

DEPARTMENT OF OCCUPATIONAL
SAFETY AND HEALTH

Guidance Note for Ventilation and Indoor Air Quality (IAQ) during Pandemic COVID-19

11TH AUGUST 2021

SCOPE OF PRESENTATION

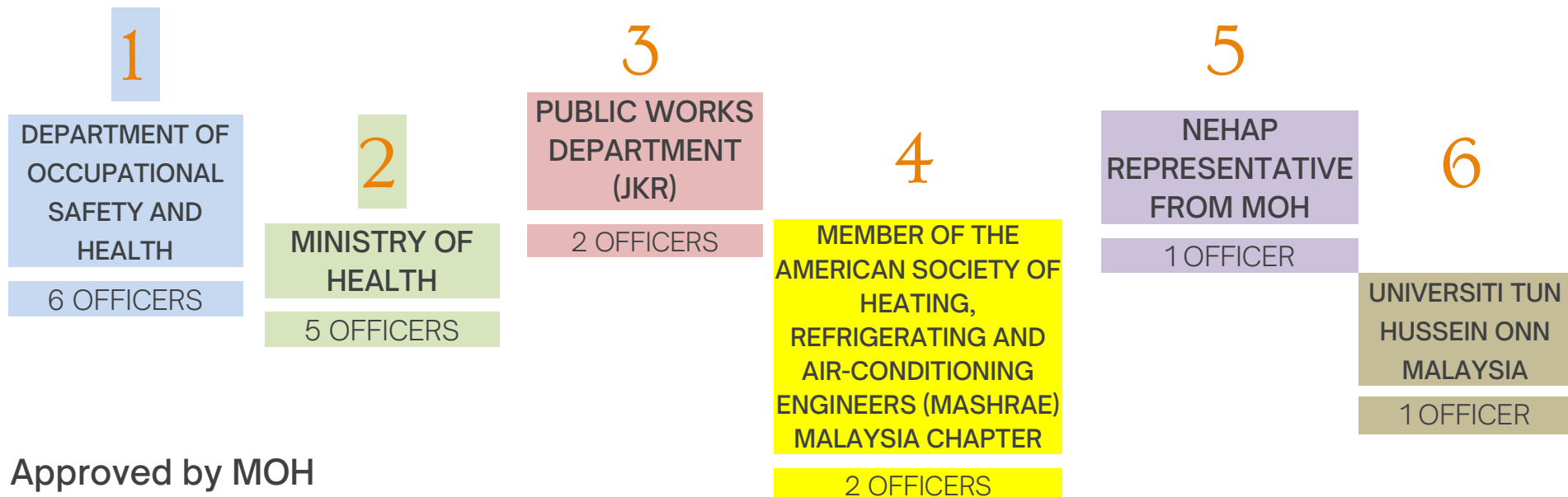
- ❖ **Background**
- ❖ **Types of settings**
- ❖ **Scope of guidance**
- ❖ **Roles of employers, building management & home owners**
- ❖ **Expectation**
- ❖ **Conclusion**

Background

- Current evidence suggest that airborne transmission could play a role in the spread of Covid-19. WHO also acknowledged that aerosols carrying the virus can “remain suspended in the air” or travel farther than 1 metre (long range).
- The COVID-19 virus can spread in **poorly ventilated or crowded indoor** settings such as office buildings, healthcare facilities, and workplace where people tend to spend longer periods of time. Virus also spreads mainly between people who are in close contact with each other .i.e. within 1 metre (short range)
- Since PKP 1.0, weekly SOP by DOSH was made compulsory for all workplaces since April 2020. One important element in the SOP is **ventilation**. Compliance was found to be above 95%.
- A Technical Committee was formed on **9th June 2021** appointed by Dato' KSU Ministry of Human Resource upon instructions from PMO
- Ministry of Human Resource through **DOSH and MOH** have collaborated to come up with an interim guidance on ventilation to enhance ventilation and indoor air quality during this pandemic.

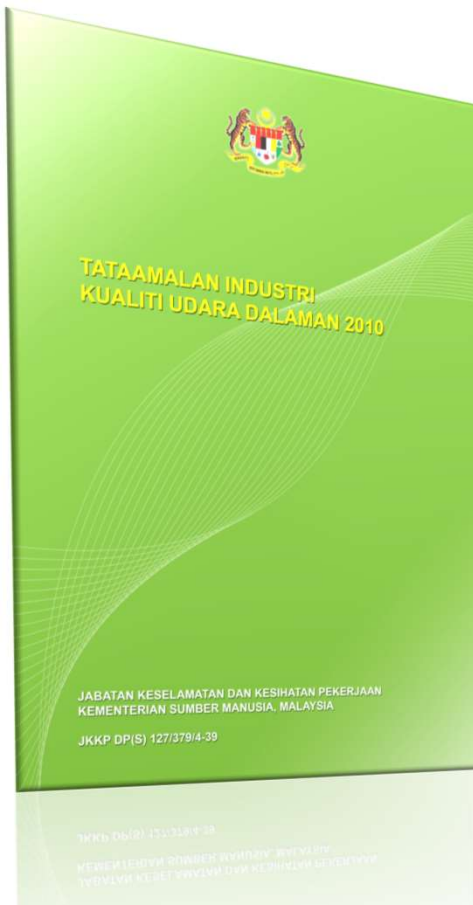
TECHNICAL COMMITTEE ON VENTILATION AND INDOOR AIR QUALITY 2021

- The committee consists of: 17 Officers



- Approved by MOH
- Guidance approved by Technical Committee YB Defence Minister then subsequently Sidang Khas MKN on **8th July 2021**

LEGISLATIONS IN MALAYSIA: INDUSTRY CODE OF PRACTICE ON INDOOR AIR QUALITY 2010



a. Purpose:

- i. Provide guidance on improving IAQ;
- ii. Set minimum standard for selected parameters to avoid discomfort and/or adverse health effect among employees and other occupants

APPLICATION OF ICOP 2010

Domestic building

Used or intended to be used for domestic/ industrial purposes

Building or any part of building/
totally enclosed areas , served by
MVAC/split unit, where there are
persons at work,

EXCEPT

Removal and disposal of
asbestos containing materials

Where any chemical hazardous
to health are used for analytical,
research or prevention purposes

Guidance Notes are developed based on ICOP 2010 & WHO & other established docs international bodies



LIMITATIONS OF ICOP

Applies to all buildings or any part of the building or totally enclosed areas served by a mechanical ventilating and air conditioning (MVAC) system including air-cooled split unit, where **there are persons at work**, except-

- i. **domestic buildings;**
- ii. any area or any part of the **building which is constructed, used or intended to be used for domestic or industrial purposes;**
- iii. any area or part of building where any **chemicals hazardous to health are used** for analytical, research or preservation purposes; or
- iv. **removal and disposal of asbestos** containing materials.

GUIDANCE OF 4 TYPES OF SETTINGS

1

NON RESIDENTIAL

2

RESIDENTIAL

3

PUBLIC SPACES

4

HEALTHCARE FACILITIES

TYPES OF SETTINGS

1

NON RESIDENTIAL



GUIDANCE NOTE ON
VENTILATION & INDOOR
AIR QUALITY FOR
NON-RESIDENTIAL SETTINGS
DURING COVID-19 PANDEMIC



2

RESIDENTIAL



GUIDANCE NOTE ON
VENTILATION &
INDOOR AIR QUALITY
FOR RESIDENTIAL
SETTING DURING
COVID-19 PANDEMIC

3

PUBLIC SPACES



GUIDANCE NOTE ON
VENTILATION AND INDOOR
AIR QUALITY (IAQ) FOR
PUBLIC AREA SETTING
DURING COVID-19 PANDEMIC



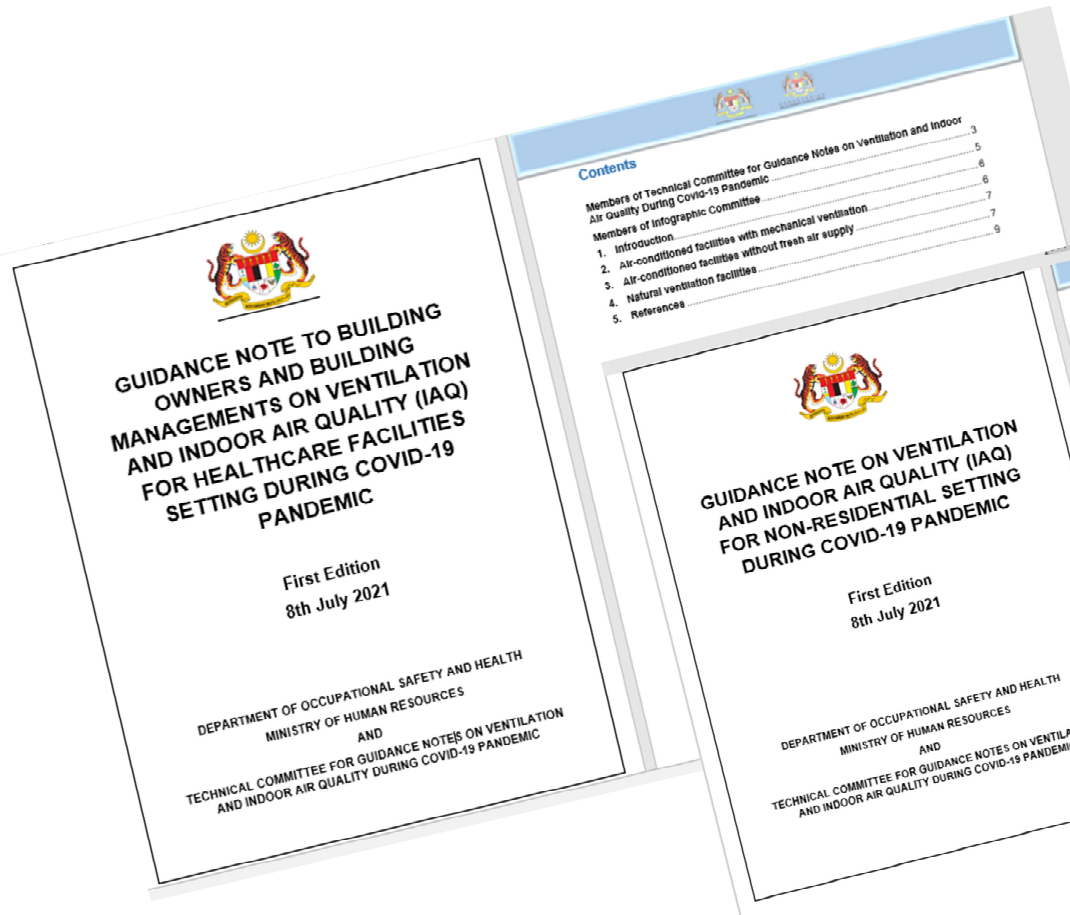
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HEALTHCARE FACILITIES



GUIDANCE NOTE TO BUILDING
OWNERS AND BUILDING
MANAGEMENTS ON VENTILATION
AND INDOOR AIR QUALITY (IAQ)
FOR **HEALTHCARE FACILITIES**
SETTING DURING COVID-19
PANDEMIC

GUIDANCE NOTES IN TEXT @ WEBSITE, SCAN QR CODE IN INFOGRAPHIC



BOTH LANGUAGES : BAHASA
INGGERIS DAN BAHASA MALAYSIA

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Scope of Guidance

- ❖ ONLY APPLICABLE DURING PANDEMIC COVID 19

TYPES OF VENTILATION:

AIR-
CONDITIONED
FACILITIES WITH
MECHANICAL
VENTILATION



AIR-
CONDITIONED
FACILITIES
WITHOUT
FRESH AIR
SUPPLY



NATURAL
VENTILATION
FACILITIES



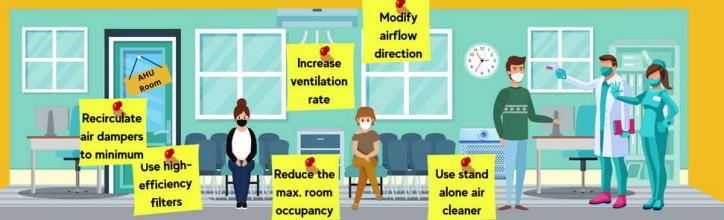
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HEALTHCARE FACILITIES



GUIDANCE NOTE TO BUILDING OWNERS AND MANagements ON IMPROVING VENTILATION AND INDOOR AIR QUALITY (IAQ) FOR HEALTHCARE FACILITIES SETTING DURING COVID-19 PANDEMIC

AIR-CONDITIONED FACILITIES WITH MECHANICAL VENTILATION



- ✓ Reduce the maximum room occupancy
- ✓ Modify airflow direction by relocating supply and return air devices
- ✓ Set recirculation air dampers to a minimum according to system capabilities
- ✓ Increase the ventilation rate according to system capabilities
- ✓ Use high-efficiency filters in AHUs. Filter should be properly installed, regularly inspected, maintained and cleaned
- ✓ Use air-cleaning technologies that be able to kill microbe in AHUs or ducting to augment MERV14 filters
- ✓ Use a stand-alone air cleaner with appropriate filters if no other (short-term) strategy can be adopted

AIR-CONDITIONED FACILITIES WITHOUT FRESH AIR SUPPLY



- ✓ Open operable windows and doors as frequently as possible, unless outdoor/outside air quality is poor
- ✓ Position extractor/mounted exhaust fans at windows to blow air outwards and increase air exchange
- ✓ Add a dedicated outdoor air supply and/or exhaust
- ✓ Modify the position of the split unit or FCUs to direct the airflow to the less clean zone or install an extractor to control the airflow where AGP is performed
- ✓ Use a stand-alone air cleaner with appropriate filters if no other (short-term) strategy can be adopted



For further information please go to the website www.dosh.gov.my or scan this QR code.



GUIDANCE NOTE TO BUILDING OWNERS AND MANagements ON IMPROVING VENTILATION AND INDOOR AIR QUALITY (IAQ) FOR HEALTHCARE FACILITIES SETTING DURING COVID-19 PANDEMIC

NATURAL VENTILATION FACILITIES



- ✓ Assess the opening locations and opening surfaces considering potential new openings
- ✓ Enable cross-ventilation rather than single-sided ventilation
- ✓ Reduce the maximum room occupancy
- ✓ The airflow direction should be from a clean to less clean area
- ✓ Increase natural ventilation with enhancement by fans
- ✓ Use a stand-alone air cleaner with appropriate filters if no other (short-term) strategy can be adopted



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NATURAL VENTILATION FACILITIES

- a) Assess the opening locations and opening surfaces considering potential new openings.
- b) Consider enabling cross ventilation rather than single-sided ventilation. However, this approach should not be implemented in a room or ward for COVID-19 suspected cases where AGP may take place and when the exhaust air is not properly managed and when the airflow is moving from a less clean to a clean area.
- c) Consider reducing the maximum room occupancy.
- d) The airflow direction should be from clean to less clean area.
- e) Increase natural ventilation with enhancement by fans.
- f) Consider to use a stand-alone air cleaner with appropriate filters if no other (short-term) strategy can be adopted. The stand-alone air cleaners do not replace ventilation in any circumstance.

AIR-CONDITIONED FACILITIES WITHOUT FRESH AIR SUPPLY


- a) Open operable windows and doors as frequently as possible, unless outdoor/outside air quality is poor. Air-conditioning should be reduced or turned off when doors and/or windows are opened.
- b) Consider positioning extractor/mounted exhaust fans at windows to blow air outwards and increase air exchange.
- c) Consider adding dedicated outdoor air supply and/or exhaust. The outdoor air system can be designed such that high-efficiency (MERV14 or F8) filters when necessary.
- d) Modifying the position of the split unit or FCUs to direct the airflow to the less clean zone or install an extractor to control the airflow where AGP are performed.
- e) Consider to use a stand-alone air cleaner with appropriate filters if no other (short-term) strategy can be adopted. The stand-alone air cleaners do not replace ventilation in any circumstance.

AIR-CONDITIONED FACILITIES WITH MECHANICAL VENTILATION

- a) To increase the ventilation rate according to system capabilities. Disable demand-control ventilation such as those with CO2 sensors, to avoid automatic reduction of outdoor air supply.
- b) Consider reducing the maximum room occupancy.
- c) Modify airflow direction by relocating supply and return air devices if necessary.
- d) Set recirculation air dampers to a minimum according to system capabilities if possible.
- e) Use high-efficiency filters (at least MERV14 or F8 is recommended) in AHUs. Filters should be properly installed regularly inspected, maintained and cleaned according to manufacturers' recommendation.
- f) Consider to use air-cleaning technologies that be able to kill microbe in AHUs or ducting to augment MERV14 filters. Efficacy and safety of all air-cleaning devices under the operating conditions must be considered.
- g) Consider to use a stand-alone air cleaner with appropriate filters if no other (short-term) strategy can be adopted. The stand-alone air cleaners do not replace ventilation in any circumstance.

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GUIDANCE NOTES ON IMPROVING VENTILATION AND INDOOR AIR QUALITY (IAQ) FOR PUBLIC AREA DURING COVID-19 PANDEMIC



1 ENGINEERING CONTROLS

- Increase outside-air ventilation
- Increase air filtration
- Adjust or reconfigure air flows

2 ADMINISTRATIVE CONTROLS

- Reduce crowd or occupancy
- Limit the use of small spaces that are shared

3 RECONFIGURATION OF BUILDING SPACES AND FURNISHINGS

- Use partitions to reduce risks of transmission and minimize direct air flow between people.

4 CLEANING AND DISINFECTIONS

- Cleaning and disinfection is recommended where there has been a suspected or confirmed case of COVID-19 within the last 24 hours.
- If more than 24 hours after suspected / confirmed cases, cleaning is enough unless there is high index transmission.
- If more than 3 days have passed since a suspected / confirmed case, no additional cleaning then usual cleaning is required
- Risk of transmission can be reduced by wearing masks consistently and correctly, practicing hand hygiene, cleaning, and taking other measures to maintain healthy facilities.

5 MEASURES FOR AIR-CONDITIONED PREMISES WITH MECHANICAL VENTILATION AIR CONDITIONING (MVAC)


- Ensure MVAC system are fully functioning.
- Maximise ventilation for indoor air dilution.
- Maximise outdoor air intake and supply by setting.
- Minimise indoor air recirculation; use high-efficiency filters in AHUs to treat recirculated air

6 MEASURES FOR NATURALLY VENTILATED PREMISES

- Improve ventilation, consider adding window or wall mounted exhaust fans.
- Improve air supply and increase ventilation rate.

7 MEASURES FOR ENCLOSED AIR-CONDITIONED PREMISES WITHOUT MECHANICAL VENTILATION PROVISION


- Increase ventilation and air exchange rate.
- Install window-mounted exhaust fans.
- Use portable air cleaner in enclosed space.
- Ensure there are no leakage of air into any occupied space.



Portable air cleaner

MINISTRY OF HEALTH MALAYSIA

For further information please go to the website www.dosh.gov.my or scan this QR code.



- **Method to control**
 - Engineering Controls
 - Administrative Controls
 - Reconfiguration of Building Spaces and Furnishings
 - Cleaning and Disinfection
- **Measures for air-conditioned premises with mechanical ventilation air conditioning (MVAC)**
 - Ensure MVAC system are fully functioning.
 - Maximise ventilation for indoor air dilution: Maximise outdoor air intake and supply by setting.
 - Minimise indoor air recirculation; use high-efficiency filters in AHUs to treat recirculated air.
- **Measures for naturally ventilated premises.**
- **Measures for enclosed air-conditioned premises without mechanical ventilation provision (e.g. split-unit air-conditioners or FCUs without fresh air supply)**

PUBLIC
SETTING

Infographic produced

RESIDENTIAL SETTINGS

GUIDANCE NOTE ON VENTILATION & INDOOR AIR QUALITY FOR RESIDENTIAL SETTING DURING COVID-19 PANDEMIC

General Guidance Applicable To All Homes (Landed Properties, Low/High Rise Apartments)

- ✓ Open window to ventilate room spaces with clean outdoor air (small opening in window when air-conditioner is being used)
- ✓ Operate electric fans to increase air movement subsequently enhance thermal comfort.
- ✓ Operate exhaust fans to improve ventilation
- ✓ Highly recommended to set temperature 23°C to 26°C
- ✓ Highly recommended 40% to 70% relative humidity
- ✓ Ensure intact water seal in sanitary system and rectify crack if any.
- ✓ Create an isolation space for sick, suspected or infected household members

Notes:

- ❖ When air-conditioners are not being used, open as many windows and doors, where practical, as possible to ventilate your dwellings, especially in the morning and evening when outdoor air is relatively cooler.
- ❖ Small opening in windows is recommended to allow ventilation, provided the opening in windows do not cause excessive infiltration of air.
- ❖ Consider installing air ionizer that is capable of deactivating viruses in suitable air conditioning system.
- ❖ Avoid using the balcony in an apartment unit, which may be in close proximity with neighbouring units.

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- There are two types of residential settings that can be distinguished as follows:
 - Houses (landed properties)
 - Other residential settings
- Both residential settings can be divided into two (2) types of ventilation as follows:
 - Enclosed air conditioned residential settings without mechanical ventilation provision.
 - Naturally ventilated residential settings
- Carrying out a Risk Assessment: It is of importance that a risk assessment be carried out to facilitate the implementation of relevant countermeasures and to assess the minimum ventilation rate per person.

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NON-RESIDENTIAL SETTINGS

GUIDANCE NOTE ON VENTILATION & INDOOR AIR QUALITY FOR NON-RESIDENTIAL SETTINGS DURING COVID-19 PANDEMIC

1 Air-conditioned Spaces With Mechanical Ventilation (Centralized Air Conditioning System)

SYSTEM EVALUATION Ensure all components are maintained

M V A C

- Increase outdoor fresh air ventilation
- Check filter and change frequently
- Reduce Occupant density

SYSTEM MAINTENANCE Building water system shall be flushed and maintained properly

- Daily Inspect: Components (Filter, MERV 13 or higher etc. HEPA filter)
- Run exhaust fan continuously (negative pressure/ adjacent room)
- Temperature: 23°C-26 °C
- Relative Humidity: 40% - 70%

2 Air-conditioned Spaces Without Mechanical Ventilation (Non-Centralized Air Conditioning System)

- ❖ Open windows and doors (to allow natural ventilation/ fresh air)
- ❖ Keep exhaust fans running to improve ventilation
- ❖ Use portable air cleaners (Recommended HEPA Filter)
- ❖ Ensure intact water seal in sanitary system and rectify crack if any

3 Natural Ventilation Spaces

- ❖ Open windows and doors (to allow natural ventilation/ fresh air)
- ❖ Purge the areas frequently (use fan toward windows and doors)
- ❖ Do not direct air flow of the fan directly from one person to another person
- ❖ Keep exhaust fans running to improve ventilation

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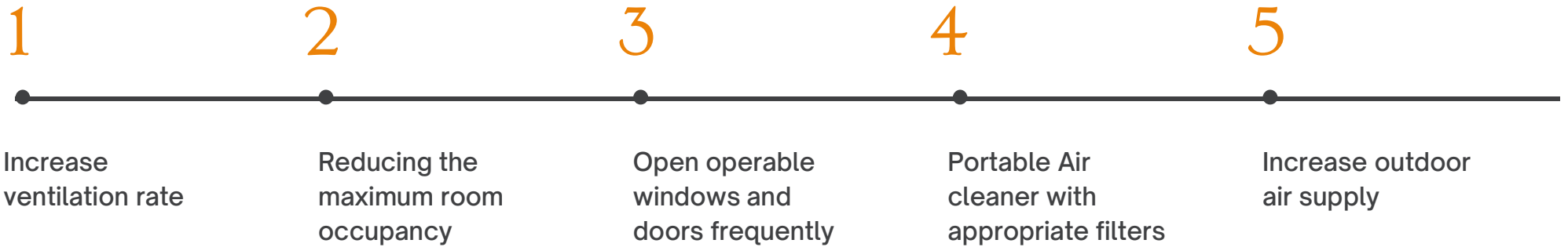
Ministry of Human Resources Malaysia

Ministry of Health Malaysia

- **Carrying out a Risk Assessment:** It is of importance that a risk assessment be carried out to facilitate the implementation of relevant countermeasures and to assess the minimum ventilation rate per person.
- **Non-residential setting can be divided into three (3) types of ventilation as follows:**
 - Air-Conditioned Spaces with Mechanical Ventilation (Centralized Air Conditioning System)
 - Air-Conditioned Spaces without Mechanical Ventilation (Non-Centralized Air Conditioning System)
 - Natural Ventilated Spaces

Recommendations

Few common method:



Few specific method:

	RESIDENTIAL	NON RESIDENTIAL	HEALTHCARE FACILITIES	PUBLIC AREA
AIR CHANGE	Use stand / ceiling fan	Minimize air recirculation	Increase outdoor air supply	Use stand / ceiling fan
AIR CLEANER/ FILTER	Use Air cleaner with appropriate filters	Min filter type MERV 13	Min filter type MERV 14	Use Air cleaner with appropriate filters

ROLES OF BUILDING MANAGEMENT, EMPLOYERS, HOMEOWNERS

- COMPLY TO STRATEGIES AND MINIMUM REQUIREMENTS LISTED IN EACH SETTINGS AND RECOMMENDATIONS SUCH AS
 - ANALYSE BUILDING MVAC SYSTEMS
 - PROPER OPERATIONS AND MAINTENANCE OF MVAC
 - MONITOR AND MAINTAIN RELATIVE HUMIDITY AS IN THE ICOP 2010
 - AVOID RECIRCULATION OF AIR
 - OPENING WINDOWS
 - EXTEND OPERATING TIMES OF MVAC
 - LIMIT NO OF OCCUPANCY
- WEAR MASK, PHYSICAL DISTANCING
- INCREASE VENTILATION RATE: 10L/S

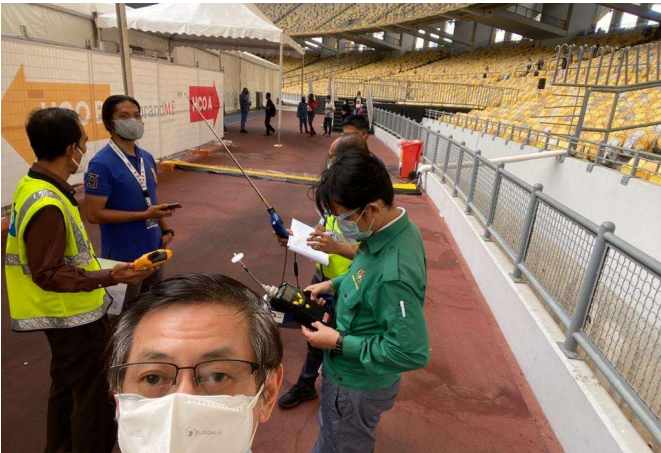


EXPECTATION

- **TO PROMOTE AND IMPLEMENT THESE GUIDANCES FOR THESE 4 SETTINGS**
- **THESE GUIDANCES MAY REDUCE THE RISK OF VIRUS TRANSMISSION THROUGH AIRBORNE.**
- **TO BE READ TOGETHER WITH SOP ESTABLISHED BY MKN AND MOH**
- **COMPLY TO SOPS AT ALL PUBLIC PLACES TO PREVENT BUILD UP OF CO2**
 - INITIAL VENTILATION PERFORMANCE INDICATOR**



MEASUREMENTS OF VENTILATION AT PPVS BY DOSH





Thank you!

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Technical Committee on Ventilation and Indoor Air
Quality (IAQ) During Pandemic COVID-19