

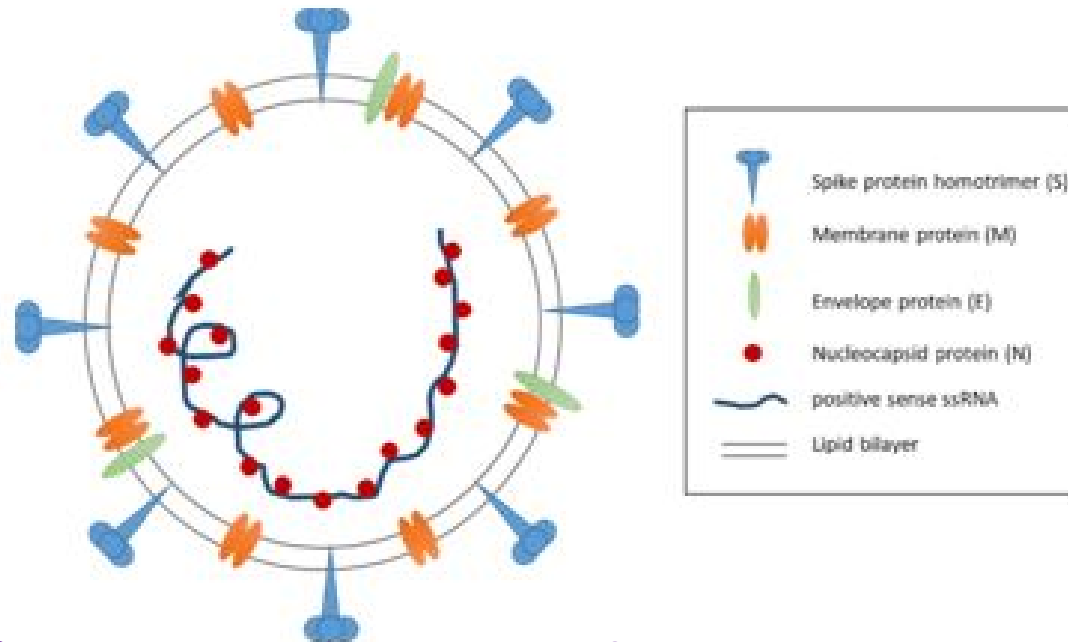
COVID-19 New Wave

อรรถพล ชีพสัตยากร

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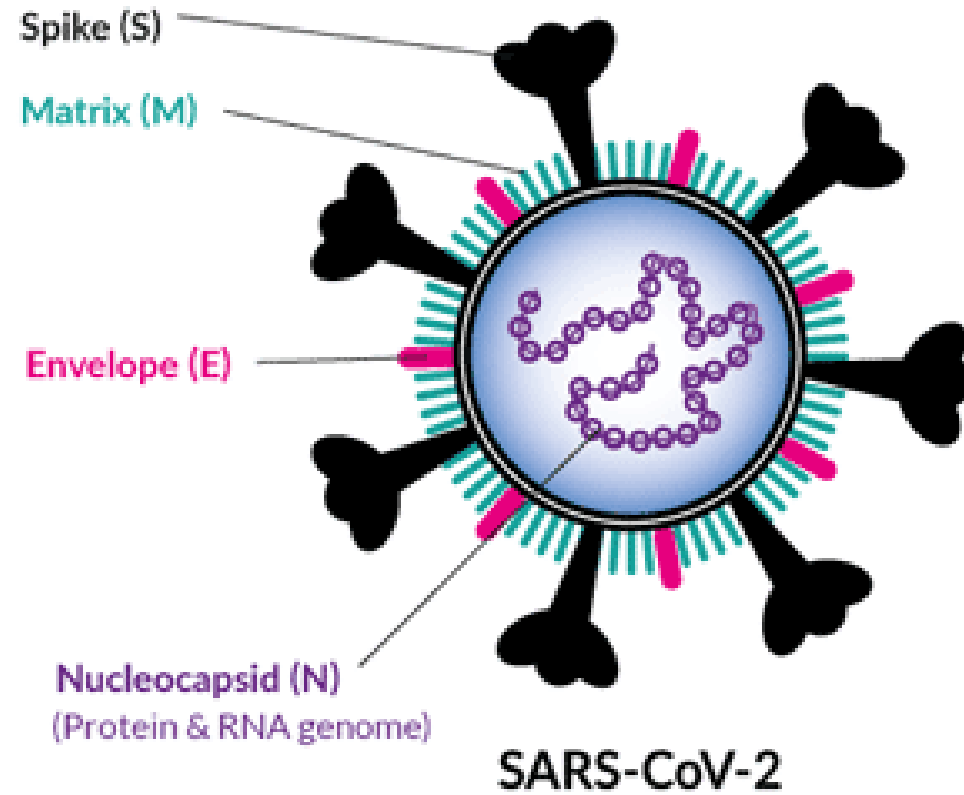
Dip. Thai Board of Preventive Medicine

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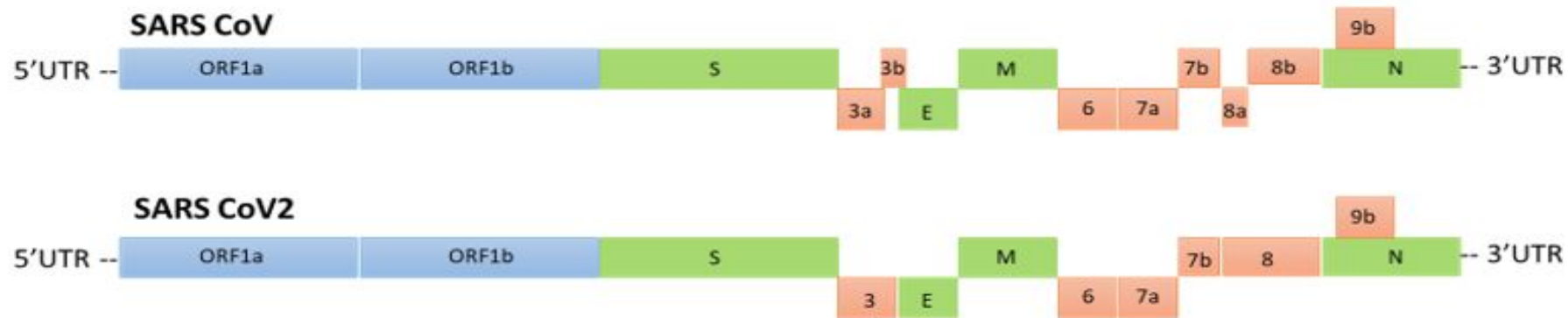


Structure of respiratory syndrome causing human SARS-CoV2 virion. (Suresh Thakur., *et al.* "COVID-19: Review on Efforts for Containment, Diagnostics, and Treatment in the Indian Context During the SARS-CoV-2 Global Pandemic". *Acta Scientific Microbiology* 4.3 (2021): 75-92)

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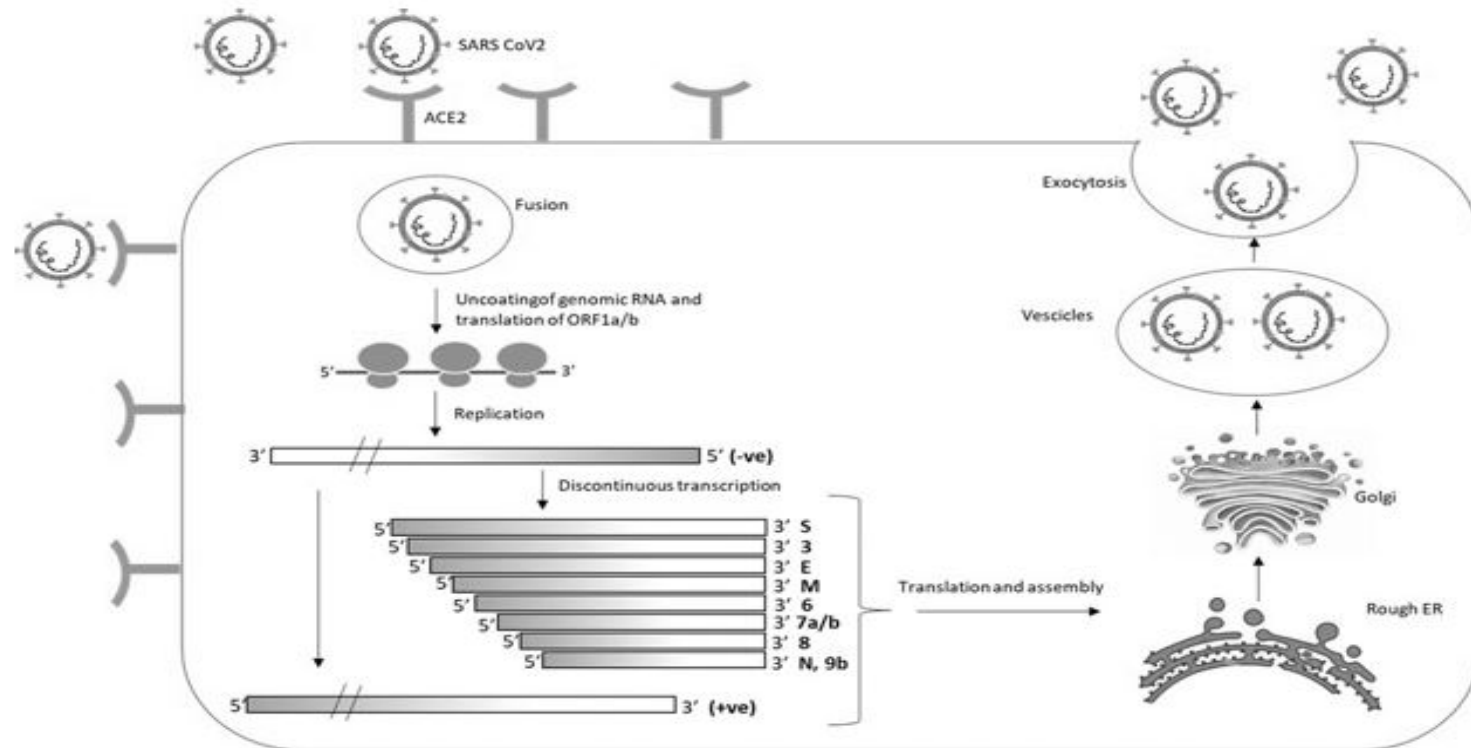
Genomic structures of SARS-CoV and SARS-CoV-2. Both the viral genomes comprise of the 5'-untranslated region (5'-UTR); open reading frame (orf) 1a/b (blue box) which encodes the non-structural proteins (nsp) for replication; structural proteins (green boxes) i.e. spike (S), envelop (E), membrane (M) and nucleocapsid (N) proteins; the accessory proteins (red boxes) such as orf 3, 6, 7a, 7b, 8 and 9b in the SARS-CoV-2 genome; and the 3'-untranslated region (3'-UTR).

.(Suresh Thakur., et al. "COVID-19: Review on Efforts for Containment, Diagnostics, and Treatment in the Indian Context During the SARS-CoV-2 Global Pandemic". Acta Scientific Microbiology 4.3 (2021): 75-92. Adapted from Shereen., et al. 2020)

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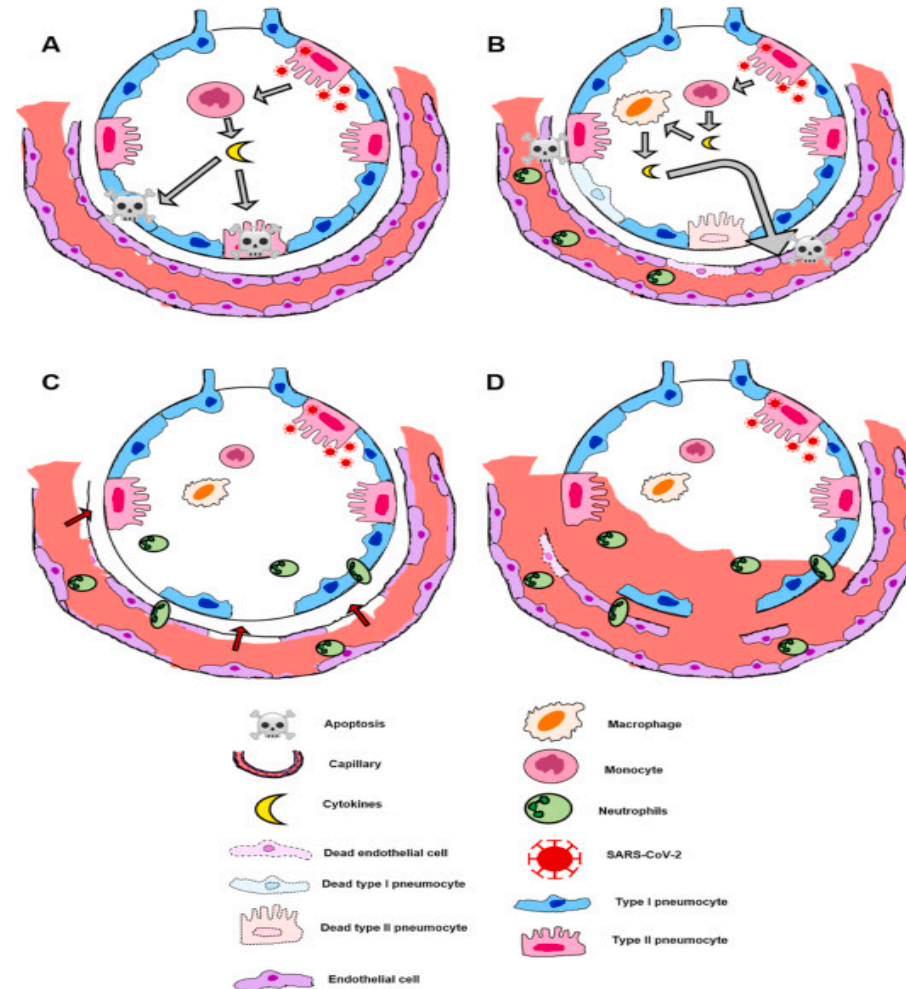
- **December 2019 :**
- **Six types of strains of SARS-CoV-2 identified (Type I-VI)**
- **Type VI : strong allelic associations : Dominant type : 4 signature Single Nucleotide Variations (SNVs) :**
 - 1) C241T (5'/UTR)**
 - 2) C3037T (nsp3 F924F)**
 - 3) C14408T (nsp12 P4715L)**
 - 4) A23403G (Spike D614G)**

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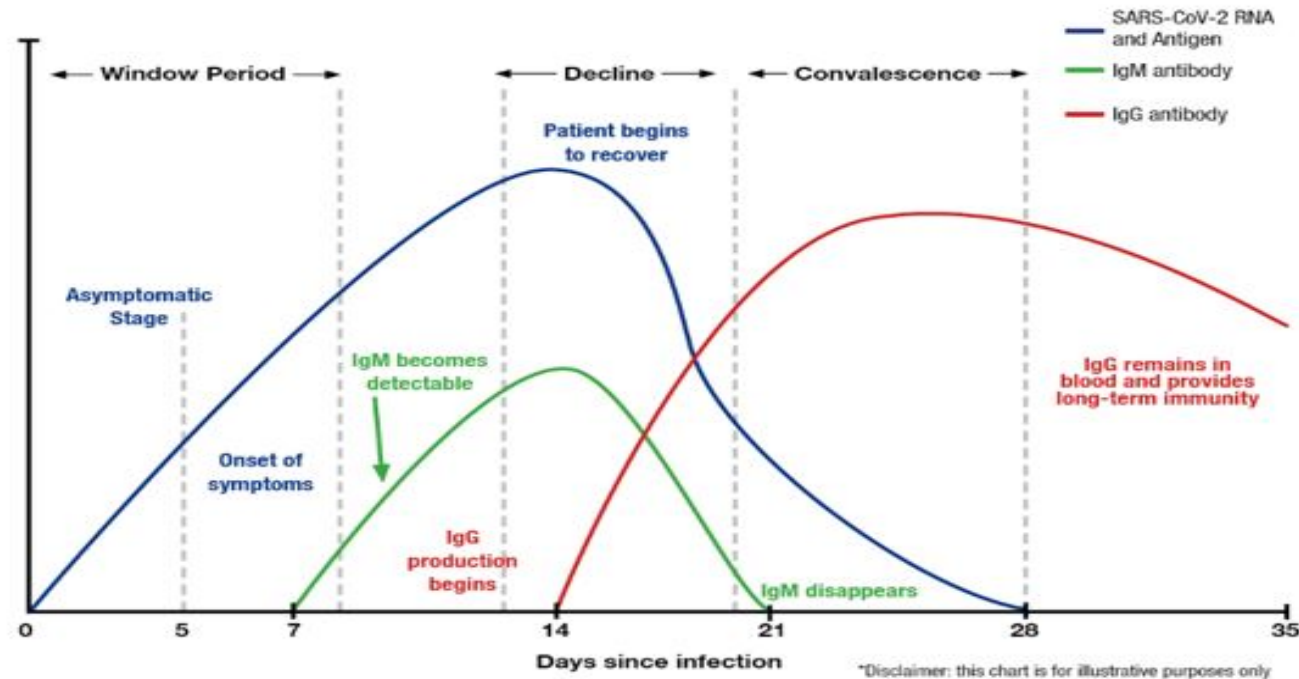
*Life cycle of SARS-CoV-2. The virus attaches to ACE2 receptor on host cells via the S protein. This causes conformational changes in the S protein leading to envelope fusion with host cell membrane through endosomal pathway. The positive genomic RNA is released and is translated into viral replicase polyproteins pp1a and 1ab. These are further cleaved into small products by viral proteinases. The viral polymerase produces subgenomic mRNAs by discontinuous transcription, which are finally translated into viral proteins. The proteins and positive strand are then assembled into virions and released by exocytosis. (Suresh Thakur, et al. "COVID-19: Review on Efforts for Containment, Diagnostics, and Treatment in the Indian Context During the SARS-CoV-2 Global Pandemic". *Acta Scientifica Microbiology* 4.3 (2021): 75-92)*

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(Batha et al.
Pulmonary pathology
of ARDS in COVID-19:
a pathological review
for clinicians.
Respiratory Medicine.
Published on
November 18, 2020.
DOI :
<https://doi.org/10.1016/j.rmed.2020.106239>)

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Variation of the Levels of SARS-CoV-2 RNA and Antigen, IgM and IgG after infection (Suresh Thakur., et al. "COVID-19: Review on Efforts for Containment, Diagnostics, and Treatment in the Indian Context During the SARS-CoV-2 Global Pandemic". *Acta Scientific Microbiology* 4.3 (2021): 75-92)

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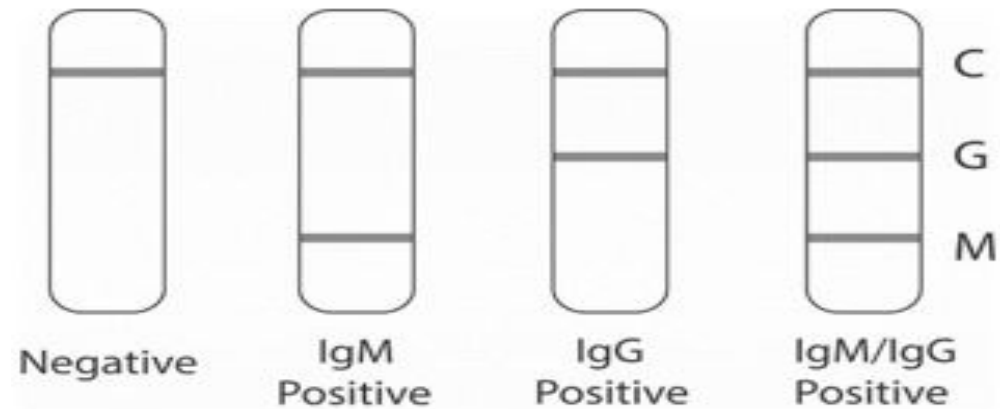


Illustration of a COVID19 rapid card test result by a Private Laboratory Company, C-control, G- IgG, M- IgM (Suresh Thakur., et al. "COVID-19: Review on Efforts for Containment, Diagnostics, and Treatment in the Indian Context During the SARS-CoV-2 Global Pandemic". Acta Scientific Microbiology 4.3 (2021): 75-92)

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RT-PCR	IgM	IgG	Clinical interpretation of the patient
+	-	-	Maybe in the window period of infection
+	+	-	Early-stage of infection
+	+	+	The active phase of infection
+	-	+	Late or recurrent stage of infection
-	+	-	Early-stage of infection or false positive for RT-PCR
-	-	+	Recovered
-	+	+	Recovery phase or false positive for RT-PCR

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- **USA**
- **Pandemic started early 2020**
- **Causes of spike in COVID-19 : Human Behavior (physical/social distancing, mask-wearing, hand-washing), closure of public places/practicing limitations, some cities/towns-it is a matter of personal choice ?**
- **Places where people live/work closely together (long-term care facilities, nursing homes, multigenerational households, prisons, some types of businesses)**
- **COVID-19 Spikes from : no. of positive COVID-19 tests, no. of symptomatic individuals, no. of hospitalization, no. of deaths**

COVID-19 New Wave

- **USA**

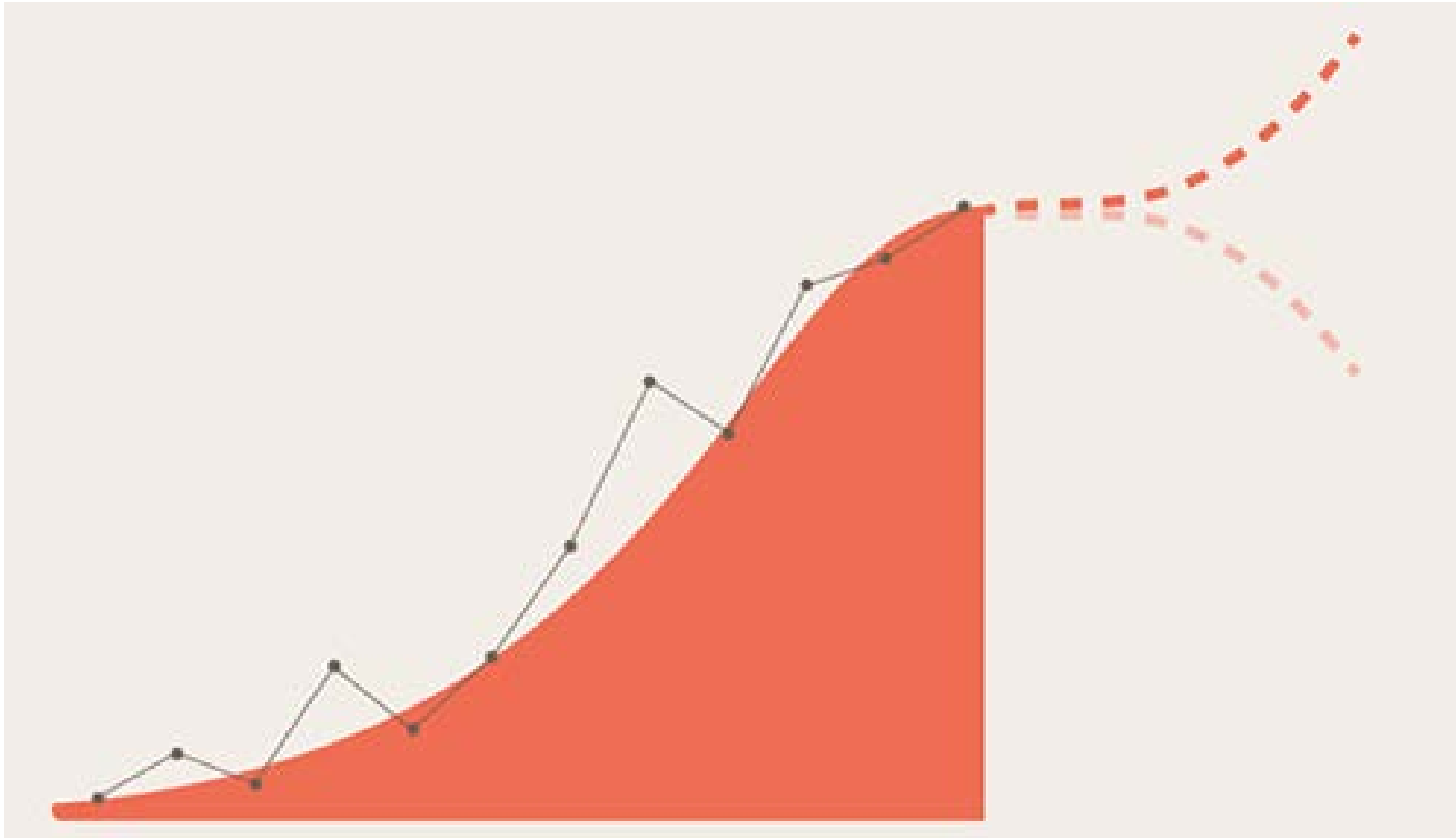
- **During Spring-Summer 2020 : Communities started to reopen stores, bars, restaurants : infected cases still high in many areas : medical experts urged reopen communities to continue COVID-19 precautions, and monitoring symptoms**
- **But the combination of reopening & lapses in these infection prevention efforts caused rising COVID-19 infections again**
- **There is a delay between a policy change (reopening businesses/relaxing occupancy limits, etc.) in a community and when the effects of this change demonstrate in the COVID-19 data**

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- **USA**

- **A dramatic increase in COVID-19 across the USA in fall & winter due to many months of canceled activities, economic challenges & stress, frustrating & tiring of taking COVID-19 precautions**
- **Around 70 % of population needs to be immune to COVID-19 before herd immunity (enough people in a community have immunity from a disease, the community is protected from outbreaks of that disease) can work**
- **If without a COVID-19 vaccine, most doctors & scientists do not accept that a herd immunity approach of letting the SARS-CoV-2 (COVID-19) “ take its course ”**

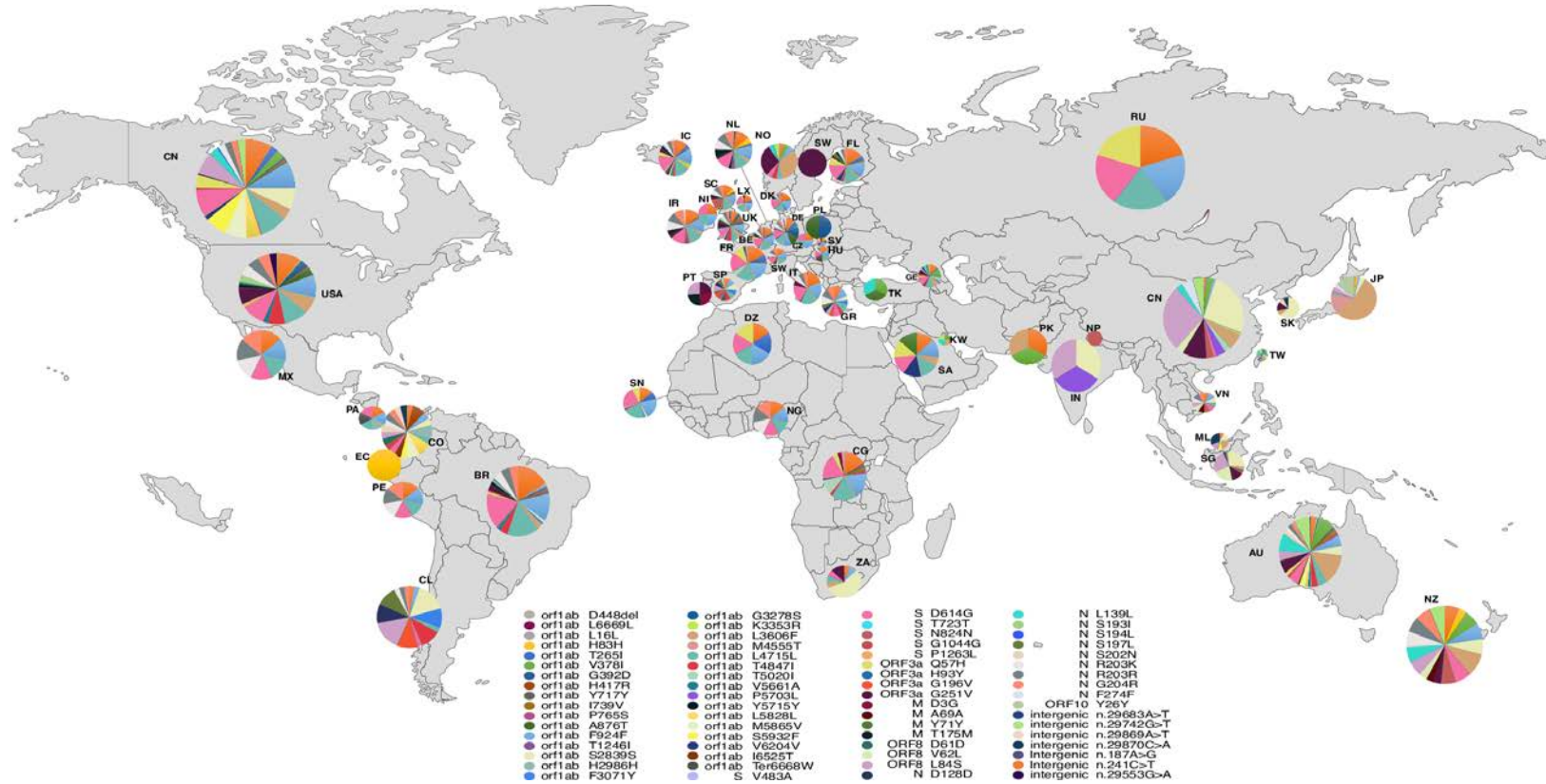
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COVID-19 New Wave

- **First major wave : first week of April 2020**
- **Some countries : South Korea : First wave in March 2020**
- **New cases in first week of April 2020 : increased by 50-70 % of the total prior to that time**
- **Strict lockdown in those countries**
- **New wave (second) occurred in August 2020 due to re-opening of many economies in May 2020 and June 2020 : new infections/day : 10-20 % (but did not in Thailand-the first country outside China had been able to control the outbreak relatively well)**
- **Despite New Wave : Overall global investment sentiment is still positive**

COVID-19 New Wave



(Laamarti M, et al. (2020) Large scale genomic analysis of 3067 SARS-CoV-2 genomes reveals a clonal geo-distribution and a rich genetic variations of hotspots mutations. PLoS ONE 15(11): e0240345)

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- **SARS-CoV-2 (COVID-19) Mutations/Variants :**
- **October 2020 :** South Africa : 501Y.V2 (South African Variant-8 mutation in gene responsible for spike protein that enable virus to infect humans) >>> became dominant strain in few weeks in South Africa (> 90 % of sequenced virus) >>> found in > 41 other countries
- **December 14, 2020 :** UK : Unexpected rise in COVID-19 in South-East England : A variant from SARS-CoV-2 “ 20B/GR family “ (a lineage call “ B.1.1.7 “)-contain 14 mutations, 50 % more transmission than its predecessor, responsible > 90 % of COVID-19 infections in the UK, Detected in 86 countries, including Malaysia & Vietnam
(WHO Thailand, February 11, 2021)
- **January 13, 2021 :** UK : 3rd Wave : 1,564 deaths within 28 days of a positive test, 1 : 50 in England = positive COVID-19, 1 : 30 in London, 1 : 20 in hotspot areas of London

COVID-19 New Wave

- **Thailand's First Wave (Puenpa et al 2020) :**
- **5 main clusters : L, S, G, V, & O types (based on genetic variations & amino acid changes (February 2020-April 2020))**
- **L type closely related to circulating strain in China**
- **Multiple Genetic Variants : G1, G2**
- **Type O : March 2020 : Returned Travelers, Religious Pilgrimage group from the southern Thailand**
- **Type G2 ; May 2020 : Migrant workers in the southern Thailand**

COVID-19 New Wave

- **Thailand** : December 17, 2020 : Reported zero cases locally for several months, Reporting a 67-year-old merchant at a seafood market (Central Shrimp Market) (no overseas travel records) in Samut Sakhon felt sick, went to a private hospital, COVID-19-tested positive : The country's first local case since Thailand imposed strict border control in March 2020
- Forcing every visitor entering the country into a two-week quarantine
- Tak, Samut Sakhon, and Rayong have firstly imposed city restriction with four colour-coded tiers have been applied
- Performing widespread contact tracing on all those working at the market : Almost 2,000 individuals were mass-tested over the next few days
- December 20, 2020 : Almost 700 tested positive (90 % of them are migrant workers from neighboring countries)
- December 22, 2020 : daily infections countrywide reach a record at 1,063 cases, whereas many major countries across the world experienced three rounds of outbreaks till December 2020

COVID-19 New Wave

- **New Wave in Thailand** : Hypothetically associated with border migration from Myanmar
- **Myanmar Second Wave** : August 16, 2020 in Rakhine State , Yangon-a major epicenter of the second wave, first case in first wave : March 23, 2020
- **Myanmar Second Wave** : G614 mutation of COVID-19 : more infectious

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COVID-19 New Wave

- **December 22, 2020 : Baseline economic projection based on assumption :**
 - 1) Infections would occur only in limited area : within Samut Sakhon & the nearby provinces
 - 2) No stringent & extensive containment measures would be implemented : Restrictions on certain economic activities in some areas could contain the new wave of COVID-19 within 1-2 months
 - 3) The economy would be affected through different channels : Tourism would be severely affected only in high-risk areas, manufacturing sector would not be significantly affected, private consumption would be somewhat affected

COVID-19 New Wave

- **December 25, 2020** : Red zone-Samut Sakhon, Orange zone (> 10 detected cases)-6 provinces, Yellow zone (0-10 detected cases)-26 provinces, Orange/Yellow zone-31 provinces, Green zone (No detected cases) : The rest of 77 provinces
- **December 29, 2020** : Spreading about 60 % of Thailand's 77 provinces
- **December 29, 2020** : The cabinet granted a special approval for foreign workers from Myanmar, Cambodia and Laos to continue residing and working legally in Thailand (whose work permits have expired, undocumented foreign workers, and their children no more than 18) until February 213, 2021 amid the COVID-19 spreading. The Ministry of Labour put forth the proposal as part of the government's efforts to control local transmission

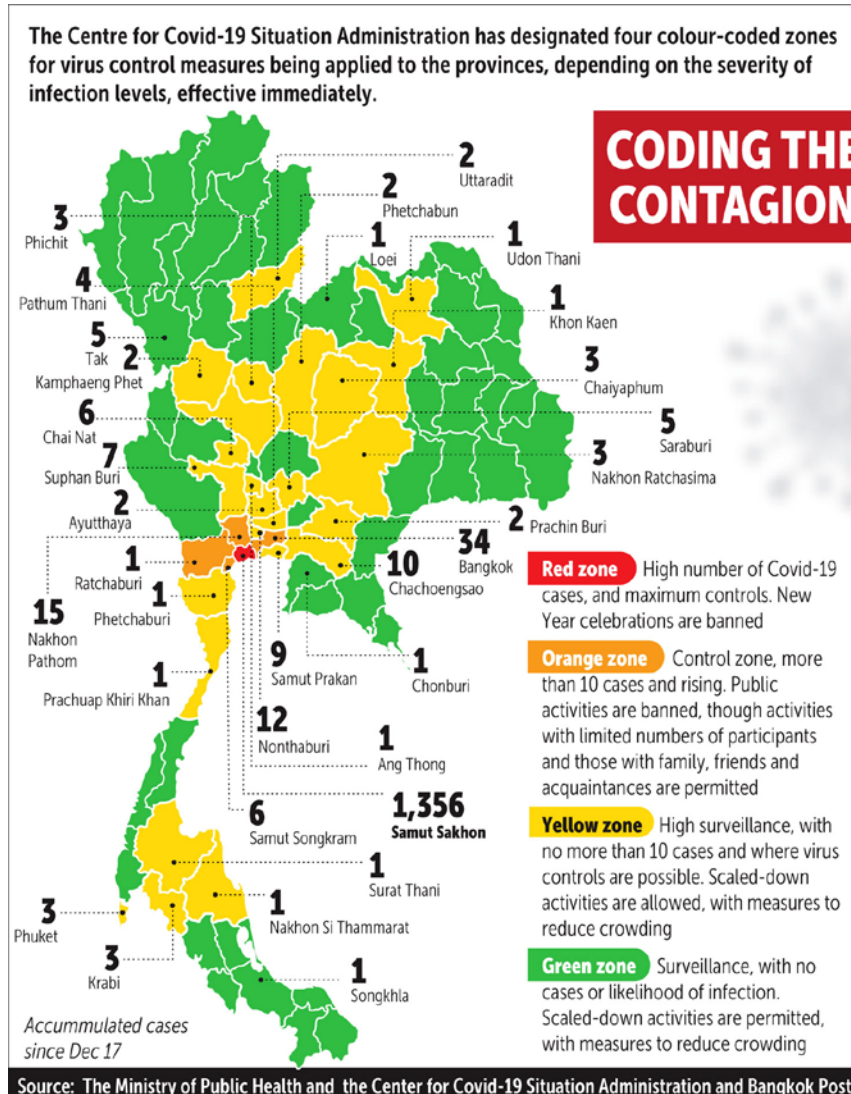
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- **January 4, 2021 : Red zone : 28 provinces**
- **A large surge in new infections : Samut Sakhon, Rayong, Chonburi, and Chantaburi and 45 provinces reported local transmission (Early January 2021)**
- **Infections mostly detected among individuals working in seafood markets, Samut Sakhon, many of them were migrant workers and close contacts of the confirmed cases**
- **Majority of the recent cases traced back to the seafood hub of Samut Sakhon province (more than 3,200 cases in 44 provinces linked to the outbreak in Samut Sakhon)**
- **Risks of infections spreading beyond the main clusters remain as more individuals travel across country during the holidays**
-

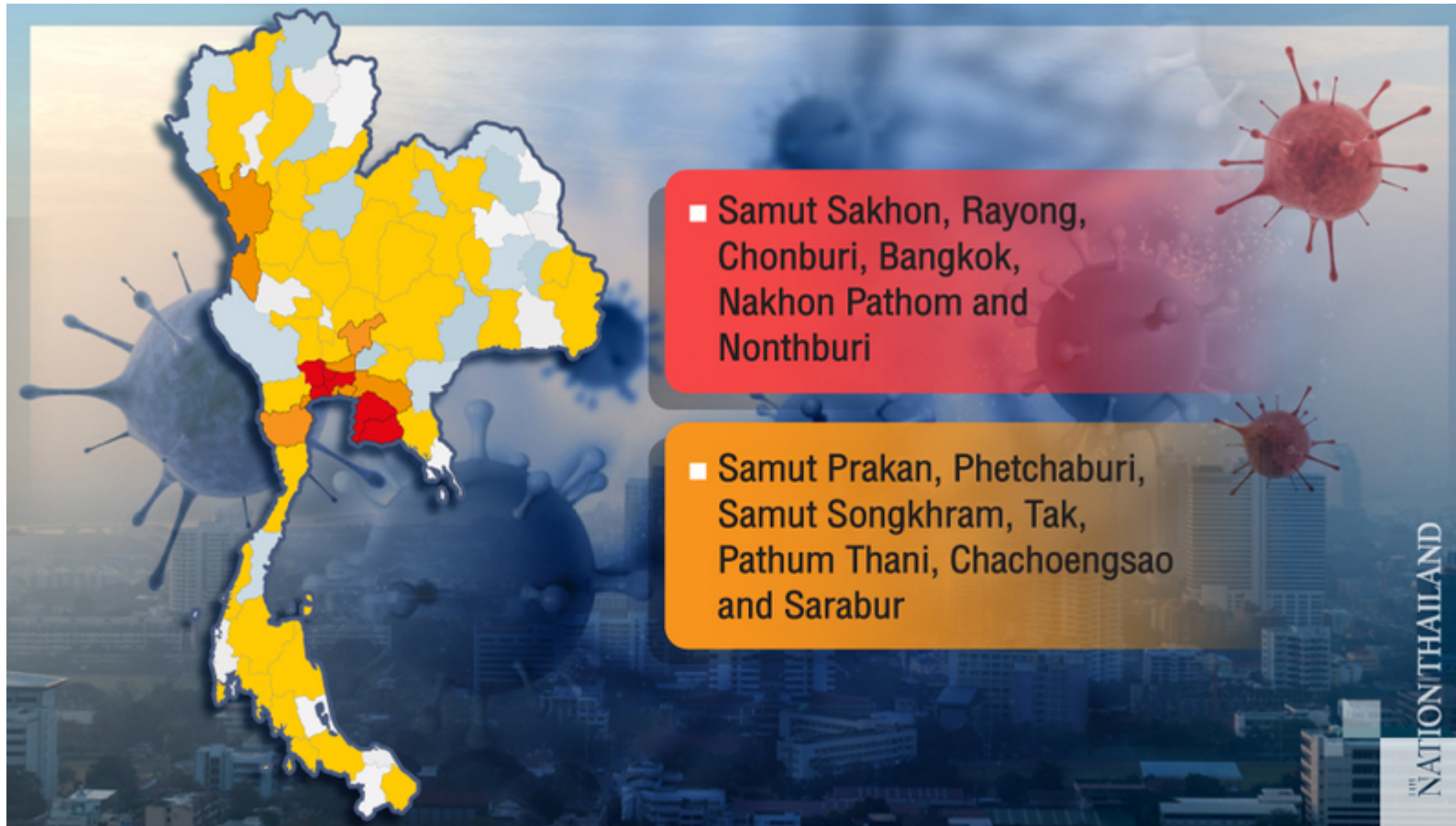
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- **Red: ≥ 51 cases** : Educational institutions and entertainment venues, such as bars, karaoke outlets, and pubs, are suspended. Crowded activities such as meetings and seminars can take place only if the organizers have obtained approval from authorities. Shopping malls, supermarkets, convenience centers, exhibition halls, industrial areas, and workers' dormitories may open as long as they adhere to health protocols. Authorities prohibit migrant workers from leaving the areas and have set up checkpoints at entry and exit points. Provincial governors are allowed to impose additional restrictions on top of curbs mandated by the central government.
- **Orange: 11-50 cases** : Public activities are prohibited. Authorities are allowing small-scale private activities, including those among family, friends, and acquaintances. Officials are limiting operating hours for commercial and industrial facilities. Transporting migrant workers out of the state is banned. Large celebrations are banned, and attendance at parties is limited.
- **Yellow: 1-10 cases** : Authorities are enacting enhanced surveillance measures. Scaled-down activities are allowed and officials are imposing rules to reduce crowding.
- **Green: 0** : Authorities are permitting small-scale activities and are implementing protocols to reduce crowding.

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COVID-19 New Wave



As of December 31, 2020

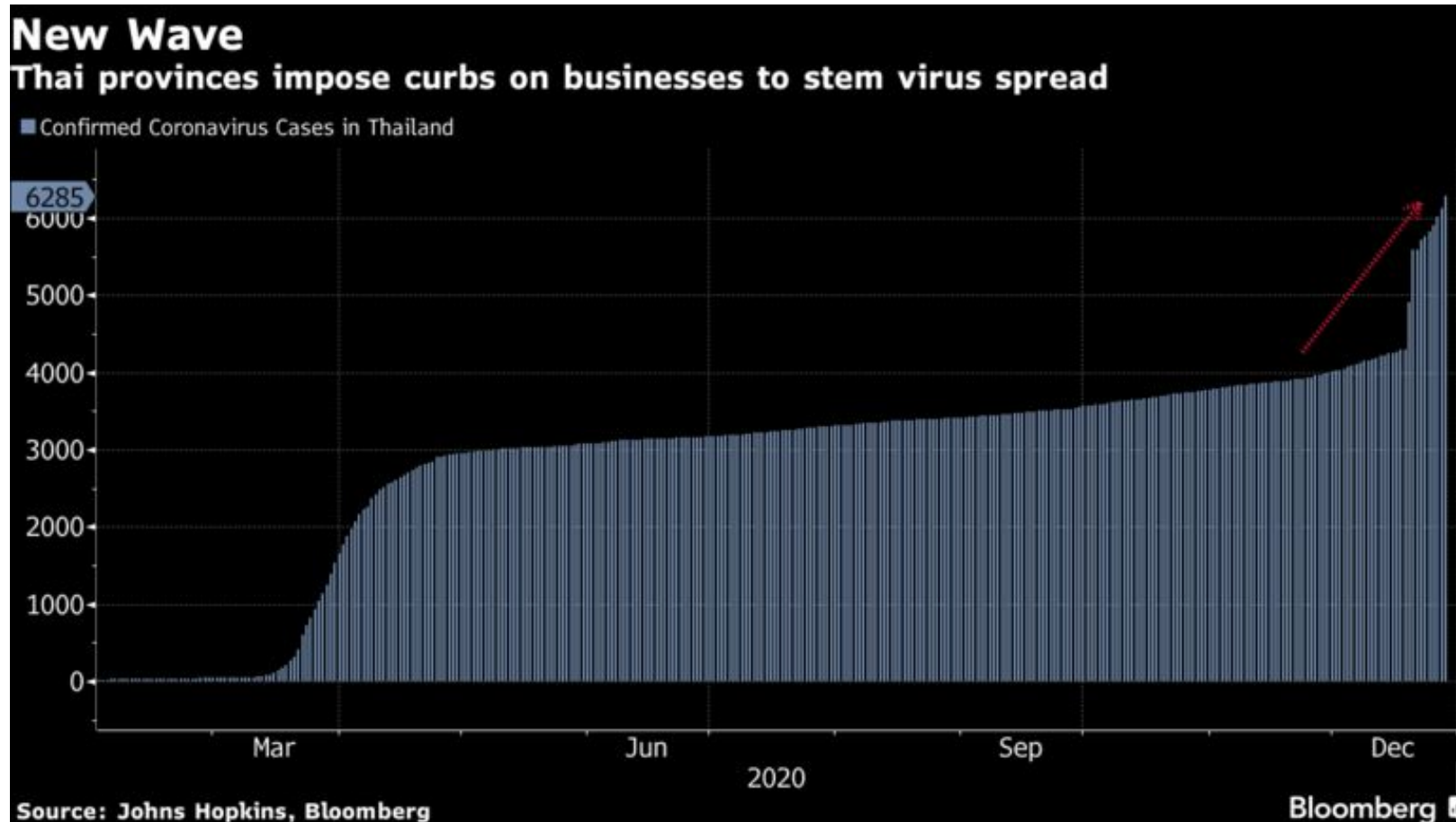
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- **Bangkok Metropolitan Administration (BMA) : Establishment of precautionary protocols : Dancing in bars and clubs, putting up checkpoints around the city, asking the consideration of working from home, canceling 2021 New year's Eve parties and countdown events, mass gathering organized without authorized permission (closure of ordered sports and entertainment venues-till January 4, 2021)**
- **Two of Bangkok's biggest shopping centers haven't announced the cancellation on their 2021 New year's Eve parties**
- **If no control measures implemented, Thailand's new cases may spike to 18,000/day in January 2021**
- **Even if Bangkok has to be locked down, it has more ammunition left in the fiscal 2021 budget if needed**

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- **In Thailand, impact of the new wave :**
- **Service sectors : hotels, retail groups & airlines will be greatly affected by any lockdown**
- **Land and rail transport groups and banking groups may be moderately affected**
- **Building materials, real estate & communication may not severely affected if the lockdown does not last too long**
- **The economic & investment situation globally & in Thailand will probably continue to improve in the first half of 2021 due to positive factors**
- **Nevertheless, in the second half of 2021 : Risk Factors : Politics in the USA, delays European fiscal measures, the stronger baht, & contraction in exports & tourism**

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COVID-19 New Wave

- **February 24, 2021-Thailand Policy Summary :**
- **1) Lockdown Status : 5 lockdown classifications :**
 - **5.1) Samut Sakhon : Maximum Control (+ Field/Mobile Hospitals)**
 - **5.2) Bangkok : Red High Control**
 - **5.3) Chonburi : Orange Medium Control**
 - **5.4) More non-essential businesses, Schools : Permitted to open under Red & Orange zones**
 - **5.5) Schools remain online-learning/closed & amusement parks, The Meetings-Incentives-Conventions-Exhibitions (MICE) segment remains not permitted in Samut Sakhon**

COVID-19 New Wave

- **February 24, 2021-Thailand Policy Summary :**
- **2) Travel Restrictions : Allowed entry : medical tourists, filming crews, foreigners who have work permits, foreigners married to Thai nationals, Special Tourist Visa holders, Thailand Elite card members, etc.**

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- **February 24, 2021-Thailand Economy Summary :**
- **1) We Travel Together (December 4, 2020) : Airline tickets of 3,000 THB (up from 2,000 THB) for selected destinations (Phuket, Krabi, Phang Nga, Songkhla, Surat Thani, Chiang Mai & Chiang Rai), etc. Extended until April 30, 2021**
- **2) Extension of SME loan plans (November 5, 2020) : Extension until January 31, 2021**
- **3) Tax Cut (November 3, 2020) : Tax cut on jet fuel from 4.726 THB to 0.20 THB. Until April 2021.**
- **4) Expats tourism subsidy (September 1, 2020) : Expats to be given 500 THB discount for domestic travel in Thailand. Budget of 2 million THB in total**

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- **February 24, 2021-Thailand Economy Summary :**
- **5) Domestic Tourism Subsidy (June 17, 2020) : Subsidise 2,000 THB for a trip of at least 2 days 1 night & must be booked via tour firms, for 1.2 million health volunteers & hospital officials, worth 22.4 billion THB, etc.**
- **6) Domestic Tourism Subsidy (August 20, 2020) : Extension of We Travel Together scheme's 40 % subsidy from 5 to 10 nights, etc.**

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- **February 24, 2021-Thailand Economy Summary :**
- **7) Phase 1 Budget (March 4, 2020) : Deduction of salary cost (300 % of eligible salary costs from April 2020-July 2020), Electricity payments extended for certain tourism businesses**
- **8) Phase 2 Budget (March 24, 2020) : Loans of up to 3 million THB for SMEs at 3 % interest rate, Extensions on corporate tax filings, Workers covered under Shared-Service-Facilities (SSF) Program to receive increased unemployment compensation of 50 % of their salary**
- **Phase 3 Budget (April 7, 2020) : 500 billion THB in funding for commercial banks to lend to SMEs at low interest rates, 5,000 THB monthly handouts for temporary, contract & self-employed workers for 6 months**

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- **Preparation for a Spike/New/Second Wave of COVID-19 :**
- **Continue to practice COVID-19 precautions (physical/social distancing, mask-wearing, hand-washing)**
- **Stay in touch with local health authorities**
- **Make sure your household maintains two weeks' worth of food, prescription medicines & supplies**
- **Work with your doctor for ensuring everyone in your household, particularly children is up to date on vaccines (flu, etc.)**

**Thank You
Very Much
For
Your Attention**