mumbai. He also has specialization in Public Health (gold medalist), Health Policy and Health Economics. He completed NIH Fogarty Postdoctoral Fellowship (2003) from the University of California, Los Angeles (UCLA, USA) in HIV/AIDS research. He also completed MSc. in International Health Policy (2008) with distinction in Health Economics from the London School of Economics and Political Science (LSE, UK). He has been a recipient of many awards and international fellowships. He was also a visiting faculty at the Karolinska Institute (Sweden) and the University of Liverpool (UK). Prof. Mukherjee has over 20 years of teaching and research experience, and over 60 publications in the fields of public health, health systems and policy analysis, economic evaluation, Health Technology Assessment (HTA), urban health, HIV/AIDS, non-communicable diseases (NCDs), and healthcare innovations. He is a member of the WHO GBD collaborator network, Global Consortium on Public Health Research, International Society of Infectious Disease, ISPOR, HTAi Asia Policy Forum, HTAsiaLink and a faculty expert with the Dept. of Health Research (Government of India) for training scientists in evidence-informed policy making and writing policy briefs. He is an editorial board member of six international journals. Prof. Mukherjee has been invited as a plenary speaker, keynote speaker and expert to many international conferences and meetings in the USA (Stanford University), UK (UoL, Imperial College, U of York), Germany (HTAi 2019 plenary speaker), Sweden (Karolinska Institute), Iran (TUMS), Thailand (PMAC), Indonesia (HTAi Asia Policy Forum), Vietnam (HTAi Asia Policy Forum), Bangladesh (Unilever) as well as at various institutions within India. Prof. Mukherjee has over 20 years of teaching and research experience, and over 60 publications in the fields of public health, health systems and policy analysis, economic evaluation, Health Technology Assessment (HTA), urban health, HIV/AIDS, non-communicable diseases (NCDs), and healthcare innovations. He is a member of the WHO GBD collaborator network, Global Consortium on Public Health Research, International Society of Infectious Disease, ISPOR, HTAi Asia Policy Forum, HTAsiaLink and a faculty expert with the Dept. of Health Research (Government of India) for training scientists in evidence-informed policy making and writing policy briefs. He is an editorial board member of six international journals. Prof. Mukherjee has been invited as a plenary speaker, keynote speaker and expert to many international conferences and meetings in the USA (Stanford University), UK (UoL, Imperial College, U of York), Germany (HTAi 2019 plenary speaker), Sweden (Karolinska Institute), Iran (TUMS), Thailand (PMAC), Indonesia (HTAi Asia Policy Forum), Vietnam (HTAi Asia Policy Forum), Bangladesh (Unilever) as well as at various institutions within India.
Dr. Phuong Khanh Nguyen

Vice Director
Health Strategy And Policy Institute

nguyenkhanhphuong@hspi.org.vn

Dr. Nguyen Khanh Phuong is currently Vice-Director of the Health Strategy and Policy Institute, Ministry of Health. She is a leading health economist with more than 20 years of experience in health financing, health economic and health system reform in Vietnam. She also has a strong background on policy evaluation and monitoring, research proposal design and development, provider payment methods, hospital services cost, health technology assessment and project evaluation. Dr. Nguyen Khanh Phuong has extensive experience in the healthcare sector, having held many positions such as coordinator, senior technical officer, principal investigator and national consultant. She has involved in several studies which provided evidence for developing important health policies such as health insurance, health financing reform… She is currently a member of HTAsiaLink Scientific Board, HTAi Asia Policy Forum Organizing Committee, Joint Learning Network… She graduated from Hanoi College of Pharmacy in 1994 and earned a master of science on Health Economics in Chulalongkorn University in Bangkok, Thailand in 1997. She earned a PhD degree on Public Health in National Institute for Hygiene and Epidemiology in 2011.

Dr. Due Ong The

Health Strategy and Policy Institute (HSPI)

ongthedue@hspi.org.vn

Dr. Ong The Due is a medical doctor by training. He has been working in the Health Strategy and Policy Institute (Ministry of Health, Vietnam) since 2012. He holds a doctorate in Health Technology Assessment from Mahidol University, Thailand. His major research interests focus on the area of (i) Health Technology Assessment, including Health Economics, Cost-Effectiveness Evaluation, Modelling, Outcomes Research, Evidence Synthesis, and (ii) Health Policy and System Research, focusing on health system at grassroots level, primary health care, non-communicable diseases, health equity, and implementation science.
Dr. Wija Oortwijn
Senior Researcher
Radboud University Medical Centre
w.oortwijn@radboudumc.nl
OortwijnW

Wija Oortwijn holds a position as senior researcher in the field of global HTA at the Radboud University Medical Centre (Radboudumc) in Nijmegen and as associate professor at Leiden University Medical Centre (Public Health and Primary Care). She studied health sciences and holds a PhD in Medicine (priority setting for HTA). She has almost 30 years of relevant professional experience in HTA and health policy analysis around the globe, with her key expertise including health priority setting, policy evaluation and measuring the impact of research. Since 1992, she has been extensively involved in the development of HTA and health system strengthening around the world. She is a founding member of the Dutch Society for HTA (NVTAG) and the international HTA Society (HTAi). Currently, she is President of HTAi, co-chairing the HTAi-ISPOR Good Practices Task Force on deliberative processes for HTA and is associate editor of the International Journal of Technology Assessment in Health Care. Furthermore, she was the scientific secretary of HTAi’s Global Policy Forum from June 2016 until June 2019.
Mr. Parashar Patel

SVP, Government Affairs & Market Access
ViewRay

ppatel@viewray.com
healthpolinmass
linkedin.com/in/parashar-patel

Parashar is ViewRay’s Senior Vice President, Government Affairs & Market Access. ViewRay’s MRIdian® Radiation Therapy System makes a difference for cancer patients and their physicians by combining the latest innovations in radiation delivery with ground-breaking magnetic resonance (MR) image guidance and real-time adaptive capabilities. As a member of the Executive Leadership Team, Parashar shapes the growth trajectory and strategy for the company. He leads global efforts to demonstrate the value of MRIdian and drive adoption of MRIdian in cancer treatment globally. Parashar is responsible for implementing and leading all aspects of government affairs and market access including the strategic vision, plans and objectives required to both enable and accelerate corporate growth. Parashar is an experienced health care executive with a demonstrated history of accomplishments in the medical device industry and public sector. His areas of expertise include health care delivery systems, payment and coverage policy, market access, medical devices, and clinical research. From October 2016 through January 2019 Parashar led Boston Scientific’s Global Health Policy team, which focused on monitoring and influencing payment and health care delivery system policies and shaping Boston Scientific’s commercial strategies in the context of policy trends. Previously, Parashar led Boston Scientific’s Global Health Economics and Market Access team, focusing on the development and execution of market access, health economics, and public policy strategies for key technologies. Prior to joining Boston Scientific in 2003, Parashar was Deputy Director of the Hospital and Ambulatory Policy Group in the Center for Medicare Management at the Centers for Medicare & Medicaid Services (CMS). The group was responsible for Medicare payment policy for a wide range of acute and ambulatory care services including inpatient and outpatient hospital services and physician services. Parashar has also held a variety of roles at CMS, the American Association of Health Plans, the Office of (then) Senate Majority Leader George J. Mitchell, the White House Office of Management and Budget, and Connecticut’s Medicaid agency. He holds a B.A. in Political Science and a Master of Public Affairs from the University of Connecticut.

Mrs. Elise Penny

Project Coordinator, Events
Health Technology Assessment International (HTAi)
epenny@htai.org

Elise Penny has over 10 years of experience in the Events and Hospitality Industry. Elise graduated from Camosun College in Victoria, British Columbia and specialized in Event and Hospitality Management. Throughout her career, Elise has planned events at various venues throughout Western Canada. Her experience is within the Social Market and has planned events such as Weddings, Celebrations, Corporate Holiday Parties and Specialty Package Events. Before joining HTAi, Elise was a Wedding and Social Catering Manager with Fairmont Hotels and Resorts.
Mrs. Alicia Powers
Manager, Events
Health Technology Assessment International (HTAi)
✉️ apowers@htai.org

Alicia (known as Ali) is an event organizer with over 15 years of experience in every aspect of events management, including large and small conference management in national and international locations, workshop development, and annual gala productions. Ali’s experience also includes event work with professional sports teams, universities, hospital foundations, and health technology startup organizations. Before joining HTAi, Ali held a position in the Corporate Communications and Marketing department at Alberta Innovates. She has also executed over 60 weddings over the past decade and was recently shortlisted in the “future leader” category at the Edmonton Event Awards. Ali also sits on the Board of Directors for the International Live Events Association (ILEA – Edmonton Chapter).

Ms. Virginia Priest
Director Health Economics and Market Access APAC
Boston Scientific
✉️ virginia.priest@bsci.com
🌐 www.linkedin.com/in/virginia-hall-priest-57010942/

Virginia is our HEMA Director for Asia-Pacific at Boston Scientific. She leads a team of health economists in developing strategies and evidence to support reimbursement and market access across the region. Virginia has >15 years’ experience in health economics and market access for pharmaceuticals and medical devices, for Government payers and industry. Prior to Boston Scientific Virginia assessed medicines for public-sector reimbursement for both the Pharmaceutical Benefits Advisory Committee (PBAC) in Australia and PHARMAC, the New Zealand Government’s Pharmaceutical Management Agency.
Dr. Raoh-Fang Pwu

Director of National Hepatitis C Program Office, MOHW
MOHW, Taiwan

jasminepwu@gmail.com
jasminepwu
www.linkedin.com/in/raoh-fang-jasmine-pwu-8031869/

Raoh-Fang (Jasmine) Pwu, PhD, is the Director, National Hepatitis C Program Office, Ministry of Health and Welfare in Taiwan. She also is adjunct Assistant Professor at the Taipei Medical University and Fu Jen Catholic University. Dr Pwu and several of her college colleagues founded a consulting company specializing in clinical/epidemiological research design and data analysis in 1999. However, when the Taiwan government asked her to develop a health technology assessment (HTA) system in Taiwan in 2007, she began working for the Division of HTA, Center for Drug Evaluation. She became the second Director of the HTA Division since 2009. In this role, she and her team have developed a strong HTA system and research. Dr Pwu is an enthusiastic collaborator. Therefore, she welcomes any chance to serve the Society. She served on the INAHTA Board from 2010-2012. She and her HTA colleagues from Thailand and Korea created HTAsiaLink in 2010 and she served as their President from 2014 to 2016. Dr Pwu has been an ISPOR member since 2001 and served as the Board of Director for 3 years (2018-2021).

Dr. Roza Sarimin

Head Of HTA Unit
Malaysia Health Technology Assessment Section (MaHTAS)

drroza.sn@gmail.com
Roza Roza

Current position is the Head of Health Technology Assessment Unit & Public Health Physician, Malaysian Health Technology Assessment Section (MaHTAS), Medical Development Division, Ministry of Health Malaysia. Responsible for planning, implementing and overseeing Health Technology Assessment (HTA) programme and also a reviewer. Principally assessing new health technologies in terms of its effectiveness, safety, cost-effectiveness to provide input on decisions to policy makers, provide relevant consultation to add value and promote efficient and high-quality health system, and advocating the use of evidence in decision making related to health technologies. Involved in setting up and heading the Surveillance of HTA & CPG Unit, MaHTAS previously as well as involved in coordinating several CPG development projects. Was earlier in-charged of Zoonotic Diseases Control Programme in Disease Control Division, Ministry of Health, responsible in overseeing prevention and control activities of the disease in the country. She began her career in clinical services delivery in few departments in several hospitals; Hospital Melaka, Hospital Putrajaya, Universiti Kebangsaan Malaysia Medical Center (PPUKM) and Seremban District Health Office.
Dr. Raymond Francis Sarmiento
Health Technology Assessment Council - Philippines

rsarmiento@up.edu.ph
rfrsarmiento
www.linkedin.com/in/raymondsarmiento

Dr. Raymond Francis R. Sarmiento is a physician-scientist and currently the Director of the National Telehealth Center, National Institutes of Health, University of the Philippines Manila. He is also a Clinical Assistant Professor of the UP College of Medicine’s Medical Informatics Unit and chair of the Health Informatics for Development Working Group of the International Medical Informatics Association. He is also the immediate past president of the Philippine Medical Informatics Society (2017-2021) and the Philippines’ representative to the WHO Working Group on Regulatory Considerations on Artificial Intelligence for Healthcare. He is a member of the Philippines’ Health Technology Assessment Council and was also a member of the WHO global working group on Smart Vaccination Certificate prior to its transition to the WHO Digital Documentation on COVID-19 Certificates. For his part in the Philippines’ COVID-19 response, Dr. Sarmiento serves as co-chair of the IATF sub-Technical Working Group on ICT for Data Governance where he helps oversee the strategic direction of the government with regards to ICT adoption, use, and implementation in the country. He is also a member of the IATF sub-Technical Working Group on Data Analytics and the Data Management team of the National Vaccination Operations Center (NVOC). In addition, he serves as the Telemedicine Policy Adviser of the Office of the Vice President’s Bayanihan E-Konsulta telemedicine program. Dr. Sarmiento graduated from the University of the Philippines College of Medicine in 2008 and finished his Public Health Informatics Fellowship from 2014 to 2016 in the Division of Surveillance, Hazard Evaluations, and Field Studies at the National Institute for Occupational Safety and Health at the U.S. Centers for Disease Control and Prevention (CDC). Prior to joining the U.S. CDC, he completed a postdoctoral fellowship in clinical informatics from 2012-2014 at the Lister Hill National Center for Biomedical Communications, National Library of Medicine at the U.S. National Institutes of Health (NIH) in Bethesda, Maryland. In 2019, he was awarded by the National Academy of Science and Technology (NAST) – Philippines as its Outstanding Young Scientist in the field of Public Health Informatics, and was selected as one of the global fellows to the prestigious Young Physician Leaders program of the InterAcademy Partnership (the association of National Academies of Science and Technology in the world). Recently, he was also honored by the JCI Philippines, TOYM Foundation, and Gerry Roxas Foundation as one of the 2020 The Outstanding Young Men (TOYM) for Medicine. Finally, Dr. Sarmiento is a regular member of the Medical Sciences Division of the National Research Council of the Philippines and is a Board Member (2021-2023) of The Outstanding Young Scientists, Inc. (OYSI), which is the non-profit organization of young scientist awardees of the NAST-Philippines and a member of the international Global Young Academy organization.
Sumitra Shantakumar is currently the GSK Vaccines Head for Epidemiology, Health Economics and Strategic Execution, Greater China and Intercontinental Region. She leads a team of epidemiologists and health economists to identify strategic opportunities for real world evidence to support the value proposition messages for pediatric and adult vaccines. She has worked in global and regional roles in industry covering oncology and primary care therapy areas. Sumitra is a trained cancer epidemiologist and received her PhD in Epidemiology from the Gillings’ School of Global Public Health, University of North Carolina (UNC) at Chapel Hill, where she holds an adjunct appointment. At UNC Chapel Hill, she received a three-year cancer epidemiology training grant from the National Cancer Institute. She earned her master’s degree in Epidemiology from Boston University School of Public Health.

Dr. Takeru Shiroiwa
Chief Senior Researcher
National Institute of Public Health

Dr. Liesl Strachan
Director
Medtronic

Liesl Strachan is a Director of Global Health Policy, Reimbursement and Health Economics within the Corporate team at Medtronic Inc. In her current role she supports the Health Economics and Reimbursement functions within Medtronic globally with their efforts towards demonstrating the safety, clinical effectiveness and economic value of Medtronic’s innovative technologies and healthcare solutions whose purpose is to improve the health outcomes of patients around the world. Liesl has 18 years’ experience within the field of Health Outcomes and Health Economics research both locally and internationally working for industry and on behalf of government bodies within Australia and Europe. Liesl graduated from the University of Technology, Sydney (UTS) with a bachelor’s degree in Biomedical Science with First Class Honours and the University Medal. She went on to complete a PhD in Neuropharmacology also at UTS and most recently completed a Graduate Diploma in Epidemiology at the London School of Hygiene and Tropical Medicine.
Mr. Scott Tackett

Vice President, Global Access, Value & Economics
Intuitive Surgical

✉️ scott.tackett@intussurg.com

Scott Tackett is currently Vice President of Global Access, Value & Economics for Intuitive. In this role, he oversees the strategies and operational management of the GAVE organization at the corporate, region, country, business unit and “centers of excellence” levels. Scott has more than 20 years of health economic and market access experience in the U.S. and various major international markets. Prior to his current role he was also the Sr. Director, Global Health Economics, Market Access & Payer Relations for Intuitive. Prior to joining Intuitive, Scott held the position of Head of Global & U.S. Market Access for the Surgical Care Division at Baxter and held other health economic and market access positions at Johnson & Johnson, St. Jude Medical, and ECG Management Consultants. Additionally, early in his career he was a hospital administrator at Barnes-Jewish Hospital and Tulane University Hospital & Clinics. Scott holds a MHA with an emphasis in health care strategy and payment systems, a MPH with an emphasis in international health economics and finance from Tulane University. Additionally, he performed post-graduate fellowship at Washington University Medical Center & Barnes-Jewish Hospital with a concentration in health system strategy and economics. He also holds a BA in Biology/Chemistry from Central Methodist University. Personal interests: travel, exercise, outdoor activities, gardening, cooking, fishing, farming, coaching baseball, and spending time with family and friends.

Mrs. Julie Van Bavel

Exec. Director Core Regional Ap
MSD

✉️ julie.vanbavel@merck.com

Julie has more than 20 years of health care evaluation experience in the pharmaceutical industry with related expertise in comparative effectiveness, HTA, health economics, outcomes research, and policy research and analysis. She has held diverse roles at the country, regional and global levels and has experience across numerous geographies including Australia, the US, Europe and Asia Pacific. She has a Bachelor of Veterinary Science from Melbourne University and a Master of Public Health from Sydney University. After starting her career working as a veterinary surgeon, she moved into the pharmaceutical industry working initially in sales before quickly transitioning into Outcomes Research, then Market Access. After leading MSD’s market access team in Australia for approximately six years, she then moved to the US where she joined Merck’s Centre for Observational and Real-World Evidence (CORE) team where she was responsible for policy research. Three years ago she returned to Sydney, Australia as an Executive Director to lead and build CORE’s Asia Pacific Regional team. In this role she is responsible for developing the regions observational research (OR) strategy and portfolio, supporting Health Technology Assessment (HTA) strategy and Health Economic (HE) modelling needs and HEOR capacity building. Julie is particularly interested in conducting research to inform policy and healthcare decision-making. Most recently, Julie was responsible for the design and creation of a health and budget impact tool for oncology and a multi-year collaborative research project on outcome-based risk sharing agreements with United Healthcare in the U.S. In her spare time Julie enjoys exercising, playing hockey, and reading.
Leonor Varela Lema works as a full time professor in the Area of Preventive Medicine and Public Health in the University of Santiago de Compostela, Spain. Until 2020 she held the position of International Project manager in the Health Technology Assessment Department of the Galician Agency for Health Knowledge (avalia-t; ACIS). She has a 18 years background in Health Technology Assessment. During her career she has formed part of the SEED Consortium (Shaping European Early Dialogues for health technologies) and has led two activity centre Departments in the European Network for Health Technology Assessment (EUnetHTA) JA3 EU Project (2018-2021). Since 2008, she has been part of the Board of Directors of the International Scientific Society for Technology Assessment (HTAi), and in 2020 she was appointed to be part of the panel of experts of the group of work of the European Commission on regulation and surveillance of the safety of devices and in vitro diagnostic tests "Expamed" and of the initiative "1 + Million Genomes" (collaboration in data on human genome). She has published and lectured extensively on topics related to HTA, epidemiology, healthcare management and decision making, and has done exhaustive research in this field.

Dr. Franz Waibel serves as HTAi Board Director since July 2020. He is a member of HTAi since 2005 and has engaged in the Global Policy Forum and the Patient and Citizen Involvement Interest Group (PCIG). He has over 30 years of experience in the field of value assessment of medicines and medical products and has been involved in HTA matters throughout his career. He worked for over 25 years in leading BioPharma companies at locations in Europe and the US and in global leadership roles in the fields of patient access, public affairs and policy. Since 2014, he provides services as an independent strategic advisor and consultant on strategic healthcare matters. He also engages in investment and innovation promotion for the Basel Area, Switzerland, where he resides with his family. He is passionate about strengthening patient involvement in HTA and Healthcare, keen to further multistakeholder dialogue and engages in healthcare system and HTA policy matters across many jurisdictions worldwide. Franz Waibel holds a PhD in Cell Biology from Basel University, Switzerland, an MBA from Birmingham University, UK and a BS from Freiburg University, Germany. He holds Swiss and German citizenships.
Ding Wang
Technical Officer
WPRO
✉️ wangdi@who.int

Tomohiro Watanuki
Healthcare Economics And Government Affairs Director
Medtronic Japan
✉️ tomohiro.watanuki@medtronic.com
He is the Immediate Past President of Asia Pacific Initiative on Reproduction (ASPIRE) for 2018 – 2020 and a vice director of Indonesian Medical Education and Research Institute Faculty of Medicine Universitas Indonesia (IMERI FKUI). Now he is the general secretary of Asian Society for Fertility Preservation (ASFP) and the chairman of National Health Technology Assessment Ministry of Health Republic of Indonesia. He is also a member of Indonesia National Academic of Sciences since 2020. In Indonesia he serves as The President of Indonesian Association for IVF (IA-IVF) for 2016-2020 and a General Secretary for Indonesian Society for Obstetrics and Gynecology (POGI). He is also the chairman of International Relationship Affair of Indonesian Medical Association (IMA). After graduated as a specialist in Obstetrics and Gynecology from Universitas Indonesia in 2005, he spent his time as a research fellow on ovarian tissue vitrification and in vitro culture of follicles at Hyogo College of Medicine Japan. He continued his research on basic laboratory on ART and had some clinical IVF training in Osaka, Barcelona, Thailand and Vietnam. He defended his PhD thesis on “Pre-antral follicle vitrification” in Faculty of Medicine Universitas Indonesia in 2014. Then he continued study to received master’s degree in public health from University of Gadjah Mada – Yogyakarta, Indonesia. He is International Affiliate of the College Royal Australian and New Zealand College of Obstetricians and Gynaecologists He is a former research manager FKUI (2014-2018) who contribute a lot for establishing research and innovation in FKUI as well as IMERI development. He did also a lot of contribution in developing IVF field in Indonesia since he is one of the founders of Indonesian Association for In Vitro Fertilization (IA-IVF) which was founded in 2009. Instead of giving services, he is also a coordinator of trainer for Subspecialty in Reproductive Endocrinology and Infertility Fellowship which is underwent in Teaching Hospital Universitas Indonesia. His researches about AMH, iCOS, and ovarian tissue vitrification were published in local journal and international journal and also conference of ART such as ASPIRE, ESHRE and IFFS annual meeting. Up to now, he has published 114 original articles in international journal indexed in Scopus and 40 original articles indexed in Pub-Med, with h-index 10. He has received a lot of awards nationally and internationally, including Best Graduates Awards from FKUI 2005, Best Indonesian young obstetrics and gynecologist award 2005 (Tadjuludin Award), Asia Pacific Young Gynecologist Award 2006, Indonesian Best Paper Award 2009 (Sarwono Awards) Best researcher FKUI 2009, 2010, 2011, Asia Pacific Best Paper 2014, First Winner of Universitas Indonesia Best Lecturer 2015, First Winner of Indonesian Best Lecturer 2015, UI Innovation Award, Gynecologist innovation awards 2015 (Makelew Award), Indonesian Best Paper Awards 2009 (Sarwono Awards), Best Indonesian Innovator 2016 (First place and second place of Innovation 2016), Indonesian Medical Association Award 2019. He did and published a lot of researches in ART especially in AMH, individualized controlled ovarian stimulation (iCOS), ovarian tissue vitrification and embryo metabolomics. He is the one of AMH expert in Asian region since he developed AMH nomogram and AMH based iCOS formula which is very important for daily practice on infertility. Currently he is a member of advisory board of Merck Serono Asia Pacific and very active in a lot of regional organization such as Pacific Rim Fertility Society (PRFS), European Society for Human Reproduction and Embryology (ESHRE), International Federation of Fertility Society (IFFS), American Society for Reproductive Medicine (ASRM), International Society for Fertility Preservation (ISFP) and American Association for Gynecology Laparoscopy (AAGL). Now he is trying to develop ovarian tissue cryopreservation in Indonesia and establish Asian Society of Fertility Preservation (ASFP) as founding member.
Dr. Jaime Wong
Senior Vice President & Senior Medical Officer
Intuitive
✉ Jaime.Wong@intusurg.com
LinkedIn: www.linkedin.com/in/jaime-wong-md-mba-cpe-frcsc-facs-24a07367/

Dr. Jaime Wong is a Certified Physician Executive and serves as the Senior Vice President & Senior Medical Officer for Intuitive, a market leading global company in the healthcare industry. He leads the Medical Safety & Innovation organization that includes Clinical Development Engineering, Global Clinical Development, Comparative Medicine and Medical Safety. Additionally, he is the Chief of Staff to the Office of the President at Intuitive. Dr. Wong is also a urologic surgeon who currently practices at the VA Palo Alto Health Care System. Previously, he was the Medical Director for the Jenkins Clinic, a non-profit urology clinic established to offer each patient the highest quality care and best possible outcomes. Holding two Bachelor of Science degrees, a Diploma in Engineering and a Doctor of Medicine degree from Dalhousie University in Nova Scotia, Canada, Dr. Wong subsequently pursued postgraduate Urology residency training at the same facility. He then completed a Minimally Invasive Surgery Fellowship at McMaster University in Ontario, Canada. Later, he received an MBA from the Goizueta Business School at Emory University in Atlanta, Georgia. Dr. Wong is a Diplomate of the American Board of Urology, Fellow of the American College of Surgeons and a Fellow of the Royal College of Surgeons of Canada. He also serves as an Adjunct Associate Professor at the Walter H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University.

Dr. Grace Hui-min Wu
Researcher
Taiwan National Hepatitis C Program Office, Ministry of Health and Welfare, Taiwan
✉ gracewu1221@gmail.com

Dr. Grace Hui-Min Wu is a researcher of Taiwan National Hepatitis C Program Office, Ministry of Health and Welfare. She also held the position of adjunct professor at the Department of Physical Therapy and Assistive Technology, National Yang Ming Chiao Tung University. Her current task is to collect and analyse the real world data to generate local epidemiologic profile of hepatitis C, and to monitor the progress of hepatitis C elimination policy including screening, link-to-care, and direct-acting antivirals treatment, to ensure that the policy goals can be achieved. Also, the long-term effectiveness and cost-effectiveness of the policy is the target of analysis. Previously she worked as a senior economic evaluation researcher of the Health Technology Assessment Division for the Center for Drug Evaluation (CDE/HTA) in Taiwan to perform new drugs assessment during 2010-2017. In CDE/HTA, she also involved in several research projects designed to use real world data to aid health policy decision-making in areas such as economic evaluation for influenza vaccination, nucleic acid test screening to donated blood, and re-assessment of reimbursed pharmaceuticals/devices such as lipid-lowering drugs, coronary stents, etc. She also took lead to develop the methodology guidelines of cost-effectiveness analysis and budget impact analysis in her division.
Vanessa Xavier
Head of Market Access
Sanofi
vanessa.xavier@sanofi.com
www.linkedin.com/in/vanessa-xavier-77474587/

Head of Market Access for Sanofi Australia and New Zealand for 4 years with almost 20 years experience working in health economics/market access in Australia, the UK and Canada.

Mr. Shuichi Yamaguchi
Project Manager
Center for Outcomes Research and Economic Evaluation for Health
yamaguchi.s aa@niph.go.jp

2019 Aug- current : Project manager at Center for Outcomes Research and Economic Evaluation for Health

Ms. Wen-wen Yang
Researcher
Ministry Of Health And Welfare
hcwwyang@mohw.gov.tw

Wen-Wen Yang is a Researcher in the Taiwan National Hepatitis C Program Office, Ministry Of Health And Welfare. Her work and primary interests include clinical effectiveness, systematic reviews, and health technology assessment.
Mr. Michael Yeung
Regional Lead, Health Economics And Market Access - Structural Heart, Asia Pacific
Boston Scientific
✉️ michael.yeung@bsci.com

Michael is the APAC HEMA lead for Boston Scientific’s Structural Heart technologies. His main responsibility is to create health economics evidence to support premium reimbursement and patient access. Michael has previously worked in U.K. and Japan, is currently based in Hong Kong. Michael received his Master’s degree in International Health Policy from The London School of Economics and Political Science.

Dr. Ping Zhou
Doctor of Medicine and Professor
Fudan University
✉️ zhouping@fudan.edu.cn

A faculty working in school of public health, Fudan University
2022 ASIA POLICY FORUM

DATES & LOCATION COMING SOON
HTAi invites you to join the leading minds in Health Technology Assessment (HTA) from around the world to discuss and debate the lifecycle approach in HTA in this year’s Annual Meeting.

The 2022 Annual Meeting will offer a global platform to deepen awareness of the consequences of a lifecycle approach to HTA from pre-market, market approval, post-market, and disinvestment; improve knowledge of suitable methods and processes; strengthen connections across stakeholders; and prioritize activities. Those with an interest in finding answers to these challenges will come together to make a lifecycle approach happen when HTAi 2022 Annual Meeting is held in Utrecht and virtually, June 25-29.

Learn more about the theme on the official HTAi 2022 Annual Meeting website.
WANT TO GET MORE INVOLVED IN A WORKING GROUP OR PROJECT?

Join an HTAi Interest Group!

Did you know:

• HTAi has 10 different Interest Groups
• 60% of HTAi members belong to one or more Interest Group
• Fosters project collaboration, facilitates the exchange of information, and sets the stage for networking on small-scale initiatives through to engagement in larger, multi-stakeholder international projects

Involvement in the IGs is open to all HTAi members with current membership, allowing you to keep up with IG activities and opportunities to get more involved in specific working groups and projects.

Want more info? Visit https://htai.org/interest-groups