Outlook for Germany in 2022 – Risk Scenarios SARS-CoV-2 (Covid-19)

An analysis for 2021/2022 on pandemic development in Germany and a model shift to North Rhine-Westphalia (NRW) with variant B.1.1.529

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[1] The authors express their own opinions in this article. However, these are based on the most recent scientific results of research in the field of pandemic facts. For further details on authors, please refer to https://www.linkedin.com/.

Preface

On the one hand, we have the millennia old theory. According to Plato's ethical theory, the well-being of the individual aims at morality, while the individual virtues contribute essentially to satisfying the social moral understanding. This satisfaction leads to a subjective state of happiness, which in this respect results in objective perfection. A state of goodness. The state of the good, once achieved, is thus to be interpreted in the so-called "theory of forms" as the highest form. Plato, who developed this theory with Socrates, came to the conclusion that the individual's soul is causal for the individual's inner state of happiness. From this, he ultimately derived an evaluation standard for the quality of life.

What does it look like in practice in our everyday lives? Consumption is in the focus of society. Consumption is far more prevalent than it is necessary for survival. In this respect, it is nonsense, has no objective additional value, and is always intended to achieve subjective satisfaction; as such it usually lasts only a brief period of time, and in its overall balance, it is anything but a healthy state of society as a whole. Selective consumerism resembles even a behavioral pattern that is the result of a misunderstood systemic product. Consumer conditioning starting from the day of the individual's birth is pre-programmed to undergo a kind of "training" with the declared aim of always ensuring consumption aptitude at a mature age. The individual is trained for life and age, the more the better, the better the stronger, and strength determines the individual's prestige in the consumer society. In ordinary times of theoretical neoliberal nonsense, this consumption can nevertheless not be objected to, as long as individual self-gratification is interpreted as a positive development.

What are the implications of these contradictions between the theory and the reality? Amid a pandemic crisis management that almost all countries around the world are confronted with, however, the result must be considered in a much more differentiated way. The tendency towards subjective self-gratification must be consistently subordinated in favor of the prioritized common good by government intervention, and contrary to neoliberal misguided perspectives. It must be self-evident in a society, that the state where it is a matter of live or die must leave no room for individual exaltation if ethics in its original form is to be given any serious meaning at all. If a part of the population cannot muster the cognitive capacity for this usually self-evident moral view, the interest of this part of the population must recede from the interest of the common welfare. To adopt an ethical framework while national league football matches are taking place and at the same time people in German hospitals have to be rejected and transferred for pandemic capacity reasons is akin to an inexplicable absurdity. The following article uses mathematically modelled scenarios to show what consequences it could have on the supposition that misunderstood theories about "individual freedom" be given precedence. First different Covid-19 scenarios for Germany will be elaborated and then used to conduct a model-shift for NRW with respect to the B.1.1.529 mutation. Based on four different scenarios, the trends in the infection rate and mortality rate are anticipated and illustrated graphically. The prediction results are analyzed and interpreted in order to derive reasonable conclusions from which concrete measures can be taken. In addition to the scenario analysis, the historical observation from the alpha variant towards the delta variant is addressed. Furthermore, an international comparison of vaccination rates is made to adjust for domestic measures, and the impact of the significant time-lag effect of mutations is assessed. The models used for simulating the scenarios are described by using a complex mathematical model with different variables, of which only the following five variables have been used for the purpose of focusing: Vaccination willingness in the following three age groups: p1 (15-34), p2 (35-59) and p3 (60-80+), and the current vaccination rate per day as well as the vaccination rate as of December 28, 2021. In the age group p3, it is generally assumed that 100% vaccination willingness is present, which is a higher percentage than the one observed as of November 23, 2021.

The simulation of the scenarios covers the period from November 23, 2021 to the first of March 2022 in the region of the Federal Republic of Germany.[2]

1. Scenario Analysis

In the following, the three scenarios with no model shift are first described and examined in more detail.[3] Subsequently, the results of the scenarios are compared, interpreted and conclusions are derived. Furthermore, the historical events of the pandemic management were summarized and discussed. Table 1 summarizes a brief variable overview of the following work scenarios.

	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4 (B.1.1.529)**
Region	Germany	Germany	Germany	North Rhine-Westphalia
Vaccination willingness p1	50%	80%	100%	100%
Vaccination willingness p2	60%	80%	100%	100%
Vaccination willingness p3	100%	100%	100%	80%
Political framework	Consistent	Consistent	Extensive amendments	Extensive amendments

Table 1: Brief variable overview of all scenarios

1.1 Scenario 1 - The gloomy scenario

The first simulated scenario represents a pessimistic prognosis for the future development of the Covid-19 pandemic in Germany. It was assumed that the policy framework would remain the same as it was on November 23, 2021. The present vaccination rate per day is 0.052% as of November 23, 2021. From December 28, 2021, a vaccination rate of 0.5% per day is assumed. The vaccination willingness in the p1 age group with young people was set at 50%, while the p2 group with middle-aged people was set at 60%. Group p3 is assumed to be completely willing to vaccinate, as mentioned earlier.

Examining the weekly incidence in Figure 1, the incidence increases rapidly before peaking in mid-December 2021 with a weekly incidence of around higher than 4,750 and lower than 6,000. After reaching the peak, the incidence decreases moderately and passes the 1,000 mark in February. At the end of the simulation period on the first of March 2022, the weekly incidence is expected to be approximately 200.

[2] A publicly available documentation of the mathematical model on which the scenario analyses are based is available on https://covid-simulator.com/model/, last accessed on December 17, 2021.

[3] All graphics in this article have been modified and revised at our own discretion, based on the results of the simulations (https://covid-simulator.com/) and the publicly available data from Our World in Data (https://ourworldindata.org/), last accessed on December 17, 2021.

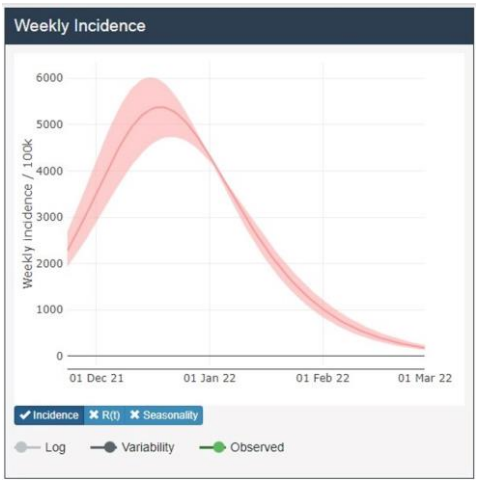

Figure 1: Weekly Incidence of modelled scenario 1

A similar trajectory to the weekly incidence can be observed for the daily cases, which are shown in Figure 2. Similar to the incidence, the peak of daily cases is predicted for mid-December with an average of more than 620,000 daily cases. In line with daily cases, the number of daily recoveries will peak in early January, two weeks after the peak of daily cases, which is consistent with the average recovery period.

Figure 2: Daily cases and recoveries of modelled scenario 1

1.2 Scenario 2 – A mitigated scenario

The second scenario adjusts two variables from the previous model, the vaccination readiness of age groups p1 and p2, and increases both percentages to 80%. In summary, Scenario 2 represents the hypothesis of generally higher vaccination willingness. However, to be representative for the real-world application, the willingness to vaccinate must increase to this percentage relatively quickly to support this scenario. The political framework is assumed to be the same for the duration of the simulation.

Looking at the weekly incidence of scenario 2 in Figure 3, it is noticeable that the peak of Incidence is shifted to the beginning of January and is on average at around 1,750. The entire course of the incidence is parabolic and normalized. At the end of the simulation, the weekly incidence is about to exceed 300 downwards, i.e. slightly higher than in scenario 1 but with an considerably lower peak.

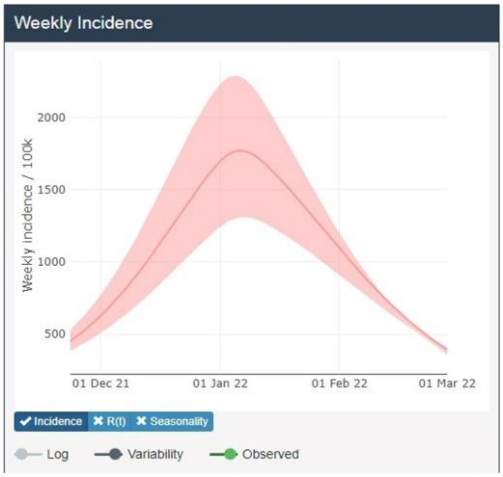

Figure 3: Weekly Incidence of modelled scenario 2

Figure 4 shows that general cases and recoveries are also more parabolic and stretched over the course of the simulation than in Scenario 1. Cases peak in early January 2022 with an average of 210,000 total cases and recoveries peak in late January 2022 with about 190,000 cases recovered. Consistent with the observation in Figure 3 (incidence), the number of general cases is higher than in Scenario 1 (Figure 2) with an average of 45,000 total cases.

Figure 4: Daily cases and recoveries of modelled scenario 2

1.3 Scenario 3 – A possible solution scenario

In the simulated solution scenario 3, compulsory vaccination by the government was simulated, resulting in 100% vaccination willingness in all age groups. Further changes in the political framework are also necessary. In addition to compulsory vaccination, a well-defined strategy, including comprehensible risk communication to the population, needs to be implemented and enforced. Scientific findings must be considered in decision-making on crisis-related issues, and warning signals, as well as suggestions from the scientific community, are to be considered.

Looking at the weekly incidence of scenario 3, the highest point of incidence is comparable to the one observed in scenario 2. The main difference, however, is that the curve becomes more flattened.

Reflecting the observed trajectory of incidence, total cases and recovered cases in Scenario 3 are flatter and more delayed compared to the first two scenarios, peaking at an average of 230,000 cases in mid-January and 210,000 recovered cases at the end of January.

Figure 5: Weekly Incidence and daily cases and recoveries of modelled scenario 3

1.4 Preliminary results

The following paragraphs explain, summarize, and discuss the results of the scenarios without the model shift.

The consequences observed in all scenarios are considered and will affect the population and the economy severely in all scenarios. However, the scenarios differ significantly in terms of the extent of harm and the range of harmful events, which means that a large number of potentially catastrophic events could be prevented. In the first scenario, the peak is reached in December 2021, which means that the target rate of 0.5% vaccination per day cannot be realized. This may result in considerable consequences that could have an impact on the further course of the pandemic, and on a more difficult mutation. Scenarios 1 and 2 will probably persist until March, whereas the third scenario will probably level off significantly sooner due to the later peak, which allowed for more comprehensive measures to immunize and sensitize the population.

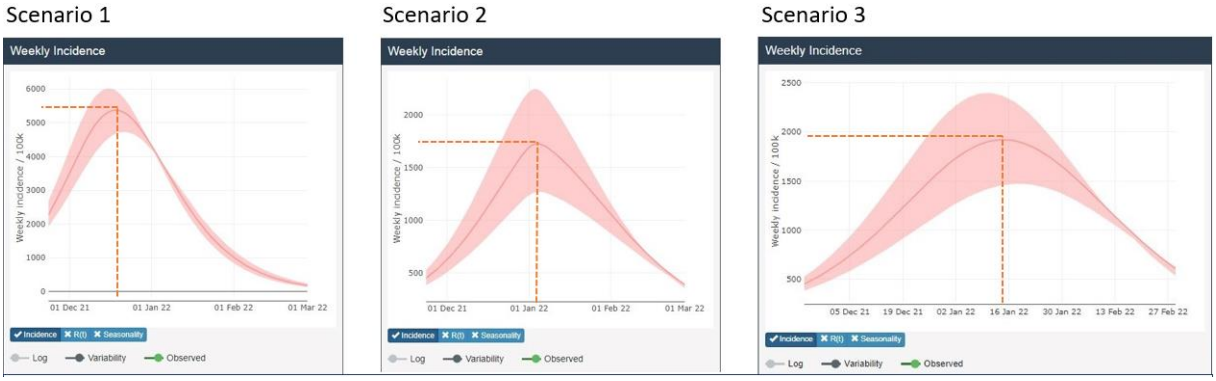

Figure 6: Weekly incidence of all three scenarios in comparison with indicated peak

As can be seen in Figure 6, scenario 1 peaks around mid-December whereas scenario 3 peaks in mid-January. This 30-day delay in the peak of observed cases has a significant time-lag effect. To illustrate the time lag effect in more detail, assume that the number of deaths results in a difference of 1,000 daily deaths, this alone would mean 30,000 more deaths than in scenario 3. If further assumptions are made that a more difficult mutation has already spread throughout the country in December, there is a risk of not achieving sufficient immunization in the near future.

As a result of these two assumptions, an unprecedented, strict lockdown may be necessary. This is unlikely to be in the interest of either the general population or the vaccine refusers. Vaccination alone can help to limit these outcomes to a significant extent and mitigate the potentially disastrous consequences.

Positive observation of the third scenario is that the level of pandemic spread is flattening, and the realization of events is shifting. The incidences are generally flattening out, which has a positive effect on the probability of a new mutation occurring. The ability to significantly increase the daily vaccination rate in Germany remains an important factor in stemming and stretching the course of the indicators in order to contain the risk of renewed mutations and the impact of the pandemic situation.

1.5 Summarizing previous events

As we know, the clever one learns from experience, the wise one learns from the experience of others. What about us, in Germany? To summarize the early events of pandemic science developed multiple vaccines in record time. After approval of the vaccines in Europe, Germany started with a great amount of vaccination willingness, which increasingly stagnates as the vaccination campaign progresses and the more vaccine-willing part of the population has already taken up the vaccination opportunity. After getting in control of the Alpha variant in early 2021, all advice from science has been ignored by both, parts of the government as well as parts of the population. Important warning signals were labelled as a nuisance and resulted in the continuous loosening of public restrictions in the spring of 2021. Looking at Figure 7 it becomes apparent that the much more dangerous Delta variant started to develop an exponential growth and, therefore got out of control in early 2021.

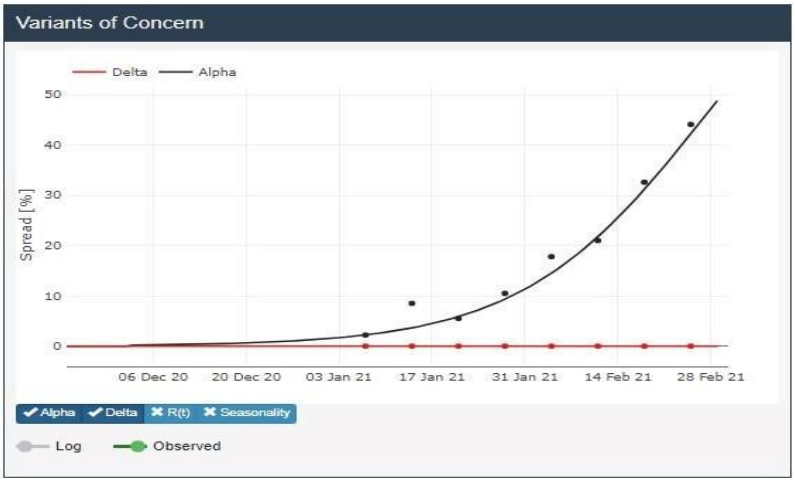

Figure 7: Variants of concern (Alpha and Delta variant)

Over the summer, science has repeatedly and clearly stated that the trends in new daily infections are worrying without being recognized by the politicians as well as parts of the public. This disregard led to a fivefold increase in incidence between July and September, the same period in which the federal elections were taking place. Between September and November, these worrying figures again increased sixfold (Figure 8).

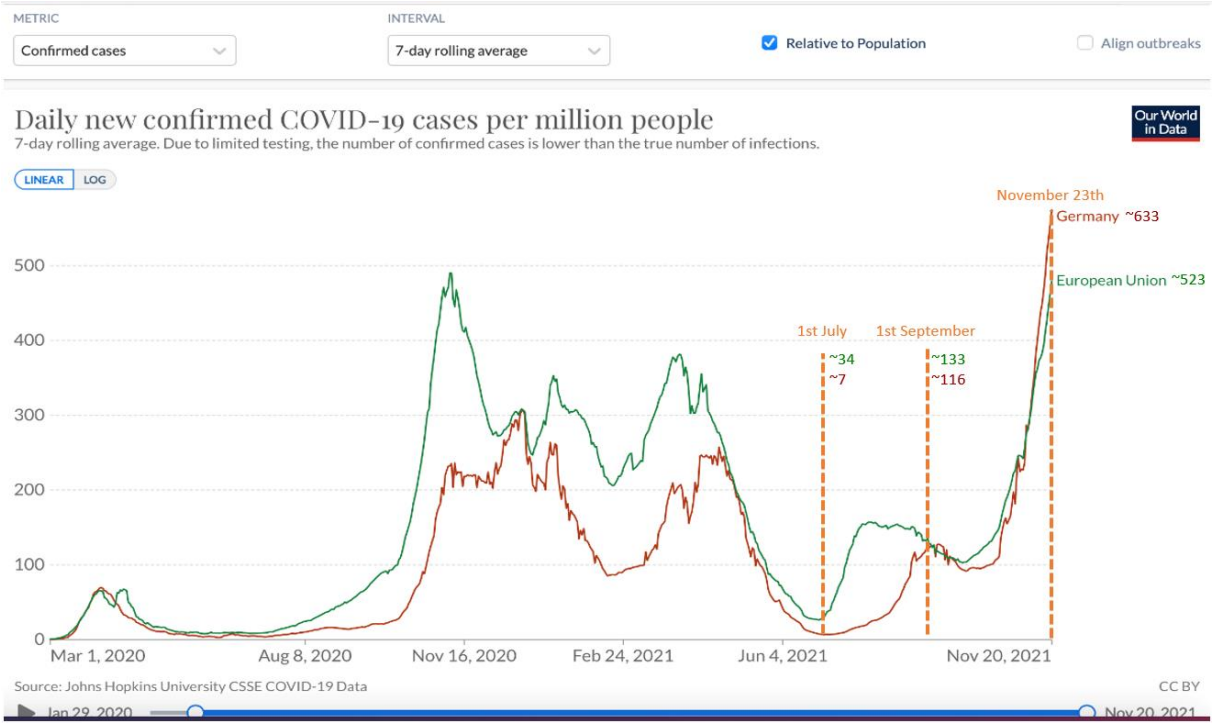

Figure 8: Daily new confirmed COVID-19 cases per million people (Our World in Data, last accessed on December 17, 2021)

Considering the global vaccination rates in Figure 9, it is evident that countries with significantly weaker economic capacities seem to be progressing just as well or better in terms of overall vaccination as economically strong nations such as Germany. In addition, one of the most effective vaccines was developed in Germany, which should result in a better availability of the vaccine. One explanation for this may be a difference in societal behavior, namely the willingness of the population to be vaccinated.

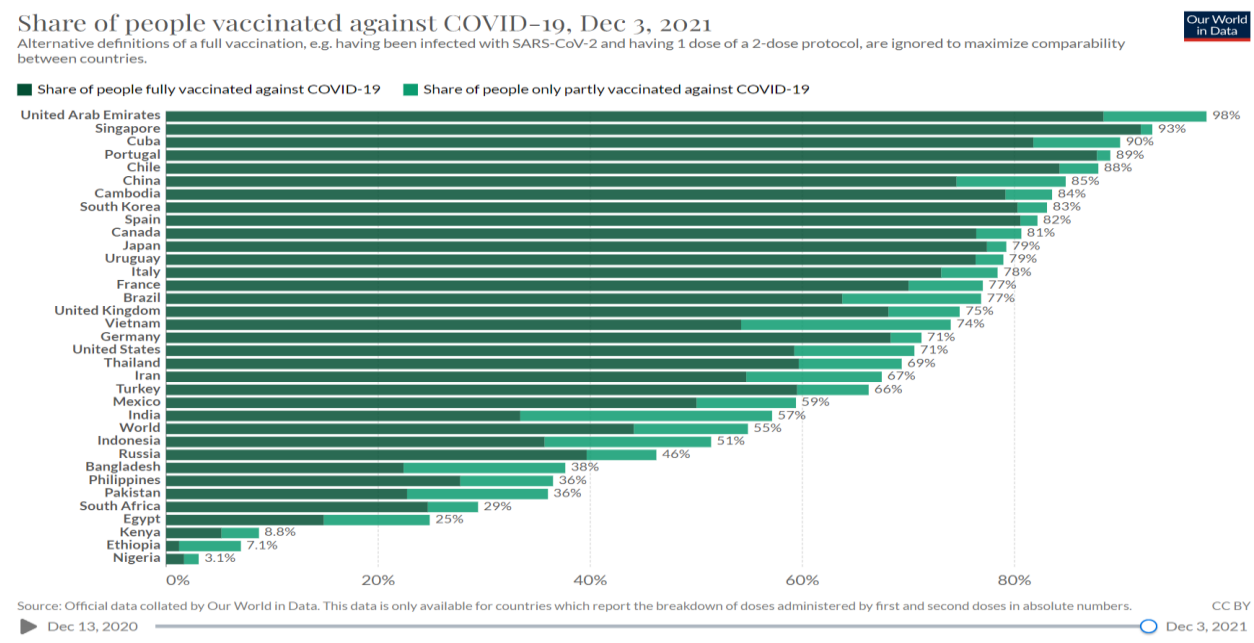

Figure 9: Share of people vaccinated against COVID-19 (Our World in Data, last accessed on December 17, 2021)

Looking at the political level, it can be seen that the decisions have not served to alleviate the pandemic situation or have not been taken correctly since spring 2021. Parts of society seem to be missing the moral compass and striving more for individual self-gratification than for the common good of self-imposed restrictions to help older and more vulnerable people of the society.

Antivaccinationists contribute significantly to the increasingly critical pandemic situation and further risk their own health and that of their fellow citizens. Furthermore, Science is largely ignored in the decision-making process by the government, but at the same time has to justify the situation in the media. This goes beyond the limits of ridiculousness. The reality seems that Germany is neither smart nor wise at the moment. The government appears to be ignoring warning signs, while parts of the population are embracing conspiracy theories more than they are trying to save people's lives. Furthermore, without the outstanding work of science, the current mortality numbers would be unfathomably higher. This is also part of our reality.

1.6 Conclusion

In summary, the empirical values from the alpha variant to the delta variant show a clear disregard of all trends and warning signals in Germany. The repeatedly disregarded trends from summer 2021 to the present day have exacerbated the pandemic situation in the country. All the scenarios simulated in the course of this work have extremely high case numbers, but by focusing on the future, the following significant conclusions can be drawn: The first two scenarios show a clearly sinister picture, that ought not to become reality. Scenario 3 illustrates how the situation can be mitigated and the consequences alleviated. While all scenarios have in common that they are not easily manageable, the ultimate goal of everyone should be to save as many lives as possible, as simulated in scenario 3.

This can be achieved through various factors. Firstly, through a direct or indirect collective vaccination obligation and a daily increase in the vaccination rate, ensuring that the vaccination rate in Germany rises to at least 0.5% per day by 28 December 2021. Furthermore, the political framework must be modified in order to establish transparent strategies and clear risk communication to the public. Likewise, scientific advice should not be used to justify the situation, but rather be used for precautionary purposes and early detection, as well as treatment of new pandemic developments. If one of these factors does not occur, solution scenario 3 probably won’t become reality.

The implementation of a collective vaccination obligation, which is mandatory for the containment and prevention of a new virus variant, is a challenge. The necessary vaccination rate is ten times the current level and in order to sufficiently restructure the political framework, a nationwide pandemic strategy is unavoidable. Regardless of all possible measures to be taken, it will be necessary to deal intensively with the situation until the end of the first quarter of 2022.

Research results from Harvard University clearly demonstrate that a new mutation of the virus could result in a very significant risk. Renewed mutations can lead to variants with different characteristics, resulting in higher infection rates, reinfection rates, lethality, and increased ineffectiveness of existing vaccines.[4]

[4] See at https://www.hsph.harvard.edu/news/press-releases/delta-like-sars-cov-2-variants-are-most-likely-to-increase-pandemic-severity/ and Bushman/Kahn/Taylor/Lipsitch/Hanage, “Population impact of SARS-CoV-2 variants with enhanced transmissibility and/or partial immune escape”, https://www.cell.com/, last accessed on December 17, 2021.

If no significant changes are made to the current handling of the pandemic, it is very likely that the pandemic will have a much more severe impact at the turn of the year 2022/2023. In all likelihood, it will only be possible to control the situation and mitigate it in the long-term using last-resort measures.

2. Model shift to variant B.1.1.529

In the course of writing this work, the assumptions made in the previous chapter that mutation will inevitably occur if pandemic management is not rigorously pursued through appropriate measures, proved to be true. Accordingly, the existing model has been adjusted further. The following paragraphs describe and analyze the model shift with regard to the B.1.1.529 mutation and its impact on North Rhine-Westphalia.

On November 26, 2021, numerous German news channels drew attention to the worrying Covid-19 variant B.1.1.529.[5]

This confirms the previously suspected assumption that a new mutation has emerged as a result of increased cases and the low vaccination rate. Since the spread of the new mutation called omicron,[6] it will spread in North Rhine-Westphalia (NRW) in the near future. To model this case for the federal state, a model shift was carried out, which is subject to the same assumptions and basic model of the previously simulated scenarios, but with various adjustments.

One adjustment is that the mutation results in the vaccines no longer retaining the same efficiency as previously assumed. Breakthroughs are increasing, especially in age group p3, which means that one in five of the vaccinated people in age group p3 would no longer be protected. In this scenario, the federal state of NRW must, therefore, control another wave with variant B.1.1.529 in addition to the fourth pandemic wave. Due to a lack of available vaccination opportunities, the vaccination rate of 0.5% per day will not be achieved, as previously modelled in scenarios 1-3. Thus, resulting in a stagnant vaccination rate at 0.061%. Due to the breakthroughs in age group p3, vaccination willingness is assumed to be only 80%. For the other two age groups p1 and p2, this remains at 100% as simulated in scenario 3.

In contrast to the first three scenarios, the region of scenario 4 is limited exclusively to North Rhine-Westphalia. The political framework conditions that have been simulated have been defined similarly to the solution scenario. The simulation period ranges from November 26, 2021 to the first of March 2022.

Examining the weekly incidence in Figure 10, the incidence of NRW appears to peak at the end of January with an average incidence of 1,000 per week. By the end of the simulation, the weekly incidence averages 600 on the first of March 2022. On the other hand, the daily cases reach an average peak of 25,000 cases at the end of January and the recovered cases reaching 23,000 cases at the beginning of February.

If we look at the period from January 1, 2022 to January 12, 2022, a critical incidence is exceeded there, which corresponds to a threefold increase in comparison to the incidence of November 26, 2021. The

[5] "South African researchers see "cause for concern" in a new Corona variant. It spreads faster than Delta and could be better immune to vaccines. The WHO is discussing the matter in an emergency meeting", see at https://www.stern.de/gesundheit/who-stuft-neue-corona-variante-als--besorgniserregend--ein-30963350.html, last accessed on December 17, 2021.

[6] See the updated news announcement at WHO, Update on Omicron, https://www.who.int/news/item/28-11-2021-update-on-omicron, last accessed on December 17, 2021.

change in the number of deaths in the time range from November 26, 2021 to February 2, 2022 is just as critical and is expected to be increased by a factor of 4.5 to an incidence value of about 1000.

Figure 10: Weekly Incidence and daily cases and recoveries of modelled scenario 4 (B.1.1.529 variant)

3. Discussion

In the following, the core observations of the previous chapters are summarized and evaluated. Furthermore, the influence of unvaccinated individuals on the course of the pandemic is investigated.

3.1 Quintessence of the observations

The quintessence of the observations of the model shift is above all, the realization that there has to be a stringent change in the way the pandemic is being handled in 2021/2022, as opposed to the way it has been handled since the outbreak of the pandemic due to ignorance of the reality on the part of the population and politicians. Otherwise, history will repeat itself if the clear trend is again ignored, and disastrous consequences may ensue. Considering the possible spreading effect of the current delta variant to B.1.1.529 shown in Figure 11 in comparison to the process in 2020/2021, i.e. the ratio of the alpha to the delta variant, the comparable course of the pandemic development can be seen, which has to be paid attention to in any case, since variant B.1.1.529 also has the potential to have an exponentially higher propagation effect, as the delta variant had in contrast to the alpha variant.

Figure 11: Variants of concern in respect of B.1.1.529 variant

In general, the current fourth wave and the new mutation complicate the entire management of the crisis. Furthermore, there is an inherent risk that the efficacy of the prevailing vaccines in the age groups p1 and p2 will be reduced. This might have further disastrous consequences and additional modelling assumptions would have to be discarded. To manage the crisis, a severe lockdown would have to be enforced to limit the damage and those who are unvaccinated would have to be completely isolated from almost all aspects of society, to protect themselves and others. Otherwise, there is a serious threat of unimaginably high death rates. Overall, NRW would be hit by the toughest series of measures since the pandemic began. As discussed in previous scenarios, a fundamental component to ensure these objectives is a clear risk communication strategy aimed at being perceived by all segments of the population.

3.2 Impact of non-vaccinated individuals

While approximately 72% of the German population had been vaccinated by December 7, 2021, 69% of which had been vaccinated twice, we have known for certain about the exponential growth of incidence since approximately October 2021. However, this trend has been predictable since the summer of 2021.

For Germany[7], the proportion of new cases reported has been shown to be due to symptomatic breakthrough infections in children 12 years of age or older in 4 out of 10 cases. Scientific modeling suggests that approximately 67% to 76% of all new infections are caused by unvaccinated individuals. In other words, the proportion of the population in Germany that has already been vaccinated twice contributed to the current pandemic situation in "only" 2 to 3 out of 10 cases, and even these 2 to 3 cases could have been avoided by more restrictive contact behavior and a more clearly comprehensible risk communication.

However, it is remarkable that the number of new infections by unvaccinated-to-unvaccinated individuals account for up to 50% of all new infections, with the active participation of unvaccinated individuals in the population protruding at a rate of over 80%. Stated differently, unvaccinated persons are involved in at least 8 cases of new infections in every 10 cases and are thus directly contributing to the current situation. The case of vaccinated infecting unvaccinated is only 15% to 17% of all cases, whereas the unvaccinated infect vaccinated with a proportion of 25% to 29%, whereby the probability of infection of vaccinated is significantly lower. Unvaccinated persons also contribute more significantly to the transmissibility of the virus, which in this respect is also a significant influencing factor for the effective R-factor, and from which the further idea of immediate contact containment, at least for unvaccinated persons in the population, must necessarily arise; on the one hand, to protect the unvaccinated person and their environment, but on the other hand also to reduce the proportionality from the R-factor, so that other population groups are not subjected to unnecessary danger. This danger extends further than merely the risk of viral infection, due to Germany's increasingly overburdened healthcare system and the associated rejection of those patients in need of treatment.

[7] For the following text sections in this chapter, see at Maier/Wiedermann/Burdinski/Klamser/Jenny/Betsch/Brockmann, Germany's current COVID-19 crisis is mainly driven by the unvaccinated, on https://www.medrxiv.org/ and at Coronavirus (COVID-19) Vaccinations, on https://ourworldindata.org/), last accessed on December 17, 2021.

4. Determining measures

This final chapter summarizes and compares the regulations that have existed to date and the adjustments that the German federal government has made in response to the B.1.1.529 variant with the prioritization and composition of measures that have resulted from this work.

4.1 Latest measures of the federal government

On the second of December 2021, the federal government, recognizing the increasingly severe situation, decided to take more stringent measures, which are outlined in more detail in the following.

In total, the measures can be summarized as seven measures. On the one hand, cultural and leisure activities as well as access to retailers are only permitted for vaccinated or recovered persons (2G). In addition, 2G-plus can be initiated on a situational basis, which requires vaccinated and recovered persons to provide a negative test result. Clubs and bars remain closed in areas with a 7-day incidence of more than 350. According to the assessment of the individual federal states, the closure of restaurants and trade fairs can also be initiated. Private gatherings will also be restricted, so that unvaccinated persons will be limited to their own household and two persons from another household. The federal states can further restrict these regulations depending on the situation. For private celebrations such as weddings, from an incidence of 350, only 50 people are allowed in closed rooms, and 200 in open areas. Large events are only allowed to use 30-50% of the possible capacity up to a maximum of 5,000 visitors, or 15,000 visitors in the case of an outdoor event. For employees in geriatric homes and nursing homes, vaccination is mandatory, and all visitors and employees are required to provide a daily negative test regardless of vaccination status. As a further regulation in the workplace, 3G has been introduced nationwide, i.e. vaccinated, recovered or tested. This must be checked daily by the employer. 3G is also being introduced in local public transport and on long-distance trains, in addition to the mandatory wearing of masks.[8]

4.2 Prioritization of measures resulting from this work

The measures for coping with the pandemic in Germany, which have been presented repeatedly in this paper, are to be prioritized as follows.

The most important measure to manage the pandemic is a coherent and transparent risk communication from the government to the population. By clearly communicating the risks, the foundation is laid for further measures to be taken and for the population to adopt a more considerate behavior. Consequently, compulsory vaccination is the only confident measure to protect human lives and relieve the burden on the overstrained health care system. Unvaccinated people should be isolated as far as feasible until the day of full vaccination, in order to effectively reduce the R factor and thus the risk of new infections as well as mutations. Similarly, events that do not serve an immediate greater purpose should be prohibited, to avoid putting lives at risk and unnecessarily worsening the severity of the pandemic through the urge of parts of the population to satisfy individual needs. Instead of using scientists for justification purposes, the advice and warning signals from the scientific community should be heeded immediately in order to respond as quickly as possible to changes in the course of the pandemic.

[8] See at https://www.bundesregierung.de/breg-de/themen/coronavirus/corona-diese-regeln-und-einschraenkung-gelten-1734724, last accessed on December 17, 2021.

4.3 Conclusion

In conclusion, the measures taken by the federal government were initiated too late and are insufficient to overcome the ongoing crisis. Once again, the mistake of the past was repeated and, instead of unified nationwide measures, too much leeway was left to the individual federal states. The restrictions on the unvaccinated are inadequate, since a gathering of unvaccinated people has the highest rate of mutual infection, at 50% of cases.[9] Furthermore, it is ethically questionable to continue to host large events, such as public soccer matches, when the flip side of the coin is that uninvolved persons are exposed to unnecessary risk and the public health system to an additional burden. As the scenario analysis in chapter one has already shown, universal mandatory vaccination is the only reliable way to achieve adequate immunization of the population, thus the initiated mandatory vaccination of nurses only is not sufficient to realize that.

Last but not least and as the former chancellor Helmut Schmidt mentioned, "the stupidity of governments should never be underestimated", we hope that the new federal government that was established in December 2021 will not continue the misconduct of the previous one, instead resorting to more comprehensive and stringent measures. This is about nothing less than setting the right framework to steer the lives of the German people into a new normality and without allowing false compromises.

[9] See fn. 7.