Corona in Vienna

Summing up what has been seen

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This paper is monitoring the understanding of the Corona pandemic as it is developing since January 2020. The first eight sections summarize what had been learned till April 2021. The core of this content still is valuable and frames what follows. From section 9 onwards the respective latest new data will be regularly updated to envisage new insights, which will be sketched in the following chapters.

1 - It is inadequate to compare Vienna with the other regions of Austria (written April 2021)

An epidemic in a large city, e.g. Vienna with a population of 2 million, cannot be compared with an epidemic in the open land. First, cultural habits (including economic and social behaviour) in a big city differ strongly from the conditions in villages and small towns. Second, the spread of a virus from one person to another person depends strongly on the distance between persons. The maximum average distance between two persons in Vienna is around 14 meters, while it is around 7 times as high in the regions, e.g. 107 meters in Lower Austria. This physical difference results in a completely different condition for the spread of a pandemic. To get an idea of what is happening it thus is necessary to restrict the analysis to Vienna, other regions and cities in Austria will have to be dealt with using a different type of analysis. This leads directly to the next point.

2 – To expect that the study of the microbiological traits of the virus provides a clear picture of the epidemic is a mistake

It is useful to know the properties of the very small (around 100 nanometres; one nanometre is one millionth of a millimetre) living system that is called Corona Virus; but this knowledge is completely insufficient to make a judgement about the dynamics of its spread. So a virologist has also to be a biologist to judge how a human individual with its breath can shoot out certain amounts of viruses. The virologist also has to be a physicist to understand how far, how fast, and how directed the very small drops containing the virus can travel in a certain environment. The influence of temperature[1], humidity of the air, of the strength of wind can all play a vital role. Finally, it also needs social scientist. They have to provide a model where, how often and for how long people usually meet; perhaps the role of sociologists. But since staying healthy

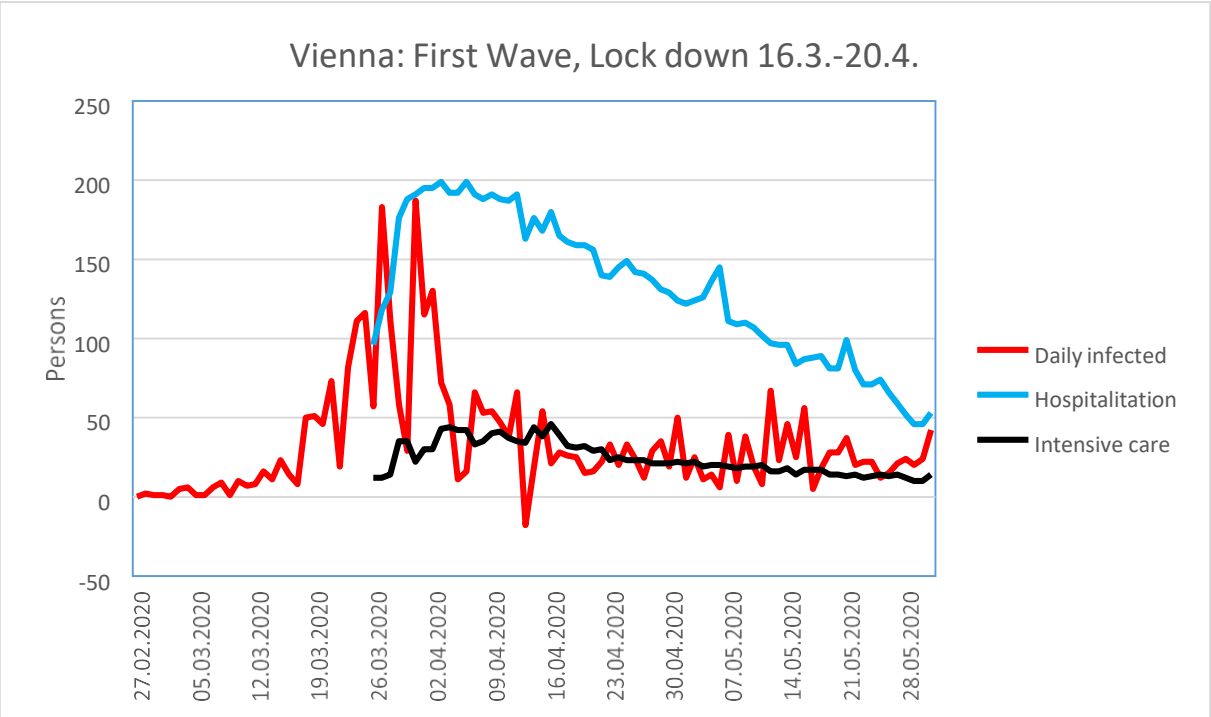
[1] See (Chen et al, 2020).

is not the only goal people in their daily life are trying to reach, economics and political science have to be taken on board. Moreover, human individuals act following their own internal models, some psychological knowledge, eventually mass psychology and cognitive science, will be necessary to understand reactions on individual and – via mass media amplified – aggregate level. In short, extended interviews with narrowly educated virologists are not too helpful.

3 – Gaining insight is possible

No reason to be frustrated because such a transdisciplinary scientist does not exist. It is possible to gain some preliminary insight by just following standard scientific methods. All serious science starts with empirically observed data. The choice of observed variables, of course, is itself already a theory-loaded action. In the case of the current pandemic it fortunately is rather straight-forward what data can be used as a starting point. From the start of the pandemic in January 2020 onwards the WHO published daily data on registered cases of Corona. This data was the basis of my brief survey of the first wave of Corona in May 2020. At that time mostly simple mathematical models basically using logistic functions were estimated, see (Hanappi, 2020). But very soon the scientific community of model-builders discovered that modelling the Corona pandemic is substantially more difficult than what the usual epidemiological approach had to offer [2] . After more than one year of a spreading pandemic now in its third wave, an enormous amount of new knowledge has been learned.

Diagram 1 recalls the situation in Vienna in May 2020.



[2] Compare (Cepelewicz, 2021) for an excellent survey of approaches to Corona pandemic modelling.

Diagram 1
Source: ARGES as prepared by Erich Neuwirth

The lockdown started on the 16th of March 2020 and its success in suppressing the further increase of the spreading of Corona became visible end of March, i.e. two weeks later. The zenith of hospitalization was reached around a further week later and was then reducing much slower than infections - though continuously – till end of May 2020.

From February 2020 till 27th of March 2020 an untamed spread of the first variant of Corona in Vienna increased with an average daily force[3] of 1,03. This initial speed of the pandemic seemed to be pretty similar in many different places around the world, including in particular China. Then the possible policy reactions started to set in.

Note that the simple logistic equation that often was used, just states that the biological force that drives the spread – in this case: a multiplication of the number of infected persons today by 1.19 gives the number of persons infected tomorrow – is countervailed by a reaction of a shrinking amount of persons available to be infected – in the case of the logistic equation this is just the difference between the total population and the already infected persons[4]. The general idea that there are forces driving the spread and countervailing forces containing it, certainly is correct, but does not help much if these forces are not further specified. If the only countervailing force stems from the ever smaller fraction of the population not yet infected, then one ends up with the infamous model of herd immunity.

Fortunately, human societies do develop more countervailing forces not covered by the simple logistic model. The Lockdown from 16-03-2020 to 20-04-2020 was the first effective example of such a defence of the population's health. In Europe it most probably also was helped by the fact that with Spring life was starting to take place more often outside of closed rooms; during work time as well as during leisure time. This in turn always depends on the weather, on temperature.

But also on the side of the driving forces of the pandemic a closer look is necessary to discover the places and circumstances under which its speed is modified. During summer, in particular during the summer holidays, the pandemic seemed to be defeated. It survived mainly in colder working environments, where many people rather close to each other had to work under stress and with almost no control of their health situation, e.g. at the meat producer Tönnies in Germany in late June 2020[5].

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[3] The force is the factor with which today's number of infected (newly registered infected minus recovered of that day; both, of course, excluding unobserved cases) has to be multiplied to get tomorrow's number of infected.

[4] As difference equation this reads x_t = v times x_{t-1} times (T - x_{t-1}), with v being the force of spread, T being the total population and x describing the number of infected persons at time t. For v being 1.19 and Vienna's population being 2 million this would imply that untamed biological spread of the virus as predicted by this model would approach 320.000 infected people in the beginning of July 2020. For a detailed discussion of herd immunity compare (Hartnett, 2020). For an empirically oriented study with a generalized logistic function compare (Wu et al., 2020).

[5] This was a first sign that in particular low-paid foreign workers under bad and unhealthy working conditions are exposed to the dangers of the pandemic, see (Robert Koch Institut, 2020).

4 – Political opportunism and helplessness spurred the second wave

Only in October 2020 the second wave of Corona started to become visible in Vienna, compare diagram 2 (updated on 03-11-2021).

From October 2020 onwards the speed of the spread looked pretty much like the one experienced in early Spring. On the 17th of November to the 1st of December the second lockdown was ordered by the government. But as the graph shows, it did not have the desired effect. From 1st of October 2020 till 20th of November 2020 the average daily force of the spread of the pandemic was 1.023. But from 1st of November till 20th of November this average force had increased to 1.028 – almost the force of 1.03 in Spring. The lockdown 'light' from on 18-11-2020 then lead to a decrease of additional infections (more recovered than newly infected) by an average force of 0.977.

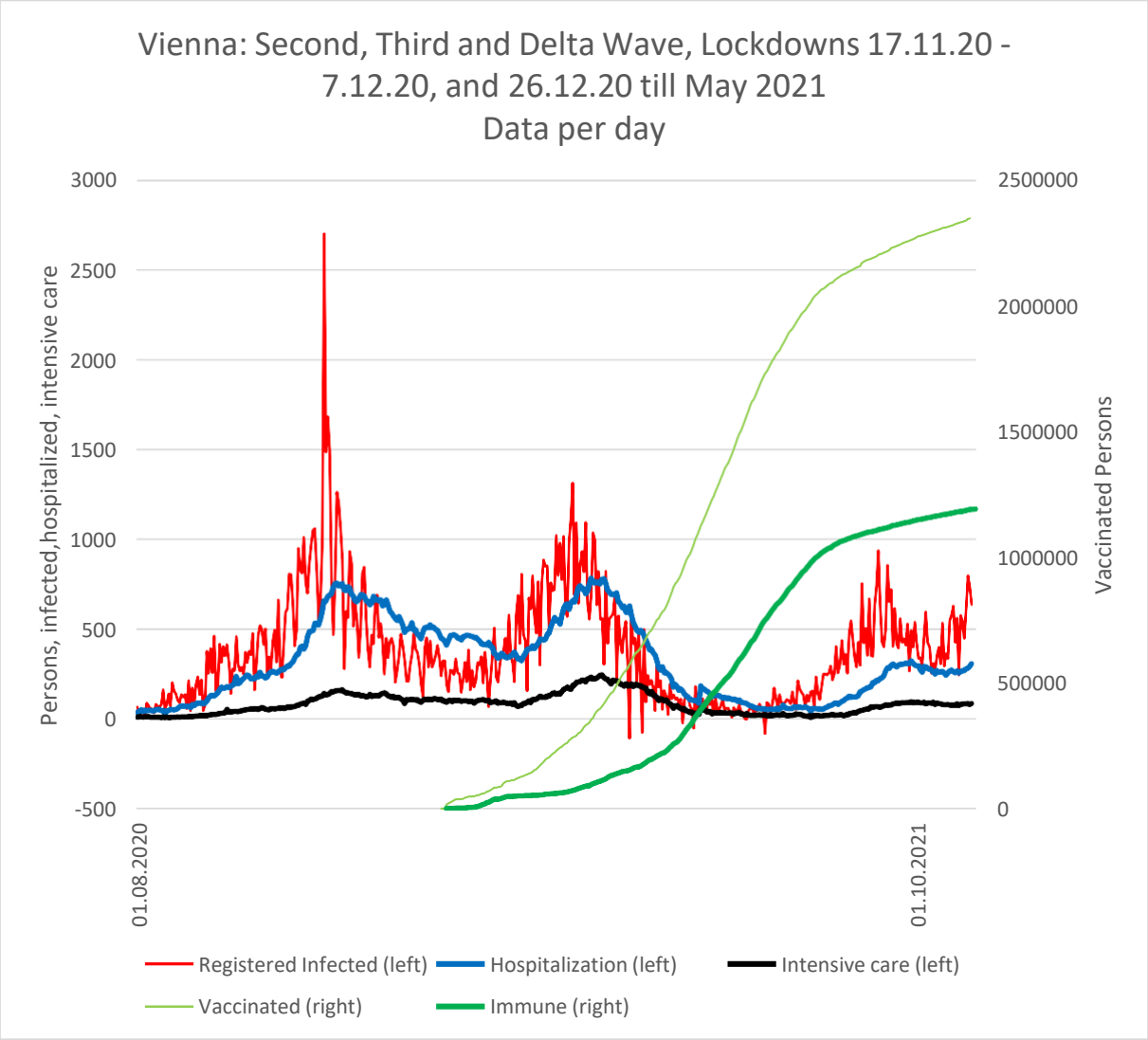


Diagram 2
Source: ARGES as prepared by Erich Neuwirth

As a consequence, a third lockdown was ordered from the 26th of December onwards, which finally could break the second wave somewhat. The health policy of autumn 2020 was characterized by a heavy use of propaganda by Sebastian Kurz, pretending that the

government is successful in fighting the pandemic. As the data reveals, the opposite was true. Moreover, an internal competition of popularity within the government between Kurz and his minister of health affairs, Rudolf Anschober, popped up. The somewhat inexperienced staff in this ministry and the destructive interference of the chancellor lead to a deadlock in a situation where effective countermeasures would have been necessary – though difficult to implement anyway.

5 – Tests are insufficient to contain an infectious wave but are helpful to estimate the number of total infected persons

During the second wave the new tool of testing was stepped up. The idea was that testing can fulfil two different tasks: First, infected persons can be found out and can be isolated to reduce the speed of the pandemic. Second, the share of positive tests in the sample can be used to estimate share of infected persons in the total population, thus including unobserved infected persons. As diagram 3 shows the ***first goal*** by and large ***failed***.

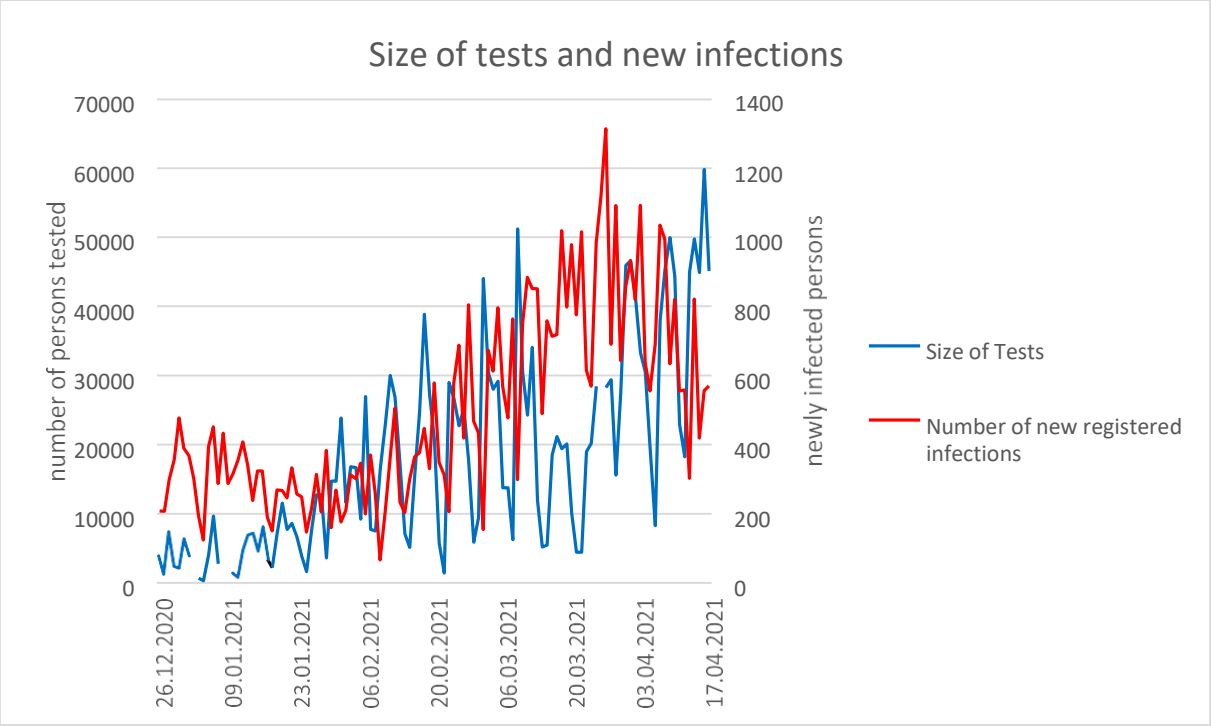


Diagram 3
Source: ARGES as prepared by Erich Neuwirth

The massive increase of the number of tests from January 2021 to mid-March 2021 could not stop the rapid spread of the virus. Though there always was a small number of persons identified in the tested sample, which could be sent into quarantine or hospital and therefore reduced the number of spreaders, this small contribution was insignificant. An additional fact that contributed to the ineffectiveness of tests was that the new British virus variant B.113, which first occurred on 03-01-2021 in Vienna, did spread faster than the previous one.

The ***second goal of testing***, namely to use test samples as a proxy for the total number of infected persons in Vienna, can be considered to have been much more ***successful***. As can be

seen in diagram 4: All test samples are ordered according to their size and compared to the share of positive tests, called Beta.

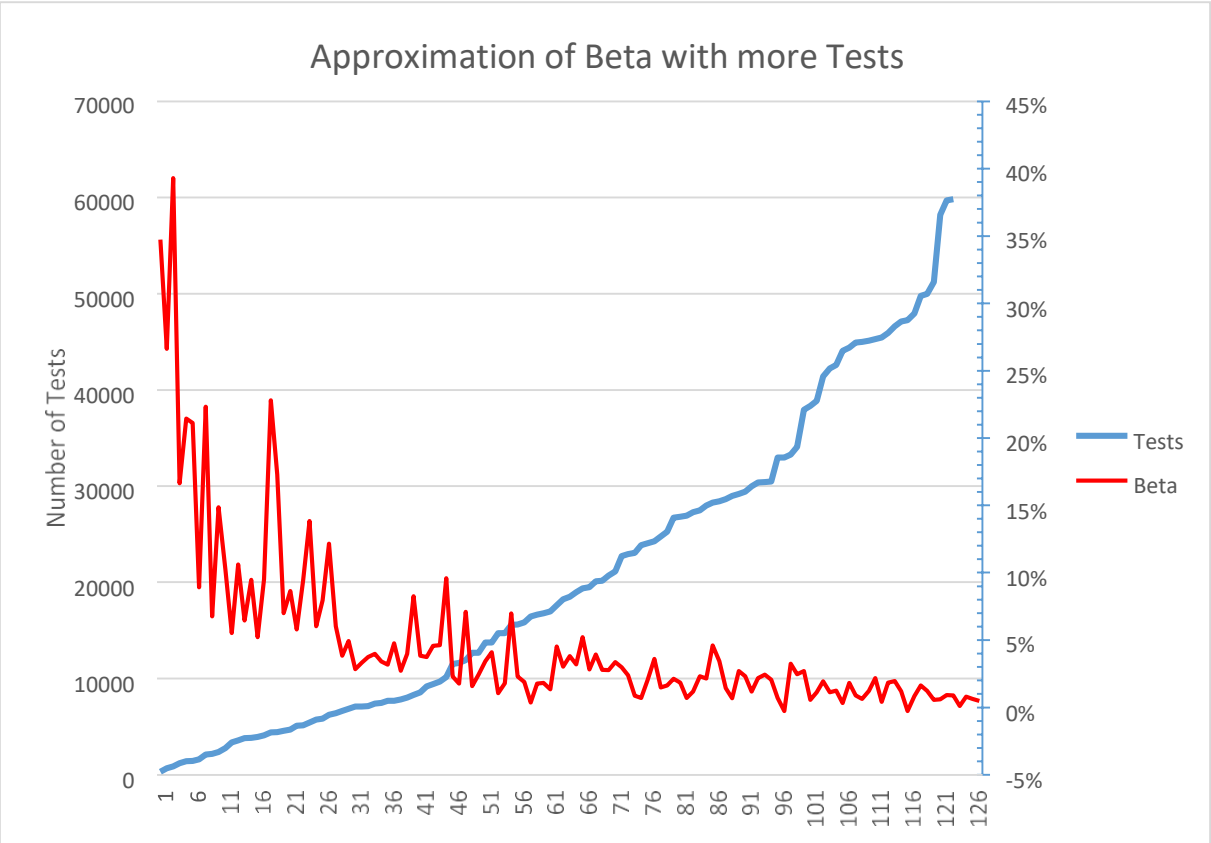


Diagram 4
Source: ARGES as prepared by Erich Neuwirth

It is straightforward to assume that larger test samples provide a better approximation – and the graphic suggests exactly that. The value of Beta seems to approach a number between 1% and 2%. Nevertheless, there are many critical points to be raised against this result. First, the proportion of infected persons in the total population might have changed strongly between 26.12.20 and 17.4.21. But keep in mind that after the sample size surpassed 10.000 there always is a Beta below 5%, whereas for the small sample sizes very implausible high numbers of infected in Vienna (20% of infected means 400.000 persons!) are estimated. These numbers therefore can certainly be attributed to the small sample size. A second criticism concerns the test data itself. The tested sample could have been biased: Either only particularly prudent persons could show up at tests, i.e. the Beta estimate would be too low, or the tests were taking place in locations where particularly many infected persons could be expected (to achieve the first goal of testing) and where inclined to take the test, i.e. the Beta estimate would be too high. Finally, the numbers of tests published by AGES might have been inaccurate for various reasons.

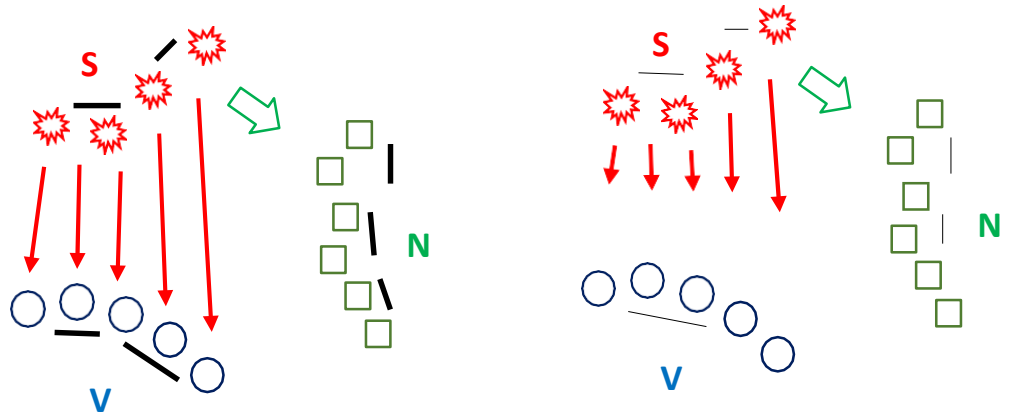
Against all these valuable criticisms, it has to be stated that such an estimate of Beta – with all its inaccuracies – is the best we have to find the total number of infected in Vienna. All studies of singular empirical phenomena, not to speak about properties of the Virus itself, cannot give an idea of the proportion of infection in Vienna. Too often an infection remains undiscovered

even by the infected person (with slight symptoms). Using the estimated Beta thus is an important – though risky - step towards the following issues.

6 – Lockdowns help, but incur a high cost

As this modest preparation of empirically observed data shows, lockdowns can reduce the spread of the pandemic somewhat. But the development since January 2021 still was disappointing, the new mutation B.113 seemed to survive and to override all effects of the long-lasting lockdown. To understand why, it is helpful to consider some typical feedbacks of social systems on the lockdown measures taken by a government.

Start with a simple structuring of anti-pandemic measures, compare graphic 5.



Graphic 5

The total population consists of infected virus spreaders, S, possible new victims, V, and those that cannot be infected (recovered and vaccinated persons), N. The arrows between the groups show the spreading process, the links without arrows show other social connections between them. A lockdown reduces strength and number of arrows by inhibiting social encounters via distance rules, wearing masks, close down of production processes, and the like. Since it is a general set of governmental orders it also cuts down and reduces the majority of all other social links between human individuals, the black links in graphic 5. This is the move from the left side of graphic 5 to the right side. Note that cutting the links only slows down the spreading process, it neither reduces the existing number of spreaders[6], D, nor does it reduce the number of possible victims[7], V. As soon as the lockdown ends, the spreading process can catch up again. It only might start at a lower level if the rate of recovery, the thick green arrow in graphic 5, has accelerated and has produced more elements of N. The number of died persons is also reducing the number of spreaders, though this number luckily is very small and these spreaders were already in quarantine in intensive care. Due to its small number this process is omitted in graphic 5.

At this point of the argument it has to be taken into account that this is a social system. Human individuals build internal models of their environmental conditions and react with actions

[6] The weak impact of the first goal of testing would do that.

[7] This is why large scale vaccination is so effective: it does exactly that.

based on their internal models. A second lockdown did provoke other reactions than the first lockdown. A third lockdown will again have different consequences. Effects of lockdowns cannot be measured like processes in Newtonian mechanics; they follow a much more complicated dynamic. Due to this feedback the impact of repeated lockdowns will decrease, simply because there is the need of individuals of the human species, economically and psychologically, to maintain a small enough social distance. Moreover, the shutdown of parts of the production system implies immediate shortages of money income and a sudden downward push of job security: Will certain businesses open up again at all? This massive economic disturbance comes into view with increased sharpness with every repeated lockdown. Not to be able to survive economically develops into a threat of personal health, which competes with the threat of the pandemic on personal health. The situation in the poor South already mirrors what might happen in the poorest quarters of Vienna's population. To care for the Corona pandemic needs a social security net, which secures that economic threads endangering health stay small enough.

With the 3rd lockdown in Vienna, which hopefully ends mid-May, the force of lockdowns has lost most of its power to delay the spreading process. A further repetition will not be needed as vaccination can shift the possible victims, V in graphic 5, to the mass of immune non-victims, N in graphic 5.

7 – Vaccination of the population of Vienna will solve the health crisis incurred by Corona

As already can be seen in diagram 2, it is the impact of mass vaccination that lead to the defeat of the 3rd wave of the pandemic, carried by B.113. Note that the relevant scale for vaccinated persons is on the right hand of the graph, since the much smaller numbers of all the other developments (shown on the left hand vertical axis) would not allow its representation. In diagram 6 the different elements contributing to the recovery that now is going to occur are displayed. And again the axis for the number of vaccinated persons due to its size had to be separated from the left hand side axis for all the other developments.

This diagram starts with the beginning of the third lockdown on 26-12-2020. It shows that the (accumulated) number of infected persons filtered out by testing (black line) is only a rather modest contribution to the recovery. A much stronger contribution comes from the (accumulated) flow of registered recovered persons (brown line). Though both impacts are slowly increasing, they could not prevent the 3rd wave of infection. Only vaccination (green line) had enough impact to change the situation to the better when the spreading started to gain speed again.

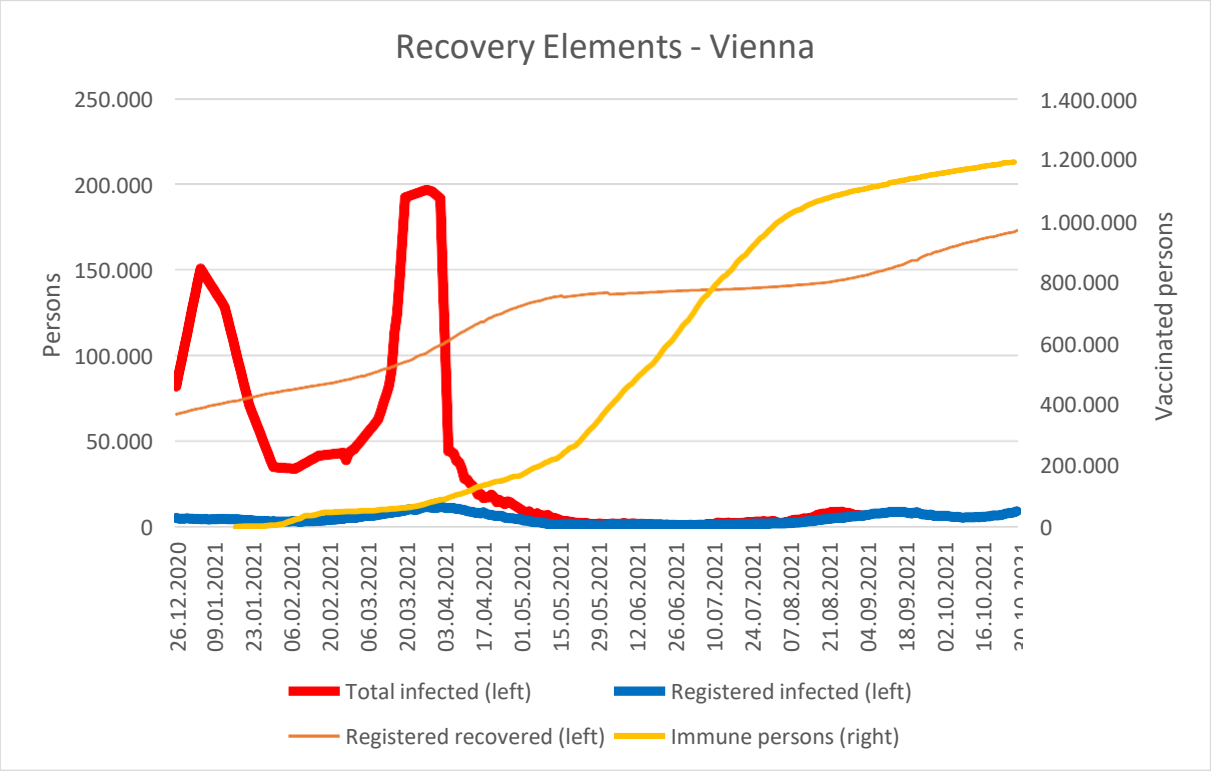


Diagram 6
Source: ARGES as prepared by Erich Neuwirth

Another important lesson to be learned from diagram 6 comes from a consideration of the development of registered infected persons (thick blue line) and total infected persons (red line) in Vienna. To compute an estimate of the total number of infected persons – one of the big mysteries of Corona modelling – the procedure described under point 5 with diagram 4 was used. The ratio Beta, i.e. how many positive persons are found in the daily tests, is used as a proxy to the same share in the total population of Vienna (excluding children). Since these Beta values jump around a lot, some smoothing had to be performed: a nine-period moving average. Moreover, the weight of each of these nine periods has been computed with the help of the relative sample size. In that way it turns out that most of the dynamics of the two waves only can be seen in the total number of infected persons, the registered infections are only the tip of the iceberg. The situation on 19th of April seemed to be slightly better than after the final break of the second wave towards the end of January.

8 – A preliminary résumé in mid-April 2021

With the help of the estimate of total infections in Vienna the risks of the consequences of being infected can be reassessed, compare diagram 7 (updated on 09-12-2021).

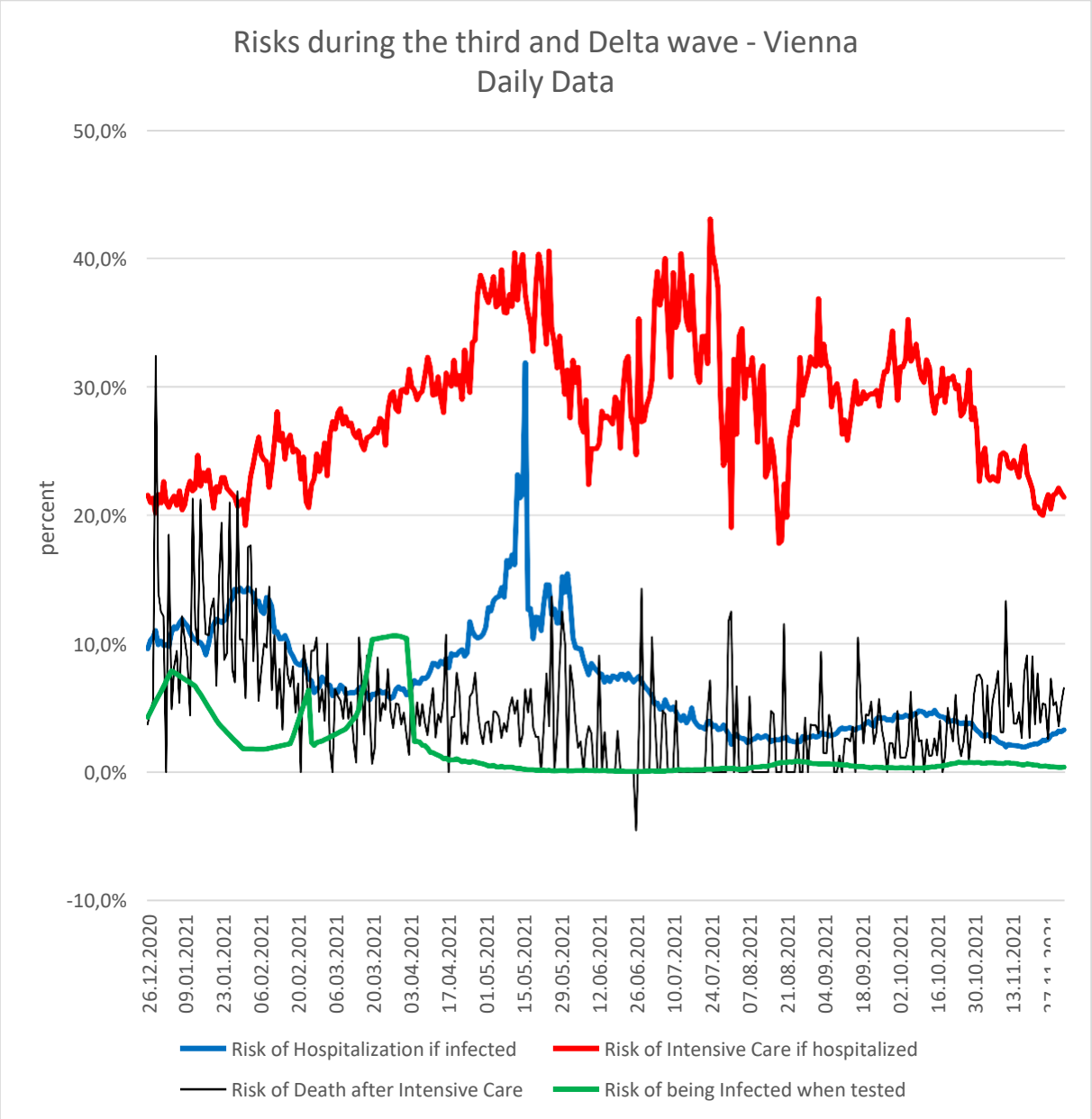


Diagram 7
Source: ARGES as prepared by Erich Neuwirth

As could have been expected, the ***risk of being infected*** (green line) follows the two waves. It is remarkable that the second wave continued to rise after 26-12-2020 (the start of the lockdown) till the first week of January. The risk of hospitalization (blue line) reached its peak when the new mutation B.113 started to invade Vienna (first occurrence 03-01.2021). This points at the special properties of that mutation: faster spread and more severe symptoms. Fortunately, with the take-off of vaccinations the spread then could be slowed down and hospitalization risk decreased. Once in hospital patients run the risk to be transferred to intensive care (red line). This again seems to be a special property of B.113: This risk increases since the new mutation has become dominant. So while the overall situation improves, the risks to get into intensive care once a person in hospital are still increasing. *This is the background for the still important threat of a shortage of intensive care facilities*. Finally, the risk to die once you are in intensive care (black line) shows that health systems have improved

and can – despite the additional severity of B.113 – keep this risk at a lower level than last year. If one considers all these (daily) risks to be independent, then there currently (April 2021) is a risk of around 0,000013 % for a citizen of Vienna to die from Corona (25 persons in 1,9 million persons).

Despite the defeat of the 3rd wave the Corona virus will stay with us, though at a manageable level. As virologists tell us, this virus produces less ***mutations*** than others, around two per month. And some of them can be more harmful than the current version, thus the danger is not standing still. But research in the area of vaccines is also developing rather fast, so there is no reason for despair. An important point is that the number of emerging new mutations is proportional to the number people being infected. So by keeping this number at a low level will also reduce the number of mutations.

Going back to the first point, namely that the choice of the cultural environment – in this case the city of Vienna – in which an epidemic is studied, is of utmost importance, it turned out that this is a general advice for understanding how to model the spread of viruses in human societies. Such societies consist of heterogeneous individuals, which nevertheless form sets of less heterogeneous ***cultural clusters***. Within each such cluster typical communication forms are the glue which binds the individuals to each other. These often are the meetings with family and friends, which we have missed so much. But communication within a cluster can also be dictated by a certain work context, or be initiated by a shared interest in a common leisure time activity. Face-to-face communications within a cluster can then quickly turn into starting points of a new spreading of a virus. One year of pandemic did teach us how to communicate electronically, how to build electronic clusters. From now on worldwide electronic clustering will have to be used to identify unhealthy viral developments at local physical locations *in time*. This sounds like a terrible proposal for a central, general electronic surveillance system – and it is exactly that. This takes me to the next point.

Our ***communication environment*** will change dramatically, not the least due to a wave of new information technology that will frame how the future global division of labour will look like. A *push to many more centrally taken decisions*, a trend towards global governance forced upon the species by health crisis, climate crisis and the crisis of global economic inequality *is inevitable*. This will spur hefty political reactions in some right-wing political quarters, and will necessitate the invention and (eventually forced) implementation of new democratic mechanisms[8].

In the small cosmos of Vienna and Austria the need of a ***more centralized***, quick and not dirty ***decision-making*** in the case of an acute crisis was only too visible in the last year. Interferences from uncoordinated local politicians – usually confused and full with prejudices – often proved to be as unwise and helpless as the decisions of the chancellor vis-à-vis the better informed centre in Brussels. Political interests at local levels need additional democratic control mechanisms from below to prevent short-sighted corruption and fraud.

[8] See (Hanappi, 2020b) for some ideas on these dynamics.

The ***crisis of the global political economy*** has just started. It was already a latent threat in 2019, but with the health crisis of the Corona virus – even if this might be under control soon - it will become manifest in the next years.

The last paragraph of chapter 8 turned out to be rather prophetic. The political situation in Austria really started to collapse as local political leaders in Salzburg and Upper Austria disregarded anti-Corona measures to win local voters, local elections[9]. The poor management of the health crisis of the Austrian government also was a main reason for the chancellor, Sebastian Kurz to step down and leave politics in early December 2021. His mistakes had already started to distort health measures when his doctrine of 'message control' was applied by the (ÖVP) health coordinators in Tyrol, when the virus first occurred in February 2020 in Ischgl[10]. The repercussions of failing health policy in politicalsystems will certainly continue. In Austria the conflict between the competences of the regions (Bundesländer) versus the necessity of central decision-making on a national level will hopefully lead to a profound reshaping of this political structure. An investigation and redesign of what democratic design is needed – how local needs and competences can be matched with their more central counterparts - has to take place! An analogue re-design process has already started on the EU level and hesitatingly also on the global level.

On the other hand, the hope that vaccination will help to keep the disease at a manageable low level – formulated in chapter 8 – turned out to be pre-mature. The Delta wave started slow in late October 2021 but gained frightening speed in its second coming in November. This should be seen as a warning that even very low infection levels, like those in June 2021, are no guarantee that a new mutation might not lead to a new wave.

There also is a lot of new evidence concerning vaccinations to be considered, the general appreciation formulated in April, now has to be modified: There are different vaccines, the repeated vaccination now is standard, if a certain vaccine is working in case of a new mutation has become a vital question. With respect to the political dimension vaccination turned out to be a surprisingly explosive issue. Stirred up by the downturn of economic expectations, larger

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[9] Mr. Stelzer, Landeshauptmann of Upper Austria, postponed necessary anti-Corona measures to the time after his re-election to gain votes from people supporting a strong anti-vaccination campaign lead by the FPÖ. After winning the election he formed a local coalition government with the FPÖ – at the cost of exploding infection rates.

[10] One of the main contributors to the Ischgl disaster, Franz Hörl, is still in office in December 2021.

parts of the population channelled their discontent with government policy into a movement against a government led initiative to spur the national vaccination process. In particular, compulsory vaccination – in Austria planned for February 2022 – has been used as an issue helping to gain popularity by right-wing, nationalist political movements and parties. Conspiracy theories and the believe in a kind of 'natural' survival of a fit race – without vaccination – were able to mobilize a considerable number of participants to join anti-vaccination demonstrations. The citizens' trust in science, perhaps infected by a justified mistrust in politicians, proved to be much lower than people working in science would have thought[11].

The following two chapters (9 and 11) were written in early December 2021, their main focus is on the fourth wave, the Delta wave.

9 – The Delta wave

During summer 2021 a new mutation of the virus, the delta variant, started to be spread. It evidently is characterized by the property to be *even more contagious*[12] than the known older mutations. Fortunately, the ongoing vaccination of Vienna's population first was able to reduce the emerging Delta wave to some extent. Till the end of October, a comparably light wave seemed to indicate that the new mutation has been overcome by Vienna's a bit more cautious anti-Corona measures during the summer, see diagram 8 (an update of diagram 2).

But then, in November 2021, a heavy break-out of Delta virus infections occurred. This break-out of daily new infections reached the high levels of the second wave. The immediate question thus comes up, why the fact that half of the population has been vaccinated did not help to avoid this dramatic development.

An immediate answer is that the speed of spread of the new mutation had been severely underestimated. In environments of not-vaccinated persons it can spread with incredible speed, in particular if these non-vaccinated groups are explicitly promoting group meetings that willingly circumvent all protective measures. That this is the case can be seen by taking a closer look at the structure of infected persons in hospitals. There, almost 90 percent of patients are non-vaccinated. The virus evidently finds its victims mainly in this group – but not only.

Another contribution to the renewed surge of infection comes from the recently discovered fact that the shelter of a vaccination decreases faster than expected: After 6 months the shelter of a double vaccination might have been halved and needs a third booster shot.

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[11] Part of the guilt for this state of affairs has to be blamed on certain social scientists, which sell their 'scientific' products to any politician who pays for it. This has earned science a bad name.

[12] Some sources report that contagion is twice as strong as that of the older mutations.

Furthermore, it also has to be considered that vaccinated persons might carry the virus and spread it even without being infected themselves.

And finally, a new group that previously had been neglected, namely children, seems to play a more important role in the spreading process. Therefore, the vaccination process now is widened to cover children too. Even if their symptoms usually are mild, they are spreaders.

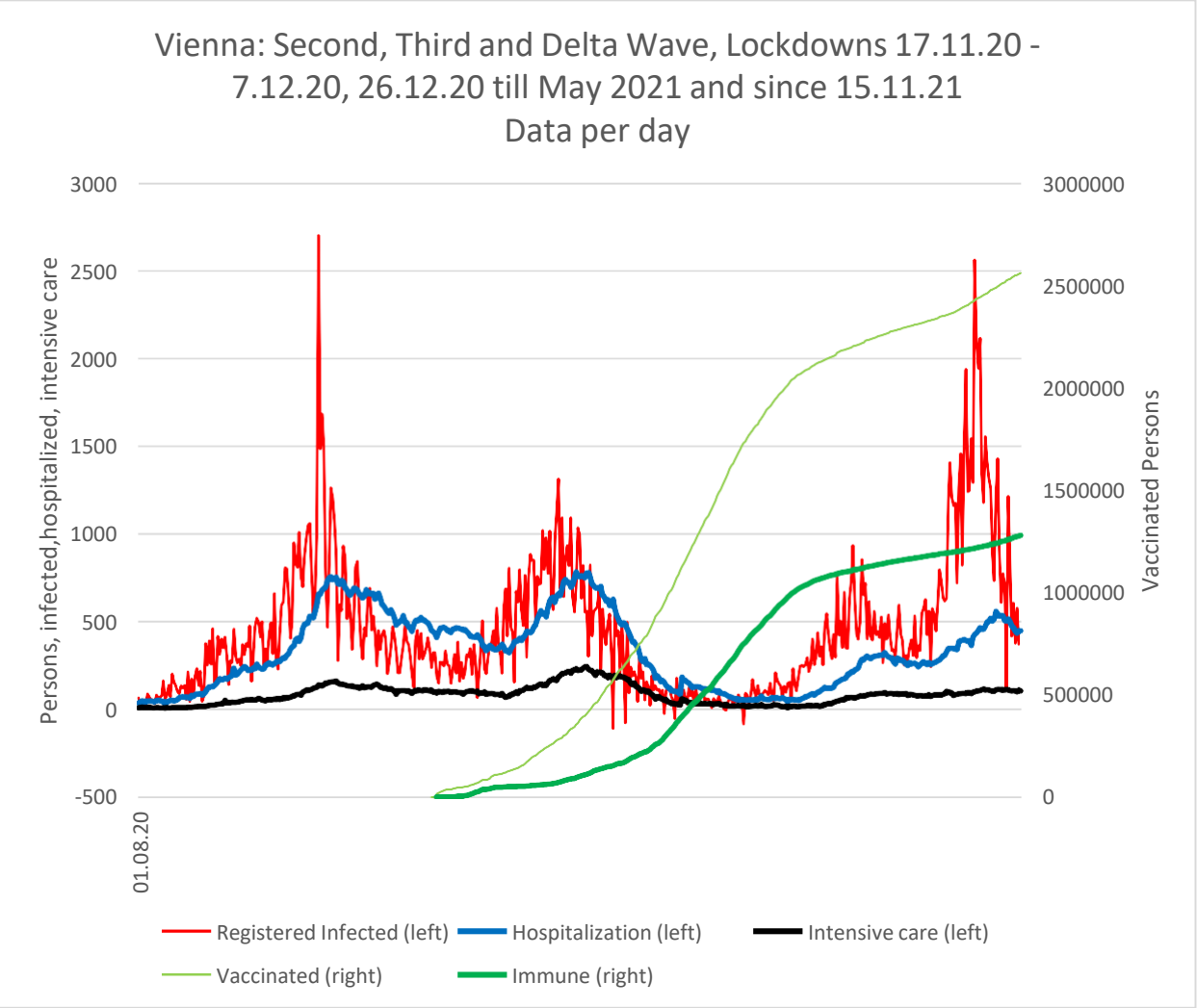


Diagram 8
Source: ARGES as prepared by Erich Neuwirth

The diagram also shows the advance of vaccinations. The light green curve is the total number of vaccinations while the thicker dark green one gives the number of completely vaccinated persons (right hand scale). Note that it is estimated that only 80% of the latter cannot be infected. It is evident that vaccination helped to dampen the Delta wave.

The risks that emerged with the Delta variant are depicted in diagram 9 (already shown in diagram 7). It shows that the risk of being infected (without considering vaccinations) would have risen only slightly, while the risk of hospitalization increases but stays surprisingly low. The risk to be passed to intensive care now is falling again. But once a patient is in intensive

care its risk to die now has doubled. These characteristics can be better interpreted if the influence of vaccination is included.

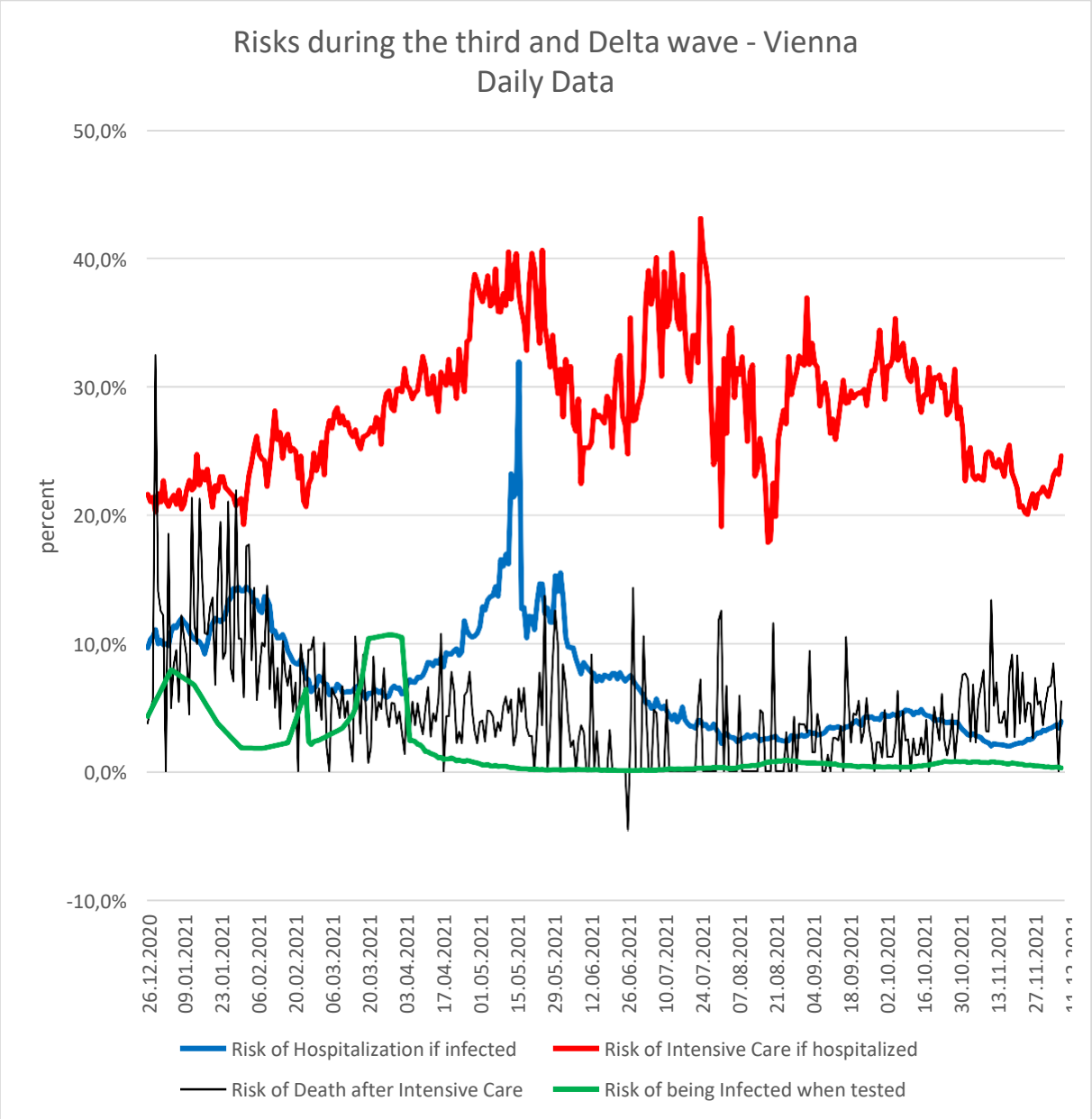


Diagram 9
Source: ARGES as prepared by Erich Neuwirth

The number of ***vulnerable persons*** (all persons in Vienna older than 12 years minus all recovered persons and minus 80% of all persons with two vaccinations) has been reduced substantially since 1.7.2021. Subtracting 80% of the fully vaccinated and all recovered persons from the total population gives what is shown in ***diagram 10*** as black line (right scale). Cum grano salis this diagram depicts the situation of non-vaccinated persons.

The risk of being infected now refers only to this group (blue line) and shows a peak around 28.8.2021. As could have been expected the risk of hospitalization (red line) followed with an increase while the risk of infection in this group exploded. Then infections briefly slowed down

and surged again in November. With the beginning of the lockdown on 15-11-21 even for the non-vaccinated a marked fall in infection risk was observed. Moreover, a rise in vaccinations due to restrictions for non-vaccinated certainly has played a role too.

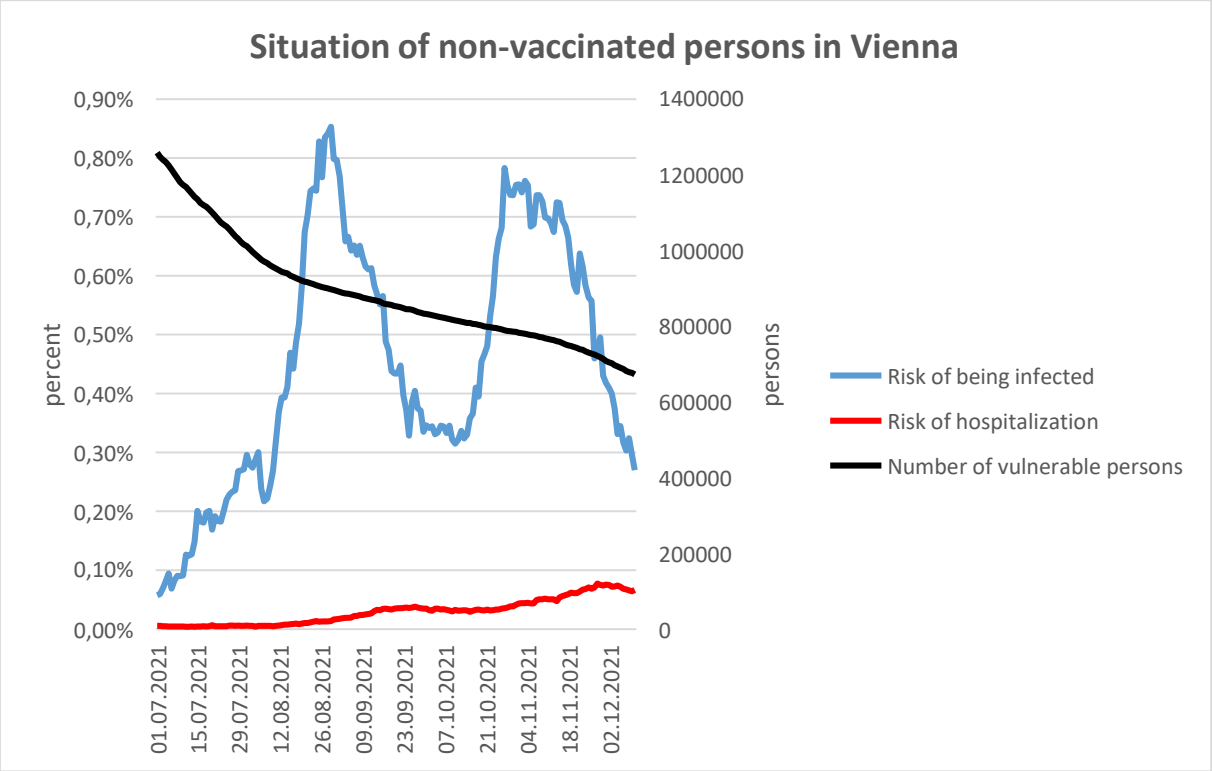


Diagram 10
Source: ARGES as prepared by Erich Neuwirth

One of the anti-Corona measures has been the introduction of access control in certain public spaces, restaurants, schools and working places. A prove of vaccination or a negative test result became necessary. Therefore, more testing occurred and with rising vaccinations the number of positive tests fell substantially. Nevertheless, the two peaks of the Delta wave can be seen in this diagram as well as in diagram 10.

The most important small piece of hope is the slightly steeper decrease of the slope of the curve of vulnerable persons that occurred in the last week in ***diagram 11***. Perhaps the prospect that vaccination becomes mandatory latest in February 2022 has induced some to get vaccinated right now. Getting tested twice a week to participate in public life is troubling anyway, and in some places even a negative test would not do.

But the still active anti-vaccination movement in Vienna will not lose power in the near future. The typical career of a participant there currently leads to an infection with a daily probability of 0,4 %. Once in hospital, a transfer to intensive care occurs with a probability of 20 %. This still is rather high. And then the daily chance to die in the meantime has doubled, it is around 5 % (staying there for an average of 10 days, this implies that around 50 % die). Despite these risks a large majority of anti-vaccination activists will survive their infection and as recent opinion polls show, most of them – in particular those with lighter symptoms – will not change their attitude. They might feel to have proven that they belong to the ‘strong race’.

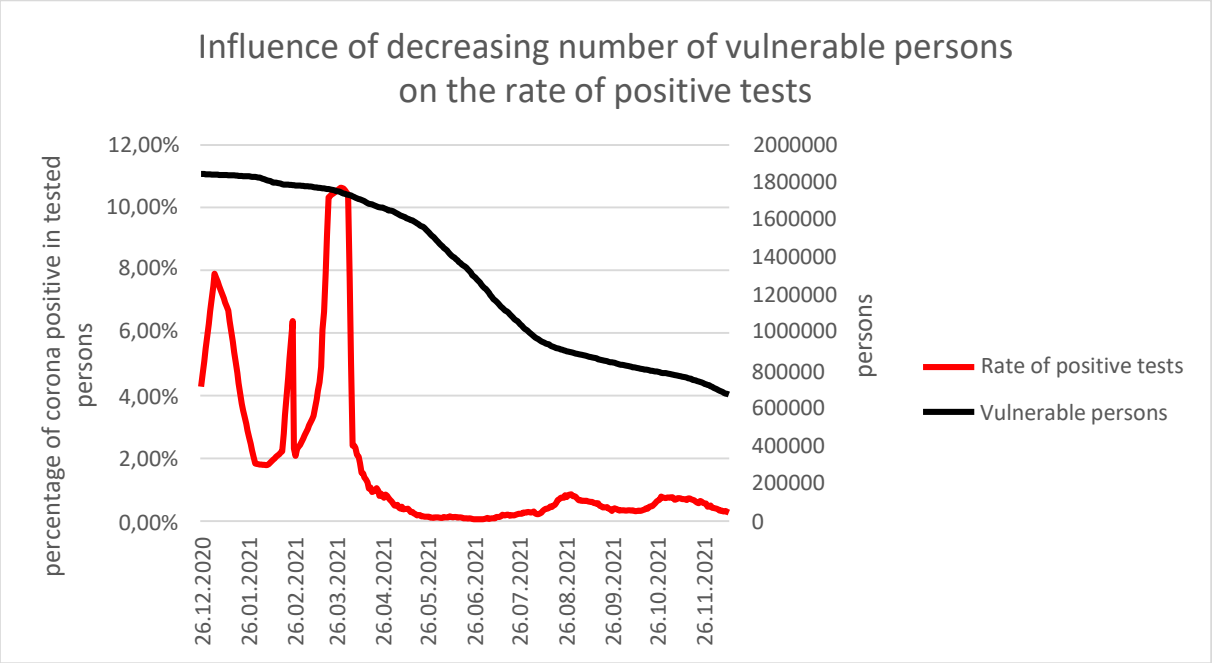


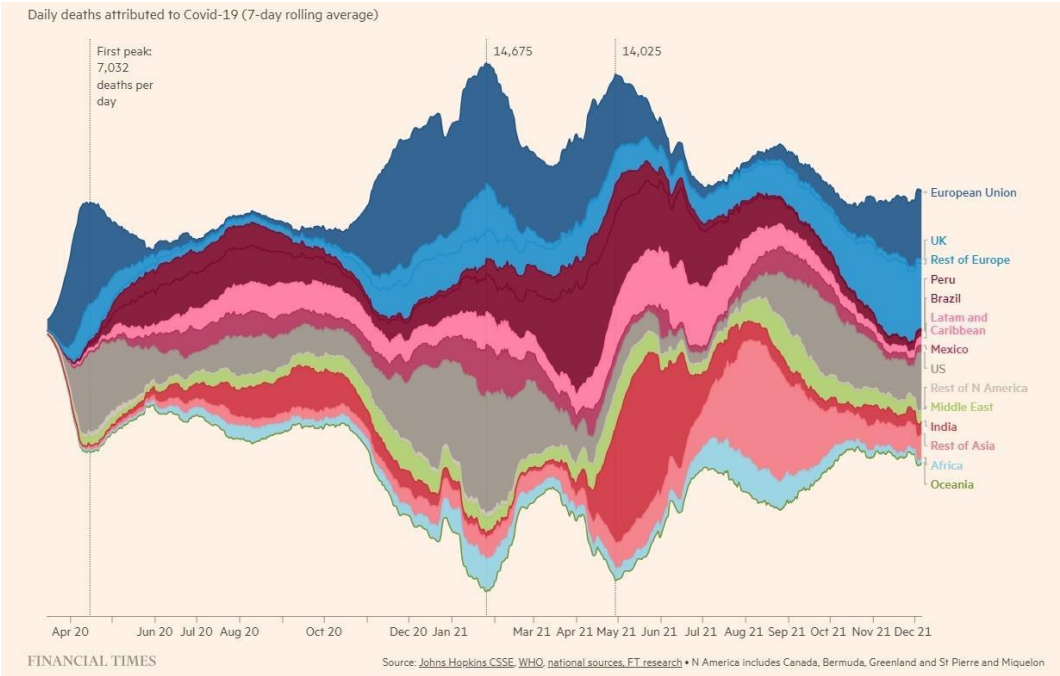
Diagram 11
Source: ARGES as prepared by Erich Neuwirth

10 – On a global level the pandemic is not over yet

New mutations occur more often where the number of infected people is high. As long as the virus stays present in large parts of the global population ***no country is save*** from being affected by new variants.

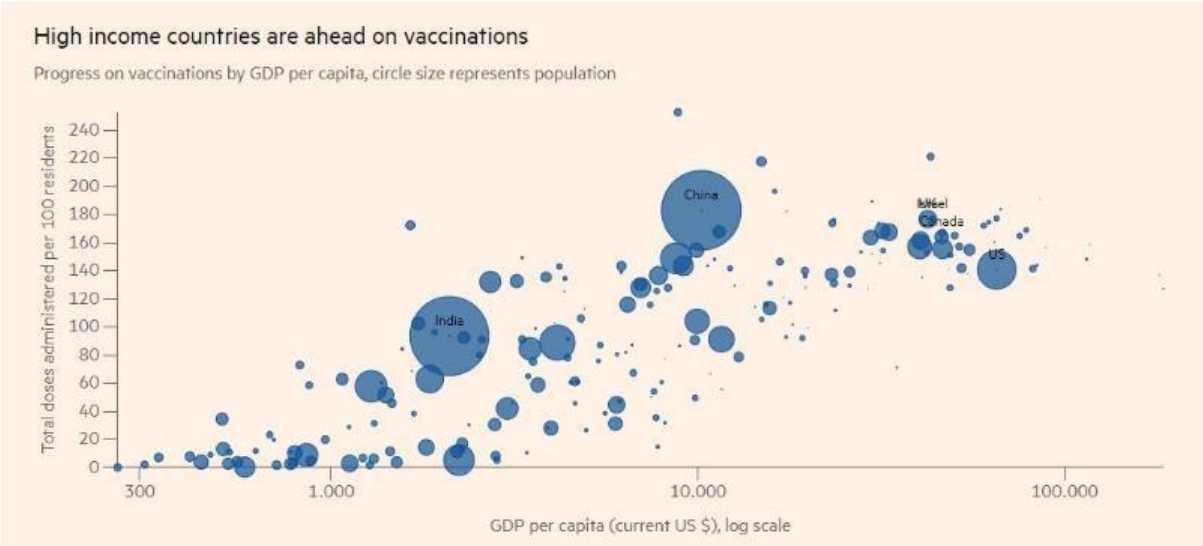
Since data on new infections and other details is insufficiently collected in the poor South, the best indicator for the situation is the number of deaths attributed to Covid-19. ***Graphic 12*** provides an updated view.

The last three months showed that Europe is becoming a hotspot of Corona deaths again. The Delta wave is hitting the non-vaccinated population particularly hard and leads to higher percentages of deaths. But the threat of new mutations still seems to come from other parts of the world where there is a much higher population of already infected persons – though these numbers are not documented. E. g. the newly observed Omicron virus that comes from South Africa. Therefore, a globally oriented vaccination policy is necessary.



Graphic 12
Source: Financial Times (Coronavirus Tracker)

Still, it is the case that vaccination is closely linked to GDP per capita, compare ***graphic 13***. In other words, it needs a conscious, non-profit motivated transfer of vaccination activity to save the global health situation of the planet. In that respect the corona pandemic resembles the climate crisis. Both can only be mastered by something like a world government. Wasn't the United Nations once installed as a forerunner to such a global democratic institution?



Graphic 13
Source: Financial Times (Covid-19 vaccine tracker)

While considering the global level of the pandemic is of utmost importance it also is revealing to remember a point made in chapter 1 of this paper. There it was stated that each Austrian regionto a decisive degree is a cultural biotope, a fact that has made it necessary to single out the analytical study of the city of Vienna. This was written in April 2021 and

November 2021 proved how correct it was! In ***diagram 12*** the break-out of the Delta wave in Vienna, UpperAustria, and Salzburg is compared.

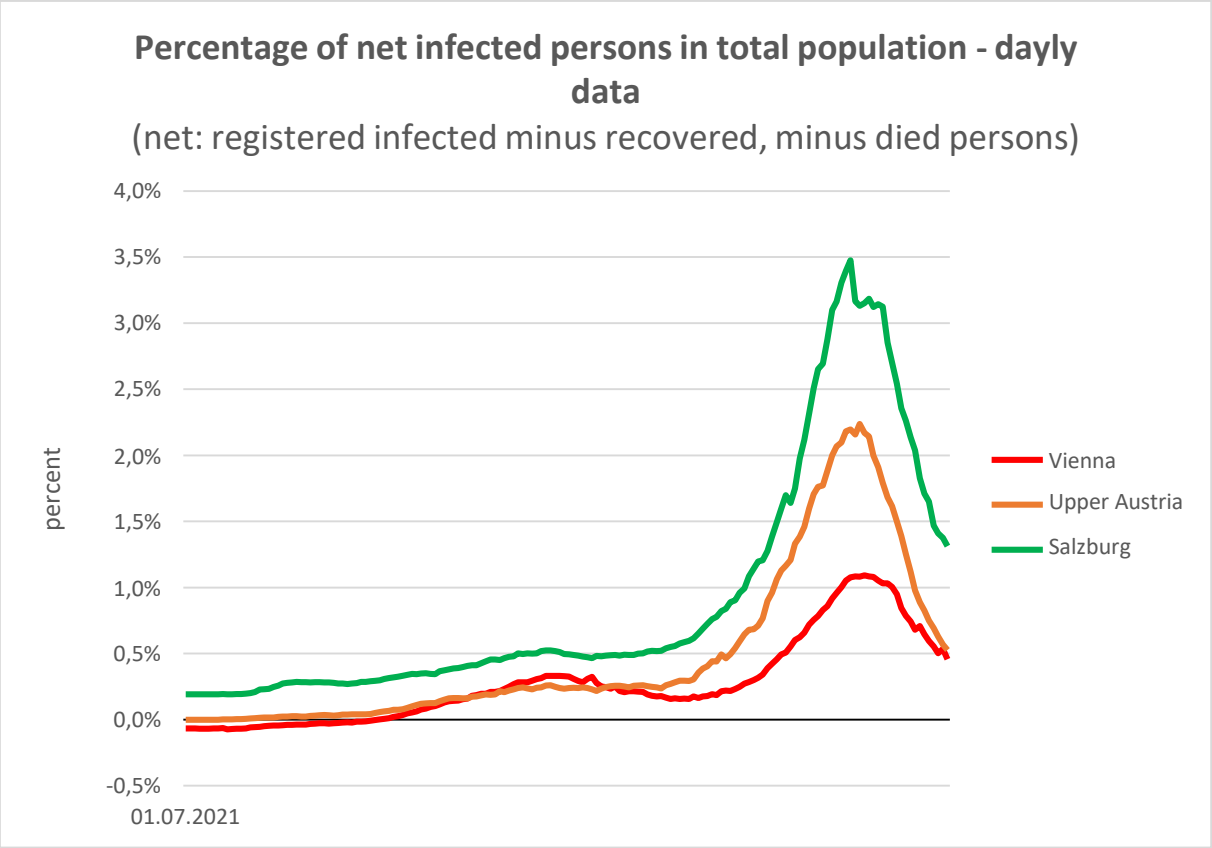


Diagram 12
Source: ARGES as prepared by Erich Neuwirth

The difference between the three regions during the break-out is striking, though the lockdown from 15-11-2021 brought them closer to each other again. This is a characteristic of the pandemic: It strikes at smaller local places and in the following can only be tamed by a centrally coordinated action of a larger political entity. How to simulate this type of interaction will be the topic of one of the following chapters of this monitoring exercise. And of course, the evolution of the new Omicron virus should then be studied by using such a new methodological tool. Science develops as interaction with the handling of human problems.

It is perplexing how the immediate fate of a single city, e. g. Vienna, is directly linked to the big questions of global political economy, e.g., the installation of global government. Hopefully, this direct connection between the local and the global will be better recognized by future generations. If not, then they probably will not exist.

The following chapter was written in March 2022. Its main focus is on the Omicron wave and on the complete failure of the Austrian government to deal with it.

11 – The Omicron Experience

In November 2021 the Austrian government under the new chancellor Schallenberg – following Kurz who had to step down because of several lawsuits - had decided to enact a law for a general compulsory Corona vaccination for all Austrians. All political parties in the Austrian parliament agreed, only the right-wing party FPÖ was against. This did happen and could happen under the impression that the Delta wave was almost non-stoppable, a hard lockdown had to be implemented.

The first astonishing fact following this brave and from the point of view of public health certainly reasonable decision was that after a spring and summer that had seen a jump of the vaccination rate of Vienna's population from 0% to 40% (on 1st of August 2021) there now occurred an ***influential political movement organizing fierce resistance against vaccination***. Two existing political forces played a pivotal role for this surprising upsurge of vaccination resistance: (i) Austria was the only European country where a political party with explicit enmity to vaccination, namely the FPÖ, had been part of government – the Kurz-Strache government with Herbert Kickl as Minister of the Interior. During this period this Coalition had access to occupy important – and even less important – positions in the country with *their men*. (ii) Sebastian Kurz was forced to resign together with his Minister of Finance Gernot Blümel, but the rest of his inner circle, the so-called 'system Kurz', largely remained in power. Also, his government coalition, with substitutes for Kurz and Blümel, stayed alive. Without the extroverted head of the group an intense infight in the conservative party started. As each aspiring politician tried to gain votes from the group of the enemies of vaccination, the opposition to the strong statement of the weak Schallenberg was a welcome opportunity to sharpen one's profile[1].

Besides these existing political preconditions, the extremely high media concentration in Austria certainly played an important role too. By jumping on each fancy message and demo that the resistance organized and exaggerating their importance the ***boulevard plus TV*** managed to make them look bigger than they were. And in the sequel, this attracted fellow-runners from every walk of life.

Very visible was that the movement ***was led and directed by right-wing groups***: At demos well-known Austrian neo-Nazi leaders (e.g., 'Identitäre') typically marched in front, Herbert Kickl was the major speaker, the whole organization ran via the FPÖ facilities. The first success was that the new law was delayed by avoiding the possibility to send it on a fast track to its execution – what would have been an absolute priority given the urgency of preventing the just emerging new wave. Instead, a tedious administrative process started that postponed the instalment of the new law till February 2022. And even then, it was left open if those who break the law should be punished at all. Finally, in March 2022, it was decided that the law was not to be executed. So, in the end the Austrian law of compulsory vaccination of all Austrians was never put to work. To judge which effect it would have had therefore simply is not possible; it only was a temporary visible symbolic action. What really had an impact was the propaganda of the anti-scientific anti-vaccination movement. It was strong enough to force the weak coalition government – after forcing the green Minister of Health to resign and be substituted by a more opportunistic person – to give up all precautionary measures exactly at the height of infection rates of Omicron! In Austria the whole Omicron experience thus, above all other remarkable features, is the experience of a ***disastrous failure of health policy*** due to complete mismanagement, opportunism and unprofessional misuse of badly selected 'experts'.

Turning to the actual data immediately reveals the dimension of this disaster.

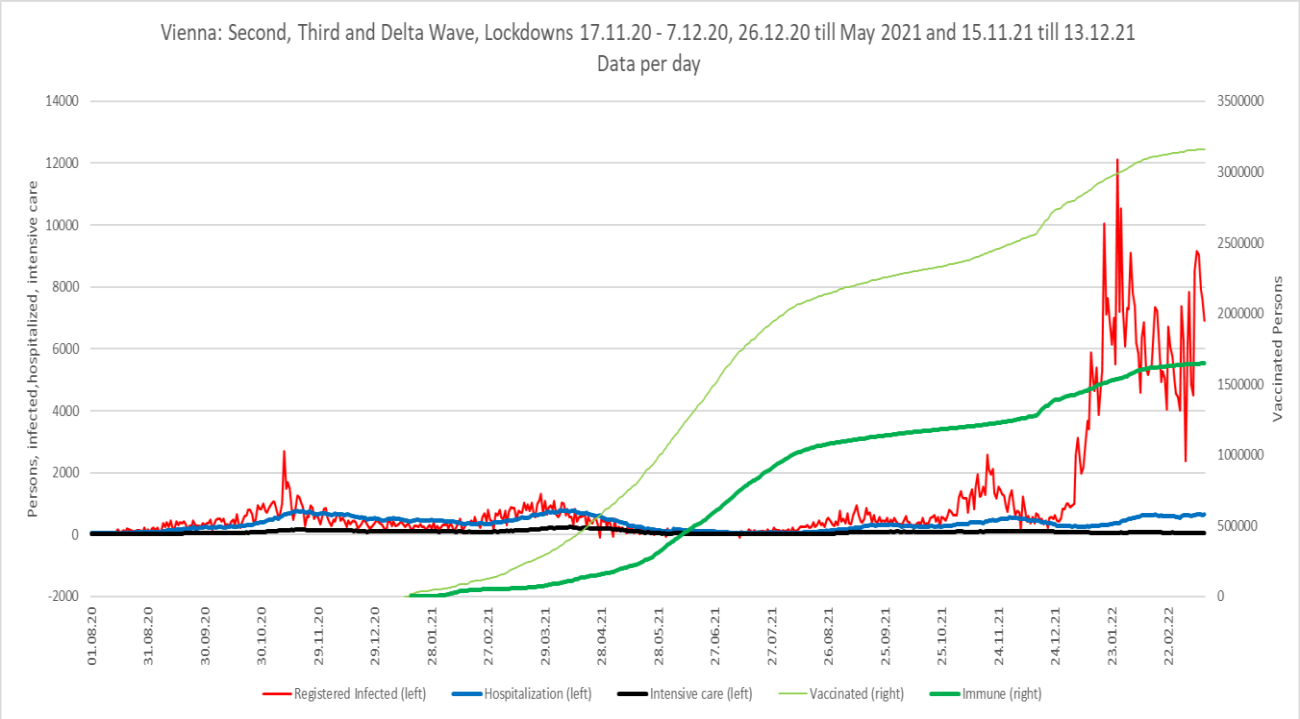


Diagram 13
Source: ARGES as prepared by Erich Neuwirth

As can be immediately seen in Diagram 13 the Omicron waves dwarf all earlier waves. The first steep slope is due to the high infection rate combined with a loose prevention policy, and then the continuing surge in the last weeks is owed to the dropping of all counter-measures.

The following two diagrams, Diagram 14 and 15, show that also compared to other EU countries Austria is doing particularly bad.

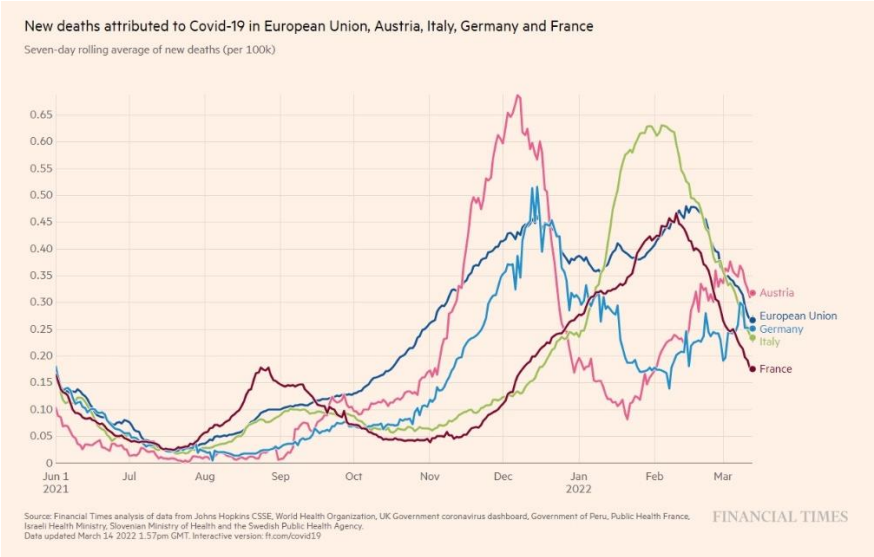


Diagram 14

Contrary to the message suggested by the government the pandemic still is causing a high number of deaths. And Austria is not only leading in this respect, compare diagram 14, but even is the country where the death rate is on the rise since January!

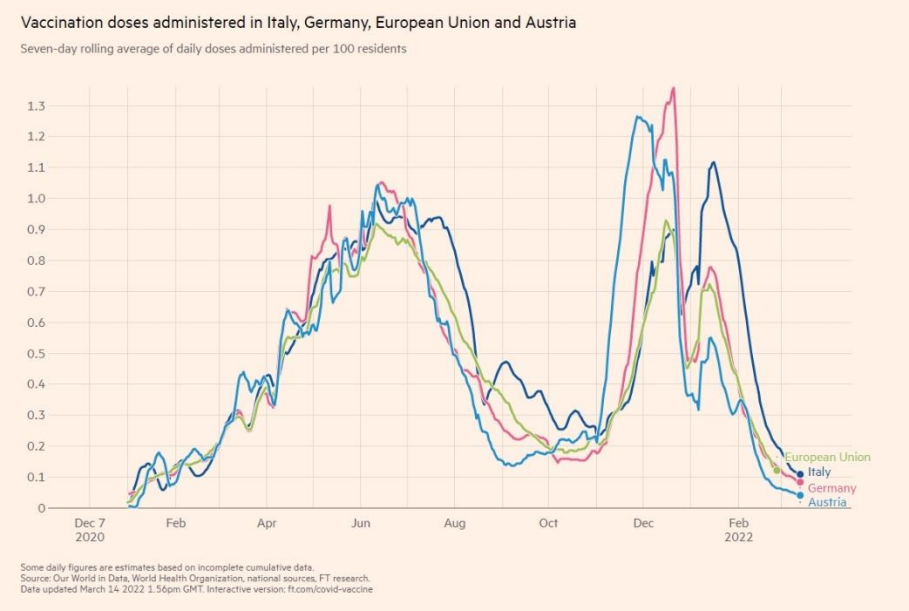


Diagram 15

Diagram 15 shows that vaccination activity in Austria during the summer 2021 was completely lost, drifted out of focus due to the carelessly overoptimistic government of Sebastian Kurz. It then had to jump quickly when the delta wave exploded in Austria – stronger than in any other European country. The culmination of this positive - though too late - reaction was the already mentioned decision to introduce a law of compulsory vaccination in November 2021. But then, with the extraordinary resistance movement against this initiative, Austria rapidly became the European laggard in vaccination activity again. The new personnel in the same Austrian government repeated the mistakes of Sebastian Kurz of last Summer.

But apart from providing some outstanding examples of bad health management of an inapt government, the Omicron incident also turned out to be revealing with respect to the nature of the pandemic itself.

A virus is not a living system, if such systems are defined as systems that maintain an independent metabolism. Viruses can only survive and spread with living systems that serve as their hosts. Despite this deficiency when compared to the human species, viruses, nevertheless, exhibit a kind of learning behaviour. Learning without the possibility to use an internal model of the environment hidden somehow-somewhere in a brain is still possible. It is ***Darwinian learning*** by the group of viruses, which works with three process types: ordinary copy production, mutation, and a test[2]. In process type 1 the small entities (individual viruses) are able to produce copies of themselves, but as unavoidable part of process type 1, environmental disturbances and irregularities lead to slight errors in some of the copies3 – this is process type 2. If then the results of process type 2 are exposed to the environment, they either can turn out to be less able to reproduce, or they can prove to be even better reproducing than the original. This is the test, process type 3, which can select successful mutations.

Darwinian learning works on the level of a species, it pushes back variants within the species that are less apt to copy in a certain environment and lets those variants increase their share that can copy better than others. Some mutations are so much off the point that they do not get a chance to compete at all, they immediately die out. Seen from outside, considering a species as one entity, it looks as if this entity is adapting its 'behaviour' – manifested as shares of different variants – to its environment[4].

This illusion is the reason why from a less scientific point of view the pandemic is treated like an ***independently acting, malicious entity***: 'Corona' has us in its hand. As soon as we thought we can handle it with certain vaccines, it escaped into a new mutation that spread four times faster (Delta). And when we pushed it back by lockdowns, it again learned to escape by speeding up again and adding a new feature: its symptoms at first sight were less severe (Omicron). This latter feature has turned out to be particularly effective since it further amplified the spreading process. As a virus you do not want your host system to die – you need it[5]. You do not even want your host to recognize that you travel on his system, symptoms should be suppressed, this enables better spreading. From this perspective, the development of Omicron looks like a pretty much straightforward strategy of the entity 'Corona'.

It is almost frightening to imagine that 'Corona' might now read in the newspaper that we have to learn ***to live with 'Corona'***, with her (for dramatic purposes I ascribe a female gender). This must be very satisfying for her: She now is part of us, is 'endemic' as some biologists would call it. Being accepted also implies that all the hard measures to stop her spreading will be taken back – this is exactly what happened in Austria recently – it becomes an accepted fact that she takes a certain toll, a certain number of lives per week. As long as there are enough beds for intensive care, the health system – and the Austrian society – would be content. She, 'Corona', has changed the mindset with which humans are looking at her. Let's take a closer look at her.

Consider the change in the risk structure that 'Corona' in the dress of Omicron now has assumed.

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[2] Herbert Simon was one of the first to described this core element of evolutionary theory in an algorithmic way, (Simon, 1969).

[3] The basic ideas, of course, go back to Charles Darwin's studies of the birds on the Galapagos islands. The simplest approach to capture the direction of mutations is to assume a predefined probability distribution, e. g. a normal distribution, across a finite set of dimensions; but for a given type of population additional information might be used to narrow down the space of possible mutations.

[4] In (Hanappi, 1994) it is speculated that the evolution of the human ability to learn was based on the capacity to internalize this 'species learning' into the brains of single members of the species.

[5] Stupid Ebolavirus kills people much too fast and thus undermines its own survival.

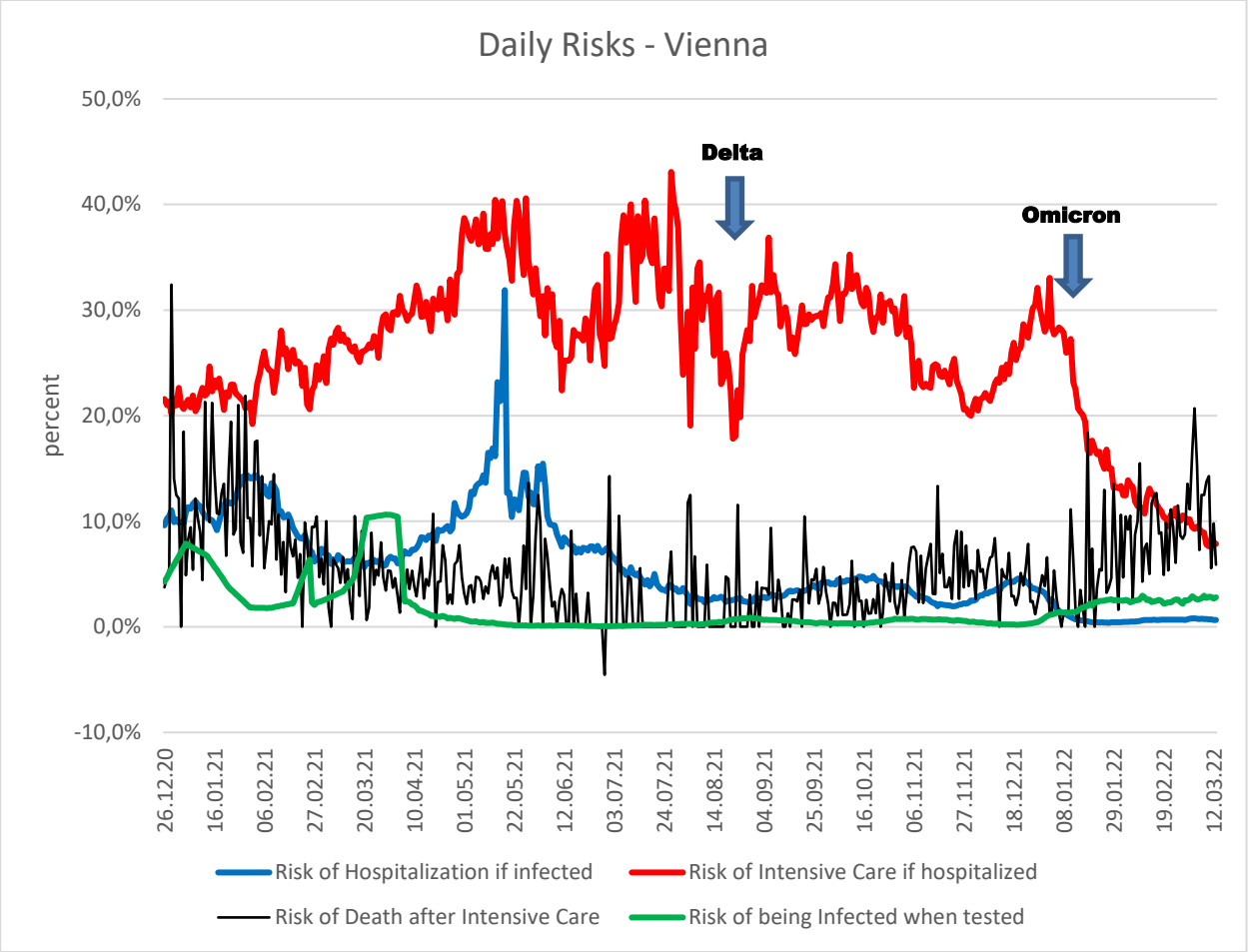

Diagram 16
Source: ARGES as prepared by Erich Neuwirth

The vaccination had a dampening effect on the risk of hospitalization when infected of the two Delta waves (blue line). From hospital to intensive care (red line) only a slight improvement during the second Delta wave can be seen. The risk of being infected when tested (green line) stayed rather low too. A moderate, delayed risk to die when in intensive care has been observed at the highest part of the second Delta wave.

But with Omicron things changed abruptly. The risk of being infected when tested (green line) suddenly jumped on a new level. The substantially higher speed of spread rapidly was felt by the population. It concerned not only non-vaccinated. It was also learned that immunity of vaccinated persons was around 80 % and did start to lose its effectiveness after four years. But two vaccinations plus a booster vaccination made sure that a transfer to hospital if infected (blue line) very unlikely. The role of vaccination, which in Spring 2021 was welcomed as a final relief from Corona, now was found to be only an insurance against serious illness and death. The large majority of infected patients in intensive care are non-vaccinated. But this risk, the risk to be transferred from hospital to intensive care (red line), is the most significant change after Omicron had set in. It fell from 30 % to less than 10 %. The second strongest change is the quickly rising risk for those in intensive care to die (black line), mainly non-vaccinated. It is rising from around 3 % to around 10 %. This again shows the type of shelter from Omicron, which vaccination provides: Less shelter from being infected, but definitely good shelter from serious illness and death.

Further insight can be gained if one takes a look at the inflows and outflows of the pool of infected persons in Vienna (***diagram 17***).

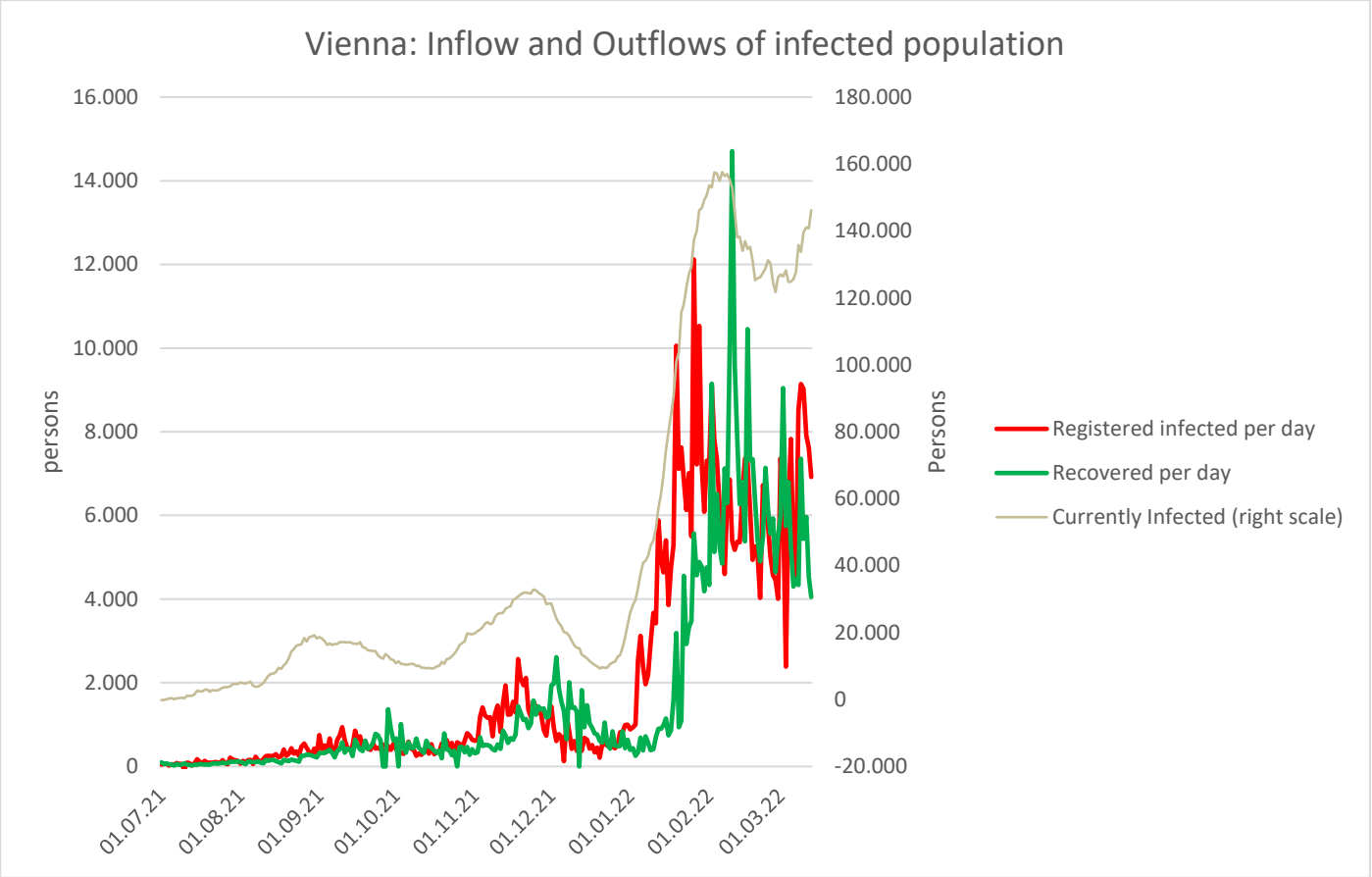

Diagram 17
Source: ARGES as prepared by Erich Neuwirth

In this diagram the outflow stemming from dead patients is neglected due to its comparatively small number. For the two Delta waves the pattern is clear: First the inflow of infected persons (red line) increases and is stronger than the outflow of recovered persons (green line), but after the wave has reached its peak, the opposite takes place; recovered persons overshoot newly infected. What is different with Omicron first of all is the sheer size of the involved numbers. The number of registered currently infected in Vienna jumped from around 30.000 persons to around 150.000 persons[6], it is five times as high! The second new feature is that again the infection increases lead and soon are followed by a massive increase of recoveries – but then both, new infections as well as recoveries remain on a very high level, leaving the number of infected on a more or less constant level! The peak is not a peak anymore but now is a plateau.

Will it fall again? The answer is yes, it will fall. The reason is that the constantly high number of recoveries reduces the pool of vulnerable persons which feeds the inflow of new infections. This is clearly seen in ***diagram 18*** that shows the situation for non-vaccinated persons. Again, the two Delta waves show the same form, the number of infected per vulnerable population (including 20% of vaccinated persons) is displayed as risk. And the Omicron dynamics again gives a completely different picture. With the decline of vulnerable persons due to massive recovery the risk of the remaining vulnerable persons – many of whom are non-vaccinated – rises sharply and stays high. Probably the ratio of 20 % of vaccinated to be counted as vulnerable for Omicron more recently will have to be raised to 50 %. These persons suffer from a higher infection risk despite their vaccination – and as vulnerable they also run a higher risk of hospitalisation (red line). This is a side effect of the new regime: If somebody is vaccinated the possibility to be infected has increased too, the shelter provided by vaccination has shifted to an insurance against lethal consequences.

[6] A conservative guess for the estimated number of unregistered infected would add at least another 50.000 persons.

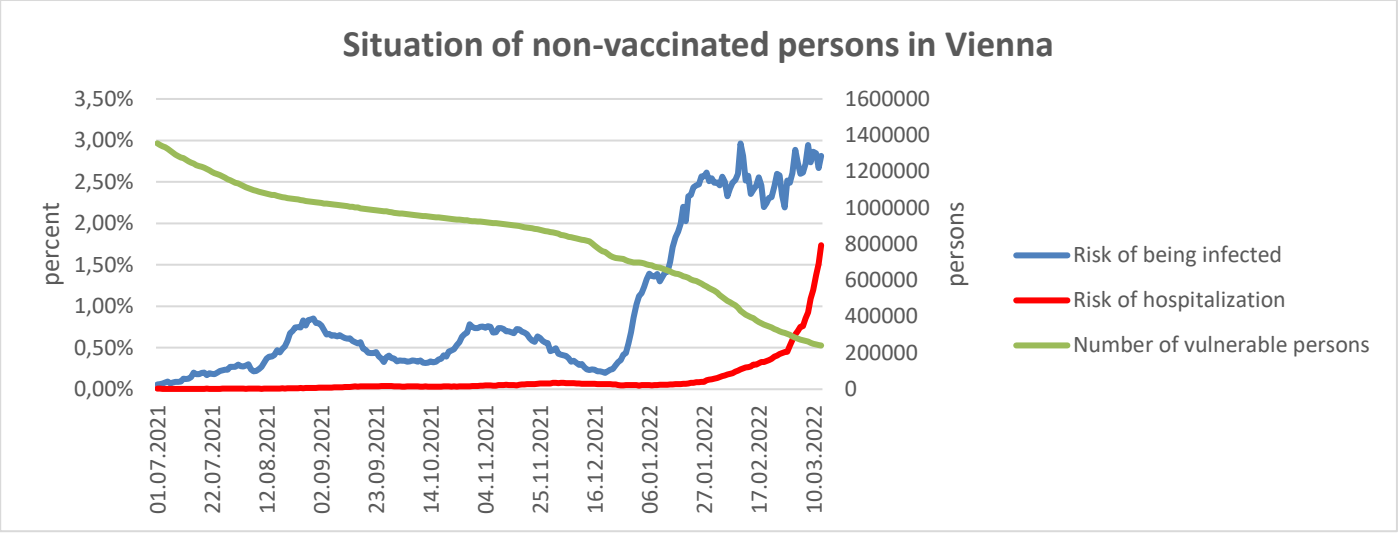

Diagram 18

Source: ARGES as prepared by Erich Neuwirth

As has been mentioned earlier, the strongest force working towards a lower number of vulnerable persons is the recovery process. With Omicron, with its high turnover of infection and recovery, this has become even more evident. The role of vaccination seemingly has been shifting to the background, the disastrous health policy of the government as well as the enormous influence of the united anti-vaccination movement on the mass media have pushed this dangerous misunderstanding.

The development of vaccination activities displayed in ***diagram 19*** show how vaccinations in Vienna faltered.

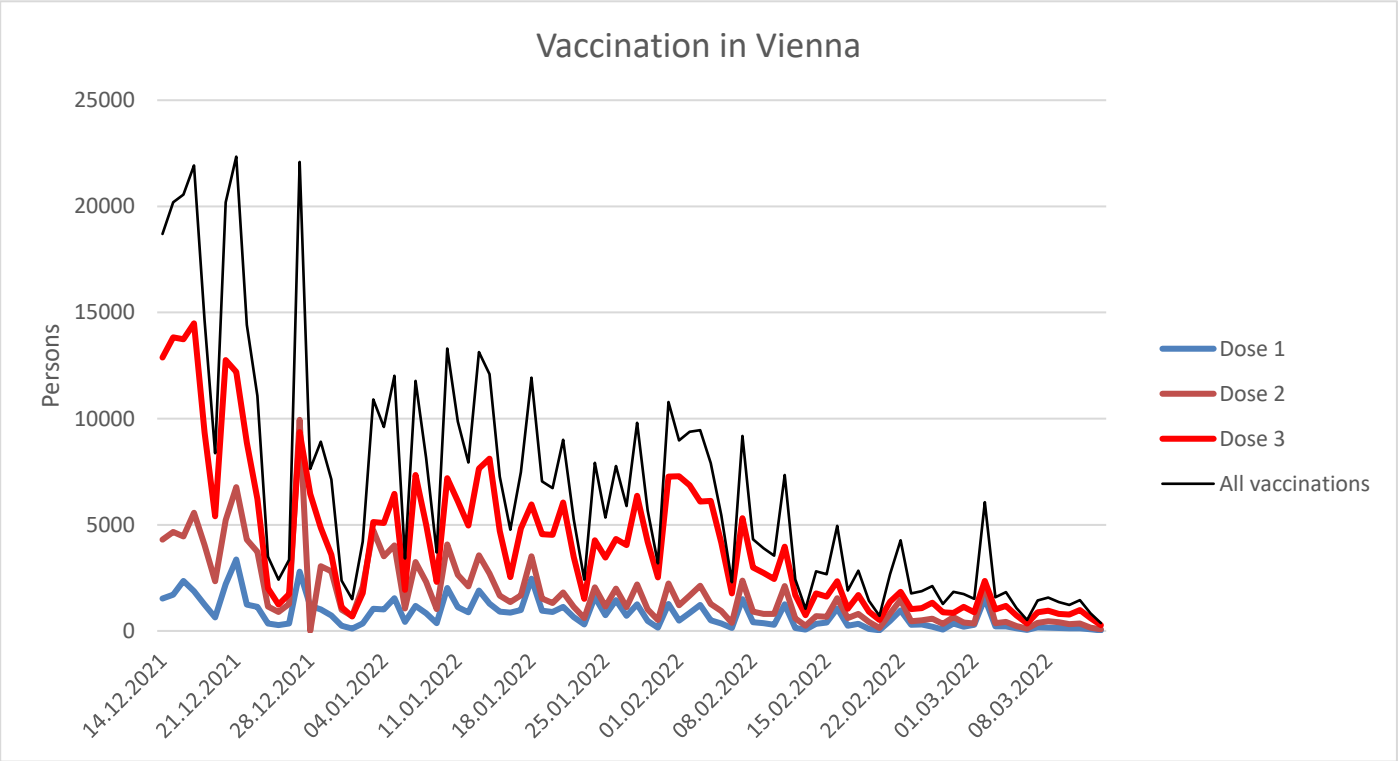

Diagram 19

Source: ARGES as prepared by Erich Neuwirth

The announcement of compulsory vaccination in November 2021 started a boom that ebbed during the Winter holidays. The slowness of the administrative hurdles caused a certain fatigue. The real downturn then can be observed on 1st of February when the prime minister announced that the new law will not be executed. And finally, when all precautionary measures were dropped, when people nowhere had to

show their 3G certificate any more, then the vaccination process was dead. This shows that to get vaccination was in general not a decision that individuals take because of their personal medical expertise, almost nobody does have such an expertise. It is either a decision enforced by a state that bundles this expertise by drawing its knowledge from the accepted international scientific community in the field, or it is a quasi-religious belief of a community in a so-called echo-chamber. The dramatic failure in Austria was that the governments echo-chamber, its closed information bubble, were certain business lobbies and their political allies in regional policy clusters. The influence of these external factors are traced in ***diagram 20***.

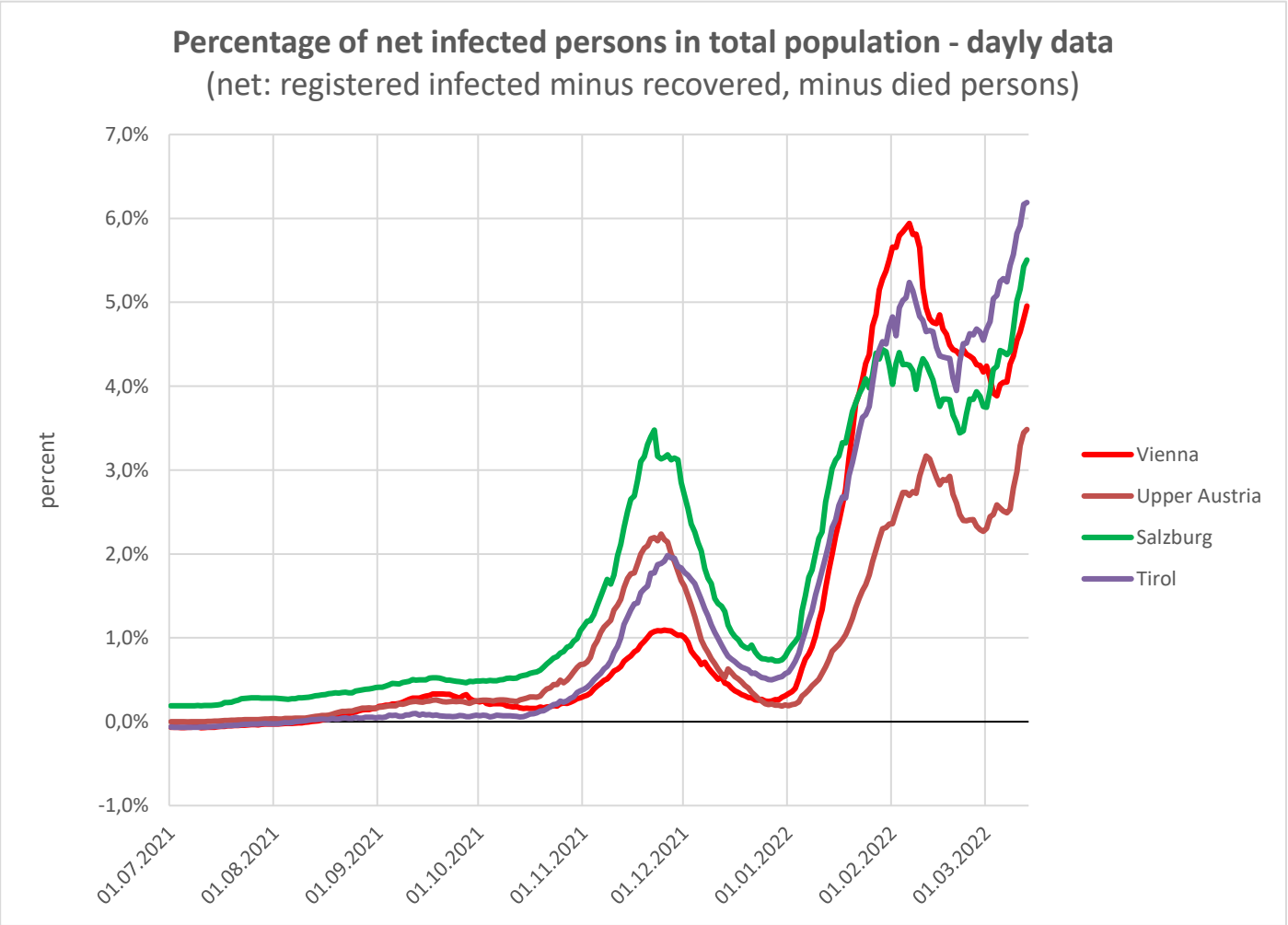

Diagram 20
Source: ARGES as prepared by Erich Neuwirth

The surge in local infection developments in Salzburg and Upper Austria in December 2021 during the regional elections there, was at least partly produced by explicit anti-vaccination propaganda of the political leaders, who wanted to attract voters from the FPÖ.

When Vienna, due to the tight space which citizens in a large city have to share, first suffered most from the super-infectious variant Omicron, it soon was improving its position when the lobbies of tourism in Salzburg and Tyrol pushed successfully for loosening Corona restrictions earlier than Vienna. As the government is dominated by politicians coming from the regions of Austria, the major of Vienna was forced to look for a somewhat more independent, more cautious health policy.

The most important summarizing point is that the pandemic is far from being over. Even if the Omicron wave comes down in the following weeks, it now is evident that neither recovered persons nor vaccinated persons are save from being infected again within a few months. The race between scientific development of vaccines

and the ongoing global mutation process is not decided yet. Science is currently preparing a second booster shot that should be available soon. On the other side it is hard to tell when the next mutation will strike and from where it will come from. To assume that this will only be next autumn is premature. The last time it had been South Africa, Brazil and China, and the season in which it emerges seems to be arbitrary. One connection that is established is that the mutation speed is proportional to the number of globally infected persons. Since vaccination was the only tool that really did reduce deadly infections so far, and in doing so increased the number of recovered, non-vulnerable persons, the initiative for global vaccination is of particular importance, compare ***graphic 21***.

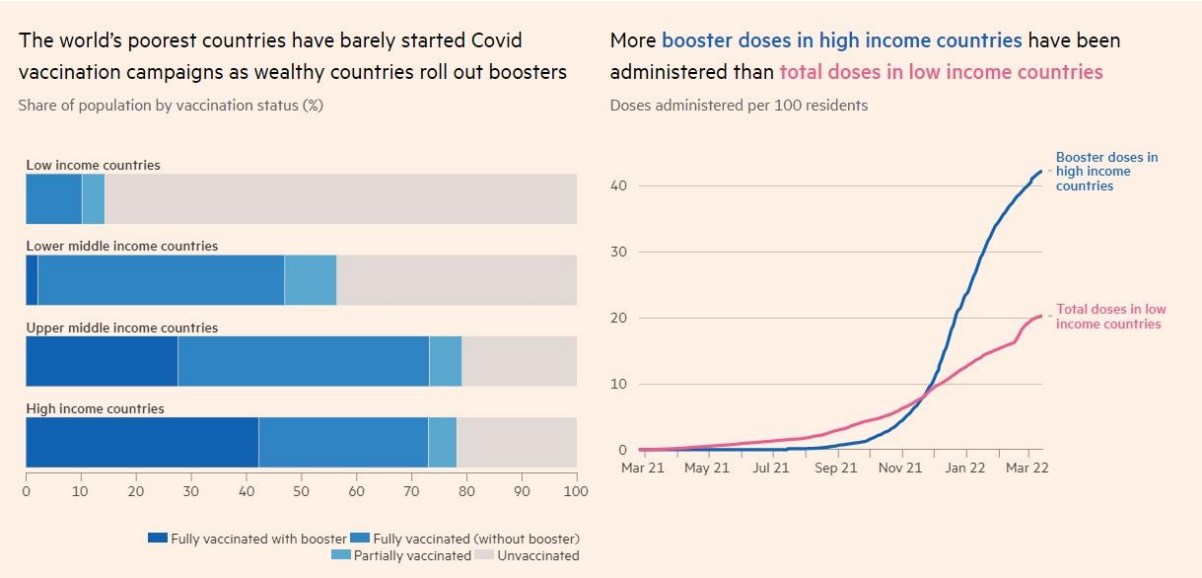

Diagram 21
Source: Source: Financial Times (Covid-19 vaccine tracker)

This graphic also gives an idea on where mutations might emerge (low- and middle-income countries) and whereto they then will travel fastest (high income-countries with most trade links).

The following two months, April and May, probably will give Vienna a break after the dramatic infectious drama of March. But if it is not used to plan and to prepare for the next mutation, then we will be back on square zero as soon as the fragile immunities of recovered persons start to scramble. We will not have learned from Omicron.

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