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How Should We Handle the Influenza Epidemic During the Coronavirus Pandemic?

Series | COVID-19 & response strategy

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[This is the twenty-first document in a series of discussion notes addressing fundamental questions about the COVID-19 crisis and response strategies. These documents are based on the best scientific information available and may be updated as new information comes to light.]

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Photo: Engin Akyurt / Unsplash

Winter is coming, and with it—like every year—the cold and the flu. Influenza causes **three to five million infections** and between 290,000 and 650,000 deaths annually. Most cases are mild, resolving within a few days with symptomatic treatment. The **most common symptoms** are fever, cough, headache, muscle aches and fatigue. However, the flu can cause serious illness and even death, especially in people who have risk factors that can lead to complications. The mortality rate for seasonal influenza is about 0.1% (**one death for every 1,000 cases of the flu**).

Influenza is **quite contagious**. An infected person can spread the virus from one to two days before symptom onset until symptoms disappear. Transmission occurs through respiratory secretions—mainly by **direct contact with respiratory droplets** larger than five microns in diameter, which can travel up to two metres through the air—and by **contact with surfaces** or objects contaminated by said droplets. After touching a contaminated surface, hands can carry the virus to mucous membranes and cause infection. **Children** often have milder symptoms but are **major spreaders of the disease**.

There are **four known types of influenza virus**: A, B, C and D. Type A and B viruses are responsible for the annual epidemics of seasonal flu. Various types and subtypes of the virus circulate throughout the year, especially during the winter months, in both the northern and southern hemispheres. The influenza virus has a **high capacity for mutation**. The strains of the various influenza viruses circulating during a particular season may be slightly different—or even com-

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pletely different—from those present in past seasons. This variability can influence the effectiveness of the flu vaccine in a given year[1].

Vaccines against influenza have been available for more than 50 years. **Flu vaccines are safe**. Their estimated effectiveness ranges from 25% to 60%[2] and depends largely on the type (or types) of strains circulating during any particular epidemic period.

1. When the Flu Meets COVID-19

"A major or even moderate flu epidemic could overwhelm a system that is already stretched to the limit, while also increasing overall morbidity and mortality."

In Spain, seasonal flu epidemics typically begin in November and last through February or even March of the following year. This year, the circumstances under which we will be facing the flu virus will be completely different from other years. We are in the midst of a **second wave of COVID-19**. The health care system is under great strain and health professionals are exhausted. A major or even moderate flu epidemic could overwhelm a system that is already stretched to the limit, while also increasing overall morbidity and mortality.

COVID-19, a disease unknown until 10 months ago, has caused **over 34 million infections** and **over one million deaths** in this short period of time. The culprit—the SARS-CoV-2 coronavirus—belongs to the **family of coronaviruses that cause the common cold**, which have been circulating in the human population for some time. Some other coronaviruses, including SARS-CoV-1 and MERS, are less transmissible but capable of causing more serious clinical manifestations. It is precisely because of its genetic similarity to SARS-CoV-1 that the novel coronavirus has been named SARS-CoV-2.

The disease it causes, COVID-19, presents a **clinical picture very similar to that of influenza**: fever, cough, general malaise and muscle aches, plus some more unusual symptoms (e.g. sudden loss of smell or taste). Symptoms are generally mild, although 15% of patients may experience complications requiring hospital admission and 5% may have more serious complications requiring admission to an intensive care unit. The **mortality rate of COVID-19** is about 1%, or **ten times that of the flu**.

No specific drugs against SARS-CoV-2 have been developed, but various **combinations of drugs** are being used to improve symptoms and, in severe cases, to shorten the length of hospital stays and reduce mortality.

At present, there is no **vaccine** against SARS-CoV-2, although a vast amount of effort and resources have been invested in finding one. Within one or two years, one or more vaccines will likely be available to vaccinate at least the most vulnerable populations.

Some theories suggest that the **simultaneous circulation of two respiratory viruses** could lead to the displacement of one of them. Therefore, it could be that the stronger virus will prevail—in other words, SARS-CoV-2 could displace the influenza virus. However, this **speculation** may not bear out in practice. For example, during the 2009 influenza pandemic, two flu viruses—H1N1 and H3N2—circulated simultaneously.

The **outlook** for this year is **uncertain**: faced with two viral infections that target

[1] When the viruses included in a vaccine are similar to the viruses in circulation, the vaccine is said to be *well matched*.

[2] CDC seasonal flu vaccine effectiveness studies. Centers for Disease Control and Prevention (CDC). Accessed 30 September 2020.

the same organs (lungs and respiratory tract), have the same risk factors in terms of severity and complications, and share the same transmission route, what can we expect this coming winter?

2. Can We Predict What Will Happen This Winter?

"We do not know what will happen. Therefore, we must not let down our guard: it is essential to maintain epidemiological surveillance of both viruses—as well as other viruses that are common in winter, such as RSV—while also implementing prevention and control measures."

We cannot predict the future, let alone what will happen when the two viruses meet. We can theorise and try to extrapolate from what happened during the **southern hemisphere** winter, but we cannot guarantee that the same situation will repeat itself in the **northern hemisphere**.

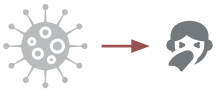
In the southern hemisphere, the flu season never arrived: there has been practically no circulation of the influenza virus. It is true that many countries in the southern hemisphere are suffering intensely from the first wave of COVID-19, which has prompted the adoption of individual protection measures and social distancing—various degrees of lockdown and school closures, for example. These measures can help to significantly reduce the circulation of the flu virus. Although the situation in the northern hemisphere may be different for some of these variables—no lockdowns, open schools—**the pattern could repeat itself and the 2020-2021 season could pass without an influenza epidemic**.

But we cannot let down our guard. We must **be prepared for the worst** and we do not have much room for manoeuvre.

On the clinical front, we will face a significant practical problem: **influenza and COVID-19 can be very similar**. In addition to assessing "prior probability"—i.e. which virus is circulating more widely and with what intensity in a given population at a particular time—we will also need to use **diagnostic tests** to **distinguish between similar clinical presentations**. These tests should be combined so that, **with a single sample, doctors are able to quickly and reliably determine** whether a patient has COVID-19, the flu, respiratory syncytial virus (RSV) or none of the above. Such a test result would inform changes in treatment, decisions regarding the need for hospitalisation, recommendations regarding isolation and the duration thereof, and whether or not to initiate contact tracing.

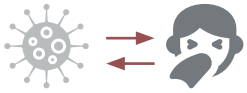
What we can do is analyse **various possible scenarios** *(see Figure 1)*

Figure 1. Possible Scenarios for the Winter of 2020 in the Northern Hemisphere.



1. SARS-CoV-2 could displace the influenza virus, causing the latter not to circulate.

2. Both viruses could circulate simultaneously, but with no interaction between them beyond a possible increase in the absolute number of cases of respiratory infection.



3. The two viruses could interact and this interaction could lead to increased morbidity and mortality, in addition to an increase in the absolute number of cases.

4. The influenza virus could undergo a major change (as yet not detected in the southern hemisphere) that causes the flu vaccine to be less effective, therefore leading to more influenza in addition to a large number of COVID-19 cases.

5. Individual prevention measures against COVID-19 —physical distancing, hand washing, masks—could **significantly limit the circulation of one or both of the viruses**, even in the absence of more drastic measures such as lockdown.

However, this is only speculation. The only thing we know for sure is that we do not know what will happen. Therefore, we must not let down our guard: it is essential to maintain **epidemiological surveillance of both viruses**—as well as other viruses that are common in winter, such as RSV, in both children and adults—while also implementing prevention and control measures, which are generally the same for all viruses.

We must prevent the simultaneous circulation of the two viruses from triggering the "**perfect storm**", to borrow the term used by the journal Science in an editorial published just as confinement measures were being loosened[3] ●

[3] Belongia EA, Osterholm MT. COVID-19 and flu, a perfect storm. *Science*. 12 June 2020. 361 (6496): 1163.

3. Is Co-infection Possible and What Consequences Would It Have?

"Data are lacking and more research is needed, but all indications suggest that influenza and COVID-19 co-infection could occasionally occur and lead to more complications in at-risk patients."

Co-infection of SARS-CoV-2 and influenza is possible, as with other viruses.

According to recently published data, co-infections **appear to be rare**. A study conducted in New York City during the first wave of the pandemic found co-infections in 3% of patients[4].

An analysis[5] by Public Health England (PHE) of COVID-19 cases in the United Kingdom between January and April 2020 found that the number of co-infected people was very low but the **risk of death** in co-infected patients was twice as high as in patients infected only with SARS-CoV-2 and six times as high as in patients with only the flu[6].

Data are lacking and more research is needed, but all indications suggest that influenza and COVID-19 co-infection could occasionally occur and lead to more complications in at-risk patients

4. Do We Have the Means to Stop the Spread of These Two Viruses?

"A massive influenza vaccination campaign will be crucial this year to protect at-risk patients and professionals who work with vulnerable populations."

Fortunately, yes. Both diseases are transmitted in the same way. We know that the proper use of **face masks**, **physical distancing**, proper and frequent **hand hygiene** and **good ventilation** are effective ways to reduce infections and slow or stop the circulation of both viruses[7]. In addition, we have a vaccine to prevent the flu

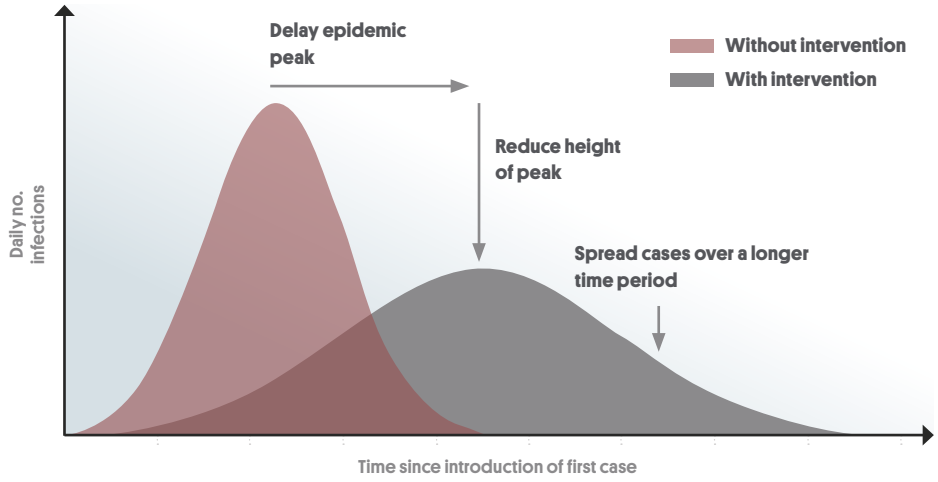
[4] Nowalk MD, Sordillo EM, Gitman MR, Paniz Mondolfi AE. Co-infection in SARS-CoV-2 infected patients: where are influenza virus and rhinovirus/enterovirus? *Journal of Medical Virology*. 30 April 2020.

[5] Unpublished data available at medRxiv.

[6] Lacobucci G. Covid-19: risk of death more than doubled in people who also had flu, English data show. *BMJ*. 2020:370:m3720.

[7] Fong MW, Gao H, Wong JY, et al. Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings—Social Distancing Measures. *Emerging Infectious Diseases*. 2020; 26(5): 976-984.

Figure 2. Impact of Social Distancing Measures in an Influenza Pandemic.



Source: Fong MW, Gao H, Wong JY, et al. Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings—Social Distancing Measures. *Emerging Infectious Diseases*. 2020;26(5):976-984.

A **massive influenza vaccination** campaign will be crucial this year. It is essential to protect **patients with risk factors** (e.g. age over 60-65 years, underlying conditions and pregnancy). Avoiding the risk of influenza infection or even co-infection is essential in at-risk patients, who are offered the flu vaccine every year. In Spain, flu vaccination rates in this population group are just over 50%. The World Health Organisation (WHO) has set a vaccination coverage target of 75%. There is much room for improvement and now is the time to achieve it.

Vaccination of all **professionals working with vulnerable populations**, such as health care workers, is also essential. In Spain, vaccination coverage for this population group is very low: barely 30%. The WHO target is the same: 75%. No further comment is necessary. Finally, it would be strategically advisable to vaccinate all groups at greatest risk of coming into contact with the virus—e.g. **teachers**—and even to offer vaccination to **children** without risk factors, as is already done in the United States and the United Kingdom. But time is short, since the vaccination campaign will begin in **mid-October**.

In short, masks, hand hygiene, physical distancing and the flu vaccine are the best steps we can take to help keep this pandemic and the possible flu epidemic under control.

Other similarly important collective prevention and control measures require action on the part of the health and political authorities •

Box 1. Can the Flu Vaccine Aggravate cases of COVID-19 or Increase the Risk of COVID-19?

Based on what we know today, probably not.

A study[8] accepted for publication evaluated the **safety of the flu vaccine** during the first wave of COVID-19. The findings show that flu vaccination does not increase the risk of contracting COVID-19 or lead to more serious illness in the event of infection, nor does it increase the risk of complications or death.

5. Conclusions

"The immediate future is uncertain but masks, physical distancing and hand hygiene—plus influenza vaccination—must be our mantra in the coming months."

1. The immediate future is uncertain. **We do not know** how SARS-CoV-2 will behave during flu season or how the influenza virus will behave in the age of COVID-19.

2. The measures we have been applying to prevent COVID-19 are also effective at preventing influenza. **Masks, physical distancing** and **hand hygiene** must be our mantra in the coming months.

3. **Co-infection** with both viruses is unlikely but possible and can increase the risk of complications and death.

4. To prevent the flu, prevent co-infection and ease the strain on the health system, it is very important to **get vaccinated**. This is particularly important for people with risk factors—e.g. age over 60-65 years, underlying conditions and pregnancy, among others—as well as other essential groups that can transmit influenza, such as health care workers and teachers.

5. The flu vaccine **does not increase the risk of infection**, complications or death from COVID-19

[8] Zein GJ, Whelan G, Serpil CE. Safety of influença vaccine during COVID-19. *Journal of Clinical Translational Science*. September 2020.

TO LEARN MORE

Information from the World Health Organisation (WHO)

• About the coronavirus: https://www.who.int/es/emergencies/diseases/novel-coronavirus-2019

• About influenza: https://www.who.int/influenza/en/

Information from the Centers for Disease Control and Prevention (CDC)

• About the coronavirus: https://www.cdc.gov/coronavirus/2019-ncov/index.html

• About influenza: https://www.cdc.gov/flu/season/

Information from the National Health Service (NHS) of the United Kingdom

• About the influenza vaccine: https://www.nhs.uk/conditions/vaccinations/flu-influenza-vaccine/

Information about vaccines against COVID-19

• Draft landscape of COVID-19 candidate vaccines. World Health Organisation (WHO). 2 October 2020.

• Corum J, Wee S and Zimmer C. Coronavirus Vaccine Tracker. *New York Times*. Updated 3 October 2020.

• Kormann C. What Will Cold-and-Flu Season Mean for the Coronavirus Pandemic? *The New Yorker*. 1 October 2020.

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