

Covid assessment: Five good reasons to stay confident

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The upsurge in COVID-19 cases observed in Quebec at the end of the year shows that the coronavirus is as stubborn as one might think and that the final chapter of the pandemic has yet to be written. Despite everything, scientific and epidemiological progress is evident, and several factors allow us to envision a much brighter future.

1. A THIRD DOSE OF EFFECTIVE VACCINE

Data acquired over the past few weeks clearly show that a booster dose restores most of the protection against the virus, including against the Omicron variant, protection that is particularly important for people who are at greater risk of complications of the disease.

Even if variants of the coronavirus such as Omicron are more transmissible and partly escape immunity, their *modus operandi* has not changed for all that: severe complications and deaths caused by these viruses mainly affect part of people who have deficient immunity, that is to say the elderly and especially those who are already affected by a chronic condition (overweight, diabetes, cancer, cardiovascular disease). Protecting this more vulnerable population with a third dose should therefore be the top priority.

It should also be remembered that vaccination protects remarkably well against hospitalizations and deaths and that, at present, the major fraction of patients affected by severe forms of COVID-19 are unvaccinated. The risk of hospitalization and admission to intensive care is 10-20 times greater for unvaccinated than for vaccinated.

2. CELLULAR IMMUNITY WILL ENABLE US TO AVOID THE WORST COMPLICATIONS

The Omicron variant largely escapes the so-called humoral immunity, that mediated by the antibodies generated by the vaccination, which allows the virus to infect people who have been vaccinated twice, without making them very sick. However, the mutations accumulated by the variant do not allow it to escape another very important part of the immune response, namely cellular immunity mediated by helper and cytotoxic (killer) T lymphocytes. This form of immunity destroys cells infected with the virus, preventing it from spreading inside the body. The net result is that, in most cases, the infection is maintained in a mild state, without disease progression to severe stages requiring hospitalization. It has also been observed in several regions of the world that the risk of hospitalization associated with infection with the Omicron variant is approximately 50% lower than that observed for the previous variants and there is no doubt that the cellular immunity contributes to this decrease in virulence.

In sum, thanks to cellular immunity, COVID-19 has become a much less fatal disease than last year, even as this virus continues to put enormous pressure on the healthcare system. It must be appreciated, however, that we will certainly avoid the worst, as the very high number of people



infected with the virus in recent weeks (and which is certainly much higher than that of official statistics) could have caused a real nightmare. If we had not acquired the means to adequately defend ourselves against the virus by vaccination.

3. TOWARDS A VIRUS WHICH WILL CAUSE LESS DAMAGE?

Even though the Omicron variant is extremely contagious, very recent data from several research laboratories indicate that it is much less effective than the Delta variant in infecting lung cells and is therefore inherently less virulent. In practice, this means that the high transmission of Omicron currently observed results in the replacement of a dangerous form of the virus (Delta variant) by a less virulent form (Omicron). Recent data also indicates that infection with Omicron protects against the Delta variant, which will accelerate the elimination of this more dangerous strain. Overall, if the current situation holds, it is likely that the virus is on its way to becoming endemic, meaning that it will continue to circulate in the population, but without causing much more damage than a bad cold (like most coronaviruses, by the way).

4. POWERFUL ANTIVIRALS AVAILABLE SOON

Extremely potent antiviral, a protease inhibitor specific to the coronavirus SARS-CoV-2, Paxlovid, shows remarkable clinical activity with a 90% decrease in hospitalizations caused by COVID-19 when given in the first five days of infection. A major advantage of this antiviral is that it is insensitive to virus mutations, and its mechanism of action is independent of immunity, which would allow it to retain its activity against other variants to come up. While vaccination remains the first line of defense for the entire population, we now have a second level of protection with these drugs, for the most severe cases.

5. NEW VACCINES IN DEVELOPMENT

The evolution of the virus towards forms more apt to escape the neutralizing antibodies generated by vaccines represents a setback, but certainly not the defeat of the vaccine strategy. On the one hand, as mentioned earlier, the booster dose largely counteracts this loss of effectiveness and provides excellent protection against the virus. On the other hand, mRNA technology is extremely versatile and can be quickly

adapted to produce a new vaccine specific to the Omicron variant. These vaccines are already in clinical studies and are estimated to be available as early as March 2022, if needed.

It should also be mentioned that considerable effort has been invested in the development of a universal vaccine against all sarbecoviruses (the coronavirus family which includes SARS-CoV-2). The main characteristic of these vaccines is that they are completely insensitive to the mutations that the coronavirus could accumulate and therefore effective against all current and future variants.

One of these vaccines is currently in clinical trials and if the results are conclusive, it could prove to be the ultimate weapon to end the pandemic.

The past two years have been difficult, but we are now at a completely different stage in this pandemic. It is not over, but we now have scientific and clinical knowledge, pharmacological tools and vaccine intervention infrastructure that allow us to look to the future with greater confidence.