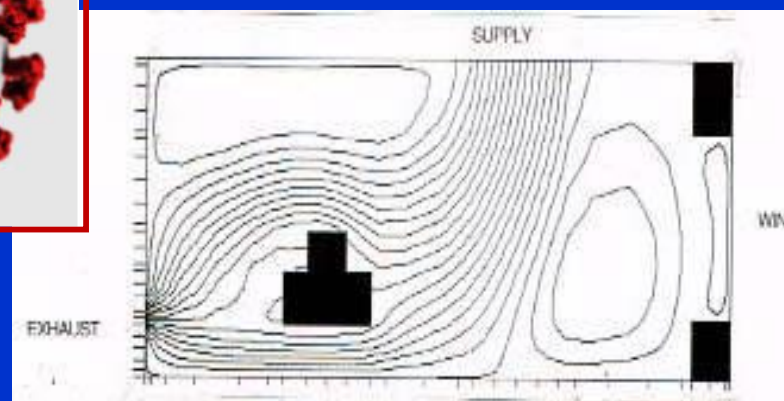
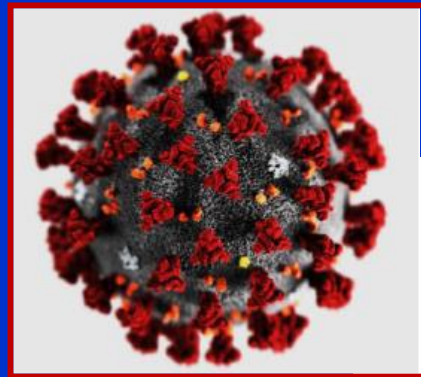


Covid 19

– Update on Infection Prevention and the Vaccine

WH Seto



The world
has
changed ...





World Health Organization

The WHO Infection Control Guidelines formulated for COVID 19

Experts in the GDG (Guideline Development Group)

The WHO Health Emergencies Programme (WHE) Ad-hoc COVID-19 IPC Guidance Development Group (in alphabetical order):

Red Cross (ICRC), Switzerland; Fernanda Lessa, Centers for Disease Control and Prevention, United States of America (USA); Shaheen Mehtar, Infection Control Africa Network, South Africa; Maria Clara Padoveze, School of Nursing, University of São Paulo, Brazil; Wing Hong Seto, Hong Kong, Special Administrative Region, China; Morris Tidball-Binz, International Committee of the Red Cross (ICRC),

Infection Prevention and Control for COVID-19

- [Infection prevention and control during health care when COVID-19 is suspected or confirmed](#)
- [Rational use of personal protective equipment for coronavirus disease \(COVID-19\) and considerations during severe shortages](#)
- [Advice on the use of masks in the context of COVID-19](#)

of masks for children in the community in the

Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed

Interim guidance
29 June 2020

Background

This is the third edition of WHO's interim guidance on infection prevention and control (IPC) strategies during health care when coronavirus disease (COVID-19) is suspected or confirmed. The first edition was aligned from WHO's interim guidance on infection prevention and control during health care for probable or confirmed cases of highly fatal respiratory coronavirus SARS-CoV-2 infection, and on infection prevention and control of epidemic- and pandemic-prone acute respiratory infections to health care. The rationale for this updated edition has been to expand the scope and structure of interim guidance, integrate updated advice on recommendations as well as considerations and advice from subject matter experts.

The main differences and additions compared to the previous version include the following:

- all sub-sections in the section "Principles of IPC strategies associated with health care for suspected or confirmed cases of COVID-19" have been updated to include classifications and additional recommendations; new guidance and practical advice for management of cases especially at sites with COVID-19 community transmission;
- inclusion of a sub-section on ventilation in the section "Transmission and engineering controls"; new guidance on IPC considerations for surgical procedures for patients with suspected or confirmed COVID-19, as well as those patients whose COVID-19 status is unknown;
- considerations for dual body management in health-care facilities;
- practical advice and available tools to assess health-care facilities' IPC readiness and to monitor and evaluate IPC measures for COVID-19.

Guidance and considerations included in this document are based on published WHO scientific, health, guidance and guidance documents, including the WHO Guidelines on infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care, scientific data on modes of COVID-19 transmission and

Principles of IPC strategies associated with health care for suspected or confirmed cases of COVID-19

To meet an optimal response to the COVID-19 outbreak using the strategies and practices recommended in this document, a facility-level IPC programme with a dedicated and trained team or team in-charge should be in place and supported by the national and facility-level management. In countries where IPC is limited or nonexistent, it is critical to start by ensuring that at least basic IPC standards are in place at the national and health-care facility level to provide minimum protection to patients, health workers and visitors. These are known as the minimum requirements for IPC that have been developed by WHO in 2017 based on a broad consensus among international experts and institutions to facilitate the implementation of WHO recommendations on the core components for IPC programmes. Addressing the IPC readiness requirements as well as some select and comprehensive IPC programme according to the WHO core component across the whole health system in all countries or entities to initiate efforts to control the COVID-19 pandemic, other strategic activities to manage health care-associated infections and antimicrobial resistance.

Additional transmission-based precautions are required for health care workers to protect themselves and prevent transmission of health care-associated infections during surgical, generating procedures and support treatment of high-risk infections – non-invasive ventilation, haemodialysis, cardiopulmonary resuscitation, manual ventilation before intubation, laryngoscopy, etc. WHO recommends additional precautions for these procedures:

Based on current evidence, the COVID-19 virus is transmitted between people through close contact and droplet, airborne transmission may occur during surgical, generating procedures and support treatment of high-risk infections – non-invasive ventilation, haemodialysis, cardiopulmonary resuscitation, manual ventilation before intubation, laryngoscopy, etc. WHO recommends additional precautions for these procedures:

For all the most effective preventive measures include:

- maintaining physical distance (≥ 1 metre) from other individuals;
- performing hand hygiene frequently with an alcohol-based hand rub or available and provided as not visible dirt on work tops and work of hands as dirty.

Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages

Interim guidance
6 April 2020

Background

This document summarizes WHO's recommendations for the rational use of personal protective equipment (PPE) in health care and home care settings, as well as during the handling of corpses. It also discusses the correct disposition of the global supply chain and considerations for decision-making during severe shortages of PPE.

This document does not include recommendations for health care workers (HCWs) to prevent or limit COVID-19 transmission from WHO advice on use of masks in the general population.

In the context of PPE shortages, medical supplies from masks – broadly referred to as "medical masks", gowns, face shields and gowns, as well as more specific procedures (filtering respirator equivalent (i.e. N95 or PFF2 or PFF3) standard or equivalent) – broadly referred to as "respirators" – and gloves. This document is intended for those involved in distributing and managing PPE, as well as public health authorities and individuals in health care and communities. It also addresses those who use PPE in a short approach, including the context of expiring handling.

This document has been updated to address key considerations for decision-making processes during severe shortages of PPE.

Preventive measures for COVID-19 disease

Based on current evidence, the COVID-19 virus is transmitted between people through close contact and droplet, airborne transmission may occur during surgical, generating procedures and support treatment of high-risk infections – non-invasive ventilation, haemodialysis, cardiopulmonary resuscitation, manual ventilation before intubation, laryngoscopy, etc. WHO recommends additional precautions for these procedures:

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Mask use in the context of COVID-19

Interim guidance
1 December 2020

Background

This document, which is an update of the guidance published on 5 June 2020, includes new scientific evidence relevant to the use of masks for reducing the spread of SARS-CoV-2, the virus that causes COVID-19, and practical considerations. It contains updated evidence and guidance on the following:

1. selecting type, only recognition, and correct use (including suspected and confirmed COVID-19 patients);
2. applying standard procedures for all patients on including alleged hand hygiene;
3. implementing engineering, additional protection (shielding and control) and, wherever applicable, correct-generating procedures and support transmission, outbreak prevention for suspected and confirmed cases of COVID-19;
4. implementing administrative controls;
5. using transmission and engineering controls.

Masked patients are meant to reduce the risk of transmission of bloodborne and other pathogens that are recognized and unrecognised. These are the best level of infection control: prevention to be used, in situations, in the case of all patients.

Key points

The World Health Organization (WHO) advises the use of masks as part of a comprehensive package of prevention and control measures to limit the spread of COVID-19. The virus that causes COVID-19 is a novel coronavirus, even when it is used correctly, its insufficiency to provide adequate protection or control. Other infection prevention and control (IPC) measures include hand hygiene, physical distancing of at least 1 metre, avoidance of gathering in close, face-to-face contact, wearing of face mask, respiratory hygiene, coughing and sneezing into elbow, and isolation. Together these measures are critical to prevent person-to-person transmission of SARS-CoV-2.

Depending on the type, masks can be used either for protection of healthy persons or to prevent person-to-person transmission (source control).

WHO continues to advise that source control is considered of having COVID-19 or suspecting viral illness, respiratory results should wear a medical mask when in the presence of others (this does not apply to those residing at home).

For any mask type, appropriate use, storage and cleaning and disposal are essential to ensure that they are as effective as possible and to avoid an increased transmission risk.

Mask use in health-care settings

- WHO continues to recommend that health workers (1) providing care to suspected or confirmed COVID-19 patients wear the following type of mask/equipment in addition to other personal protective equipment (as per part of standard, shield and control precautions – medical mask in the absence of several generating procedures (GPs) – respiratory N95 or PFF2 or PFF3 standard, or equivalent as case settings for COVID-19 patients whose GPs are performed, these may be used by health workers whose providing care to COVID-19 patients in other settings if they are readily available and if there is not a case.
- In case of known or suspected community or cluster SARS-CoV-2 transmission WHO advise the following:
 - universal masking for all persons (staff/patients, visitors, service providers and others) within the health facility (including primary, secondary and tertiary care levels), outpatient care, and long-term care facilities);
 - mask use during various ordinary physical activity, essential parameters to be considered when wearing of masks by patients when physical distancing of at least 1 metre cannot be maintained or when physical distancing is not possible.
- In case of known or suspected community or cluster SARS-CoV-2 transmission, health workers should wear a medical mask. This is known as targeted continuous medical masking for health workers in clinical areas.
- Exhibitions value on respiratory use discouraged as they bypass the filtration function for which are by the virus.

Mask use in community settings

- Decisions makers should apply a risk-based approach when considering the use of masks for the general public.
- In case of known or suspected community or cluster SARS-CoV-2 transmission:
 - WHO advises that the general public should wear a non-medical mask in indoor (e.g. shops, shared workplaces, schools – see Table 2 for details) or outdoor settings when physical distancing of at least 1 metre can be maintained.
 - If visitors, visitors' visitation has been considered to be adequate, WHO advises that the general public should wear a non-medical mask, regardless of whether physical distancing of at least 1 metre can be maintained.

For adequate ventilation refer to specific national authorities or local health authorities which have specific requirements for ventilation systems. If not available or applicable, a

Health workers etc. the context of COVID-19 virus



**World Health
Organization**

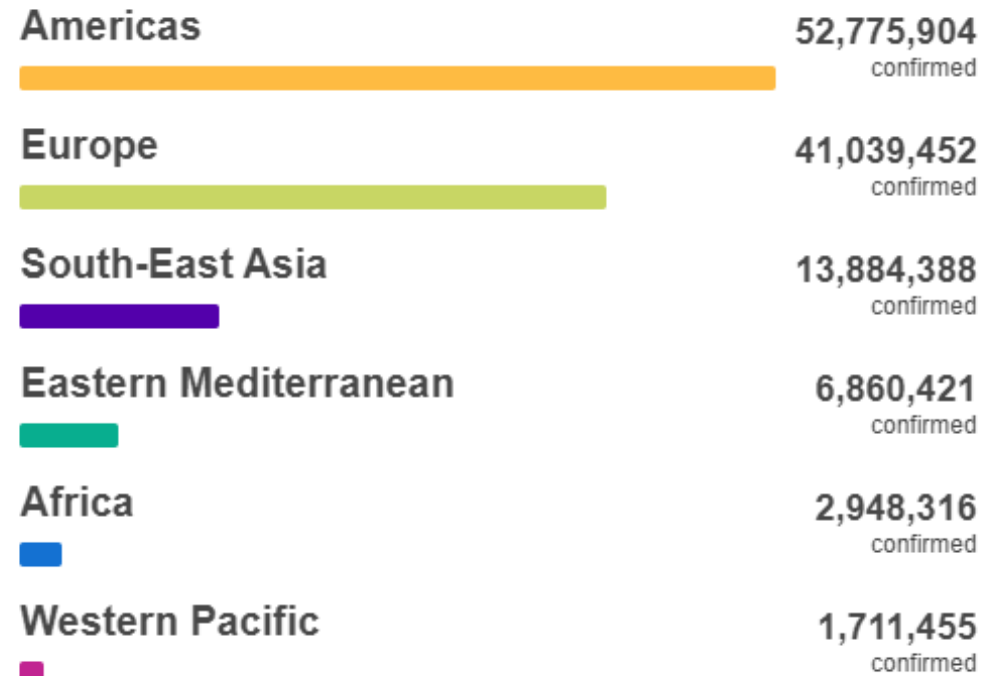
Globally, as of 5:13pm CET, 14 March 2021,

Global Situation

119,220,681

confirmed cases

Situation by WHO Region

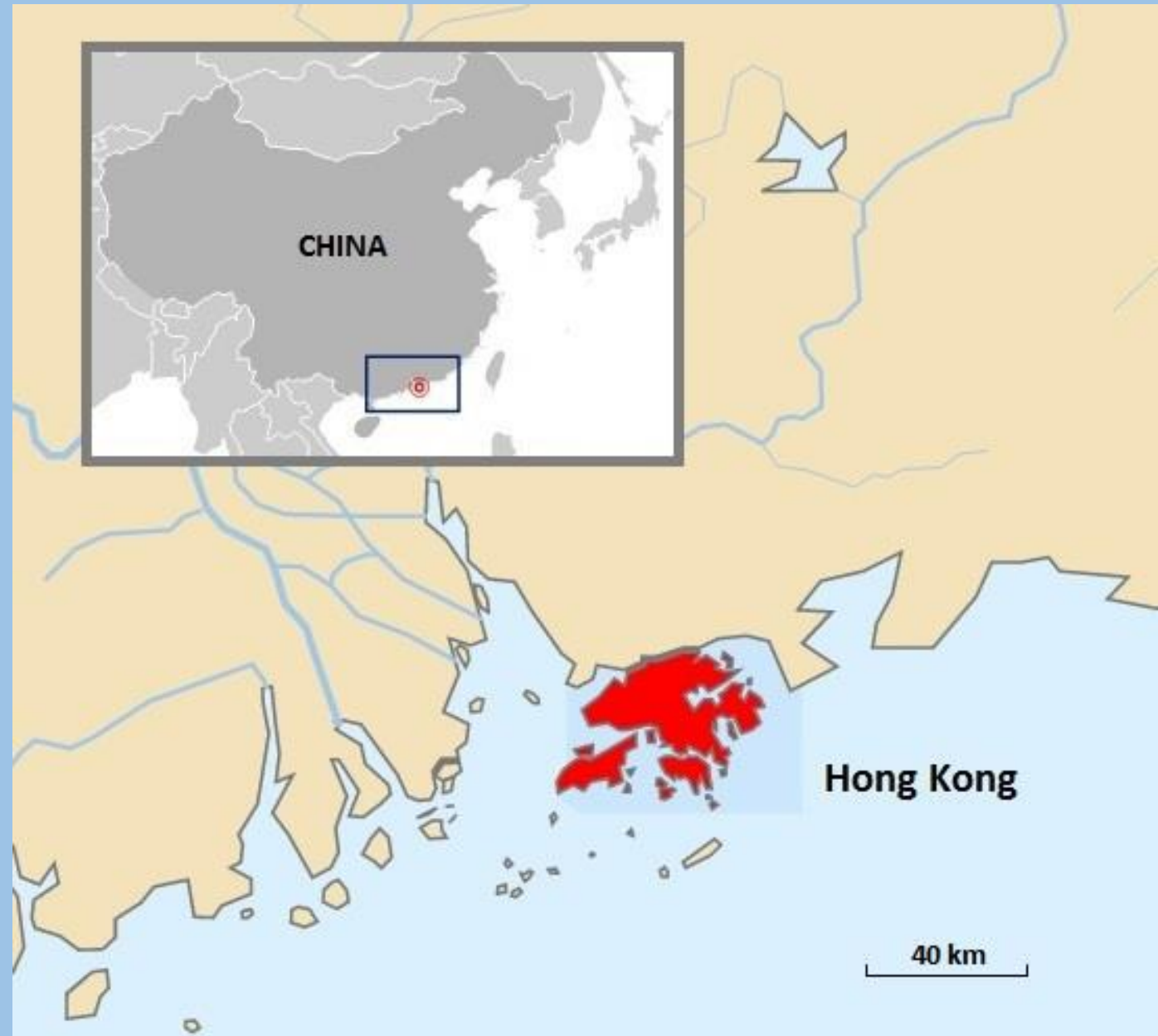


Source: World Health Organization

▨ Data may be incomplete for the current day or week.

Hong Kong and COVID 19

- Population 7.3 million with high pop density and highly developed economy
- **Heavily affected by SARS in 2003** – subsequent investment in capacity for response to emerging infections – hospital isolation beds, laboratory testing capacity, and new public health agency



As of 14th March, 2021

Hong Kong

Total cases: 11,282
(18.2% imported)

Cases per million: 1496

Tests per million: 1,233,061

USA

Total cases: 30,043,662

Cases per million: 90,306

Tests per million: 1,140,618

65x

Netherlands

Total cases: 1,151,218

Cases per million: 67,082

Tests per million: 406,168

45x

Reasons for success:

1. Sufficient isolation facilities
2. Effective implementation of isolation and quarantine policies
3. Aggressive testing and contact tracing
4. Effective infection control measures in hospitals

Reasons for success:

1. Sufficient isolation facilities – 1400 beds available from the start.

Hospital Authority wants all active COVID 19

Present Isolation Facilities

Over 3000 isolation beds

with 816 negative pressure beds at
Infection Control Centre

Also Community Treatment
Centre

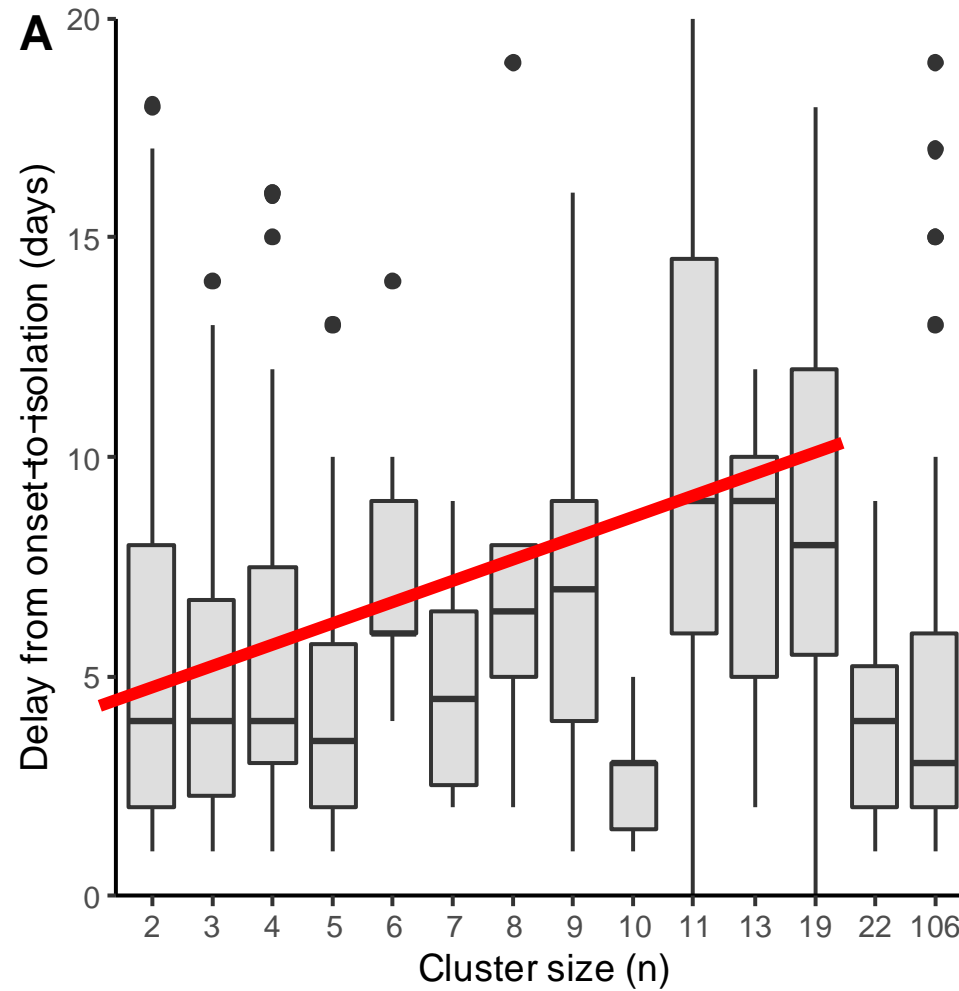


The Community Treatment Centre up at Asia World-Expo



Delay in isolation associated with cluster size

With Dillon Adam



Home care for patients with suspected or confirmed COVID-19 and management of their contacts

Interim guidance

12 August 2020



Home care – difficult to prevent spread

Home care for patients with suspected 2019-nCoV infection presenting with mild symptoms

In view of the currently limited knowledge of the disease caused by 2019-nCoV infection and its transmission patterns, WHO recommends that suspected cases of 2019-nCoV infection be isolated and monitored in a hospital setting. This would ensure both safety and quality of health care (in case patients' symptoms worsen) and public health security.

Decision to care for COVID-19 patients at home

Home care may be considered for an adult or child with confirmed or suspected COVID-19 when inpatient care is unavailable or unsafe (e.g. when capacity is insufficient to meet the demand for health-care services). Such patients who have been discharged from hospital may also be cared for at home, if necessary.

Reasons for success:

1. Sufficient isolation facilities – 1400 beds available from the start
2. Effective implementation of isolation and quarantine policies – 14 days (21 days from high risk countries)

Four large quarantine centers:

Penny's Bay,
LYM Park and Holiday Village,
Silka Tsuen Wan,
Dorsett Kwun Tong
A total of 4600 Quarantine Units



Penny's Bay

+

36 designated quarantine hotels



Sheraton Hong Kong

Reasons for success:

1. Sufficient isolation facilities – 1400 beds available from the start. **Hospital Authority wants all active COVID 19**
2. Effective implementation of isolation and quarantine policies
3. Aggressive testing and contact tracing

Aggressive testing

Hong Kong: total tests done = 9,296,529 - 14 March 2021

Per million population: 1,223,061

(China: 111,163)

(South Korea: 137,746)

(Japan: 70,459)

(Singapore: 1,326,878)

Reasons for success:

1. Sufficient isolation facilities – 1400 beds available from the start
2. Effective implementation of isolation and quarantine policies
3. Aggressive testing and contact tracing
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1. Sufficient isolation facilities – 1400 beds available from the start
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Total: 136 pages

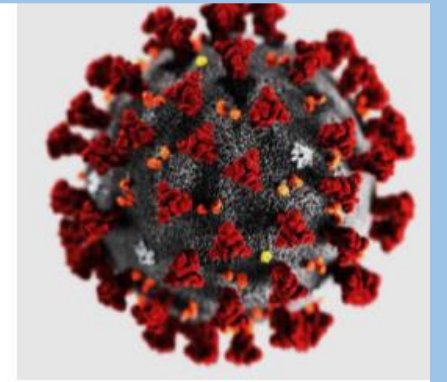
All the infection
control measures
needed in
hospitals

Hospital Authority Communication Kit –

Coronavirus disease 2019 (COVID-19)
Formerly named Novel Coronavirus (nCoV)

Version 6.7

12 Jan 2021



Prepared by Chief Infection Control
Officer (CICO) Office



醫院管理局
HOSPITAL
AUTHORITY

緊急

E M E R G E N C Y

因應特區政府應變計劃，醫院管理局現已實施緊急級別措施

所有進入公立醫院人士必須遵守下列措施：

In accordance with the Hong Kong Government's Preparedness Plan, the Hospital Authority has implemented measures for the Emergency Response Level. All people entering public hospitals must follow instructions below:

進入及離開醫院前
請徹底清潔雙手
*Clean your hands
before and after visiting hospital*



請遵守醫院指示
量度體溫
*Please perform temperature check
as required by hospital*



醫院範圍內
必須佩戴外科口罩
Wear a surgical mask in all hospital areas



必要情況下，訪客可能被要
求登記身分，以便日後跟進
*Visitors may be required to provide
personal information for future follow-up*



所有公立醫院謝絕探病
No visiting in all public hospitals

謝絕探病
No Visiting



Personal Protective Equipment (PPE)

- The primary use of PPE is to protect healthcare workers and reduce opportunities for transmission of microorganisms in healthcare facilities
- Appropriate use of PPE can safeguard oneself and the others

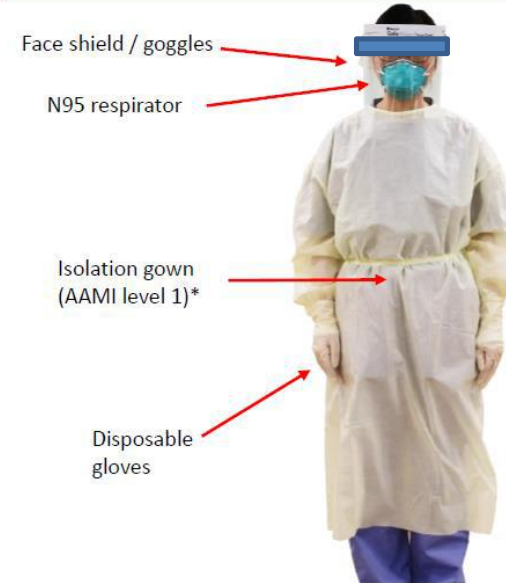


Personal Protective Equipment (PPE)

PPE at triage / fever room / fever consultation room / surveillance ward



Recommended PPE for AGPs / suspected or confirmed COVID-19



- > *AAMI level 3 isolation gown can be considered when splashing is anticipated. Alternatively, a waterproof apron on top of the AAMI level 1 isolation gown is also acceptable.
- > Shoe covers are not recommended.

Effective IPC also in the Private Hospitals.

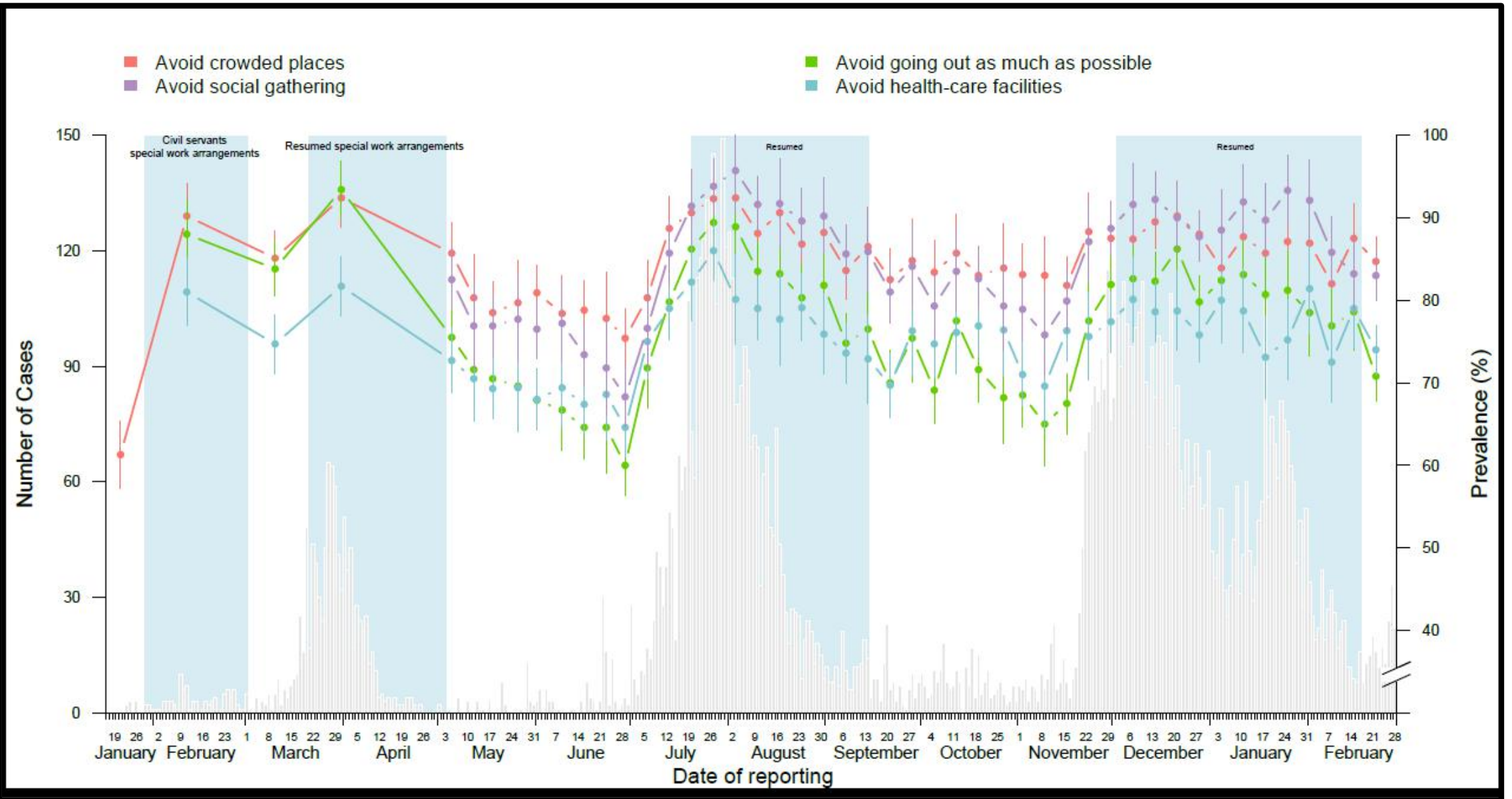
1. Aggressive screening + FTOCC (epi-clues) and all cases transferred to HA.
2. All suspected cases to be put on droplets and contact precautions
3. Effective infection control measures.

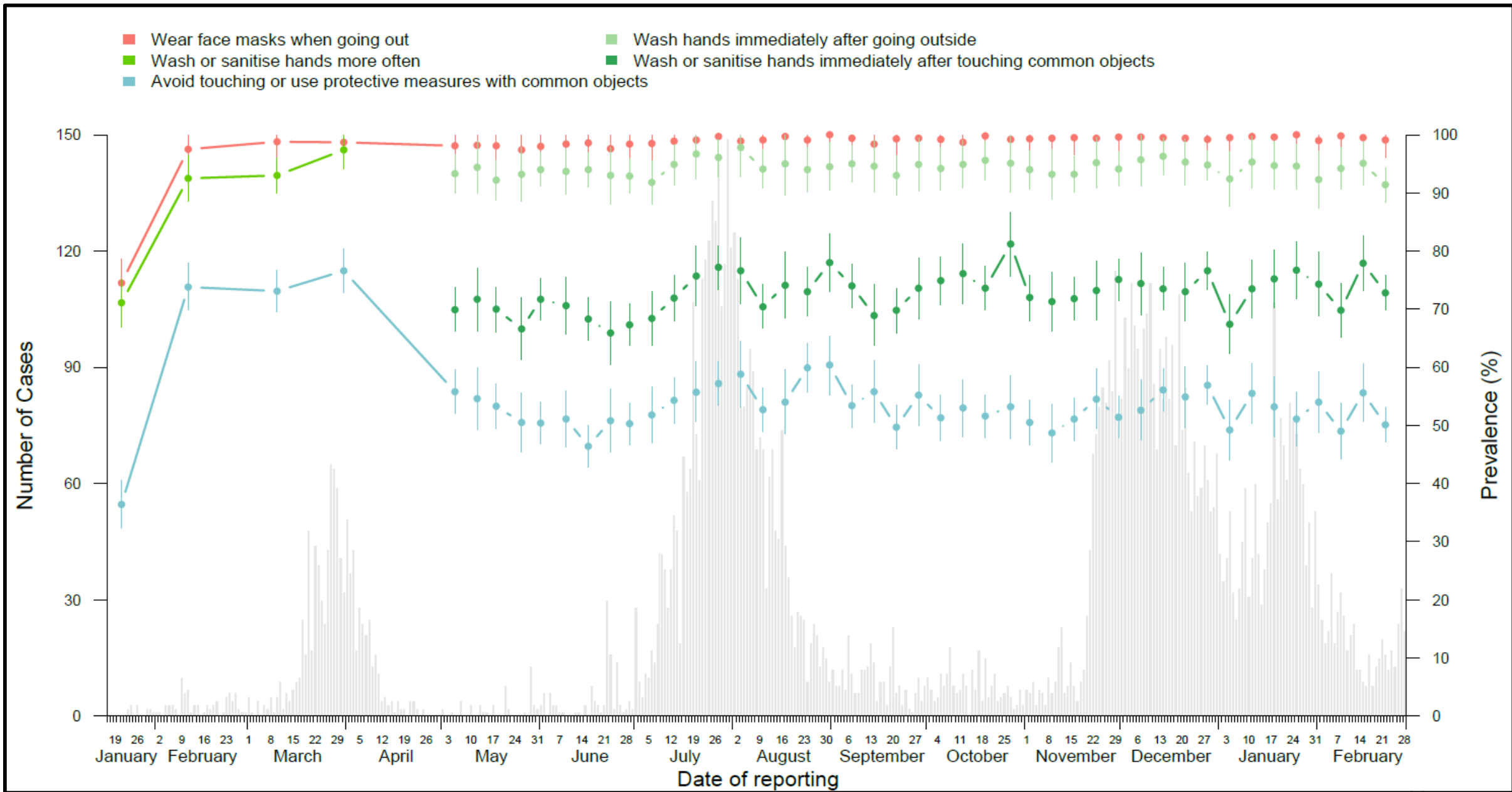


Total of 20 +ve cases detected by our screening and transferred to HA

No hospital outbreak in GHK up till the present.

Other Relevant Conclusions and Lessons







Lowbury Lecture 2014 - Hospital Infection Society, London

Journal of Hospital Infection 89 (2015) 225–228

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevierhealth.com/journals/jhin



Lowbury lecture

Airborne transmission and precautions: facts and myths

W.H. Seto*

University of Hong Kong, School of Public Health, Hong Kong, SAR, China

A R T I C L E I N F O


Article history:
Received 17 November 2014
Accepted 20 November 2014
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Keywords:
Airborne transmission
Influenza
N95 respirator
Respiratory virus
Severe acute respiratory syndrome (SARS)
Surgical mask

S U M M A R Y

Airborne transmission occurs only when infectious particles of $<5 \mu\text{m}$, known as aerosols, are propelled into the air. The prevention of such transmission is expensive, requiring N95 respirators and negative pressure isolation rooms. This lecture first discussed whether respiratory viral infections are airborne with reference to published reviews of studies before 2008, comparative trials of surgical masks and N95 respirators, and relevant new experimental studies. However, the most recent experimental study, using naturally infected influenza volunteers as the source, showed negative results from all the manikins that were exposed. Modelling studies by ventilation engineers were then summarized to explain why these results were not unexpected. Second, the systematic review commissioned by the World Health Organization on what constituted aerosol-generating procedures was summarized. From the available evidence, endotracheal intubation either by itself or combined with other procedures (e.g. cardiopulmonary resuscitation or bronchoscopy) was consistently associated with increased risk of transmission by the generation of aerosols.

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WH Seto,
HK, China

**Airborne transmission and precaution –
facts and myths**

Bacteria That Cause Airborne Nosocomial Infections

- Group A Streptococcus
- Staph. aureus
- Neisseria meningitidis
- Bordetella pertusis
- MTB
- Acinetobacter
- Legionellae
- Clostridia
- Pseudomonas
- Nocardia

Viruses Implicated in Airborne Nosocomial Infections

- Rinoviruses
- Influenza and
- Parainfluenza viruses
- Respiratory Syncytial Virus
- Adenovirus
- Varicella Zoster Virus
- Measles
- Rubella
- Smallpox
- Certain enteroviruses

Adapted from Schaal, 1985

Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed

Interim guidance

29 June 2020



Airborne transmission is different from droplet transmission as it refers to the presence of microbes within droplet nuclei. Droplet nuclei are generally considered to be particles $<5\mu\text{m}$ in diameter that can remain in the air for longer periods of time and can be transmitted to others over distances greater than 1 metre. Airborne transmission of the COVID-19 virus is possible under circumstances and settings where aerosol generating procedures (AGPs) are performed,

Airborne
needs
aerosol
 ≤ 5 micron



aerosol



Majority of droplets are from 10-100 μm .

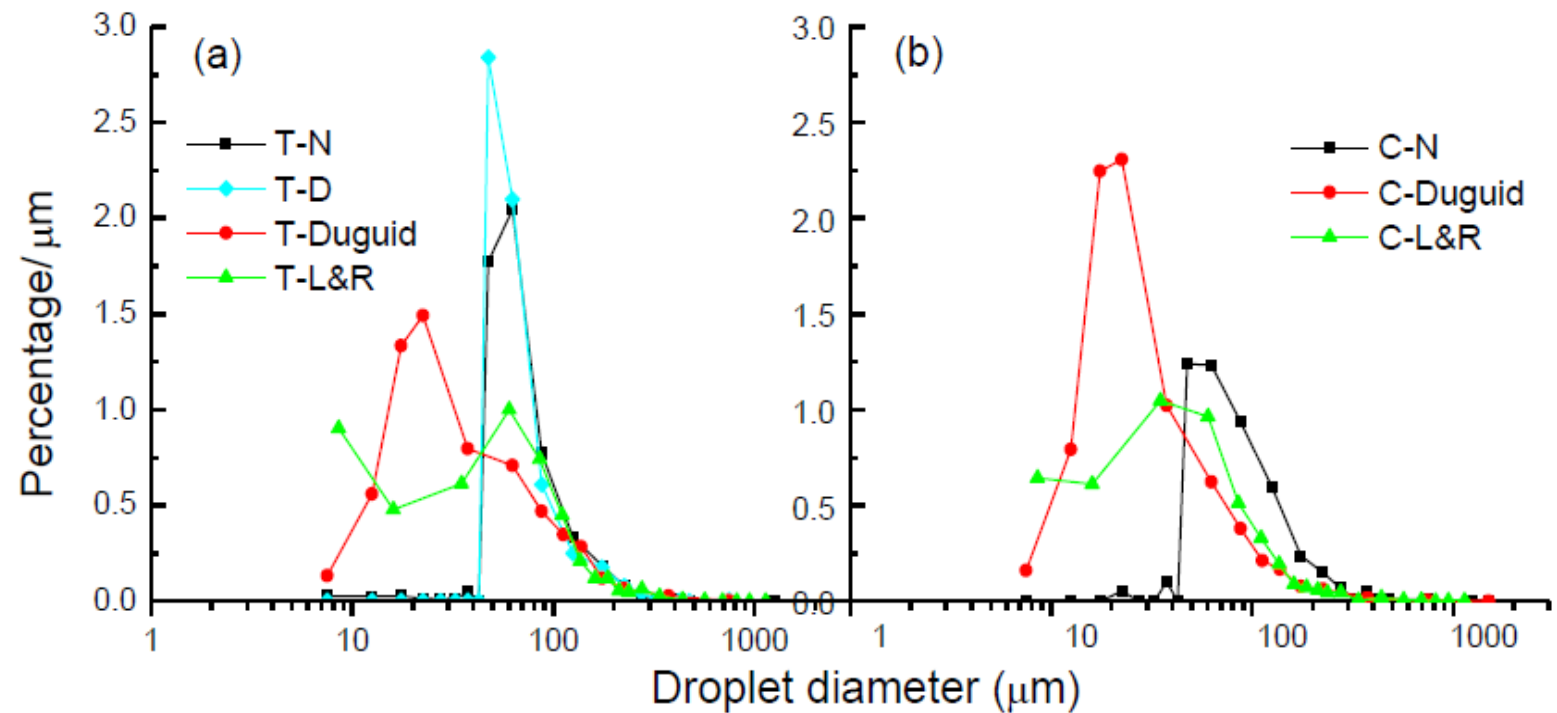


Figure 2-3 Percentage/ μm versus droplet diameter estimated at the mouth: a) talking; b) coughing (Xie et al. 2009).

N = Nicas et al (2005), D = Morawska (2006), Duguid (1946), L&R = Louden and Rpberts (1967)

No live virus detected in aerosol after coughing....

OPEN ACCESS Freely available online

PLOS ONE

Absence of Detectable Influenza RNA Transmitted via Aerosol during Various Human Respiratory Activities – Experiments from Singapore and Hong Kong



Julian W. Tang^{1,2,3,*}, Caroline X. Gao^{4,5,6}, Benjamin J. Cowling⁷, Gerald C. Koh⁸, Daniel Chu⁷, Cherie Heilbronn^{5,6}, Belinda Lloyd^{5,6}, Jovan Pantelic⁹, Andre D. Nicolle³, Christian A. Klettner³, J. S. Malik Peiris⁷, Chandra Sekhar¹⁰, David K. W. Cheong¹⁰, Kwok Wai Tham¹⁰, Evelyn S. C. Koay^{3,11}, Wendy Tsui¹², Alfred Kwong¹², Kitty Chan¹³, Yuguo Li⁴

Published: September 10, 2014

Results

No influenza RNA was detected from any of these swabs with either team's in-house diagnostic influenza assays.

Table 1. Results for the Hong Kong experiments (n = 9).

| Subject code no. | Influenza A/B | Age (yrs) | Sex (M/F) | Days post-onset of illness | Air sampling method | Test distance (m) | Patient 'source' activities | Influenza RNA detected in filter/sampler (cop/mL) | Influenza RNA cop/mL in source diagnostic swab |
|------------------|---------------|-----------|-----------|----------------------------|------------------------------|-------------------|---|---|--|
| 00302 | A | 47 | M | 3 | PTFE filter + SKC BioSampler | 0.1 | Count 1–20; Cough 10 times | None | 9.50×10^7 |
| 01402 | A | 42 | M | 3 | PTFE filter + SKC BioSampler | 0.1 | Count 1–100; Cough 10 times | None | 1.39×10^5 |
| 01702 | A | 14 | F | 2 | PTFE filter + SKC BioSampler | 0.1 | Breath 1 min; Count 1–20; Cough 20 times | None | 1.67×10^5 |
| 02602 | A | 17 | F | 3 | PTFE filter + SKC BioSampler | 0.1 | Talk 10 min; Count 1–100; Cough 20 times | None | 4.19×10^5 |
| 02702 | A | 22 | F | 2 | PTFE filter + SKC BioSampler | 0.1 | Talk 10 min; Count 1–100; Cough 20 times | None | 8.67×10^6 |
| 03802 | A | 49 | F | 3 | PTFE filter + SKC BioSampler | 0.1 | Talk 10 min; Count 1 to 100; Cough 20 times | None | 7.40×10^6 |
| 04102 | A | 57 | F | 2 | PTFE filter + SKC BioSampler | 0.1 | Talk 10 min; Count 1 to 100; Cough 20 times | None | 3.01×10^6 |
| 05602 | A | 62 | F | 2 | SKC BioSampler | 0.1, 0.5 | Talk 10 min; Count 1 to 100; Cough 20 times | None | 5.38×10^5 |
| 00203 | B | not given | M | 3 | SKC BioSampler | 0.1, 0.5 | Talk 10 min; Count 1 to 100; Cough 20 times | None | 3.70×10^6 |

doi:10.1371/journal.pone.0107338.t001

Tang JW, Gao CX, Cowling BJ, Koh GC, et al. (2014) Absence of Detectable Influenza RNA Transmitted via Aerosol during Various Human Respiratory Activities – Experiments from Singapore and Hong Kong. PLoS ONE 9(9): e107338.

doi:10.1371/journal.pone.0107338

<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0107338>

Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed

Interim guidance
29 June 2020



Modes of transmission

- Droplets and Contact

According to current evidence, SARS-CoV-2, the virus that causes COVID-19, is primarily transmitted between people through respiratory droplets and contact routes.¹⁷⁻²² Droplet transmission occurs when a person is in close contact (within 1 m) of someone with respiratory symptoms (e.g. coughing or sneezing) and is therefore at risk of having his/her mucosae (mouth and nose) or conjunctiva (eyes) exposed to potentially infective respiratory droplets. Transmission may also occur through fomites in the immediate environment around the infected person.²³ Therefore, transmission of the COVID-19 virus may occur by direct contact with infected people and indirect contact with surfaces in the immediate environment or with objects used on the infected person (e.g. stethoscope or thermometer).

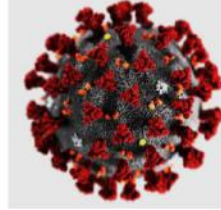
Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed

Interim guidance

29 June 2020



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**Hospital Authority
Communication Kit –
Coronavirus disease 2019 (COVID-19)
Formerly named Novel Coronavirus (nCoV)
Version 5.2
7 Jul 2020**

Route of transmission

- This evidence demonstrates viral transmission by droplets and contact with contaminated surfaces of equipment; it does not support routine airborne transmission.
- Airborne transmission may happen, as has been shown with other viral respiratory diseases, during aerosol-generating procedures (e.g., tracheal intubation, bronchoscopy), thus WHO recommends airborne precautions for these procedures.


Now to the Vaccine ..




2019冠狀病毒病
疫苗接種計劃
COVID-19 Vaccination Programme

***Protect yourself and others
Get Vaccinated***


Why get COVID-19 vaccination



An important public health tool in the medium and long term





Greatest hope to help contain the pandemic



COVID-19 Vaccines Basic Knowledge Series

Herd immunity

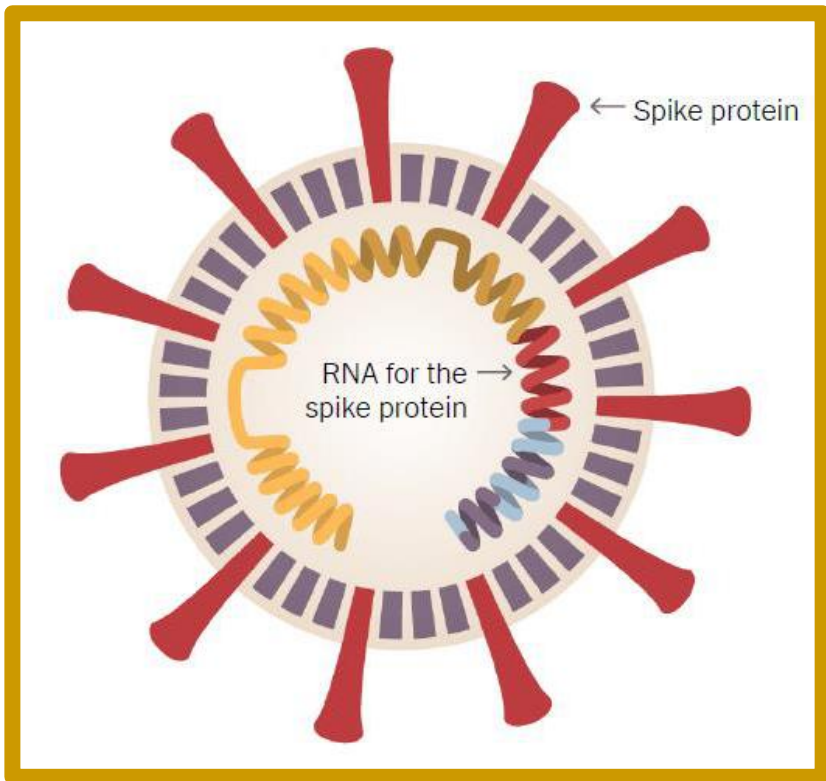
If majority of people in a community have received effective vaccine, those cannot be vaccinated due to bodily conditions can still be protected indirectly by herd immunity. However, the prerequisite is that sufficient number of people get vaccinated.



Immunogens used to develop viral vaccines

- Vaccines are being developed with different technologies — some well-known and others completely new for human vaccines, such as peptide and nucleic acid technologies

| IMMUNOGEN | HOW IT WORKS | ADVANTAGE | DISADVANTAGE | EXAMPLE of vaccines |
|--|---|--|---|---|
| Attenuated live virus | Live virus but doesn't cause disease | Induces same response as natural infection | Not recommended for pregnant women and immunocompromised persons | Measles, rubella, mumps, yellow fever, smallpox (vaccinia) |
| Whole inactivated virus | Inactivated dead virus | Induces strong antibody response | Requires large quantities of virus | Influenza, rabies, hepatitis A Sinovac 科興 |
| Protein subunit | A protein derived from a pathogen | May have fewer side effects than whole virus (redness, swelling at injection site) | May be poorly immunogenic; complex process | Influenza |
| Recombinant | Host cell is used to express an antigen | No need to produce the whole virus | May be poorly immunogenic; High cost | Hepatitis B |
| Peptides | Synthetic produced fragment of an antigen | Rapid development | Poorly immunogenic; High cost | <i>COVID-19 vaccines in development</i> |
| Replicating or non-replicating viral vector | Viral pathogen expressed on a safe virus that doesn't cause disease | Rapid development | Prior exposure to vector virus (eg. adenovirus) may reduce immunogenicity | Ebola AstraZeneca 阿斯利康 |
| Nucleic acid | DNA or RNA coding for a viral protein | Strong cellular immunity; rapid development | Relatively low antibody response | <i>COVID-19 vaccines in development</i> BioNtec 復必泰 |



There are three main approaches to making a vaccine:



Using a whole virus or bacterium



Parts that trigger the immune system



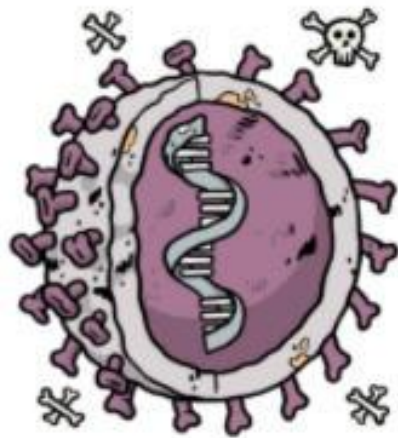
Just the genetic material

BioNtec – inject mRNA that makes the spike proteins to provoke an immune response against it

The different types of vaccines

There are three main approaches to designing a vaccine. Their differences lie in whether they use a **whole** virus or bacterium; just the **parts** of the germ that triggers the immune system; or just the **genetic material** that provides the instructions for making specific proteins and not the whole virus.

The whole-microbe approach



Inactivated vaccine

Sinovac

科興



Live-attenuated vaccine



Viral vector vaccine

Astra Zeneca

阿斯利康

The whole-microbe approach

Johnson & Johnson

There are three main approaches to making a vaccine:



Using a whole virus
or bacterium



Parts that trigger
the immune system



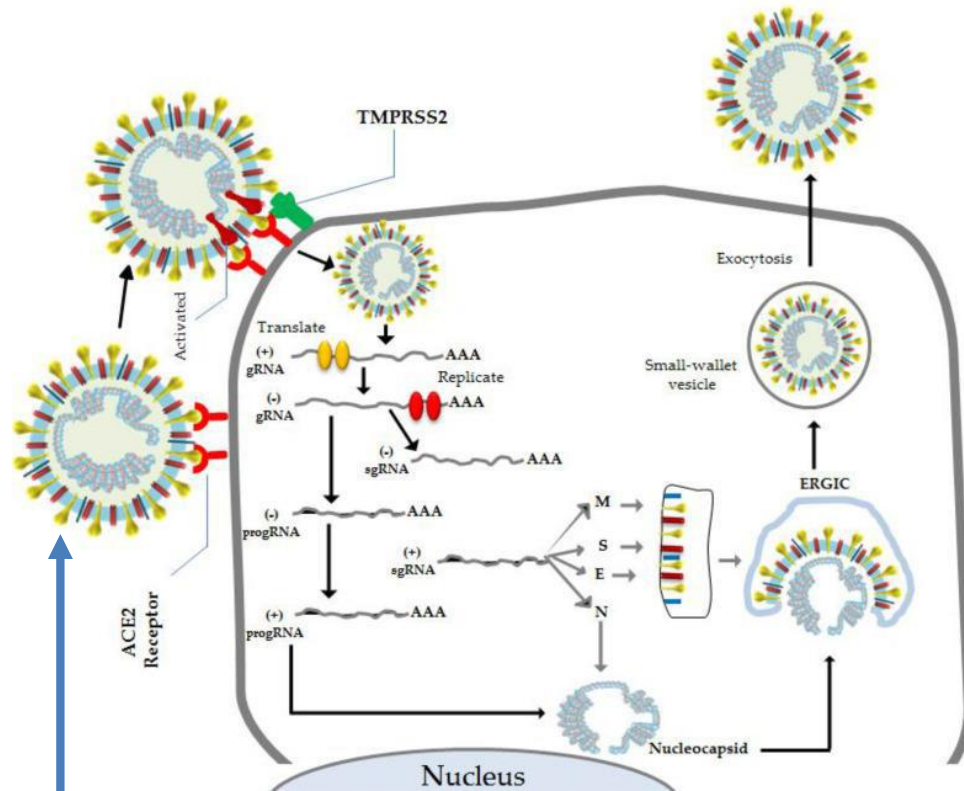
Just the
genetic material

**BioNtec – inject mRNA that makes
the spike proteins to provoke an
immune response against it**

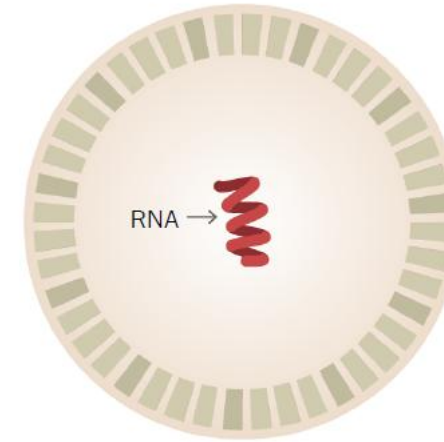
The different types of vaccines

There are three main approaches to designing a vaccine. Their differences lie in whether they use a **whole** virus or bacterium; just the **parts** of the germ that triggers the immune system; or just the **genetic material** that provides the instructions for making specific proteins and not the whole virus.

Mechanism and Entry of SARS-CoV-2



The mRNA vaccine



- The vaccine delivers the mRNA into cells.
- The cells ribosomes read the mRNA and make spike proteins.
- The spike proteins provoke an immune response to produces antibodies
- These antibodies inactivate the spikes of Covid 19 (but may not kill the virus)
- RNA vaccines can be produced more quickly than traditional methods.

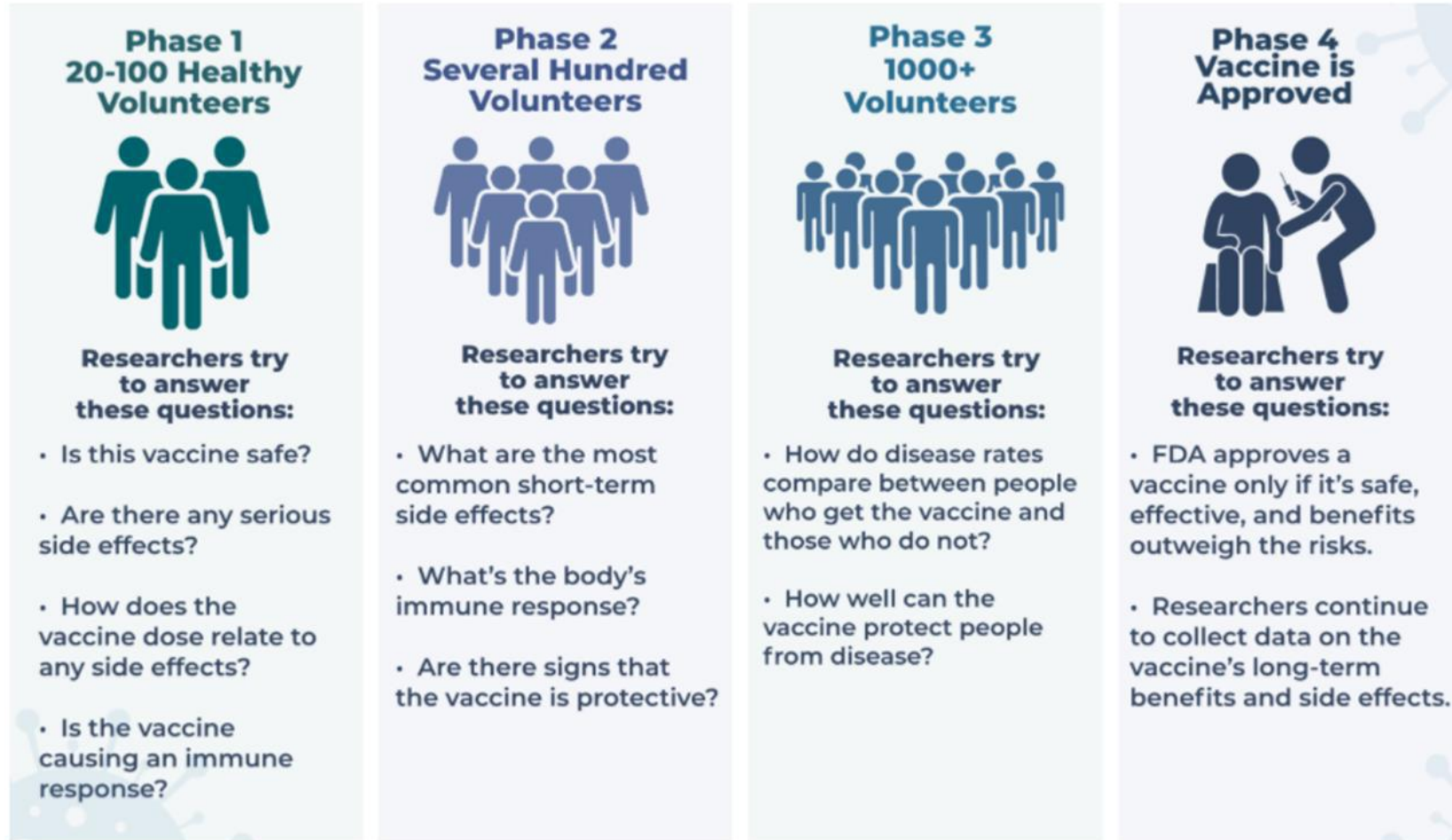
Types of Vaccines

The Government plans to provide the public with the following COVID-19 vaccines:

- **Inactivated virus** technology platform - by **Sinovac Biotech** (Hong Kong) Limited
- **mRNA technology platform** - by Fosun Pharma in collaboration with the German drug manufacturer **BioNTech** (BNT162b2 mRNA vaccine)
- **Non-replicating viral vector** technology platform - by **AstraZeneca**, in collaboration with the University of Oxford.

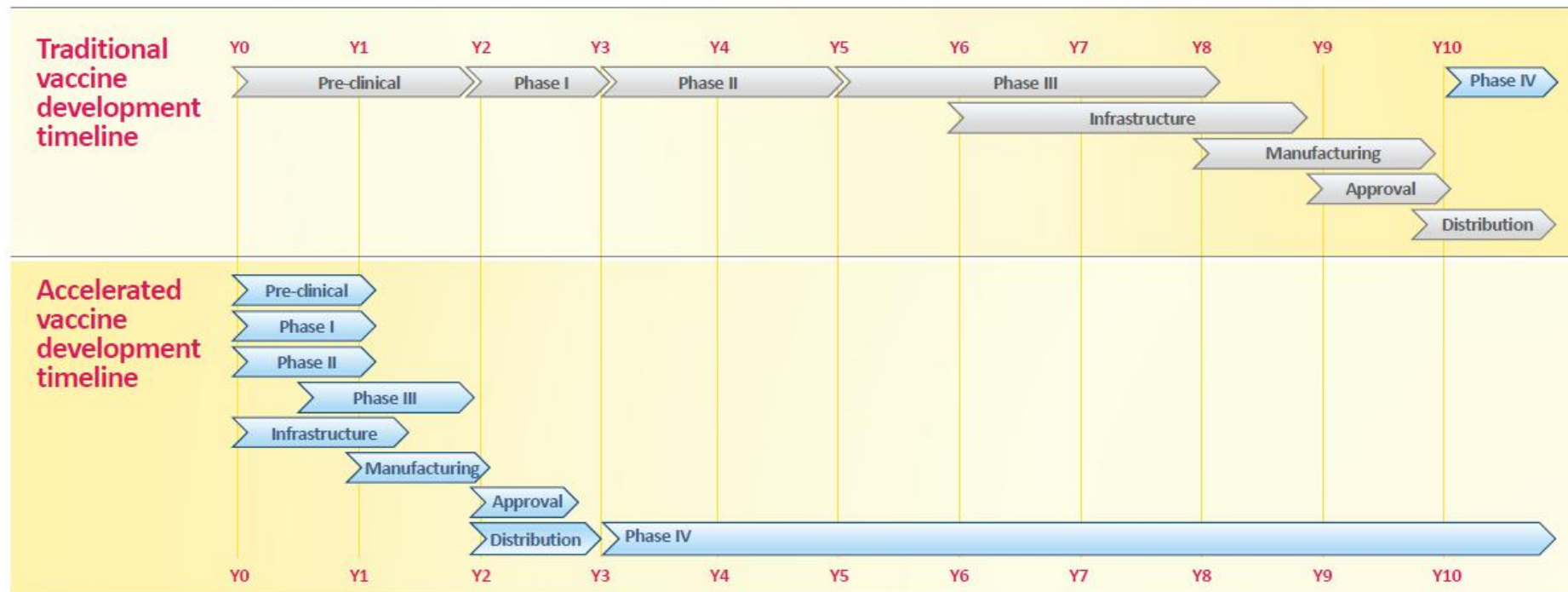
The Government will continue sourcing safe and effective vaccines from other vaccine manufacturers or drug companies.

Phases of clinical trials



Source: <https://covid19community.nih.gov/resources/understanding-clinical-trials>

COVID-19 vaccine accelerated development



- Normal vaccine development performs each step in sequence
- To accelerate COVID-19 vaccine development, **steps are done in parallel**
- All usual safety and efficacy monitoring mechanisms remain in place; such as adverse event surveillance, safety data monitoring & long-term follow-up
- **Phase IV post-marketing surveillance** for side effects is critical and essential

復星醫藥/德國藥廠BioNTech
Fosun Pharma/BioNTech

信使核糖核酸新冠疫苗
COVID-19 mRNA Vaccine

Comirnaty「復必泰」

(BNT 162b2)

接種須知
Vaccination Fact Sheet



BionTech

4 Possible side effects¹

Like all vaccines, Comirnaty can cause side effects, although not everybody gets them.

| | Side effects | may affect |
|--------------------|--|---|
| Very common | <ul style="list-style-type: none">• injection site: pain, swelling• tiredness• headache• muscle pain• joint pain• chills, fever | more than 1 in 10 people |
| Common | <ul style="list-style-type: none">• injection site redness• nausea | up to 1 in 10 people |
| Uncommon | <ul style="list-style-type: none">• enlarged lymph nodes• feeling unwell• pain in limb• insomnia• injection site itching | up to 1 in 100 people |
| Rare | <ul style="list-style-type: none">• temporary one sided facial drooping | up to 1 in 1000 people |
| Not known | <ul style="list-style-type: none">• severe allergic reaction | cannot be estimated from the available data |

科興 Sinovac

新型冠狀病毒滅活疫苗 (Vero細胞)
COVID-19 Vaccine (Vero Cell), Inactivated

CoronaVac「克爾來福」

接種須知
Vaccination Fact Sheet



sinovac

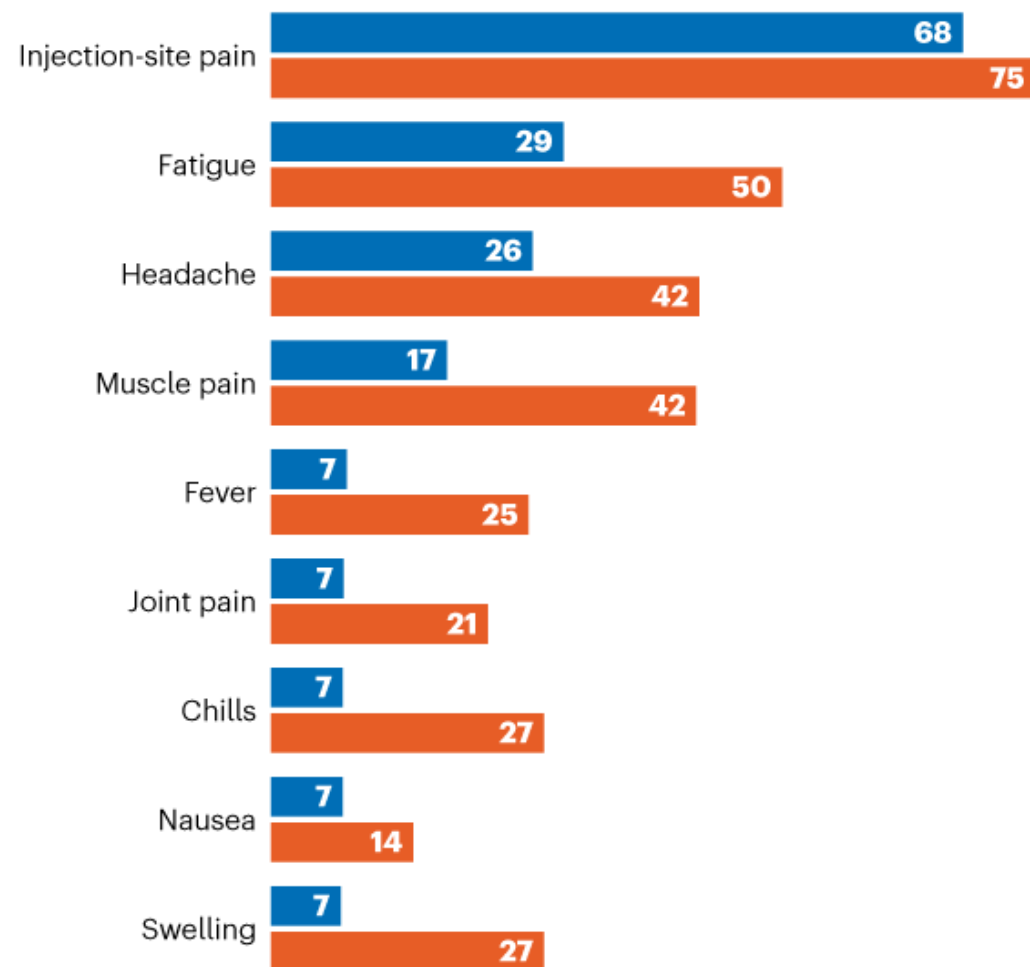
4 Possible side effects¹

| | Side effects | may affect |
|--------------------|--|----------------------------|
| Very common | <ul style="list-style-type: none">• injection site: pain• headache• fatigue | ≥ 10% people |
| Common | <ul style="list-style-type: none">• injection site swelling, pruritus, erythema, induration• myalgia• nausea• diarrhea• arthralgia• cough• chills• pruritus• loss of appetite• rhinorrhea• sore throat• nasal congestion• abdominal pain | 1% -10% people |
| Uncommon | <ul style="list-style-type: none">• burn at injection site• vomit• hypersensitivity• abnormal skin and mucosa• fever• tremor• flushing• edema• dizziness• drowsiness | 0.1% -1% people |
| Rare | <ul style="list-style-type: none">• muscle spasms• eyelid edema• nosebleeds• abdominal distension• constipation• hyposmia• ocular congestion• hot flashes• hiccup• conjunctival congestion | 0.01% - 0.1% people |
| Serious | <ul style="list-style-type: none">• No serious adverse event related to vaccination was identified up to 3 February 2021. | |

TRACKING SIDE EFFECTS

According to data collected by the CDC's v-safe smartphone app, a higher percentage of people reported side effects after receiving the second dose of the Pfizer–BioNTech vaccine than after receiving the first dose. Injection-site pain was most common, whereas nausea and chills were not as common.

■ Dose 1 ■ Dose 2



The Oxford/AstraZeneca COVID-19 vaccine

How efficacious is the vaccine?

The AZD1222 vaccine against COVID-19 has an efficacy of 63.09% against symptomatic SARS-CoV-2 infection.

Longer dose intervals within the 8 to 12 weeks range are associated with greater vaccine efficacy.



Viral vector vaccine



Adverse reactions following Covid-19 Vaccine AstraZeneca

- **The following reactions were reported by the vaccine clinical trial participants:**
- **Local reactions**
- More than 60% reported tenderness at the injection site with redness, swelling, pain also being reported

- **Systemic reactions**
- The most frequently reported systemic reactions (reactions affecting the whole body) were
 - tiredness (> 50%)
 - headache (> 50%)
 - muscle aches (> 40%)
 - feeling generally unwell (>40%)
 - chills (> 30%)
 - raised temperature (pyrexia)(> 30%)
 - joint pain (> 20%)
 - nausea (> 20%)

- these symptoms were usually mild or moderate in intensity and resolved within a few days after vaccination
- medicines such as paracetamol can be given for post-vaccination pain or fever if required
- inform vaccinees these symptoms normally last less than a week but if their symptoms get worse or they are concerned, they should speak to their GP



新冠疫苗比較



COMPARISON OF COVID-19 VACCINES

復必泰 疫苗



BioNTech (BNT162b2 mRNA vaccine)

復星醫藥與德國BioNTech
Fosun Pharma in collaboration with
the German BioNTech

信使核糖核酸
mRNA technology

2劑 (隔3星期)
2 doses (receive second dose after 3 weeks)

95%

-75°C

針口痛(84.1%)、疲倦(62.9%)、頭痛(55.1%)
Pain Tiredness Headache

科興 克爾來福疫苗



Sinovac (CoronaVac vaccine)

科興生物
Sinovac Biotech

滅活疫苗
Inactivated virus technology

2劑 (隔4星期)
2 doses (receive second dose after 4 weeks)

62.3%

2-8°C

針口痛(60.9%)、頭痛(50%)、肌肉痠軟(19%)
Pain Headache Muscle soreness

藥廠
MANUFACTURER

疫苗技術
TECHNOLOGY

接種劑量
DOSAGE

有效率
EFFICACY

保存溫度
STORAGE TEMPERATURE

副作用
SIDE EFFECTS

Busting Myths about COVID-19 Vaccines

Series



COVID-19 vaccines are not safe because they were developed and tested quickly?



The COVID-19 situation warranted an emergency response. That does not mean any safety protocols or testing have been bypassed. While the development process has been expedited due to the high need for a vaccine, no short cuts have been taken. Indeed, there have been a lot of technological developments that allow vaccines to be developed much more quickly.

All the ingredients in the vaccine, as well as the vaccine itself, have been fully checked and monitored to ensure its safety.



Busting Myths about COVID-19 Vaccines

Series



The mRNA vaccines for COVID-19 will alter human DNA?



mRNA does not enter the nucleus of the cell and **does not affect our DNA** either.

mRNA vaccines teach our cells how to make a protein (or a piece of a protein) that triggers an immune response. **That immune response is what protects us from getting infected if the real virus enters our bodies.**



Busting Myths about COVID-19 Vaccines

Series



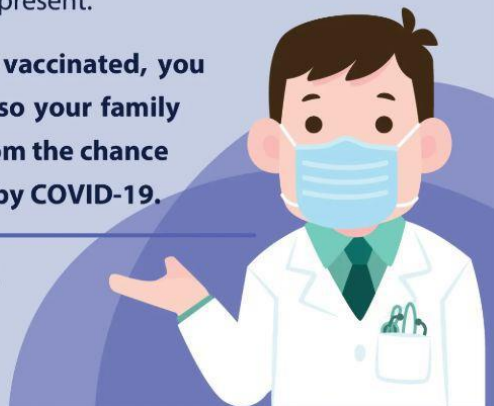
Many people recover from COVID-19 infection and so we do not need a vaccine?



COVID-19 is a deadly disease that may cause severe illness – and also long term consequences that we have yet to fully understand. The COVID-19 vaccines have been created so as to decrease death and severe illness.

Although a high percentage of people recover from COVID-19, some experience severe illness or even die. It is also common to have the virus but never experience symptoms, and it is possible to spread the virus to others even when symptoms are not present.

When you make the choice to be vaccinated, you are protecting not only you but also your family members and those around you from the chance of death and severe illness caused by COVID-19.



Busting Myths about COVID-19 Vaccines

Series



COVID-19 vaccines can control the population through microchip tracking or implanting something in the human brain?



All ingredients in vaccines as well as the vaccines themselves are thoroughly tested and verified.

There are some false claims that COVID-19 vaccines will use technology of injectable microchip implants to track human movement or even control bodily functions through 5G cell phone towers. **This is false.** There is no COVID-19 vaccine that will track people or gather personal information into a database.



Busting Myths about COVID-19 Vaccines

Series



The four facial paralysis cases that participated in the BioNTech COVID-19 vaccine clinical trial earlier were confirmed to be related to the vaccine?



During the clinical trial, four participants had facial paralysis after being vaccinated with BioNTech COVID-19 vaccine. A subsequent investigation by the US Food and Drug Administration found that the incidence of facial paralysis was about the same as usual, and **it could not be proven that the cases were caused by the vaccine.** The World Health Organization stated that it would continue keep monitoring, and there has been no new discovery so far.



Understanding Vaccines: Facts and Myths

Series



Natural immunity is healthier and more effective than vaccine-induced immunity?



Vaccination is one of the best ways to prevent diseases.

The risks of getting the virus itself are far much higher than those of the vaccine. **In total, vaccines are estimated to save between 2 and 3 million lives every year.**

Vaccines reduce risks of getting a disease by working with your body's natural defences to build protection. When we get vaccinated, we are not just protecting ourselves, but also those around us.



Understanding Vaccines: Facts and Myths

Series



Diseases cause me less harm than vaccines?



Like any medicine, vaccines may cause side effects. They are usually minor and temporary, such as a sore arm or mild fever. More serious side effects are possible, but extremely rare.

Please remember, **you are far more likely to be seriously injured by a vaccine-preventable disease than by a vaccine.**



Understanding Vaccines: Facts and Myths

Series



Vaccines contain toxic ingredients?



Vaccines contain various ingredients to keep them safe and effective. Many of the ingredients have been used for decades in billions of doses of vaccine.

Each vaccine component serves a specific purpose, and each ingredient is tested in the manufacturing process. **All vaccine ingredients are passed for safety.**



Understanding Vaccines: Facts and Myths

Series



Vaccines can weaken my immune system?

Vaccination is a simple, safe and effective way to protect people from harmful diseases before they are exposed. In fact, **vaccines use your body's natural defence mechanism to build resistance against specific infections and strengthen your immune system.**



Understanding Vaccines: Facts and Myths

Series



For all vaccines, I can be immunised for life with just one injection?

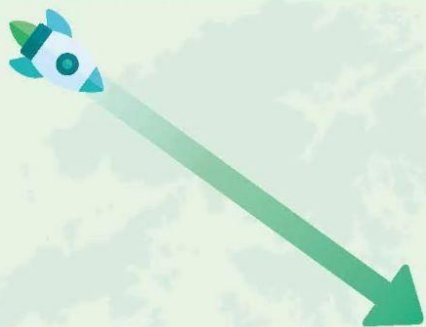
Some vaccines only require one single dose to provide life-long protection. Nevertheless, **most vaccines will require more than one dose** (i.e. with the second dose, or third dose, several months apart). In addition to the above mentioned primary course of "multiple doses", some vaccines may even require the recipient to receive a "booster dose" after a fixed period (e.g. one year, or several years after).

香港如何戰勝病毒

How Hong Kong defeats viruses

疫苗篇

The chapter on Vaccines



1963

1983

世衛在2000年
宣布小兒麻痺症
已在香港絕迹

The WHO declared that
polio-free status has been
achieved for Hong Kong
in 2000

人類與病毒之戰

Battle between human and viruses

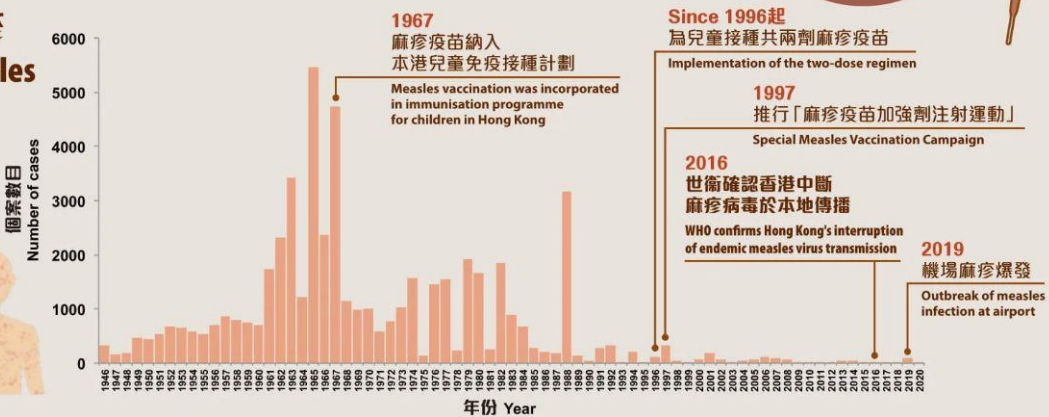
疫苗篇

The chapter on Vaccines



麻疹

Measles



人類與病毒之戰

Battle between human and viruses

疫苗篇

The chapter on Vaccines



乙型肝炎 Hepatitis B



出生於初生嬰兒
普及乙型肝炎疫苗
注射計劃實施後的兒童
Children who were born after
the implementation of universal
hepatitis B vaccination programme

乙型肝炎表面抗原
HBsAg

<1%

接種疫苗後，請在休息區休息



After receiving vaccination,
please stay in the resting area for



三十分鐘
30 minutes

若你在接種疫苗後出現異常情況，請向你的醫護人員（包括醫生、牙醫、藥劑師、護士及中醫師）報告，並同意他們向衛生署呈報以監察疫苗的安全性。醫護人員會評估是否需要呈報。

If you develop adverse effects after vaccination, please report to your healthcare professionals, including doctors, dentists, pharmacists, nurses and Chinese Medical Practitioners and give consent to them to report to the Department of Health for monitoring the safety of the vaccine. They will assess whether reporting is necessary.

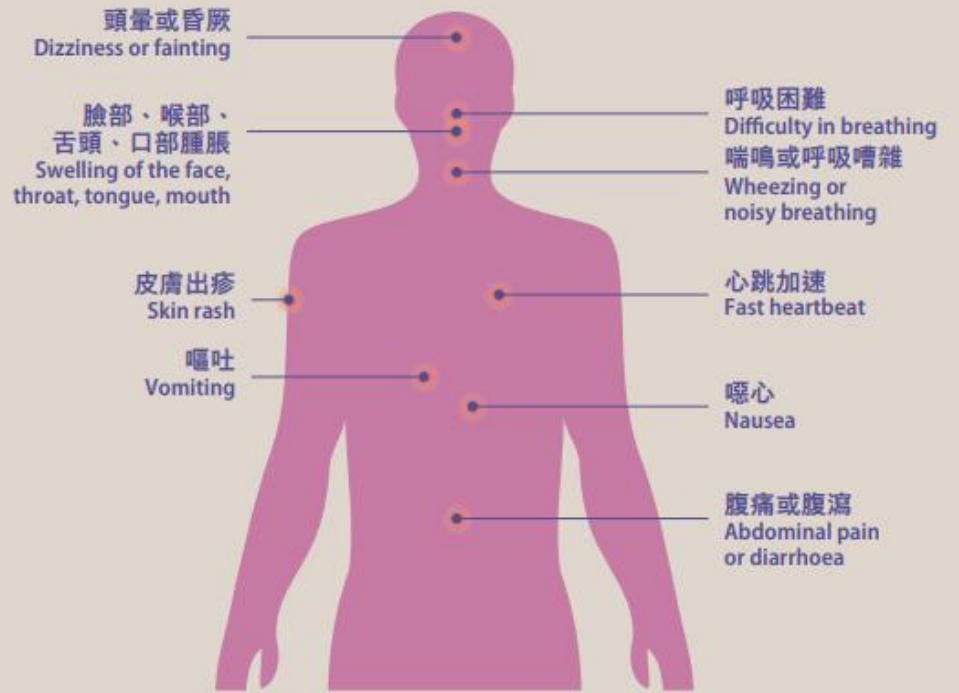


疫苗未必能為接種人士提供百分百保護，為了保障自己及其他人，請繼續遵守其他的防疫措施包括**戴口罩**、**保持手部衛生及社交距離**等。

The vaccine may not protect 100% of those who have received the vaccine. In order to protect yourselves and others, please continue to observe protective measures after vaccination, including **mask wearing**, **hand hygiene** and **social distancing**.

若你在接種疫苗後出現以下徵狀，請即通知中心職員：

Please inform centre staff immediately if you have any of the following symptoms after receiving vaccination:



हिन्दी



नेपाली



සිංහල



ไทย



Bahasa Indonesia



Tagalog



ಕನ್ನಡ



मराठी



বাংলা



Tiếng Việt



衛生防護中心
Centre for Health Protection



更多防疫資訊

For more information on fighting the virus:

www.coronavirus.gov.hk



衛生防護中心Facebook專頁

Centre for Health Protection Facebook Fanpage

[fb.com/CentreforHealthProtection](https://www.facebook.com/CentreforHealthProtection)

衛生署健康教育專線
Health Education Infoline of the Department of Health

2833 0111



衛生署
Department of Health

Community Vaccination Centre at Gleneagles



Gleneagles Hospital

HONG KONG

港怡醫院



Just be alert

**Put on PPE when
needed**

Thank you

