COVID-19 Epidemic

Outlook Report

Prepared by BlueDot
February 24, 2020

SECTION I

Important Updates

Updated as of February 24th, 2020

Increasing number of new countries reporting their first infections of COVID-19 despite declines in China

- Kuwait, Bahrain, Afghanistan, Iraq and Oman reported their first infections.
- A sudden increase in reported cases was observed in the Islamic Republic of Iran, Italy, and South Korea.
- Reporting on infections in China have been declining since early February.

Cases continue to be reported in Iran, suggesting widespread transmission

- Eighteen new cases of COVID-19 were reported in Iran, bringing the total number to 61.
- Four new deaths attributed to COVID-19 have also been reported by the country's Ministry of Health, bringing the number of deaths to 12.
- There has also been a case in Afghanistan and another in Canada with reported travel to Qom, in addition to a case in Kuwait with history of travel to Mashhad, Iran. These travel-associated cases, and a case in Bahrain and another in Oman with travel history to Iran, indicate there may be more widespread transmission than official case counts suggest.
- Kuwait's civil aviation authority has suspended all its flights to and from Iraq.

Sudden increase in cases reported in Italy since February 21st, including reported deaths

- Ninety three additional cases of COVID-19 were reported in Italy, bringing the total number to 229 in the country.
- Four new deaths attributed to COVID-19 were reported, bringing the total number of deaths to six.
- Given the rapidly evolving situation, the Italian Ministry of Health announced on February 23 that it is working closely with the ECDC and is expecting to provide an updated risk assessment on February 24.

SECTION II

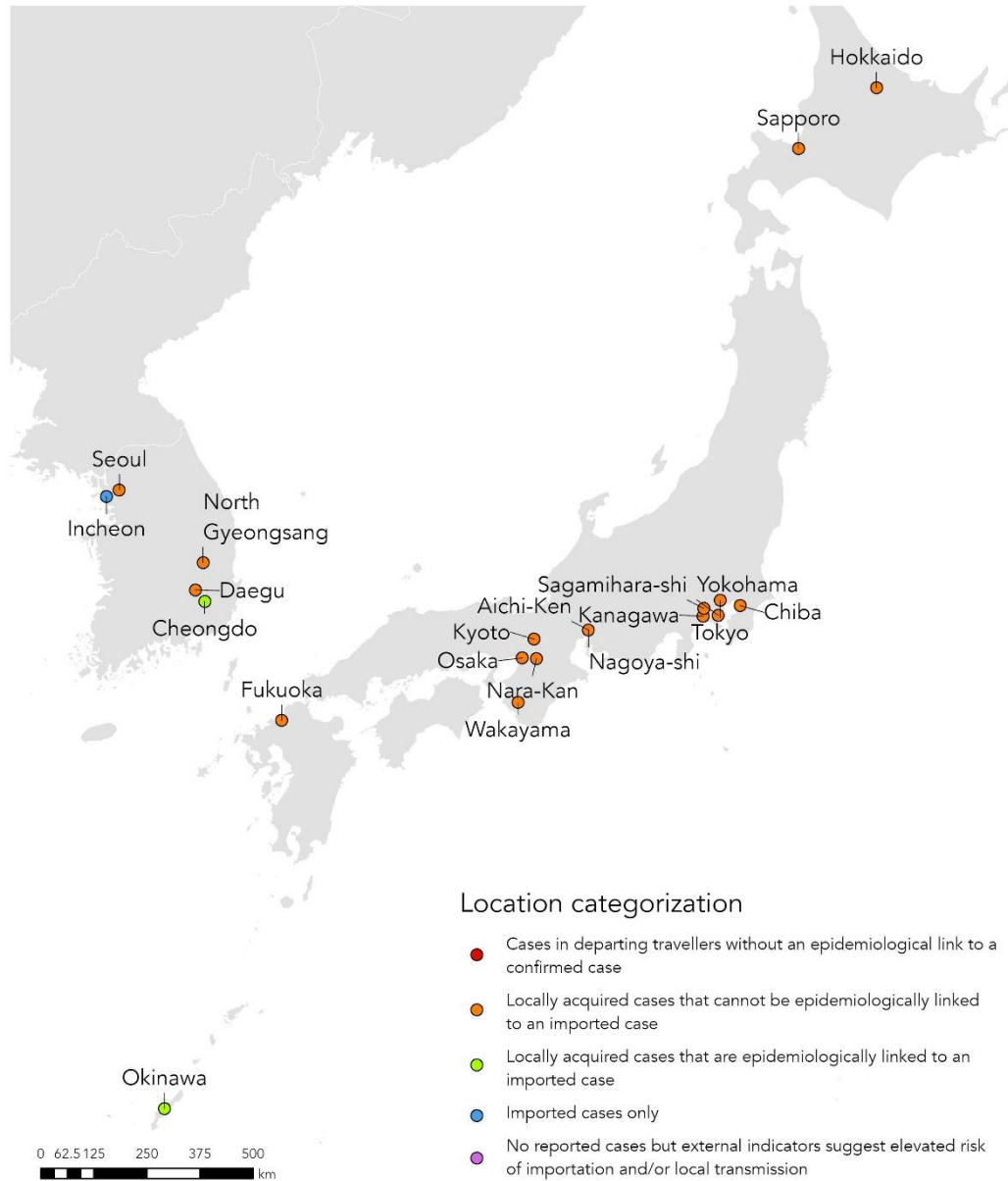# Global categorization of cities

BlueDot has classified cities worldwide into categories of COVID-19 transmission, supported by data generated by our global epidemic surveillance system, collected as of February 24th, 2020. The maps and table depicting global cities by corresponding COVID-19 transmission category are provided below. Maps were divided by region: Japan/South Korea, Southeast Asia, Australia, Middle East and Western Asia, Europe, North America. For the maps, countries for which all cases were only reported at the country-level were not depicted (i.e. Oman, Kuwait, Bahrain). See supplementary table for categories of additional locations.
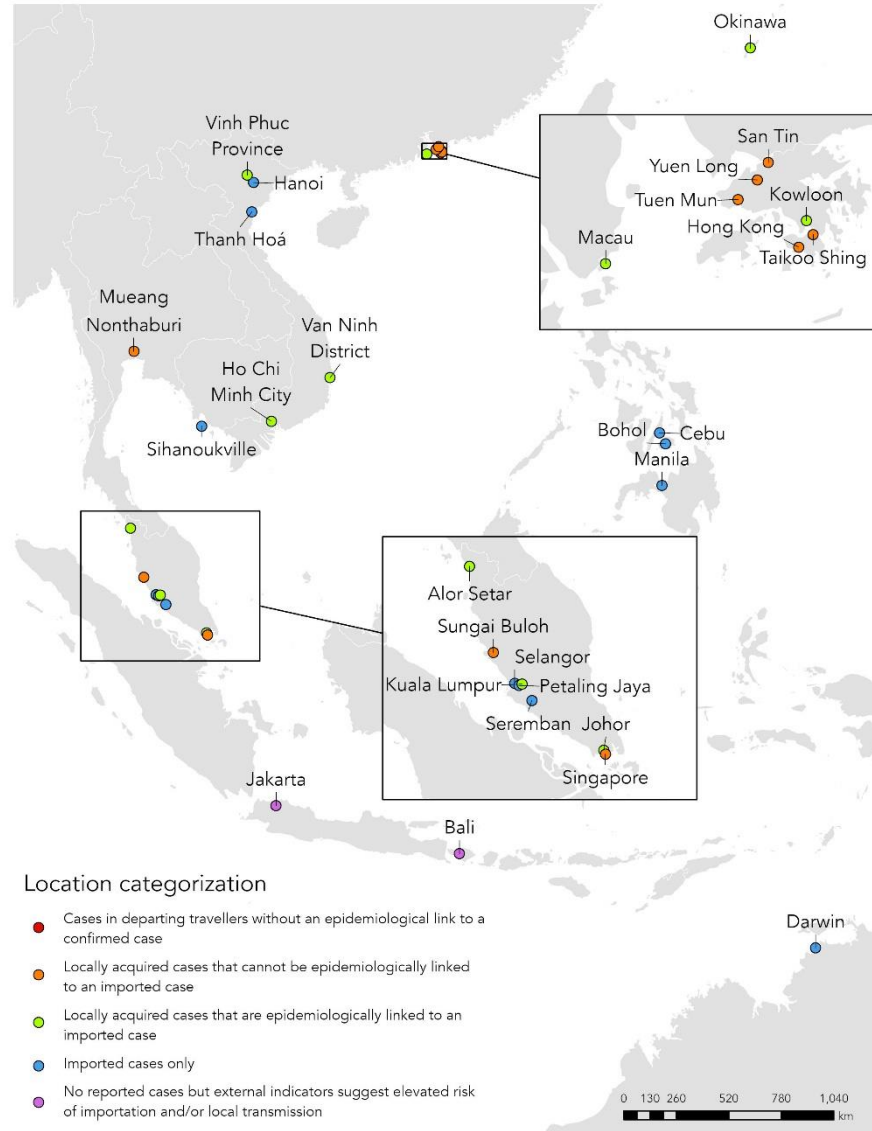
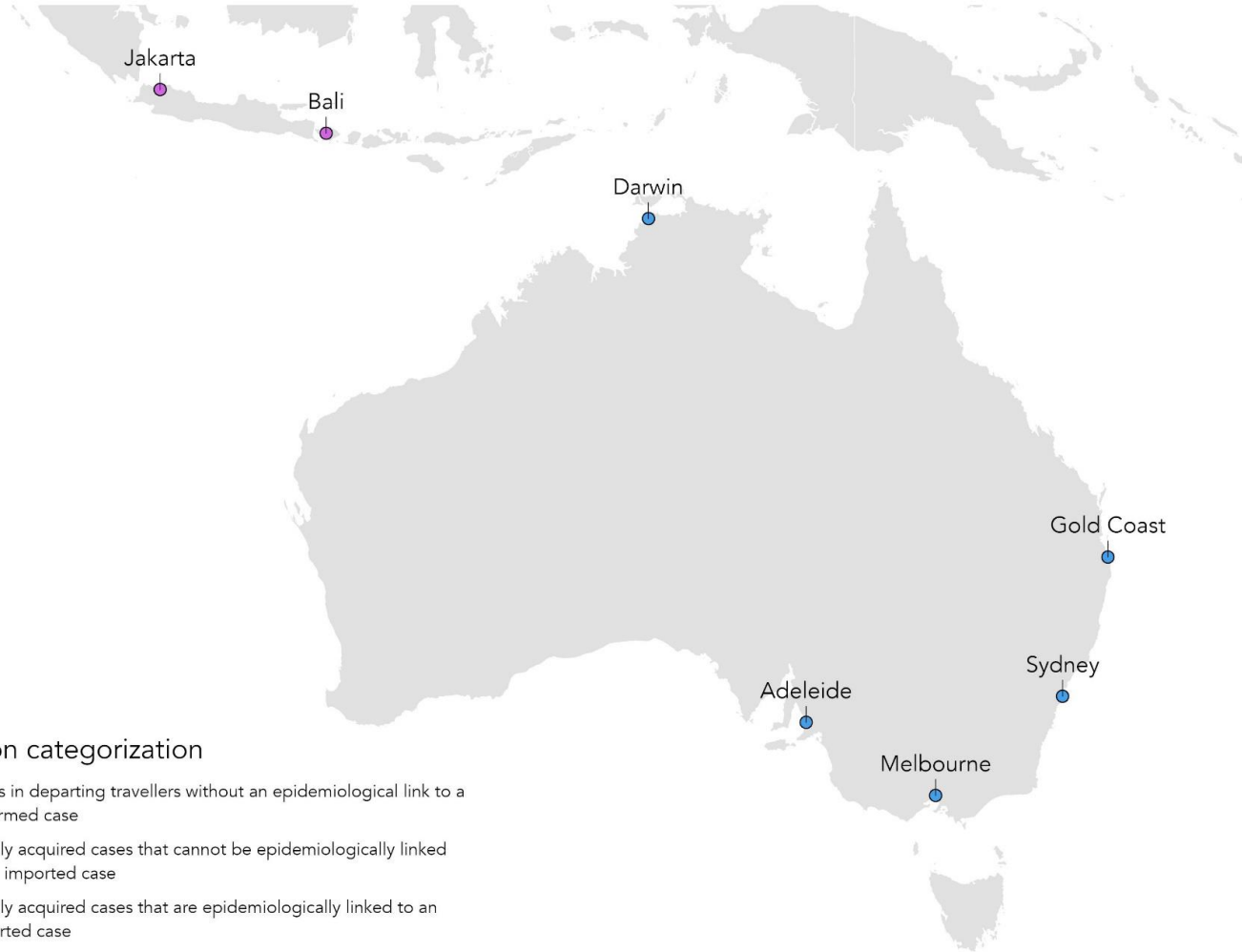Cities with reported cases outside of mainland China have been categorized as follows:

🔵 Imported cases only
   o These locations have confirmed imported cases of COVID-19. As these locations have not yet reported locally acquired cases, the current extent of local transmission is thought to be negligible.

🟢 Locally acquired cases that are epidemiologically linked to an imported case
   o These locations have confirmed locally acquired cases of COVID-19, limited to known close contacts of an imported case (e.g. within a household, workplace, etc.) or which can clearly be traced back to an imported case. While these locations are demonstrating some degree of local transmission, the current extent of this transmission is thought to be limited.

🟠 Locally acquired cases that cannot be epidemiologically linked to an imported case
   o These locations have confirmed locally acquired cases of COVID-2019, which cannot be traced back to an imported case. These locations are demonstrating a broader degree of local transmission, which is likely occurring in the community.

🔴 Cases in departing travellers without an epidemiological link to a confirmed case.
   o These locations are confirmed or strongly presumed to have been the sources of exposure for COVID-19 cases detected in departing travellers to other cities or countries, but have no links back to a confirmed case. In these locations, local transmission of COVID-19 may be occurring at heightened levels.

🟣 No reported cases but external indicators suggest elevated risk of importation and/or local transmission
   These locations have not confirmed imported or locally acquired cases of COVID-2019. However, global mobility data suggest that there is significant risk of spread from areas currently experiencing COVID-19 transmission into these areas. These locations appear to be at heightened risk of receiving imported COVID-19 cases if they are not already present, or could indicate that they already have imported cases, with or without local transmission, that have not yet been identified

Hokkaido

Sapporo

Seoul

North
Gyeongsang

Incheon

Daegu

Cheongdo

Sagamihara-shi   Yokohama

Aichi-Ken   Kanagawa   Chiba

Kyoto   Tokyo

Osaka   Nagoya-shi

Fukuoka   Nara-Kan

Wakayama

Okinawa

0   62.5   125   250   375   500
km

Location categorization

- Cases in departing travellers without an epidemiological link to a confirmed case

- Locally acquired cases that cannot be epidemiologically linked to an imported case

- Locally acquired cases that are epidemiologically linked to an imported case

- Imported cases only

- No reported cases but external indicators suggest elevated risk of importation and/or local transmission

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Okinawa

Vinh Phuc
Province
Hanoi

Thanh Hoá

San Tin
Yuen Long
Tuen Mun   Kowloon
Hong Kong
Macau   Taikoo Shing

Mueang
Nonthaburi

Van Ninh
District

Ho Chi
Minh City

Sihanoukville

Bohol   Cebu
Manila

Alor Setar

Sungai Buloh
Selangor
Kuala Lumpur   Petaling Jaya
Seremban   Johor
Singapore

Jakarta

Bali

Darwin

Location categorization

● Cases in departing travellers without an epidemiological link to a confirmed case

● Locally acquired cases that cannot be epidemiologically linked to an imported case

● Locally acquired cases that are epidemiologically linked to an imported case

● Imported cases only

● No reported cases but external indicators suggest elevated risk of importation and/or local transmission

0   130 260   520   780   1,040
km

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Jakarta

Bali

Darwin

Gold Coast

Sydney

Adeleide

Melbourne

Location categorization

- ● Cases in departing travellers without an epidemiological link to a confirmed case
- ● Locally acquired cases that cannot be epidemiologically linked to an imported case
- ● Locally acquired cases that are epidemiologically linked to an imported case
- ● Imported cases only
- ● No reported cases but external indicators suggest elevated risk of importation and/or local transmission

0 150 300   600   900   1,200
km

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Rasht
Gilan
Tonekabon
Tehran
Masshad
Beirut
Markazi
Qom
Herat
Tel Aviv
Najaf

Kathmandu

Location categorization

🔴 Cases in departing travellers without an epidemiological link to a confirmed case

🟠 Locally acquired cases that cannot be epidemiologically linked to an imported case

🟢 Locally acquired cases that are epidemiologically linked to an imported case

🔵 Imported cases only

🟣 No reported cases but external indicators suggest elevated risk of importation and/or local transmission

Kasaragod
Thrissur
Alappuzha
Angoda

0   187.5 375   750   1,125   1,500
km

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Lapland

Joenkoeping

York

London
Brighton

Frankfurt

Paris

Starnberg

Haute-Savoie

Lyon Piemonte Veneto
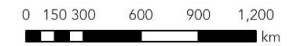
Milan Codogno

Bordeaux

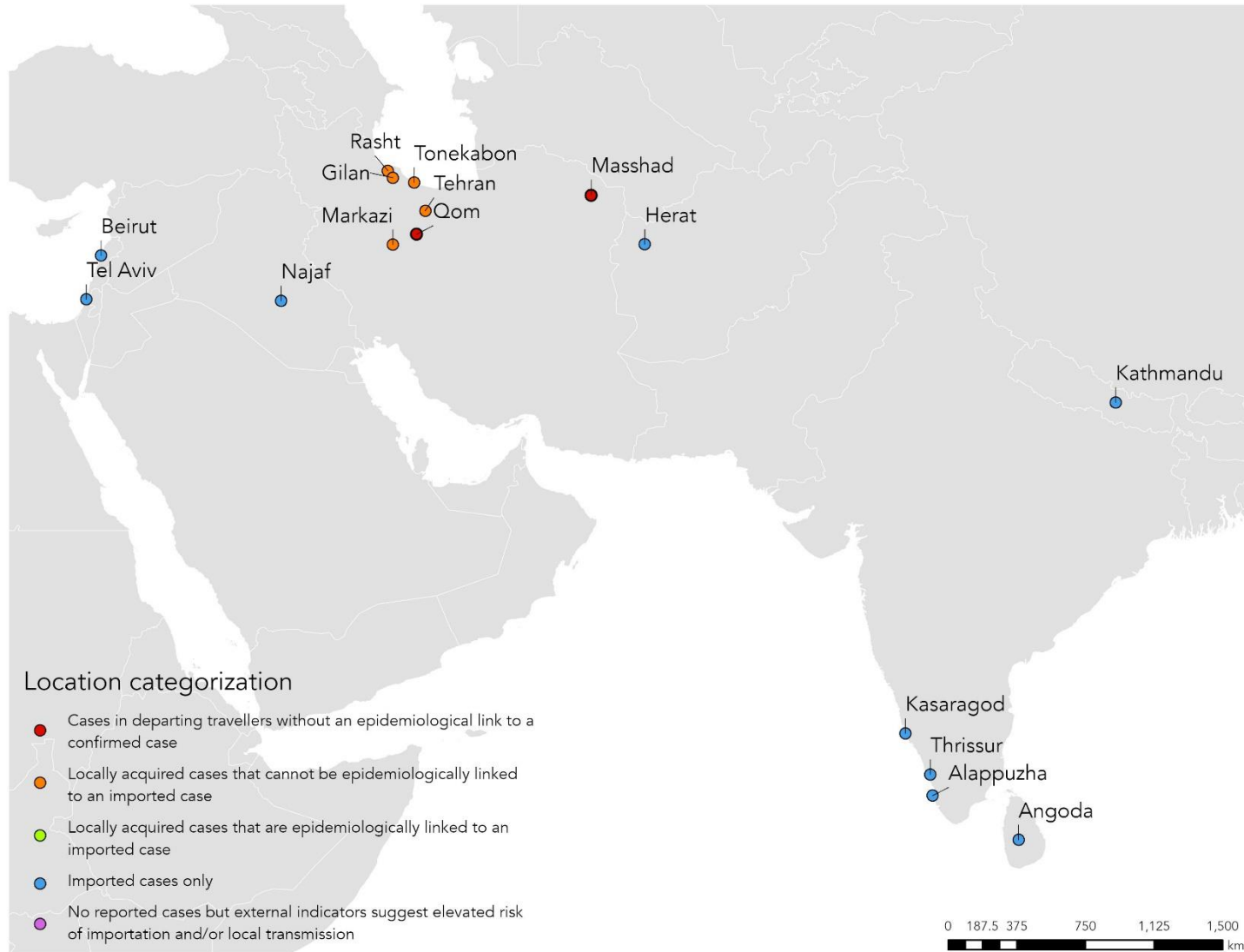Emilia
Romagna Rome

Mallorca

La Gomera

Location categorization

● Cases in departing travellers without an epidemiological link to a
confirmed case

● Locally acquired cases that cannot be epidemiologically linked
to an imported case

● Locally acquired cases that are epidemiologically linked to an
imported case

● Imported cases only

● No reported cases but external indicators suggest elevated risk
of importation and/or local transmission

0 187.5 375   750   1,125   1,500
km

Metro
Vancouver

Snohomish
County

Madison

London

Toronto

Boston

Chicago

Santa Clara County

San Benito County

Los Angeles County

Sacramento County

Orange County
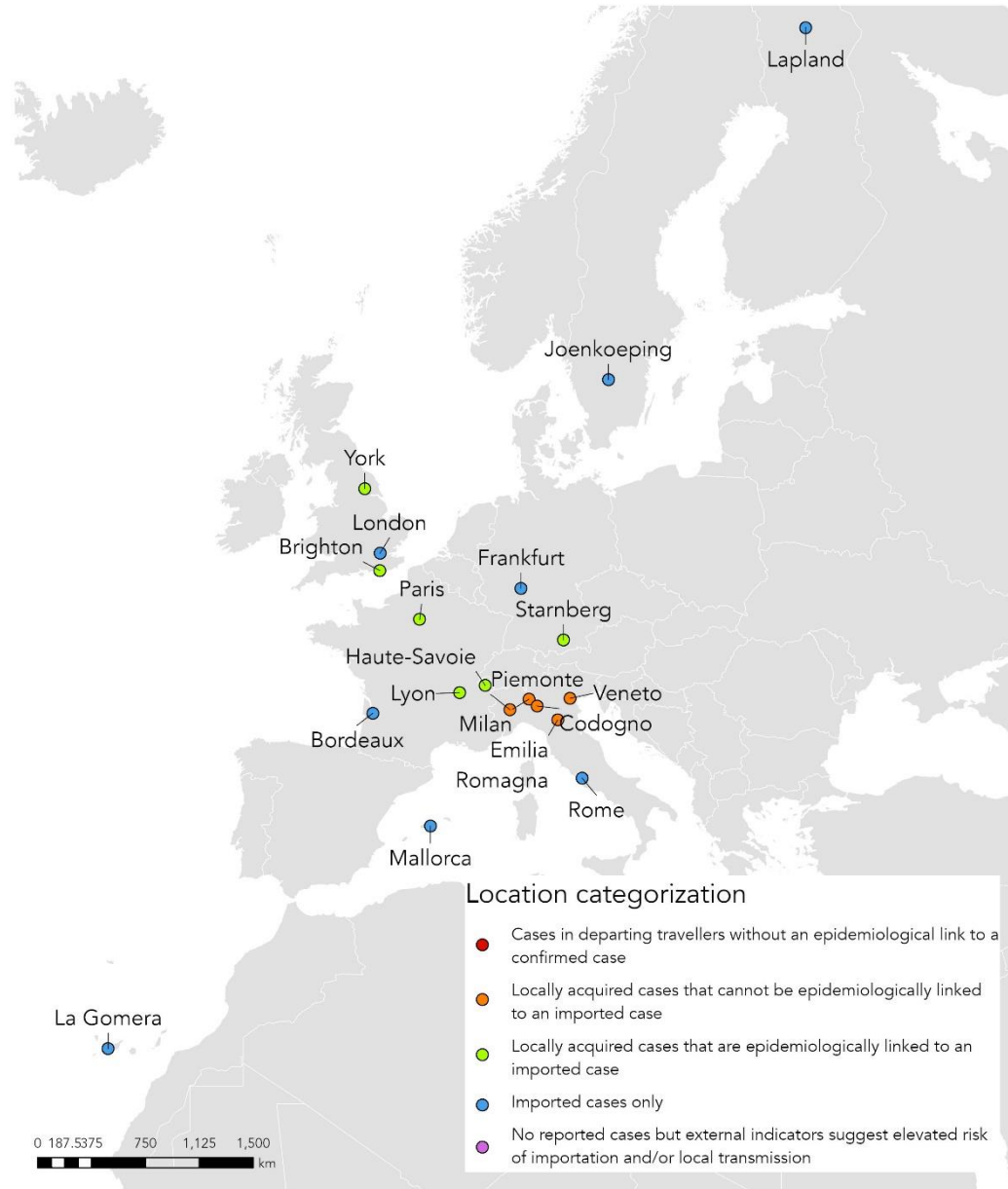
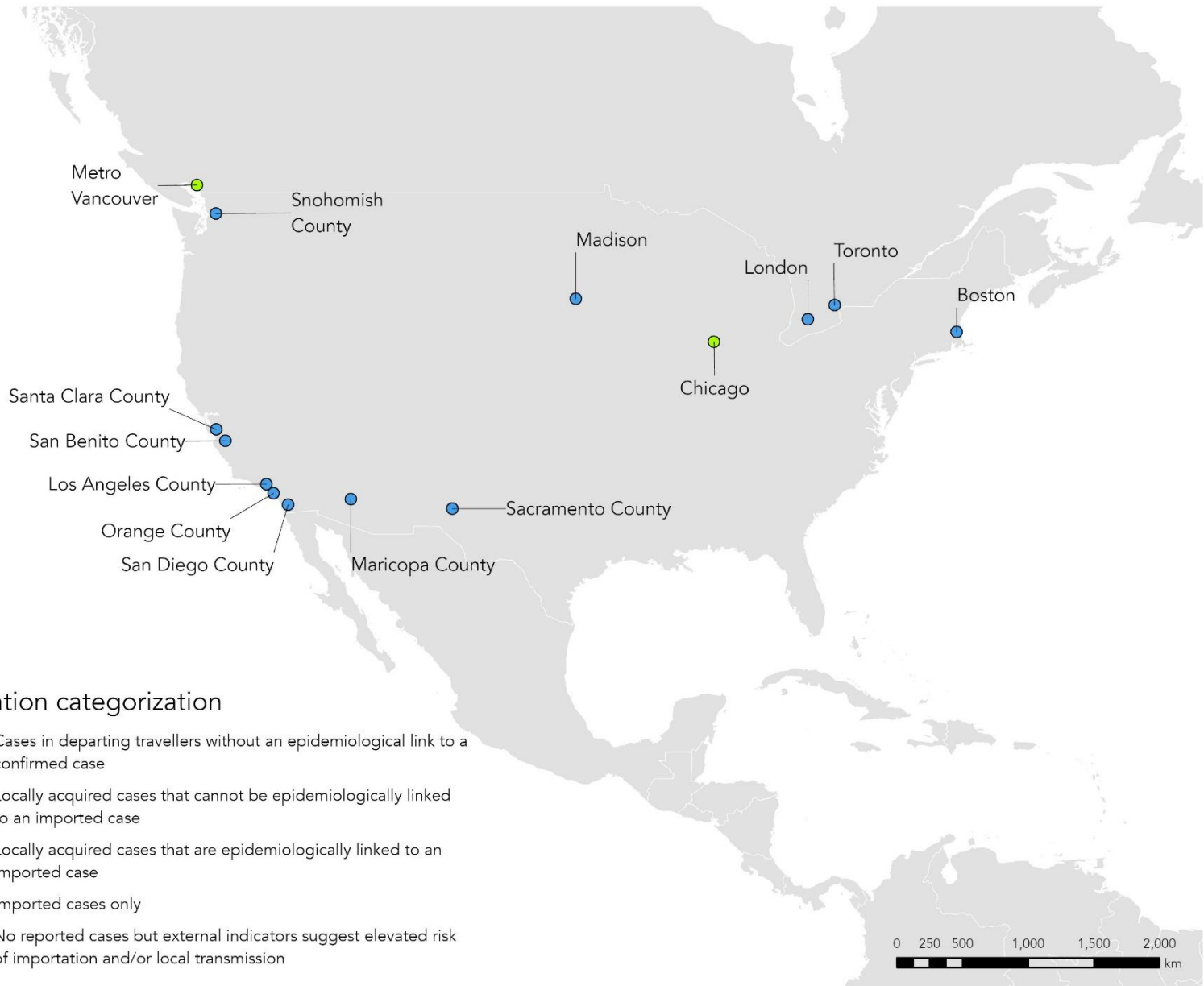San Diego County

Maricopa County

Location categorization

- Cases in departing travellers without an epidemiological link to a confirmed case

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- Locally acquired cases that are epidemiologically linked to an imported case

- Imported cases only

- No reported cases but external indicators suggest elevated risk of importation and/or local transmission

0   250 500   1,000   1,500   2,000
km

Country	Location	Geography Level	Feb 10	Feb 12	Feb 14	Feb 17	Feb 19	Feb 24
Japan	Japan	Country	4	4	4	4	4	4
	Kanagawa	Prefecture		1	1	1	2	3
	Tokyo, Honshu	City	1	1	3	3	3	3
	Aichi	Prefecture	1	1	1	3	3	3
	Nara	Prefecture	3	3	3	3	3	3
	Osaka, Honshu	City	3	3	3	3	3	3
	Kyoto, Honshu	City	3	3	3	3	3	3
	Chiba	Prefecture	1	1	1	1	3	3
	Yokohama, Kanagawa	City	2	2	2	2	2	3
	Wakayama	Prefecture		3	3	3	3	3
	Nagoya, Aichi	City				3	3	3
	Sagamihara, Kanagawa	City				2	2	3
	Hokkaido	Island		3	3	1	1	3
	Okinawa	Prefecture						2
	Sapporo, Hokkaido	City						3
	Fukuoka	Prefecture						3
South Korea	South Korea	Country	2	2	2	3	3	3
	Incheon	City	1	1	1	1	1	1
	Seoul	City	1	1	1	3	3	3
	Daegu, North Gyeongsang	City						3
	Cheongdo, North Gyeongsang	County						2
	North Gyeongsang (aka. Gyeongbuk)	Province						3
Germany	Starnberg, Bavaria	City	2	2	2	2	2	2
	Frankfurt	City	1	1	1	1	1	1
Canada	Toronto, Ontario	City	1	1	1	1	1	1
	Vancouver	City	1	1	1	1	1	1
	London	City	1	1	1	1	1	1
	Metro Vancouver	Metropolitan	2	2	2	2	2	2
United Kingdom	England	Other	2	2	2	2	2	2
	York, England	City	2	2	2	2	2	2
	Brighton, England	City	2	2	2	2	2	2
	London, England	City		1	1	1	1	1
Italy	Milan	City						3
	Codogno, Lodi, Lombardy	Town						3
	Veneto	Region						3
	Emilia Romagna	Region						3
	Piemonte	Region						3
	Rome	City	1	1	1	1	1	1
Cambodia	Sihanoukville	City	1	1	1	1	1	1
Sweden	Joenkoeping	City	1	1	1	1	1	1
Hong Kong	Hong Kong	Country	3	3	3	3	3	3
	Taikoo Shing, eastern part of Hong Kong isalnd	Island				3	3	3
	Kowloon, Tsuen Wan District	City				2	2	2
	Yuen Long	District						3
	Tuen Mun, New Territories	Town						3
	San Tin, Yuen Long	"Loosely Defined"						3
Singapore	Singapore	Country	3	3	3	3	3	3
Australia	Melbourne, Victoria	City	1	1	1	1	1	1
	Sydney, New South Wales	City	1	1	1	1	1	1
	Southport, Queensland	City	1	1	1	1	1	1
	Adeleide, South Australia	City	1	1	1	1	1	1
	Darwin, Northern Territories	City						1
	Gold Coast, Queensland	City	1	1	1	1	1	1
	Snohomish County, Washington state	County	1	1	1	1	1	1
	Chicago, Illinois	City	2	2	2	2	2	2

Country	Location	Type						
United States	Orange County, California	County	1	1	1	1	1	1
	Los Angeles County, California	County	1	1	1	1	1	1
	Maricopa County, Arizona	County	1	1	1	1	1	1
	Santa Clara County, California	County	1	1	1	1	1	1
	Boston, Massachussets	City	1	1	1	1	1	1
	San Benito County, California	County	1	1	1	1	1	1
	San Diego County, California	County	1	1	1	1	1	1
	Sacramento County, California.	County						1
	Madison, Wisconsin	City	1	1	1	1	1	1
France	Paris, Ile-de-France	City	2	2	2	2	2	2
	Bordeaux, Nouvelle-Aquitaine	City	1	1	1	1	1	1
	Haute-Savoie, Auvergne-Rhône-Alpe (French Alps)	City	3	3	3	3	2	2
	Lyon	City					2	2
Philippines	Manila, Central Autonomous Region	City	1	1	1	1	1	1
	Bohol	City	1	1	1	1	1	1
	Cebu	City	1	1	1	1	1	1
Russia	Zabaikalsky region	Other	1	1	1	1	1	1
	Tyumen, Siberia	City	1	1	1	1	1	1
Sri Lanka	Angoda, Central Province	Province	1	1	1	1	1	1
Spain	La Gomera, Canary Island	City	1	1	1	1	1	1
	Mallorca, Balearic Islands	Other	1	1	1	1	1	1
Taiwan	Taiwan	Country	2	2	2	2	3	3
Macau	Macau	Other	2	2	2	2	2	2
Belgium	Belgium	Country	1	1	1	1	1	1
Finland	Lapland, Nothernmost region	City	1	1	1	1	1	1
Nepal	Kathmandu	City	1	1	1	1	1	1
India	India	Country	1	1	1	1	1	1
	Thrissur, Kerala State	City	1	1	1	1	1	1
	Alappuzha, Kerala State	City	1	1	1	1	1	1
	Kasaragod, Kanjangad District, Kerata State	City	1	1	1	1	1	1
UAE	UAE	Country	1	2	2	2	2	2
Vietnam	Ho Chi Minh City	City	2	2	2	2	2	2
	Thanh Hoá	City	1	1	1	1	1	1
	Hanoi	City	1	1	1	1	1	1
	Van Ninh District	City	2	2	2	2	2	2
	Vinh Phuc Province	Province	2	2	2	2	2	2
	Vietnam	Country	2	2	2	2	2	2
Malaysia	Johor	City	2	2	2	2	2	2
	Petaling Jaya, Selangor	City	1	1	1	1	1	1
	Sungai Buloh	City	3	3	3	3	3	3
	Seremban, Negri Sembilan	City	1	1	1	1	1	1
	Kuala Lumpur	City	1	1	2	2	2	2
	Alor Setar, Kedah	City	2	2	2	2	2	2
	Selangor	City	1	1	1	1	1	1
	Malaysia	Country	4	4	4	4	4	4
Indonesia	Jakarta	City	5	5	5	5	5	5
	Bali	City	5	5	5	5	5	5
Thailand	Amphoe Mueang Nonthaburi	City	3	3	3	3	3	3
	Thailand	Country	4	4	4	4	4	4
North Korea	North Korea	Country	5	5	N/A	N/A	N/A	N/A
Egypt	Egypt	Country			1	1		1
Iran	Qom	Province					1	4
	Tehran	Province						3
	Tonekabon	Province						3

	Rasht	Province						3
	Gilan	Province						3
	Markazi	Province						3
	Masshad	Province						4
	Rasht	Province						3
Israel	Tel Aviv	City						1
Lebanon	Beirut	City						1
Iraq	Najaf	City						1
Oman	Oman	Country						1
Kuwait	*Kuwait*	Country						1
Bahrain	*Bahrain*	Country						1
Afghanistan	Herat province	Province						1