

While the outbreak has entered a new phase, Europe must prepare to prevent a replay of the Chinese drama

Dear Reader:

Following requests from colleagues and concerned people in many parts of the world, I will provide regular assessments of the coronavirus outbreak and recommendations for personal protection on this web page.

In parallel, I have set up a Twitter account and a Facebook profile, which you are kindly invited to follow.

Due to the urgency of the issue, we wanted to get this up and running quickly. Please apologize improvisations and imperfections, which will be mended during operation.

The Personal Alert Level

We propose a simple Personal Alert Level (PAL) scheme indicating the recommended personal preventive actions:

“Green”	No threat, no action needed
“Yellow”	No immediate threat, but preemptive measures recommended
“Orange”	A threat that requires personal protective measures
“Red”	A serious threat demanding changes of behavior

Personal Alert Level for Europe: Yellow

These levels of personal alertness are therefore not identical to the WHO pandemic

stages or other schemes from public health authorities, which aim to coordinate the activities of governments and other official bodies. When you are in a hurry or not interested in details, you may just watch the PAL indicated on the top of my web page. In case the level is increased or lowered, I will inform you by Twitter and email (see contact form in the side bar).

In a nutshell

We increased the Personal Alert Level (PAL) from “Green” to “Yellow” for Europe. The coronavirus outbreak poses no immediate threat here, but some preemptive measures are now recommended:

1. Any individual suffering from severe flu-like symptoms including

- heavy chills and bone pain and/or
- fever > 38.5 °C (rectal temperature) and/or
- serious cough
- and no or very little rhinitis (runny nose),

should seek medical care and follow the Enhanced Protection Protocol (EPP) outlined below until the diagnosis has been established.

2. All individuals arriving from China should follow EPP for 14 days.

- If you arrived from China within the last 14 days and notice any flu-like symptoms, immediately call a doctor over the telephone and ask for advice.

3. Avoid close contact with people who were in the People’s Republic of China in the last 14 days.

4. If you must travel to Asia within the next 12 months, consider buying respirators and hand sanitizer now.

Presently safe situations and not recommended practices:

- No need to avoid crowded places like public transport, mass events etc.
 - Wearing of surgical facemasks in public has no proven benefit and promulgates fear.
 - No special protection is necessary for travels to destinations other than China.
 - Your children are safe at school and in daycare facilities.
 - Contact with Chinese (and other Asian) people, including children, who have not been exposed is not hazardous at all. Help to prevent ungrounded fears and social exclusion.
-

Enhanced Protection Protocol (EPP)

“Wash your hands frequently” is probably the most-cited advice from public health authorities. This is not detailed enough to counter the threat of a potentially fatal infection. Based on the experience with infectious agents in hospitals, laboratories and in outbreak situations, we suggest the following “Enhanced Protection Protocol” (EPP). The EPP has been designed in two versions, (i) for protection of the environment from potentially infected individuals and (ii) for self-protection. As self-protection is not recommended at the Yellow Personal Alert Level, only the EPP for potentially infected individuals is described here.

EPP for potentially infected individuals

- Try to stay at home as much as possible.
- Avoid proximity to other people (< 2 m) as consequent as possible. Do not touch anybody who did not consent taking the risk of a possible infection.
- If you live with other people who do not follow EPP, consider staying in a separate room. Disinfect* or clean shared hygiene items such as tubs, sinks and toilet seats after every use.
- Avoid unnecessary travel. Do not use public transportation. Consider taking a taxi instead.
- Do not visit schools, daycare facilities, hospitals and doctor’s offices (if you are not the patient) or other places where you might infect particularly vulnerable

people. Do not meet with chronically diseased people (e.g., with cancer or asthma), children or pregnant women.

- Avoid cinemas, theaters and crowds.
- If possible avoid shopping, going to the hairdresser, massage, gym, sauna, public swimming pools or other places where you are in direct contact with people or objects that are touched by many people.
- Wear a respirator whenever you must be in the proximity (less than 2 m) of other people. Strictly follow the handling rules of the respirator*.
- Wash your hands* with soap in the following situations:
 - After coughing, sneezing or blowing your nose
 - After eating
 - After going to the toilet
 - After touching your face, ear, hair or genitals
 - Before and after putting on your respirator
 - Before touching objects likely touched by other people in the next 7 days.
- Always have a suitable disinfectant* at hand in case no lavatory is available. Keep a record of people you get in close contact to (to facilitate contact tracing in case you develop symptoms of nCoV infection).

* Procedures and technical details will be published on this website shortly. Hand washing instructions are available at <https://www.cdc.gov/handwashing/when-how-handwashing.html>

Definitions used here

nCoV

The novel coronavirus causing the present outbreak in China has been officially designated “2019-nCoV” (the earlier habit to name a new bug by the suspected origin of the epidemic, such as “Spanish flu”, has been abandoned to avoid stigmatization). We will refer her to the “new coronavirus” or “nCoV”.

Case

A “case” is a person who has been infected with nCoV. Cases can be asymptomatic, light, severe or fatal. “Confirmed cases” is the fraction of the (true) number of cases that has been diagnosed by a laboratory test. China reports only those laboratory-confirmed cases to WHO.

NB: WHO issued a more complicated case definition, which includes neither asymptomatic infections nor sick patients, as long as they do not require hospital admission or had contact to confirmed or probable cases.

Facemask

A facemask or “surgical mask” (Spanish: Mascarilla quirúrgica, French: Masque chirurgical, German: OP-Maske) is intended to catch bacteria and viruses shed from the wearer’s mouth and nose. There is no unified international quality standard. Especially in Asia, very poor quality masks are sold. This is the kind of mask almost everybody wears now in China.

Respirator

A respirator or “filtering half mask” (Spanish: Mascarilla sanitaria, French: Masque respiratoire German: Atemschutz-Halbmaske) is designed to protect the wearer from hazardous atmospheres, including bacteria and viruses. The technical specifications are regulated in many countries. In the EU, they are classified according to EN 149:2001+A1:2009 in three protection levels (FFP1, FFP2, FFP3). Outside EU, the US classification NIOSH N95 is commonly used. N95 means that at least 95% of particles (under certain test conditions) are withheld, which is equivalent to FFP2. FFP3 filtration efficiency is at least 98%.

Europe

Geographical Europe, excluding Russia, Belarus and Ukraine.

Risk Assessment

People's Republic of China

- As of February 9, WHO reported 37,251 confirmed cases and 812 deaths.
- Reported cases are doubling every four days at present. About 20 percent of cases are reportedly "severe". Total number of reported deaths has been constantly around 2 percent of infections.
- 70 percent of the cases are reported from Wuhan and the surrounding Hubei province. The reported death rate in Hubei is around 4 percent, twice the nationwide average.
- China has implemented a number of - in some cases draconian - measures in an attempt to contain the outbreak. Border exit controls, which are claimed to be in place by Chinese health authorities, are considered as ineffective.

The reported numbers allow only a rough estimate of the real speed of spread of the disease and capture only a fraction of severe cases and the death rate (case fatality rate), for the following reasons:

- China is an authoritarian state. Officials are accountable to the party first and foremost. Chinese officials have repeatedly provided false numbers to the public and withheld crucial information about the scope of the epidemic.
- Mild and asymptomatic cases are underreported, especially from Hubei province, where every suspected case is imprisoned in isolation wards. This is the most likely explanation for the higher percentage of reported deaths here.
- Diagnostic reagents have run out or were never available in several regions. As China reports only laboratory-confirmed cases, the real number must be higher. This lowers China's chances to contain the outbreak. On the other hand, this means that the case fatality rate and the fraction of severe cases must be below 2 and 20 percent, respectively, because deaths and severe cases are more likely attributed to coronavirus than light or asymptomatic ones.

For the purpose of this risk assessment, we estimate that in China

- the true total case number lies around 100,000,
- 15 percent of cases are severe,
- 5 percent of cases require intensive care and

- the case fatality rate is around 1 percent.

The official Chinese announcements that the outbreak will be contained very soon are not reliable. Our best estimate is that the maximum of the epidemic will be reached not earlier than 4 weeks from now and that the outbreak will go on for at least 6 more months.

Friday's announcement that Chinese economy will recover soon is also wishful thinking. We expect a long-lasting depression with serious impacts on worldwide economy.

World

- As of February 9, WHO reported 307 confirmed cases and one death in 24 countries outside of China.
- Several countries have implemented travel restrictions and/or entry controls (temperature screening, interviews, individual hygiene recommendations) for travelers from China.
- Germany was the first country reporting a local (autochthonous) transmission chain outside China. By now, several countries have reported local transmissions. In all reported cases, these small "outbreaks" were contained by rapid diagnosis, isolation of infected individuals, tracing and quarantine of recent contacts.
- These countermeasures are not available or expected to be less effective in low-income countries. China has intense business and trade traffic to those countries, particularly in Southeast Asia and Africa. WHO has delayed support measures for low income countries by procrastinating the declaration of the Public Health Emergency of International Concern.

For the purpose of this risk assessment, we assume that the epidemic has already started in densely populated areas in less developed countries. The long-term global outcome of the epidemic will particularly depend on the spread and impact of nCoV in the less developed world. The following factors have been considered in this analysis:

- Transcontinental traffic from less developed countries is less intense than from China.
- The spread of respiratory infections (including other coronaviruses that are causing a common cold) is usually lower under tropical and hot climate

conditions. Coronaviruses seem to thrive in cold, dry air.

- Viruses tend to gain a survival advantage by losing some of their pathogenicity when they adapt to a new host. If the nCoV epidemic persists for several months to years, it can be expected that the fraction of severe cases and the case fatality rate will fall.
- Available antivirals have not been tested against coronaviruses at large scale because the common cold heals up without specific therapy. It is well possible that an already available antiviral can improve the outcome of nCoV infection.
- The SARS epidemic of 2003 vanished after about 6 months and other outbreaks with dangerous coronaviruses (such as MERS-CoV) were quickly contained. Therefore, there was little motivation for the industry to develop antivirals and vaccines against coronaviruses. This may change now.

We expect a possible secondary spread into the industrialized world to be delayed and at a comparatively low rate. In a best case scenario, it can be anticipated that nCoV will have no significant impact on public health in countries with advanced medical infrastructure and border entry controls in place (such as the USA). In a medium case scenario nCoV will spread globally but at much lower speed than what we have seen in China. In this case, it will probably diminish its pathogenicity and treatment options will become available in time. With entry controls and effective hinterland surveillance in place, industrialized countries will not experience a replay of the Chinese drama.

Europe

- As of February 9, eight European countries have reported a total of 35 confirmed cases to WHO.
- Several European countries have implemented entry controls for flights from China. There is no common EU strategy so far.
- The largest outbreak until now took place in Bavaria (Germany), when a businesswoman (the index patient) traveling from China infected several employees of her company. According to a paper published in *The New England Journal of Medicine* on January 30, the index patient did not show any symptoms by that time. However, this alarming statement turned out to be false. The index patient had typical symptoms of a beginning nCoV infection and took already paracetamol at the time. Reportedly, she did not wear a respirator or face mask and shook hands with her colleagues as usual. Germany has not implemented entry controls for passengers arriving from China.

- For Germany, the laboratory capacities including the available diagnostic tests to detect nCoV infections, the wards to isolate patients and the preparedness and capacity to trace and quarantine contacts are considered sufficient. The preparation for pandemic influenza has been advanced in most regions and can be used as a blueprint to counter smaller outbreaks of nCoV resulting from imported cases.
 - The protection against nCoV import into Germany is considered insufficient. This is also true for the EU unless a coordinated entry screening is in place. Following public criticism, the German Minister of Health announced on February 4 that he will “think about” entry controls.
 - In the French mountain village Les Contamines-Montjoie (Haute-Savoie), four adults and a nine-year-old boy from Britain were tested positive for nCoV yesterday. Reportedly, they acquired the infection from a man who came from Singapore. After travelling on to Britain, he was tested positive for nCoV; this triggered the investigation in France. The boy lives with his family in the village and went to school there. Contact tracing has been initiated.
-

Rationale for the recommendations

This is our most likely short-term scenario (4 weeks) for Europe:

- More cases from China will be imported, particularly to countries without entry controls.
- Some imported infections will lead to local transmission chains. States with a well-prepared system for surveillance and contact tracing and a good medical infrastructure (including suitable isolation wards) will have a good chance to interrupt transmission early. As a consequence, nCoV will not cause an uncontrollable, widespread outbreak there.
- To interrupt transmission chains at the beginning, detection of hinterland cases is crucial. It must be pointed out that the locally transmitted (non-imported) infections detected in Europe so far (in Bavaria and Haute-Savoie) were only recognized after the index cases, who both had a travel history to Asia, had been tested positive for nCoV. Without this information, health officials would never have identified these nCoV infections.

- During the present flu and common cold season and with insufficient entry controls, chances are high that imported nCoV cases will be misinterpreted. As stated above, present data indicate that the vast majority of nCoV infections is mild or even asymptomatic. This makes the detection even more difficult.

We increased the Personal Alert Level (PAL) from “Green” to “Yellow” for Europe because the present situation requires some preemptive measures:

- Travelers from China have a relatively high risk of being infected with nCoV. As an example, two of the 128 persons evacuated by the German Government from Wuhan on February 1st tested positive for nCoV. Both cases reportedly appeared to be healthy and developed only mild symptoms later on. Assuming that the risk to acquire nCoV in Wuhan is roughly 10 times higher than in other Chinese cities, about one of 500 asymptomatic passengers would be carrying the virus. – FYI: Air China serves Frankfurt and Dusseldorf daily from Beijing and Shanghai with Boeing 777-300 (500 pax) and Airbus 350-900 (325 pax). In addition, there are several other services between China and Europe.
- Entry controls for passengers from China are not implemented in Germany and some other European countries. Where in place, these controls will most likely not detect more than 50 percent of the imported cases. Therefore, the population should be vigilant about unusual cases of seemingly “common” respiratory infections.
- This appeal for vigilance is restricted to severe cases with flu-like symptoms because otherwise it would result in too many false alarms. This leaves potential mild cases of nCoV infection unnoticed. However, even if only 1-2 out of 20 cases result in severe symptoms, no infections chain will remain undetected. If the community is alerted and helps to detect possible nCoV infections, the risk for the population can be reduced to almost nil.
- The Enhanced Protection Protocol (EPP) developed here fills the gap between every-day hygiene recommendations for the entire population (“wash your hands regularly” etc.) and the official isolation procedures for suspected cases. As an example, the infections in Bavaria could have been prevented if the Chinese businesswoman had followed EPP.
- Despite the fact that the infection risk for the European populations is extremely low at present, many people feel alarmed and insecure. As a consequence, surgical face masks and respirators are in short supply in many places. If you plan to travel to Asia within the next year, we recommend to buy respirators and

hand sanitizer already now. And yes, there is a high chance that you will never need it. Let us prepare for the worst and hope for the best.