

The development of the COVID-19 epidemic in Finland

Short-term scenarios for preparedness

Jouni Varanka, Seppo Määttä, Kaisa Oksanen, Pasi Pohjola,
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Short-term scenarios to support preparedness

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Abstract

This memorandum describes three scenarios for the development of the COVID-19 epidemic in Finland. The scenarios examine the development of the epidemiological situation and its potential economic and social impacts. The scenarios are not projections but, instead, approximate and simplified descriptions of alternative development paths. The examination concerns the strategic level, and the memorandum does not present measures in detail. The aim is to support the Government in strategic decision-making and in the consideration of different alternatives.

The scenarios examine the period between December 2020 and the end of June 2021. At the end of 2020, the situation in Finland has followed an accelerating trend similar to that seen in other European countries during the autumn period. However, this has occurred at a significant delay and developed clearly more slowly than in other countries. While population throughout the country have contracted the virus, the incidence is still well below the EU average.

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Covid-19 epidemian kehittyminen Suomessa

Lyhyen aikavälin skenaarioita varautumista varten

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Kieli	englanti	Sivumäärä	41

Tiivistelmä

Tässä muistiossa kuvataan kolme skenaariota COVID-19-epidemian kehitymisestä Suomessa. Skenaarioissa tarkastellaan epidemiologisen tilanteen kehittymistä sekä sen taloudellisia ja sosiaalisia vaikutuksia. Skenaariot eivät ole ennusteita vaan karkeita ja yksinkertaistettuja vaihtoehtoisten kehityskulkujen kuvauksia. Tarkastelutaso on strateginen, eikä muistiossa käsitellä toimenpiteitä yksityiskohtaisesti. Tarkoitus on tukea hallitusta strategisessa päätöksenteossa ja vaihtoehtojen punninnassa.

Skenaarioissa tarkastellaan ajanjaksoa joulukuusta 2020 kesäkuun loppuun 2021. Suomen tilanne vuoden 2020 lopussa on noudattanut samankaltaista kiihtyvää kehityskulkua kuin muissa Euroopan maissa on syyskaudella nähty, mutta huomattavalla viiveellä ja muita maita selvästi hitaammin kehittyen. Virusta on väestössä koko maassa, mutta ilmaantuvuus on yhä EU:n keskiarvoa selvästi alhaisempi.

Asiasanat koronavirukset, skenaariot, varautuminen, tulevaisuus

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Covid-19-epidemins utveckling i Finland

Scenarier på kort sikt i syfte att skapa beredskap

Statsrådets publikationer 2021:11

Utgivare Statsrådets kansli

Författare Jouni Varanka, Seppo Määttä, Kaisa Oksanen, Pasi Pohjola, Jukka Railavo, Mika Salminen, Markus Sovala, Mikko Spolander, Jaana Tapanainen-Thiess, Liisa-Maria Voipio-Pulkki, Raija Volk, Simopekka Vänskä, Tuija Leino, Kari Auranen, Jenni Pääkkönen, Olli Palmén

Språk engelska

Sidantal

41

Referat

I den här promemorian beskrivs tre scenarier för hur covid-19-epidemin kan komma att utvecklas i Finland. I scenarierna granskas hur det epidemiologiska läget utvecklas samt vilka ekonomiska och sociala konsekvenser det har. Scenarierna är inga prognoser utan en grov, förenklad beskrivning av alternativa riktningar som utvecklingen kan gå i. Scenarierna har granskats på strategisk nivå, och i promemorian behandlas åtgärderna inte i detalj. Syftet är att stödja regeringen när den fattar strategiska beslut och väger alternativ mot varandra.

I scenarierna granskas perioden från och med december 2020 till slutet av juni 2021. Situationen i Finland har följt en accelererande utveckling som liknar den som observerades i övriga Europa under hösten, men med en betydande fördröjning och en klart långsammare utveckling än i andra länder. Virusets spridning bland befolkningen i hela landet men incidensen är fortfarande klart lägre än genomsnittet i EU.

Nyckelord coronavirus, scenarier, beredskap, framtid

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Summary

This memorandum describes three scenarios of the development of the COVID-19 epidemic in Finland. The scenarios examine the development of the epidemiological situation, and potential economic and social impacts. The scenarios are not projections but, instead, approximate and simplified descriptions of alternative development paths. The examination concerns the strategic level, and the memorandum does not present measures in detail. The aim is to support the Government in strategic decision-making and the consideration of different alternatives.

The scenarios examine the period between December 2020 and the end of June 2021. At the end of 2020, the situation in Finland has followed an accelerating trend similar to that seen in other European countries during the autumn period. However, this has occurred at a significant delay and developed clearly more slowly than in other countries. While population throughout the country have contracted the virus, the incidence is still well below the EU average.

Selecting scenarios and their common assumptions

The scenarios have been selected between two opposite extremes considered unrealistic to describe three different development paths considered possible. One of the extremes would include allowing the epidemic to progress nearly on its natural course without implementing mitigating policy measures.

This alternative would very likely lead to an increase in the need for healthcare significantly exceeding capacity, which cannot be allowed. The other extreme is an attempt to stop the communicable disease with highly significant restrictive measures. Based on epidemiological data, this alternative cannot be achieved in Finland in practice.

Assumptions taken into account in all scenarios are:

- Winter conditions impair the prerequisites for combating the epidemic. Holiday seasons pose an additional risk of spreading.
- Thus far, only a fraction of the population has contracted COVID-19. At the population level, immunity to the disease remains very low.
- Coronavirus vaccines will already be available in Finland in the first quarter of 2021. As a result, we can assume that the combination of the vaccination and the expected subsidence of the disease as the summer gets nearer will reduce the incidence of new cases towards the end of the second quarter. Nevertheless, both assumptions contain significant uncertainty.
- All of the scenarios include taking recommended or restrictive measures to control the epidemic, but these differ in terms of their intensity and timing.
- The scenarios do not assume that new discretionary government support measures will be introduced for households and businesses.
- The baseline for the regional restrictions and the epidemic is the status on 30 November.

Scenarios and their main features

The main difference between the scenarios is related to both the development of the epidemic as well as the selected policy line, which affect one another.

The selected scenarios are

1. Sufficiently intense, repeated restrictions
2. Restrictive measures slow down the epidemic without halting it
3. Drifting into delayed restrictive measures

Scenario 1: Sufficiently intense, repeated restrictions

In this scenario, the incidence of diseases is reduced by taking intense restrictive measures to such a low level that no significant burden is caused to healthcare. The necessary duration for imposing the restrictions is between 3 and 4 weeks. As the restrictive measures cannot be continued permanently, the incidence may subsequently rise again, and the restrictive measures be tightened again as a result. The scenario assumes that there may be need to do this several times.

In this scenario, the maximum number of patients in intensive care is around 50, which does not endanger the carrying capacity of the healthcare system.

Based on a calculation by the Ministry of Finance Economics Department, the positive impacts on economic growth of this scenario would transcend the negative impacts of the implemented restrictions thanks to the short duration of the measures taken to curb the epidemic. However, the restrictions have significant impacts on specific industries such as service sectors. The decline of the epidemic would nonetheless generally lead to a boost in economic confidence and strengthen the preconditions for growth, also in the service sectors in due time.

While a certain amount of care debt is accumulated, the duration of waiting times to treatment can be shortened in many places, and the provision and use of services can gradually return to normal.

Scenario 2: Restrictive measures slow down the epidemic without halting it

This scenario does not take into account the impact of restrictive measures taken at the beginning of December. The nature of the epidemic is gradually accelerating and changing in all regions, especially in larger population centres, to clearly spread among the population. The risk of the disease spreading extensively to nursing homes for elderly grows, resulting in a risk for a significant increase in mortality. In this scenario, the number of patients in intensive care is about 200, which is at the upper capacity limit and requires imposing intense restrictions on elective activity.

Over time, it would probably be necessary to significantly tighten the restrictive measures as the spread of the epidemic would be intense. New areas would transition to the spreading stage, which would result in imposing more extensive regional restrictive measures. The probably fairly moderate impact these would have on the national scenario has not been taken into account here.

The confidence of households and businesses is further weakened, which means that economic growth will be more subdued than in the previous scenario. The general government deficit will grow higher than in scenario 1. Service debt and an undetected need for services are constantly accumulating in social welfare and healthcare services more quickly than in scenario 1, resulting in longer waiting times and probably also a later need in more intense services.

Scenario 3: Drifting into delayed restrictive measures

In this scenario, the impact of restrictive measures is limited. The nature of the epidemic is rapidly changing practically everywhere in Finland to spread intensely among the population. After a delay, the burden on hospitals will increase at a considerably rapid rate, especially if a significant proportion of those who have contracted the disease are over 50 years old. This burden would already be significant at the end of the year, and during the peak of the epidemic, intensive care capacity would be spread extremely thin.

Other care would have to be reduced to include only the most essential services. This development path would ultimately require imposing very extensive restrictive measures to reverse the growth of the epidemic.

In scenario 3, recovery from the collapse of total production of 2020 would remain very modest in 2021, and the general government deficit would continue to increase. The use of social welfare and healthcare services would decrease and increase the risks of the progress of diseases or a failure to detect them as well as loneliness and social exclusion. These would probably result in serious social problems and a later, more extensive and challenging, service need.

In this scenario, the maximum number of patients in intensive care is around 500, and the carrying capacity is significantly exceeded.

Key conclusions

The scenarios and the assessments of economic, health and social impacts based on these point to the conclusion that rapid and determined measures to curb the epidemic will lead to the most favourable outcome. While it may be necessary to repeat the measures in late winter and in spring, the duration and effects disturbing normal life will remain less severe compared to the alternatives delaying taking action.

The result is particularly detrimental in a scenario in which restrictive measures are postponed to the extent that the epidemic gets out of hand and subsequently makes it imperative to take extensive restrictive measures to restore control. In this alternative, the impacts of the epidemic on the national economy are also lower than in the previously presented estimates. It should nonetheless be noted that this is based on the assumption applying to all of the scenarios that the economy will begin to recover and that growth will clearly accelerate in autumn 2021.

In any scenario – including those presented outside the scope of this review – there is a considerable amount of uncertainty related to aspects such as a voluntary reduction in mobility and contacts regardless of imposed restrictions. There is also uncertainty about how a prolonged epidemic situation affects people’s willingness to comply with different restrictions and recommendations. These factors, in turn, have a particular impact on the development of the situation of the service sectors. For reasons such as these, the scenarios presented in this memorandum are preliminary in nature and must be specified as the situation progresses. There is particular interest in the speed at which vaccines will affect the progress of the pandemic nationally and globally.

1 Introduction

The Government's hybrid strategy¹ aims to:

1. prevent the spread of the virus in society,
2. ensure the carrying capacity of healthcare,
3. particularly protect people belonging to risk groups.

The overall negative impacts of the restrictive measures on society should be assessed in relation to the benefits gained. An action plan² based on the strategy guides the authorities in charge of the implementation of the Communicable Diseases Act in the epidemiologically appropriate use of recommendations and restrictions. The action plan is applied simultaneously with the management of the epidemic and post-epidemic reconstruction. Therefore, when deciding on new restrictive measures, it is necessary to take into account the epidemiological, social and economic impacts of the measures. The aim is that the epidemic will be effectively contained in a manner causing as little disturbance to people, companies, society and the implementation of basic rights as possible.

This memorandum describes three scenarios of the development of the COVID-19 epidemic in Finland. The scenarios examine the development of the epidemiological situation, and potential economic and social impacts. The differences between the scenarios are related to the number of interpersonal contacts and the success of the protective measures. This is affected by issues such as the political choices made regarding the restrictive measures, but also the personal choices by individuals. The purpose of the memorandum is to support the Government in strategic decision-making. As a result, it refrains from delving into details. Due to the nature of the epidemic, the time span of the scenarios is short, extending from the beginning of December 2020 to June 2021.

The aim is to later extend the examination further into the future, for example to 2023 and 2026, at which point the global pandemic can be expected to have subsided. While the consequences of the epidemic will be at the focus in this case, assessment will also concern aspects such as how the epidemic situation of other countries will affect the conditions for foreign trade in Finland.

¹ Government Resolution on a plan for a hybrid strategy to manage the COVID-19 crisis, 6 May 2020.

² Valtioneuvoston periaatepäätös toimintasuunnitelman antamisesta hybridistrategian mukaisten suositusten ja rajoitusten toteuttamiseen COVID 19 -epidemian ensimmäisen vaiheen jälkeen (Government resolution on the adoption of an action plan for implementing recommendations and restrictions in accordance with the hybrid strategy after the first phase of the COVID-19 epidemic), 3 September 2020.

This memorandum presenting various scenarios is part of the overall assessment of the impacts of the Government's Covid-19 measures. Regularly prepared reports on overall impacts have widely identified the impacts of the coronavirus crisis and related restrictive measures. The most recent assessment report will compile the key indicators describing the detected impacts, which have been updated in autumn 2020.

1.1 Summary of the pandemic situation in Europe

At the end of 2020, the COVID-19 pandemic continues to be at a clear growth phase on a global scale. The epidemic seems to follow a pattern of seasonal variation, involving a relapse during the winter months in the northern hemisphere.

In Europe, the epidemic situation greatly improved in summer 2020. After August, the number of cases has surged in nearly every country, exceeding the figures of the first wave of the epidemic in spring 2020. Unlike in the spring, the testing capacity has now been high in nearly every country in the autumn, and this has resulted in a clear drop in the average age of verified cases and a reduction in case fatality rate to one tenth of the previous rates. However, morbidity continues to be quite high among those aged 50 or over. If the incidence rate continues to be high, there is a risk of exceeding the healthcare capacity. The majority of the case fatality rate can be attributed to those aged 70 or over.

The situation in late autumn has been dire in many countries (e.g. Belgium and the Czech Republic), and extensive restrictions to physical contact have been imposed around the beginning of November. Typically, such measures have only been imposed once there has been no other option. In most countries, the measures have produced a clear drop in incidence rates in around a month.

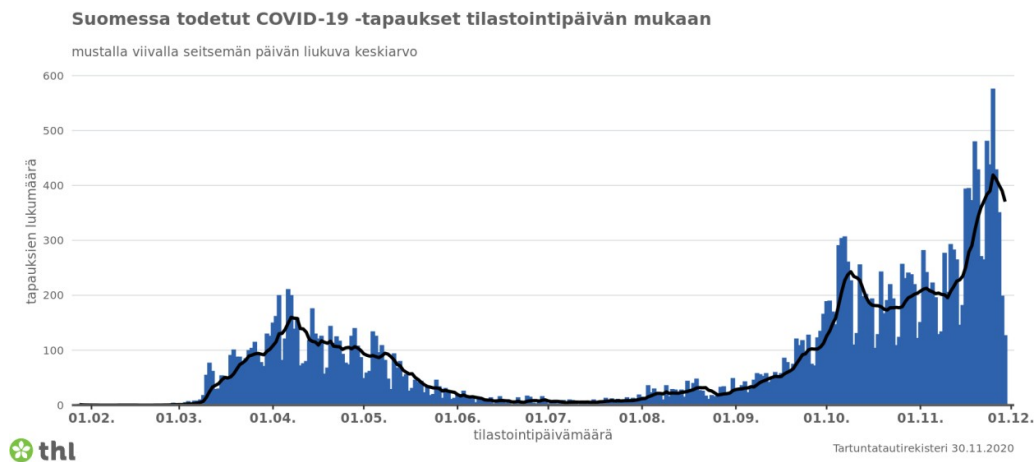
1.2 Summary of Finland's national situation

The number of new COVID-19 cases in Finland took a clear upward turn at the beginning of September after a lull in the summer (Figure 1).

Figure 1. COVID-19 cases in Finland, epidemic graph 30 November

COVID-19 cases detected in Finland broken down by date, black line indicates seven-day moving average

Vertical: Number of cases



(Date of data compilation, Finnish National Infectious Diseases Register 30 Nov 2020)

During October and November, the incidence of COVID-19 was approximately 50 cases/100,000 people per 14 days in Finland, but increased by more than 90/100,000 people during week 47 and week 48. There has been clear growth in all special catchment areas and in nearly every hospital district.

In the current situation, the epidemic is primarily combated with local and regional measures under the Communicable Diseases Act. It is crucial to react quickly and proactively to the decline of the epidemic situation by introducing effective and epidemiologically appropriate additional measures. Regional control and restrictive measures are key to preventing the spread of infections to halt the spread of the virus.

The starting point for the scenarios is that, at the end of 2020, the situation in Finland has followed an accelerating trend similar to that seen in other European countries during the autumn period. However, this has occurred at a significant delay and developed clearly more slowly than in other countries. While the trend is similar, future development remains unknown.

2 Scenarios of the development of the COVID-19 epidemic

While it is impossible to prepare a certain projection on the epidemic in Finland, we can outline approximate alternative scenarios. It should be emphasised that the scenarios are not policy alternatives or projections but, instead, approximate and simplified descriptions of alternatives, which aim to make it easier to perceive the future.

All of the scenarios include a few common basic assumptions:

1. The modelling of the course of the epidemic and the development of the national economy is based on previous experiences of epidemic and economic development trends, and they do not take into account any unexpected turns.
2. Winter conditions impair the prerequisites for combating the epidemic. Holiday seasons pose an additional risk of spreading.
3. Thus far, only a fragment of the population has had a COVID-19 infection (at most 2% of the population), which means that nearly the entire population is still susceptible to contracting the virus.
4. Coronavirus vaccines will already be available in Finland in the first quarter of 2021. Together, the vaccination coverage and seasonal variation in the epidemic alleviate the severity of the epidemic from the second quarter of 2021. However, there is major uncertainty associated with this assumption.
5. All scenarios include taking recommended or restrictive measures to control the epidemic, but these differ in terms of their intensity and implementation.
6. The scenarios do not assume that new discretionary government support measures will be introduced for households and businesses.
7. The baseline for the regional restrictions and the epidemic is the status prior 30 November.

In addition, a few points should be considered for all the scenarios:

1. Finland is a sparsely populated country (18 people/km², cf. Belgium 838 people/km²). As a result, there are fewer situations where people might contract the virus with the exception of the largest cities.
2. Compared to many other EU member states, Finland has fewer socially disadvantaged people. Based on experiences gathered from other countries, the epidemic is more easily spread among disadvantaged people due to cramped housing conditions and work that cannot be performed remotely.
3. All of the scenarios include significant uncertainty related to human behaviour. Based on experiences gathered in other countries, we may presume that, re-

ardless of policy measures or restrictions, the aggravation of the epidemic increases the voluntary avoidance of physical contact among the population to at least some degree. However, this does not produce an effect extensive enough to influence the course of the epidemic. Similarly, if the epidemic is prolonged, people's willingness to comply with restrictions and recommendations may drop, which would reduce the efficiency of these measures.

4. The uncertainty associated with the epidemic negatively affects the activities of companies, for instance, as greater uncertainty reduces investments and delays relaunching operations. It is extremely difficult to assess the magnitude of this impact in terms of numbers.

2.1 Selecting scenarios

The scenarios have been selected between two opposite extremes considered unrealistic to describe three different development paths considered possible. One of the extremes would include allowing the epidemic to progress nearly on its natural course without implementing mitigating policy measures.

This alternative would most likely lead to high mortality rates and significantly exceeding healthcare capacity, which can not be allowed. The other extreme is an attempt to halt the communicable disease by imposing highly significant long-term restrictive measures. Based on epidemiological data, this alternative can not be achieved in Finland in practice.

The main difference between the scenarios is related to both the development of the epidemic as well as the selected policy line, which affect each other.

3 Summary of scenarios

The scenarios have been described and their impacts detailed at the end of the memorandum.

The selected scenarios are:

1. Sufficiently intense, repeated restrictions

In this scenario, the incidence of the epidemic is pushed back to such a low level that no significant burden is caused to healthcare. The duration of the effective and extensive restrictive measures is estimated to be between 3 and 4 weeks. As the incidence is bound to increase after removing restrictions, there is need to reintroduce the restrictions, possibly for a number of times.

2. Restrictive measures slow down the epidemic without halting it

This scenario corresponds to the national situation in November 2020 if it would have been allowed to continue without tightening the restrictive measures at the beginning of December. The epidemic is constantly growing, gradually resulting in the virus clearly spreading in the population in all regions, particularly in their larger population centres. The risk of overflow to nursing homes for older people increases, resulting in higher mortality. As the epidemic spreads, the measures taken to combat the epidemic are intensified in a targeted manner and as necessary. New regions enter the spreading stage and the restrictive measures carried out at the regional level are more extensive than those imposed currently.

3. Drifting into delayed restrictive measures

In this scenario, the impact of restrictive measures remains limited. The epidemic gets quickly worse and its nature changes relatively quickly to spread intensely in the population practically everywhere in Finland. After a delay, hospitals are subject to quickly growing burdened, particularly if a large number of those who have contracted the disease are middle-aged or older. It would take only a few weeks for intensive care to be close to its maximum capacity, this would be clearly exceeded during the epidemic peak. This development path would involve implementing highly extensive, but delayed, restrictive measures, which would ultimately succeed in halting the growth of the outbreak.

Table 1. Scenario comparison table

Scenario	No 1: Sufficiently intense, repeated restrictions	No 2: Restrictive measures slow down the epidemic without halting it	No 3: Drifting into delayed restrictive measures
Combating the epidemic	Incidence is proactively reduced by imposing extensive national and regional restrictions. Preparing for reintroducing the restrictions as necessary.	As the epidemic spreads, the restrictive measures are intensified in a targeted manner and as necessary.	Extensive restrictive measures introduced with a delay
Development of the epidemic	The spread of the epidemic is slowed down and may occur in waves	The epidemic continues to accelerate, and intense measures have to be taken later to halt it (similar to the situation in Denmark in autumn 2020).	The epidemic is rapidly intensifying, nearly following a so-called natural course (similar to the situation in Spain in autumn 2020)
Number of persons in intensive care, maximum	around 50 people – sufficient capacity	around 200 people – at upper capacity limits, other care is considerably limited	around 500 people – capacity is significantly exceeded, other healthcare is limited to the most essential care
Perceived uncertainty related to the development of the epidemic	Moderate	Significant	Significant
Change in GDP, calculation	2020: -4.5% 2021: 2.6%	2020: -4.5% 2021: 1.8%	2020: -4.5% 2021: 0.8%
Key impacts	The impact of the epidemic on curbing economic growth remains rather small. However, the restrictions clearly dampen economic growth and result in new lay-off peaks. While a certain amount of care and service debt is accumulated, waiting times to treatment can be shortened in many places, and the provision and use of services will gradually grow.	Economic growth is weaker. In social welfare and healthcare services, waiting times to treatment and undetected service needs are constantly growing, which also increases a later need for more intense services.	Economic growth will remain very modest in 2021 and the position of general government finances will deteriorate further. The use of services is reduced, which increases a risk of the worsening of diseases or a failure to detect them as well as loneliness and social exclusion. The need for social welfare and healthcare services will later grow and become more difficult.

An empirical model³ has been used to assess the financial impacts of the Covid-19 pandemic and the subsequent restrictions, measuring the severity of the pandemic based on the need for hospitalisation. The model also includes variables used to measure the quantity and quality of the implemented restrictive measures and financial support instruments⁴. The calculations extend to the end of June 2021. In all of the scenario calculations, there is positive economic development in the second half of 2021.

The financial impacts have been compared with a projection published by the Ministry of Finance in October. A new economic forecast for the Ministry of Finance will be published on 17 December 2020. The short-term economic development of the forecast corresponds better with the restrictions described in scenario 1 than the projection published in October.

Observations on the effects of the epidemic relevant for all scenarios:

- The overall impacts of the Covid-19 situation are caused by the direct and indirect effects of the epidemic itself as well as the combined effects of the recommended and restrictive measures and various support measures. Significant uncertainty is related to all the assessments.
- The effectiveness of the recommended and restrictive measures depends on the degree to which these are complied with. This, in turn, is influenced not only by the overall morale, such as perceived future prospects, but also by the clarity and consistency of communications and instructions.
- The epidemiological situation in Finland and particularly the economic impacts of the pandemic depend not only on the development of the epidemic in Finland, but also the situation globally and in neighbouring regions.
- The coronavirus crisis has made social inequality visible and more pronounced. Harmful impacts are felt and replicated in those in an already disadvantaged position.
- Restrictive measures are particularly detrimental to tourism, the events industry, cultural life and the service sector.
- In all scenarios, the number of unemployed jobseekers is likely to grow in proportion to the baseline in the autumn 2020 projection by the Ministry of Employment and the Economy, above all depending on how necessary it will be to impose intense restrictive measures. Long-term unemployment will also increase in all three scenarios, potentially significantly.

³ COVID-19-pandemian ja rajoitustoimien vaikutukset talouteen (The economic effects of the COVID-19 pandemic). Palmén. Ministry of Finance publications 2020:84, <http://urn.fi/URN:ISBN:978-952-367-710-4>

⁴ <https://github.com/OxCGRT>

4 Discussion

The above scenarios are approximate and simplified. The basic assumption in all of them is that the epidemic will develop fairly steadily, but will almost certainly accelerate unless measures are taken. In reality, the epidemic may show rapid changes to any direction depending on the regionally varying situation. All scenarios involve probably making decisions on rather extensive restrictive measures along the way, which could change the outcome. These restrictive measures have not been fully taken into account in the baseline scenarios. The same applies to the timing and usefulness of the vaccine. According to the current estimate, Finland will be able to obtain the first authorised vaccines in early 2021⁵. Vaccinations will be started as soon as possible after this, in accordance with the vaccination order described in a national strategy approved by a Government decree.

It is unlikely that any of the scenarios will be realised in the exact form presented in this document. We can also not exclude the possibility of unpredictable epidemic behaviour – for example, the restrictions imposed in spring 2020 were more effective than expected.

If the aim is to assess which of the above scenarios would be most likely, it may be noted that scenario 1 would require several repeated periods of sufficiently strong restrictive measures. It is not yet possible to say whether the restrictive measures introduced at the beginning of December will be sufficient to result in development in line with this scenario.

On the other hand, the number of cases identified in scenario 2 will climb to a very high level (an estimated peak of 5,000/day), which would cause a considerable burden to healthcare capacity. The modelling shows that, during the epidemic peak, hospital inpatient wards would have around 1,450 people with a coronavirus infection and more than 200 would need intensive care. This would cause extreme burden to health care, and even though Finland could probably survive the situation, it would have to abandon a large share of non-urgent care or postpone this until later. This would significantly increase the already grown nursing debt. The high morbidity would also cause serious concern among the population, which in itself would likely cause an increase in inactivity. For its part, scenario 3 depicts a situation which we would undoubtedly want to avoid using any means necessary.

It is likely that the course of the epidemic will correspond to a combination of the above scenarios. Until now, Finland has fared relatively well in combating the spread and impacts of the epidemic. This challenge may become more difficult during the winter. We cannot completely eliminate an alternative in which the development occurring in Europe will also find its way to Finland after a delay despite all our precautions and preparedness. This makes it

⁵ Finland's COVID-19 vaccination strategy, Ministry of Social Affairs and Health 2 December 2020.

important to also prepare for the threat of a situation similar with scenario 3 in terms of both the required restrictive measures and the best available means in healthcare.

4.1 Long-term development of the epidemic situation

The development after the summer of 2021 will depend greatly on the efficiency of the vaccine and the development of the vaccination coverage of the population. If this is achieved in Finland by the beginning of autumn 2021 at a good level, the acceleration of the epidemic back to its current level can probably be avoided. However, it is possible that some sort of a winter epidemic will occur in the period 2021–2022, as no vaccine provides 100% protection at the population level and not everyone can or wants to get vaccinated.

The situation may develop internationally so that a large proportion of the population will have been vaccinated in high-income countries by the end of 2021 (although there is considerable uncertainty about this schedule and a high risk of delays), and travel and trade will gradually resume in autumn 2021. It is expected that those who intend to travel will be required to present vaccination certificates.

However, the situation in middle-income and low-income countries will pose a challenge to returning to a normal situation: Will these countries be able to vaccinate their population at the same time as the aforementioned higher income countries? As a result, the coronavirus outbreak may continue much longer in these countries and practical difficulties may occur in resuming international travel to countries where the epidemic has been prevented by strict border control measures. This would slow down the recovery of the world economy.

We cannot be certain that some of the developed vaccines will not have a rare but serious adverse effect that occurs only after hundreds of thousands or millions of people have been vaccinated, or one that occurs after a delay. Typically, new vaccines are introduced in different countries at different times and stages. This approach enables the detection and avoidance of potential adverse effects in other countries.

At the global level, vaccines that have been quickly developed whose technology lacks long-term experience are currently widely introduced. Because of this, European pharmaceutical authorities require manufacturers to carry out long-term monitoring of those who have been vaccinated during phase 3 trials to investigate this particular issue. This must be taken into account in communications, and it must be ensured that possible adverse effects of vaccines are monitored.

4.2 Scenarios and business life

The uncertainty surrounding the epidemic and its future development is a key factor affecting economic activity and business operations. The epidemic has affected and will continue to unevenly affect business life, which is described in slightly more detail in the descriptions of scenarios. It is highly difficult to assess the extent to which markets and demand will return to the pre-epidemic level and approaches, and to what extent they will not.

For Finnish export companies, international demand and its recovery are a more significant variable than the restriction policy chosen at the national level. In addition, in (international value chains), the difficulties of a single company may lead to extensive difficulties in other, viable companies in the value chain. In addition to the tourism sector, travel restrictions have a wide impact on business life. They hinder business negotiations, including attracting foreign investments to Finland, and have a long-term negative impact on the availability of foreign experts.

Regardless of the scenarios, an increase in bankruptcies is expected in early 2021.

In the context of preventing an increase in unemployment, it is essential to take the restrictive measures in a manner that does not cause unreasonable harm to business life.

The coronavirus crisis and the associated uncertainty is expected to end or weaken in the second half of 2021. At this point, new and renewed business activities will emerge to replace the activities that have ceased to respond to the new market situation. A key question is how fast new activities will be created and to what extent the development can be promoted.

5 Conclusions

1. It can be considered obvious that we must strive to avoid a development path corresponding to the third scenario with any means necessary, as its impacts on the economy, people's health and social aspects would be grave. Therefore, the third scenario resembles the situation in many EU countries in which societies have failed in managing the epidemic, resulting in the epidemic progressing nearly along its natural course.
2. The scenarios and the assessments of economic, health and social impacts based on them point to the conclusion that effective and determined measures to control the epidemic will lead to the most favourable outcome at the end of June 2021.
3. As a whole, the impacts of the epidemic on the national economy will be smaller than in the previous estimates. This is partly influenced by the assumption that the economy will develop favourably after the epidemic has subsided.
4. In the scenarios, the primary driver of the impacts on the national economy is the progress of the epidemic rather the restrictions themselves. However, when preparing individual restrictive measures, it is important to assess their impacts on business life in a situation where many companies are faced with an unsound situation.
5. A key uncertainty in the development of the epidemic is related to population behaviour. Compliance with operating models that reduce the risk of infection is critical. This can be influenced not only by restrictions and recommendations, but also by using consistent communications using plain language available in multiple languages.
6. Managing uncertainty can be expected to have a favourable impact on the stress experienced by the population and, through this, on various social problems. Uncertainty also has a negative impact on companies' willingness to invest and their interest in resuming their business activities. The information on the scenarios presented here would lend itself to preparing a communication narrative that explains how we as a society will manage until summer 2021 and continue on from there.
7. In all of the presented scenarios, disadvantages are accumulated and intensified by the effects of various mechanisms. Similar observation has been made in other countries. This development process is likely to occur after a delay, and its impacts will remain partly unrealised or hidden as we reach summer 2021. In addition to following the situation, it would be useful to assess whether there are still ways to alleviate the mechanisms related to the coronavirus crisis generating more inequality. This would help reduce the need for corrective measures, which will have a high cost in the future.

Appendix 1 More detailed descriptions of the scenarios

Scenario 1: Sufficiently intense, repeated restrictions⁶

In the first scenario, the aim is to reverse the growth of epidemic, which regained strength in October and November 2020. The aim of the scenario would be to reduce the incidence of the disease from its current level across the country back to as close to the baseline as possible. This would be done through extensive restrictive measures to limit physical contacts between people to their minimum. The restrictions would aim to prevent spread among the population in those parts of the country where this does not yet occur.

A large share of the restrictive measures could be implemented by regional and local authorities.

Experience gathered from other European countries during the autumn shows that restrictive measures enforced for around 3–4 weeks can help reduce the number of cases, reduce the burden on healthcare, and prevent infections and deaths. After imposing restrictions it will take between 2 and 3 weeks before a decrease in the number of cases can be verified. The decrease in hospitalisations occurs at a slower pace.

As the examination concerns the strategic level, this document does not take a stand on which and what kinds of measures could be potentially sufficient. Instead, the scenario presumes that the restrictive measures taken would be so effective that they significantly reduce interpersonal contacts, resulting in returning the incidence of infections to the desired level.

Depending on the regional epidemic situation, various restrictive measures would be implemented. It would be necessary to introduce restrictive measures in several, consecutive 3–4-week periods. However, the restrictions could be at least partly dismissed between these periods.

Achieving an incidence level close to the baseline requires introducing restrictive measures long enough for every active infection in the population to reach a stage when the affected person is no longer infectious. As it is impossible to stop all physical encounters between people and as there will inevitably be exposure and infections between people living in the same household, the restrictions must have a duration spanning at least several incubation

⁶ Mathematical modelling of scenario 1 provided at the end of the description.

and infectivity cycles. In practice, at least 2 to 3 will probably be needed. This probably means a 3–4-week period. For the sake of simplicity, scenario 1 presumes that the level will be reached in the first week of January. However, it is not possible to provide a precise projection.

Once this target has either completely or nearly reached, some of the restrictive measures will probably have to be abandoned, as they can only be imposed if they can be considered vital and proportionate, and as the disadvantages caused by the restrictions are significant. As a result, it is likely that, after a delay whose length is difficult to predict, Finland will return to a situation in which the number of coronavirus cases is growing during the winter season.

Gradually, the incidence would return to the same level at which point the extensive restrictive measures were previously introduced. While in the scenario, this level would be achieved at the beginning of February, there is even more uncertainty related to the delay than the decline of the epidemic during the restrictions, as there is no previous experience of the dynamics of the reacceleration of the virus in mid-winter. If such acceleration occurs, the aforementioned restrictions would have to be reintroduced if the objective was the same as before, namely reducing the number of cases to as close to the baseline as possible.

Reimposing extensive restrictions that significantly restrict and cause major harm to people for the third time within a year could have the result that the population would no longer be as motivated to commit to the restrictions as in the previous spring and when the first restrictive measures were introduced in late autumn.

From an epidemiological viewpoint, the assessment of the development of the epidemic currently also includes many other uncertainties, but the start of the spring may help in significantly reducing the risks of further infections.

On the other hand, the number of contacts and taking risks may increase during the Easter and May holidays, and also as a result of people growing weary with a life controlled by restrictions. This may result in the epidemic accelerating again, and it may be necessary to implement new rounds of restrictive measures in March and April.

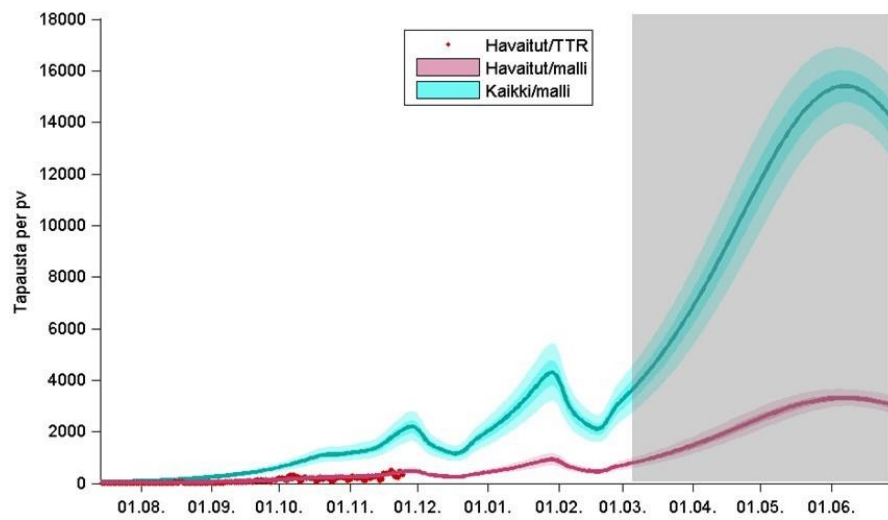
Figure 2. Modelled development of detected and actual infections in scenario 1, which involves implementing at least two consecutive rounds of extensive restrictive measures.

Detected/ Finnish National Infectious Diseases Register

Detected/model

Total/model

Vertical: Cases per day



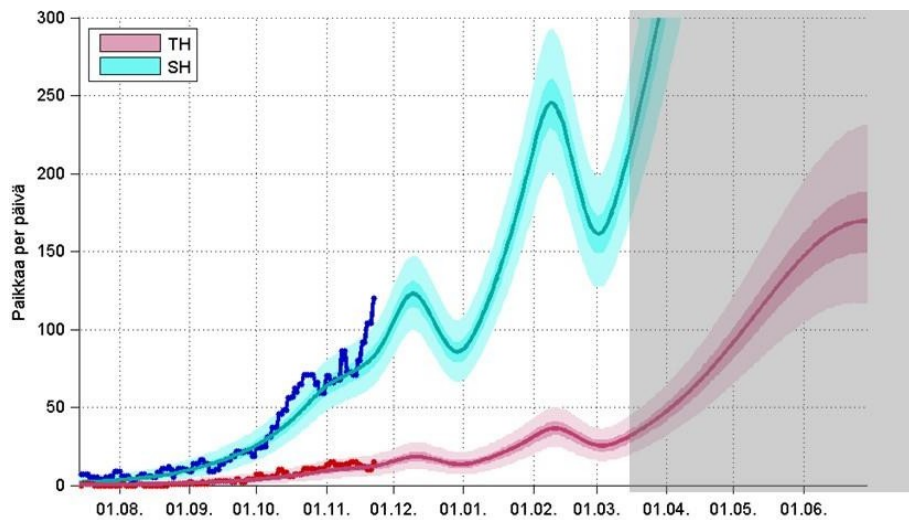
The grey area illustrates a development path in which no factor slowing down the epidemic would exist after the beginning of March. The vaccine and the arrival of spring may slow down the new upwards turn in infection rates and it is likely that new cycles of restrictive measures will have to be introduced.

Figure 3. Estimated daily burden to hospitals (H) and intensive care (IC) in scenario 1. Gray area as above.

IC

H

Vertical: Beds per day



Scenario 1 identifies the following impacts on services, employment and business life

While the waiting times to receiving hospital treatment will be shortened considerably, completely in some hospital districts, the whole country will not return to the normal level (non-urgent care in 180 days). The use of specialised medical care remains at a lower level than normally. The use of remote services is developing and contributes to reducing the care deficit. Local coronavirus clusters will be quickly dealt with using regional restrictive measures, which will hardly affect the waiting times.

The use of health centres remains below normal levels, and some care debt continues to be accumulated, as the measures required by responding to the epidemic bind resources from regular activities. While remote services are rapidly developed and implemented, they do not fully compensate for a reduction in face-to-face appointments. Combating regional disease clusters binds health centre resources, but the situation returns back to the normal situation during the outbreak relatively quickly (in weeks). Starting in late winter, vaccinating will bind a considerable amount of health centre resources.

Services for vulnerable groups (such as people with mental health problems, persons with disabilities, those with substance abuse issues and people with a foreign background) will

also be carried out as remote services. They do not completely compensate for the service deficit caused by a reduction in therapies requiring physical contact. Not everyone is able to use or has access to remote services. In the scenario, the service debt of these groups will increase, but the growth will eventually slow down.

The scenario involves reducing oral healthcare debt despite the fact that a lot of staff have been assigned to coronavirus testing and tracing tasks. The private sector activities will be quicker to resume.

The number of services provided by older people will increase slowly to the pre-coronavirus level. The number of services provided at home will be restored close to the pre-coronavirus level.

While the scenario includes a growth in the need for child welfare services and related deficit, the situation can be alleviated once the restrictive measures are more concerned with managing local virus clusters. The use of school health care will return close to the situation during normal times.

The scale of impacts in business life depends on the extent and duration of the restrictions required.

In this scenario, telecommuting is implemented in all jobs where this is possible. This will affect companies such as restaurants serving lunch and partly the use of other services in areas with a lot of workplaces as well as special goods retailers to the extent that their services are used during or in connection with people's workdays. The impacts would probably be similar in scope to those of spring 2020, when a large number of organisations transitioned to telecommuting. However, it can be assumed that, overall, an extensive shift to remote work will result in less negative employment impacts than many other measures.

Banning or restricting public events will lead to the continuation and extension of worker lay-offs in the events industry. Up to 62% of companies in the industry face a threat of closure. After the disintegration of the field of operators, it will take time to launch new activities, and it is estimated that it will take between 2 and 3 years to return to the current level. Some of the meeting previously occurring in person will be replaced with new digital solutions. The growth in this area will require new experts.

In the restaurant sector, the scenario can be presumed to have some effects on employment, but above all major impacts on lay-offs. It would result in a new peak in lay-offs. To some extent, even more permanent job losses may arise if some of the restaurants licenced to serve alcoholic beverages fail to cope with new lockdown measures.

While department stores will suffer, online trade may gain benefits. Similarly as in the previous section, this is likely to result in a large peak in lay-offs and partly more permanent loss of employment.

In this scenario, the closure of public spaces is more likely to reduce wellbeing rather than directly cut down employment; the closure is likely to cause more lay-offs. Closing all restaurants and cafés would cause another peak in lay-offs, and partly also a more permanent decrease in employment, as not all companies can withstand another lockdown.

In the scenario, public transport and employment in the transport sector (domestic flights, VR, bus transport) will decrease. Reducing public transport connections particularly hurts women's and young people's opportunities for moving around.

Restrictions on travel and goods transport would probably result in an increase in transport costs and changes in timetables. In the tourism sector, the number of bankruptcies, lay-offs and dismissals is increasing. In this capital-intensive sector, companies could also consider selling their assets. The risk is that the buyers come from abroad and the Finnish tourism sector ends up in foreign ownership.

The impacts of scenario 1 on the national economy

In the first scenario, successfully curbing the epidemic will hold back the increase the need for hospital care. As a result, the impact of the epidemic on slowing down economic growth will remain minimal. However, the intense restrictive measures introduced to curb the epidemic have a clearly negative effect on economic growth.

According to the calculation, the beneficial impact of curbing the disease on economic growth is greater than the negative impact of the imposed restrictions. Therefore, according to the calculation, the intense measures to curb the epidemic appears to be the most economically favourable alternative, even though this is done by increasing restrictions.

According to the calculation, repeated restrictions can effectively curb the course of the epidemic so that the negative impact on the economy resulting from the introduction of these restrictions is reversed.

Scenario 2: Restrictive measures slow down the epidemic without halting it⁷

This scenario corresponds to the national situation in November 2020 if it would have been allowed to continue without tightening the restrictive measures at the beginning of December. The number of cases will increase by around 20% at the weekly level. In this case, the number of cases reported weekly would reach around 5,000 at the turn of the year, at which point the total number of COVID-19 cases diagnosed in Finland would be approximately 43,600. This development would correspond to the average situation in Denmark in autumn 2020.

The burden on hospitals would increase at a moderate rate, provided that no major changes occurred in age groups. Nevertheless, this burden could already be significant at the end of the year, although the hospitals would not yet be overburdened at this point. At least regionally, there would be a need to reduce the available non-urgent treatment.

After the turn of the year and during the winter of 2021, the epidemic will continue to grow and reach its peak at the beginning of March, at which point the highest number of weekly cases will be diagnosed. It is necessary to restrict access to non-urgent care throughout the country, and intensive care capacity is stretched to the limit.

As the spring progresses, the epidemic will take a slow decline and the wave occurring during the winter will be over in June and July. During the wave, almost 5% of the population has been diagnosed with the virus. The actual number of people who have contracted the virus could be up to several times higher. The number of deaths may have risen to several thousands.

In terms of the implemented measures, scenario 2 is most similar with the hybrid strategy model followed by Finland in autumn 2020, which involved imposing significantly tighter restrictions at the turn of November and December. In this context, the competent authorities at the local and regional level had the main responsibility for combating the epidemic with the powers they have under normal legislation.

While there are some major uncertainty factors related to the implementation of scenario 2, the disease burden caused by the development path presented for the scenario will in any case eventually become rather high.

⁷ Mathematical modelling of scenario 2 is attached.

Figure 4. Modelled development of detected and actual infections in scenario 2, in which cases would increase at the same rate as in the autumn without further deceleration.

Current trajectory

Detected/ Finnish National Infectious Diseases Register

Detected/model

Total/model

Vertical: Cases per day

Box: Maximum number of cases detected per day (5000)

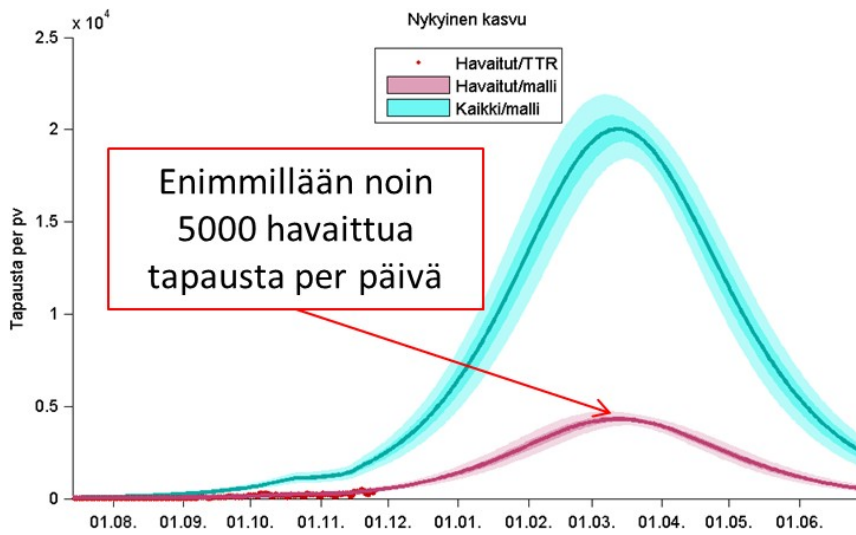


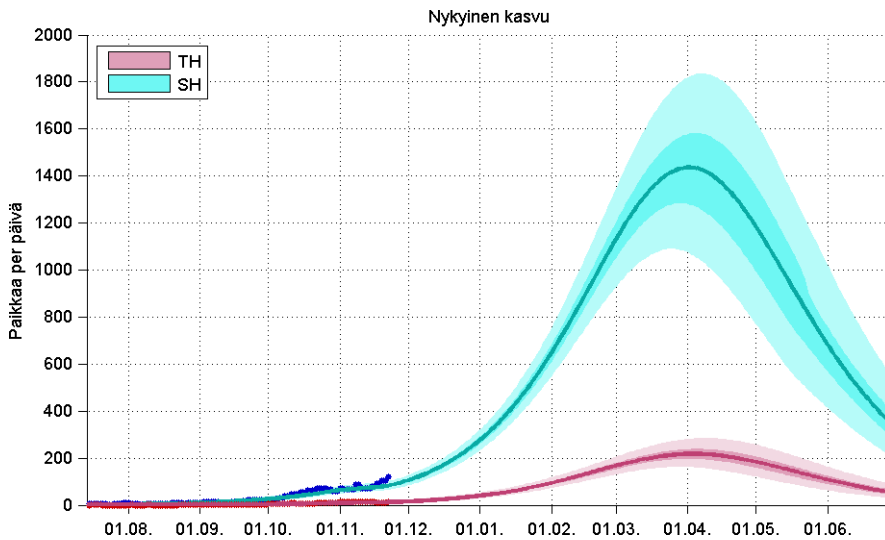
Figure 5. Estimated daily burden to hospitals (H) and intensive care (IC) in scenario 2.

Current trajectory

IC

H

Vertical: Beds per day



Scenario 2 identifies the following impacts on services, employment and business life

The care debt in specialised medical care could be initially reduced, but depending on the region, it will take up to the end of 2022 to eliminate the backlog in waiting times. Although patients with coronavirus will not initially cause overload to hospitals, the testing and tracing of the epidemic causes significant burden (laboratory). Regional restrictive measures may temporarily reduce the use of other hospital services, and virus clusters may increase the amount of care needed by coronavirus patients for a few weeks. Later, the burden on health care will increase, stretching intensive care capacity extremely thin. Other specialised medical care will have to be limited considerably. The risk of quarantines and illness may also increase among staff.

The use of health centre services will remain at a lower level than usual, especially among older people (+70 years old). Waiting times to treatment and undetected service needs are constantly growing, which also increases a later need for more intense services. However, remote services are rapidly developed and introduced.

The queues for oral health care are only slightly shortened, as oral health care staff are assigned to coronavirus testing and tracing activities. This will result in not only oral health but also other somatic diseases to get worse in terms of both quantity or quality.

The use of health services among older people will remain at a lower level than normal, which will cause a delay in the detection and treatment of illnesses, resulting in a higher disease burden than normal later. The increased workload of informal caregivers will be visible as a higher demand for public services. Many will suffer a decline in their functional capacity and mood, and an increase in loneliness.

The need for child welfare will grow and the capacity for child welfare services can not be increased rapidly due to problems in the availability of workforce (e.g., a lack of social workers; illness and quarantines). The situation differs greatly from one region to another. School health care is used less than in a normal situation (such as fixed-term school closures, public health nurses reassigned to tasks related to the coronavirus outbreak).

The increase in the number of cases may be expected to somewhat influence consumer behaviour. On the other hand, compared to scenario 1, possible negative effects would be caused by behavioural changes related to the epidemic. However, these would remain minor if the disease situation continues to be fairly calm at the regional level.

If border traffic continued to operate nearly normally in this scenario, production and employment in related sectors would remain at approximately the anticipated level. The change in the number of people employed in 2021 is negative in the Ministry of Economic Affairs and Employment's labour market projection, but the changes are minor. In the industrial sector, the challenges emerging in 2020 will only become visible in employment in 2021. In construction, the number of building permits has decreased considerably, partly for reasons other than the coronavirus crisis, but also partly due to the crisis. However, the considerable decrease in licences will not be directly translated into changes in production and employment, and the employment impacts would remain moderate.

In the scenario, it can be assumed that consumers would also reduce their use of those adventure services that are not subject to restrictions, and operators are challenged by a lack of trust in safe participation. Uncertainty about the future manifests as both the uncertain behaviour of consumers, the additional costs of rapid changes and later as the courage of companies to relaunch business activities. This puts burden on companies' reserves and partly leads to bankruptcies. The use of creative services diminishes, but is quick to return to its normal level.

However, as people nonetheless have a desire for activities and content, it can be presumed that the consumption of digital content will increase and gain momentum, and copyright revenue will grow, as consumers consume content in their homes. As a lockdown of a few weeks will not be sufficient for producing new content or distribution models, there will probably not be enough time for domestic growth in this area. The transition to new digital distribution models and platforms may accelerate.

However, in scenario 2, the use of regional restrictive measures instead of national restrictions would enable tourism companies to continue their operations and provide domestic tourism services in regions where the disease situation is relatively good. The demand for domestic travel will partly support the survival of the industry during the coronavirus crisis, as long as special attention is paid to health safety when travelling. The poor coronavirus situation at the global level and the issued travel policies and restrictions make the recovery of the demand for international tourism uncertain and slow. In the tourism sector, the number of bankruptcies, lay-offs and dismissals is increasing.

The special impacts of the scenario are more company-specific than sector-specific. If the customers or employees of the company cross regional borders, the regional restrictions make it difficult for the company to operate. Export-oriented industries have a need for travelling and transporting goods across regional and national boundaries.

The impacts of scenario 2 on the national economy

The epidemic prevention model described in the second scenario does not increase the values of the indicator describing the imposed restrictions; instead, these would remain at the same level as in November. Therefore, the increase in the need for hospital care is the only factor slowing down economic growth in the calculation. The calculation emphasises the importance of curbing the growth in disease cases and therefore the increase in the need for hospital care for economic activity.

The economic growth for 2021 in the second scenario would be almost one per cent more lower than in the first scenario, which would increase the general government deficit and debt by around half a percentage point.

Scenario 3: Drifting into delayed restrictive measures⁸

In this scenario, the impact of restrictive measures remains generally limited. On a weekly level and depending on the stage of the epidemic, the number of cases increases by around 30 to 50%, and at times even faster. In this case, the number of cases reported weekly

⁸ Mathematical modelling of scenario 3 is attached.

would reach around 23,000 at the turn of the year, at which point the total number of COVID-19 cases diagnosed in Finland would be over 90,000. This development would mainly correspond to that in Spain in August and September 2020.

There would be major risk of virus overflow to nursing homes for elderly, and epidemics would occur in many institutionalised care facilities. Mortality among people over 70 years of age would rise to a high level, particularly in the case of people with multiple illnesses and those with reduced functional capacity.

After the turn of the year and during the winter of 2021, the epidemic will continue on a very fast growth track and reach its peak at the beginning of February. At this point, the highest weekly number of cases (nearly 70,000 laboratory-confirmed cases) are diagnosed (the actual number of cases can be significantly higher). In the whole country, other healthcare must be limited to the most essential care, and intensive care capacity has clearly been exceeded. This also affects the mortality of hospitalised patients, which will be higher than at any other point thus far.

Regional prevention measures will be intensified significantly as more and more regions move to a rapidly developing spreading stage.

If the changes proposed to the Communicable Diseases Act by the Government were in force, the municipal authorities or Regional State Administrative Agencies could also restrict the use or opening hours of business premises in the areas most severely affected by the epidemic. Recommendations could be issued on avoiding travel to and tourism in these regions.

As a result of the interaction between the restrictive measures and the start of the spring and summer, the epidemic would gradually slow down over several months, so that the end of the epidemic waves of the winter would be in sight by June and July. In this scenario, approximately 15–20% of the population could have contracted a laboratory-confirmed infection (the actual proportion of infected persons could be up to twice as high), and the number of deaths could reach above ten thousand, with the majority occurring among the elderly, but also affecting the mortality of middle-aged people to some extent. It is not yet possible to estimate how many of the infected persons would be left with long-term injuries or problems affecting their health and functional capacity due to the disease.

The Scenario 3 model would emphasise the ultimately considerably high social disadvantages caused by the widespread morbidity and moderately high mortality rates. However, the inevitable restrictive measures and the reduction in the level of activity caused by concern among the population would undoubtedly also cause significant adverse effects.

Figure 6. Modelled development of detected and actual infections in scenario 3.

Detected/ Finnish National Infectious Diseases Register

Detected/model

Total/model

Epidemic declines, R +20% since January

Maximum number of cases detected per day around 10,000

Vertical: Cases per day

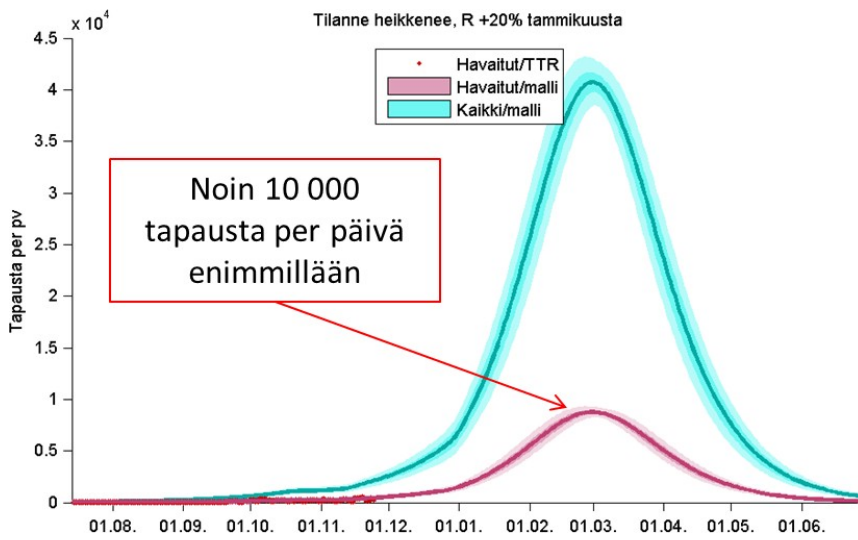


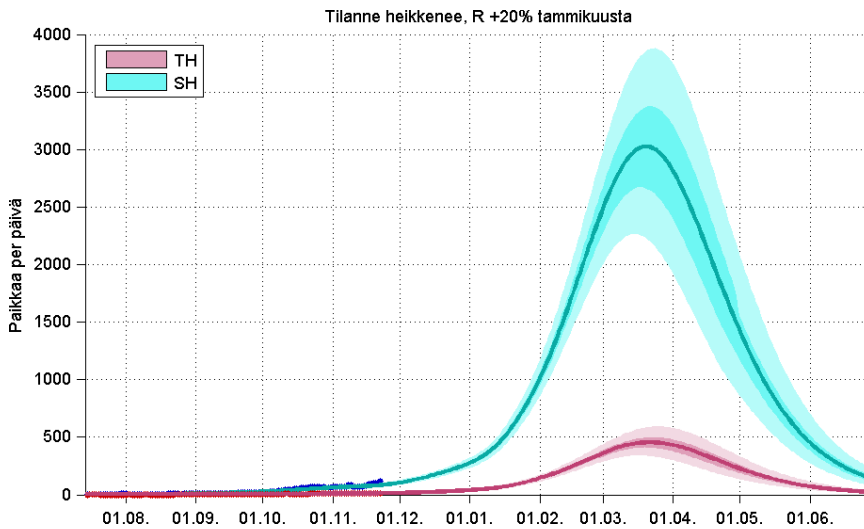
Figure 7. Estimated daily burden to hospitals (H) and intensive care (IC) in scenario 3.

Epidemic declines, R +20% since January

IC

H

Vertical: Beds per day



Scenario 3 identifies the following impacts on services, employment and business life

The treatment of coronavirus patients would utilise the resources of specialised medical care, especially the maximum capacity of intensive care. Waiting times to elective care grow differently in the regions and cannot be significantly shortened. The availability of resources is reduced as a result of personnel falling ill and having to quarantine.

The use of health centres is reduced, testing and tracing as well as launching vaccination takes up resources. Remote services are rapidly developed and introduced. Early detection of diseases is jeopardised, which will cause an increasing and more difficult disease burden later.

The various support and therapy activities provided to vulnerable groups must be radically reduced and implemented as remote services to the extent possible. The situation in these groups deteriorates. Personnel availability becomes difficult (employees falling ill / placed under quarantine). The oral health care resources would still be used for tasks related to coronavirus. The situation with waiting times would get worse.

Loneliness increases among older people, and mental health issues become more common. Service use decreases. Services provided at home can not be restored to normal levels. The use of health care services remains at a low level and increases the risks of the worsening of illnesses or a failure to detect them.

Schools need to be closed down, which contributes to increasing the need for child welfare (including hidden needs). This could lead to a crisis in child welfare services in some regions. Lack of first-line child welfare services increases the need for more severe services (placement of a child outside the home).

In scenario 3, the worsening of the disease situation could cause consumers to drastically reduce their service use and other transactions. In addition, in any case, there would be a need for more severe restrictions at some point, whose impacts would be partly in line with those presented in scenario 1. This could lead to an initial drop in employment in the service sector, as the spread of the epidemic would change consumer behaviour, and restrictions imposed later could cause another slump.

For processing industry (industrial and construction sector), scenario 3 means prolonged uncertainty and increasing insecurity compared to the other scenarios. The prolonged uncertainty could be reflected in the postponement of new projects, especially in construction, and the resulting decrease in employment could be higher than anticipated.

As the number of cases would increase considerably, it can be assumed that consumers would reduce all activities that expose them to infection. The lack of trust in safe participation affects many service sector operators, especially those providing adventure services. The use of creative services decreases but is gradually restored to the previous level as companies recover.

In scenario 3, restrictions would further weaken the poor economic situation, liquidity levels and recruitment opportunities of tourism companies, increasing the number of bankruptcies, lay-offs and redundancies in the tourism sector. As a result of the worsening coronavirus pandemic, the attitude towards tourists is no longer only positive from the viewpoint of health safety.

In this scenario, entire production plants, such as sawmills and pulp/paper mills, will have to be temporarily closed down. However, as the number of interpersonal contacts is relatively low in these workplaces, the situation can be quickly managed. Nevertheless, thousands of employees are affected by closures. The main risk groups are staff members and the availability of necessary foreign temporary labour. Due to restrictions in production, international customer relationships are deteriorating/suffering, which has potential long-term effects on

exports. Rapidly changing regulatory requirements, instructions and procedures result in additional costs for companies.

The impacts of scenario 3 on the national economy

In the third scenario, the epidemic is spreading and the need for hospital care is increasing significantly. While the restrictions imposed in the third scenario are considerably stricter and in force for a longer time, these are long overdue compared to the other scenarios.

In the third scenario, economic growth will slow down even more in the first quarter 2021 than in the second quarter of 2020. This is influenced by both a strong increase in the need for hospital care and the expected, significant tighter, restrictions. As a result, economic growth would remain very modest in 2021 and the position of general government finances would deteriorate further.

Appendix 2 Ministry of Finances' calculation of the impacts of scenarios

Development according to the Ministry of Finances projection

	Sufficiently intense, repeated restrictions	Restrictive measures slow down the epidemic without halting it	Drifting into delayed restrictive measures
	Change in GDP, %		
2020	-4.5	-4.5	-4.5
2021	2.6	1.8	0.8
	Unemployment rate, %		
2020	8.0	8.0	8.0
2021	8.2	8.4	8.7
	General government budgetary position, % of GDP		
2020	-7.7	-7.7	-7.7
2021	-5.0	-5.3	-5.8
	General government debt-to GDP ratio, % of GDP		
2020	70.2	70.2	70.2
2021	72.8	73.2	74.3

	Difference to baseline, percentage points		
	Change in GDP		
2020		0.0	0.0
2021		-0.8	-1.8
	Unemployment rate		
2020		0.0	0.0
2021		0.2	0.5
	General government budgetary position		
2020		0.0	0.0
2021		-0.3	-0.8
	General government debt-to GDP ratio		
2020		0.0	0.0
2021		0.4	1.5

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