

Article for newspaper

Title; [No politics but just Science](#)

As a retired prof. ir. chemical technology,  $1+1=2$  and the prevention of Corona transmission is an understandable and manageable problem. A problem that can be considered as an infection risk caused by transmission of a Corona virus. So, the question is how can the infection-transmission risk be reduced to an acceptable level, preferably negligible?

In the chemical industry, we make a risk analysis to describe and assess **all possible scenarios** based on possible occurrence (frequency) and their consequences (the effect). Applying a risk analysis to the infection risk of transmission provides some new insights, which are the basis of potentially additional infectious transmission reduction measures.

### Risk analysis based on assumptions

Assumptions:

1. All viruses and bacteria that are inhaled, first end up in the mucus of the airways. before they can cause an infection.
2. Corona infection occurs when an infectious virus is present **long enough in the mucus layer** of the epithelium of the airways.
3. An infection can be caused by the virus penetrating behind and/or into the epithelial cells.

Based on these assumptions, the risk of infection can be reduced by reducing the **residence time of infectious viruses in the mucus.**

1. The mucus in the respiratory tract is produced in the lungs, nasal, pharynx and mouth. This mucus – about 1.5 liter/day – is largely transported to the stomach where bacteria and viruses are destroyed.
2. A small part of the mucus is brought into the ambient air by breathing, talking, sneezing, singing, screaming and coughing by the transmitter.
3. The mucus with bacteria and viruses causes possible infections by the transmitter and when emitted maybe by the receiver.
4. Bacteria and viruses are immediately attacked by cells of the innate immune system in the mucus, **if these are recognized** by the same immune system. This happens, among other things, in the case of a cold with a runny as a result.
5. The Corona virus is not recognized by the innate immune system.
6. It is known that 10 to 20% of people have trapped bacteria colonies in the throat and nasal cavities that are not attacked by the innate immune system. – long residence time in the mucus –
7. It is known that viruses use bacteria to hide, move and multiply.
8. The bacteria and viruses freely present in the mucus are continuously drained by cilia. – short residence time in the mucus –

The number of bacteria and viruses that the receiver breathes can be reduced by various measures that can be controlled by the recipient itself. The quantity is a function of the concentration of microorganisms in the air and the volume of inhaled infectious air.

1. With a greater distance from the transmitter, the concentration decreases. At 1.5 meters this becomes almost negligible.
2. The reduction in concentration works worse in the face of headwinds for the receiver.
3. The concentration in indoor air depends on the degree of exchange and is the lowest outdoors.
4. The number of inhaled microorganisms is determined by the duration of exposure to infectious air.

Bacteria and viruses have limited viability outside the body and cannot survive under certain circumstances. Hand washing, good personal hygiene and preventing/minimizing contact with the mucous membranes of mouth, nose and eyes can minimize transmission by touch.

Transmission by air can also be reduced by the transmitter and the receiver by wearing a nose/mouth protection -mask-. A comprehensive risk analysis can also be carried out to determine the transmission reduction effect of all possible scenarios, but this is not addressed in this paper. Carrying a mask makes always a substantial contribution to transmission reduction.

Based on the analysis made, the question is: **How can the infectious nature of the mucus with bacteria and viruses be reduced?**

### Scientifically proven

It is known from the scientific literature that:

1. the mucus of the epithelium in the vagina of the carrier of a copper IUD (contraceptive) absorbs copper ions.
    1. The copper ions in the mucus have a limited toxic effect, which prevents fertilization and no copper poisoning in the body.
    2. The maximum copper concentration in the mucus is limited to the solubility of copper in the mucus.
  2. copper (Cu) in contact with a wound, enhances wound healing; this was already known to the Romans. The copper kills the bacteria.
  3. the body contains approximately 100 mg of Cu. Mainly (75%) in liver, kidneys, heart and brain and 25% in the muscles.
  4. Cu plays a crucial role in the innate and adaptive immune system in our body.
  5. Recommended Daily Amount (RDA) to Cu is 1mg/day.
  6. Cu-metal and Cu-ions in mucus kill bacteria, because bacteria absorb so much Cu that they burst open and become inactive.
  7. bacteria with an increased Cu concentration and/or damage are recognized by the innate immune system cells and attacked.
  8. Cu in viruses damages the RNA and the shell. As a result, the virus is recognized by the innate immune cells and the viruses become inactive.
- 
1. free copper ions are very reactive and harmful in the body.
  2. free copper ions in the mucus are mixed with saliva in the throat/esophagus, and thereby immediately neutralized.

3. free copper ions that pass through the epithelium and are absorbed into the plasma are immediately neutralized.
4. an intake of more than 300 mg Cu is acutely toxic.
5. bacteria move along the Cu concentration gradient. First there is a movement towards the Cu source, to gain Cu to grow, and later there is a movement from the Cu source, to prevent poisoning by too much Cu-uptake.
6. the viscosity of the mucus decreases by release of cell material of dead bacteria.

From all these known data it follows that a very pure copper thread in contact with the mucus in the nose should reduce the number of bacteria and viruses in the mucus and thus the transmission.

The NPPU (Nose Personal Protection Unit) has been designed to make a copper wire as cheap, easy and safe as possible.

The copper wire model, called NPPU, is shaped in such a way that it makes direct contact with the mucus of the epithelium of the nasal septum as a "nose-insert". Wearing the NPPU has the following effects.

1. The mucus on the nasal septum dissolves Cu-ions from the NPPU.
2. The Cu-ions in the mucus kill the bacteria and viruses.
3. The mucus with the Cu-ions is drained through the nasal and pharynx and comes into contact with the other mucus.
4. The dead and damaged bacteria and viruses activate the innate immune system in the mucus.
5. All this happens before an infection of the body occurs.

So based on all the information, the concentration of infectious bacteria and viruses in the mucus should be substantially reduced, resulting in a substantial reduction in infectious transmission!

**What we don't know for sure is whether viruses in contact with Cu-ions are damaged in mucus, but a reduced virus concentration is already achieved with a reduction in bacterial concentration!**

### Proof of Principle

We have carried out a number of measurements and tests to partially demonstrate the supposed effect of transmission reduction through the use of the NPPU.

### Measurements:

1. NPPU in water produces a Cu concentration of 1.0 mg/liter.
2. NPPU preserved in natural vinegar yields a Cu concentration of 1.6 mg/liter.

There is a mucus production by the epithelium in the airways of 1.5 liters/day, a small part of which is produced by the nasal septum. It is estimated that less than 0.1 mg Cu/day can be dissolved with continuous wearing of the NPPU. However, the NPPU should for the time being not be used for more than 8 hours/day. In that case, the maximum Cu amount is less than 5% of the RDA value.

### Test:

1. In all 10 subjects, a significant decrease in the number of bacteria was shown after 4 hours of wearing the NPPU.
2. In the 5 subjects with an NPPU preserved in vinegar, a runny nose was immediately noticeable. An accelerated discharge of mucus seems to occur here.
3. In the 5 subjects with an NPPU kept in water, there were no directly noticeable effects after entry, however, 2 of the subjects suddenly had a runny nose with sneezes after 2 hours. It looks like stuck bacterial colonies are being released.
4. The test with a copper NPPU (5p) and a stainless steel NPPU (5p) (placebo) did only show a significant decrease in bacteria using the copper NPPU.
5. The long-duration test of 8 hours, with sampling every two hours, shows that a continuous decrease in bacteria was detected.

### Conclusion drawn as a chemical technologist so far:

1. Wearing the NPPU reduces the presence of bacteria - with and without viruses - in the throat and nasal area.
2. **Wearing the NPPU reduces transmission!**

### Necessary follow-up research by medical experts:

1. Demonstrating that wearing the NPPU does not have acutely toxic side effects based on, for example, plasma analyses. (This is not expected based on the available literature.)
2. Demonstrating that wearing the NPPU does not have predictable long-term toxic side effects based on a literature review. (This is not expected based on the available literature.)
3. Determining transmission reduction by wearing the NPPU as a function of wearing time and frequency.
4. Translating wearing time and frequency of the NPPU for sufficient social transmission reduction to prevent an epidemic, another "lock-down", etc.

### Potential NPPU:

1. The NPPU substantially reduces the risk of transmission infection, especially when combined with wearing a mask.
2. The frequent wearing of the NPPU protects the wearer (transmitters) and his environment (receivers), reduces the necessary "social distancing" and makes this less critical.
3. The NPPU reduces the transmission of bacteria (including MRSA) and viruses (Corona and Influenza) and thus the overall risk of infection.

The question now is why are governments, sports organizations and medical faculties of universities not interested in investigating this potential as a matter of urgency??

So far, I haven't had any response in two months. People are too busy!

Or it seems to be too simple and too cheap to be true.

But urgent involvement of:

1. experts is necessary for validation based on medical science.
2. the government is necessary for priority setting and for urgent approval.
3. stakeholders is necessary for financing and accelerated application.

We – Water & Minerals Advice – ask medical experts worldwide to investigate the efficiency and safety of the NPPU. [www.waterandmineralsadvice.com](http://www.waterandmineralsadvice.com) has been set up for this purpose.

Ir. Michel Boesten

Retired Prof. chemical engineering University of Groningen, The Netherlands