A new system adopted by Tokyo to address the threat of infectious diseases

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Analysis of infection spread cases in Japan by the expert committee (Feb 26, 2020)

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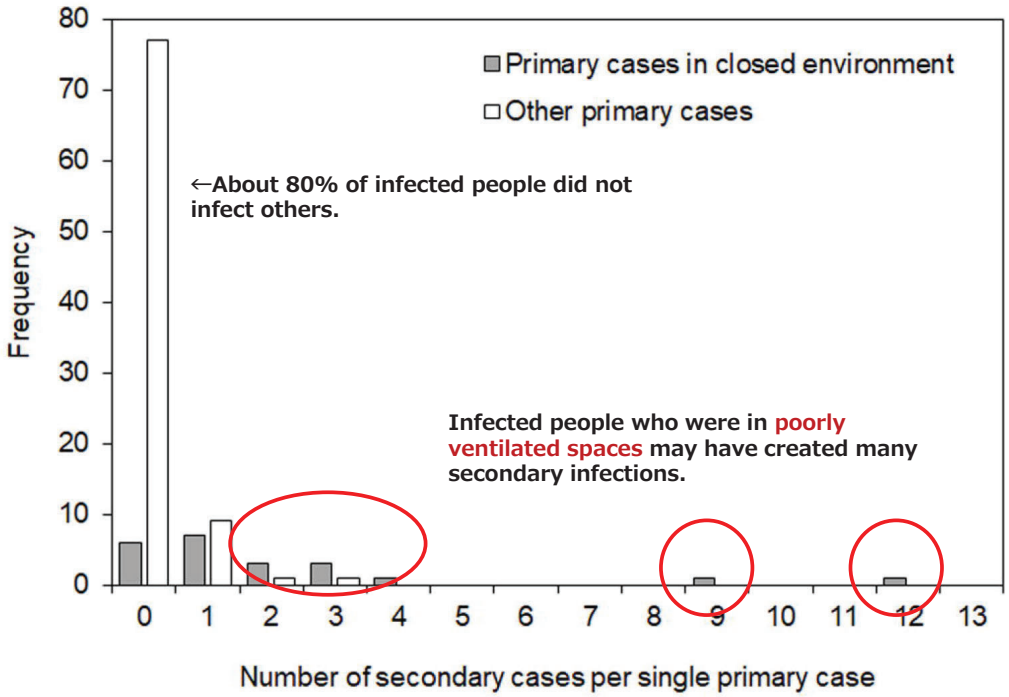

Nishiura H, Oshitani H et al., MHLW COVID-19 Response Team, Motoi Suzuki, Closed environments facilitate secondary transmission of coronavirus disease 2019 (COVID-19), *medRxiv* preprint, Feb 26, 2020. 0029272

Government Caution March 9, 2020

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1. **Enforce ventilation**: In a room with windows, if possible, open the windows on opposite or different sides simultaneously to encourage ventilation. However, **there is no established evidence of how much ventilation is adequate**.
2. **Decrease the density of people**: In case of crowds, reduce the density of people by securing the space of the venue and increasing the distance between people by 1-2 meters.
3. **Avoid short-range conversations, vocalization, and chanting**: Avoid places where people are in close proximity to you. If you need to talk at a close distance, wear a mask to prevent the transmission of droplets.

Source: the Ministry of Health, Labour and Welfare's Expert Group on Countermeasures for Novel Coronavirus Infectious Diseases published "Positions for Countermeasures for Novel Coronavirus Infections", March 9, 2020

Avoid the "Three Cs"

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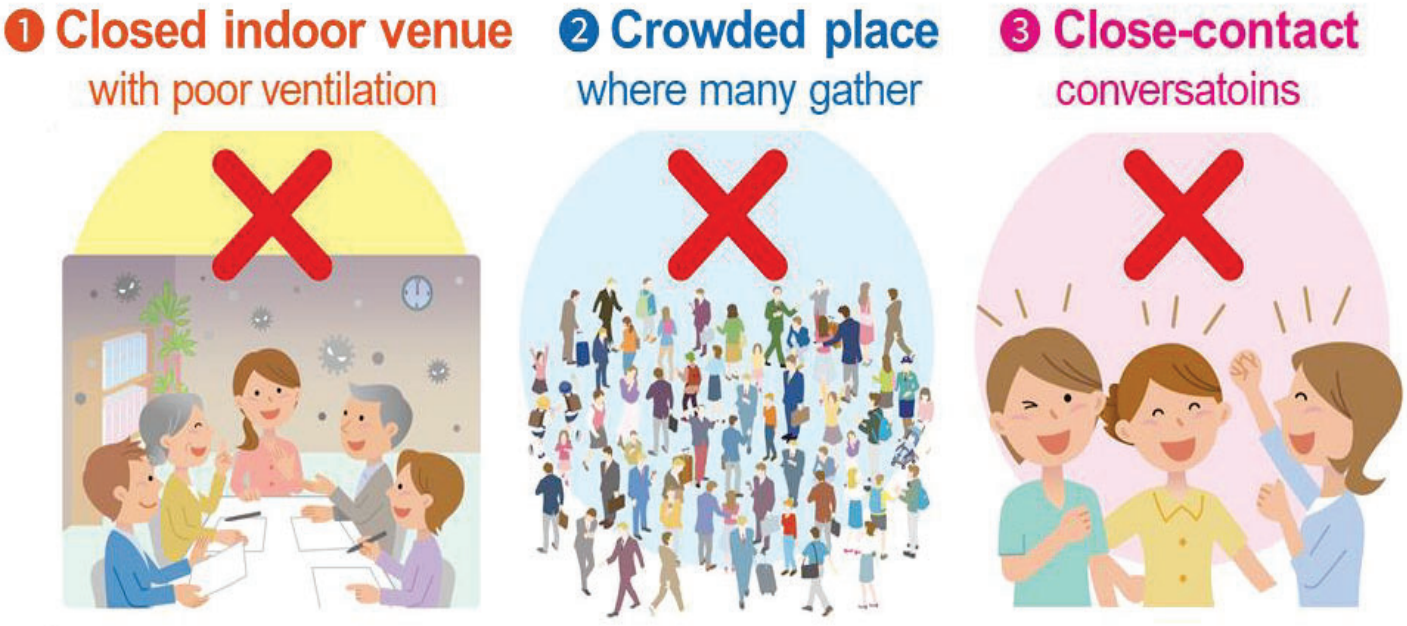

https://www.kantei.go.jp/jp/headline/kansensho/coronavirus.html

Society of Heating, Air-conditioning and Sanitary Engineers (**SHASE**) and Architectural Institute of Japan (**AIJ**)

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Emergency presidential discourse March 23, 2020

SHASE AIJ

March 23, 2020

The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan (SHASE)

President Shin-ichi Tanabe

Architectural Institute of Japan (AIJ)

President Izuru Takewaki

Role of ventilation in the control of the COVID-19 infection:
Emergency presidential discourse

At the Ministry of Health, Labour and Welfare's Expert Meeting on Novel Coronavirus Infectious Disease Control on March 9, 2020, "A View on Novel Coronavirus Infectious Disease Control" was announced [1]. Subsequently, on March 18, the Prime Minister's Office, together with the Ministry of Health, Labour and Welfare, published a leaflet titled "Let's Avoid These Three Conditions When We Go Out!" [2], according to which to be avoided are closed spaces with poor ventilation, crowded places, and close contact. Inquiries about ventilation have been received from members of the Architectural Institute of Japan and the Society of Heating, Air-Conditioning and Sanitary Engineers of Japan, both of which specialize in indoor environments.

Regarding the effects of ventilation on the novel coronavirus (COVID-19), Nishiura et al. analyzed the

https://www.aij.or.jp/covid19_info.html

Ministry of Health, Labor and Welfare's views on ventilation (March 30, 2020)

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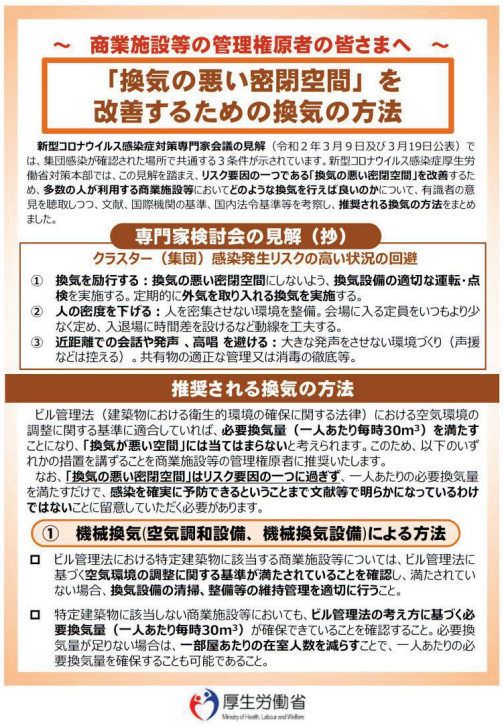

～ 商業施設等の管理権原者の皆さまへ ～

「換気の悪い密閉空間」を改善するための換気の方法

新型コロナウイルス感染症対策専門家会議の見解（令和２年３月９日及び３月19日公表）では、集団感染が確認された場所で共通する３条件が示されています。新型コロナウイルス感染症厚生労働省対策本部では、この見解を踏まえ、**リスク要因の一つである「換気の悪い密閉空間」を改善**するため、**多数の人が利用する商業施設等**において**どのような換気を行えば良いのか**について、有識者の意見を聴取しつつ、文献、国際機関の基準、国内法令基準等を考察し、**推奨される換気の方法**をまとめました。

専門家検討会の見解（抄）

クラスター（集団）感染発生リスクの高い状況の回避

① **換気を励行する：換気の悪い密閉空間**にしないよう、**換気設備の適切な運転・点検**を実施する。定期的に**外気を取り入れる換気を実施**する。
② **人の密度を下げる：**人を密集させない環境を整備。会場に入る定員をいつもより少なく定め、入退場に時間差を設けるなど動線を工夫する。
③ **近距離での会話や発声、高唱 を避ける：**大きな発声をさせない環境づくり（声援などは控える）。共有物の適正な管理又は消毒の徹底等。

推奨される換気の方法

ビル管理法（建築物における衛生的環境の確保に関する法律）における空気環境の調整に関する基準に適合していれば、**必要換気量（一人あたり毎時30m³）を満たす**ことになり、**「換気が悪い空間」には当てはまらない**と考えられます。このため、以下のいずれかの措置を講ずることを商業施設等の管理権原者に推奨いたします。

なお、**「換気の悪い密閉空間」はリスク要因の一つに過ぎず**、一人あたりの必要換気量を満たすだけで、**感染を確実に予防できるということまで文献等で明らかになっているわけではない**ことに留意していただく必要があります。

① 機械換気(空気調和設備、機械換気設備)による方法

- ビル管理法における特定建築物に該当する商業施設等については、ビル管理法に基づく**空気環境の調整に関する基準が満たされていることを確認**し、満たされていない場合、**換気設備の清掃、整備等の維持管理を適切に行う**こと。
- 特定建築物に該当しない商業施設等においても、**ビル管理法の考え方に基づく必要換気量（一人あたり毎時30m³）**が確保できていることを確認すること。必要換気量が足りない場合は、**一部屋あたりの在室人数を減らす**ことで、一人あたりの必要換気量を確保することも可能であること。

厚生労働省

Ventilation methods to improve "poorly ventilated enclosed spaces".

For mechanical ventilation, if a ventilation rate of **30 m³/h·person (8.3L/s·person)** is ensured, it cannot be said that infection can be prevented with certainty, but it is not deemed an enclosed space with poor ventilation.

https://www.mhlw.go.jp/content/10900000/000618969.pdf

Act on Environmental Health in Buildings (1970～)

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Standards on indoor air quality

Measurement / check	Item	Criterion	Remarks
Measured at least within every two months	Suspended dust	～0.15 mg/m^3	
	CO	～6ppm	Revised from 10ppm
	CO_2	**～1000ppm**	
	Air temperature	18℃～28℃	Revised from 17℃ By WHO recommentation
	Relative humidity	40%～70%	
	Air velocity	～0.5 m/sec	
At first measuring	Formaldehyde	0.1mg/m^3 (0.08ppm)	New-construction, renovation
Checking / cleaning	Cooling tower, water of humidifier	Water quality criterion, regular check, Cleaning, exchanging water	Legionella / microbes
	Drain pan of HVAC	regular check, cleaning	

Hayashi M, Kobayashi K, Kim H, Kaihara N. The state of the indoor air environment in buildings and related tasks in Japan. J. Natl. Inst. Public Health, 69(1) 2020.

CO2 monitors every where in Japan

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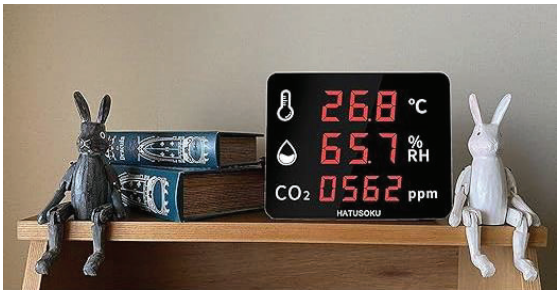

Air Cleaner November 11, 2020

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1. The air cleaner must be a filtration type with a HEPA filter and have an air volume of $5m^3$/min or more.
2. Install an air cleaner within a range of about $10m^2$ (6 tatami mats) from where people live.
3. To avoid air stagnation, match the direction of the air that takes in outside air with the direction of the air cleaner.

Modes of Transmission

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Contact transmission

The most common mode of transmission, contact transmission is divided into two subgroups: direct and indirect. Indirect transmission involves the transfer of an infectious agent through a contaminated intermediate object or person.
VRE, MRSA, Norovirus, etc.

Droplet transmission

Respiratory droplets carrying infectious pathogens transmit infection when they travel directly from the respiratory tract of the infectious individual to susceptible mucosal surfaces of the recipient, generally over short distances.
Influenza, Rubella, Mumps, etc.

Airborne transmission

Airborne transmission occurs by the dissemination of either airborne droplet nuclei or small particles in the respirable size range containing infectious agents that remain infective over time and distance.

Tuberculosis, Measles, Chickenpox, etc.

Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

Airborne Precaution

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Airborne Precautions prevent transmission of infectious agents that remain infectious over long distances when suspended in the air (e.g., rubeola virus [measles], varicella virus [chickenpox], M. tuberculosis, and so on.

The preferred placement for patients who require Airborne Precautions is in an airborne infection isolation room (AIIR).

- **Single-patient room**
- **Monitored negative pressure to the surrounding area**
- **12 ACH for new construction and renovation**
- **6 ACH for existing facilities**
- **air exhausted directly to the outside or recirculated through HEPA filtration before return**
- **AIIR should have an ante-room (FGI, ASHRAE).**

A respiratory protection program that includes education about the use of respirators, fit-testing, and user seal checks is required in any facility with AIIRs.

Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

Modeling the Modes of Exposure to respiratory aerosol particles

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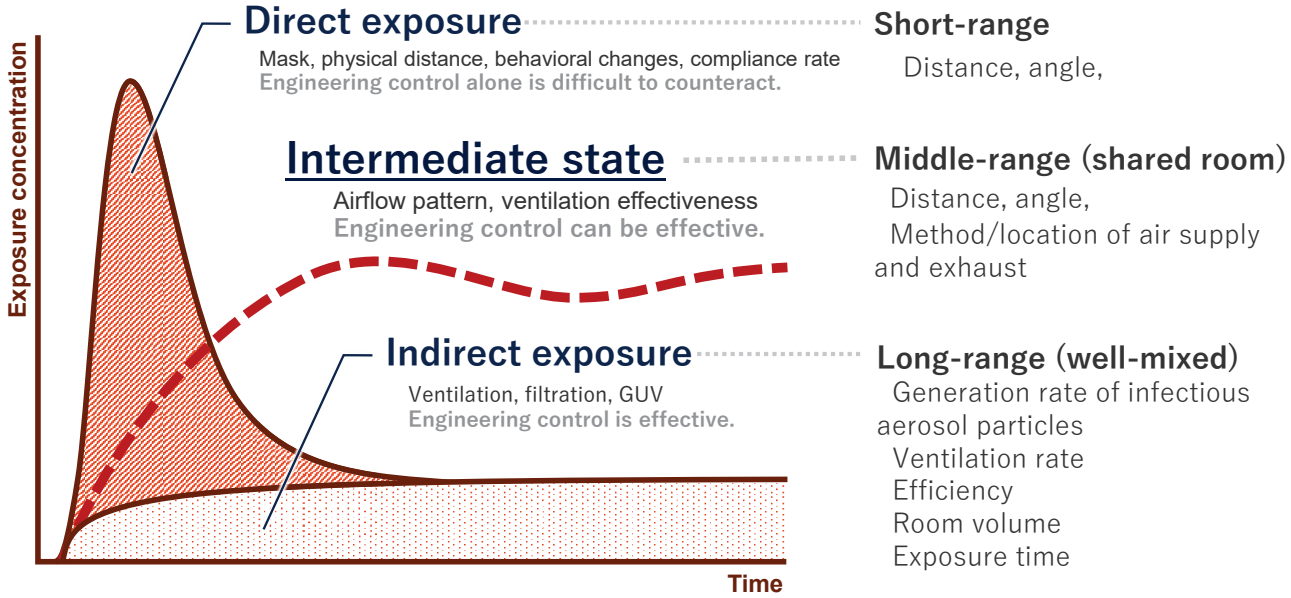

100 years ago: Spanish Flue

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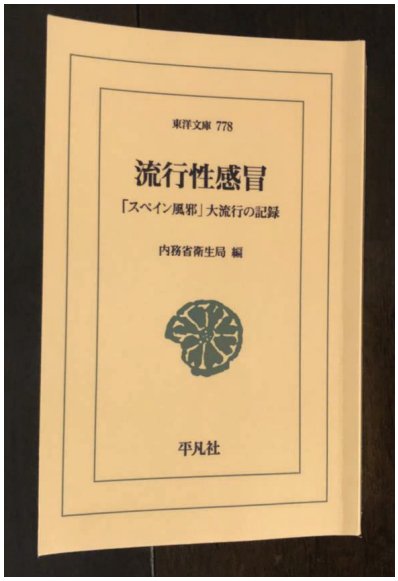

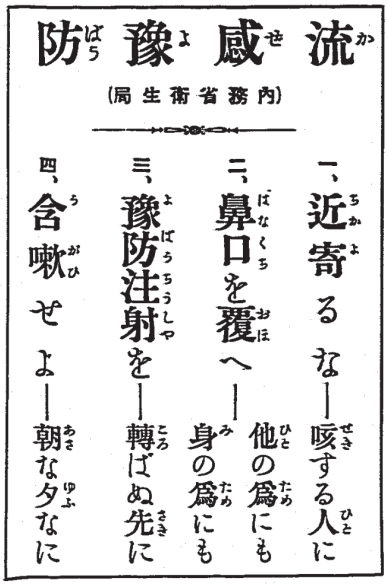

1. Avoid Contact
2. Cover mouth and nose (Mask)
3. Vaccinated
4. Gargle **No-description of ventilation**

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No-description of ventilation

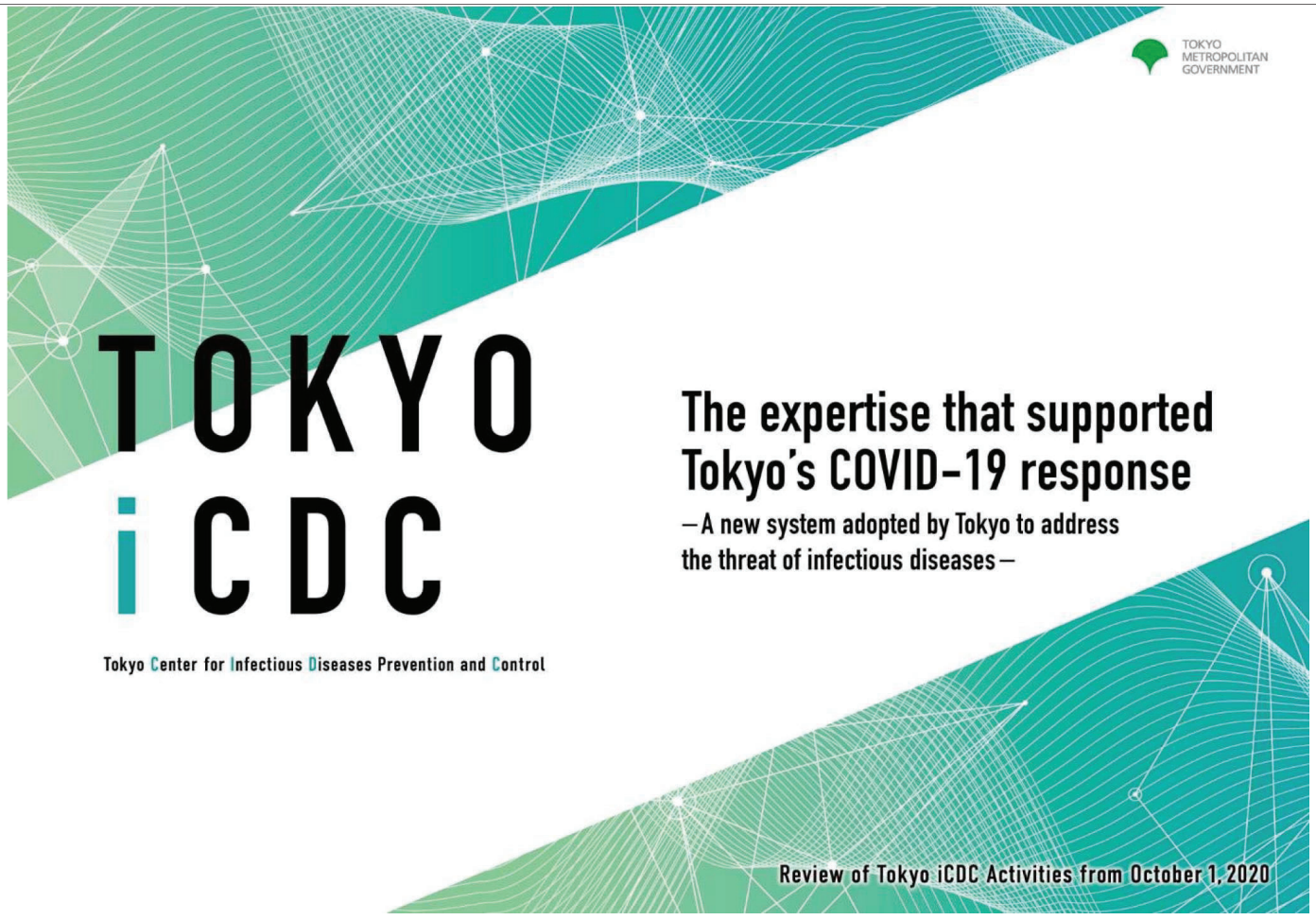
Tokyo Governor Koike has regular meeting

第68回東京都新型コロナウイルス感染症モニタリング会議(令和3年10月21日13時00分～)

公開 2021.10.21 | 視聴回数 4,764回

新型コロナウイルス感染症に関する対応

https://tokyodouga.jp/m7y1zw4udbw.html



https://www.metro.tokyo.lg.jp/english/topics/2023/1020_02.html