

Risk Assessment for International Dissemination of COVID-19 to the ASEAN Region

ASEAN Biodiaspora Virtual Center (ABVC)

as of June 10, 2020 (2:00 PM GMT+8)



COVID-19: Highlights and Situation Overview

- Worldwide, there have been over 7.2 million cases and over 412,000 deaths attributed to COVID-19. Although some regions are showing evidence of epidemic control, globally the number of new cases each day continues to climb. In addition, the WHO is raising concerns that cases and deaths across Latin America are rising faster than anywhere in the world. To date, the region has recorded nearly 1.2 million cases and more than 60,000 deaths.
- A new technical note, Medical certification, ICD mortality coding, and reporting mortality associated with COVID-19, has been released that describes medical certification and classification of deaths related to COVID-19. The primary goal is to identify all deaths due to this disease in all countries (WHO Report No. 140).
- Greater Surabaya in East Java Indonesia has officially ended its large-scale social restrictions (PSBB), a partial lockdown to curb the spread of COVID-19, on June 8. Surabaya and its satellite cities, Gresik and Sidoarjo, will implement a transition phase for the next two weeks.
- The Department of Health (DOH) in the Philippines said in the media briefing that the spike in "fresh" cases the past days didn't mean the COVID-19 cases in the country was increasing but could be the result of the laboratories improved reporting of cases. According to the DOH, "fresh" cases are test results that came out and had been validated by its Epidemiology Bureau in the last 3 days, while "late" cases are test results that came out 5 days or older, but were only validated recently.
- The last COVID-19 patient in Laos has recovered from the disease and was discharged from the hospital on June 9 (Tuesday). Lao reported no new COVID-19 case/s for 59 consecutive days since April 12.
- Brunei reported no new COVID-19 case/s for 34 consecutive days since May 7.
- Antiviral drug remdesivir can now be used to treat seriously ill COVID-19 patients in Singapore. The Health Sciences Authority (HSA), today (June 10), has granted conditional approval for Gilead Sciences' remdesivir, allowing infectious diseases specialists to administer the drug to some patients. As part of the conditional approval, Gilead is required to collect the relevant safety data and to monitor the use of the drug. Drugs may be administered to patients with low oxygen saturation levels less than or equal to 94 percent, or who might require supplemental oxygen or more intensive breathing support such as extracorporeal membrane oxygenation – a type of life support, or invasive mechanical ventilation
- The deputy of the Thailand's government's committee on COVID-19 control, said today (June 10), that the committee planned to lift the 11pm-3am curfew for 15 days. The night curfew will be lifted as a trial, but the emergency decree will remain in force to ensure continued containment of COVID-19.

Travel Advisories (new update/s)

- Cambodia: According to Economy and Finance Minister, Cambodia has required foreigners to pay for COVID-19 lab test, quarantine and treatment services. Under the kingdom's health measures, all travelers, both Cambodians and foreigners, who travel to Cambodia will be transferred from airports to waiting centers for COVID-19 lab tests and they are required to wait for the test results at those centers. Foreigners, however, must pay for the single trip

between airport and waiting center, COVID-19 test, a day for staying at a hotel or at a waiting center to wait for the test result, and for meals.

- Indonesia: The Indonesian government has issued a circular stipulating requirement for people seeking to travel within or into the country during the transition to the so-called "new normal" period. Those intending to go on inter-provincial trips using public transportation are required to show their ID cards, health certificates stating they are COVID-19-negative after undergoing polymerase chain reaction (PCR) or rapid tests and have the government-made Peduli Lindungi app installed and activated on their mobile phones at the time of departure. Travelers arriving in Indonesia from abroad are also required to present COVID-19-free health certificates. Those who have yet to obtain such certificates will be asked to undergo COVID-19 tests on the spot upon arrival. They will also be required to stay at government-provided quarantine facilities while awaiting their results.

Cases and Deaths as of 10 June 2020

- As of June 10 (2PM, GMT+8), worldwide, there were **7,212,063** confirmed cases, including **411,152** deaths. Globally, Case Fatality Ratio (CFR)* is **5.70**.
- In **China**, there were **84,638** confirmed cases with **4,645** deaths, including deaths in Hong Kong (4) and Taiwan (7). Confirmed cases in China include confirmed cases in Hong Kong (1,107), Macau (45), and Taiwan (443).
- **7,127,425 confirmed cases** of COVID-19 have been reported in **212 countries/states** (other than China, Hong Kong, Taiwan and Macau):

REGION	COUNTRY	FIRST CONFIRMED CASE(S)	LATEST CONFIRMED CASE(S)	CONFIRMED CASES/ (Deaths)	CASE FATALITY RATIO*
ASIA PACIFIC	Thailand	13 Jan 2020	09 Jun 2020	3,121 (58)	1.86
	Vietnam	23 Jan 2020	08 Jun 2020	332	
	Singapore	23 Jan 2020	09 Jun 2020	38,514 (25)	0.06
	Malaysia	25 Jan 2020	09 Jun 2020	8,336 (117)	1.40
	Cambodia	27 Jan 2020	08 Jun 2020	126	
	Philippines	30 Jan 2020	09 Jun 2020	22,992 (1,017)	4.42
	Indonesia	02 Mar 2020	09 Jun 2020	33,076 (1,923)	5.81
	Brunei	10 Mar 2020	27 May 2020	141 (2)	1.42
	Myanmar	23 Mar 2020	09 Jun 2020	246 (6)	2.44
	Lao PDR	24 Mar 2020	13 Apr 2020	19	
	Japan	16 Jan 2020	09 Jun 2020	17,174 (916)	5.33
	South Korea	20 Jan 2020	09 Jun 2020	11,852 (274)	2.31
	Nepal	24 Jan 2020	09 Jun 2020	4,086 (15)	0.37
	Australia	25 Jan 2020	09 Jun 2020	7,267 (102)	1.40
	Sri Lanka	27 Jan 2020	09 Jun 2020	1,858 (11)	0.59
	India	30 Jan 2020	09 Jun 2020	268,125 (7,487)	2.79
Afghanistan	24 Feb 2020	09 Jun 2020	21,459 (384)	1.79	
Pakistan	26 Feb 2020	09 Jun 2020	108,317 (2,172)	2.01	

	New Zealand	28 Feb 2020	23 May 2020	1,504 (22)	1.46
	Bhutan	05 Mar 2020	08 Jun 2020	59	
	Maldives	07 Mar 2020	09 Jun 2020	1,916 (8)	0.42
	Bangladesh	08 Mar 2020	09 Jun 2020	71,675 (975)	1.36
	Mongolia	10 Mar 2020	06 Jun 2020	194	
	Turkey	10 Mar 2020	09 Jun 2020	171,121 (4,711)	2.75
	French Polynesia	12 Mar 2020	06 May 2020	60	
	Guam	15 Mar 2020	09 Jun 2020	180 (5)	2.78
	New Caledonia	17 Mar 2020	01 Jun 2020	20	
	Fiji	18 Mar 2020	20 Apr 2020	18	
	Papua New Guinea	21 Mar 2020	22 Apr 2020	8	
	Timor Leste	21 Mar 2020	25 Apr 2020	24	
	Northern Mariana Islands	28 Mar 2020	09 Jun 2020	20 (2)	10.00
AMERICAS	USA	21 Jan 2020	09 Jun 2020	2,040,896 (113,985)	5.59
	Canada	25 Jan 2020	09 Jun 2020	96,616 (7,941)	8.22
	Brazil	26 Feb 2020	09 Jun 2020	711,696 (37,359)	5.25
	Mexico	28 Feb 2020	09 Jun 2020	120,102 (14,053)	11.70
	Saint Martin	01 Mar 2020	30 May 2020	41 (3)	7.32
	Ecuador	01 Mar 2020	09 Jun 2020	43,917 (3,690)	8.40
	Dominican Republic	01 Mar 2020	09 Jun 2020	20,126 (539)	2.68
	Chile	03 Mar 2020	09 Jun 2020	142,759 (2,283)	1.60
	Argentina	03 Mar 2020	09 Jun 2020	23,620 (698)	2.96
	Peru	05 Mar 2020	09 Jun 2020	199,696 (5,571)	2.79
	Costa Rica	06 Mar 2020	09 Jun 2020	1,342 (11)	0.82
	Colombia	06 Mar 2020	09 Jun 2020	40,719 (1,308)	3.21
	French Guiana	06 Mar 2020	09 Jun 2020	773 (2)	0.26
	Martinique	06 Mar 2020	06 Jun 2020	202 (14)	6.93
	Paraguay	07 Mar 2020	08 Jun 2020	1,145 (11)	0.96
	Panama	10 Mar 2020	09 Jun 2020	16,854 (398)	2.36
	Bolivia	10 Mar 2020	09 Jun 2020	13,949 (475)	3.41
	Honduras	11 Mar 2020	09 Jun 2020	6,450 (262)	4.06
	Cuba	11 Mar 2020	09 Jun 2020	2,205 (83)	3.76
	Guyana	11 Mar 2020	07 Jun 2020	154 (12)	7.79
	Jamaica	12 Mar 2020	09 Jun 2020	599 (10)	1.67
	St Vincent and the Grenadines	12 Mar 2020	08 Jun 2020	27	
	Saint Lucia	13 Mar 2020	06 May 2020	19	
	Trinidad and Tobago	13 Mar 2020	31 May 2020	117 (8)	6.84
	Venezuela	13 Mar 2020	09 Jun 2020	2,473 (22)	0.89
	Guatemala	13 Mar 2020	09 Jun 2020	7,502 (267)	3.56
	Uruguay	13 Mar 2020	07 Jun 2020	845 (23)	2.72

Curacao	13 Mar 2020	04 Jun 2020	21 (1)	4.76	
Puerto Rico	13 Mar 2020	09 Jun 2020	5,185 (142)	2.74	
Suriname	13 Mar 2020	07 Jun 2020	100 (1)	1.00	
Antigua and Barbuda	13 Mar 2020	01 Jun 2020	26 (3)	11.54	
Guadeloupe	13 Mar 2020	06 Jun 2020	164 (14)	8.54	
Cayman Islands	13 Mar 2020	09 Jun 2020	171 (1)	0.58	
Aruba	14 Mar 2020	13 May 2020	101 (3)	2.97	
Bahamas	15 Mar 2020	08 Jun 2020	103 (11)	10.68	
US Virgin Islands	16 Mar 2020	04 Jun 2020	71 (6)	8.45	
Sint Maarten	17 Mar 2020	17 May 2020	77 (15)	19.48	
Montserrat	17 Mar 2020	25 Apr 2020	11 (1)	9.09	
Barbados	17 Mar 2020	24 May 2020	92 (7)	7.61	
El Salvador	18 Mar 2020	09 Jun 2020	3,191 (58)	1.82	
Nicaragua	18 Mar 2020	03 Jun 2020	1,118 (46)	4.11	
Bermuda	18 Mar 2020	02 Jun 2020	141 (9)	6.38	
Haiti	19 Mar 2020	09 Jun 2020	3,538 (54)	1.53	
Dominica	22 Mar 2020	02 Jun 2020	18		
Grenada	22 Mar 2020	26 May 2020	23		
Belize	23 Mar 2020	08 Jun 2020	19 (2)	10.53	
Turks and Caicos Islands	23 Mar 2020	28 Apr 2020	12 (1)	8.33	
Saint Kitts and Nevis	24 Mar 2020	20 Apr 2020	15		
British Virgin Islands	25 Mar 2020	15 May 2020	8 (1)	12.50	
Anguilla	26 Mar 2020	03 Apr 2020	3		
Caribbean Netherlands	01 Apr 2020	01 Jun 2020	7		
Falkland Islands	03 Apr 2020	24 Apr 2020	13		
Saint Pierre and Miquelon	05 Apr 2020	05 Apr 2020	1		
EUROPE	France	24 Jan 2020	09 Jun 2020	154,591 (29,296)	18.95
	Germany	27 Jan 2020	09 Jun 2020	186,313 (8,802)	4.72
	Finland	29 Jan 2020	09 Jun 2020	7,025 (324)	4.61
	Italy	30 Jan 2020	09 Jun 2020	235,561 (34,043)	14.45
	Russian Federation	31 Jan 2020	09 Jun 2020	485,253 (6,142)	1.27
	Spain	31 Jan 2020	09 Jun 2020	241,966 (27,136)	11.21
	Sweden	31 Jan 2020	09 Jun 2020	45,924 (4,717)	10.27
	United Kingdom of Great Britain	31 Jan 2020	09 Jun 2020	289,140 (40,883)	14.14
	Belgium	05 Feb 2020	09 Jun 2020	58,437 (9,619)	16.46
	Switzerland	25 Feb 2020	09 Jun 2020	30,988 (1,923)	6.21
	Austria	25 Feb 2020	09 Jun 2020	16,979 (672)	3.96
	Croatia	25 Feb 2020	06 Jun 2020	2,247 (106)	4.72
	Norway	26 Feb 2020	09 Jun 2020	8,567 (239)	2.79
	Romania	26 Feb 2020	09 Jun 2020	20,749 (1,353)	6.52

Estonia	26 Feb 2020	09 Jun 2020	1,947 (69)	3.54
Georgia	26 Feb 2020	09 Jun 2020	818 (13)	1.59
North Macedonia	26 Feb 2020	09 Jun 2020	3,239 (157)	4.85
Greece	26 Feb 2020	09 Jun 2020	3,049 (182)	5.97
Denmark	27 Feb 2020	08 Jun 2020	11,962 (593)	4.96
San Marino	27 Feb 2020	09 Jun 2020	688 (42)	6.10
Lithuania	27 Feb 2020	09 Jun 2020	1,727 (72)	4.17
Netherlands	27 Feb 2020	09 Jun 2020	47,903 (6,031)	12.59
Azerbaijan	27 Feb 2020	09 Jun 2020	7,876 (93)	1.18
Belarus	28 Feb 2020	09 Jun 2020	50,265 (282)	0.56
Iceland	28 Feb 2020	07 Jun 2020	1,807 (10)	0.55
Ireland	28 Feb 2020	09 Jun 2020	25,207 (1,683)	6.68
Monaco	29 Feb 2020	31 May 2020	99 (4)	4.04
Czech Republic	01 Mar 2020	09 Jun 2020	9,699 (328)	3.38
Luxembourg	01 Mar 2020	09 Jun 2020	4,040 (110)	2.72
Armenia	01 Mar 2020	09 Jun 2020	13,675 (217)	1.59
Latvia	02 Mar 2020	09 Jun 2020	1,089 (26)	2.39
Portugal	02 Mar 2020	09 Jun 2020	35,306 (1,492)	4.23
Andorra	02 Mar 2020	05 Jun 2020	852 (51)	5.99
Liechtenstein	03 Mar 2020	27 Apr 2020	82 (1)	1.22
Ukraine	03 Mar 2020	09 Jun 2020	27,856 (810)	2.91
Slovenia	04 Mar 2020	09 Jun 2020	1,486 (109)	7.34
Hungary	04 Mar 2020	09 Jun 2020	4,017 (550)	13.69
Poland	04 Mar 2020	09 Jun 2020	27,365 (1,172)	4.28
Faroe Islands	04 Mar 2020	23 Apr 2020	187	
Bosnia and Herzegovina	05 Mar 2020	09 Jun 2020	2,728 (160)	5.87
Gibraltar	05 Mar 2020	07 Jun 2020	176	
Slovakia	06 Mar 2020	09 Jun 2020	1,531 (28)	1.83
Serbia	06 Mar 2020	09 Jun 2020	11,965 (250)	2.09
Vatican City	06 Mar 2020	08 May 2020	12	
Malta	07 Mar 2020	09 Jun 2020	632 (9)	1.42
Moldova	07 Mar 2020	09 Jun 2020	10,025 (365)	3.64
Bulgaria	08 Mar 2020	09 Jun 2020	2,810 (164)	5.84
Albania	09 Mar 2020	09 Jun 2020	1,299 (34)	2.62
Cyprus	09 Mar 2020	09 Jun 2020	970 (18)	1.86
Channel Islands	09 Mar 2020	09 Jun 2020	564 (46)	8.16
Jersey	10 Mar 2020	08 Jun 2020	312 (30)	9.62
Kazakhstan	13 Mar 2020	09 Jun 2020	13,074 (58)	0.44
Kosovo	13 Mar 2020	09 Jun 2020	1,263 (31)	2.45
Uzbekistan	15 Mar 2020	09 Jun 2020	4,482 (18)	0.40
Greenland	16 Mar 2020	27 May 2020	13	
Montenegro	17 Mar 2020	10 May 2020	324 (9)	2.78
Kyrgyzstan	18 Mar 2020	09 Jun 2020	2,055 (24)	1.17
Isle of Man	19 Mar 2020	21 May 2020	336 (24)	7.14
Tajikistan	30 Apr 2020	09 Jun 2020	4,690 (48)	1.02

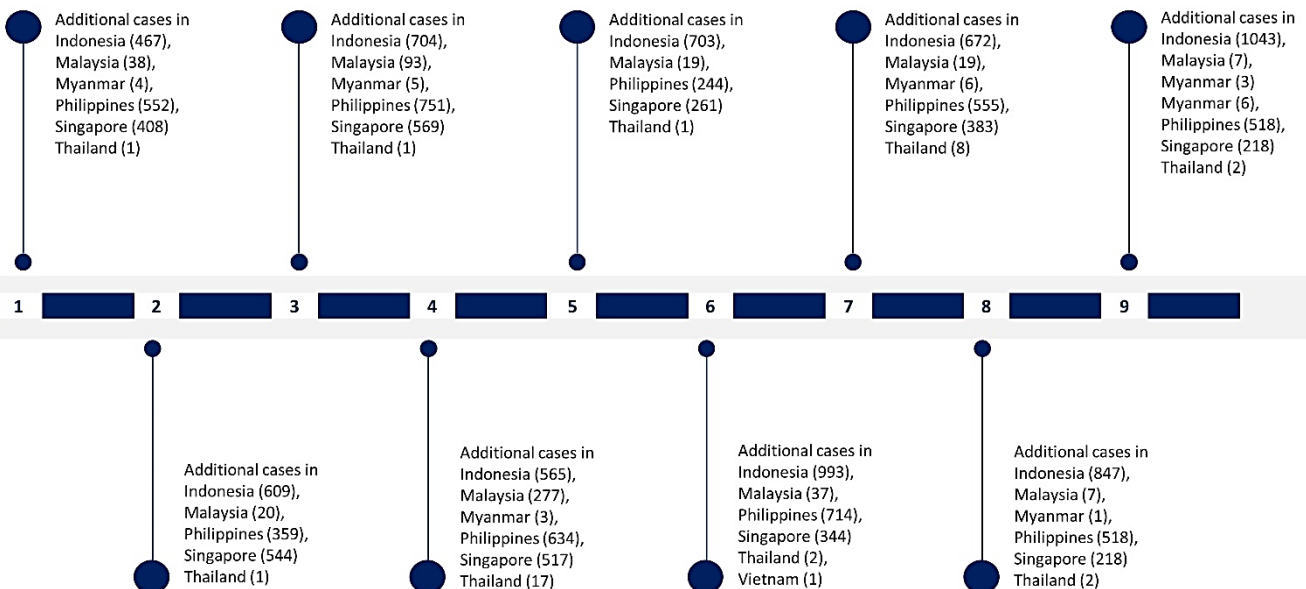
MIDDLE EAST	UAE	29 Jan 2020	09 Jun 2020	39,904 (283)	0.71
	Iran	19 Feb 2020	09 Jun 2020	175,927 (8,425)	4.79
	Israel	21 Feb 2020	09 Jun 2020	18,089 (298)	1.65
	Lebanon	21 Feb 2020	09 Jun 2020	1,368 (30)	2.19
	Kuwait	24 Feb 2020	09 Jun 2020	33,140 (273)	0.82
	Oman	24 Feb 2020	09 Jun 2020	18,198 (83)	0.46
	Bahrain	24 Feb 2020	09 Jun 2020	15,731 (28)	0.18
	Iraq	24 Feb 2020	09 Jun 2020	14,268 (392)	2.75
	Qatar	29 Feb 2020	09 Jun 2020	71,879 (62)	0.09
	Saudi Arabia	02 Mar 2020	09 Jun 2020	108,571 (783)	0.72
	Jordan	02 Mar 2020	08 Jun 2020	831 (9)	1.08
	Palestine	05 Mar 2020	09 Jun 2020	654 (5)	0.76
	Syria	22 Mar 2020	09 Jun 2020	144 (6)	4.17
	Yemen	10 Apr 2020	09 Jun 2020	496 (112)	22.58
AFRICA	Egypt	14 Feb 2020	09 Jun 2020	35,444 (1,271)	3.59
	Algeria	25 Feb 2020	09 Jun 2020	10,382 (724)	6.97
	Nigeria	28 Feb 2020	09 Jun 2020	12,801 (361)	2.82
	Tunisia	02 Mar 2020	03 Jun 2020	1,087 (49)	4.51
	Morocco	02 Mar 2020	09 Jun 2020	8,437 (210)	2.49
	Senegal	02 Mar 2020	09 Jun 2020	4,516 (52)	1.15
	South Africa	05 Mar 2020	09 Jun 2020	50,879 (1,080)	2.12
	Cameroon	06 Mar 2020	09 Jun 2020	8,312 (212)	2.55
	Togo	06 Mar 2020	09 Jun 2020	497 (13)	2.62
	Burkina Faso	09 Mar 2020	09 Jun 2020	890 (53)	5.96
	Democratic Republic of Congo	10 Mar 2020	09 Jun 2020	4,259 (90)	2.11
	Ivory Coast	11 Mar 2020	09 Jun 2020	3,881 (38)	0.98
	Reunion	11 Mar 2020	08 Jun 2020	481 (1)	0.21
	Ghana	13 Mar 2020	09 Jun 2020	9,910 (48)	0.48
	Guinea	13 Mar 2020	09 Jun 2020	4,216 (23)	0.55
	Gabon	13 Mar 2020	06 Jun 2020	3,101 (21)	0.68
	Sudan	13 Mar 2020	09 Jun 2020	6,242 (372)	5.96
	Kenya	13 Mar 2020	09 Jun 2020	2,989 (88)	2.94
	Ethiopia	13 Mar 2020	09 Jun 2020	2,336 (32)	1.37
	Central African Republic	14 Mar 2020	09 Jun 2020	1,850 (5)	0.27
	Seychelles	14 Mar 2020	06 Apr 2020	11	
	Rwanda	14 Mar 2020	09 Jun 2020	451 (2)	0.44
	Namibia	14 Mar 2020	08 Jun 2020	31	
	Swaziland	14 Mar 2020	09 Jun 2020	340 (3)	0.88
	Mauritania	14 Mar 2020	09 Jun 2020	1,104 (59)	5.34
	Mayotte	14 Mar 2020	09 Jun 2020	2,151 (25)	1.16
	Equatorial Guinea	15 Mar 2020	29 May 2020	1,306 (12)	0.92
	Republic of Congo	15 Mar 2020	07 Jun 2020	683 (22)	3.22
	Benin	16 Mar 2020	09 Jun 2020	305 (4)	1.31
	Liberia	16 Mar 2020	09 Jun 2020	383 (31)	8.09
	Tanzania	16 Mar 2020	15 May 2020	509 (21)	4.13
	Somalia	16 Mar 2020	09 Jun 2020	2,416 (85)	3.52
	Gambia	17 Mar 2020	09 Jun 2020	28 (1)	3.57
	Zambia	17 Mar 2020	09 Jun 2020	1,200 (10)	0.83
Mauritius	18 Mar 2020	05 Jun 2020	337 (10)	2.97	
Djibouti	18 Mar 2020	08 Jun 2020	4,278 (31)	0.72	
Niger	19 Mar 2020	08 Jun 2020	973 (65)	6.68	
Chad	19 Mar 2020	09 Jun 2020	839 (70)	8.34	
Zimbabwe	20 Mar 2020	09 Jun 2020	287 (4)	1.39	
Cape Verde	20 Mar 2020	09 Jun 2020	567 (5)	0.88	

Madagascar	20 Mar 2020	09 Jun 2020	1,138 (9)	0.79
Uganda	21 Mar 2020	09 Jun 2020	657	
Eritrea	21 Mar 2020	19 Apr 2020	39	
Angola	21 Mar 2020	09 Jun 2020	92 (4)	4.35
Mozambique	22 Mar 2020	09 Jun 2020	453 (2)	0.44
Libya	24 Mar 2020	09 Jun 2020	332 (5)	1.51
Guinea-Bissau	25 Mar 2020	09 Jun 2020	1,389 (12)	0.86
Mali	25 Mar 2020	08 Jun 2020	1,547 (92)	5.95
Botswana	30 Mar 2020	09 Jun 2020	42 (1)	2.38
Sierra Leone	31 Mar 2020	09 Jun 2020	1,025 (50)	4.88
Burundi	31 Mar 2020	07 Jun 2020	83 (1)	1.20
Malawi	02 Apr 2020	09 Jun 2020	443 (4)	0.90
South Sudan	05 Apr 2020	08 Jun 2020	1,604 (19)	1.18
Sao Tome and Principe	06 Apr 2020	08 Jun 2020	513 (12)	2.34
Lesotho	13 May 2020	03 Jun 2020	4	
			7,127,425	
			(406,507)	

*The calculated CFR is based on reported deaths and reported case counts, and does not account for recovered cases over time or rate of testing in a particular region.

**Adjusted cumulative count from last report

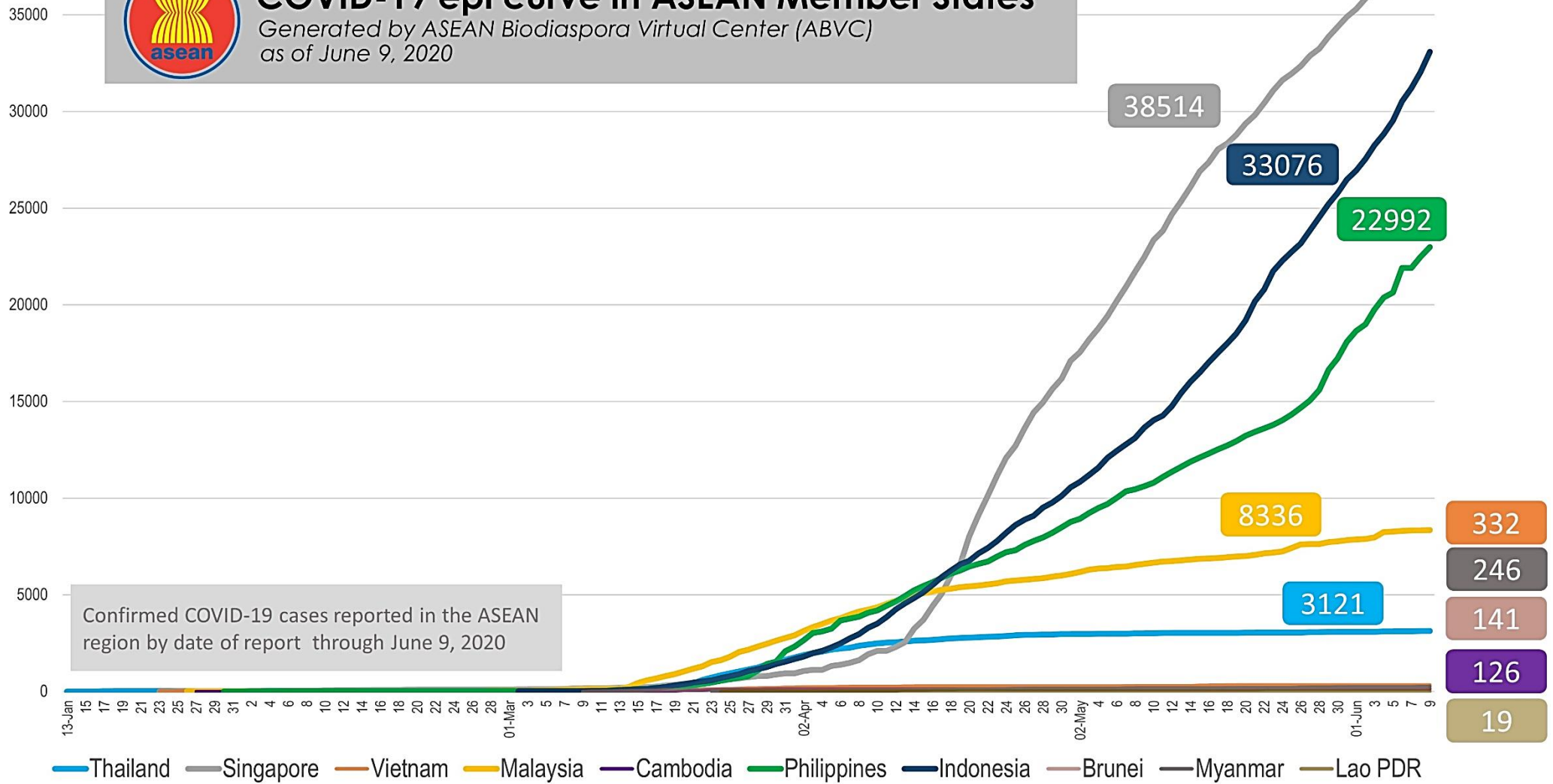
Timeline of COVID-19: ASEAN (continuation)





COVID-19 epi curve in ASEAN Member States

Generated by ASEAN Biodiaspora Virtual Center (ABVC)
as of June 9, 2020



Air Travel Connectivity from International COVID-19 Hotspots to the ASEAN Region

In this report, Bluedot provided a COVID-19 status update for countries in the Association of Southeast Asian Nations (ASEAN) region and approximate prospective connectivity from COVID-19 "hotspots" into ASEAN countries via air travel in the coming months. ASEAN is a regional intergovernmental organization comprised of 10 countries in Southeast Asia: Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. Hotspots were defined as countries with a rapidly increasing rate of new COVID-19 cases, or greater than 5 new COVID-19 cases per 1,000 population in the past 30 days based on BlueDot's up-to-date, A.I.-driven surveillance data.

Bluedot used commercial flight data to highlight prospective connectivity into each member state in the ASEAN region. Metrics related to number of flights and aircraft carrier seat capacity were used to estimate the maximum potential inbound flights and maximum potential inbound passengers on these flights, respectively.

Key questions

- Question 1: What countries have the highest direct connectivity to ASEAN member states? What countries have the highest number of potential passengers on flights currently scheduled to arrive in ASEAN member states during June and July 2020? What is the status of COVID-19 in these origin countries?
- Question 2: What is the anticipated connectivity between COVID-19 hotspots and ASEAN member states? What proportion of potential passengers on all flights currently scheduled to arrive in ASEAN member states during June and July 2020 originate from a COVID-19 hotspot?

Executive Summary

For the months of June and July 2020:

- The five countries (outside the ASEAN region) with the highest number of potential inbound passengers on scheduled direct flights to the ASEAN region **as a whole** are (in descending order): **China, South Korea, Hong Kong (SAR), Japan, and Taiwan.**
- Of all ASEAN member states, Singapore is expected to receive the highest number of potential inbound passengers **from any country** through 3,898,602 seats on scheduled direct flights.
- The ranked order of ASEAN member states receiving the **highest number of potential inbound passengers from a COVID-19 hotspot country**, based on number of seats on scheduled direct flights, are (in descending order): **Indonesia, Malaysia, Thailand, Philippines, Singapore, Vietnam, Myanmar, Cambodia, Brunei Darussalam**, then **Laos.**
- **Indonesia** is expected to receive the highest number of potential inbound passengers **from a COVID-19 hotspot country** through 658,206 seats on scheduled direct flights.
- Across ASEAN member states, the number of potential inbound passengers, based on seats on scheduled direct flights, from a COVID-19 hotspot country accounts for **1.9% to 33%** of all potential inbound passengers **from any country.**

What does this mean?

If international travel restrictions are relaxed and scheduled direct flights proceed with maximum aircraft capacity, Indonesia, Malaysia, Thailand, Philippines, Singapore, and Vietnam may be the top five ASEAN member states most susceptible to COVID-19 introduction by air travel in the upcoming two months.

Methods

To estimate prospective flight connectivity into the ASEAN Region for the months of June and July 2020, Bluedot leveraged data published by Innovata on scheduled commercial direct flights around the world. These data contain airport-level information about each scheduled flight and the associated aircraft seat capacity. For the purpose of our analyses, data have been aggregated to the country level. These data do not account for future cancelled flights nor number of occupied seats, and therefore represent the potential maximum volumes of passengers on these scheduled flights. Given widespread air travel restrictions related to COVID-19 and physical distancing measures implemented by individual carriers, we expect that the actual number of completed flights and occupied seats on each flight will be significantly reduced.

Worldwide, scheduled flight data for June and July 2020 to identify origin countries with direct connectivity to ASEAN member states were also utilized. Top five origin countries based on total number of aircraft seats on direct inbound flights were then selected. To contextualize the epidemic status of COVID-19 in these origin countries, Bluedot classified them into six categories based on the rate of change of new COVID-19 cases over the past week, as of 9:00AM EDT on June 5th.

From the full list of origin countries with direct air travel connectivity to ASEAN member states, Bluedot used COVID-19 surveillance data to select “hotspot” countries that met at least one of the following criteria as of May 29th, 2020: 1) a rapidly accelerating rate of new COVID-19 cases, or 2) ≥ 5 new COVID-19 cases reported per 1,000 population over the past 30 days. All hotspot countries with scheduled direct flights into at least one ASEAN member state during June and July 2020 have been selected. Based on these criteria, hotspot countries included are (in alphabetical order): Bahrain, Bangladesh, Belgium, Kuwait, Qatar, United Arab Emirates, Singapore, Spain, and the United States.

Bluedot also leveraged their A.I.-driven surveillance data to provide a COVID-19 status update of the ASEAN region as of June 2, 2020.

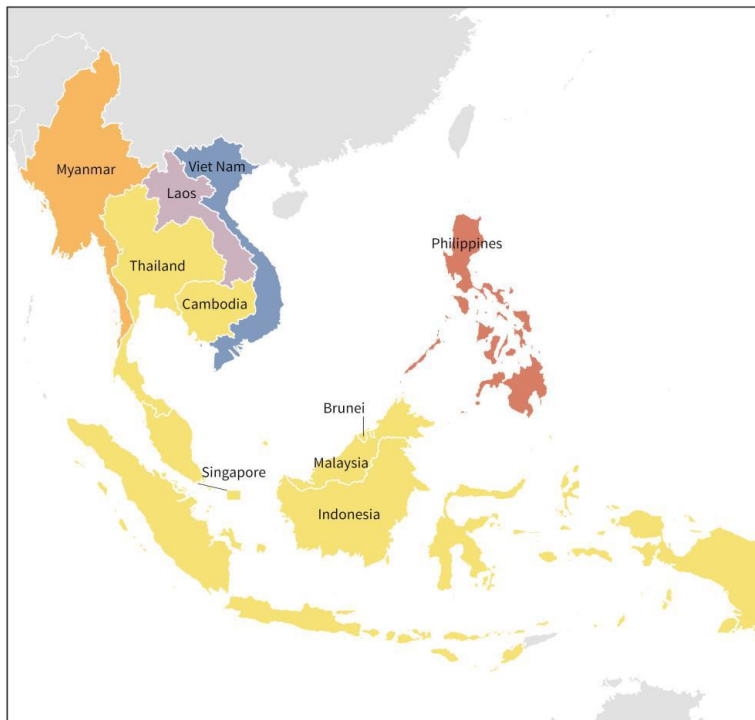
COVID-19 status in ASEAN region

The COVID-19 status update of the ASEAN region using BlueDot's up to date A.I.-driven surveillance data are shown in below. For each ASEAN member state, we calculated the cumulative COVID-19 case count, death count, and reported number of new cases per 1,000 in the last 30 days (Table 1, Map 2). We also classified each ASEAN member state into one of six COVID19 categories based on the rate of change of new COVID-19 cases over the past week (Map 1). Table 1. Summary of COVID-19 category, cumulative case counts, cumulative death counts, and cases confirmed and reported in the last 30 days per 1,000 population for each ASEAN member state.

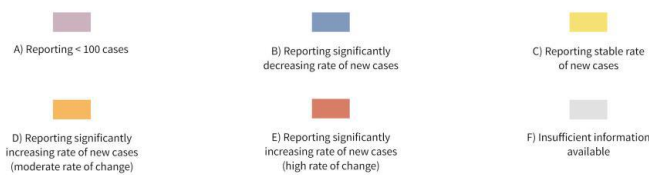
Table 1. Summary of COVID-19 category, cumulative case counts, cumulative death counts, and cases confirmed and reported in the last 30 days per 1,000 population for each ASEAN member state.

ASEAN member state	COVID-19 Category as of Jun 5, 2020 ¹	Cumulative COVID-19 case counts	Cumulative COVID-19 death counts	COVID-19 cases reported in the last 30 days per 1,000 population
Brunei Darussalam	C	141	2	0.005
Cambodia	C	125	0	0
Indonesia	C	28,818	1,721	0.069
Laos	A	19	0	0
Malaysia	C	8,247	115	0.066
Myanmar	D	236	6	0.001
Philippines	E	20,382	984	0.107
Singapore	C	36,922	24	4.936
Thailand	C	3,101	58	0.002
Viet Nam	B	328	0	0

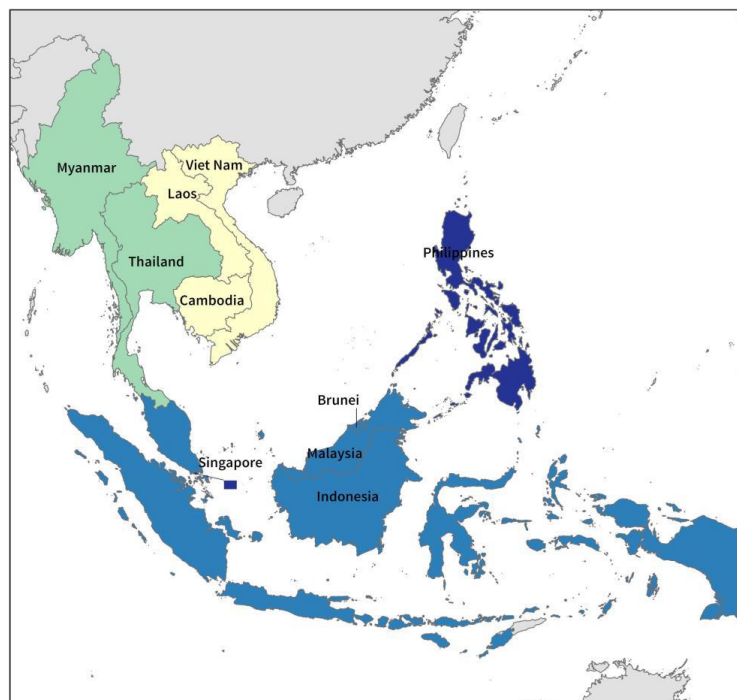
¹ Categorization determined based on both the modelled rate of change and associated measures of statistical significance. Category definitions are noted in the Appendix.



ASEAN member states categorized by rate of new COVID-19 cases



Map 1: Map of ASEAN member states depicting countries by the corresponding COVID-19 category (as of June 5th, 2020). Category definitions are noted in the Appendix.



Map 2: Map of ASEAN member states depicting the reported number of COVID-19 cases in the last 30 days per 1,000 population at a national level (as of June 5th, 2020).

Results

Question 1: What countries currently have the highest direct connectivity to ASEAN member states? What countries have the highest number of passengers on flights currently scheduled to arrive in ASEAN member states during June and July 2020? What is the status of COVID-19 in these origin countries?

Key Results:

- **China** is the country with the highest direct connectivity to **Cambodia** and **Thailand** based on the number of total seats across all direct flights scheduled for June and July 2020. **South Korea** is the country with the highest direct connectivity to the **Philippines** and **Vietnam**. For all other ASEAN member states, the country with the highest direct connectivity is a neighboring ASEAN member state (Table 2).
- Not depicted in Table 2 below: The top 5 origin countries (outside of the ASEAN region) with the most seats from all direct inbound flights scheduled to land in the ASEAN region as a whole for June and July 2020 are (in descending order): **China, South Korea, Hong Kong (SAR), Japan, and Taiwan**.
- Countries **outside of the ASEAN region** that are among the top 5 origin countries for at least one ASEAN member state include: **Australia, China, Hong Kong (SAR), India, Japan, Qatar, Saudi Arabia, and South Korea**.
- Of all ASEAN member states, **Singapore** is expected to receive the most potential inbound passengers from 3,898,602 seats on 17,285 scheduled direct flights in June and July 2020. This is followed by (in descending order): Thailand, Malaysia, Indonesia, Philippines, Vietnam, Cambodia, Myanmar, Brunei Darussalam, and Laos.

Table 2. Summary of the top 5 origin countries, their COVID-19 category, number of scheduled seats, proportion of total scheduled seats, number of scheduled flights, proportion of total scheduled flights into each ASEAN member state.

ASEAN Member State Destination	Ranking	Origin Country	COVID-19 Category as of Jun 5, 2020 ¹	Number of scheduled seats	Proportion of total scheduled seats ²	Number of scheduled flights	Proportion of total scheduled flights
Brunei Darussalam		All	-	110,876	100%	646	100%
	1	Malaysia	C	26,010	23.5%	161	24.9%
	2	Singapore	C	17,770	16.0%	102	15.8%
	3	Indonesia	C	12,450	11.2%	83	12.8%
	4	Australia	D	12,202	11.0%	55	8.5%
	5	Philippines	E	8,940	8.1%	57	8.8%
Cambodia		All	-	367,178	100%	2,299	100%
	1	China	C	97,149	26.5%	554	24.1%
	2	Thailand	C	53,614	14.6%	280	12.2%
	3	Viet Nam	B	49,662	13.5%	526	22.9%
	4	Singapore	C	46,760	12.7%	285	12.4%
	5	Malaysia	C	34,020	9.3%	190	8.3%
Indonesia		All	-	1,972,032	100%	9,132	100%
	1	Malaysia	C	540,547	27.4%	3,009	33.0%
	2	Singapore	C	497,700	25.2%	2,419	26.5%
	3	China	C	133,201	6.8%	633	6.9%
	4	Qatar	D	106,782	5.4%	346	3.8%
	5	Saudi Arabia	C	93,075	4.7%	397	4.3%
Laos		All	-	105,728	100%	653	100%
	1	Thailand	C	38,527	36.4%	221	33.8%
	2	China	C	24,984	23.6%	160	24.5%

	3	South Korea	C	21,422	20.3%	117	17.9%
	4	Viet Nam	B	10,686	10.1%	84	12.9%
	5	Cambodia	C	5,789	5.5%	47	7.2%
Malaysia		All	-	2,534,303	100%	12,753	100%
	1	Indonesia	C	536,499	21.2%	2,995	23.5%
	2	Singapore	C	427,600	16.9%	2,531	19.8%
	3	China	C	256,530	10.1%	1,164	9.1%
	4	Thailand	C	178,015	7.0%	970	7.6%
	5	India	E	130,708	5.2%	690	5.4%
Myanmar		All	-	248,048	100%	1,459	100%
	1	Thailand	C	74,022	29.8%	440	30.2%
	2	Singapore	C	58,424	23.6%	337	23.1%
	3	China	C	51,441	20.7%	307	21.0%
	4	India	E	13,044	5.3%	81	5.6%
	5	South Korea	C	11,865	4.8%	79	5.4%
Philippines		All	-	1,862,415	100%	7,957	100%
	1	South Korea	C	345,199	18.5%	1,647	20.7%
	2	Japan	D	214,770	11.5%	957	12.0%
	3	Hong Kong (SAR)	D	209,140	11.2%	850	10.7%
	4	China	C	176,119	9.5%	834	10.5%
	5	Singapore	C	170,100	9.1%	783	9.8%
Singapore		All	-	3,898,602	100%	17,285	100%
	1	Indonesia	C	498,040	12.8%	2,422	14.0%
	2	Malaysia	C	431,737	11.1%	2,545	14.7%
	3	Australia	D	321,627	8.2%	1,212	7.0%
	4	Thailand	C	304,607	7.8%	1,428	8.3%
	5	India	E	303,277	7.8%	1,449	8.4%
Thailand		All	-	2,864,547	100%	13,300	100%
	1	China	C	513,455	17.9%	2,880	21.7%
	2	Singapore	C	298,579	10.4%	1,410	10.6%
	3	Hong Kong (SAR)	D	209,872	7.3%	916	6.9%
	4	South Korea	C	186,023	6.5%	818	6.2%
	5	Malaysia	C	178,015	6.2%	970	7.3%
Viet Nam		All	-	1,692,174	100%	8,312	100%
	1	South Korea	C	491,532	29.0%	2,310	27.8%
	2	China	C	157,834	9.3%	903	10.9%
	3	Taiwan	D	141,811	8.4%	566	6.8%
	4	Singapore	C	139,494	8.2%	659	7.9%
	5	Thailand	C	137,546	8.1%	716	8.6%

¹Categorization determined based on both the modelled rate of change and associated measures of statistical significance. Category definitions are noted in the Appendix.

²On all international scheduled direct flights arriving into the ASEAN member state of interest during June and July 2020.

Question 2: What is the anticipated connectivity between COVID-19 hotspots and ASEAN member states? What proportion of potential passengers on all flights currently scheduled to arrive in ASEAN member states during June and July 2020 originate from a COVID-19 hotspot?

Key Results:

- Based on all direct scheduled travel **from hotspot countries** into ASEAN member states, **Indonesia** is expected to receive the **most potential inbound passengers** with 658,206 seats during June and July 2020. **Malaysia** is the ASEAN member state that is expected to receive the **second most potential inbound passengers**, with 572,592 seats on scheduled direct flights originating from hotspot countries. This is followed by (in descending order): Thailand, Philippines, Singapore, Viet Nam, Myanmar, Cambodia, Brunei Darussalam, and Laos.
- Across all ASEAN member states, direct connectivity from **any COVID-19 hotspot** origin country accounts for between **1.9%** (Laos) to **33.3%** (Indonesia) of all seats on scheduled direct flights originating from any country (hotspot and non-hotspot, combined) during June and July 2020.
- Singapore**, as a hotspot origin country, accounts for the **greatest proportion of seats on scheduled direct flights** from a COVID-19 hotspot into all other ASEAN member states, during June and July 2020. This ranges from 1.9% (i.e. 1,980 seats) for Laos to 25.2% (i.e. 497,700 seats) for Indonesia.

Table 3. Summary of the hotspot origin countries, their COVID-19 category, number of scheduled seats, proportion of total scheduled seats, number of scheduled flights, proportion of total scheduled flights into each ASEAN member state.

ASEAN Member State	Hotspot origin countries ¹	COVID-19 Category as of Jun 5, 2020	Number of scheduled seats	Proportion of total scheduled seats	Number of scheduled flights	Proportion of total scheduled flights
Brunei Darussalam	Bahrain	C	0	0%	0	0%
	Bangladesh	E	0	0%	0	0%
	Belgium	B	0	0%	0	0%
	Kuwait	B	0	0%	0	0%
	Qatar	E	0	0%	0	0%
	Spain	B	0	0%	0	0%
	Singapore	C	17,770	16.0%	102	15.8%
	United Arab Emirates	C	4,318	3.9%	17	2.6%
	United States	B	0	0%	0	0%
	Other (non-hotspot)	-	88,788	80.1%	527	81.6%
Cambodia	Bahrain	C	0	0%	0	0%
	Bangladesh	E	0	0%	0	0%
	Belgium	B	0	0%	0	0%
	Kuwait	B	0	0%	0	0%
	Qatar	E	0	0%	0	0%
	Spain	B	0	0%	0	0%
	Singapore	C	46,760	19.7%	285	12.4%

	United Arab Emirates	C	0	0%	0	0%
	United States	B	0	0%	0	0%
	Other (non-hotspot)	-	191,096	80.3%	2,014	87.6%
Indonesia	Bahrain	C	0	0%	0	0%
	Bangladesh	E	0	0%	0	0%
	Belgium	B	0	0%	0	0%
	Kuwait	B	0	0%	0	0%
	Qatar	E	106,782	5.4%	342	3.7%
	Spain	B	0	0%	0	0%
	Singapore	C	497,700	25.2%	2,419	26.5%
	United Arab Emirates	C	53,724	2.7%	166	1.8%
	United States	B	0	0%	0	0%
	Other (non-hotspot)	-	1,313,826	66.6%	6,205	67.9%
Laos	Bahrain	C	0	0%	0	0%
	Bangladesh	E	0	0%	0	0%
	Belgium	B	0	0%	0	0%
	Kuwait	B	0	0%	0	0%
	Qatar	E	0	0%	0	0%
	Spain	B	0	0%	0	0%
	Singapore	C	1,980	1.9%	11	1.7%
	United Arab Emirates	C	0	0%	0	0%
	United States	B	0	0%	0	0%
	Other (non-hotspot)	-	103,748	98.1%	642	98.3%
Malaysia	Bahrain	C	0	0%	0	0%
	Bangladesh	E	52,640	2.1%	309	2.4%
	Belgium	B	0	0%	0	0%
	Kuwait	B	0	0%	0	0%
	Qatar	E	42,394	1.7%	142	1.1%
	Spain	B	0	0%	0	0%
	Singapore	C	427,600	16.9%	2,531	19.8%
	United Arab Emirates	C	49,958	2.0%	161	1.3%

	United States	B	0	0%	0	0%
	Other (non-hotspot)	-	1,961,711	77.4%	9,610	75.4%
Myanmar	Bahrain	C	0	0%	0	0%
	Bangladesh	E	0	0%	0	0%
	Belgium	B	0	0%	0	0%
	Kuwait	B	0	0%	0	0%
	Qatar	E	0	0%	0	0%
	Spain	B	0	0%	0	0%
	Singapore	C	58,424	23.6%	337	23.1%
	United Arab Emirates	C	4,350	1.8%	25	1.7%
	United States	B	0	0%	0	0%
	Other (non-hotspot)	-	185,274	74.7%	1,097	75.2%
Philippines	Bahrain	C	9,588	0.5%	34	0.4%
	Bangladesh	E	0	0%	0	0%
	Belgium	B	0	0%	0	0%
	Kuwait	B	12,692	0.7%	38	0.5%
	Qatar	E	56,125	3.0%	169	2.1%
	Spain	B	0	0%	0	0%
	Singapore	C	170,100	9.1%	783	9.8%
	United Arab Emirates	C	83,008	4.5%	229	2.9%
	United States	B	87,296	4.7%	251	3.2%
	Other (non-hotspot)	-	1,443,606	77.5%	6,453	81.1%
Singapore	Bahrain	C	0	0%	0	0%
	Bangladesh	E	45,952	1.2%	226	1.3%
	Belgium	B	0	0%	0	0%
	Kuwait	B	0	0%	0	0%
	Qatar	E	43,665	1.1%	141	0.8%
	Spain	B	5,060	0.1%	20	0.1%
	Singapore	C	N/A	N/A	N/A	N/A
	United Arab Emirates	C	50,857	1.3%	133	0.8%
	United States	B	62,290	1.6%	290	1.7%

	Other (non-hotspot)	-	3,690,778	94.7%	16,475	95.3%
Thailand	Bahrain	C	14,100	0.5%	50	0.4%
	Bangladesh	E	17,004	0.6%	86	0.6%
	Belgium	B	4,173	0.1%	13	0.1%
	Kuwait	B	15,364	0.5%	46	0.3%
	Qatar	E	134,467	4.7%	439	3.3%
	Spain	B	0	0%	0	0%
	Singapore	C	298,579	10.4%	1,410	10.6%
	United Arab Emirates	C	66,167	2.3%	189	1.4%
	United States	B	0	0%	0	0%
	Other (non-hotspot)	-	2,314,693	80.8%	11,067	83.2%
Vietnam	Bahrain	C	0	0%	0	0%
	Bangladesh	E	0	0%	0	0%
	Belgium	B	608	0.04%	2	0.02%
	Kuwait	B	0	0%	0	0%
	Qatar	E	49,656	2.9%	186	2.2%
	Spain	B	0	0%	0	0%
	Singapore	C	139,494	8.2%	659	7.9%
	United Arab Emirates	C	12,045	0.7%	33	0.4%
	United States	B	0	0%	0	0%
	Other (non-hotspot)	-	1,490,371	88.1%	7,432	89.4%

N/A: Not Applicable

1 Countries were identified as hotspots if they met one of the following criteria as of May 29th, 2020: 1) a rapidly accelerating rate of new COVID-19 cases in the past 7 days, or 2) >5 new COVID-19 cases reported per 1,000 over the last 30 days.



Report generated by
ASEAN Biodiaspora Virtual Center (ABVC)
 in collaboration with **Bluedot Inc.**
 Email: support@biodiaspora.org

