

Statement of Scientific Facts

Why Covid Matters

Covid is a Severe Disease - Infection with this virus can have serious consequences including hospitalization, death, and disability from Long Covid. Even so-called “mild cases” where hospitalization is not needed can be very harmful. While this does not mean that Covid will affect every person to the same degree, the acute stage of infection can be severe in up to one in five people, including those who are young and previously healthy. Covid is more destructive than any other currently widespread infectious disease.

Covid is not just a respiratory disease - While the virus spreads through the respiratory route, it affects various organs and systems, including the heart, lungs, brain, intestines, kidneys, and other organs. It may cause long-lasting damage to these organs.

Children - Children are less likely to get severe symptoms when infected by covid and most other viruses. Children do develop severe disease and Long Covid, the long term developmental consequences of which are still unknown, and they can die. Children can also infect parents and other family members, who may die or become disabled, causing emotional and socioeconomic harms. While it is surely important for children to learn, and while there are clear benefits to in-person learning, the proven harms of Covid spreading in the classroom outweigh the benefits of in-person learning while the virus is spreading. In-person schooling should not be mandated while the virus continues to circulate in the community, parents should not be penalized for protecting their children by keeping them home, and virtual options should be enabled and supported, with special attention to disadvantaged communities.

Long Covid - The focus of most discussions is on the short term symptoms of Covid, however, long term consequences happen in 30-50% of cases,¹ which can lead to great suffering, disability and loss of income. This can happen to people of all ages, even when the initial infection is not severe, and it can occur for vaccinated individuals with breakthrough infections.

¹ <https://www.medrxiv.org/content/10.1101/2021.11.15.21266377v1>

While the virus initially invades the body through the respiratory route,² it can cause permanent damage not only to the lungs, but to other organs and systems, including the heart, intestines, and kidneys.³ Its effects on the brain⁴ and the nervous system can cause psychiatric illness, cognitive impairment (brain fog, IQ loss), dementia, neuropathic (nerve) pain, and a host of other disorders. Its effect on the vascular (blood vessel) system can cause blood clots leading to stroke and limb amputations, as well as erectile dysfunction.⁵ In addition to disease prevention and research on treatments, public health measures to support and protect Covid long-haulers are needed.

Endemic Covid – “Living with the virus” means allowing the uncontrolled spread of Covid, which has devastating consequences. Infected people may die or become disabled, and they can spread it to others before they realize they are contagious. Progressive damage from multiple infections can occur over time. We do not presently have widely available treatments that reduce these harms to acceptable levels. Endemic Covid would overwhelm healthcare systems and cause widespread, preventable suffering.

The continuation of the perpetual uncontrolled spread of SARS-CoV-2 has devastating consequences. Someone who gets the virus may not only die or be hospitalized, but can get Long Covid, which is not benign, and spread this virus to others. Progressive damage through multiple infections has been shown to occur over time. We do not have treatments presently that reduce these harms to acceptable levels. On a population level, this can overwhelm healthcare systems and mean severe shortages of labor and harm to businesses through loss of key employees. These consequences make the uncontrolled spread of the virus unacceptable.

Healthcare Systems at Risk - As Covid outbreaks expand, healthcare systems have become strained to the point of being overwhelmed and are forced to provide suboptimal care. Morbidity and mortality, or diseases and deaths, rise in both Covid patients and in non-Covid patients who are unable to access preventive care or treatments. Health care workers in many places at this time are inadequately protected against airborne transmission. Up to 180,000 are estimated to have died since January of 2020.⁶ Others become traumatized and burned out, further worsening staffing shortages. To protect our healthcare systems, we must protect healthcare workers in the short term, and stop the uncontrolled spread.

² Oral gastrointestinal route is an alternative, possibly through contaminated food products
<https://link.springer.com/article/10.1007/s10311-020-01101-x>

<https://pubs.acs.org/doi/full/10.1021/acs.est.0c06822>

[https://www.thelancet.com/journals/langas/article/PIIS2468-1253\(20\)30048-0/fulltext](https://www.thelancet.com/journals/langas/article/PIIS2468-1253(20)30048-0/fulltext)

<https://www.nature.com/articles/s41575-021-00416-6>

³  Resources LongCovid -ApresJ20 | 12-11-2021 update

⁴ [https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366\(21\)00084-5/fulltext](https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366(21)00084-5/fulltext)

[https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(20\)30228-5/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(20)30228-5/fulltext)

<https://www.medrxiv.org/content/10.1101/2021.06.11.21258690v1>

<https://www.nature.com/articles/s41593-020-00758-5>

<https://stm.sciencemag.org/content/13/596/eabf8396>

⁵ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8450276/>

⁶ <https://www.who.int/news/item/20-10-2021-health-and-care-worker-deaths-during-covid-19>

Variants – When the virus is allowed to replicate and spread, it has the opportunity to mutate. Mutations change the virus and its properties over time towards becoming more transmissible, and potentially more resistant to vaccines and treatments. We have seen this clearly as the virus evolved from the original strain that was first identified, through other variants including the highly transmissible Delta, and currently to the even more contagious Omicron. While vaccines do not cause variants, when a population is partly or even completely vaccinated, and the virus is allowed to continue to spread unchecked, selection pressure can amplify vaccine-evading mutations because variants that are not as evasive to the vaccine are relatively less transmissible as more people get vaccinated. d of Covid in the long term.

Strategies

Strategies - When a pandemic starts, there are different strategies that can be used to respond to it that have widely different consequences.

Outcome-based strategies:

- (1) Elimination - Stop the virus from spreading using all necessary means.
- (2) Suppression - Act to reduce transmission without imposing the goal of elimination.
- (3) Mitigation - Reduce the spread while limiting the effort and costs of actions taken.

Tool-based strategies: When a strategy doesn't specify a particular goal, it may be based upon using a specific tool for response, and implicitly or explicitly accepts unspecified harm including loss of life and health. Such strategies include a vaccination only strategy. In this case, the outcome is dictated by the effectiveness of the vaccine. These strategies may be based upon wishful thinking—the often unrealized belief that the actions taken will achieve a desired outcome, such as prevention of cases or preventing severe disease.

What are the current strategies? - In recent months countries have had three dominant worldviews: (1) In the US and many countries in Europe, there has been widespread acceptance of the consequences of inaction aside from vaccination, (2) in other countries, such as Japan, South Africa, and New Zealand there has been a strong suppression strategy combining vaccination and social measures (masks, social distancing, testing) and (3) in China, and other countries including Senegal, and some states in Australia and provinces of Canada, elimination was the adopted strategy. Changes in these strategies are now taking place due to the Omicron variant.

Vaccine alone strategy - As of the fall of 2021 the dominant narrative described in the news media is that of a vaccine alone strategy. This has been particularly true in the United States and Europe, where vaccines have been viewed as the key to reopening the economy and society. However, vaccines alone do not provide enough protection against the virus to prevent infection and to avoid severe disease, Long Covid and economic harm. Vaccinated individuals can become hospitalized and suffer from Long Covid, and even die, either during the acute phase of the infection or months later due to the long term consequences. Unvaccinated individuals suffer these consequences in greater proportions. In this strategy, the goal is to

reopen all of society immediately, in the false hope that life can continue as it was before the pandemic, without otherwise taking actions to mitigate, suppress or eliminate the virus. The existence of vaccines has been used in this narrative to argue in favor of eliminating mask mandates, notwithstanding that masks are very powerful preventive measures. Vaccination has also been used to avoid testing, even though testing and vaccination are not interchangeable. Vaccines have also been used to increase meeting capacities up to full capacity rather than allowing for social distancing. To be effective measures for preventing harm, the vaccines should be used as one tool in combination with other measures.

Elimination strategy - Elimination is a strategy to reduce dramatically the number of cases of transmission to the point where community spread of the virus in a given area has been completely stopped, or where transmission from residual cases can be prevented by limited measures such as contact tracing. This strategy has been shown to impact society, economy and liberties significantly less and for a smaller period of time than other strategies, as well as to dramatically reduce the impact of the virus on health and the disruption of health systems. Elimination can and should be done, but it is difficult to do. Delaying pursuing elimination not only delays when elimination is achieved, it makes it progressively harder to achieve.

Reaching elimination generally requires broad public support and engagement in the effort, political will, and policies that minimize the harm that would otherwise be caused by the actions taken to reach elimination. Using all tools available is recommended in order to achieve the fastest possible reduction in cases so that reopening can be achieved quickly with the least health and economic harm, and with minimal loss of freedom. These methods include mass testing, brief local lockdowns, limits on gatherings, masking, ventilation and air filtration when people are together especially indoors, and restrictions on non-essential travel including 14 day quarantines and testing. Guidelines for all measures should be established and stringently imposed until cases are eliminated, Reopening can then safely occur in zones where elimination has been achieved by maintaining 14-day quarantines on individuals entering from anywhere that has not achieved elimination to prevent reimporting cases that would undermine the accomplishment of elimination.

Suppression strategy - Suppression is a strategy to reduce the level of transmission to minimize the harm from the disease when achieving elimination is not practical. The lowest levels of transmission are associated with the lowest costs for continuing the suppression. Suppression also provides time to vaccinate, scale up testing and develop better treatments, so as to implement more effective mitigation or elimination strategies.

Mitigation strategy - A mitigation strategy focuses on using tools to reduce transmission without implementing stronger measures such as mass testing or lockdowns. Almost by definition, the effect of mitigation is insufficient to reduce R to less than one. Under these conditions the exponential growth of cases continues until widespread infection occurs, hospitals are overwhelmed, and individuals themselves take stronger action and/or policies including lockdowns are implemented so that cases go down. Once cases go down, the restrictions are often relaxed prior to achieving elimination due to the absence of an elimination strategy. The result is “yo-yo lockdowns”—a sequence of peaks and valleys of transmission that

are often mistaken for virus-associated properties rather than the linked social response along with virus transmission dynamics.

Layered protection - Minimizing the harm caused by Covid requires combining various measures to mitigate transmission. Prevention is far superior to mitigation and treatment strategies. The most effective strategy at preventing transmission requires using all of the measures that reduce the spread of the virus in combination with safe and proven medical treatments. Combining them leads to a multiplicative reduction of the risk of being infected. Over time, these measures cause transmission to decline exponentially—a rapid effect. While the use of one or a few tools will cause some reduction compared to no tools at all, the layered approach will reduce cases more rapidly.

Prevention as a societal treatment - Engaging in prevention to achieve suppression or elimination is akin to a societal level treatment.

The Effectiveness of Strategies

Health - It is apparent that elimination is the most effective strategy in terms of preventing disease and death. In addition it also is the best strategy to prevent hospital saturation and reduce stress on health professionals.

Economics - It is clear that over the longer term, elimination is the most effective strategy in terms of the broader economy.⁷ Over the range of days and weeks, the tools that are used to eliminate will harm economic activity in the short term. However, the alternative of allowing the virus to spread and then having to suppress it from a higher level, is much more costly. Thus the early prevention of transmission is an investment in greater economic activity in the longer term.

Freedom - The immediate need to suppress transmission is a motivation for reducing freedom temporarily. If elimination is achieved, freedoms can be restored. The alternative need to suppress transmission after cases rise dramatically leads to much harsher conditions for freedom over the long term. However, freedom is lost while pursuing elimination until it is achieved or the strategy is abandoned, which makes minimizing the duration of action key to enlisting the population in relinquishing freedoms. The freedom to travel long distances is generally lost for a greater period of time by an elimination strategy due to waiting for elimination actions in other jurisdictions. The importance of gaining freedom of local action should be recognized. This should also motivate larger scale coordination for elimination by jurisdictions regionally and globally.

Overall impact - the overall impact of the disease is smallest when the cases are most limited. The ability to achieve reduction of cases by short time action is similar to firefighting where it is

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<https://www.institutmolinari.org/2021/09/21/the-zero-covid-strategy-continues-to-protect-people-economies-and-freedoms-more-effectively/>

well established that rapid response to minimize harm is the best strategy. This applies to individual physical, psychological as well as social and economic harms. An important responsibility of the pandemic response effort is to mitigate the harms that are caused in the context of response efforts, i.e. financial and other support for individuals and companies, so that during a short time strong effort to stop transmission is possible and their harms are minimized.

Feasibility - Being able to eliminate the virus requires broad and widespread support. This includes both the government and the population broadly agreeing to implement the measures. When such support does not exist, a suppression strategy may be more feasible than an elimination strategy. Consensus cannot be achieved however until elimination is put forward as an option by the media and the government.

Transmission

Venues for transmission - Transmission occurs at home, at schools, in the workplace, in social gatherings, in public transport, in air travel, in meetings, and any other place where individuals share the same air. Reducing transmission in any place or context reduces the likelihood of subsequent transmission in other locations.

Airborne Transmission - It has been well established that the dominant form of Covid transmission is through microscopic respiratory particles that stay in the air like smoke or mist in indoor environments. The fact that the virus is airborne is important as the mode of transmission determines what non-pharmaceutical interventions are effective in stopping transmission, and what tools are not. For airborne transmission the most effective tools include masks, ventilation, air filtering, physical distancing, and shifting indoor to outdoor meetings.

The emphasis that has been placed on other tools has distracted from these most effective methods. In particular, plexiglass line-of-sight barriers do not work, plexiglass and other barriers can help when they fully partition the spaces in which individuals are located. Targeted high contact or highly contaminated surface cleaning may be of use, but not general surface cleaning. Hand hygiene is known to prevent other pathogen transmission, and may continue to be of some help for preventing this one. None of these measures should take precedence over ensuring clean air.

Prevention

Lockdowns - A lockdown is a measure that is designed to minimize the number of interactions in person between people by restricting mobility, sharing air, and face to face interactions to the maximum extent feasible for a given period of time. A partial lockdown does this to some degree but is much less effective even though it carries similar costs. A rapid way to reduce transmission is through the strongest practical lockdown. To gain the best outcome, a strong lockdown should be maintained until elimination is achieved in a given area, with appropriate

travel restrictions on non-essential travel including quarantines for those entering from areas that do not have elimination.

Mass and Rapid Testing - Mass testing is a strategy where everyone or as many people as possible are tested for the virus. Transmission is reduced by isolating identified cases and quarantining their close contacts. A single mass testing can dramatically reduce the number of transmissions and even stop a small outbreak. Repeated mass testing can quickly reduce transmission overall and is a powerful method to achieve elimination. The type of test is not essential as long as it has the ability to detect cases before and during symptoms. PCR, LAMP and antigen tests can be used. Availability, cost, and time to results should be considered in the selection of which test to use. Rapid antigen tests are often inexpensive and may be self administered. The higher accuracy of PCR and LAMP tests means that fewer rounds of testing are needed for a given reduction of transmission. Pool testing of multiple individuals in a single test can reduce their costs.

Isolation and Quarantine - The terms “isolation” and “quarantine” are sometimes confused and used interchangeably. In medical usage, isolation is for someone who is infected, while quarantine is for someone who is suspected of being infected. In order to perform an effective isolation or quarantine, preventing transmission through ensuring the air breathed out from a person who is infected is not re-breathed by someone who is not in isolation is vital. Since it is not known who is infected in a quarantine, quarantines should separate each individual with allowance for children or others who require care. By contrast, in isolation facilities there may be contact between those who are isolated together. Home quarantines require careful precautions and family members who live together, and other housemates are frequently infected. Setting up trusted facilities away from home for isolation and quarantine, with effective ventilation and air filtration, is an important way of preventing such transmission by communities and by countries. More generally, contact tracing, isolation and quarantines are an essential way to reduce transmission and their effective use also makes other methods such as mass testing effective as well.

Contact Tracing - Effective contact tracing requires determining who may have been infected by contact through shared air with an infectious person during the time the person was infectious. This can include people who were not in proximity to each other as, for example, when respiratory particles containing virus stay in the air for hours after an infected individual leaves the room. Regardless of the duration of exposure, a contact should be placed immediately into an effective quarantine for 14 days from the time of exposure. In a place where elimination has been achieved (or may be within the next two weeks), every person who has not been in an area where elimination occurred should be deemed exposed.

Masks - Masks are vital to stopping an airborne respiratory virus, such as SARS-CoV-2. Masks should be well fitting and have strong filtration to be effective. Children over the age of two can and do safely wear masks. In areas without elimination, implementing mask mandates is an effective way to reduce transmission.

Accurate information about mask efficacy and best methods of use should be disseminated. For example, high quality N95/KN95/FFP3/KF94 masks should be used in preference to cloth and surgical masks. Surgical masks are generally superior to cloth masks. Improving the fit of a surgical mask by using a mask brace, greatly improves efficacy. The combined protection of a surgical mask under a well-fitting, two-layer cloth mask with a nose bridge is much better.

Respirators - Respirators are designed to prevent breathing in contaminated air, generally by filtering the air of airborne particles. These are very effective at preventing a person from getting Covid-19, especially when fit-tested, as are models that use directed airflow, often called powered air purifying respirators (PAPRs). The widespread use of respirators should be encouraged especially in high risk conditions in workplaces or travel.

Ventilation and Filtration - Transmission occurs primarily through airborne particles that are breathed, coughed, or sneezed out by a person who is infected and breathed in by someone who then becomes infected. The CDC and WHO, and many country policies, are not sufficiently clear about the way to prevent transmission by airborne particles leading to confusion and inadequate action in individual and organizational practices. In workplaces, public spaces, and public transport, as well as transportation more generally, shared air should be cleaned by adequate ventilation and filtration, as part of the system of controls (Engineering [Hierarchy of Controls](#)) well known in the occupational health and safety science, as highly effective measures to minimize risks and to reduce airborne transmission.

Travel restrictions - Travel restrictions limit non essential travel and prevent individuals who must be able to travel from transmitting the virus from community to community by using quarantines and contact restrictions. Universal travel precautions, where entry into an area only occurs with a full 14 day, properly administered quarantine, are the most reliable way to keep the virus out. In order to achieve and maintain elimination, places should implement effective universal travel precautions from all places where elimination has not been achieved. Travel restrictions should be used in conjunction with other measures to control transmission within geographical areas. As has been shown, without measures to stop transmission within communities when it is necessary (i.e. if a few cases do arrive), travel restrictions alone, or inadequate travel restrictions, are not effective as they only delay rather than prevent the outbreak. This is similar to a fire, where actions to stop sparks from igniting a new fire may be necessary and at the same time preventing more sparks from arriving reduces the need to fight them.

Vaccination - Vaccination reduces the likelihood of transmission, symptomatic cases, and severe cases. These reductions show that vaccines are an important tool to fight the pandemic. However, the degree of effectiveness depends on the timing of exposure relative to the vaccination (waning of effectiveness) and the variant that one is exposed to (e.g. some reduced efficacy for the Delta variant compared to previous variants, and very significant reductions seen for Omicron). While the vaccines are an important tool for alleviating the harms caused by the virus, alone they are insufficient.

Those who are unvaccinated and exposed to the virus are infected more easily and become more severely sick than those who are vaccinated, and are several times more likely to die. However, even those who are vaccinated can be infected, become severely sick, die, spread the virus to other people, and develop Long Covid. The vaccines cannot and do not reduce or affect the likelihood of inhaling the virus emitted by someone else. The antibodies produced by the vaccines last for several months and do provide some protection against onward transmission, but antibodies are not 100% effective. Benefits of the vaccines strongly outweigh any costs that may exist. While vaccine alone strategies have failed, universal vaccinations can be a great benefit when combined with other measures.

Treatments

Early Treatments - While treatments such as monoclonal antibodies and oral treatments, such as those from Pfizer and Merck show encouraging promise, they have not been shown to be effective enough at reducing the harms of the virus to prevent the severe harm caused by the virus overall. The development of treatments should be accelerated by undergoing early and rapid testing. Using proven early treatments is important. However, they are not a substitute for suppressing and mitigating the spread of the virus.

Other treatments: There are a variety of treatments that have been advocated for without substantial evidence. These should not be used outside of medical advice and trials.
