

2020 Yearly Air Quality Review



The Question

- Whether implementation of the Clean Air Plan improves air quality?
- Indicator
 - Pollutant concentration
 - Change in cardiovascular disease / respiratory disease hospital admission
 - Effectiveness of AQHI implementation

Table of Content

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 - Whether implementation of the Clean Air Plan improves air quality?
 - The failure of implementation of AQHI to reduce cardiovascular and respiratory disease
 - The gap of AQHI to capture pattern of high pollution episodes
- A new Clean Air Plan

Part 1: 2019 Air Quality Data

- 2019 Pollutant level by district
- 2019 Eastern Vs. Western Vs. Roadside
- 2019 Vs. 2018
- 4-year trend analysis 2016-2019

Pollutant Level by District (2019)

	NO2($\mu\text{g}/\text{m}^3$)	PM10($\mu\text{g}/\text{m}^3$)	PM2.5($\mu\text{g}/\text{m}^3$)	Ozone($\mu\text{g}/\text{m}^3$)	SO2($\mu\text{g}/\text{m}^3$)
1 st highest	Kwai Chung (54)	Tuen Mun (41)	Tuen Mun (25)	Tseung Kwan O (72)	Kwai Chung (8)
2 nd highest	Sham Shui Po (48)	Kwun Tong (40)	Kwun Tong (21)	Central and Western (65)	Tsuen Wan (7)
3 rd highest	Tuen Mun (47)	Yuen Long (37)	Tai Po (20)	Eastern (64)	Tung Chung (6)
HK Average	41	31	19	59	5
WHO level	40	20	10	N/A	N/A

*Roadside air monitoring stations excluded

The most polluted district in 2019:

Tuen Mun (PM)

Kwai Chung (NO2,SO2)

Tsueng Kwan O (Ozone)

2019 Eastern Vs. Western Vs. Roadside

	NO ₂ (μg/m ³)	PM ₁₀ (μg/m ³)	PM _{2.5} (μg/m ³)	Ozone(μg/m ³)	SO ₂ (μg/m ³)
Eastern	36	32	19	64	4
Western	44	33	20	53	6
Roadside	79	38	25	32	5
HK Average	49	33	20	54	5
WHO level	40	20	10	N/A	N/A

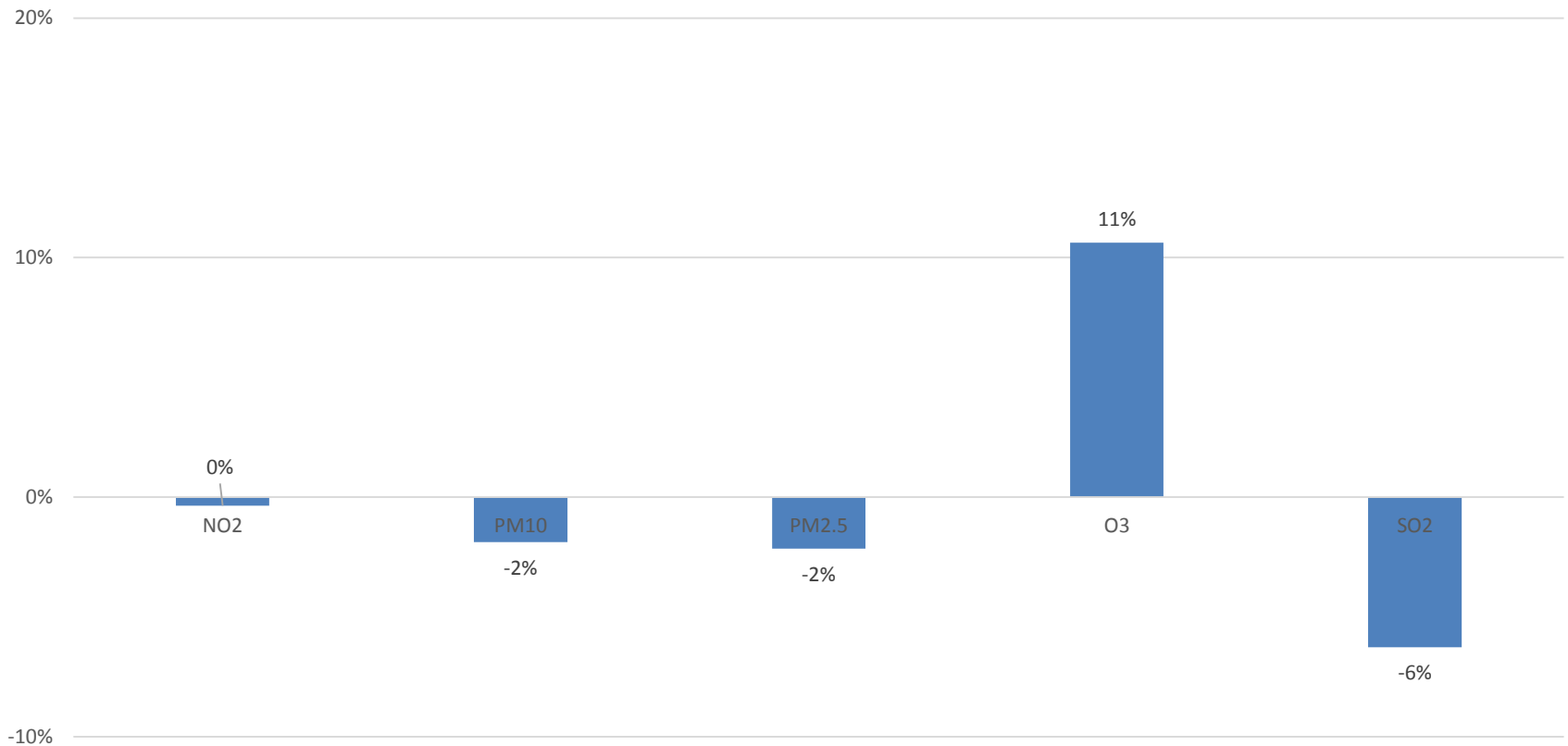
*Roadside air monitoring stations included

*For TKO data range 2019/1-2019/10

Except ozone, all level of pollutants in western part of HK > eastern part of HK
 Roadside air pollution still very serious, nearly double/2.5X WHO level

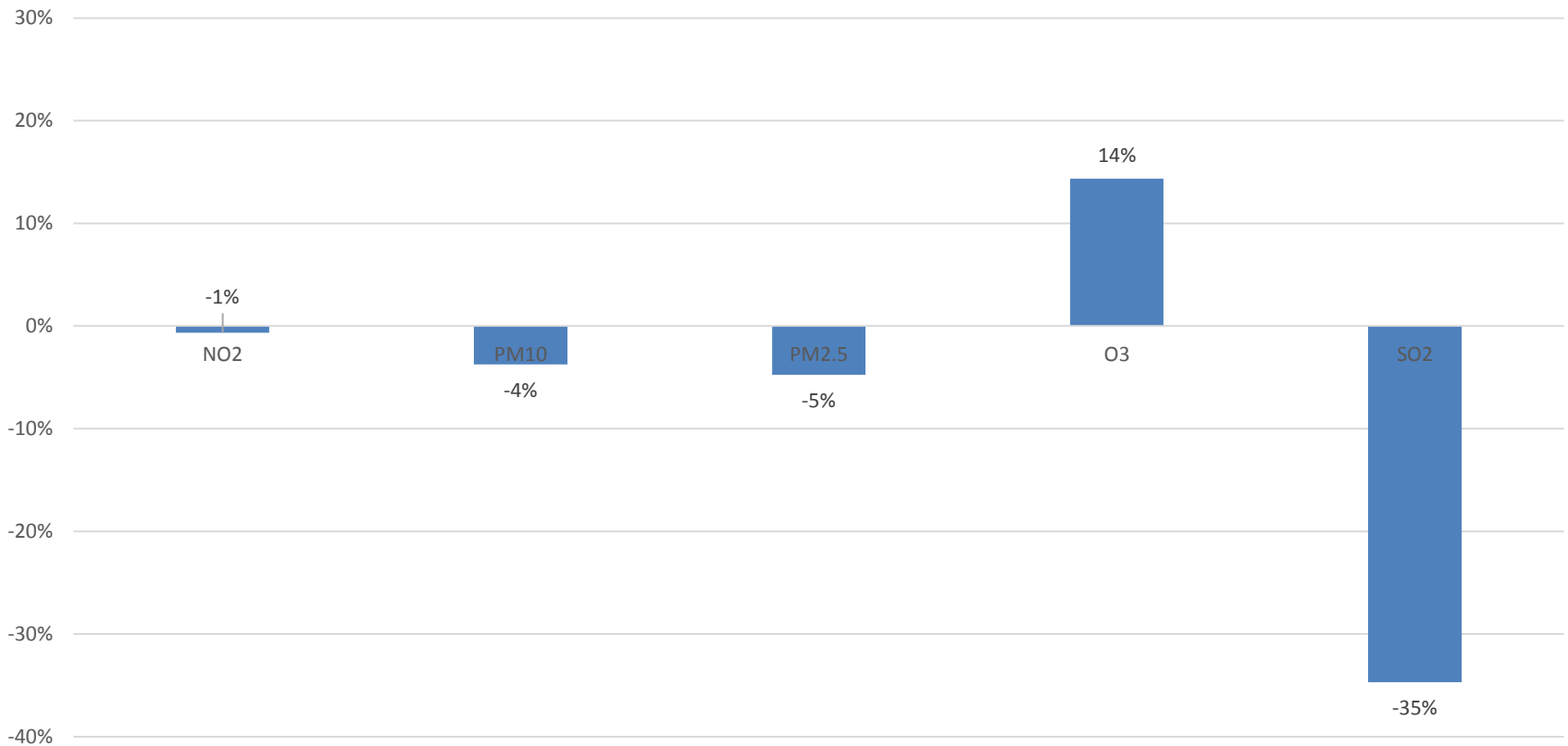
2019 vs 2018 - Eastern

% change of pollutant concentration -
2019 vs 2018 - Eastern Part of HK



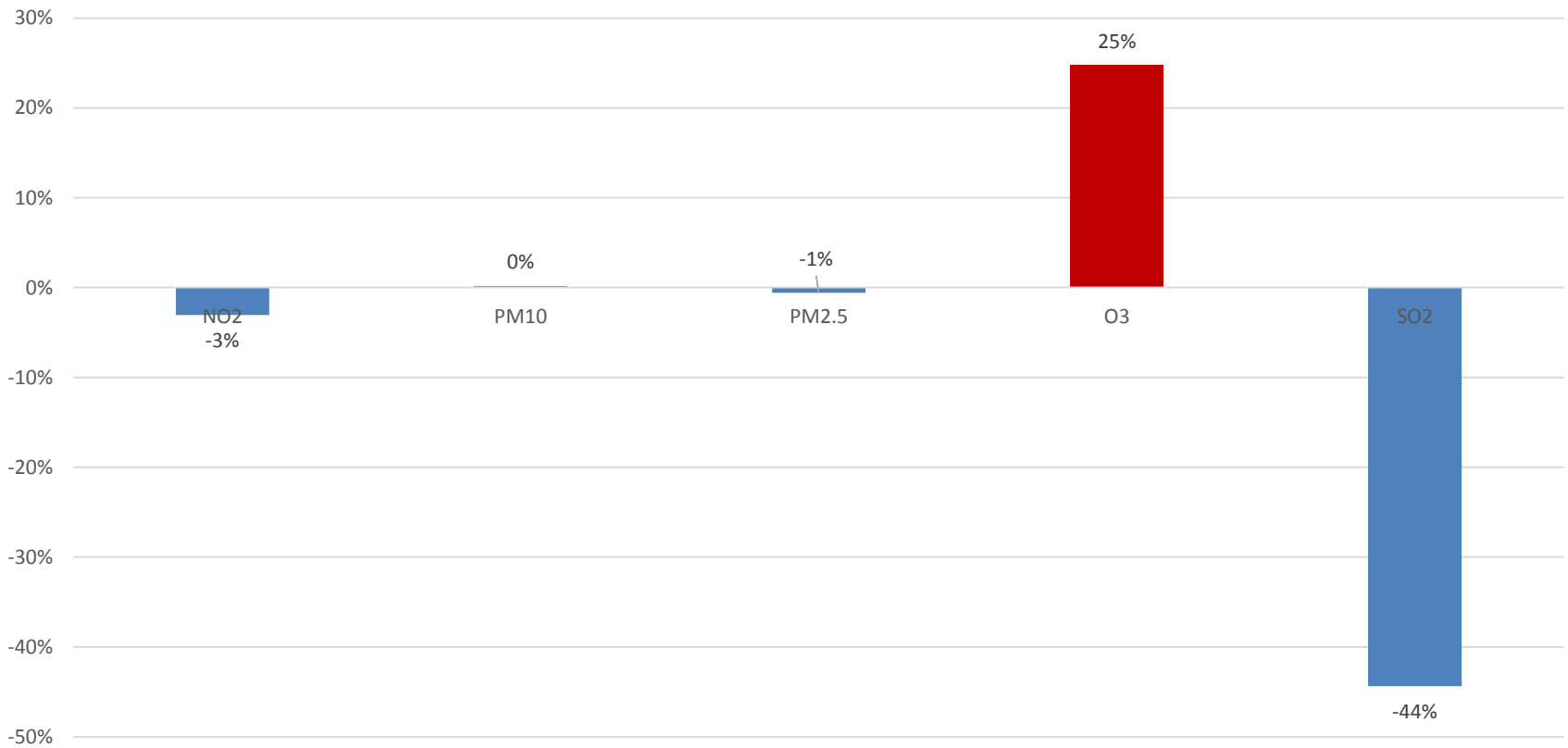
2019 vs 2018 - Western

% change of pollutant concentration -
2019 vs 2018 - Western Part of HK



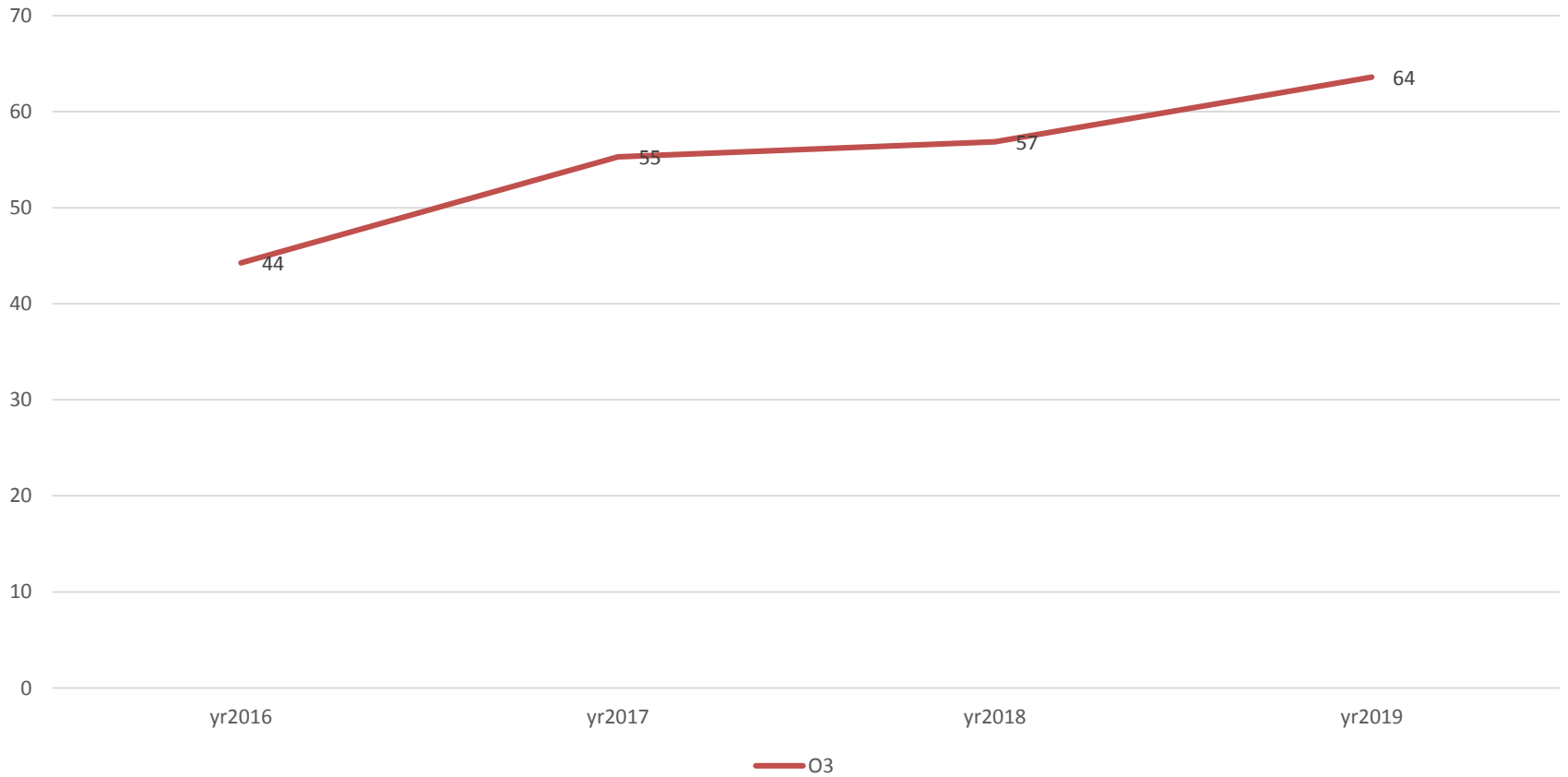
2019 vs 2018 - Roadside

% change of pollutant concentration -
2019 vs 2018 - Roadside



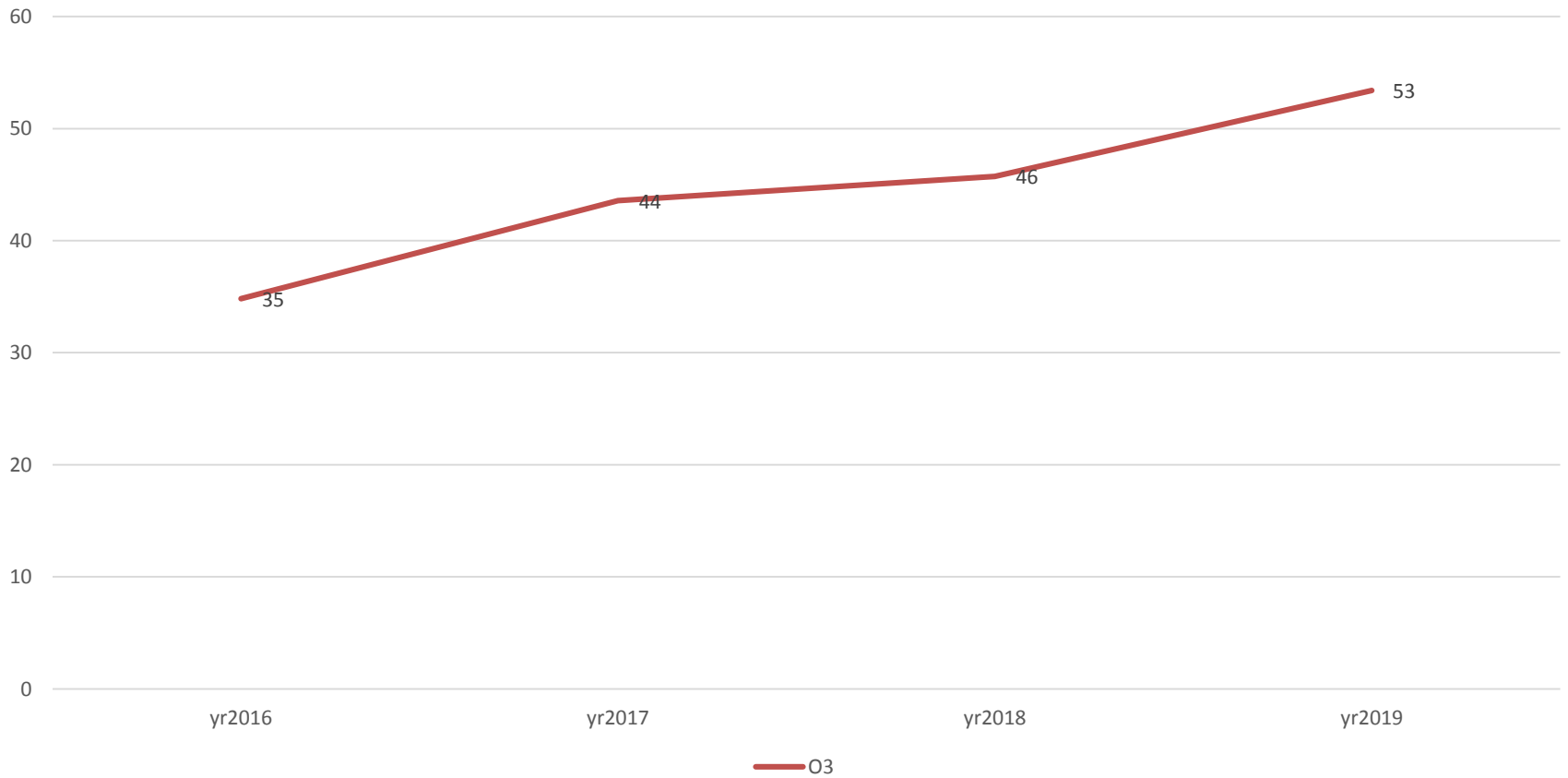
2016 – 2019 Eastern

Change of Ozone concentration - Eastern Part of HK



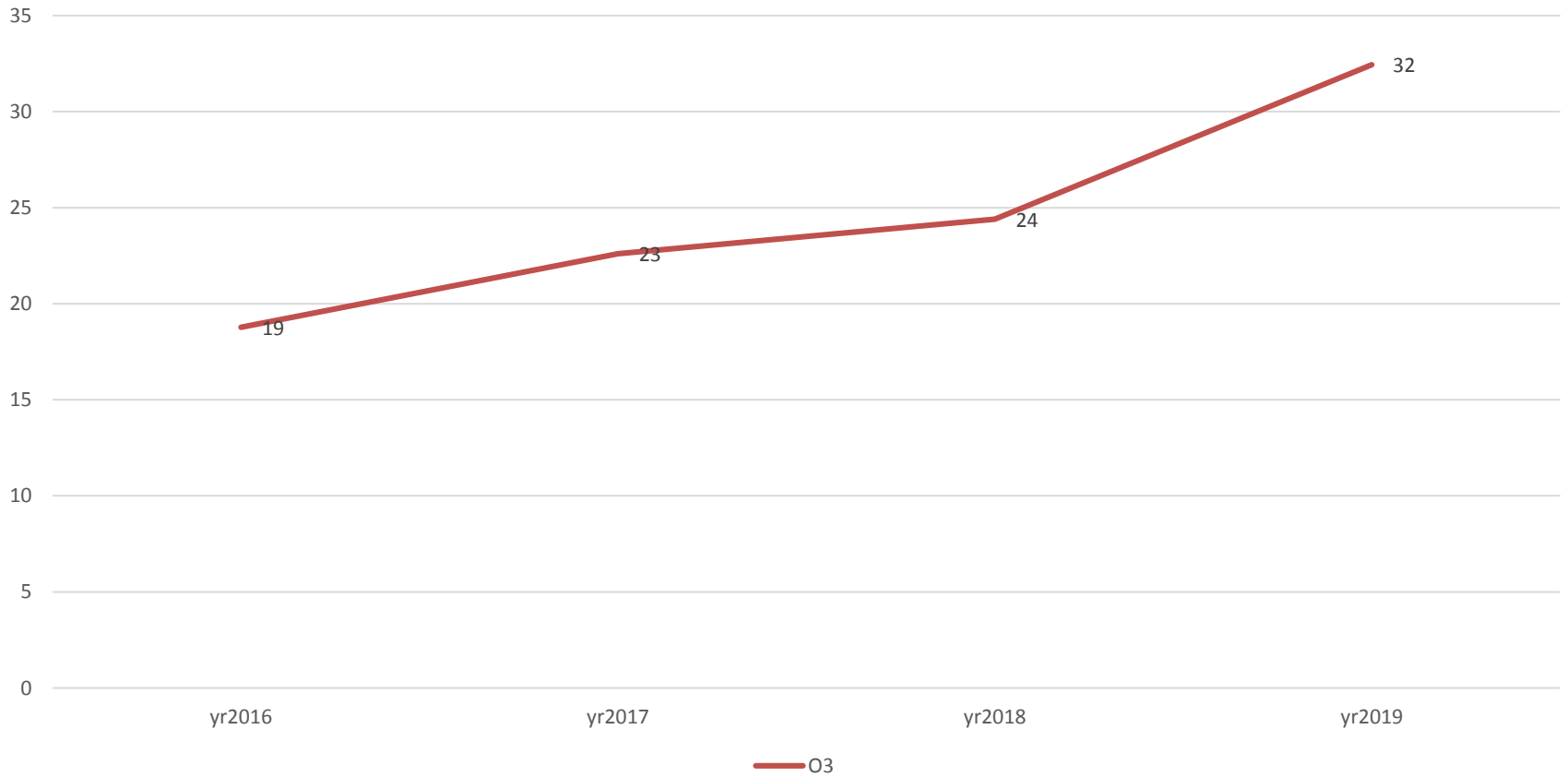
2016 – 2019 Western

Change of Ozone concentration - Western Part of HK



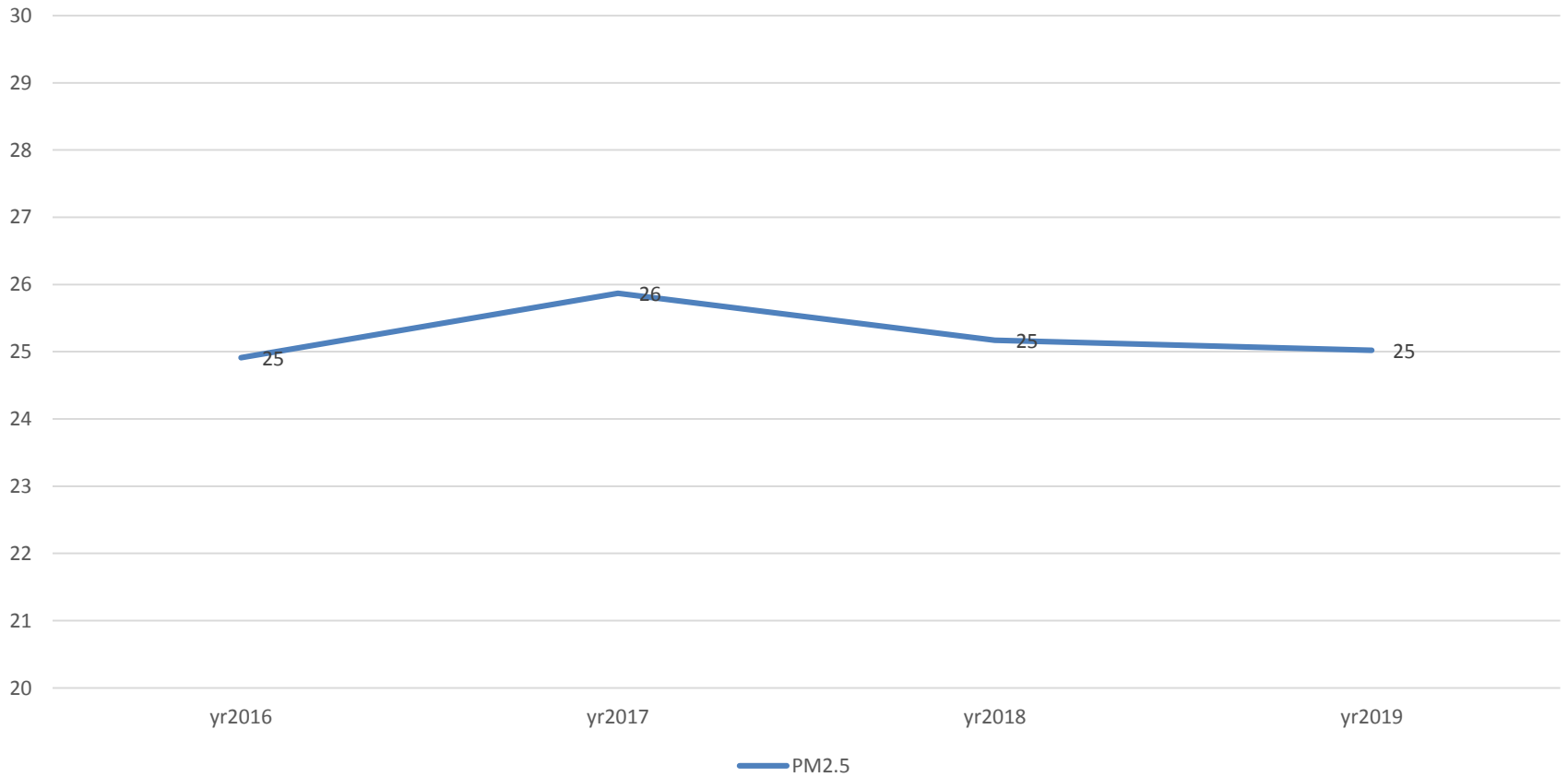
2016 – 2019 Roadside - Ozone

Change of Ozone concentration - Roadside



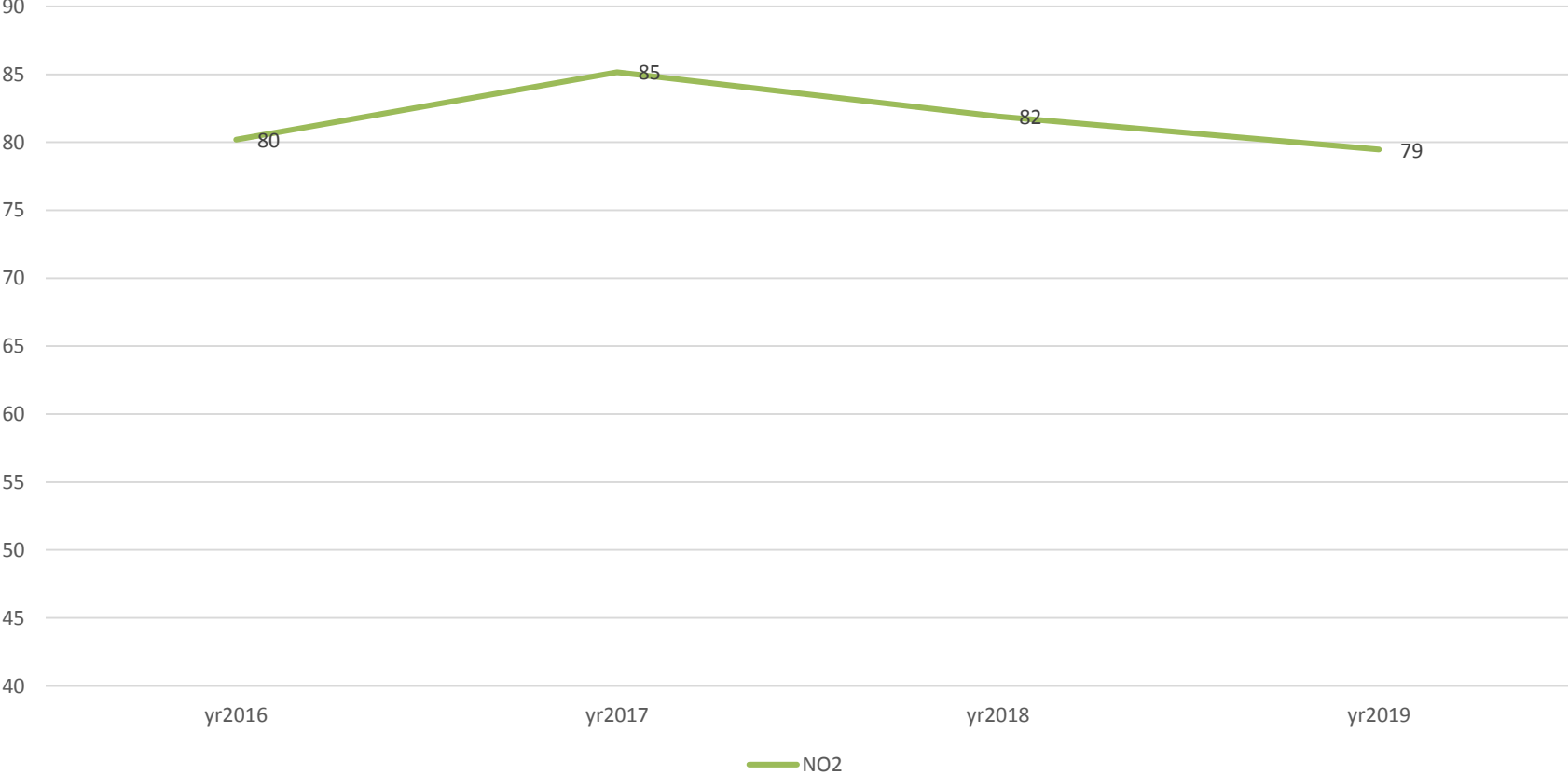
2016-2019 roadside – PM2.5

Change of PM2.5 concentration - Roadside



2016-2019 roadside – NO2

Change of NO2 concentration - Roadside



2019 Air Quality Data Summary

- 2019 Pollutant level by district
 - Tuen Mun (PM)
 - Kwai Chung (NO₂,SO₂)
 - Tsueng Kwan O (Ozone)
- 2019 Eastern Vs. Western Vs. Roadside
 - Except ozone, all level of pollutants in western part of HK > eastern part of HK
 - Roadside air pollution still very serious, nearly double/2.5X WHO level
- 2019 Vs. 2018
 - Both Ozone increases significantly for eastern part (11%), western part(14%) of HK, and roadside(25%)
- 4-year trend analysis 2016-2019
 - 2019 the highest level of ozone in 4 years, significantly higher than that in 2018
 - Improvement of roadside PM_{2.5} and NO₂ has been stagnant for last 3 years

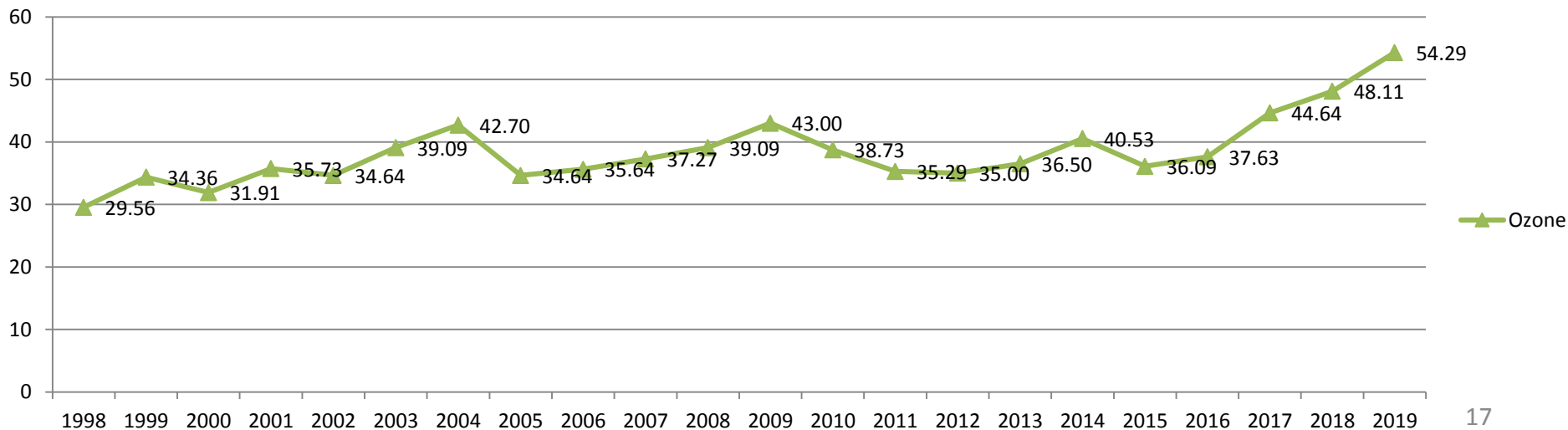
2019 Air Quality Data Analysis

- High level of roadside NO₂ persists (double WHO level), with small percentage decreases last year
 - NO₂ emission by car still dominates roadside pollution, though some improvement shown by policy measures to cut down transport emission
- The level of ozone largely increases
 - % of increase of ozone in western part of HK > eastern part of HK
 - May indicate increase regional influence
 - Tuen Mun has exceptional high level of PM_{2.5} and PM₁₀
 - may due to the combined influence of regional pollution, power plant and road transport

2019 Air Quality Data Analysis

- The increasing level of ozone seems unstoppable
 - Highest level since 1998
 - But the government decided not to tighten ozone AQO standard
 - Ozone = VOCs + NO_x + (oxygen), so need to control both the level of NO_x and VOCs
 - But we still don't have VOCs emission inventory yet, and the mechanism of why such a high level of ozone is produced as a secondary product

Ozone level in Hong Kong 1998-2019



Part 2: Does AQHI reflect the air pollution issue in HK?

A brief review on the effectiveness of
Clean Air Plan (2015-19)

How air pollution causes cardiovascular diseases (CVD)?

- A brief overview – three pathways
 - Proinflammatory mediator created in the lung caused by air pollution spill over to blood circulation system
 - Create automatic nervous system imbalance
 - Penetration of PM directly into cardiovascular tissue (Franklin et al, 2015)

3. BLOOD



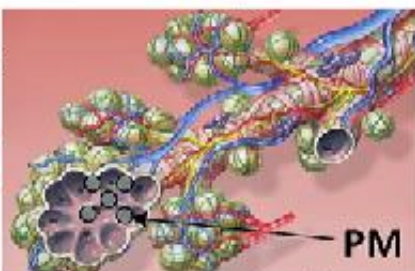
Circulating PM constituents

UFP, soluble metals
Organic compounds

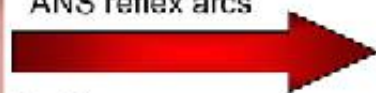
PM and/or constituents transmitted into blood



Bronchioles/Alveoli



Lung receptors
ANS reflex arcs



2. CNS



1. "SYSTEMIC SPILL-OVER"

Lung oxidative stress & inflammation
Lung cell-derived cytokines
Activated cells leaving lung circulation

Circulating mediators of oxidative stress & inflammation



ANS modulation of Inflammation
Inflammation within CNS regions

ANS imbalance

↑ SNS
↓ PSNS

ACUTE PATHWAYS



Arrhythmia
↑ HR



Platelet Activation
Thrombosis



Vasoconstriction
↑ Blood pressure

Amplified systemic inflammatory & oxidative stress response

- Cells: Activated WBCs, platelets
- Humoral: APR, clotting factors
- Hemodynamic: ET, LT, AT2
- Oxidized: PL, FA, LDL, HDL
- Other: MP, Exosomes

Chronic ANS modulation
↑ HPAA

SUB-ACUTE & CHRONIC PATHWAYS



LV hypertrophy
LV fibrosis; RV strain
↑ Arrhythmia potential



METABOLIC SYNDROME
Insulin resistance/DM
Dyslipidemia/dysfunctional HDL



Atherosclerosis
Vascular dysfunction/Stiffness
Hypertension



- Thrombosis
- Coagulation

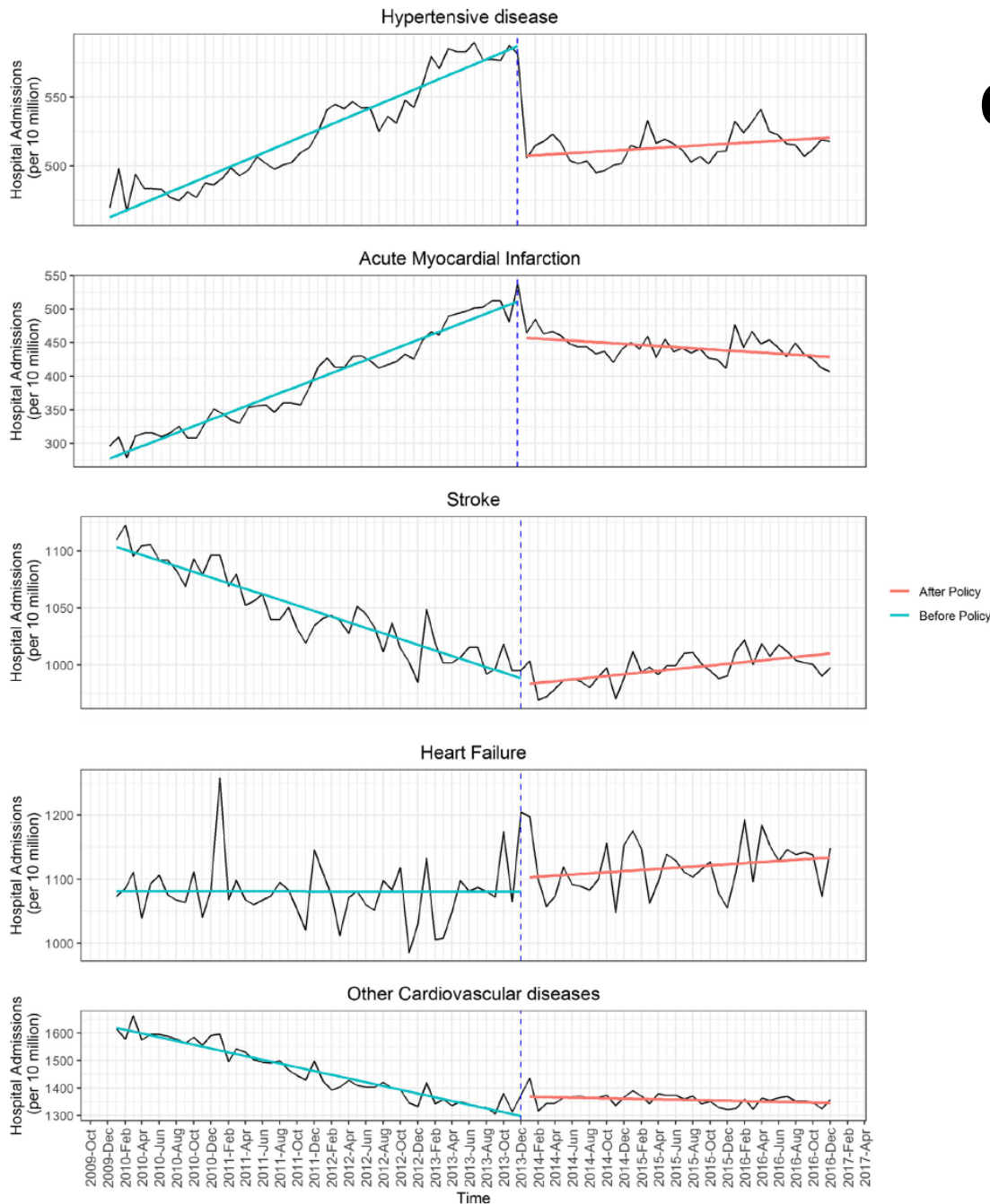
CLINICAL EVENTS

CHF
ACS/Stroke
DVT
ARRHYTHMIA
SUDDEN DEATH

AQHI fails to reduce CVD in HK's elderly population

- Research by HKU School of Public Health
- The implementation of AQHI fails to reduce overall emergency admission for CVD
 - A non-significant minor drop in emergency CVD admissions in the elderly
 - No significant decrease in emergency hospital admissions for overall CVD or other major CVD-subtypes, like stroke, heart failure and other CVD (Mason et al, 2020)

Comparison of before and after policy



- Immediate after the policy, sudden drop in HPD and AMI
- Stroke, heart failure and other CVD admissions showed no changes following the policy (Mason et al, 2020)
- Similar results for respiratory diseases → no significant decline for all respiratory diseases (Mason et al, 2019)

Fig. 2. Time series plots graphically displaying before and after monthly mean emergency hospital admissions for the elderly, adjusted for: seasonality, temperature, humidity, air pollutants and time trend; for cardiovascular sub-types from 2010 to 2016.

Which pollutants represent AQHI better?

	PM10	NO2	Ozone	SO2	PM2.5	AQHI
PM10	1					
NO2		1				
Ozone		-0.29	1			
SO2				1		
PM2.5	0.92				1	
AQHI	0.71	0.41	0.67	0.24	0.68	1

The higher the correlation coefficient, the more related the change of pollutants with the change of AQHI

From the above correlation matrix, **PM10 and PM2.5** is more correlated to AQHI than other pollutants from 2019 air quality data in HK

Current deficiency in our AQHI formula

- Our statistical data shows that API is more correlated to PM10 and PM2.5, not ozone
- **But current AQHI formula put more weight on ozone (50%) over PM2.5 (17%)**
- That explains why we only have very high AQHI when ozone is high (but not PM2.5), for instance, before typhoon days

of the air pollutants. Statistical models have been used to adjust for time-dependent variables that act as confounding factors in a time series model. There is no universally agreed “correct” model. Conventionally, a model with the “best fit”, using various statistical parameters (e.g., the AIC value) is often used. We have tested the effect of model choice on the β values of the air pollutants, and found that they vary appreciably with the ‘degree of freedom’ (df) used in the modelling process. At the ‘best fit’ model (when $df=147$), the β will be severely biased towards ozone (O_3), which accounts for more than 50% of the %ER and particulates ($PM_{2.5}$) at 17%. While in general, the β values of the two gaseous pollutants, O_3 and nitrogen dioxide (NO_2) are larger than that for $PM_{2.5}$ and sulphur dioxide (SO_2), we found that when a df of 70 was used in modelling, the β values were much more “balanced”, with O_3 contributing to 37% and PM_{10} at 20%. This choice insures that even the air pollutants with smaller β values will contribute towards the summative %ER, instead of a scenario where the %ER is overwhelmingly influenced by one dominant pollutant, O_3 . We then sought to derive the maximum regression coefficients for each air pollutant, and selected a model (at $df=70$) where the β of all the pollutants were near their maximum values. The rationale for this arbitrary model choice was that the %ER based on a near-maximum β for each air pollutant would be a conservative estimate of health risk. This method of model choice, advocated by Prof. TW Wong, was agreed by Prof. Yu and Lau.

After much discussion, the additive approach in risk estimate, the choice of the present model, as well as the banding method, were agreed by all but one member of the team.

(Wong Tze Wai, 2012)

A case on 2019/12/22

- A case showing how the current AQHI is not sensitive to the high level of PM10/PM2.5
- On 2019 Dec 22
 - After 2pm, high PM10, low ozone but relatively low AQHI
 - As only focus on ozone, PM10 high is not reflected in the current AQHI system

2019/12/22 AQHI

時間	中西區	東區	觀塘	深水埗	葵涌	荃灣	將軍澳	元朗	屯門	東涌	大埔	沙田	塔門	銅鑼灣	中環	旺角	
12	3	3	3	3	3	3	3	3	5	5	5	3	3	3	4	3	3
13	4	3	4	4	4	4	5	3	6	6	6	4	3	3	5	5	5
14	5	4	5	5	5	5	6	4	7	7	6	5	3	4	6	6	6
15	7	4	6	6	6	6	8	4	8	8	7	7	4	4	8	8	8
16	8	5	7	7	7	7	9	4	9	9	8	8	5	4	8	8	8
17	8	5	6	7	8	8	9	5	9	9	9	8	6	5	9	9	8
18	8	5	5	7	8	8	9	4	9	9	9	8	7	4	9	9	8
19	8	4	4	7	8	8	9	4	9	9	8	7	7	4	8	9	8
20	8	4	4	7	7	7	8	4	8	9	7	6	7	3	8	8	8
21	7	4	4	6	6	6	6	4	8	8	6	5	7	3	7	8	7
22	6	4	4	6	5	5	5	4	7	7	5	5	6	3	7	7	6

For instance, CWD, AQHI for 1300 and 1400 only 4 and 5 respectively, but PM2.5 and PM10 doubled and tripled from 12noon to 1300



過去24小時污染物濃度摘要

- 一般監測站
- 中西區
 - 東區
 - 觀塘
 - 深水埗
 - 葵涌
 - 荃灣
 - 將軍澳
 - 元朗
 - 屯門
 - 東涌
 - 大埔
 - 沙田
 - 筲門
- 路邊監測站
- 銅鑼灣
 - 中環
 - 旺角

中西區

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	52.8	18.8	5.2	-	64.3	49.2
2019-12-23 09:00	62.6	19.8	5.2	-	57.1	45.4
2019-12-23 08:00	49.9	37.5	6.4	-	93.8	74.1
2019-12-23 07:00	94.2	1.4	9.1	-	119.2	92.9
2019-12-23 06:00	108.5	0.4	11.0	-	120.7	92.7
2019-12-23 05:00	119.9	0.7	14.0	-	125.8	90.8
2019-12-23 04:00	118.4	0.7	11.8	-	123.8	90.0
2019-12-23 03:00	109.0	1.4	11.0	-	120.8	86.6
2019-12-23 02:00	110.5	1.3	11.4	-	105.4	80.3
2019-12-23 01:00	100.2	0.5	8.6	-	71.2	57.1
2019-12-23 00:00	102.2	0.0	9.3	-	86.0	61.9
2019-12-22 23:00	124.4	0.6	11.3	-	105.3	77.5
2019-12-22 22:00	144.3	0.4	12.6	-	107.3	80.4
2019-12-22 21:00	152.8	2.3	14.3	-	100.9	73.9
2019-12-22 20:00	164.6	3.3	15.1	-	125.5	91.9
2019-12-22 19:00	178.8	25.1	17.9	-	131.6	96.8
2019-12-22 18:00	184.2	22.3	22.3	-	136.6	99.5
2019-12-22 17:00	149.2	66.7	25.1	-	140.6	102.6
2019-12-22 16:00	144.6	59.0	20.4	-	132.7	96.6
2019-12-22 15:00	160.7	33.3	22.9	-	128.8	92.2
2019-12-22 14:00	150.8	19.6	18.8	-	127.3	88.8
2019-12-22 13:00	142.9	13.0	16.7	-	97.0	66.9
2019-12-22 12:00	81.0	17.2	6.9	-	39.3	31.8
2019-12-22 11:00	71.2	8.0	6.6	-	39.4	31.7

備註：

- (1) 顯示的是香港時間。
- (2) PM₁₀ - 可吸入懸浮粒子
PM_{2.5} - 微細懸浮粒子

8
7
5
4
3

AQHI only increases from 3 to 4 when PM2.5 doubled and PM10 tripled

AQHI increases to 5 to 8 when ozone tripled

Only sensitive to ozone?

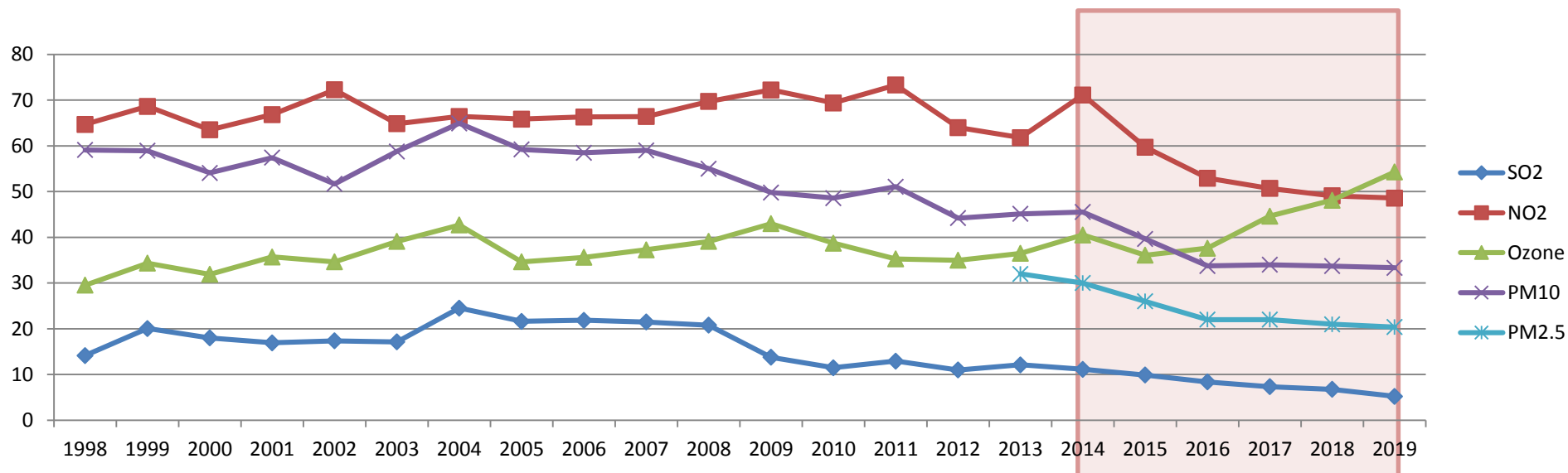
But the health impact of PM2.5 is much higher than ozone, both short-term and long term

Review of Clean Air Plan – missing indicators

- How can we tell if Clean Air Plan is successful or not?
- Government focuses on decrease of level of air pollutants / implementation of planned policies
- But we also need to know whether those policies can improve health!

Review Clean Air Plan – 1st indicator

- Level of air pollutants
 - Improvement in general vs. highest ozone in the past 4 years



Review Clean Air Plan – 2nd indicator

- Change in cardiovascular disease / respiratory disease hospital admission
 - No significant decrease in emergency hospital admissions for overall CVD or other major CVD
 - No significant decline for all respiratory diseases

Review Clean Air Plan – 3rd indicator

- The effectiveness of AQHI implementation
 - Seems not sensitive to certain high pollution episodes
 - Public doesn't fully understand the implication of AQHI
 - As a result, implementation of AQHI fails to change people's behavior and reduce hospital admissions for both cardiovascular and respiratory diseases

A new Clean Air Plan – soon?

- Bold initiatives to target roadside emission
 - Electrification of public transport
- Better indicator to show conversion from air pollution reduction to enhanced health
 - Include emergency admissions to cardiovascular and respiratory diseases, two main categories of disease directly affected by air quality
- Clear coordination and delegate other bureaus clear objectives to make a more comprehensive plan
 - THB: ceiling for total mileage travelled by vehicles
 - FHB: emergency admissions to CVD and respiratory diseases
 - ENB: better frame AQHI to behavioral change of citizens in response to high pollution episodes

Appendix – 2019/12/22

過去24小時污染物濃度摘要

一般監測站

中西區

東區

觀塘

深水埗

葵涌

荃灣

將軍澳

元朗

屯門

東涌

大埔

沙田

塔門

路邊監測站

銅鑼灣

中環

旺角

深水埗

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	56.9	23.6	2.6	-	56.0	30.5
2019-12-23 09:00	65.7	24.3	2.8	-	76.6	48.6
2019-12-23 08:00	77.7	11.3	3.8	-	95.1	64.4
2019-12-23 07:00	91.6	5.1	4.8	-	100.6	64.6
2019-12-23 06:00	88.9	5.4	5.1	-	111.4	64.2
2019-12-23 05:00	104.2	4.2	7.6	-	115.2	67.7
2019-12-23 04:00	116.3	4.4	11.4	-	108.0	65.6
2019-12-23 03:00	109.8	4.3	6.5	-	88.7	57.2
2019-12-23 02:00	114.4	4.4	8.3	-	74.6	50.7
2019-12-23 01:00	101.4	4.2	12.0	-	65.7	47.2
2019-12-23 00:00	101.8	4.0	12.7	-	53.6	36.4
2019-12-22 23:00	100.8	3.9	8.0	-	57.2	33.8
2019-12-22 22:00	112.6	3.9	12.4	-	79.0	39.0
2019-12-22 21:00	137.4	3.8	16.3	-	96.7	47.1
2019-12-22 20:00	159.2	4.0	17.5	-	111.6	58.5
2019-12-22 19:00	171.4	4.0	19.3	-	118.0	59.9
2019-12-22 18:00	162.3	4.4	14.8	-	112.6	60.2
2019-12-22 17:00	157.0	14.7	15.1	-	123.8	67.6
2019-12-22 16:00	135.8	30.3	12.4	-	145.4	77.8
2019-12-22 15:00	151.0	29.2	23.9	-	143.6	76.0
2019-12-22 14:00	157.4	26.3	29.8	-	97.1	52.4
2019-12-22 13:00	134.4	16.2	20.6	-	47.0	30.7
2019-12-22 12:00	86.1	16.9	5.5	-	33.6	23.1
2019-12-22 11:00	62.2	20.2	5.1	-	35.5	19.9

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

東區

觀塘

深水埗

葵涌

荃灣

將軍澳

元朗

屯門

東涌

大埔

沙田

塔門

路邊監測站

銅鑼灣

中環

旺角

葵涌

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	57.4	23.4	7.8	-	57.9	37.6
2019-12-23 09:00	73.3	15.2	8.5	-	66.6	48.2
2019-12-23 08:00	70.9	10.3	8.4	-	80.9	61.8
2019-12-23 07:00	69.9	10.4	7.8	-	93.2	66.6
2019-12-23 06:00	85.7	3.9	8.4	-	98.2	67.4
2019-12-23 05:00	83.5	4.9	7.7	-	98.7	66.6
2019-12-23 04:00	90.5	3.0	7.8	-	94.7	64.9
2019-12-23 03:00	102.2	2.2	7.7	-	85.0	60.1
2019-12-23 02:00	104.6	2.2	8.1	-	86.5	58.0
2019-12-23 01:00	107.1	1.8	9.5	-	73.0	50.0
2019-12-23 00:00	111.2	1.8	11.1	-	48.7	38.4
2019-12-22 23:00	104.6	0.9	12.9	-	51.9	33.6
2019-12-22 22:00	123.6	1.0	13.7	-	63.2	38.7
2019-12-22 21:00	134.2	1.0	13.8	-	92.9	59.8
2019-12-22 20:00	158.1	1.7	15.2	-	109.4	69.0
2019-12-22 19:00	176.0	24.3	19.2	-	119.3	77.0
2019-12-22 18:00	184.9	2.4	24.9	-	124.4	82.8
2019-12-22 17:00	174.0	49.9	23.7	-	126.0	79.7
2019-12-22 16:00	171.5	13.5	34.1	-	136.2	90.0
2019-12-22 15:00	176.9	27.8	50.6	-	117.7	83.1
2019-12-22 14:00	167.0	16.4	36.2	-	76.5	51.5
2019-12-22 13:00	146.1	10.9	22.7	-	36.6	26.8
2019-12-22 12:00	91.7	6.0	11.0	-	27.6	23.1
2019-12-22 11:00	79.1	5.6	11.5	-	27.7	21.2

備註：

(1) 顯示的是香港時間。

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PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

東區

觀塘

深水埗

葵涌

荃灣

將軍澳

元朗

屯門

東涌

大埔

沙田

塔門

路邊監測站

銅鑼灣

中環

旺角

荃灣

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	50.7	31.1	3.5	940.0	60.6	45.5
2019-12-23 09:00	79.6	15.4	4.4	1,180.6	71.6	56.2
2019-12-23 08:00	74.6	2.3	3.8	1,208.9	87.0	71.0
2019-12-23 07:00	72.6	2.1	3.4	1,185.3	94.1	75.5
2019-12-23 06:00	65.4	4.7	3.1	1,070.7	95.8	78.4
2019-12-23 05:00	61.4	8.1	3.1	1,048.1	92.5	75.7
2019-12-23 04:00	64.9	6.9	3.1	1,051.7	94.7	77.5
2019-12-23 03:00	69.8	7.3	3.7	1,138.3	99.2	80.4
2019-12-23 02:00	82.1	3.3	4.9	1,234.1	107.0	88.2
2019-12-23 01:00	-	-	-	-	100.6	82.6
2019-12-23 00:00	103.1	1.7	4.5	1,286.5	112.3	91.8
2019-12-22 23:00	102.1	3.8	4.3	1,288.1	115.3	93.1
2019-12-22 22:00	109.5	6.4	4.7	1,313.9	118.3	95.5
2019-12-22 21:00	118.1	9.0	5.4	1,219.7	104.7	82.8
2019-12-22 20:00	141.8	5.6	6.4	1,163.6	93.6	68.8
2019-12-22 19:00	192.0	7.1	10.5	1,287.1	140.6	101.8
2019-12-22 18:00	190.2	64.0	13.1	1,332.1	143.8	104.5
2019-12-22 17:00	169.1	84.8	15.8	1,303.6	148.7	107.6
2019-12-22 16:00	164.1	85.5	18.3	1,292.6	161.1	113.2
2019-12-22 15:00	175.4	47.7	39.4	1,438.9	158.1	109.8
2019-12-22 14:00	175.5	18.6	40.8	1,416.5	139.0	93.0
2019-12-22 13:00	153.6	13.5	24.2	1,377.4	89.7	58.5
2019-12-22 12:00	102.0	7.0	7.9	1,042.9	51.5	38.9
2019-12-22 11:00	86.5	7.2	7.7	1,037.1	43.3	33.2

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

東區

觀塘

深水埗

葵涌

荃灣

將軍澳

元朗

屯門

東涌

大埔

沙田

塔門

路邊監測站

銅鑼灣

中環

旺角

元朗

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	51.6	37.0	6.3	973.6	96.4	23.2
2019-12-23 09:00	91.0	7.5	6.9	1,408.4	102.7	40.6
2019-12-23 08:00	90.7	1.0	7.3	1,415.4	107.8	46.4
2019-12-23 07:00	93.7	0.8	7.1	1,425.9	94.2	44.5
2019-12-23 06:00	82.8	1.2	6.4	1,259.6	95.3	37.5
2019-12-23 05:00	84.1	0.8	6.3	1,364.7	91.9	39.4
2019-12-23 04:00	85.4	0.8	5.5	1,361.6	93.6	40.6
2019-12-23 03:00	81.4	0.8	5.9	1,318.7	112.8	42.6
2019-12-23 02:00	-	-	-	-	112.6	41.5
2019-12-23 01:00	-	-	-	-	97.4	38.1
2019-12-23 00:00	99.8	3.3	8.0	1,221.9	97.3	35.1
2019-12-22 23:00	106.6	5.8	8.8	1,258.6	95.1	36.7
2019-12-22 22:00	120.9	6.5	8.7	1,275.3	117.2	37.5
2019-12-22 21:00	140.6	16.2	10.8	1,418.2	140.8	50.6
2019-12-22 20:00	150.8	44.8	15.4	1,462.9	148.6	63.3
2019-12-22 19:00	183.2	40.5	15.0	1,601.8	155.7	66.1
2019-12-22 18:00	178.6	73.4	19.3	1,489.7	126.1	66.2
2019-12-22 17:00	121.7	99.7	12.0	1,278.3	118.8	50.0
2019-12-22 16:00	115.9	113.3	12.5	1,259.5	152.4	51.6
2019-12-22 15:00	149.1	84.6	16.1	1,463.7	166.1	63.7
2019-12-22 14:00	161.4	59.0	17.5	1,500.1	129.4	64.9
2019-12-22 13:00	139.9	30.8	13.4	1,320.8	125.5	49.8
2019-12-22 12:00	141.3	19.8	12.3	1,408.3	93.3	52.2
2019-12-22 11:00	104.8	17.1	8.0	1,234.7	67.2	35.9

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

東區

觀塘

深水埗

葵涌

荃灣

將軍澳

元朗

屯門

東涌

大埔

沙田

塔門

路邊監測站

銅鑼灣

中環

旺角

屯門

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	49.4	38.4	7.5	733.8	87.0	57.3
2019-12-23 09:00	84.8	14.0	10.7	1,060.9	111.2	66.7
2019-12-23 08:00	89.0	5.1	11.8	1,139.9	96.5	66.0
2019-12-23 07:00	78.7	5.4	9.5	996.1	104.7	60.2
2019-12-23 06:00	83.4	5.9	11.3	1,133.2	108.9	63.9
2019-12-23 05:00	84.9	4.8	11.5	1,253.4	112.9	65.9
2019-12-23 04:00	83.9	4.9	11.6	1,245.8	115.9	65.0
2019-12-23 03:00	86.4	4.8	13.1	1,226.9	107.3	54.4
2019-12-23 02:00	86.1	5.0	13.3	1,211.5	117.6	68.5
2019-12-23 01:00	102.7	4.4	11.1	1,164.4	104.5	80.6
2019-12-23 00:00	110.5	4.5	9.7	1,028.7	115.6	86.8
2019-12-22 23:00	116.1	6.3	10.3	1,075.5	119.9	87.0
2019-12-22 22:00	129.1	6.1	10.3	1,101.1	135.5	95.7
2019-12-22 21:00	148.9	10.4	11.4	1,169.6	152.4	101.8
2019-12-22 20:00	176.0	17.7	12.4	1,233.3	164.6	100.1
2019-12-22 19:00	171.7	45.8	18.3	1,224.2	170.8	99.0
2019-12-22 18:00	133.0	111.1	21.1	1,143.2	135.2	77.7
2019-12-22 17:00	122.4	92.8	18.1	1,016.9	134.0	78.9
2019-12-22 16:00	101.2	129.9	15.8	971.2	151.4	90.6
2019-12-22 15:00	120.7	111.6	20.7	1,086.3	148.1	83.3
2019-12-22 14:00	133.4	58.4	25.5	1,112.5	148.0	77.2
2019-12-22 13:00	140.4	27.7	28.9	1,197.2	146.1	76.0
2019-12-22 12:00	145.6	14.7	26.1	1,180.5	122.8	65.4
2019-12-22 11:00	110.2	12.5	15.5	1,133.1	91.1	48.6

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

東區

觀塘

深水埗

葵涌

荃灣

將軍澳

元朗

屯門

東涌

大埔

沙田

塔門

路邊監測站

銅鑼灣

中環

旺角

東涌

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	42.7	41.6	6.9	782.7	43.1	33.9
2019-12-23 09:00	48.9	45.7	8.1	887.1	81.6	58.9
2019-12-23 08:00	99.2	2.0	8.6	1,422.3	93.5	65.5
2019-12-23 07:00	84.9	1.8	7.0	1,374.6	79.2	56.9
2019-12-23 06:00	74.0	1.5	6.4	1,331.2	72.4	51.8
2019-12-23 05:00	69.6	1.6	6.0	1,325.1	72.1	52.4
2019-12-23 04:00	70.2	1.6	5.9	1,306.5	77.2	57.6
2019-12-23 03:00	70.7	1.8	6.3	1,297.3	82.2	62.0
2019-12-23 02:00	75.5	1.7	6.4	1,262.1	90.7	69.0
2019-12-23 01:00	-	-	-	-	94.8	71.9
2019-12-23 00:00	98.2	1.8	6.3	1,306.4	98.9	76.3
2019-12-22 23:00	116.2	5.0	6.8	1,306.4	91.7	72.0
2019-12-22 22:00	108.2	17.2	7.2	1,198.8	94.6	74.8
2019-12-22 21:00	116.1	20.6	7.7	1,208.9	99.2	78.3
2019-12-22 20:00	140.0	12.9	7.3	1,269.1	104.2	81.5
2019-12-22 19:00	154.4	22.8	8.1	1,282.6	115.2	85.7
2019-12-22 18:00	144.2	101.9	13.3	1,215.1	129.1	93.2
2019-12-22 17:00	139.7	111.3	17.0	1,217.3	136.6	97.1
2019-12-22 16:00	147.1	89.2	19.3	1,210.9	142.0	98.2
2019-12-22 15:00	152.0	59.3	20.6	1,272.3	142.2	96.3
2019-12-22 14:00	149.6	33.7	20.6	1,301.4	128.1	83.3
2019-12-22 13:00	134.5	13.4	18.1	1,368.4	119.8	74.1
2019-12-22 12:00	136.3	5.3	19.4	1,449.6	117.4	73.2
2019-12-22 11:00	130.2	4.3	14.6	1,372.5	79.4	52.6

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

東區

觀塘

深水埗

葵涌

荃灣

將軍澳

元朗

屯門

東涌

大埔

沙田

荃門

路邊監測站

銅鑼灣

中環

旺角

大埔

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	37.4	32.5	7.4	-	65.8	48.7
2019-12-23 09:00	57.1	7.0	7.6	-	67.5	50.2
2019-12-23 08:00	59.2	8.5	7.5	-	80.2	63.5
2019-12-23 07:00	66.5	0.1	6.5	-	100.0	82.4
2019-12-23 06:00	60.0	0.0	6.0	-	97.9	80.8
2019-12-23 05:00	56.2	0.1	5.7	-	94.8	78.6
2019-12-23 04:00	50.8	0.0	5.4	-	98.4	79.9
2019-12-23 03:00	72.7	0.1	6.1	-	110.7	88.2
2019-12-23 02:00	73.3	0.3	5.5	-	100.3	79.2
2019-12-23 01:00	-	2.9	5.3	-	93.6	74.3
2019-12-23 00:00	65.7	4.9	5.5	-	93.1	73.2
2019-12-22 23:00	77.0	5.3	5.8	-	102.7	80.2
2019-12-22 22:00	74.5	16.3	5.5	-	105.7	81.7
2019-12-22 21:00	91.9	17.1	5.6	-	108.1	83.6
2019-12-22 20:00	82.7	41.6	6.0	-	105.1	79.1
2019-12-22 19:00	87.4	55.0	6.3	-	121.7	85.2
2019-12-22 18:00	140.6	46.5	7.1	-	142.5	97.0
2019-12-22 17:00	135.2	77.7	9.0	-	149.2	101.2
2019-12-22 16:00	127.1	80.3	7.9	-	163.3	107.4
2019-12-22 15:00	139.9	63.2	8.0	-	150.9	98.0
2019-12-22 14:00	131.7	43.7	7.5	-	125.6	79.8
2019-12-22 13:00	104.3	32.5	6.5	-	71.6	49.4
2019-12-22 12:00	55.2	41.1	5.3	-	41.9	32.1
2019-12-22 11:00	38.2	43.5	5.3	-	31.9	26.8

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

東區

觀塘

深水埗

葵涌

荃灣

將軍澳

元朗

屯門

東涌

大埔

沙田

塔門

路邊監測站

銅鑼灣

中環

旺角

銅鑼灣

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	64.3	11.6	7.7	978.4	83.6	58.9
2019-12-23 09:00	73.6	10.1	8.3	939.7	69.7	49.6
2019-12-23 08:00	78.3	11.4	10.1	959.2	93.3	70.1
2019-12-23 07:00	75.6	8.2	9.6	1,008.7	109.9	84.7
2019-12-23 06:00	94.0	1.7	9.9	1,169.3	109.9	86.2
2019-12-23 05:00	105.9	1.9	10.7	1,256.6	108.1	85.9
2019-12-23 04:00	105.7	1.7	9.6	1,279.1	113.3	87.1
2019-12-23 03:00	114.8	2.0	13.5	1,263.5	113.0	83.2
2019-12-23 02:00	114.9	1.6	15.2	1,197.7	102.5	77.6
2019-12-23 01:00	111.4	0.8	13.7	1,720.7	84.9	65.7
2019-12-23 00:00	118.4	0.8	13.0	1,736.8	99.1	76.8
2019-12-22 23:00	140.6	1.6	17.4	1,419.4	114.7	88.2
2019-12-22 22:00	153.5	2.1	19.7	1,601.8	129.3	100.7
2019-12-22 21:00	194.7	2.5	22.2	1,851.5	141.0	104.9
2019-12-22 20:00	170.9	3.7	19.1	1,790.8	118.1	89.2
2019-12-22 19:00	195.7	2.7	21.3	1,899.1	118.5	88.4
2019-12-22 18:00	213.8	3.4	26.2	1,721.5	142.5	100.8
2019-12-22 17:00	206.9	4.0	24.3	1,669.1	148.7	107.2
2019-12-22 16:00	231.2	5.0	28.7	1,843.0	158.2	111.5
2019-12-22 15:00	218.6	5.1	26.5	1,744.6	157.1	109.1
2019-12-22 14:00	189.1	4.8	23.3	2,020.2	136.6	91.7
2019-12-22 13:00	163.2	4.0	18.5	1,714.9	98.3	69.0
2019-12-22 12:00	113.7	3.4	12.6	1,467.5	52.5	40.0
2019-12-22 11:00	92.3	3.9	9.7	1,323.5	46.1	32.1

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

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大埔

沙田

荃門

路邊監測站

銅鑼灣

中環

旺角

中環

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	75.0	13.7	9.5	1,073.0	68.5	49.2
2019-12-23 09:00	88.7	14.2	9.5	1,016.6	59.0	44.5
2019-12-23 08:00	81.9	19.8	10.4	1,012.6	104.8	81.2
2019-12-23 07:00	113.7	4.6	14.0	1,472.0	126.4	97.7
2019-12-23 06:00	116.6	5.2	14.0	1,495.3	117.1	91.0
2019-12-23 05:00	109.2	5.5	13.5	1,344.4	126.0	95.5
2019-12-23 04:00	119.2	5.8	14.0	1,415.6	122.7	93.6
2019-12-23 03:00	112.5	6.1	13.6	1,326.9	123.6	93.4
2019-12-23 02:00	120.4	5.8	16.6	1,279.6	108.4	82.4
2019-12-23 01:00	109.7	4.6	14.0	1,118.9	84.5	59.5
2019-12-23 00:00	121.6	4.3	16.6	1,021.4	94.2	60.5
2019-12-22 23:00	131.2	4.3	16.9	1,100.3	98.6	67.4
2019-12-22 22:00	157.5	4.9	19.8	1,322.5	107.8	78.4
2019-12-22 21:00	165.9	5.8	17.8	1,356.3	113.7	79.3
2019-12-22 20:00	193.1	5.9	20.7	1,376.3	135.5	92.1
2019-12-22 19:00	215.1	6.3	25.5	1,449.6	138.6	94.4
2019-12-22 18:00	244.4	7.5	30.9	1,446.9	153.6	104.6
2019-12-22 17:00	240.0	15.3	28.6	1,417.5	157.2	107.9
2019-12-22 16:00	229.6	13.4	26.2	1,426.3	139.7	98.3
2019-12-22 15:00	201.9	13.5	24.9	1,488.2	137.9	94.6
2019-12-22 14:00	185.1	10.7	22.5	1,531.9	136.3	91.3
2019-12-22 13:00	165.0	9.8	20.7	1,486.7	91.1	61.5
2019-12-22 12:00	99.9	12.0	10.7	1,117.8	39.8	29.5
2019-12-22 11:00	77.9	13.4	8.1	980.6	37.9	28.9

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

過去24小時污染物濃度摘要

一般監測站

中西區

東區

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元朗

屯門

東涌

大埔

沙田

荃門

路邊監測站

銅鑼灣

中環

旺角

旺角

日期時間	二氧化氮	臭氧	二氧化硫	一氧化碳	PM ₁₀	PM _{2.5}
2019-12-23 10:00	-	-	-	-	73.3	53.8
2019-12-23 09:00	89.4	5.2	7.3	909.3	75.3	58.3
2019-12-23 08:00	88.9	1.7	8.5	1,072.2	110.9	87.8
2019-12-23 07:00	95.5	0.7	8.3	1,112.4	128.0	100.5
2019-12-23 06:00	105.7	0.9	9.4	1,219.3	134.5	104.4
2019-12-23 05:00	111.4	0.6	10.0	1,183.0	131.4	103.2
2019-12-23 04:00	122.9	0.3	11.3	1,266.5	133.7	104.3
2019-12-23 03:00	125.6	0.5	11.4	1,306.3	130.8	101.9
2019-12-23 02:00	125.6	0.4	15.7	1,242.8	107.7	86.0
2019-12-23 01:00	109.6	0.1	16.1	969.6	93.1	77.5
2019-12-23 00:00	115.5	0.0	13.5	950.9	81.0	66.1
2019-12-22 23:00	126.0	0.0	11.5	917.7	74.8	60.1
2019-12-22 22:00	134.1	0.0	16.6	945.7	81.4	63.2
2019-12-22 21:00	162.0	0.1	19.2	1,044.4	106.7	79.1
2019-12-22 20:00	191.6	0.4	20.2	1,160.9	113.8	83.3
2019-12-22 19:00	215.5	0.3	24.5	1,223.3	123.9	88.7
2019-12-22 18:00	212.9	0.8	20.6	1,347.2	126.4	91.3
2019-12-22 17:00	224.2	3.7	20.2	1,288.3	137.8	98.9
2019-12-22 16:00	213.5	8.3	25.7	1,261.7	141.0	98.7
2019-12-22 15:00	205.9	8.4	29.6	1,274.1	152.0	105.9
2019-12-22 14:00	202.9	5.4	31.1	1,359.1	143.7	97.5
2019-12-22 13:00	164.6	5.1	21.6	1,215.5	107.3	71.9
2019-12-22 12:00	115.6	4.3	9.0	985.9	48.2	38.4
2019-12-22 11:00	79.1	4.3	9.9	875.4	41.1	36.7

備註：

(1) 顯示的是香港時間。

(2) PM₁₀ - 可吸入懸浮粒子

PM_{2.5} - 微細懸浮粒子

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