

# The Coronavirus SARS-CoV-2 Infection: Information and Recommendations for people

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In recent days, we are swamped with alarming warnings concerning our health, which ultimately strikes fear into the hearts of ordinary people who lack the necessary knowledge and data to fully comprehend the situation.

*Fear is the root of many harms:* distrust, divisiveness, flight, renunciation, knee-jerk reactions, disputes, compulsive shopping and many other behaviours, depending on our personal mind-set.

Eventually, *fear of illness* can even trigger illness, because it creates tension and stress, and prolonged stress may expose and aggravate latent vulnerabilities. It may cause an increase in blood pressure, irregular heartbeat or may upset sleep and digestion-related processes. It may tip an already fragile balance. This is particularly true for the elderly or those suffering from chronic illnesses. Eventually, it undermines the immune system.

*This is exactly what we have to avoid at all cost in the current situation!*

*The cure is always awareness,* stemming from knowledge and common sense, which impulsive and emotional fear prevent us to consolidate.

In the light of the present situation in Italy, we shall try to understand the CoronaVirus Disease (CoVID) and establish what we can actually do in this predicament.

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## 1. What science says about Coronaviruses

Coronaviruses encompass a large family of positive sense single-stranded RNA viruses, which affect the respiratory system. Their diameter measures approximately 80-160 nm (1 nanometre is a millionth of a millimetre) and their genome is among the longest of the RNA viruses (circa 30,000 nitrogen bases).

The name "coronavirus" is derived from their appearance under the electron microscope, where the bulbous-shaped proteins on their external surface create a crown image. These very same proteins enable the virus to attach itself to the cell membrane of the cells it will infect. Once penetrated by the virus, the cell's own RNA-related machinery will be hacked so as to force transcription of the virus' RNA and translation of its external envelope proteins, followed by the assemblage of these elements to form copies of the whole virus, released to further infect other cells (1).

are responsible for pathologies in mammals and birds, in which they cause diarrhoea (cows and pigs) or diseases of the respiratory tract (chickens).

**In humans, common Coronaviruses cause respiratory infections**, often quite mild, such as the common cold, and in some cases, they may cause non-severe viral pneumonia (about 20% of all viral pneumonia are associated with coronaviruses). Only rarely do they trigger a Severe *Acute Respiratory Syndrome* (SARS).

As has happened with other viruses in the past, some animal-specific Coronaviruses that would normally not infect humans can make an "*inter-species jump*". This means that they pass to humans, causing very severe and occasionally life-threatening pneumonia.

In this case, the severity of the pathology is due to the novelty of the virus. Since our immune system has never encountered it before, it does not know it. Therefore, it cannot defend itself and undergoes attacks that may become particularly violent and dangerous in immunologically debilitated or immunosuppressed individuals. This is particularly true for the elderly with severe chronic diseases, or for people with debilitated immune, cardiopulmonary, renal or metabolic systems.

So far, **seven human Coronaviruses** have been identified. The first four viruses (also known as "common cold viruses") listed below are very common and were identified in the 1960s. The last three have been identified more recently:

1. *Human Coronavirus 229E* (Coronavirus alpha).
2. *Human Coronavirus NL63* (Coronavirus alpha).
3. *Human Coronavirus OC43* (Coronavirus beta).
4. *Human Coronavirus HKU1* (Coronavirus beta).
5. *SARS-CoV* (Coronavirus beta that caused the *Severe Acute Respiratory Syndrome* of 2002, an epidemic originated in China that infected about 8,100 people, with a mortality of 9.5%)
6. *MERS-CoV* (Coronavirus beta that caused the *Middle East Respiratory Syndrome* of 2012, an epidemic originated in Saudi Arabia that infected about 2,500 people with a mortality of 35%).
7. *Coronavirus SARS-CoV-2* (new Coronavirus identified in late 2019, causing a severe acute respiratory syndrome leading to death in a small minority of cases. The outbreak started in Wuhan, a city in China, where it infected about 150,000 people with an estimated mortality of 2.1% so far: about 3,200 deaths out of

150,000 confirmed Chinese cases) (2) (for updated world data see bibliography (3) and for updates of the Italian data see bibliography 4).

The virus subsequently spread to some other countries in Asia. Almost immediately afterwards, it reached Italy, which has become the second country in the world for number of cases in few weeks. The virus is now rapidly spreading all over Europe, and maybe all over the world, and is about to cause a real **pandemic**.

**TABLE 1**

Coronavirus Name	Type of coronavirus	Year of first finding	Number of infected	Associated pathology	Recorded mortality
<b>229E</b>	alpha	sixties	unknown	Common cold	Extremely rare
<b>NL63</b>	alpha	sixties	unknown	Common cold	Extremely rare
<b>OC43</b>	beta	sixties	unknown	Common cold	Extremely rare
<b>HKU1</b>	beta	sixties	unknown	Common cold	Extremely rare
<b>SARS-CoV</b>	beta	2002	8100	flu, rarely pneumonia	9,5%
<b>MERS-CoV</b>	beta	2012	2500	flu, rarely pneumonia	35%
<b>SARS-CoV-2</b>	beta	2019	almost 330,000	flu, rarely pneumonia with acute distress respiratory syndrome	around 2.1% (Chinese data) and 7-8% (Italian data)

**Coronavirus SARS-CoV-2** is referred to as the "*novel Coronavirus*", because it is a **new strain of Coronavirus** never identified in humans before. The virus is associated with an outbreak of pneumonia cases recorded in the city of Wuhan (central China) starting from the 31st December 2019. It seems - but it is not certain - that most cases were initially believed to have an epidemiological link with the *Huanan Seafood market* (Southern China), a wholesale market for seafood and live animals.

In fact, **Coronavirus SARS-CoV-2** is 96% genetically identical to a known Coronavirus of bats and 86-92% to a pangolin Coronavirus. Therefore, the transmission of a mutated virus from animals to humans is the most likely cause of the appearance of the novel Coronavirus.

## 2. How is the infection transmitted?

Human Coronaviruses are transmitted from one infected person to another mainly **by direct contact** through saliva, coughing or sneezing (to be infected, you must be within a range of about 1-1.5 meters). The virus probably spreads also by direct contact with the nasolabial mucous membranes or with the hand of an infected individual (who is likely to have contaminated hands, since people easily tend to touch their nose or cover their mouth with their hand when coughing or sneezing) (5).

In China, the highest rate of infection (78-85%) was recorded within families, mainly due to aero-transmitted droplets from virus carriers standing very close to other members of the household. Transmission by airborne droplets at distances of 1.5 or-2 meters or more is not a significant path of contamination, especially if standing in large indoor spaces or in the open air(6).

According to data released by the WHO to date (6), it appears that even if you have a direct personal contact with an infected person, your probability of being infected is far from high: just 1 to 5%. These data are not final and it is likely that are to be revised upwards.

In the transmission by direct (skin) contact, e.g. if touched by the hand of an infected and sick person, you are at risk of being contaminated only if you put your hand in your mouth or if you touch (the mucous membranes of) your nose or eyes before washing your hands thoroughly.

*A sick person can contaminate not only during the symptomatic phase of the disease but - like in any viral infection -also during the 5-6 days preceding the onset of clinical symptoms (actually, most likely during the preceding two weeks), thus, long before the infection is detected.*

The virus is believed to settle in the throat of the infected person. There it rapidly multiplies and when it reaches a sufficient quantity, it enters the blood and invades the whole body, concentrating in the lungs through the inhaled air. *For this reason, as a preventive measure, it is important to use mouthwashes that are able to block the local increase of the viral contamination (see further below). This is all the more vital at the onset of the very first symptoms.*

### 3. Why is the number of cases of infected people multiplying?

Firstly, I think it is appropriate to thank our Government, the Ministries of Health and of the Interior, the Civil Protection and the various Regional Governors, for having worked together as soon as the first news reached us from China in late January. They deserve our thanks for having quickly decided to take courageous and unprecedented measures, not adopted by all other countries, aimed at containing the spread of the epidemic and for approving the large-scale use of pharyngeal swabs.

In retrospect, maybe the movement of people should have been restricted as soon as the first isolated cases were discovered. However, who could have imagined that this virus would geographically spread so rapidly?

*Given that in Italy – at least at the beginning of the epidemics -the swabs were taken in all the people who had a contact with individuals who tested positive, a policy not adopted so far by any other European country, it is self-evident that in our country a very high number of infected people is detected.*

On the other hand, it is conceivable that other factors are playing a role in the propagation of the infection in our country (it has been suggested that the Italian climate could be a contributory factor)

Not surprisingly, Italy has become the most affected European country, with a number of cases similar to that of Hong Kong (3), at the beginning, and even higher in the last few days. It is incomprehensible that governments and physicians in the rest of Europe are sitting on the fence and not taking any action to protect their population, which in my view is just as exposed to the risk of contamination as ours.

*When taking steps to protect ourselves against the spreading of the disease, we must avoid any alarmism and exaggeration, lest the CoVID becomes a real economic threat, undermining our country, with far-reaching repercussions, beyond the threat and damage to the citizen's health and the health system. Alarmism may cause civil unrest, sufferings and even fatalities!*

And if you are wondering why there are so many infected people, just think of how many people nowadays meet with tens or hundreds of persons in a few days for work or other reasons.

*For this reason, it is highly recommended to stay at home, until the infection peak is behind us.*

#### 4. The symptoms of Coronavirus SARS-CoV-2-infection

In humans, the most common symptoms are malaise, asthenia (lack or loss of strength), high temperature and a cough. In severe cases, the infection may cause pneumonia with severe acute respiratory distress, kidney failure and sometimes death (5).

The situation is complicated by the fact that we are still in a period in which we also have the *common flu, caused by the real influenza virus, as well as by many other viruses*. The problem is that the seasonal flu and CoVID present the same symptoms and overlapping clinical picture, at least in the first days.

Differential diagnosis is difficult and can only be confirmed by microbiological PCR (Polymerase Chain Reaction) on pharyngeal swab samples. The results are available in just 2-3 hours.

However, in the light of the rapid proliferation of the epidemics in some Italian regions (Lombardy, Emilia Romagna and Veneto), and subsequently spreading elsewhere, it is very likely that it will soon affect the whole country. For this reason, it was a right for our government to declare the entire Italian territory a 'Red Area'.

#### 5. CoVID Mortality

Seasonal flu syndrome mortality (NOT caused by the actual influenza virus) is said to be around 7,000 people per year in Italy.

According to *InfluNet* (the national integrated - epidemiological and virological - surveillance system of influenza, coordinated by our Ministry of Health with the collaboration of the *Istituto Superiore della Sanità* (National Institute of Health), every year the influenza syndrome affects approximately 6-8 million people, i.e. 9% of the population.

In Italy, influenza viruses are directly responsible for approximately 300-400 deaths every year, with about 200 fatalities from primary viral pneumonia. However, according to the estimates of various studies, an extra 4 to 8,000 "indirect" deaths are to be added to this number, for fatalities caused by pulmonary (bacterial pneumonia) or cardiovascular (heart failure) complications of influenza.

The many viruses that induce seasonal flu syndromes can in fact cause complications, particularly in the elderly and in subjects already suffering from severe chronic conditions or immunodeficiencies at the onset of the flu.

Accordingly, in Italy the annual mortality rate from seasonal flu (that is to say the ratio between deaths and infected people) is less than one every thousand, that is 0.1%.

If we now compare these data with those of the novel Coronavirus, one might ask whether the seasonal flu syndrome is more dangerous than the Coronavirus SARS-CoV-2 infection, considering that the annual fatalities linked to the seasonal flu in Italy greatly exceed those recorded so far in China in connection with the novel virus.

*Bearing in mind that at the moment any answer is based merely on provisional data*, one could say "NO", because the Italian mortality of CoVID seems to be around 7-8% and therefore greater than the flu syndrome and a month from the start the epidemic shows no sign of stopping its run and a month from the start the epidemic shows no sign of stopping its run.

However, it is still far too early to draw conclusions. We do not have definite data; there are only provisional statistics, since the exact number of people infected with Coronavirus SARS-CoV-2 is not known. In all likelihood, the number of infected people is far higher (many people have hardly any symptoms and therefore fail to be recorded; moreover, while during the first two weeks of the outbreak everybody got a pharyngeal swab, at present swabs are only used to confirm the diagnosis of symptomatic subjects).

*The fundamental difference between influenza viruses and the Coronavirus SARS-CoV-2 is that the new Coronavirus SARS-CoV-2 is unknown to our immune system. The usual viruses that cause seasonal flu syndrome are unable to infect the entire population, since many individuals are already be immunized against it (either by vaccination or through natural antibodies formed from previous encounters with the virus). Whereas the new Coronavirus SARS-CoV-2 is able to prey on naive immune systems, spreading with a much greater rate than other viruses (as is recently being observed) and causing severe damages, which are felt with a higher impact rate within a smaller group of people within the total population, until now.*

At any rate, another 1-2 months will be required before more accurate data are available. It is likely that meanwhile (in line with the aforementioned explanation) the infection caused by Coronavirus SARS-CoV-2 will spread across the globe in the next 2-3 months to come.

Based on the currently available data, it appears that Coronavirus SARS-CoV-2 mortality is strongly influenced by the age of affected patients, by his/her pre-existing pathologies and, most importantly, by the assistance that the patient receives from the National Health System. The conditions of the country's health care system equally play an important role. In China, 20% of infected patients required hospital treatment for several weeks, but most hospital beds were already taken by other patients admitted for unrelated pathologies. Furthermore, CoVID infected patients with severe symptoms have a higher mortality rate if there is an insufficient number of intensive care beds.

Therefore, the first and most imperative measure is to aggressively contain the spread of the virus, in order to reduce the number of severely-ill CoVID patients and increase the number of available intensive care beds (including medical supplies and medical staff) as much as possible (which is exactly what our government has been trying to do since the start of the outbreak).

*What are the characteristics of the subjects who have died of the new Coronavirus SARS-CoV-2?*

They are mostly elderly (approximately 84%) and immune-compromised subjects, for whom the mortality obviously lies much higher than the 2.1% estimated for the total population (Chinese data). The same increased vulnerability applies to them in case of common flu. According to the data of our Department of Civil Protection (4), in Italy the mortality is estimated at around 7-8%. However, one should also keep in mind that these percentages are likely an overestimate, since less people are tested, and the capacities of the intensive care units are overstretched. In the hospitals of the most affected regions of Italy, not everyone who needs it can be intubated to overcome the phase of pneumonia associated with CoVID. This leaves the elderly even more at risk of mortality.

## 6. People most at risk

Viruses can enter and multiply inside any human organisms with which they come in contact. Their impact is not necessarily the same in every individual. In case of the Coronavirus SARS-CoV-2, the data available so far (2, 3, 7) show that this infection can lead to:

- *An asymptomatic infection or symptoms that go unnoticed.* It is difficult to say how many people are liable to be infected, as is the case with numerous viral infections, some individuals are asymptomatic or show signs similar to those of a common cold or a mild and transient pharyngitis. Usually, these subjects are not old, they have a particularly robust immune system and, generally, do not even undergo medical checks, since they are unaware of being infected. However, according to the WHO experts' document (6), the vast majority of people infected eventually develop symptoms. Cases of asymptomatic Coronavirus SARS-CoV-2 positive patients are

- *A mild infection.* This applies to approximately 80% of infected individuals (with positive swab). These people (generally adults) do not have an immune system of the same robustness as the aforementioned group but are still strong enough to counteract the infection and reduce it to flu-like symptoms.
- *A severe infection.* This applies to 14-15% of infected individuals. These people generally have a weakened immune system (as is the case with elderly or patients with preceding chronic pathologies), leading to the development of symptoms that require hospitalization in conditions of isolation.
- *A very critical or deadly infection.* This applies to approximately 3-5% of infected individuals. Generally, these people are already so debilitated, that their immune system is unable to control the disease, most often resulting in bilateral basal pneumonia (75-79% of cases). Bilateral basal pneumonia is characterized by:
  - intense dyspnoea, with a respiratory rate of about 30 acts /minute;
  - a blood saturation of 90% (as measured by placing the saturation meter on one of the digits of either hands);
  - a partial arterial blood pressure of 50-60% (measured by haemogas-analysis);
  - and lung infiltrates in more than 50% of the pulmonary field in a time span of 24-48 hours (the most affected lobe appears to be the lower right lobe) (8).

If these patients do not receive assisted breathing (intubation), they risk succumbing to respiratory failure, septic shock and multi-organ failure in a highly variable and subjective amount of time (9).

According to the data of a particular study (10), only 11% of the critically ill subjects did not experience any fever until 2-8 days after the onset of symptoms. Furthermore, the average time interval from onset of symptoms to radiological confirmation of pneumonia was 3-7 days and that from the onset of symptoms to admission to the ICU was 7.0-12.5 days.

### **The real and actual risk of the Coronavirus SARS-CoV-2 infection depends on the conditions of the immune system:**

1. *Potentially, we could all be at risk*, because any of us could find him/herself to be "momentarily" in a "temporary" condition of increased risk due to certain factors causing an imbalance and weakening of our immune system. In my view, among the main factors causing such imbalance, we should list the followings:
  - *Very intense and prolonged psycho-somatic stress, especially causing agitation, anger, fear;*
  - *Extremely altered nutrition-pattern* (often referred to as "junk food" consumption);
  - *Quantitatively altered nutrition consumption* (too scarce or excessive);
  - *Consumption of products with altered nutritional value* (i.e. deprived of nutrients that are essential to our organism's vital processes: oxygen, water, essential amino acids, essential fatty acids, vitamins, minerals);
  - *Severely reduced fluid intake*, especially for prolonged periods of time;
  - *Excessive sedentary lifestyle*, especially for prolonged periods of time;
  - *Severe sleep deprivation*, especially for prolonged periods of time;
  - *Chronic exogenous intoxication* (excessive consumption of drugs, alcohol, coffee, smoking, pharmaceutical drugs).

If the exposure to these risk conditions is not severe, intense and too prolonged, and if the individual is fit and not an elderly, in 80% of cases the Coronavirus SARS-CoV-2 infection will manifest itself through mild symptoms. This also means that quarantine/confinement for 15-20 days in these cases will suffice.

2. However, *14-15% of infected individuals* may develop severe symptoms as result of pre-existing chronic pathologies aggravated by the aforementioned conditions, debilitating the immune system to such an extent, to require immediate hospitalization in conditions of isolation. In fact, the Coronavirus SARS-CoV-2 infection is generally aggravated by the presence of several factors:

- *Old age* (over 80 years of age)
- *Severe chronic immune pathologies*: immune-deficiencies or immune imbalances of various types, such as those expressed with recurrent infections, HIV infections, etc
- *Severe chronic respiratory diseases*: bronchial asthma, chronic bronchitis, bronchiectasis, respiratory infections, respiratory failure, etc.
- *Severe chronic cardiovascular pathologies*: advanced ischemic coronary artery disease, atrial fibrillation, dilated cardiomyopathy, heart failure, etc.;
- *Severe chronic metabolic diseases*: decompensated diabetes mellitus, chronic pancreatitis, intestinal malabsorption, severe obesity, cachexia , etc.;
- *Severe chronic kidney diseases*: decompensated renal failure, etc.;
- Severe chronic neurological conditions, especially myopathy associated with respiratory failure, etc.;
- *Oncological pathologies at advanced stages*, namely with involvement of vital organs and vital centres, etc.;
- *Acute or chronic treatment with immunosuppressives* (corticosteroids, non-steroidal immunosuppressants, oncologic chemotherapy, major surgical procedures under general anaesthesia, etc.);

3. *About 3-5% of infected people* can enter a very critical state due to pre-existing precarious immune conditions, some even facing death from multi-organ failure despite advanced technology and vigorous therapy available on the Intensive Care.

From this perspective, we may wonder: *why are we not increasingly investigating the reasons why some individuals die from the Coronavirus SARS-CoV-2, whereas others survive the infection?*

This is the question that, we as doctors should strive to answer. Understanding why some people become very ill or die, and why others make full recovery could help to lay the foundations for a more effective and targeted preventive medicine.

TABLE 2

<b>Status</b>	<b>Minor risk</b>	<b>Major risk</b>	<b>Deadly risk</b>
<i>Affected persons:</i>	80% of infected people	14-15% of infected people	3-5% of infected people
<i>Inducing/promoting age:</i>			
- healthy person	all	>65	>80
- ill person	all	all	all
<i>Inducing/promoting conditions:</i>			
- very intense and prolonged psycho-somatic stress	+	++	+++
- extremely altered nutrition-pattern ("junk food")	+	++	+++
- quantitatively altered nutrition consumption (too scarce or excessive)	+	++	+++
- consumption of products with altered nutritional value (i.e. poor in essential nutrients)	+	++	+++
- severely reduced fluid intake	+	++	+++
-severe sleep deprivation	+	++	+++
- chronic exogenous intoxication	+	++	+++
<i>Inducing/promoting pathologies:</i>			
- severe chronic immune pathologies		++	+++
- severe chronic respiratory diseases		++	+++
- severe chronic cardiovascular pathologies		++	+++
- severe chronic metabolic diseases		++	+++
- severe chronic kidney diseases		++	+++
- severe chronic neurological conditions		++	+++
- oncological pathologies at advanced stages		++	+++
- acute or chronic treatment with immunosuppressives		++	+++
Treatment for suspect or symptomatic cases:	Mandatory staying at home and calling the National designated medical phone number	Hospitalization in conditions of isolation	ICU

## 7. Contagion prevention

Although no virus is able to live and reproduce outside of a living organism (human or animal) indefinitely, viruses are known to survive a short amount of time in an external environment. (The Coronavirus SARS-CoV-2 is believed to be able to survive no more than a few hours outside its host. Data thus far data are still unverified, due to the novelty of the virus and the lack of sufficient studies. In fact, some claim that the virus is able to survive up to one day inside residential buildings).

The actual prevention of contagion depends on the probability that people be exposed to viruses, released by either sick individuals or healthy carriers. (Healthy carriers refers to individuals who have been contaminated with the virus, but who are either asymptomatic or have not developed symptoms yet, or individuals who will never show any symptoms, because their body is able to eliminate the virus efficiently).

The rules for the prevention of the contamination with the Chinese Coronavirus SARS-CoV-2 are practically the same that apply to all viruses (11, 12, 13) and be summarized in the paragraphs below.

a. **Adopting a lifestyle that reinforces our defences against infectious diseases in general**

Examining the list of people at risk and Table 2, it quickly becomes evident that *the first measure of prevention is preserving a strong and well-functioning immune system*. This approach is of fundamental and applicable to the prevention of any pathology, whether it is infectious or not.

***Thus, the first and most effective form of prevention is always to have a correct lifestyle! More often than not, our organism is able to overcome the attack caused by any virus/bacterium/fungus/germ (whether it yet exists or has yet to develop), provided that we keep it in good health and protect it adequately.***

Having already devoted [many papers](#) and [several books](#) to this subject, in the present article I will only mention the most important rules, in the list below:

- *Reduce as much as possible the consumption of animal-based food products (i.e. meat, milk and other products derived from these aliments) and industrially processed food products.* (By reducing meat consumption, we indirectly fight against intensive animal farms, where animals kept in very poor conditions and treated worse than worthless objects. In fact, the animals live under such stressful conditions, that they become more prone to infections, requiring constant administration of antibiotics. Consequently, this promotes the onset of viral infections, eventually creating the conditions that enable pathogenic germs to make the "inter-species jump" of from animal to man).
- *Maximize the consumption of vegetables, especially fresh vegetables, whole cereals with low gluten, pulses and fresh as well as dried fruit.*
- *Drink approximately 1.5-2 litres of water per day, preferably slightly alkaline and with low fixed residue.*
- *Take necessary measures to normalize your body weight: eating less (smaller quantities) if you are overweight and chewing the food adequately in order to facilitate and speed up digestion.*
- *Engage in some physical activity every day (for example, at least 30 minutes of brisk walking in the open air and surrounded by nature).*
- *Sleep a minimum of 7 hours, if not 8 hours, a day.* Do so in the dark, without background noise and possibly far from sources of electromagnetic fields.
- *Quit your addictions at once ('cold turkey') or gradually (smoking, coffee, alcohol, drugs, unnecessary consumption of pharmaceutical drugs, as well as the excessive use of mobile phones, computers, television; give up any kind of addictive and/or detrimental behaviour).*
- *Use probiotics, some supplements or nutraceuticals depending on individual nutritional deficiencies, especially when related to nutrients that are considered essential for our body (nowadays, deficiencies are increasingly frequent due to the pollution of the environment and of the food chain). The most important supplements with antiviral functions are vitamin A, C, D and mineral salts based on copper and zinc (see below).*

- *Take some time out every day for reading and/or meditation as well as other forms of leisure that are relaxing and gratifying.* If possible, in periods of greatest infectious risk, I recommend:
  - avoid crowded areas, or - even if only on Sundays –
  - arrange Sunday outings to places where you can breathe good air and reinvigorate yourself:
    - in the mountains (above 800-1000 meters or at the most convenient altitude appropriate to your general health condition),
    - or at the seaside (even in winter, walking a few hours along the beach can be beneficial, especially for children and the elderly, provided they are adequately dressed for cold weather conditions).
- *Avoid conflict and any other circumstances leading to increased stress that we can help* (however, we should also try to do something to help the resolution of conflicts that do not depend on us).
- *Adopt a positive and peaceful state of mind to minimize both personal and inter-personal stress* (obviously, not everyone is born with such a predisposition, but we can all try to improve ourselves).

b. **Strengthening our antiviral defences in critical periods and when we are in a high-risk situation**

When the goal to achieve is a quite rapid immune-stimulant effect, in order to activate a nonspecific antiviral response as fast as possible, it is imperative that *every piece of advice be carefully weighted and personalized*. In fact, if a person meets one of the health risk conditions listed in Table 2, he/she very likely needs a personalized immune-stimulant treatment, that only his/her physician is qualified to prescribe.

Bearing in mind that in the present article, any **advice can only be generic, during a period of increased exposure to infection risk, to adults** I would recommend following guidelines in order to achieve a rapid immune-stimulation:

- ***Commit to integrating a habit of periodic fasting*** (at least one day a week) *in order to compensate for deregulated eating patterns, and with that minimize the accumulation of toxic substances as well as catabolites that weaken the immune system. With the exception of children people older than 80 years of age, and those with particular pathologies, this advice is beneficial for everyone:*
  - overweight or obese individuals;
  - people with metabolic pathologies affecting the abdominal organs;
  - people who are aware of an excessive amount of food habit (we are all familiar with our own weaknesses with regard to food consumption!);
  - people who crave simple sugars or refined flours; or who eat a lot of animal-based products (especially meat and dairy).

There are several ways of fasting, but I would recommend a *simple personalized manner of periodic fasting*. It is enough to stimulate the reactive-defensive processes of the body and enable it to react efficiently in many unfavourable conditions. Animal studies using laboratory guinea pigs have widely demonstrated that, if fed on alternate days (as opposed to every day), thus subjecting the guinea pigs to frequent forced fasting, their lifespan can be extended by as much as 30% and morbidity reduced, even without losing weight (14, 15).

Based on my own clinical experience, my advice is to fast once a week (preferably during 2 days for those who need it most) and to drink only water (or herbal teas) at

will (about 2.5-3 litres) during the fast. Those who are unable to fast can start by drinking plenty of water in between or before meals, consuming only cooked and/or raw vegetables seasoned with lemon and/or balsamic vinegar at lunch and/or dinner. *Remember that, generally speaking, experiencing a little hunger is good for the body and mind!*

Those who believe that they can fast for a longer period, can try what I like to call the "15-day diet". It is based on the sole intake of liquids and vegetables in moderate quantities, throughout that period:

- 1st and 2nd day: only water or purifying herbal teas;
- 3rd and 4th day: centrifuged vegetables, vegetable extracts or only cooked and/or raw apples;
- 5th-15th day: vegetable broths, vegetable soups, soups, cooked and raw vegetables, some pulses, two or three seasonal fruits, a spoonful of olive oil a day, lemons ad libitum.

- ***Take high doses of vitamin C (ascorbic acid) in powder:*** it is widely known that vitamin C leads to immune stimulation through many mechanisms of action. In fact, deficiency of vitamin C has shown to result in decreased immunity paired with increased susceptibility to infections, whereas the integration of vitamin C seems to prevent and treat many respiratory and systemic infections (16). However, it is important to note that to achieve acute and intense immune stimulation, high dosages are required (17), such as 2.5-5 grams of vitamin C (i.e. half or a teaspoon) per day for several days (maximum a month). If you want to assume high dosages throughout longer cycles, it is desirable to apply a 15 day-break free from any vitamin intake. The aforementioned dosages of the vitamin must be dissolved in a litre of water and consumed little by little over the span of an entire day. This is necessary to avoid diarrhoea, as result of increased osmolarity (our bodies are only able to absorb small quantities of vitamin C at a time, thereby leaving the remaining 'unused' vitamin C in the intestines, which is discarded by attracting water). It should also be noted that, if one cannot keep the bottle in the dark, it is preferable to prepare half a litre in the morning and the other half in the afternoon, in order to avoid prolonged ambient light exposure
- ***Ingest a teaspoon of baking soda with a little water every night before going to bed*** (or some alkalizing salt tablets, easily available on the market). This is not the optimal solution, which is the prevention of acidification of our internal environment (corresponding with a urinary pH inferior to a value of 6.5). However, induced alkalization may still have a positive metabolic impact, since under circumstances of acidosis our enzymes are not able to function adequately and increase the body's susceptibility to inflammation and illness.
- ***Take parenterally administered Glutathione:*** do so by consuming a single 600 mg ampoule every 5-7 days during the critical period of risk exposure; in case of fever, every single day throughout 7-10 days. Glutathione is one of the most powerful antioxidant substances produced by our own organism, and in this case important in defending in our body from inflammations caused by free radicals. In fact, it is known that viruses, particularly Coronavirus SARS-CoV-2, cause interstitial alveolitis through the production of free radicals, which also contribute to cell necrosis.

Therefore, glutathione is an important preventive weapon and an additional means of support in case of pathology. It is a natural substance without any known side effects.

- **External use of essential oils (EOs):** EOs are powerful antibacterial, antifungal and antiviral agents, whose beneficial action has been proven for many years (18, 19, 20) and also reported by our National Institute of Health (21). They are generally selected based on their aromatograms (these are laboratory test to assess the sensitivity of a germ towards a specific EOs). In case of viral infection, the following EOs can be used in combination with one another: *Ravintsara EO*, *Eucalyptus EO*, *Rosemary EO*, *Lemon EO*, *Cloves EO*, *Cinnamon EO* (be mindful of its slight irritative effect), *Peppermint EO*, *Mountain pine EO* and *Thyme EO*. All of these OE have an antiviral function. You do not have to purchase them all, but I would recommend preparing a mixture by mixing at least three or four of them. A single drop of such a mixture - of equal parts of the chosen EOs - can be used to *externally rub the nostrils or the front of the neck*. The mixture can also be *diffused in closed spaces*, using an electric diffuser (generally 1 drop of the mixture is used for every square meter of the room), or used for *fumigations* (2-3 drops in a pot of boiling water, in order to inhale the released steam with eyes closed, while bending over the pot and covering one's head with a towel). You can also use 2-3 drops directly on a *handkerchief to be sniffed frequently* or put a drop inside the *protective mask*. In order to *purify the rooms*, one can proceed as follows: fill a normal small pressure sprayer with 100 ml of a 40% alcohol (a common *grappa* would do) and add 70-80 drops of the aforementioned mixture of Essential Oils. Shake the solution well and spray it into the air 3-4 times a day. You can also spray it on your hands, and then rub your face for disinfection, or onto a cloth with which you can rub the door handles and other frequently used objects and disinfect them. Finally, the EOs also emit a very pleasant fragrance in rooms, besides having an antiviral and antibacterial function.  
**Beware** not to touch your eyes with fingers wet with EOs!  
**Beware** not to use the OEs for young children (under 3 years old), since they may cause bronchospasms. Some adults may also be hypersensitive to the EOs; therefore, it is important to test one's reaction beforehand by putting a drop on the forearm: in case of red skin rash, wash thoroughly with soap and water. For on hypersensitive individuals, dilute the EOs by mixing 5 drops of the mixture with a teaspoon of olive oil, and keep the mixture in a tightly closed little glass bottle.
- **Some supplements:** beside the aforementioned vitamin C, there are other important nutritional supplements for the prevention of viral infections. The most relevant are:
  - **Vitamin A:** a deficiency compromises both innate and acquired immunity, by reducing the functionality of neutrophils, macrophages and Natural Killer lymphocytes (innate immunity), and for the important role it plays in the development of Th1, Th2 and B lymphocytes (acquired immunity)(22). Dosage - wise, doctors may consider using 50,000 IU / day for a period of 7-15 days and 10,000 IU / day afterwards.
  - **Vitamin D:** vitamin D deficiency (extremely common nowadays) is associated with an increased risk of acute viral respiratory infection. Meta-analyses of clinical studies on vitamin D supplementation have demonstrated its protective effect against viral infections (23, 24). In fact, vitamin D has numerous immune-stimulatory effects, but for fast action, an intake of daily high dosages is required, such as 10,000 IU/day for a period of 7- 15 days (in emergency cases, a dosage of 100,000 IU/day may be envisaged for 4-5 days). Switch to 5,000 IU/day

afterwards. Bear in mind, that the intake of vitamin D should be accompanied by the ingestion of about 1.5-2 litres of water per day.

- **Copper:** it is essential for the uptake of vitamin C; it contributes to the normal functioning of the immune system and inhibits viral growth (25). Your physician may consider prescribing dosages of around 1.5-2 mg per day (ingested on a full stomach, reduce to half of the original dosage in case of nausea).
- **Zinc:** it promotes the normal functioning of the immune system against viral and bacterial pathogens; zinc is also required for the good functioning of the thymus, the leukocytes, and especially T lymphocytes (26). Recent studies have shown that zinc is a powerful and selective inhibitor of interferon-lambda signalling pathways, which are important pro-inflammatory cytokines in acute and chronic viral infections (27).
- **Probiotics:** the efficacy of many probiotics in the prevention and treatment of viral infections is known or many years (28). In fact, recent studies have shown that viruses are eliminated by interferon, the production of which is stimulated by probiotics (which activate of dendritic cells). For this reason, probiotics should feature among the additional rational options for the treatment of viral diseases (29). There are numerous probiotics to recommend in the prevention and treatment of respiratory infections. My personal advice is to use at least two different probiotics per day, or alternatively, take two to three types following a rotation scheme in case of elevated risk of infection. The most documented species in scientific literature include *Lactobacillus rhamnosus GG*, *Lactobacillus paracasei*, *Lactobacillus plantarum L-137*, *Lactococcus lactis JCM5805*. Other probiotics are also an option.
- ***A strictly personalized homeopathic treatment:*** in my view, homeopathy is extremely powerful medical approach (Medicine) with an immediate impact on acute pathologies, when the remedy administered is truly suitable for the characteristics of the person in question, i.e. when there is a strong similarity between the psychosomatic symptoms and the homeopathic characteristics ("*Materia Medica*") of the administered medication. Hence, it is impossible to list which remedies are recommended to prevent or treat an infection or other pathologies. None the less, although *Homeopathy operates by similitude and not by patient/remedy equality*, it is still possible to provide some general advice on which remedies - based on a two-century long clinical experience - have proved to be most suitable for any viral pathology (known or unknown to medical practitioners). If you agree with the above, I recommend that you contact your homeopathic doctor, who is certainly able to provide you with an effective (personalized) treatment and pertinent advice.

Finally, do not forget that the immune system is strongly influenced by: our central nervous system (and therefore by psycho-somatic stress); our diet (if unbalanced, deficient and/or polluted); our degree of fatigue or sedentary lifestyle; the presence of relapsing or chronic inflammatory processes; the pharmaceutical drugs we use; and by the degree of tensions we experience in our daily lives.

*These factors determine our ability to defend ourselves not only against Coronavirus SARS-CoV-2, but also against any virus, bacterium or germ. In fact, in the case of any disease!*

Therefore, it is indisputable that an appropriate lifestyle is essential to the normal functioning of our immune system.

c. What a healthy person can do to try to avoid contact with viruses

The most common recommendations for avoiding direct contact with the Chinese Coronavirus SARS-CoV-2 are the followings:

- *Avoid direct or close contact (i.e. a distance of less than 1.5-2 meters) with sick people, people with suspicious respiratory symptoms or with people who are simply at risk of the disease (i.e. people who in the last 15- 20 days may have been in contact with people who later got sick).*
- *Wash your hands frequently with soap and water, rubbing your hands for at least 20 seconds, or use antiseptic solutions (30); (beware that if an infected individual has touched the tap that we have to turn to wash the hands, if we touch it again afterwards (i.e. after washing our own hands), we will get re-infected. Therefore, washing our hands where an infected individual has recently washed himself can actually facilitate infection, unless we take some precautions, such as drying our hands with small paper towels from the dispenser in the lavatories, and using them to turn off the tap and to touch the door handle when exiting, so as to avoid any contact with our just cleaned bare hands).*
- *Gargle with appropriate mouthwashes when you suspect having inhaled pathogenic viruses or you suspect that they have in contact with your mouth (31). Gargling is even more effective, if the mouthwashes are added with potent natural antiviral substances such as Ravintsara EO. Use a single droplet in your mouth, in order to get accustomed to its taste and slight irritant effect; afterwards you can squeeze two droplets in your mouth 3 times a day. If this is not an option, you can make do by simply adding a splash of water to the droplets and use this to gargle with. This precautionary measure is particularly important, since the virus initially settles in our throat and multiplies there during the first days, and only later, it invades the whole body.*
- *Avoid touching your eyes, nose or mouth with unwashed hands (naturally, if you have touched contaminated people or objects shortly beforehand).*
- *Protect your nose and mouth with a surgical mask or anything that can act as a physical barrier to the entry of the virus in your body. The mask should be used when you suspect having contracted the infection (so as not to contaminate others), when coming in contact with people suffering from, or suspected of, having respiratory problems, or when there is a real epidemic in your city or surroundings*
- *Protect your hands using disposable gloves.*
- *Clean all surfaces that may have been infected, by using chemical disinfectants capable of eliminating the Coronavirus SARS-CoV-2 (bleach-based products [sodium hypochlorite] or other chlorinated solutions, peracetic acid [even at low concentrations] or 75% ethanol).*
- *Limit as much as possible any factor that may unbalance your immune system (such as stress and consumption - voluntary or involuntary – of toxic substances) and reinforce immuno-boosting actions (such as maintaining a correct lifestyle and taking multi-vitamin and multi-mineral supplements at double dosage).*

#### d. What to do in case of infection

If in the past 15-20 days you have been in close contact with people who later fell ill with CoVID, or with people who are suspected of having been contaminated and expected to become ill in the near future, and if you start to experience mild flu-like respiratory symptoms, I would recommend the following additional measures to the ones aforementioned:

- *Stay at home and contact your GP (general practitioner), who will evaluate the clinical situation and therapeutic measures to be taken or dial the national medical emergency number (1500 or 112).*
- *Sneeze and cough into a disposable handkerchief or into your bent elbow (these measures prevent contamination of the environment and of your hands).*
- *·Restrain from touching your nose and mouth with your hands (so as not to contaminate yourself and facilitate the spread of the virus).*
- *Wear a surgical mask and throw used paper handkerchiefs into a dustbin and close it immediately afterwards.*
- *Sanitize your surgical mask with some drops of the essential oil mixture (see preceding chapter) several times a day.*
- *Take elevated dosages of vitamin C (up to even 5-10 grams per day), vitamin D, glutathione, copper, zinc, in other words the supplements mentioned earlier on.*
- *Do not make use of antibiotics and only use antipyretic drugs in case of very uncomfortable fever. It is common knowledge that very high temperature is the result of an activated immune system, and that it blocks viral replication and facilitates its elimination.*
- *If the symptoms are limited and you have no sign of respiratory problems, DO NOT go to Emergency services of the hospital, keep your General Practitioner (GP) informed instead.*
- *People living alone, beside their GP, should inform at least also a family member or a friend, and keep them updated on their health state.*
- *·Rest and try to sleep a lot.*

#### e. ·Avoiding irrational and pointless behaviour

To complete the section on prevention, a brief mention of irrational actions that should be avoided out not supported:

- *There is no point in avoiding people from China who have been living in Italy for years and their children who attend our schools (contagion is possible only through people who have visited the areas affected by the infection in the past 15-20 days, or who have been in contact with sick people or potential healthy carriers. At any rate, now that the infection has reached epidemic proportions, any distinction between Italian and non-Italian subjects is pointless, since anybody may be infected).*
- *There is no point in avoiding purchases of or disinfecting objects made in China, because they cannot be vectors of infection (infection is possible only through direct human contact - between sick and healthy subjects - and the virus only survives a few hours outside of the human body).*
- *There is no point in avoiding contact with pets, because they do not appear to spread the virus.*

- *Do not take antiviral drugs or antibiotics:* antivirals do not prevent Coronavirus SARS-CoV-2 infections and antibiotics are of no use against viruses, they only work on bacteria.

## 8. Fever management in viral infections

There is no specific treatment for infections caused by the Coronavirus SARS-CoV-2, nor are any vaccines currently available to protect us against it. Hospitals are trying out several drugs, that might be effective to some extent (these are trials solely based on hypothetical assumptions). Some labs are working on developing a vaccine. Should these efforts result in a new vaccine, any such a product would only still be in its experimental phase. I would therefore urge people to be careful when considering their use, because at this stage the risks could outweigh the benefits.

It is worth bearing in mind that the vast majority of people, infected with Coronavirus SARS-CoV-2, spontaneously recover in a period of approximately 15 days.

On this note, I would like to make a brief digression to discuss the question of **fever** in more detail.

Whenever a flu syndrome appears, in the broadest sense of the term, it seems that today the most widespread and pressing concern is lowering body temperature.

*This is a serious mistake, liable not only to prolong the duration of illness, but also, in some cases, to increase the risk of complications and even death.* In fact, a Canadian study from 2014 suggests that in the United States, the suppression of fever increases by 5% (95% CI: 0, 2-12.1%) the expected number of flu infections and flu-related mortality in the case of seasonal flu (32).

We should not overlook the capital role played by fever in our defence mechanism:

- *It kills germs* (all viruses and bacteria are temperature-sensitive, and an increase in temperature from 37° C to 38° C can reduce viral multiplication by more than 90%, whereas temperature 39° C blocks the growth of any virus altogether);
- *It stimulates the body's immune response*, mobilizing the defence mechanisms that can contain, fight and kill any pathogen.

As Doc. Donzelli MD also points out in his article (33), **the use of antipyretics** (i.e. paracetamol) **or any non-steroidal anti-inflammatory drug** (NSAID) **facilitates the transmission of common germ infections**. This is because it blocks the rise in temperature and, with it, all the benefits of activated inflammatory mechanisms at the site of infection, which enable the body to either block or kill germs (34).

Therefore, it is not desirable to lower body temperature too early. In fact, if there are no particular contraindications and if the individual can sustain it adequately, we should allow the fever to follow its course and drop spontaneously, signalling that the organism is immunologically stronger and winning its battle against the spread of the germs.

If necessary, one can always intervene pharmacologically with an antipyretic, if after 1-3 days of fever, the organism shows signs that it cannot sustain fever any more or if the subject suffers from some pre-existing pathology (naturally, all these options should be discussed with and agreed by your General Practitioner).

Allow me again to underscore that, as is the case with any viral infection, **antibiotics are not useful**. They can be prescribed in the event of bacterial superinfection, e.g. in the case of a non-viral bronchitic or pulmonary complication.

In the initial period of illness, many natural products can be used and in particular homeopathic treatments. These contribute not only to reinforce our immune defences, but also to reduce the risk of complications, to shorten the duration of disease and to avoid relapses (35). The guidance of a homeopathic practitioner is required, because this kind of therapy must always be tailored to the requirements and condition of the patient. Standard treatments should only be applied when personalised therapy is not available.

The following general measures are also of great use against viral infections:

- *Bedrest*
- *A little fasting on the first day by replacing solid food with an abundant amount of fluids, sweetened with honey*
- *Revising our daily plans in order to improve our lifestyle.*

If this was the required response to our viral infection, and if the course of the infection was not severe and ended without complications, then we could truly say that "*not all evil comes to harm*", since in the end the virosis would result in an improvement of our initial health condition.

## 9. Conclusions

In light of the current situation, I would advise everyone to abstain from circulating news that spread fear, and encourage the *dissemination of constructive information instead, which contribute to limit the spread of the virus and help people to increase their immune defences.*

The message should be that the best type of prevention - as I have always stressed and repeated - is the one that is tailored-made and implemented well in advance of the emergency, **when you are well!**

**True prevention of viral infections, or rather of any disease, starts at the time of your conception until your last breath.** True prevention can take the shape of as a large-scale standardised treatment, since blanket therapies imposed on everyone always yield three outcomes: some people will benefit from them, some people will be harmed, and others will not respond to the standardised treatment.

The Ministry of Health (36) and the National Health Institute (Istituto Superiore della Sanità) (37) are providing adequate information on the Coronavirus SARS-CoV-2 on their websites.

**They should urge the public at large to consult their website, and more importantly, they should urge the population to adopt an appropriate lifestyle.**

Our organism obeys a very important physiological law that I like to call: "**The whole supports the part**" (38). When nourished adequately and respected through the adoption of good lifestyle measures, our body, when it is well in its whole, protects all the parts that of which it is built. It does not fear the Coronavirus SARS-CoV-2 or any other pathogenic conditions ... but **are we nourishing our body and respecting it in an adequate way from a psychosomatic perspective?**

*Thus, let us start and take immediately some steps to adopt the right approach in our life, and to acknowledge that each, and every one of us, can always do something to improve their situation.*

In fact:

**Knowledge and awareness involve a Personal growth and, always, the path to true health can only start only there.**

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