

Dear Mr. Prime Minister of Israel Naftali Bennett!

This letter was written by a group of doctors, engineers and physicists from the former USSR who were engaged in medical practice in the country of origin, participated in organizing the fight against epidemics in different cities of the USSR, and developed medical equipment.

Our community of scientists now living in a number of cities in Israel was surprised and alarmed to learn about the recent decision of the Cabinet of Ministers to combat the coronavirus epidemic based on a new criterion for responding to the epidemic's development in the country, published on July 8, 2021 (https://m.newsru.co.il/finance/08jul2021/eco_301.html).

According to this criterion, the reason for tightening measures is not the number of cases and not the index of infectiousness, but the number of seriously ill patients.

We consider it our professional and moral duty to warn that the assessment of the epidemic situation cannot be based mainly on critically ill patients, since this indicator lags behind the current situation by at least 2 weeks, and such a delay in measures dramatically reduces their effectiveness. This will lead to a significant increase in the number of diseases and mortality.

It is important to note that with the current significant scale of diseases, vaccination cannot become a lifesaver against a pandemic. And as a result, there is noticeable chance that the new strains of the virus would appear this time in our environment (which is favorable for the new strains emergence). Because of that, the vaccine will work worse or not work at all. Already now, according to the Israeli Ministry of Health, the effectiveness of the Pfizer vaccine against infection by the "delta" strain is only 39%.

It is also necessary to take into account that as many as up to 50% recovered patients (according to different estimates) need long-term rehabilitation, and a significant part of them become disabled. All of this will make a heavy burden on the country's health care, its economy and financial system.

Therefore, the question arises: is the threat of too many unjustified victims in Israeli, losses of their health, and the risk of collapse of the most important structures of the state, - justified, only because of the wrongly chosen working criterion for combat the pandemic?

On the other hand, we understand that the number of seriously ill patients is also important for the final effectiveness' evaluation of the measures against a pandemic. But it is not adequate as a basis for urgent operational action in this struggle. Therefore, it should be left to the health care system, where it is required to estimate the number of beds, wards, ventilators and other practical needs.

The above, Appendix 1 (where a quantitative examination of the impact of the new criterion on the effectiveness of the fight against a pandemic is presented), allows us to formulate the following proposals:

1. For prompt action to combat the coronavirus epidemic, an urgent need to return to the criterion based on the number of Infections Per Day (IPD). At the same time, it is also important to use an important criterion for the number of seriously ill patients, as a secondary criterion and apply it for the final evaluation of operational measures against coronavirus.

2. Immediately start tightening the regimes of the country's functioning in order to avoid complete quarantine.

3. Urgently strengthen all possible organizational measures to block the spread of the virus in Israel and its the sources. To a large extent, this applies to Ben-Gurion Airport, where it is necessary to block the airlines to and from the "red" and "orange" countries (as minimum), and some additional actions (for more details, see also "Appendix 2").

Signed by:

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Appendix 1.

Calculations: the impact of the new criterion on the effectiveness of the fight against the pandemic.

Let us first present the results of a qualitative calculation.

Let us consider quantitatively how changing the criterion affects the effectiveness of the fight against the pandemic. The increase in the number of patients during an epidemic is considered an exponential process, and it can be calculated using geometric progression expressions. We will take into account additional 2 weeks delay in decision making to tighten measures against coronavirus, which is associated with the new criterion. For the calculation, we will use the number of new daily diseases for Israel (for 7

days in July - from 11 to 17.07.21), which are taken from the international site (<https://ourworldindata.org/covid-cases>). The calculation is presented in below.

A 2 weeks delay will increase the daily number of diseases from the initial 737 (as of 17.07.21) to 2005 Diseases Per Day (DPD) at the end of 2 weeks, and the total number of patients will reach 17835 people. Taking into account the overall mortality rate in Israel of about 0.75%, such a delay will cause 134 additional victims. This estimation is based on the assumption that tightening will begin after 2 weeks delay. And what happened if delay is 3, 4 or 5 weeks? And if this criterion lasts for another 2 months, for example?! The total number of those who have recovered then (after 62 days) will be (with the same initial number of DPD = 737) more than 1 million, and the number of deaths will reach 8091 people (which is 125% more than the existing number). The number of new daily infections will be 80,600.

It should be noted that presented data are not exaggerated at all, rather the opposite, since according to the current information - the new "delta" strain is distinguished by a higher infectivity and longer symptom-free period.

Let us now show an example of a detailed calculation based on the geometric progression formulas, which explains the above results. These formulas are given, for example, on the website:

<https://byjus.com/maths/geometric-progression/>.

Let's analyze a series of numbers $A_1, A_2, A_3 \dots A_n$, where each of them is the number of diseases per day (DPD), and they all make up a geometric progression with a coefficient K . This means that each subsequent term is equal to the previous one, multiplied by K : $A_2 = A_1 * K$, $A_{10} = A_9 * K$, etc. This is how the actual numbers during the epidemic usually behave. Of course, there are jumps in the data, but averaging over several days flattens them.

Then the existing progression formulas give:

For the n -th day, the amount of DPD will be:

$$A_n = A_1 * K^{(n-1)}, \quad (1)$$

and the sum (S_n) - the total number of patients by this day - will be:

$$S_n = A_1 * (K^n - 1) / (K - 1) \quad (2)$$

Now you can consider quantitatively how the change in the criterion affects the number of patients. In our case $n = 2$ weeks = 14 days - the decision delay to tighten the measures. From the data for 7 July days in Israel (from 11.07.21 to 17.07.21) by the number of DPD from the site (<https://ourworldindata.org/covid-cases>), we find the progression coefficient $K = 1.08$ (after averaging these data). In this case, from the original 737 DPD (as of 07/17/21) we get [from formula (1)]:

$$A_n = 737 * 1.08^{(14-1)} = 737 * 2.72 = 2005 \text{ DPD.}$$

That means, that two-week delay (at constant K) will result in an increase in the daily DPD from 737 to 2005 at the end of these 2 weeks.

Let us now calculate the total number of cases during the same time interval.

In this case, from the initial 737 patients (as of 07/17/21) from formula (2) we obtain:

$$S_n = 737 * (1.08^{14} - 1) / (1.08 - 1) = 737 * (2.937 - 1) / 0.08 = 737 * 24.2 = 17835$$

So, total number of patients will reach 17835 people.

Taking into the account 0.75% overall mortality rate in Israel (which can be estimated on the basis of generally known data as the ratio of the total number of deaths (6455) to the total number of cases (856261) during the entire pandemic) - the total number of victims of the 2-week delay will be 134 people. Similarly, using the same formulas (1) and (2), you can calculate the impact of the 2 months delay, (for example 62 days in July-August). We will receive (with the same $K = 1.08$ and the same initial number of patients 737) - 80,600 daily patients, more than 1.078 million patients at the end of 2 months, and 8091 deaths.

Calculations were carried out by Gershon Levitsky, engineer-biophysicist.

Appendix 2.

Organizational measures to close the sources of the spread of the virus in Israel.

1. Regulated blocking of airlines to and from dangerous countries (in terms of the situation with the corona - "red" and "orange").
2. In this regard, it is also necessary to consider the issue of prohibiting travel agencies from selling tickets to these countries.
3. Relocation of operational test points to premises located before passport control booths, thus preventing uncontrolled penetration of infected people into the country and infecting healthy population.
4. Blocking the access of passengers arriving from dangerous countries to biopass control.
5. 24h and 100% testing of passengers arriving from dangerous countries, regardless of the time during the day.
6. Centralized removal of passengers according to clause 5 to the hotels allocated for quarantine for a period determined by medical regulations.
7. To organize control of the infection level in the settlements to send, if necessary, operational medical personnel to the places with disease' outbreaks. To inform the population about the situation in the country, preventing people from traveling to those cities and settlements on their own.