

**Final Report on Compliance  
with the Requirement on Air Change or  
Air Purifiers in Seating Areas  
of Dine-in Catering Premises  
under Cap. 599F**

Working Group on  
Implementing the Requirement  
on Air Change or Air Purifiers  
in Dine-in Restaurants under Cap. 599F

**15 December 2021**

**Final Report on Compliance with the Requirement on  
Air Change or Air Purifiers in Seating Areas of Dine-in Catering Premises  
under Cap. 599F (“the Requirement”)**

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## 1. FOREWORD

- (a) Professor Sophia CHAN Siu-chee  
Secretary for Food and Health

Increasing air change in poorly ventilated and crowded indoor spaces is an important building block of the Government's overall anti-epidemic strategy. Implementing this in dine-in catering premises deserves priority attention, as augmentation of fresh air provision through air change or infection control by air filtration or germicide option would help reduce the risk of virus transmission in the mask-off environment. I am grateful to the Working Group for its meritorious contributions in completing the job with excellence under a compressed time frame.

As per the advice of Professor KY Yuen between the third wave and the fourth wave in the second half of 2020, the Government took on board the measure on air change or air purifiers for implementation in dine-in catering premises. In this regard, a voluntary declaration scheme was launched in October 2020, and this was substituted by the mandatory registration scheme in March 2021. The Government has arrived at the decision, after balancing relevant factors, including the efficacy of the measure and the capability of the trade. Pursuant to the Prevention and Control of Disease (Requirements and Directions) (Business and Premises) Regulation (Cap. 599F), the Secretary for Food and Health's Directions in relation to Catering Business gazetted on 17 March 2021 stipulated a requirement on air change or air purifiers for compliance in the seating areas of dine-in catering premises (the Requirement).

The smooth and expeditious implementation of the Requirement would not have been possible without the strong commitment and commendable efforts of the Working Group under the distinguished leadership of its Chairman and with the superb support from its members who are experts in their respective professional disciplines. I am indeed deeply impressed by –

- (a) the Guide that presents the technical details in an in-depth and yet user-friendly manner. This has enabled all to master the key concepts and facilitated pertinent and expeditious follow-up actions; and
- (b) this Final Report that is enlightening and inspirational. This has shed light on the pathways for further actions and helped galvanise other parties into actions towards minimising the viral load in air and delivering a better-ventilated indoor environment.

The full implementation of the Requirement in dine-in catering premises is a critical milestone marking a commemorative breakthrough. The lack of restaurant clustering since

April 2021 bears testimony to the tremendous contributions made by the Working Group for this cause. I am sure that the work of the Working Group will long be remembered as a masterpiece that is part and parcel of the holistic strategy in combating the pandemic, and a cornerstone for building up a resilient catering sector that lives up to its reputation as a gourmet paradise for our local citizens and outside visitors.

On behalf of the Government and the health sector, I wish to pay tribute to the Working Group and compliment the Electrical and Mechanical Services Department and the Food and Environmental Hygiene Department, for what they have accomplished for safeguarding public health and enabling society and economy to resume normal. I also look forward to the continued multi-disciplinary, cross-sectoral and community-wide support for the Government's anti-epidemic strategy, and appeal to all to work towards attaining the goal of dynamic "zero infection".

(b) Professor YUEN Kwok-yung  
Chair of Infectious Diseases, Department of Microbiology, HKU

In August and October 2020 and March 2021, I have been invited by the Centre for Health Protection to offer expert advice on certain outbreaks in dine-in catering premises from the virology and infectious disease perspective. With the support of a multi-disciplinary team consisting of epidemiologists from the Centre of Health Protection and representatives from various Departments, I have conveyed advice relating to air change per hour in catering premises to the Government. I am glad that such advice which is backed up by scientific evidence and professional knowledge has been taken on board by the Government and implemented through the laudable efforts made by the Working Group.

Fighting against coronavirus has all along been an uphill battle. I agree with the Secretary for Food and Health that a multi-disciplinary, cross-sectoral and community-wide approach is definitely indispensable. Professor Yuen Pak-leung, the Chairman of the Working Group, is a well-versed veteran who has been contributing his engineering expertise towards the anti-epidemic cause in 2003 (severe acute respiratory syndrome (SARS)) and in 2020 and beyond (SARS-CoV-2). Members of the Working Group are also expert representatives coming from a wide spectrum of backgrounds, including public health, engineering, surveying and ventilation. In addition, the Electrical and Mechanical Services Department and the Food and Environmental Hygiene Department also provide support from the engineering perspective and the regulatory perspective respectively. The accomplishment of the Working Group for the anti-epidemic cause is certainly praise-worthy.

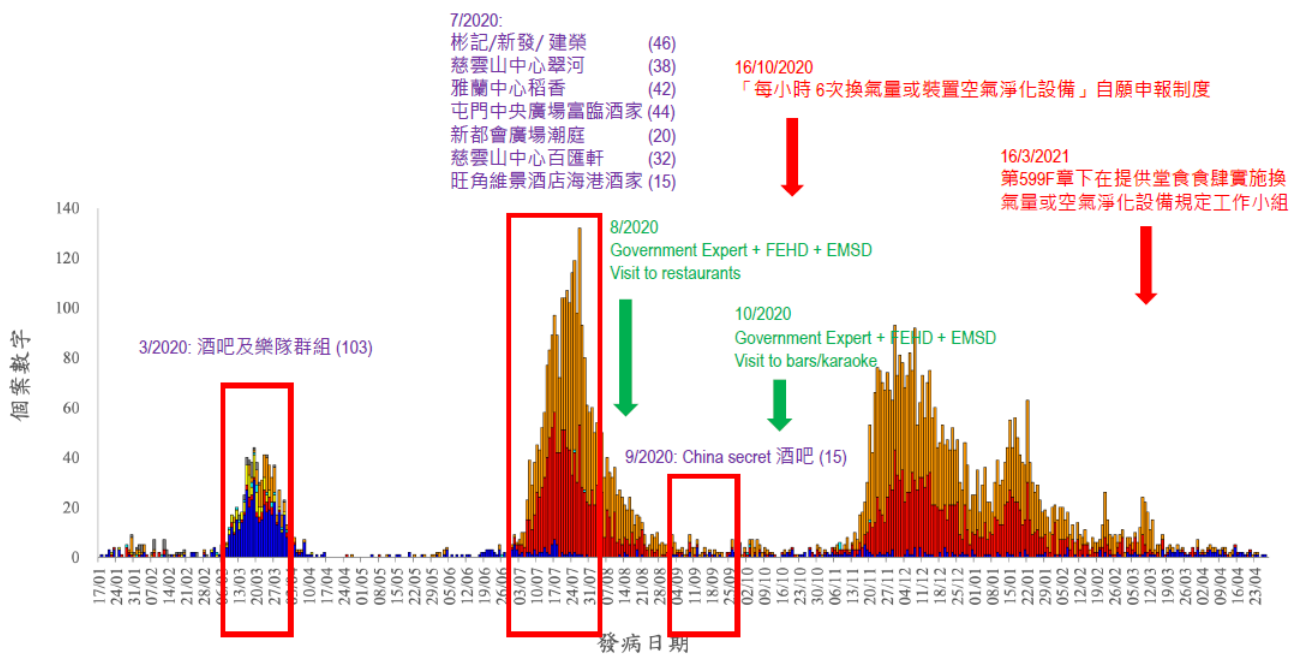
Hong Kong is especially susceptible to emerging infectious diseases due to overcrowded living environment caused by a high population density and a large number of in-bound visitors. The risk level of dine-in catering premises in terms of virus transmission warrants attention, as customers are mask-off when consuming food / drink and the conditions are often packed given the high rentals. Implementing air change per hour at 6 or above or installation of Ultraviolet Light (C) or High-Efficiency Particulate Arrestor (MERV 13) air purifiers in dine-in catering premises strikes a fine balance between protection of personal and public health and taking account of the practical impact on the trade.

We witness the rigour and tact of the Working Group, through reading its Guide and its Final Report. As shown in the powerpoint presentation introduced by Dr. David Lung to the Working Group and the analysis made by the Working Group in Part 5 of the Final Report, the epidemiological findings point to the importance of taking forward the air change or air purifier measure in poorly ventilated indoor environment with long mask-off time and oral conversation at short distance. On the efficacy of the measure, the lack of restaurant clustering since April 2021 speaks for itself. I hope that other relevant sectors could make reference to

the useful experience of the catering sector and put aside their imaginary difficulties in moving forward with implementing air change or air purifiers in their respective premises.

With dedication and professionalism, the Working Group has done a brilliant job that is difficult to be surpassed. I would like to join the Secretary for Food and Health in conveying my greatest appreciation to the Working Group, for setting an exemplary role model and convincing other relevant stakeholders to buy in this important initiative. I treasure the opportunity of having the Working Group as a seasoned partner cum trusted comrade in championing the cause of putting the pandemic under control.

### Sequence of event



- (c) Ir Professor YUEN Pak-leung  
Chairman of the Working Group

The Working Group feels honoured to be invited by the Government to join the fight against the virus. Increasing air change in some 18 000 existing catering premises is by no means easy; but guided by the motto “the climbing of a height begins at the base”, we have worked in concert with the Government, the experts, the professionals, the stakeholders and the community to accomplish the arduous mission.

With the requirement on air change or air purifiers gazetted on 17 March 2021 for compliance in the seating areas of dine-in catering premises from 18 March 2021 onwards, the Working Group appointed on 16 March 2021 held its first meeting on 17 March 2021 to forge ahead in full speed with our work plan, guided by the premise of a science-based and evidence-based approach.

It is indeed fortunate of us to have the benefit of the following –

- (a) sturdy support from members coming from a wide spectrum of backgrounds, including public health, engineering, surveying and ventilation, and representatives of the Electrical and Mechanical Services Department and the Food and Environmental Hygiene Department;
- (b) top-notch advice from experts of various professional disciplines that not only lays a solid foundation for practicable measures that suit the context of various settings in a sensitive and pragmatic manner, but also enables useful analysis of the efficacy outcomes and constructive insights that provide some pointers for charting future paths for actions; and
- (c) full co-operation from the catering trade, the ventilation contractor trade, the electrical supplier trade, the development sector and the hotel sector, which play a pivotal role in bringing the mission impossible into fruition.

It is with great pleasure that I present to all this Final Report of the Working Group, recapitulating the work and outcome of the Working Group and crystallising our experience into insights for future knowledge/experience sharing purposes. The vast majority of catering premises have reported compliance with the Requirement progressively in Q2 to Q3 2021, as it took time for the market supply (of air purifiers) to reach HK to meet the surge in demand in those days. It is comforting to learn of the lack of restaurant clustering in April 2021 and the post-implementation stage from May to September 2021. The fruitful outcome demonstrates the progressive realisation of the support-worthy goal to protect the health of staff, customers

and the public, fortify the public confidence in patronising our catering premises, restore our society and economy to normality, and gear up for the resumption of quarantine-free travel between the Mainland and Hong Kong.

Last but not the least, I would like to take this opportunity to express our thanks and gratitude to all concerned for their assistance to the Working Group in bringing into fruition better-ventilated catering premises with resilience to rise above challenges in testing times.

Together, we fight the virus! In unison, we come through the pandemic!



## 2. EXECUTIVE SUMMARY

- 2.1 In the light of the changing development on the COVID-19 pandemic, the Government stipulated on infection control grounds a requirement on air change or air purifier to be complied with in the seating areas of dine-in catering premises in the directions in relation to catering business under the Prevention and Control of Disease (Requirements and Directions) (Business and Premises) Regulation (Cap. 599F) (the Regulation) since 17 March 2021.
- 2.2 The Working Group, established for the smooth implementation of the requirement, together with relevant government departments proactively collaborated with stakeholders including catering business operators, ventilation works contractors, electrical appliance suppliers. Premised on a science-based and evidence-based approach, the Working Group was fully committed to assisting them in rising above the challenges, so as to protect the health of staff, customers and the public and fortify the public's confidence in patronising catering premises.
- 2.3 As illustrated in Part 3 and Part 4 of the Final Report, the Working Group took forward the exercise through literature review with international standards, stakeholders' feedback and thorough deliberation. Guided by professionalism and pragmatism, the Working Group followed through its work plan for using engineering control means for reducing the risk of airborne transmission of SARS-CoV-2. A list of air purifiers that met the specified specifications has been issued since 31 March 2021. "A Guide on Compliance with the Requirement on Air Change / Air Purifiers in Seating Areas of Dine-in Catering Premises" has been issued since 11 April 2021 to provide specific technical details in an in-depth yet user-friendly manner to enable the trades to master the essential points and facilitate expeditious follow-up arrangements to fulfill the Requirement. A series of public education and publicity work has also been made, including compilation of FAQs, production of video clip on operational details, holding of webinar and on-site visits to assist catering premises in implementing the Requirement.
- 2.4 According to the analysis made by the Working Group in Part 5 of the Final Report, the epidemiological findings point to the importance of taking forward the air change or air purifier measure in poorly ventilated indoor environment with long mask-off time and oral conversation at short distance. Since April 2021, dine-in catering premises were required to have complied with the Requirement (air change or air purifiers) and relevant measures were also launched under the vaccine bubble policy. In fact, there has been no restaurant clustering documented in April 2021 and during the post-implementation period (1 May to 28 September 2021). Of the 53 relevant catering

premises visited by 19 confirmed cases from 1 May 2021 to 31 August 2021, all were ACH-compliant as at the respective time of visit. Notwithstanding the high risk of exposure in the mask-off environment and the visits made by the confirmed cases to the restaurants, the Requirement might have been instrumental in forestalling the emergence of any outbreak at the restaurant setting since April 2021. The measure to control airborne spread within restaurants could be among the various factors that has contributed to a reduction in risks on virus transmission within restaurants since April 2021<sup>1</sup>.

- 2.5 In Part 6 of the Final Report, the Working Group wishes to consolidate the experience gained and share its collective insights, in case this would be of use when parties concerned wish to chart the way forward as further findings from scientific research unveil themselves. Knowledge/experience sharing sessions and close liaison among parties concerned in various sectors might help keep current the knowledge base and facilitate further pursuit of the engineering control approach on handling air change. It also hopes that our experience on this issue could help reinforce the due attention and importance to be accorded by various international professional organisations (public health, engineering, building etc.) to the engineering control approach on handling air change.
- 2.6 As the Working Group Chairman says, “time and tide (the pandemic) wait for no man”. We appeal to all to press ahead at full steam with the multi-disciplinary, cross-sectoral and community-wide efforts in support of the Government’s anti-epidemic strategy.

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<sup>1</sup> However, without a meaningful number of sample size for a sophisticated study involving isolating various confounding factors (transmission by way of contact rather than short-range airborne; other infection control measures etc.) to be conducted, the Working Group acknowledges that the effect may not be easily demonstrated under the current caseloads and there is limitation to the interpretation under intellectual rigour.

### **3. BACKGROUND**

#### **Introduction**

- 3.1 This Working Group has been established since 16 March 2021 to advise the Government on the smooth implementation of the Requirement (see **Appendix 1** for the terms of reference and the composition). This Final Report articulates our mission, recapitulates the theoretical and scientific basis, records the implementation details, offers some observations and shares some insights.

#### **Mission**

- 3.2 This Working Group has been joining hands with the Government and stakeholders in the mission to enable Hong Kong to come through the pandemic, and we together fortify the Requirement (air change or air purifiers), one of the building blocks that underpins the Government’s overall anti-epidemic strategy, thus equipping our dine-in catering sector with resilience to rise above challenges in testing times.

#### **Cap. 599F Directions**

- 3.3 The World Health Organization (“WHO”) declared on 30 January 2020 that the outbreak of a novel coronavirus infection constituted a Public Health Emergency of International Concern, and characterized COVID-19 as a pandemic on 11 March 2020.
- 3.4 The HKSARG launched the Preparedness and Response Plan for Novel Infectious Disease of Public Health Significance on 4 January 2020. Among the anti-epidemic measures, social distancing is key to delaying the spread of COVID-19. The Prevention and Control of Disease (Requirements and Directions) (Business and Premises) Regulation (Cap. 599F) was enacted on 28 March 2020, and the Secretary for Food and Health’s Directions (“SFH’s Directions”) in relation to Catering Business have been in place since 28 March 2020.

#### **Voluntary Declaration Scheme**

- 3.5 A voluntary declaration scheme was launched on 16 October 2020 for inviting catering business operators<sup>2</sup> to declare on-line, in respect of the seating areas of dine-in catering premises, (1) whether they have attained air change per hour (fresh air) (“ACH”) at 6

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<sup>2</sup> It covered holders of general restaurant, light refreshment restaurant, marine restaurant and factory canteen licences issued by the Food and Environmental Hygiene Department (“FEHD”).

or above; or (2) whether they have installed air purifiers that meet the specified specifications<sup>3</sup> as an alternative, on or before 31 December 2020. It has subsequently been extended until 17 March 2021, after which it has been substituted by the mandatory registration scheme below.

### **Mandatory Registration Scheme**

3.6 Under the mandatory registration scheme launched on 18 March 2021, catering business operators as defined in section 3 of Cap. 599F<sup>4</sup> are required to register on-line<sup>5</sup>, in respect of the seating areas of dine-in catering premises, (1) whether they have attained ACH at 6 or above; or (2) whether they have installed air purifiers that meet the specified specifications<sup>6</sup>, on or before 30 April 2021; and to download a notice within 2 days after the registration for display at the entrance of their dine-in catering premises<sup>7</sup>. The Requirement is set out in the SFH's Directions gazetted on 17 March 2021 (see **Appendix 2** for an extract of the Gazette Notice).

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<sup>3</sup> It covered (1) Ultraviolet-C (“UV-C”) cum High-Efficiency Particulate Arrestance Filter (“HEPA”) device; or (2) UV-C device.

<sup>4</sup> It covered holders of general restaurant, light refreshment restaurant, marine restaurant and factory canteen licences issued by FEHD and non-licensed operators of catering premises (those in a clubhouse holding a certificate of compliance issued by the Home Affairs Department (“HAD”), school canteens, workplace canteens etc.).

<sup>5</sup> The link of the on-line platform is <https://www.fehd.gov.hk/english/licensing/CateringPremisesAir.html>. A certificate issued by a Registered Specialist Contractors (Ventilation) (“RSC(V)”) in prescribed format is required to be uploaded and the submission is required to be signed by the catering business operator concerned.

<sup>6</sup> It covered (1) HEPA cum UV-C device; or (2) HEPA device; or (3) UV-C device.

<sup>7</sup> In addition, the list of licensed catering premises meeting ACH of 6 or above, and/or those installed with air purifier(s) meeting the prescribed specifications, will be published on FEHD website for public inspection.

## 4. THEORETICAL AND SCIENTIFIC BASIS

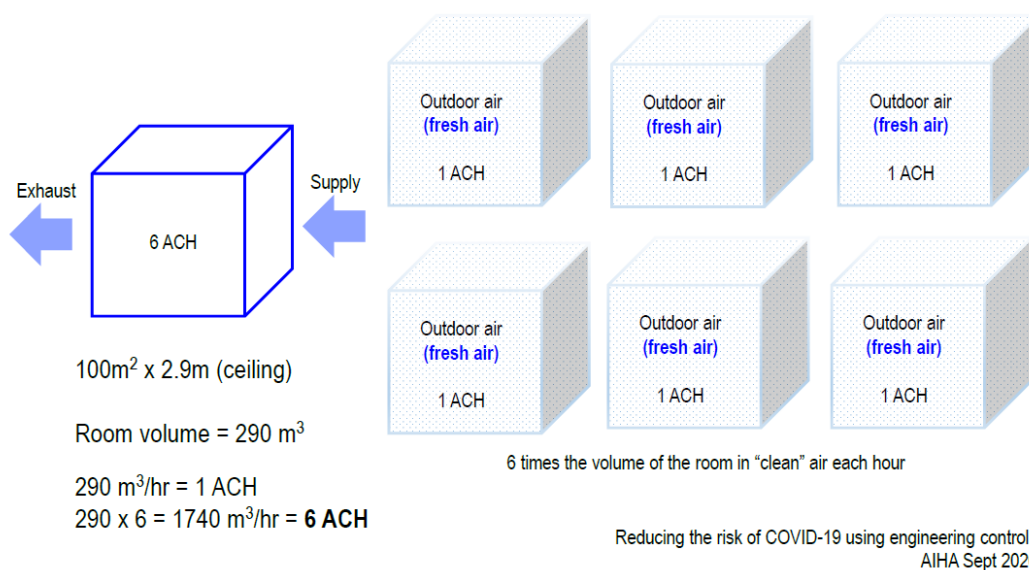
### Introduction

4.1 At the outset, the Government’s position (see [Appendix 3](#) presented to the Working Group), including the rationale behind its decision made in October 2020, was affirmed by the Working Group. In gist, the Working Group has reviewed various research articles on the theoretical and scientific basis provided at that time, and recorded that the concept of increasing ACH, either in lieu of or as augmentation to, the existing provision in the catering premises, is a practical means taken worldwide to tackle the imminent issue at hand as articulated by the Government. At its meeting on 9 December 2021, further literatures examined by the Working Group further reinforced the engineering control approach adopted at the outset.

### General

4.2 While discussion of airborne transmission of SARS-CoV-2 is still evolving, the Working Group could as early as March 2021 appreciate the theoretical and scientific basis behind the Government’s decision on using ACH at 6 or above<sup>8</sup> in the context of the voluntary declaration scheme in October 2020, on which the mandatory registration scheme in March 2021 was premised. There are several key risk factors of COVID-19 in dine-in catering premises, including long mask-off time and oral conversation at short distance. Given the studies available, one could not rule out the possibility that

<sup>8</sup> The diagram below seeks to facilitate layman’s understanding of what ACH at 6 means –



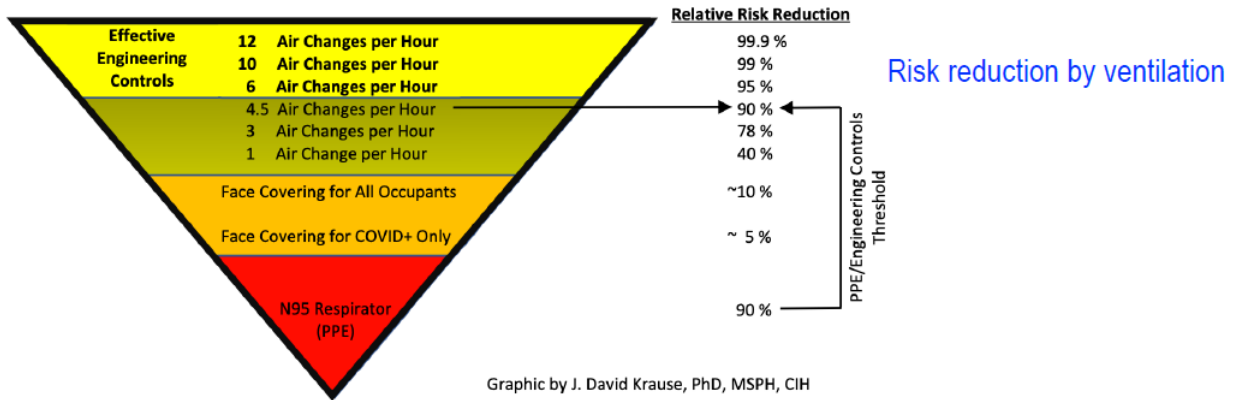
Source: Modified from “Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document (AIHA)” (presenting the smart-art presentation with figures in HK context) – see item 15 of the bibliography list of the Guide

SARS-CoV-2 can be transmitted by an airborne route in poorly ventilated and crowded indoor spaces, and good air ventilation or air changes can dilute virus-laden particles at close-range of infected persons.

- 4.3 Increasing indoor air changes to reduce infection is promoted by WHO, the Centers for Disease Control and Prevention of the United States (“US CDC”) as well as many other international professional organisations (public health, engineering, building etc.), while the accumulation of evidence on airborne transmission of SARS-CoV-2 is still on-going. Their suggestions also highlight that when the air dilution option is not possible, the air filtration or germicide option may be pursued as the alternative. In summary, augmentation of fresh air provision through air change or infection control by air filtration or germicide option would help reduce the risk of airborne transmission of SARS-CoV-2.

### **Specific**

- 4.4 Consolidating on the outcome of the literature review, based on the national standards of the People’s Republic of China and the guidelines on ventilation system design for public places (including food premises) formulated by the Chartered Institution of Building Services Engineers (in the UK), the fresh air provision for catering premises is recommended to be 8 to 10 litres/second/person (equivalent to 6.4 to 8 ACH with an assumed storey height of 3 metres). According to the “Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document” (Version 4) published by the American Industrial Hygiene Association (AIHA) in September 2020, ACH to 6 is an effective engineering control to reduce the relative risk of exposure to COVID-19 by 95% (ACH at 4.5 only offers a relative risk reduction of 90% whereas an ACH at 6 offers a relative risk reduction of 95%). In non-healthcare facilities where occupant density cannot be limited to fewer than one person per 3 square metres (or there is a likelihood that infected persons being present), it is necessary to increase the air change rate to ACH at 6 or above.

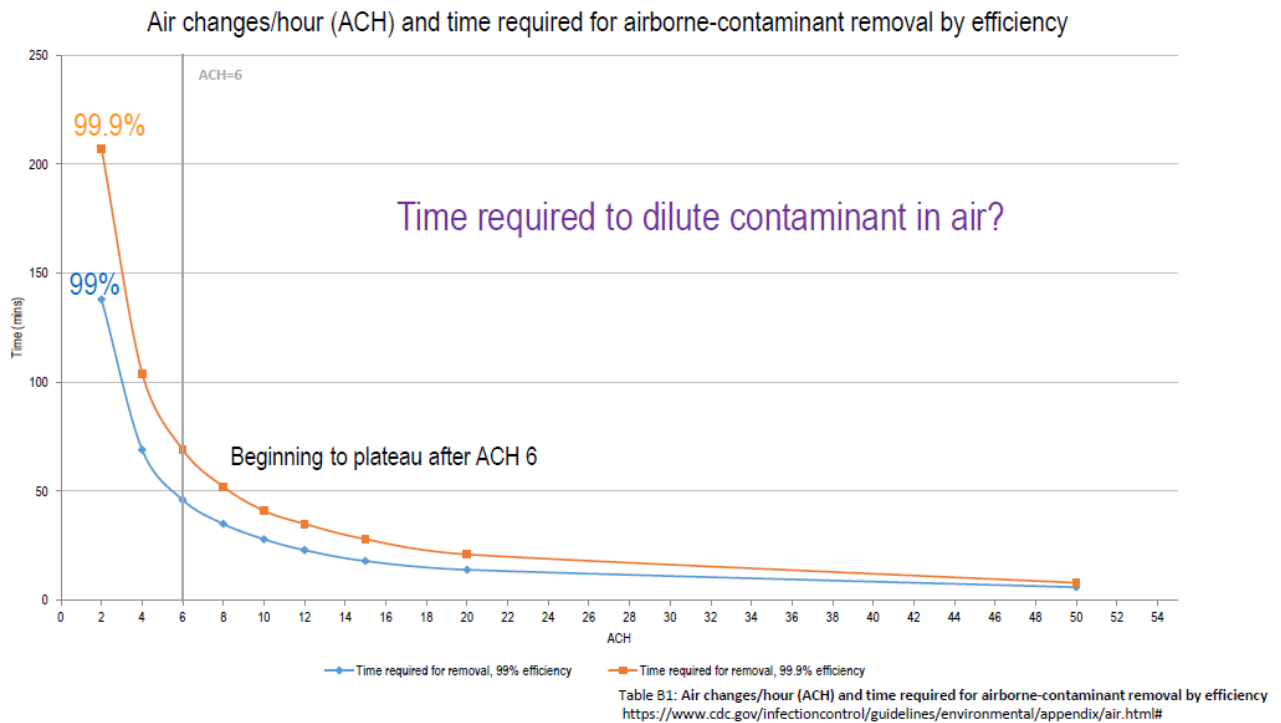


AIHA August 2020

Source: “Supplement to Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document (AIHA)” and “Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document (AIHA)” – see items 14 and 15 of the bibliography list of the Guide

4.5 After balancing all the relevant factors (including the effectiveness of the measures and the acceptability to the trade), the Government made an optimal choice and decided in October 2020 to adopt ACH at 6 or above in respect of the seating areas of dine-in catering premises<sup>9</sup> as the threshold under the voluntary declaration scheme. This level is equivalent to 27 cubic metres/hour/person, which is higher than 17 cubic metres/hour/person stipulated under the Public Health and Municipal Services Ordinance (Cap. 132).

<sup>9</sup> assuming a storey height of 3 metres and a footprint of 1.5 square metres per person



Source: Modified from Appendix B – Table B.1.: Air changes/hour (ACH) and time required for airborne- contaminant removal by efficiency (in graph presentation) in “Guidelines for Environmental Infection Control in Health-Care Facilities (US CDC)” – see item 1 of the bibliography list of this Final Report

4.6 To facilitate the public to grasp the idea, the Government has not opted to express the threshold in terms of the 7.5 litres/second/person description. The Working Group reckons that the thresholds could move with times, as further findings from scientific research unveil themselves. It should suffice for the various standards available prior to the publication of this Final Report to be presented in the summary table below for ease of reference -



| Standards/Regulations  | Year                            | m <sup>3</sup> /hr/person | L/s/person | ACH at 3m height Ceiling @1.5m <sup>2</sup> /person | ACH at 2.3m height Ceiling @1.5m <sup>2</sup> /person |
|--|---------------------------------|---------------------------|------------|---|---|
| Section 93(1) of and Second Schedule to the Public Health and Municipal Services Ordinance (Cap. 132) (for Restaurant) | prior to 1997                   | 17.0                      | 4.7        | 3.8   | 4.9   |
| Buildings Department Practice Note ADM2 (for Office)   | May 2011                        | 36.0                      | 10.0       | 8.0   | 10.4  |
| Chartered Institute Building Services Engineer (CIBSE) Guide A (for Restaurant)  | 2015 edition (May 2019 reprint) | 36.0                      | 10.0       | 8.0   | 10.4  |
| ASHRAE Standard 62.1 The Standards for Ventilation and Indoor Air Quality (for Restaurant)                             | 2019                            | 18.7                      | 5.1        | 4.2   | 5.4   |
| 國家市場監督管理總局、中國國家標準化管理委員會 (國家標準) GB37488-2019 Hygiene Indicators and Limits for Public Places (for Public Leisure Place) | April 2019                      | 30.0                      | 8.3        | 6.7   | 8.7   |
| FEHD's voluntary declaration scheme on air changes in licensed catering premises                                       | October 2020                    | 27.0                      | 7.5        | 6.0   | 6.0   |
| FEHD's mandatory registration scheme on air change in licensed catering premises                                       | March 2021                      |                           |            |   |   |
| Scottish Government Coronavirus (COVID-19): Ventilation Guidance   | December 2020                   | 28.8 - 36.0               | 8 - 10     | 6.4 - 8   | 8.3 - 10.4  |
| WHO Roadmap to Improve and Ensure Good Indoor Ventilation in the Context of COVID-19 (non-residential settings)        | March 2021                      | 36                        | 10         | 8   | 10.4  |

4.7 As the ventilating system in the seating area of dine-in catering premises generally meets ACH at 3.8 to 4.9<sup>10</sup> or above, the system could be adjusted, upgraded or improved to make up the difference, if any, or by installing air purifiers with filtration or germicide function of a level that is effective in reducing the risk of SARS-CoV-2 transmission. These measures are recognised and recommended by

<sup>10</sup> This is the baseline as converted from the requirement of 17 cubic meters per hour per person in the Second Schedule of the Public Health and Municipal Services Ordinance (Cap. 132). An assumed footprint of 1.5 square meters for each person and an assumed storey height (ranging from 3 metres to 2.3 metres) are adopted.

For food preparation room (kitchens) of dine-in catering premises, ACH at 20 is already a licensing requirement.

international/national engineering and health organisations, including (a) the American Society of Heating, Refrigeration and Air-Conditioning Engineers (“ASHRAE”); (b) the Chartered Institution of Building Services Engineers (“CIBSE”); and (c) US CDC.

## 5. IMPLEMENTATION

### Work of the Working Group

- 5.1 As early as 18 March 2021 when the Requirement came into operation, the Working Group held its first meeting and also invited suppliers to provide information on their air purifiers that met the specified specifications before 28 March 2021.
- 5.2 The Working Group held five meetings<sup>11</sup>, arranged five engagement sessions with stakeholders<sup>12</sup>, convened a press conference on 31 March 2021, organised a webinar for stakeholders on 27 April 2021, joined the Government's team to attend the LegCo Food Safety and Environmental Hygiene Panel meeting on 30 April 2021, and conducted visits to various catering premises on three days<sup>13</sup>.



- 5.3 The literature review, stakeholders' feedback and thorough deliberation laid a solid foundation for taking forward the exercise. At the inaugural press briefing on 31 March 2021, the Working Group introduced how to use engineering control means for

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<sup>11</sup> Five meetings were held respectively on 18 and 30 March, 19 April, 6 May and 8 December 2021.

<sup>12</sup> Five engagement sessions with stakeholders, namely separately with RSCs and air purifier suppliers on 24 March, with the catering sector on 25 March, the hotel trade on 8 April and the property management sector on 23 April 2021.

<sup>13</sup> Visits to catering premises including Chinese restaurant, Hong Kong-style tea restaurant, bar, dessert shop, hotel restaurant, dining club, etc. on 29 March, 20 April and 25 May 2021.

enhancing ventilation, and foreshadowed the release of a list of air purifiers that met the specified specifications and the issue of a Guide to provide general information and guidance on how the Requirement could be fulfilled.

- 5.4 The Working Group started to release a list of air purifiers that met the specified specifications from 31 March 2021. There were a total of 464 air purifiers on the list uploaded onto FEHD's webpage.
- 5.5 Guided by professionalism and pragmatism<sup>14</sup>, the Working Group issued a Guide on 11 April 2021 to provide specific technical details in an in-depth yet user-friendly manner. The Guide consists of various sections, including theoretical basis; calculation of ACH; feasible measures to improve ACH; rationale for air purifiers meeting specified specifications as alternative; standards required of meeting specified specifications; points to note and observe relating to safety precautions on installation, application, repair and maintenance covering electrical works, building services and fire safety aspects; registration procedures and transparency measures; procedural steps for ventilation works contractors; and schematic presentation of workflow. The Guide sought to enable the trades to master the essential points and facilitate expeditious follow-up arrangements, so as to facilitate the prompt implementation of the Requirement.
- 5.6 The Working Group conducted public education and publicity work, including –
- (a) compiling FAQs;
  - (b) producing video clip on operational details;
  - (c) holding a webinar (with video clip on the proceeding); and
  - (d) making visits to grasp a first-hand understanding of the on-the-ground situation and offer advice to assist catering premises in implementing the Requirement.

### **Outcome of Registration and Compliance**

- 5.7 The number of catering premises with registration received and confirmed in 2021 is set out in the table below -

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<sup>14</sup> With illustration by way of working examples, determination of air change / air purifiers are based on the seating layout and zoning under the SFH's directions under Cap. 599F, as compared with computation of the standard of 17 cubic meters / hour / person (as a whole) stipulated under the Public Health and Municipal Services Ordinance (Cap. 132).

| By Year-month | Number of catering premises with registration <b>received</b> |                       |        | Number of catering premises with registration <b>confirmed</b> |                       |        |
|---------------|---|-----------------------|--------|--|-----------------------|--------|
|               | licensed premises   | non-licensed premises | total  | licensed premises  | non-licensed premises | total  |
| 2021-01       | 39  | 0                     | 39     | 39   | 0                     | 39     |
| 2021-02       | 53  | 0                     | 53     | 53   | 0                     | 53     |
| 2021-03       | 219   | 0                     | 219    | 127  | 0                     | 127    |
| 2021-04       | 7 039   | 422                   | 7 461  | 1 757  | 5                     | 1 762  |
| 2021-05       | 10 137  | 846                   | 10 983 | 7 592  | 292                   | 7 884  |
| 2021-06       | 13 629  | 1 166                 | 14 795 | 11 030   | 580                   | 11 610 |
| 2021-07       | 14 901  | 1 304                 | 16 205 | 13 649   | 795                   | 14 444 |
| 2021-08       | 15 352  | 1 430                 | 16 782 | 14 637   | 909                   | 15 546 |
| 2021-09       | 17 083  | 1 430                 | 18 513 | 16 035   | 1 029                 | 17 064 |
| 2021-10       | 17 147  | 1 429*                | 18 576 | 16 858   | 1 127                 | 17 985 |
| 2021-11       | 17 267  | 1 374*                | 18 641 | 17 042   | 1 224                 | 18 266 |

\* Duplicated/withdrawn registrations were removed.

Please see <https://www.fehd.gov.hk/english/licensing/licence-foodPremises-rest.html> for the lists of various compliant licensed catering premises.

5.8 As at 30 November 2021, the number of registrations for licensed and non-licensed food premises received stood at 18 641, among which 18 266 had been confirmed to have met the requirement while checking of the remaining 81 was in progress. 294 licensed catering premises were under lock and their food businesses were suspended. 13 summonses were initiated against non-compliant catering premises who could not provide any valid reasons for the blatant and persistent breaches<sup>15</sup>.

5.9 A breakdown by meeting ACH at 6 or above, installation of air purifiers (with types) or both is set out in the table below -

<sup>15</sup> Court hearings for all the 13 summonses are pending.

| Number of Registration on Air Change/Installation of Air Purifier Under Cap.599F<br>( as at 30.11.2021 ) |                 |                                     |                           |                       |               |                                      |                           |                       |               |
|--|-----------------|-------------------------------------|---------------------------|-----------------------|---------------|--------------------------------------|---------------------------|-----------------------|---------------|
| Air Change/Air Purifier  |                 | No. of Registration <b>Received</b> |                           |                       |               | No. of Registration <b>Confirmed</b> |                           |                       |               |
|  |                 | Under Voluntary Scheme              | Under Registration System |                       | Total         | Under Voluntary Scheme               | Under Registration System |                       | Total         |
|  |                 |                                     | Licensed Premises         | Non-licensed Premises |               |                                      | Licensed Premises         | Non-licensed Premises |               |
| ACH  |                 | 116                                 | 1 704                     | 301                   | 2 121         | 113                                  | 1 665                     | 290                   | 2 068         |
| Air Purifier   | HEPA            | 2                                   | 3 506                     | 244                   | 3 752         | 0                                    | 3 509                     | 210                   | 3 719         |
|  | UV-C            | 10                                  | 1 845                     | 139                   | 1 994         | 9                                    | 1 833                     | 113                   | 1 955         |
|  | HEPA cum UV-C   | 0                                   | 9 886                     | 656                   | 10 542        | 0                                    | 9 814                     | 582                   | 10 396        |
|  | <b>Subtotal</b> | 12                                  | 15 237                    | 1 039                 | 16 288        | 9                                    | 15 156                    | 905                   | 16 070        |
| Both ACH & air purifier  | HEPA            | 0                                   | 78                        | 7                     | 85            | 0                                    | 43                        | 6                     | 49            |
|  | UV-C            | 1                                   | 38                        | 3                     | 42            | 1                                    | 27                        | 2                     | 30            |
|  | HEPA cum UV-C   | 0                                   | 81                        | 24                    | 105           | 0                                    | 28                        | 21                    | 49            |
|  | <b>Subtotal</b> | 1                                   | 197                       | 34                    | 232           | 1                                    | 98                        | 29                    | 128           |
| <b>Total</b>   |                 | <b>129</b>                          | <b>17 138</b>             | <b>1 374</b>          | <b>18 641</b> | <b>123</b>                           | <b>16 919</b>             | <b>1 224</b>          | <b>18 266</b> |
|  |                 | <b>17 267</b>                       |                           |                       |               | <b>17 042</b>                        |                           |                       |               |

5.10 In addition, follow-up actions have also been taken in respect of the following catering premises –

- (a) with the assistance of EMSD, FEHD has seen to the compliance with the Requirement in all its 68 cooked food venues; and
- (b) FEHD has also checked the airline lounges and the Food Court within the restricted area of the Airport. 8 air lounges<sup>16</sup> and the Food Court have reported compliance with the Requirement. The remaining 6 air lounges<sup>17</sup> have not yet reported compliance with the Requirement.

<sup>16</sup> One of the 8 air lounges still has its business suspended as at 30 November 2021.

<sup>17</sup> All 6 air lounges still have their businesses suspended as at 30 November 2021.

## 6. OBSERVATIONS

6.1 The PPT presented by Dr. David LUNG to the Working Group at its Fifth Meeting is set out below.

Review of COVID-19 clustering in restaurants  
Jan – Sept 2021

David Lung

1

Measures implemented during different specified periods

|                                    | 7/1 – 17/2   | 18/2 – 28/4            | 29/4 – 23/6                                      | 24/6 – 29/9  | 30/9 – 27/10                    |
|------------------------------------|--|------------------------|--|--|---------------------------------|
| Time of suspending Dine-in Service | 6pm – 4:59am   | 10pm – 4:59am          | Type A: 6pm – 4:59am<br>Type C: 12am – 4:59am    | Type B: 10pm – 4:59am<br>Type D: 2am – 4:59am          |                                 |
| Masking                            | All time except while consuming food or drinks at a table                          |                        |  |  |                                 |
| Hand hygiene                       | Provision of hand sanitizers   |                        |  |  |                                 |
| Body temperature screening         | Conducted before entry   |                        |  |  |                                 |
| LeaveHomeSafe (LHS)                | Scanning of LHS venue QR code or registration of name/contact information required |                        |  |  |                                 |
| Table distance                     | 1.5m or with partition   |                        |  |  |                                 |
| Seating capacity                   | 50%  |                        | Type A: B: C: 50%<br>Type D: 75%                 | Type A: B: 50%<br>Type C: 75%<br>Type D: 100%          |                                 |
| Persons per table                  | 2  | Type A: 2<br>Type B: 4 | Type A: 2<br>Type B: 4<br>Type C: 6<br>Type D: 8 | Type A: 2<br>Type B: 4<br>Type C: 6<br>Type D: 12      |                                 |
| No. of Participants at Banquet     | 20   |                        | Type A: B: C: 20<br>Type D: 100                  | Type A: B: C: 20<br>Type D: 160                        | Type A: B: C: 20<br>Type D: 240 |
| Testing/Vaccination for staff      | NA   | Type B: testing        | Type A: NA; Type B: testing                      | Type C: 1 <sup>st</sup> dose; Type D: fully vaccinated |                                 |
| Vaccination for patrons            | NA   |                        | Type D: 1 <sup>st</sup> dose                     | Type D: 1 <sup>st</sup> dose for 2/3 of the patrons    |                                 |

2

Definition of clustering in a restaurant

- Confirmed customers attending the same food premises **around** the same time during their respective **incubation or infectious period**
- Had no other contact history (i.e. pure meal contacts or customers who did not know each other)
- Clusters refer to groups of patrons who are not sharing the same dining table (signify cross table transmission)
- Exclude family members or friends who dined together on the same dining table in the food premises

3

|                | Total number of clusters identified (cases involved) [(a)] | Number of confirmed local cases with history of visiting restaurants [(b)] | Number of restaurant exposures by the confirmed cases (confirmed cases x no. of visit to restaurants) [(c)] | Number of restaurant clustering identified per 100 exposures [(a) / (c) x 100] |
|----------------|--|--|---|--|
| Jan 2021       | 1 (2 cases involved)                                       | 140  | 274   | 0.365  |
| Feb 2021       | 3 (27* cases involved)                                     | 119  | 399   | 0.752  |
| March 2021     | 2 (4 cases involved)                                       | 145  | 424   | 0.472  |
| April 2021     | 0  | 43   | 117   | 0  |
| May 2021       | 0  | 7  | 24  | 0  |
| June 2021      | 0  | 4  | 19  | 0  |
| July 2021      | 0  | 5  | 32  | 0  |
| August 2021    | 0  | 3  | 20  | 0  |
| September 2021 | 0  | 0  | 0   | 0  |
| Total          | 6  | 466  | 1306  |  |

\*one cluster involving 22 patrons in a restaurant outbreak

4

From 1 Jan 2021 – 30 April 2021

- 447** patients confirmed positive have history of visiting restaurants during their respective infectious period
- Total of **1214** episodes recorded through the contract tracing system of CHP
- Among the **1214** episodes, there were **6** episodes of clustering documented

5

1 May 2021 – 28 September 2021

- 19** patient confirmed positive have history of visiting restaurants during their infectious period
- Total of **95** episodes recorded through the contract tracing system of CHP
- There was **no clustering** in restaurants documented during this period
- Variant of concern (VOC) cases detected during this period:
  - Beta: 10
  - Alpha: 3
  - Delta: 2\*

\*basic reproductive number of Delta variant is much higher than the R0 of the ancestral strain

6

**Details of the restaurants:**

- There were 62 restaurants (95 restaurants with 33 duplicated) visited by confirmed cases from May to August 2021

| ACH status                              | No. of catering premises |
|---|--------------------------|
| Catering premises with ACH registration | 53                       |
| Non-catering premises*                  | 5                        |
| No specific address and shopsign        | 3                        |
| Business suspended                      | 1                        |
| Total                                   | 62                       |

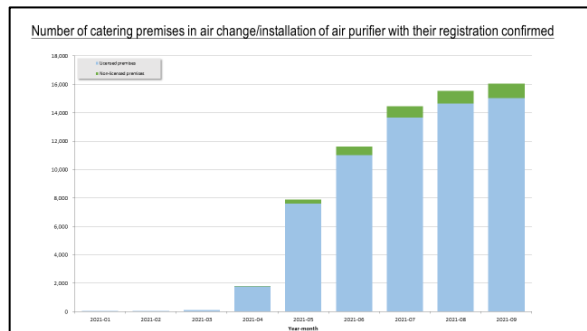
- All 53 with ACH registration have been uploaded onto FEHD's website

\* mainly food factories – not subject to the air change/air purifier requirement under Cap. 599F, as no dine-in operation is involved

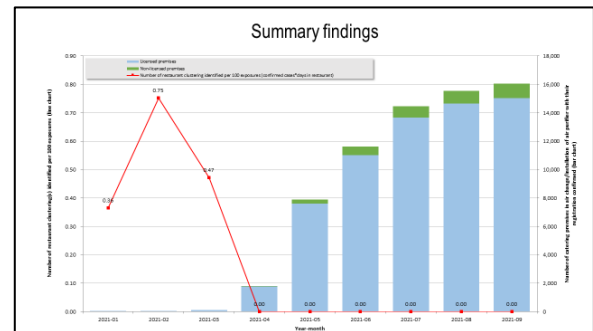
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8



9



10

**Summary of observation during the period of review**

- During the period of review, restaurant clustering only occurred in the first three months of the pre-implementation phase (January – April 2021)
- There was a lack of restaurant clustering in April 2021
  - Over 7500 catering premises / cook food venues had reported compliance with requirement by the end of April 2021
- No clustering in restaurants was observed in April 2021 and the post-implementation phase (May – September 2021)

11

**The end**

12

6.2 As shown in page 2 of the PPT, the Working Group acknowledges that a basket of anti-epidemic and social distancing measures have been implemented in dine-in catering premises since March 2020 that have contributed towards putting the pandemic under control.

6.3 We witness end April 2021 as a watershed as follows –

- dine-in catering premises were required to have complied with the Requirement (air change or air purifiers) by 30 April 2021; and
- the vaccine bubble policy has been implemented in dine-in catering premises



from 29 April 2021, whereby:

- (i) for Type B mode of operation<sup>18</sup>, staff members must undergo regular testing (unless they have completed the vaccination course). This has been changed from deep throat saliva to combined nasal and throat swab from 29 April 2021 and from once every 14 days to once every 7 days from 19 August 2021;
- (ii) for Type C mode of operation, staff members must have received the first dose of vaccine; and
- (iii) for Type D mode of operation, staff members must have completed the vaccination course and the relevant percentage of customers must have received the first dose of vaccine.

6.4 A clustering in a restaurant is defined (according to the Centre for Health Protection working protocol) to mean –

- (a) confirmed cases attending the same food premises around the same time during their respective incubation or infectious period;
- (b) had no other contact history (i.e. pure meal contact or customers who did not know each other);
- (c) clusters refer to groups of patrons who are not sharing the same dining table (signify cross-table contamination); and
- (d) excluding family members or friends who dined together on the same dining table in the food premises.

6.5 During the pre-implementation period (1 January to 30 April 2021), there were 447 confirmed cases that have history of visiting restaurants during their respective incubation or infectious period. A total of 1 214 episodes was recorded through the COVID-19 Case Handling and Information Sharing Portal of CHP. Among the 1 214 episodes, there were 6 clusters documented (patients involved ranging from 2 to 27). The number of restaurant clustering identified per 100 exposures was 0.365 in January, 0.752 in February, 0.472 in March and 0 in April 2021. Next generation sequencing was performed for the clusters involved in January to March 2021 (for those clusters

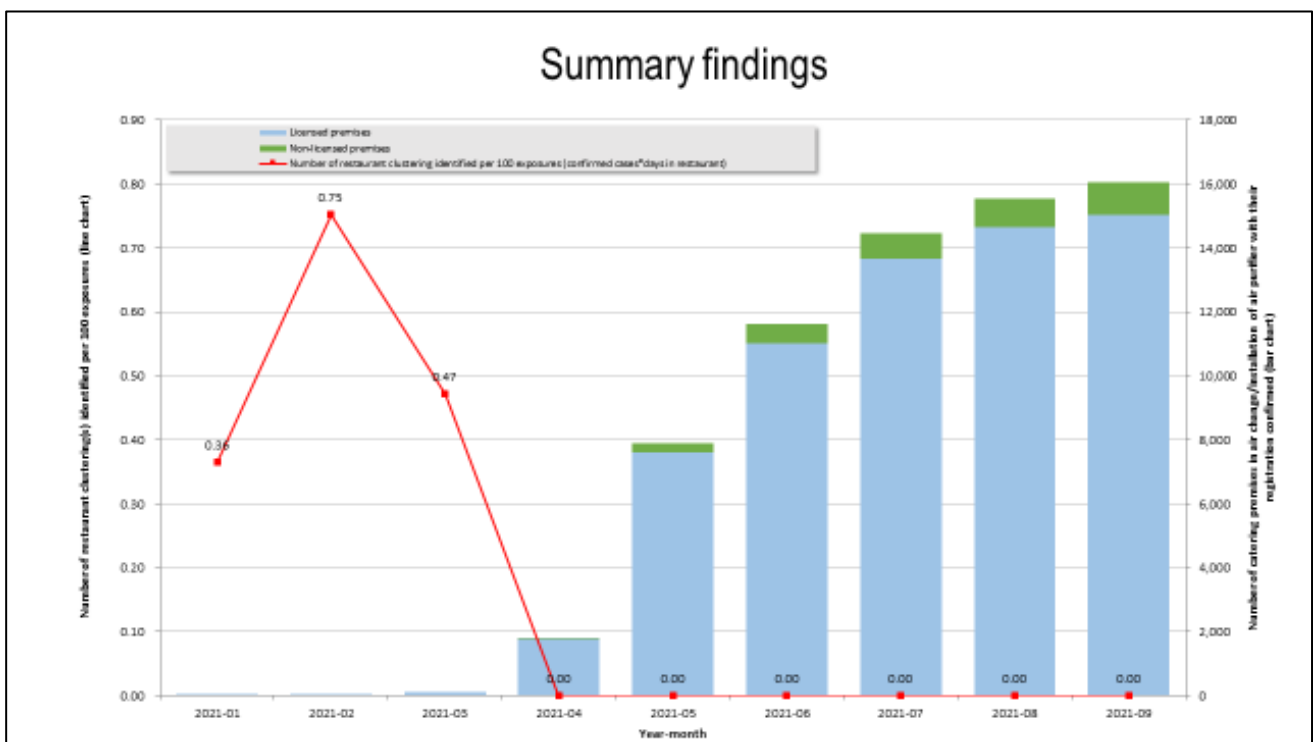
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<sup>18</sup> Before 29 April 2021, there has already been a requirement for staff members of Type B mode of operation to undergo regular testing.

with sequencing results available), the finding was compatible with common source outbreak.

6.6 During the post-implementation period (1 May to 28 September 2021), there were 19 confirmed cases (15 cases were variant of concern: 10 beta, 3 alpha and 2 delta) having history of visiting restaurants during their respective incubation or infectious period. A total of 95 episodes was recorded through the COVID-19 Case Handling and Information Sharing Portal of CHP. There was no restaurant clustering documented during this period.

6.7 The chart below summarises the findings in paragraph 6.5 and paragraph 6.6 above.



6.8 An analysis was conducted on the 62 restaurants (95 restaurants involving 33 duplicates) visited by the 19 confirmed cases from 1 May to 31 August 2021. Of the 62 restaurants, 53 were catering premises, 5 not catering premises, 3 without a specific address and 1 with business suspended. For each visit, we have compared the date of visit (to the restaurant) by the confirmed case and the date of ACH registration received from the restaurant (hereinafter called “registered”). 43 catering premises were registered before the respective time of visit while the remaining 10 catering premises were registered after the respective time of visit.

| <b>Group of Catering Premises</b>                 | <b>Mode of Operation</b>                           |
|---|--|
| 43 registered before the respective time of visit | Type B: 38<br>Type C: 3<br>Type D: 1<br>Bar/Pub: 1 |
| 10 registered after the respective time of visit  | Type B: 10   |

- 6.9 Zooming in the group of 10 registered after the respective time of visit, we have conducted a desk-top analysis on their original ACH on the basis of their respective ventilation plans prevailing at the respective time of visit. All 10 catering premises were actually ACH-compliant (i.e. reaching ACH 6 or above) at the material time (i.e. the respective time of visit), though they have not yet completed the formality on registration then. In other words, all the 53 catering premises were ACH-compliant (either through reporting compliance with the Requirement or actual status) as at the respective time of visit.
- 6.10 During the period of review, restaurant clustering only occurred in the first three months of the pre-implementation phase (January to April 2021); whereas in addition to the lack of restaurant clustering in April 2021, there is also no clustering of cases in restaurants in the post-implementation phase (May, June, July, August and September 2021). It should be noted that over 7 500 catering premises / cooked food venues<sup>19</sup> had reported compliance with the Requirement by the end of April 2021. Notwithstanding the high risk of exposure in a mask-off environment and the visits made by the confirmed cases to the restaurants, the Requirement (air change or air purifiers) might have been instrumental in forestalling the emergence of any outbreak at the restaurant setting since April 2021. This measure to control airborne spread within restaurants could be among various factors that have contributed to a reduction in risks on virus transmission in restaurants since April 2021.
- 6.11 With the above said, with the marked reduction of confirmed cases in the community since April 2021, this would inevitably affect the number of confirmed cases visiting restaurants and the number of restaurant exposures by the confirmed cases. Without a meaningful number of sample size for a sophisticated study involving isolating various confounding factors (transmission by way of contact rather than airborne; other infection control measures etc.) to be conducted, we acknowledge that the effect may not be easily demonstrated under the current caseloads and there is limitation to the interpretation under intellectual rigour.

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<sup>19</sup> 68 cooked food venues under FEHD and 7 471 catering premises under the registration system

## 7. INSIGHTS

- 7.1 The Working Group wishes to consolidate the experience gained and share its collective insights, in case this would be of any use to parties concerned when they chart the way forward as further findings from scientific research unveil themselves.
- 7.2 At the outset, the Working Group reckons that given that catering premises have to complete registration within only one and a half months, it is inevitable that the data would have to be based on a desk-top study with reference to the latest ventilation plan available.
- 7.3 To sustain performance and search for improvement, it would be useful to embark on a statistically meaning exercise to assist the concerned catering premises and provide pointers for the remaining catering premises, with a view to capitalising on the learning curve and bridging the gap between theory and practice<sup>20</sup>. Such exercise would be conducted by invitation and on-site measurement would be conducted by prior appointment. Such objective data could lay a solid foundation for formulating befitting strategies in face of the ever-evolving mutant strains.
- 7.4 As set out in paragraph 12 of the Guide –
- (a) the policy intent behind Cap. 132 is municipal services, and the concept is sufficient fresh air;
  - (b) the policy intent behind Cap. 599F is infection control, and the concept is reducing risk of infection by provision of clean air through various means to minimise viral load in air; and
  - (c) one is required to comply with all laws of Hong Kong (in this context, both Cap. 132 and Cap. 599F inclusive). Given the threshold of the ventilating requirement under Cap. 599F is higher than that under Cap. 132, it is incumbent on one to attain the higher threshold as well.

FEHD would advise new applicants intending to submit an application for a provisional or full licence (as the case may be) for operating food business under Cap. 132 to achieve the threshold of ACH at 6 or above in the seating areas under the prevailing Cap. 599F.

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<sup>20</sup> Such data will purely be used for offering advice and future analysis.

- 7.5 With catering premises having completed their registration, the list of air purifiers, which was only current during the preceding nine-month period, would be removed from FEHD's webpage to an archive. The tasks of updating such a list or examining air purifiers of other technologies would have to be handled by other expert authorities on this subject. In compiling or updating such a list, one should continue to bear in mind that apart from the pertinence to the anti-epidemic cause, the impact of such technologies in terms of no harmful effect on human health should also be a relevant factor to be considered.
- 7.6 As mentioned in paragraph 4.3 above, one could not rule out the possibility that SARS-CoV-2 can be transmitted by an airborne route in poorly ventilated and crowded indoor spaces, and good air ventilation or air changes can dilute virus-laden particles at close-range of infected persons. Progress on ACH of varying degrees has been made at various settings, such as hospitals under Hospital Authority's purview, residential homes under Social Welfare Department's purview, quarantine hotels under Department of Health's purview, fitness centres under Home Affairs Bureau's purview and schools under Education Bureau's purview. It would be useful if knowledge/experience sharing sessions<sup>21</sup> and close liaison among parties concerned could be arranged, so that the knowledge base could be kept current and the engineering control approach on handling air change could be pursued under a holistic approach in an orderly manner. This is especially important, with quarantine-free travel between the Mainland and Hong Kong to be resumed soon.
- 7.7 Hong Kong has been a strategic partner in the international arena in the fight against the pandemic, in terms of the rigorous scientific research findings from our prestigious scholars and the decisive strategies and well-formulated course of actions taken in Hong Kong. We hope that the Hong Kong's experience on this issue could help reinforce the due attention and importance to be accorded by various international professional organisations (public health, engineering, building etc.) to the engineering control approach on handling air change.

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<sup>21</sup> An example is the Webinar on "Control of Multi-Drug Resistant Organisms in Ambulatory and Long Term Care Facilities with COVID-19 Pandemic" co-organised by Infectious Disease Control Training Centre, Hospital Authority; Infection Control Branch, Centre for Health Protection; and Chief Infection Control Officer's Office, Hospital Authority, on 10 December 2021.

## **8 CONCLUSION**

- 8.1 The Working Group wishes to thank all, including the Government, the experts, the professionals, the stakeholders and the community, for their unwavering determination and persistent support to enable this arduous mission impossible to be accomplished.
- 8.2 The Working Group witnesses how the public health architecture coupled with the Government's strategies, policies, legislation and infection control measures formulated and the multi-disciplinary and cross-sector collaboration and community-wide understanding and support rendered rise above the challenges posed by the pandemic, and treasures the opportunity of participating in the fight against the virus as a tiny building block in the overall scheme.
- 8.3 Premised on a science-based and evidence-based approach, the Working Group has taken follow-up actions on the best research findings available at the prevailing time. As new knowledge and evidence will unveil themselves over time, review and forward planning will inevitably be required in order to move with times. We trust that the Government will continue to monitor the situation on an on-going basis and keep current the efforts that are necessary to sustain performance or keep up with changing circumstances.

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| 13 | Guidance for building operations during the COVID-19 Pandemic – “Consider portable room air cleaners with HEPA filters; Consider UVGI (ultraviolet germicidal irradiation)”<br><a href="https://www.ashrae.org/file%20library/technical%20resources/ashrae%20journal/2020journaldocuments/72-74_ieq_schoen.pdf">https://www.ashrae.org/file%20library/technical%20resources/ashrae%20journal/2020journaldocuments/72-74_ieq_schoen.pdf</a>   |                 | American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Journal | May 2020                             | Building      |
| 14 | Supplement to Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document<br><a href="https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Guidance-Documents/SUPPLEMENT-to-Reducing-the-Risk-of-COVID-19-Using-Engineering-Controls-Guidance-Document.pdf">https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Guidance-Documents/SUPPLEMENT-to-Reducing-the-Risk-of-COVID-19-Using-Engineering-Controls-Guidance-Document.pdf</a>  |                 | AIHA   | Version 1:<br>11 August 2020         | Building      |
| 15 | Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document<br><a href="https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Guidance-Documents/Reducing-the-Risk-of-COVID-19-using-Engineering-Controls-Guidance-Document.pdf">https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Guidance-Documents/Reducing-the-Risk-of-COVID-19-using-Engineering-Controls-Guidance-Document.pdf</a><br><b>(Increasing to ACH at 6 or above is an effective engineering control to reduce the relative risk of exposure to COVID-19 by 95%)</b> |                 | AIHA   | Version 4:<br>9<br>September<br>2020 | Building      |

|    |   |                      |   |                   |               |
|----|---|----------------------|---|-------------------|---------------|
| 16 | Latest guidance from CIBSE and Scientific Advisory Group for Emergencies (SAGE) - Role of ventilation in controlling SARS-CoV-2 transmission<br><a href="https://www.cibse.org/coronavirus-covid-19/coronavirus,-sars-cov-2,-covid-19-and-hvac-systems">https://www.cibse.org/coronavirus-covid-19/coronavirus,-sars-cov-2,-covid-19-and-hvac-systems</a> |                      | Scientific Advisory Group for Emergencies | 30 September 2020 | Building      |
| 17 | A Critical Review on Ultraviolet Disinfection Systems against COVID-19 Outbreak: Applicability, Validation, and Safety Considerations<br><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7571309/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7571309/</a>  | M Raeiszadeh et. Al  | ACS Photonics                             | 14 October 2020   | Public Health |
| 18 | CIBSE COVID-19 Ventilation Guidance<br><a href="https://www.pps.co.com/wp-content/uploads/2020/11/Covid_19_Ventilation_guidance_v4.pdf">https://www.pps.co.com/wp-content/uploads/2020/11/Covid_19_Ventilation_guidance_v4.pdf</a>  |                      | CIBSE                                     | 23 October 2020   | Building      |
| 19 | Susceptibility of SARS-CoV-2 to UV irradiation<br><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7402275/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7402275/</a>   | CS Heilingloh et. Al | Am Journal of Infection Control           | October 2020      | Public Health |
| 20 | Viable SARS-CoV-2 in the air of a hospital room with COVID-19 patients<br><a href="https://pubmed.ncbi.nlm.nih.gov/32949774/">https://pubmed.ncbi.nlm.nih.gov/32949774/</a>   | Lednicky JA et.al    | Int J Infect Dis                          | November 2020     | Public Health |
| 21 | Coronavirus (COVID-19): ventilation guidance - November 2020, Guidance to support the mixing of individuals safely in indoor  |                      | Scottish Government                       | 18 December       | Building      |

|    |  |                     |  |                           |                            |
|----|--|---------------------|--|---------------------------|----------------------------|
|    | <p>domestic and commercial properties.</p> <p>“8-10 litres of fresh air per person (minimum) would be a better guide to fresh air demand”</p> <p><a href="https://www.gov.scot/publications/coronavirus-covid-19-ventilation-guidance---november-2020/pages/ventilation/">https://www.gov.scot/publications/coronavirus-covid-19-ventilation-guidance---november-2020/pages/ventilation/</a></p>   |                     |  | 2020                      |                            |
| 22 | <p>In-room Air Cleaner Guidance for Reducing COVID19 in Air in your Space/Room.</p> <p><a href="https://www.ashrae.org/file%20library/technical%20resources/covid-19/in-room-air-cleaner-guidance-for-reducing-covid-19-in-air-in-your-space-or-room.pdf">https://www.ashrae.org/file%20library/technical%20resources/covid-19/in-room-air-cleaner-guidance-for-reducing-covid-19-in-air-in-your-space-or-room.pdf</a></p>   |                     | American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) | 21 January 2021           | Building                   |
| 23 | <p>Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID-19) Pandemic Infection Control Guidance – “Consider the addition of portable solutions (e.g., portable HEPA filtration units) to augment air quality in areas when permanent air-handling systems are not a feasible option.”</p> <p><a href="https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html">https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html</a></p> |                     | Centers for Disease Control and Prevention   | Updated: 23 February 2021 | Public Health              |
| 24 | <p>Probable airborne transmission of SARS-CoV-2 in a poorly ventilated restaurant</p> <p><a href="https://www.sciencedirect.com/science/article/pii/S0360132321001955">https://www.sciencedirect.com/science/article/pii/S0360132321001955</a></p>   | Prof Yuguo Li et al | Building and Environment   | March 2021                | Public Health/<br>Building |

## 10 ACKNOWLEDGEMENT

10.1 The Working Group wishes to take this opportunity to convey thanks and gratitude to the following parties for their support and assistance –

- Catering trade associations, including –
  1. Association of Restaurant Managers
  2. The Association for Hong Kong Catering Services Management Limited
  3. Hong Kong Federation of Restaurants & Related Trades Limited
  4. Institution of Dining Art
  5. Hong Kong Japanese Restaurant Association
  6. Food and Beverage International Association
  7. The Federation of Hong Kong Food and Beverage Industries Trade Unions
- Electrical appliance associations, including –
  1. Hong Kong & Kowloon Electrical Appliances Merchants Association Limited
  2. Hong Kong & Kowloon Electric Trade Association
  3. Radio Association of Hong Kong
  4. The Hong Kong Electrical Appliance Industries Association
- The Federation of Hong Kong Hotel Owners
- The Real Estate Developers Association of Hong Kong
- Hong Kong Registered Specialist Contractors (Ventilation) Association
- Food and Health Bureau
- Department of Health, including Centre for Health Protection
- Electrical and Mechanical Services Department
- Food and Environmental Hygiene Department

**Working Group on the Requirement on  
Air Change or Air Purifiers in Dine-in Restaurants  
under the Directions in relation to Catering Business  
under Cap. 599F for Implementation by the Time Limit as Stipulated Therein**

**Terms of Reference**

A requirement on air change or air purifiers in dine-in restaurants will be stipulated in the Secretary for Food and Health's directions in relation to catering business under the Prevention and Control of Disease (Requirements and Directions) (Business and Premises) Regulation (Cap. 599F) on infection control grounds. The Working Group is appointed by the Director of Food and Environmental Hygiene Department to advise on the smooth implementation of the requirement by around end April 2021 (or by an extended time limit as may be necessary that may be further provided for in the updated directions) and work on the following deliverables for reference by restaurant operators, ventilation contractors and air purifier suppliers –

- (a) specific guidelines for implementing the air change per hour at 6 in terms of fresh air intake for the seating area; and
- (b) specific guidelines for the alternative of using air purifiers (HEPA<sup>1</sup> cum UV-C<sup>2</sup> device or HEPA device or UV-C device) in terms of meeting the specifications promulgated and application on-the-ground in a proper manner.

**Composition** (on an ad personam basis)

Chairman

Professor PL YUEN

Members

Ir Antonio CHAN

Mr HO Kui-yip

Ir Kenneth LI

Professor LI Yu-guo

Dr David LUNG

Mr Simon SIU Yat-ming

Professor WANG Sheng Wei

**Other Details**

Representatives from the Food and Environmental Hygiene Department and (FEHD) and the Electrical and Mechanical Services Department (EMSD) will serve as observers on the Working Group.

FEHD will provide secretariat support for the Working Group.

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<sup>1</sup> High-Efficiency Particulate Arrestance Filter

<sup>2</sup> Ultraviolet-C

**Extract from gazette notice on the air change / air purification requirement in dine-in restaurants under Cap. 599F**

- (e) in respect of seating area of catering premises:—
- (i) if the air change per hour (fresh air) (*ACH*) is not 6 or above, must on or before 30 April 2021 install air purifiers of any of the following types that meet the specified specifications set out in the Food and Environmental Hygiene Department (*FEHD*) webpage in the seating area according to the on-the-ground situation (including the site condition) and the manufacturer manual:—
    - 1. High-Efficiency Particulate Arrestance Filter (HEPA) cum Ultraviolet-C (UV-C) device; or
    - 2. High-Efficiency Particulate Arrestance Filter (HEPA) device; or
    - 3. Ultraviolet-C (UV-C) device;
  - (ii) except food business which has submitted a certificate in respect of ACH and/or air purifiers through the FEHD’s webpage on “Voluntary Declaration Scheme on Air Changes in Licensed Catering Premises”, must register on FEHD’s designated webpage on or before 30 April 2021 and upload onto a designated position of the FEHD webpage a certificate in specified form filled in and signed by a registered specialist contractor (ventilation works category) providing the following information:—
    - 1. the ACH and whether the ACH is 6 or above  
(the ACH must be calculated according to the instructions set out in the FEHD webpage on the basis of the following information on its food business licence (or on the basis of site condition, if without a food business licence):—
      - (1) area of seating area;
      - (2) height of seating area measured from floor to ceiling (may opt for actual storey height or assumed storey height at 3 metres); and
      - (3) capacity of outside fresh air supplied to the seating area by the ventilation system);
    - 2. if the ACH is not 6 or above, whether having installed air purifiers referred to in item (i) above and provide the following information about the air purifiers:—
      - (1) type;
      - (2) brand;
      - (3) model;
      - (4) quantity; and
      - (5) location;
  - (iii) if unable to complete the registration referred to in item (ii) above on or before 30 April 2021, must submit an application to the FEHD for an extension of time for registration. If approved, must complete the registration referred to in item (ii) above within the time limit as specified by the FEHD;
  - (iv) within 2 days after the registration has been confirmed by the FEHD, must download a notice from a designated position of the FEHD webpage, and display the notice with the following specifications round-the-clock at the entrance of the catering premises:—
    - 1. the size of the notice must not be less than 297 x 420 mm (A3 size);
    - 2. the letters in the notice must be black in colour, the font type must be Times New Roman, and the font size must not be less than 32; and
    - 3. the content of the notice must be displayed in a way that is clearly legible and in a location unobstructed, with the following information included:—
      - (1) licence number (if any);
      - (2) name and address of the business; and
      - (3) air change per hour (fresh air) and/or air purifier(s) installed (as applicable); and
  - (v) after the air purifiers have been installed at the premises, must properly switch on, operate, maintain and repair the air purifiers in accordance with the manufacturer manual when the premises is opened for business;

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**Presentation by the Government to the Working Group on the Rationale Behind the Government’s Decision made in October 2020 on Air Change Per Hour (Fresh Air) at 6 or above**

The ensuing paragraphs sets out the gist of the presentation made by the Government to the Working Group on the rationale behind its decision on air change per hour (fresh air) (ACH) at 6 or above.

In the course of formulating the guidelines, the Government has briefed the Working Group on the development leading to the decision made in October 2020 (together with the justifications in support of the decision) for adopting “ACH at 6 or above or the installation of air purifiers that meet the specified specifications” as the threshold for the voluntary declaration scheme launched on 16 October 2020. The voluntary declaration scheme has been replaced by the mandatory registration scheme since 18 March 2021.

The use of “ACH at 6 or above or the installation of air purifiers that meet the specified specifications” was suggested by Professor Yuen Kwok-yung. In considering the advice, government departments conducted from August to September 2020 a literature review of the research materials available at the time –

- (a) There were discussions in the international community, other places and Hong Kong on the possibility of short range airborne transmission of SARS-COV-2 and the use of engineering control means (including ventilating measures) to assist the infection control cause. According to evidence available at that time and statements by various health authorities, COVID-19 is mainly transmitted by droplet and contact routes. Short range air-borne transmission can occur in certain circumstances in the healthcare setting (e.g. aerosol-generating procedures) or certain community settings (e.g. in certain indoor crowded space, during choir practice, in restaurants, fitness class etc.)<sup>1</sup>; and

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<sup>1</sup> Examples:

- “Transmission of SARS-CoV-2: implications for infection prevention precautions” published by the World Health Organization (WHO) in July 2020 (<https://www.who.int/publications/i/item/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>)
- Dedicated website on COVID-19 of the Centers for Disease Control and Prevention of the United States at that time (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/overview/index.html>)
- Dedicated website on COVID-19 on the “Global Heat Health Information Network” of the WHO at that time (<https://www.who.int/news-room/q-a-detail/q-a-ventilation-and-air-conditioning-in-public-spaces-and-buildings-and-covid-19>  
<http://www.ghin.org/heat-and-covid-19/ac-and-ventilation>)

- (b) As there was no gold standard on ventilating measures for catering premises for preventing SARS-COV-2 transmission at the time, government departments could only examine pertinent ventilation standards available for non-residential buildings or other scientific and clinical studies on ventilating measures<sup>2</sup> (the proposed standards ranging from 5.15 litres/second/person to 10 litres/second/person).

Clearly, it takes time for sufficient data to be built up to substantiate a conclusive view on short range airborne transmission of SARS-COV-2. Nonetheless, we could not rule out the fact that enhancing the ventilating measures could assist the infection control cause.

Consolidating on the outcome of the literature review, based on the national standards of the People’s Republic of China and the guidelines on ventilation system design for public places (including food premises) formulated by the Chartered Institution of Building Services Engineers (in the UK), the fresh air provision for catering premises is recommended to be 8 to 10 litres/second/person (equivalent to 6.4 to 8 ACH with an assumed storey height of 3 metres). According to the “Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document” (Version 4) published by the American Industrial Hygiene Association (AIHA) in September 2020, increasing ACH to 6 is an effective engineering control to reduce the relative risk of exposure to COVID-19 by 95% (ACH at 4.5 only offers a relative risk reduction of 90% whereas an ACH at 6 offers a relative risk reduction of 95%). In non-healthcare facilities where occupant density cannot be limited to fewer than one person per 3 square metres (or there is a likelihood that infected persons being present), it is necessary to increase the air change rate to ACH at 6 or above.

After balancing all the relevant factors (including the effectiveness of the measures and the acceptability to the trade), the Government made an optimal choice and decided in October 2020 to adopt ACH at 6 or above in respect of the seating areas of dine-in catering premises<sup>3</sup> as the threshold under the voluntary declaration scheme. This level is equivalent to 27 cubic metres/hour/person, which is higher than 17 cubic metres/hour/person stipulated under the Public Health and Municipal Services Ordinance (Cap. 132). To facilitate the public to grasp the idea, the Government has not opted to express the threshold in terms of the 7.5 litres/second/person description. For ease of reference, the various standards are presented in the summary table below -

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<sup>2</sup> Examples:

- The American Society of Heating, Refrigeration and Air-Conditioning Engineers Standard 62.1 (5.15 litres/second/person for restaurant dining rooms (people + area rate))
- “Hygienic Indicators and Limits of Public Places” National Standard GB37488-2019 of the People’s Republic of China (30 square metres/second/person or 8.3 litres/second/person)
- Practical Notes ADM-2 by Building Department (10 litres/second/person for office buildings)
- The Chartered Institution of Building Services Engineers (in the UK) Guide A (10 litres/second/person for restaurants)

<sup>3</sup> assuming a storey height of 3 metres and a footprint of 1.5 square metres per person

| Standards/Regulations   | m <sup>3</sup> /hr/person<br>@1.5m <sup>2</sup> /person | L/s/person<br>@1.5m <sup>2</sup> /person | ACH at<br>3m height<br>Ceiling | ACH at<br>2.3m height<br>Ceiling |
|---|---|--|--------------------------------|----------------------------------|
| Section 93(1) of and Second Schedule to the Public Health and Municipal Services Ordinance (Cap. 132)<br>(for Restaurant)           | 17.0  | 4.7                                      | 3.8                            | 4.9                              |
| ASHRAE Standard 62.1 The Standards for Ventilation and Indoor Air Quality<br>(for Restaurant)                                       | 18.7  | 5.1                                      | 4.2                            | 5.4                              |
| 國家市場監督管理總局、中國國家標準<br>化管理委員會 (國家標準) GB37488-2019<br>Hygiene indicators and limits for public<br>places<br>(for Public leisure place) | 30.0  | 8.3                                      | 6.7                            | 8.7                              |
| Buildings Department Practice Note ADM2<br>(for Office)   | 36.0  | 10.0                                     | 8.0                            | 10.4                             |
| Chartered Institute Building Services<br>Engineer (CIBSE) Guide A<br>(for Restaurant)   | 36.0  | 10.0                                     | 8.0                            | 10.4                             |
| Voluntary declaration scheme on air<br>changes in licensed catering premises  | 27.0  | 7.5                                      | 6.0                            | 6.0                              |
| Net increase  | 10.0  | 2.8                                      | 2.2                            | 1.1                              |