

Survey with Informational Text

Dear Participants,

The purpose of this survey is to find out what you think about the COVID-19 pandemic situation, particularly virus-laden aerosols.

You have to be at least 18 years old to participate in this survey. Your answers and identities will remain confidential and will not be provided to third parties. Please feel comfortable answering these questions. There is no direct and tangible risk or benefit tied to filling out this survey. However, your responses are important for us to find ways to help end the COVID-19 pandemic. In addition, you have full rights to withdraw your participation in this survey at anytime without any consequences and you may request your data to be revoked.

The survey will take about 15 minutes (including reading a short text). Thank you for your participation

Sincerely,

Aerosol Science Research Center, National Sun Yat-sen University, Taiwan
Integrated Chemical BioPhysics Research, Faculty of Science, Universiti Putra Malaysia

IMPORTANT: If you are filling out the survey on a phone, please turn your phone horizontally for the right format.

* Required

Consent to Participate

1. I have read and understood the information in this form. By signing this form, I voluntarily agree to participate in this survey.

Mark only one oval.

- ☐ Yes, I agree to participate in this survey (please proceed to fill the items of survey)
- ☐ No, I disagree to participate in this survey (please stop filling this survey)

A. Background

2. A1. Gender *

Mark only one oval.

- ☐ Male
- ☐ Female
- ☐ Prefer not to say

3. A2. Age *

Mark only one oval.

- ☐ 18 - 25
- ☐ 26 - 30
- ☐ 31 - 35
- ☐ 36 - 40
- ☐ 41 - 45
- ☐ 46 - 50
- ☐ 51 - 55
- ☐ 56 - 60
- ☐ 61 - 65
- ☐ 66 - 70
- ☐ 71 and above

4. A3. Highest degree of education *

Mark only one oval.

- ☐ SPM (Sijil Pelajaran Malaysia)
- ☐ STPM (Sijil Tinggi Pelajaran Malaysia)
- ☐ Matriculation
- ☐ Diploma
- ☐ Bachelor
- ☐ Professional programs such as LLB, MD, DDM
- ☐ Master
- ☐ Doctoral

5. A4. Which level of education are you teaching? *

Mark only one oval.

- ☐ Pre-school
- ☐ Kindergarten
- ☐ Primary school
- ☐ Secondary school
- ☐ Matriculation
- ☐ Diploma
- ☐ Bachelor
- ☐ Professional programs such as LLB, MD, DDM
- ☐ Master
- ☐ Doctoral

6. A5. How many years have you been teaching? *

Mark only one oval.

- ☐ 0-5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ 21 years and above

7. A6. What is the main subject area that you teach? *

Mark only one oval.

- ☐ Agriculture, forestry, fisheries and veterinary
- ☐ Arts and humanities
- ☐ Business, administration and law
- ☐ Education
- ☐ Engineering, manufacturing and construction
- ☐ Health and welfare
- ☐ Information and communication technologies
- ☐ Islamic studies
- ☐ Natural sciences, mathematics and statistics
- ☐ Services
- ☐ Social sciences, journalism and information
- ☐ Other: _____

8. A7. What is your main teaching position? *

Mark only one oval.

- ☐ Pre-school teacher
- ☐ Primary school teacher
- ☐ Secondary teacher
- ☐ Administrator
- ☐ Lecturer/instructor
- ☐ Assistant professor
- ☐ Associate professor
- ☐ Full professor
- ☐ Other: _____

9. A8. What is the location of your current school/university? (city, state; for example "Klang, Selangor")

10. A9. What type of community do you live in? *

Mark only one oval.

- ☐ Urban
- ☐ Suburban
- ☐ Rural

11. A10. What is your ethnicity?

Mark only one oval.

- ☐ Malay
- ☐ Chinese
- ☐ Indian
- ☐ Iban
- ☐ Kadazan
- ☐ Orang Asli
- ☐ Other: _____

12. A11. Consent for ethnicity question: you were just asked about your ethnicity, do you agree if your response about ethnicity will be used for research?

Mark only one oval.

- ☐ Yes
- ☐ No

13. A12. Do you currently live with children (18 years old and below)? *

Mark only one oval.

- ☐ Yes
- ☐ No

14. A13. Do you currently live with elders (65 years old and over)? *

Mark only one oval.

- ☐ Yes
- ☐ No

15. A14. In regards to COVID-19, how much do you trust the following sources of information? *

Mark only one oval per row.

	Absolutely not trustworthy	Not trustworthy	Neutral	Trustworthy	Absolutely trustworth
A14-1. Academic and research institutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-2. Health workers (doctors, nurses, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-3. Mainstream news media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-4. Non-profit organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-5. Political figures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-6. Public health authorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-7. Religious groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-8. School staff members (professors, administrators, teachers, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-9. Scientists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A14-10. Social networks (i.e. Facebook, WhatsApp)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. A15. Do you currently adhere to the following precautionary measures against COVID-19? *

Mark only one oval per row.

	Yes	No
A15-1. I avoid greeting with handshaking, hugging, and cheek kissing.	<input type="radio"/>	<input type="radio"/>
A15-2. I avoid eating uncooked foods.	<input type="radio"/>	<input type="radio"/>
A15-3. I avoid gathering with many people.	<input type="radio"/>	<input type="radio"/>
A15-4. I wash hands with soap and water for at least 20 seconds.	<input type="radio"/>	<input type="radio"/>
A15-5. I avoid touching eyes, nose, and mouth with unwashed hands and fingers.	<input type="radio"/>	<input type="radio"/>
A15-6. I use a cover or elbow during coughing and sneezing.	<input type="radio"/>	<input type="radio"/>
A15-7. I avoid going to crowded places.	<input type="radio"/>	<input type="radio"/>
A15-8. I keep a distance of more than 1 to 2 meters of from each other.	<input type="radio"/>	<input type="radio"/>
A15-9. I clean and disinfect objects and surfaces that I have touched.	<input type="radio"/>	<input type="radio"/>
A15-10. I use alcohol-based hand sanitizers for disinfection of surfaces and hands.	<input type="radio"/>	<input type="radio"/>
A15-11. I avoid unnecessary outings.	<input type="radio"/>	<input type="radio"/>
A15-12. I wear face masks when going out.	<input type="radio"/>	<input type="radio"/>
A15-13. I got vaccinated.	<input type="radio"/>	<input type="radio"/>

17. A16. Have you heard in the past that viruses can spread through aerosols? *

Mark only one oval.

☐ Yes

☐ No

18. A17. Have you ever read any literature, comics or animations related to "airborne transmission of virus-laden aerosols" in the past?

Mark only one oval.

☐ Yes

☐ No

T. Article about Airborne Transmission of Respiratory Viruses

Please read the article about airborne transmission of respiratory viruses.

Introduction of aerosols and virosols:

- * Aerosols are microscopic liquid, solid or semisolid particles that are so small that they remain suspended in the air.
- * Depending on the origins, aerosols can be classified as natural aerosols and anthropogenic aerosols made from human activities.
- * There is a special type of aerosols that carry viruses, called virus-laden aerosols or virosols.

Difference between droplets and virosols:

- * Virosols are produced when infected individuals speak, sing, shout or simply breathe.
- * In size, virosols are smaller than 100 μm . Yet, most of them are even smaller than 5 μm . Therefore, they can linger in the air for hours.
- * For example, a 5- μm aerosol can float in the air for 33 minutes, and a 1- μm virosol can float and travel in the air for more than 12 hours, from a height of 1.5 m.
- * The trajectory of virosols are largely influenced by airflow and ventilation.
- * In contrast to virosols, droplets are larger than 100 μm , and are often produced through coughing and sneezing. Some people may also release droplets while speaking.
- * The trajectory of droplets is governed by gravity, and is NOT affected by airflow and ventilation.
- * Droplets cannot go farther than 1-2 m, and normally fall to the ground or surfaces within 5 seconds from height of 1.5 m.
- * Droplets cannot be inhaled.
- * Even though droplets can also deliver respiratory viruses, they are poorer virus deliverers than virosols.

Factors affecting the survival of virosols:

- * The persistence of viruses in aerosols depends on the types of viruses and various environmental conditions including temperature, relative humidity, UV radiation, airflow, and ventilation.
- * Sunlight and UV disinfection lamps can effectively inactivate the viruses by damaging their RNA and proteins so they cannot replicate themselves or enter the cell.
- * Virosols can be effectively filtered by HEPA purifiers. Air cleaners installed with HEPA filters can remove at least 99.97% of aerosol particles with a size of 0.3 μm . Particles that are larger or smaller than 0.3 μm are trapped with even higher efficacy.

Deposition and infection of virosols:

- * Virosols can be inhaled and can reach and deposit in the bronchiolar and alveolar regions of the lungs.
- * Once inhaled, virosols > 5 μm can enter and deposit in the nasopharyngeal region; however, the virosols $\leq 5 \mu\text{m}$ may settle in the bronchiolar and alveolar regions, bypassing the screening in the oral and nasal regions.
- * Viruses need the cell entry receptors such as ACE2 that binds with SARS-CoV-2 to enter the cell and

initiate new infections.

Factors facilitating the spread of virosols:

- * Although different masks provide protection to varying degrees, they cannot completely block airborne transmission of virus-laden aerosols. If not wearing a mask properly with fit, small gaps between the mask and skin allow virosols to sneak in.
- * Clustering is the key element for superspreading events.
- * Commonalities among superspreading events include indoor settings, crowds, exposure duration of 1 h or more, poor ventilation, vocalization and lack of proper mask-wearing.
- * Surface cleaning alone does not stop airborne transmission. Although it is important to keep surfaces clean, surface cleaning does not suppress the risk of airborne transmission. It is crucial to clean the air as well.
- * Physical barriers, such as table shields which are designed to block droplets, can impede the airflow and even trap higher concentrations of aerosols in the breathing zone, increasing the risk of airborne transmission.

Effective aerosol precautionary measures:

- * Improve ventilation.
- * Add air filtration, such as HEPA air cleaners.
- * Use UV disinfection with caution.
- * Wear a mask properly with fit.
- * Avoid clustering.
- * Keep physical distance.
- * Implementing layering multiple aerosol precautions effectively reduces the risk of airborne transmission

Source: C. C. Wang et al., Science 373, eabd9149 (2021). DOI: 10.1126/science.abd9149

19. T1. Have you read this article before in a different setting? *

Mark only one oval.

☐ Yes

☐ No

B. Knowledge

20. B1. Please answer the following true or false questions. *

Mark only one oval per row.

	True	False	I do not know
B1-1. Aerosols are very small particles that suspend in the air.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-2. Aerosols can contain pathogens such as viruses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B1-3. Aerosols that contain infectious viruses such as SARS-CoV-2 can be spread through air.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-4. Virus-laden aerosols can be produced by infected individuals when they breathe, talk, sing, shout, cough, and sneeze.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-5. Aerosols that contain viruses can remain suspended in the air for more than 12 hours if they are small in size.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-6. The persistence of viruses in aerosols depends on various environmental conditions, including temperature, relative humidity, UV radiation, airflow, and ventilation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-7. When inhaled, virus-laden aerosols can reach and deposit in the lungs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-8. Virus-laden aerosols can infect the cells when there are proper cell receptors, such as ACE2 for SARS-CoV-2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-9. Virus-laden aerosols can travel in the air through airflow and ventilation pattern.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-10. Before falling to surfaces or being inhaled, virus-laden aerosols may travel no more than one meter.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-11. Loosely-fitted masks are still effective in blocking virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-12. Sunlight and UV radiation can effectively inactivate viruses in aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-13. Virus-laden aerosols can be effectively filtered by "High-Efficiency Particulate Air" (HEPA) filters.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-14. Clustering of people facilitates the spreading of virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-15. Cleaning the surfaces can effectively stop the airborne transmission of virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B1-16. Physical barriers such as			

plastic/glass can trap virus-laden aerosols in the local seating area and increase the risk of airborne transmission.

☐☐☐

C. Perceptions

21. C1. How do you feel about the following statements? *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
C1-1. We should prevent airborne transmission of virus-laden aerosols, regardless of the level of its harm.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C1-2. I need to understand the effects of airborne transmission of virus-laden aerosols on the human body.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C1-3. I don't know the relative contribution of airborne transmission of virus-laden aerosols in all infection cases.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C1-4. Our lives are full of dangers, so there is no need to worry too much about airborne transmission of virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C1-5. Only a few disease cases are caused by airborne transmission of virus-laden aerosols, and its incidence rate is actually very low.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C1-6. We should support feasible measures that can reduce the harm caused by airborne transmission of virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C1-7. I need to know the pros and cons of the available solutions in preventing airborne transmission of virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C1-8. I don't know if the data provided by the local health authority is accurate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1 9. Because virus-laden aerosols are so small and invisible, aerosols are so easy to inhale, and aerosols transmit a lot of viruses, virus-laden aerosols is not that dangerous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q1 10. Dust mites, volatile organic compounds and other body gases are much more harmful to the body than virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q1 11. We should support measures that can prevent virus-laden aerosols, even if they are expensive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q1 12. I need to understand the possibilities of preventing various methods of preventing airborne transmission of virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q1 13. I don't know the effectiveness of various methods of preventing virus-laden aerosols transmission of virus-laden aerosols.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q1 14. I don't believe that airborne transmission of virus-laden aerosols is really that dangerous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q1 15. Among all environmental pollutants, the most serious is on aerosols, and it is a bit of virus-laden aerosols is a bit alarmist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q1 16. I don't know how to mitigate virus-laden aerosols, because scientists have not reached a consensus on this issue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q1 17. Compared with the risks in life (such as flying and crossing the road), the risk of virus-laden aerosols is actually low.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

D. Actions

22. D1. To what extent, are you willing to engage in the following precautionary measures for airborne transmission of virus-laden aerosols

Mark only one oval per row.

	Absolutely Not	Not	Neutral	Yes	Absolutely Yes
D1-1. I will try to wear a mask properly with fit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D1-2. I will try to keep a distance of more than 1 to 2 meters from each other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D1-3. I will try to avoid clustering.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D1-4. I will try to get vaccinated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D1-5. I will try to use air filtration, such as air cleaners with HEPA filters.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D1-6. I will try to use UV disinfection with caution*.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D1-7. I will remind other people to follow these precautionary measures.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D1-8. I will share the information about these precautionary measures to other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Use of UV disinfection lamps may pose potential risks such as damage to the eyes and skin, ozone generation, and material degradation, if not installed and used properly. Always refer to the guidelines from your local health authority.

Feedback

23. Please share any feedback you may have about the survey.

24. Can we contact you for follow-up research? If yes, please kindly provide your email.

Thank you for
your
participation

Please see below for the comics and animation videos in different languages.
Please also feel free to share the information with others.

Virosol Comics

Malay Language: [http://aerosol.nsysu.edu.tw/cms/cms/upload/ckeditor/files/Virosols-Malay-UPM\(1\).pdf](http://aerosol.nsysu.edu.tw/cms/cms/upload/ckeditor/files/Virosols-Malay-UPM(1).pdf)

Mandarin Language:

[http://aerosol.nsysu.edu.tw/cms/cms/upload/ckeditor/files/The%20quest%20of%20the%20virosols_121aiwan\(1\).pdf](http://aerosol.nsysu.edu.tw/cms/cms/upload/ckeditor/files/The%20quest%20of%20the%20virosols_121aiwan(1).pdf)

English Language:

[http://aerosol.nsysu.edu.tw/cms/cms/upload/ckeditor/files/The%20quest%20of%20the%20virosols_upd121321\(1\).pdf](http://aerosol.nsysu.edu.tw/cms/cms/upload/ckeditor/files/The%20quest%20of%20the%20virosols_upd121321(1).pdf)

Virosol Animation Video

Mandarin Language: <https://www.youtube.com/watch?v=QcK-4g-cjVs&t=10s>

English language: <https://www.youtube.com/watch?v=iFmxvZY69zI&t=1s>

