



Potential Corruption of Science About COVID 19

Aleš Pachmann¹ 

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Abstract: *Covid-19 is the disease. When someone is PCR test Sars-CoV-2 positive – it does not necessarily mean that such person is sick or spreads the virus. Clinical evaluation is needed to determine such information. The author of this paper examines the hypothesis that only sick (symptomatic) persons or persons with high viral load (under certain circumstances – coughing, sneezing and maybe loud talking and singing) can transfer Sars-CoV-2 to others.*

This paper aims to analyse and evaluate other methods of testing for SARS-CoV-2 than PCR from nasopharyngeal swabs (or saliva/throat/front nose samples). Suggested is PCR testing from real clinical face masks samples to evaluate the condition of the test subject and his ability to spread the virus. Potential corruption is in scientific claims that PCR testing from nasopharyngeal swabs (or saliva/throat/front nose samples) is so-called “gold standard”.

A critical overview of current literature on this topic was provided and research with surface and air samples collections in hospitals in rooms with only symptomatic and only asymptomatic patients. Recommendations for public policy are done.

1. INTRODUCTION

Coronaviruses (CoVs) are a large family of enveloped, single-stranded, zoonotic RNA viruses. Four CoVs commonly circulate among humans: HCoV2-229E, -HKU1, -NL63 and -OC43. However, CoVs can rapidly mutate and recombine leading to novel CoVs that can spread from animals to humans. The novel CoVs severe acute respiratory syndrome coronavirus (SARS-CoV) emerged in 2002 and Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012. The 2019 novel coronavirus (SARS-CoV-2) is currently causing a severe outbreak of disease (termed COVID-19) in China and multiple other countries, threatening to cause a global pandemic. In humans, CoVs mostly cause respiratory and gastrointestinal symptoms. Clinical manifestations range from a common cold to more severe diseases such as bronchitis, pneumonia, severe acute respiratory distress syndrome, multi-organ failure and even death (Zimmermann, P., & Curtis, N., 2020).

Although coronavirus disease 2019 (COVID-19) is characterized by fever and respiratory symptoms, some patients have no or mild symptoms (Park, S. K., Lee, C. W., Park, D. I., Woo, H. Y., Cheong, H. S., Shin, H. C., ... & Joo, E. J. 2021). Coronavirus disease 2019 (COVID-19) emerged in Hubei Province, China in December 2019 and has become a global pandemic, with hundreds of thousands of cases and over 165 countries affected. Primary routes of transmission of the causative virus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), are through respiratory droplets and close person-to-person contact (Amirian 2020).

This paper aims to analyse and evaluate methods to determine asymptomatic, presymptomatic or postsymptomatic spreaders. This paper examines the hypothesis that only a sick (symptomatic) person can transfer Sars-CoV-2 to others.

¹ AMBIS Vysoká škola, Praha Lindnerova 575/1 180 00 Praha 8 - Libeň, Czech Republic

Used are methods of legal sciences, literature research about the topic, own research with surface and air samples collections in hospital in rooms with only symptomatic and only asymptomatic patients. Discussions with experts and air samplers companies were done as well.

Discussions if asymptomatic SARS-CoV-2 carrier can spread the virus are still quite inconclusive and there is a lack of methodology to prove such claims. Viral load measurement is one potential way: “study sheds light on the frequency of asymptomatic SARS-CoV-2 infection, their infectivity (as measured by the viral load) and provides insights into its transmission dynamics and the efficacy of the implemented control measures.” (Lavezzo, E., Franchin, E., Ciavarella, C., Cuomo-Dannenburg, G., Barzon, L., Del Vecchio, C., ... & Crisanti, A. 2020).

Cohort study of symptomatic and asymptomatic patients with SARS-CoV-2 infection who were isolated in a community treatment center in Cheonan, the Ct values in asymptomatic patients was similar to those in symptomatic patients. Viral molecular shedding was prolonged. Because transmission by asymptomatic patients with SARS-CoV-2 may be a key factor in community spread, population-based surveillance and isolation of asymptomatic patients may be required (Lee, S., Kim, T., Lee, E., Lee, C., Kim, H., Rhee, H., ... & Kim, T. H. 2020).

However, there is no scientific evidence that viral load levels can cause that asymptomatic SARS-CoV-2 carrier can transmit the virus to others. Only one very interesting study proofed scientifically that such option is maybe possible: “The low concordance of SARS-CoV-2 detection between filters and nasopharyngeal swabs indicated that the number of viral particles collected on the face mask filter was below the limit of detection for all patients but those with the highest viral loads.” (Smolinska, A., Jessop, D. S., Pappan, K. L., De Saedeleer, A., Kang, A., Martin, A. L., ... & van der Schee, M. P. 2021). However this study was done in a way: “Patients were instructed to breathe normally into the face mask for between 30 and 60 min during which they were asked to cough 10 times and speak out loud for 1 min.” (Smolinska, A., Jessop, D. S., Pappan, K. L., De Saedeleer, A., Kang, A., Martin, A. L., ... & van der Schee, M. P. 2021). So, not clear is whether face masks were in case contaminated by SARS-CoV-2 by loud speaking or coughing or by speaking out loud.

As an epidemic progresses over time, suspected cases are examined and tested for the infection using laboratory diagnostic methods. Then, time-stamped counts of the test results stratified according to the presence or absence of symptoms at the time of testing are often reported in nearly real-time. Nevertheless, it is important to note that the estimation of the asymptomatic proportion needs to be handled carefully since real-time outbreak data are influenced by the phenomenon of right censoring (Mizumoto, K., Kagaya, K., Zarebski, A., & Chowell, G. 2020).

There is no clear evidence if presymptomatic people can spread SARS-CoV-2. Some studies trying to prove this possibility. However such studies are mainly based on mathematical models or case studies which are not appropriate methods.

As expected, the proportion of pre-symptomatic transmission increased from 48% (95% CrI: 32–67) in the baseline scenario to 66% (95% CrI: 45–84) when allowing for negative serial intervals, for the Singapore data, and from 62% (95% CrI: 50–76) to 77% (95% CrI: 65–87) for the Tianjin data. When the incubation period is larger, it is expected that these proportions will be higher and when it is smaller, they are expected to be lower. Hence, a large proportion of transmission appears to occur before symptom onset, which is an important point to consider when planning intervention strategies (Ganyani, T., Kremer, C., Chen, D., Torneri, A., Faes, C., Wallinga, J., & Hens, N. 2020).

The possibility of presymptomatic transmission increases the challenges of containment measures. Public health officials conducting contact tracing should strongly consider including a period before symptom onset to account for the possibility of presymptomatic transmission. The potential for presymptomatic transmission underscores the importance of social distancing, including the avoidance of congregate settings, to reduce COVID-19 spread (Wei, W. E., Li, Z., Chiew, C. J., Yong, S. E., Toh, M. P., & Lee, V. J. 2020).

Doubts about above mentioned methods based on case studies and mathematical models were raised after research done in Wuhan between January 23 and April 8, 2020. All city residents aged six years or older were eligible and 9,899,828 (92.9%) participated. No new symptomatic cases and 300 asymptomatic cases (detection rate 0.303/10,000, 95% CI 0.270–0.339/10,000) were identified. There were no positive tests amongst 1,174 close contacts of asymptomatic cases (Cao, S., Gan, Y., Wang, C., Bachmann, M., Wei, S., Gong, J., ... & Lu, Z. 2020).

2. METHODS BASED ON SARS-COV-2 AIR SAMPLING

Only logic and possible methods to detect whether someone spreads SARS-CoV-2 from his respiratory tract (fecal - oral and fecal aerosol route considerations are out of scope of this paper) can be based on studies focusing on air sampling. Only such an approach can evaluate whether so called symptomatic or presymptomatic or postsymptomatic persons can be potential SARS-CoV-2 spreaders.

Studies in this way are quite rare and obviously connected to so called environmental detection.

Viable SARS-CoV-2 was isolated from air samples collected 2 to 4.8 m away from the patients. The genome sequence of the SARS-CoV-2 strain isolated from the material collected by the air samplers was identical to that isolated from the newly admitted patient. Estimates of viable viral concentrations ranged from 6 to 74 TCID₅₀ units/L of air and concluded that patients with respiratory manifestations of COVID-19 produce aerosols in the absence of aerosol-generating procedures that contain viable SARS-CoV-2 (Lednický, J. A., Lauzard, M., Fan, Z. H., Jutla, A., Tilly, T. B., Gangwar, M., ... & Wu, C. Y. 2020).

However, some studies were inconclusive in this way. SARS-CoV-2 RNA was not detectable by air samplers, which suggests that the airborne route is not the predominant mode of transmission of SARS-CoV-2 (Cheng, V. C. C., Wong, S. C., Chan, V. W. M., So, S. Y. C., Chen, J. H. K., Yip, C. C. Y., ... & Yuen, K. Y. 2020).

To address the airborne transmission mode of SARS-CoV-2 air samples were collected in the largest hospital in Iran. Results indicated that all collected samples were negative in terms of the viral RNA. There were not detected any positive readings 2 m from the patients' beds (Faridi, S., Niazi, S., Sadeghi, K., Naddafi, K., Yavarian, J., Shamsipour, M., ... & MokhtariAzad, T. 2020).

3. PROOF OF CONCEPT

On the basis of inconclusive results based on mentioned air sampling studies made in hospital – the author of this paper decided to make his own research in this way while hypothesis was that air samplers can detect SARS-CoV-2 in symptomatic Covid 19 patients rooms.

Patients agreed with the survey and hospital management as well. However later on hospital (in the Czech republic) did not want to be mentioned in any study and name of the hospital is not mentioned because of this wish. Symptomatic and postsymptomatic/asymptomatic. Covid 19 patients were located in different areas of the hospital – location for symptomatic (respiratory or pneumonia) only and postsymptomatic or asymptomatic/postsymptomatic only.

Air dehumidifiers with HEPA filters were used with the volume of dried air 300m³/hour what was sufficient to recirculate the air in patients' rooms within 2 hours. Three rooms were investigated in rooms with asymptomatic/postsymptomatic patients and no SARS-CoV-2 was detected on HEPA filters (swabs were transferred to laboratory). Surface swabs were clean as well even below patients' beds and on other places (except one positive sample close to one door – could be from doctors' shoes). Toilets were not investigated.

Investigated was one room with one symptomatic patient with respiratory problems (strong coughing plus pneumonia) and one patient with heavy pneumonia (severe disease). SARS-CoV-2 was detected on HEPA filter of the dehumidifier placed in the room and even on the HEPA filter placed in the corridor in front of the room of these two patients. This indicates that wind could move SARS-CoV-2 even into the hospital's corridor when the nurse opened the door. There was obviously opened window in this patient's room. This survey was done in April 2020.

Investigated were surfaces in this room as well with positive swabs below both patients' beds and toilets were investigated as well – also positive swabs. Interesting was that positive swabs were found even in toilet ventilation 2 metres high.

The author concluded that symptomatic or maybe even postsymptomatic patients can potentially spread the virus and asymptomatic persons most probably not.

There is a problem in the definition “symptomatic” and “postsymptomatic” while the patient has developed dangerous pneumonia but does not have symptoms like coughing or sneezing. Observed patient with pneumonia was expected by doctors to be sent home soon, however, the high volume of ground-glass opacities occurred in his lungs within one week.

This small survey brought precious information to the author of this paper despite was not representative.

The survey was unintentional proof of concept of the idea to test individuals on SARS-CoV-2 while using their face masks and similar methods. This option found out the author of this paper after mentioned survey.

4. SARS-COV-2 TESTING FROM AIR SAMPLERS PLACED IN FACE MASKS

In this chapter are summarised findings of clinical studies while air samplers were placed in SARS-CoV-2 positive patients in the hospital. The test was taken from PVA strips placed in face masks or from face mask filters. Surprisingly such studies do not have many followers until now. A novel method to detect SARS-CoV-2 in exhaled breath using sampling strips fixed within facemasks that can be readily removed and analysed using RT-qPCR (face-mask sampling was introduced (Williams, C. M., Pan, D., Decker, J., Wisniewska, A., Fletcher, E., Sze, S., ... & Barer, M. R. 2021).

In 66 hospitalised patients 38% were FMS positive within 24 h of a routinely positive SARS-CoV-2 PCR by nasopharyngeal swab. Higher FMS viral loads were associated with higher IS-ARIC (International Severe Acute Respiratory and Emerging Infections Consortium mortality and deterioration scores) deterioration and mortality scores, respiratory symptoms at the time of sampling and shorter intervals between symptom onset and sampling (Williams, C. M., Pan, D., Decker, J., Wisniewska, A., Fletcher, E., Sze, S., ... & Barer, M. R. 2021).

Testing for SARS-CoV-2, using face mask filters and nasopharyngeal swabs collected from hospitalized COVID-19-patients, showed that filter samples offered reduced sensitivity (8.5% compared to nasopharyngeal swabs). The low concordance of SARS-CoV-2 detection between filters and nasopharyngeal swabs indicated that the number of viral particles collected on the face mask filter was below the limit of detection for all patients but those with the highest viral loads (Smolinska, A., Jessop, D. S., Pappan, K. L., De Saedeleer, A., Kang, A., Martin, A. L., ... & van der Schee, M. P. 2021).

5. FUTURE RESEARCH DIRECTIONS

SARS-CoV-2 testing from air samplers placed in face masks is the prospective way of research that can potentially influence public health policy worldwide. More robust clinical testing should be recommended in this way. Conclusions on potential patients' early treatment should be investigated collaterally since this approach enables predict severity of the disease immediately.

6. CONCLUSION.

Potential corruption is in scientific claims that PCR testing from nasopharyngeal swabs (or saliva/throat/front nose samples) is so called "gold standard". Suggested is PCR testing from face masks samples to evaluate the health condition of the test subject and his ability to spread the virus". Protected should be really sick people and not make focus on people with no symptoms of Covid 19 who do not exhale SARS-CoV-2.

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