

# CONTOURS OF INTEGRATED PANDEMIC ADVICE

Initial exploration, further knowledge questions and required action

June 2023





## Summary

Based on two short simulations, a diverse group of scientists investigated what joint, integrated advice could look like during a pandemic. Integrated advice involves biomedical, social, and economic domains providing joint, collective recommendations to policymakers. The conclusions can be summarised in three lessons learned:

**Lesson 1: Integrated advice does not occur automatically:** it requires action and investment from scientists and policymakers.

**Lesson 2: A joint framework for weighting advice from different scientific disciplines is feasible** and can provide general guidance, also when the disciplines continue to issue advice independently.

**Lesson 3: Unanswered questions** remain concerning the different facets of integrated advice and how those come together in a broadly supported integrated decision-making framework.

We call upon all parties involved to take action now to be better prepared in the event of a new pandemic.

## Introduction

During the COVID-19 pandemic, the Dutch government took far-reaching policy decisions based on biomedical, social and economic advice. The Outbreak Management Team (OMT) advised about the biomedical impact of government policy, and, amongst others, the Netherlands Institute for Social Research (SCP) and the Council of Public Health & Society (RVS) advised about the social impact. The COVID-19 Behaviour Unit established in March 2020 by the National Institute for Public Health and the Environment (RIVM) provided reflections on behaviour resulting from the packages of public health regulations. Amongst others, the Netherlands Bureau for Economic Policy Analysis (CPB) and the Social and Economic Council (SER) provided insight into the macroeconomic impact. In addition to these formal advisory bodies, existing and new (advocacy) organisations also issued solicited and unsolicited advice<sup>1</sup>. Insights frequently came from the separate substantive disciplines, resulting in the advice provided originating from 'independent silos'. There was no method or process to integrate this formal and informal advice from different sources into a single valuable, broadly considered guidance for policymakers.

Figure 1 provides a schematic representation of the current process of issuing advice to the government during a pandemic. Please note that the figure describes the situation for solicited advice, but that unsolicited advice is often provided as well. We broadly distinguish the domains 'biomedical' (including epidemiology, virology, infectious disease control), 'social' (including social, behavioural and communication sciences) and 'economic'. Politicians currently receive advice from two sources, namely the OMT and the Societal Impact Team (SIT). The SIT was established in August 2022, and so did not exist during the first two years of the COVID-19 pandemic.

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<sup>1</sup> The *Bestuurlijke Afstemmingsoverleg* (BAO) also has the statutory task to assess the feasibility of the advisory reports.

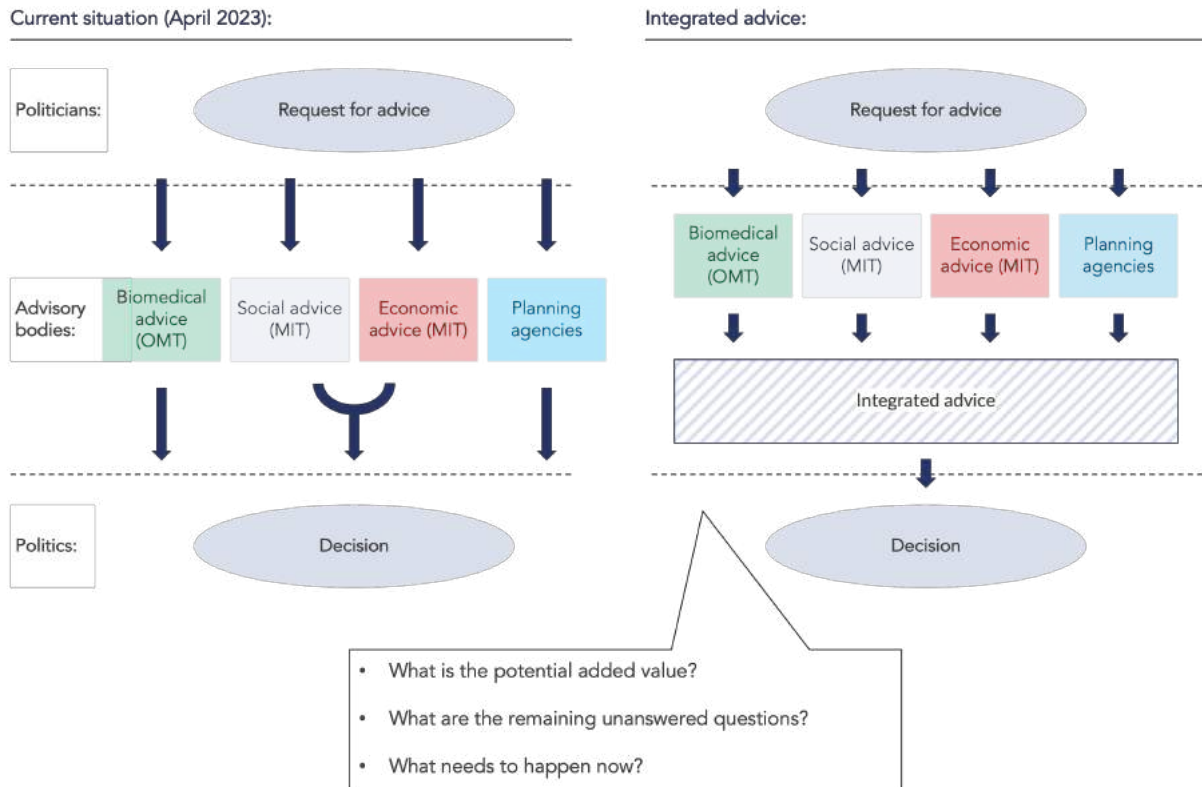


Figure 1: Schematic representation of the current process of (solicited) advice concerning the pandemic and the new situation in the case of integrated advice. Research is needed into the possibilities, impossibilities and added value of integrated advice and what, at present, is still required to realise that. In the case of integrated advice, it will still be possible for the individual parties to issue independent advice as well.<sup>1</sup>

In January 2022, a group of scientists and politicians from different disciplines came together for the first time to reflect on the advice provided to the government during the COVID-19 pandemic<sup>2</sup>. This led to the wish to draw up a knowledge agenda across overarching domains. During a second meeting in July 2022, this knowledge agenda was elaborated with an interdisciplinary group of scientists and the conclusions were presented in the report 'Learning from a crisis'<sup>3</sup>. The main research question in this report was: how can recommendations be provided in a joint, integrated way during a pandemic? By this, we mean that different disciplines jointly reach a single, collective recommendation, as shown on the left side in Figure 1.

Integrated advice was not used during the COVID-19 pandemic. The first Dutch Safety Board report stated that there was a dominant perspective from the viewpoint of infectious disease control at the start of the pandemic and, consequently, a lack of balance in the approach<sup>4</sup>. Integrated advice may have provided a solution to this. However, it is not yet known whether integrated, joint recommendations are indeed more effective (and according to which parameters or outcome measures this should be measured) than advice delivered from different 'silos'. In addition, it is unclear what the exact form of delivery for integrated advice should be, and what actions are required to achieve this.

<sup>2</sup> This subject is discussed in the report 'From pandemic to endemic' [in Dutch], <https://convergence.nl/app/uploads/Van-Pandemie-naar-Endemie.pdf>. This also contains a list of participants.

<sup>3</sup> See <https://convergence.nl/app/uploads/Leren-van-een-crisis.pdf>. This also contains a list of participants.

<sup>4</sup> Approach COVID-19 crisis Part 1: until September 2020 [in Dutch], Dutch Safety Board, <https://www.onderzoeksraad.nl/nl/page/16666/aanpak-coronacrisis-%E2%80%93-deel-1-tot-september-2020>.



In February 2023, the third 'Learning from a crisis' meeting was held, during which a group of scientists from different disciplines came together to perform an initial scoping exercise of integrated advice. Two short simulation rounds were carried out: the reopening of society on 22 April 2021 and the current threat posed by avian influenza. These two simulations acted as an initial test of how integrated advice could be used. This document describes the lessons learned from this meeting.

## Lesson 1: Integrated advice does not occur automatically

Providing joint advice and bringing together various disciplines is not so straightforward and was by no means the way in which events unfolded during the COVID-19 pandemic. Answering the knowledge gaps as described in Lesson 3 in this document therefore requires action and investment from all parties involved.

**Science:** Stimulate a dialogue and ensure understanding exists between the different domains. Make sure different parties know how to find each other in the event of a new pandemic. Start research immediately on how to provide advice more effectively, both within individual domains and across domains. Answer any remaining fundamental questions, especially the questions listed later in this document.

**Advisory bodies (planning agencies, RIVM, SIT, OMT, strategic advisory bodies):** Work towards a knowledge infrastructure that contributes to low-threshold sharing of knowledge and data during a pandemic.

Ensure that an ecosystem exists that encourages collaboration and knowledge production, also at an international level. Ensure pandemic preparedness during non-crisis periods by continuing to rehearse different scenarios.

**Politicians and policymakers:** Encourage and support initiatives to answer remaining questions. Think about the design of advice and cross-departmental consultation during a pandemic.

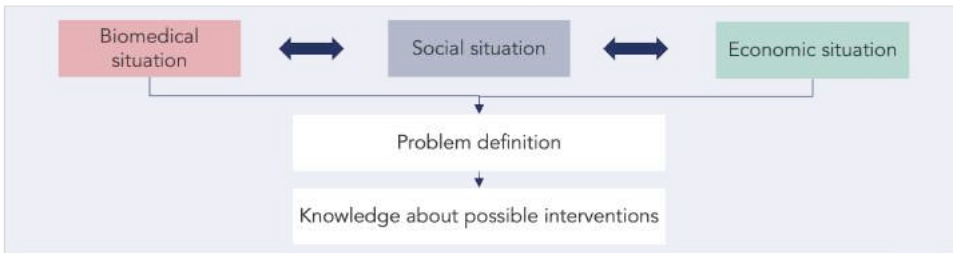
We call upon all parties involved to act now to be better prepared in the event of a new pandemic.

## Lesson 2: A joint framework is feasible

The participants in the simulations were positive about the feasibility of providing joint advice. Although the participants were free to determine the form of the advice, all groups concluded that an integrated decision-making framework<sup>5</sup> is desirable. Figure 2 provides a visualisation of the (minimal) steps required to provide integrated advice. We subsequently explain this in more detail.

### Steps in an integrated decision-making framework:

#### 1. Determine situation, define problem and collect available knowledge



#### 2. & 3. Determine expected impact of measures in short and long term

Short term		Biomedical		Social		Economic			
		Parameter A	Parameter B	Parameter C	Parameter D	Parameter E	Parameter F	+	
No public health measures									
Package of measures #1	No measures	Effect on parameters With accompanying policy Uncertainty		Parameter A	Parameter B	Parameter C	Parameter D	Parameter E	Parameter F
	Package of measures #1	Effect on parameters With accompanying policy Uncertainty							

#### 4. Weighting of uncertainty and the effect on social values

Weighting		Biomedical		Social		Economic	
		Parameter A	Parameter B	Parameter C	Parameter D	Parameter E	Parameter F
No measures	Weighting for uncertainty						
	Weighting for values A						
	Weighting for values B						
Package of measures #1	Weighting for uncertainty						
	Weighting for values A						
	Weighting for values B						

#### 5. Drawing up advice

Several options for advice:

1. Leaving clarification and weighting completely up to politicians
2. Science explains most important weightings / points of tension
3. Science performs entire qualitative / quantitative weighting

#### 6. Communicating advice

- Communication of advice to society
- Communication of advice to politicians

Figure 2: Conceptual representation of the steps in an integrated decision-making framework. The steps are the initial contours of an integrated decision-making framework but all of these still need to be further investigated and elaborated.<sup>2</sup>

<sup>5</sup> An integrated decision-making framework is used at various places by policymakers and advisers. One such case is the integrated decision-making framework for policy and legislation (IAK) for civil servants. Dependent on the context the precise definition can differ. In this document, we understand an integrated decision-making framework to be a predetermined process to realise an integrated advice.

## 1. Determine the situation, define problems and collect available scientific knowledge

For both solicited and unsolicited advice, begin by explicitly describing the initial situation and agreeing upon the definition of the problem. In the case of domain-specific advice, the aim can be determined in advance (for instance, preventing harm to health). However, in the case of integrated advice, the aim does not need to be determined in advance and different aims can co-exist. In Step 3, these objectives are then weighed against each other.

After the problem has been defined, each discipline itemises all available relevant scientific knowledge. This may include, for instance, the expected clinical course of the virus, possible interventions, and evidence about the demonstrated effectiveness of these interventions. This knowledge then forms the basis of joint next steps.

*Integrated advice (instead of separate advice per scientific discipline) makes it possible to...*

- **... pose exploratory questions for a sharper definition of the problem**

Taking an integrated look at a situation from different perspectives at the moment when it arises makes it possible to determine the problem more clearly.

*For example, in the case of an outbreak of a novel virus: what do scientists know about similar viruses? How virulent is it and which possible scenarios do policymakers need to take into account? At the same time: what is the state of the economy and how much scope is there to use public health measures?*

## 2. Determine the expected impact of public health measures in the short-term

After suitable public health measures have been outlined (this can be done by an advisory body or politicians), the effect of these measures (or no measures) on defined parameters can be determined. This determination can be quantitative or qualitative in nature. Amongst other things, integrated advice makes it possible for behavioural and communication sciences to provide immediate insights about expected compliance with the measures, and how this can be encouraged. This may consequently change the expected impact of the measures. Several packages or combinations of measures should always be considered.

*Integrated advice (instead of separate advice per scientific discipline) makes it possible to...*

- **... more easily achieve consensus about the parameters chosen**

The effect of the various packages of measures based on different parameters needs to be known per domain. Which parameters are the most relevant in the given situation can best be determined jointly.

*For example: Possible parameters of interest may include the number of predicted intensive care unit (ICU) and hospital admissions, impact on mental well-being, and unemployment rates.*

- **... include the interaction between different parameters across the domains**

After the effect of public health measures on the chosen parameters has been determined within each domain, a joint refinement takes place. This is because parameters from the different domains can influence each other.

*For example: The reduced public support for measures leads to less compliance with public health measures and consequently to a reduced effect on containing the pandemic. Or, considerable anxiety about the virus has a stronger effect on the economy if nothing is done than the effect determined with the original economic model.*

- **... advise better accompanying measures**

Accompanying policies are additional measures intended to reduce the negative effects of other policies. In the context of the COVID-19 pandemic, accompanying measures could be used to soften the effects of the COVID-19 measures. To provide optimal advice about this, scenarios and possibilities need to be considered from a multidisciplinary perspective, also because accompanying policies may involve allocation of scarce financial resources.

*For example: If a (partial) lockdown will be implemented for a long period, then accompanying measures can be proactively initiated to prevent considerable loneliness among older people. This could be done, for instance, by setting up initiatives to bring older and young people into contact with each other.*

- **... come up with smarter measures**

Jointly looking at the impact and effects of public health measures allows these to be more broadly determined, although this always remains a challenge. This allows more customised advice to be provided. It is important to realise that there is never an optimal solution for everybody in society.

*For example: If loneliness is very common among young people, but a pandemic pathogen tends to cause a mild infection in this population, then the possibility of opening schools and enabling young people to participate in sports becomes a feasible measure to explore. At the same time, teachers or other close contacts of young people could be given priority when it comes to vaccinations or provide them with personal protective equipment (PPE) to protect themselves from infection.*

### 3. Determine the expected impact of public health measures in the long-term

In addition to determining the short-term effects of a pandemic, the long-term impact must also be examined from the beginning. An important lesson from the COVID-19 pandemic is that longer-term implications were insufficiently examined, particularly at the beginning of the pandemic (see also the report 'Learning from a crisis'<sup>5</sup>)

*Integrated advice (instead of separate advice per scientific discipline) makes it possible to...*

- **... create broader scenarios for the long-term**

Broader long-term scenarios should not just consider the virus but also the societal and economic effects. This includes reduced support for the measures as well.

*For example: In the acute phase of a crisis, an integrated team parallel to the acute crisis advisory team (where it is necessary to come up with advice quickly) can focus on the long-*



term scenarios<sup>6</sup>. This long-term perspective can, for example, ensure that adjustments to the accompanying policy are made if the crisis is likely to last for months or even years.

#### 4. Weighting uncertainty and the effect on societal values

An important role of scientific advisory bodies is interpreting uncertainty. Areas of uncertainty can be weighed up with the aim of reaching a consensus across different disciplines. Different perspectives need to be acknowledged, not only between disciplines but also within each discipline.

Subsequently, an analysis takes place regarding what the expected change per parameter could mean for collective societal values. In essence, this means determining a weighting (degree of importance) for each parameter for the various collective values (for example, freedom, equality, solidarity, and justice). This weighting depends on the values that different people in society consider important. Scientists do not determine the values a society strives for, but they can help to highlight the effects that public health measures could have on a predetermined set of collective societal values.

*Integrated advice (instead of separate advice per scientific discipline) makes it possible to...*

- **... integrally determine the weighting of uncertainty and effects in different value systems**  
Data is often obtained from different sources during a crisis and is subject to considerable uncertainty. Dependent on a society's values, one parameter might also be considered more important than another. It is therefore possible to integrate the weighting of different outcome parameters into joint recommendations. Please note that science does not determine which values are the most important but can help reveal or understand the possible weightings. However, there is currently a need to develop a suitable methodology to determine the values held by a society (see also Lesson 3).

*For example: A lot of uncertainty exists regarding the societal risks of avian influenza (Does it have pandemic potential? What is the case fatality rate and does this vary across age groups?). At the same time, it is likely that little support exists in society for (strict) public health measures so soon after the COVID-19 pandemic. If the prevention of mortality is deemed as an important value in society, then (as yet uncertain) important parameters could include possible deaths or the predicted number of ICU admissions. However, if freedom is the most important value in society, then perhaps parameters like support of autonomy and freedom of choice need to receive more weight.*

#### 5. Drawing up the advice

The previous steps form the basis for providing recommendations. It remains unclear as to what extent integrated advice should already incorporate a weighting of importance for each recommendation rather than allowing politicians to do that. The advice could simply be the presentation of the information from Steps 2 and 3, but it is also possible to provide further analyses. Ultimately, the final decision is, of course, **taken by politicians**.

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<sup>6</sup> In the 2016 Dutch manual for crisis management (*Nationaal Handboek Crisisbeheersing*), such a system is also mentioned as part of the decision-making, with an interdepartmental team for the long-term ('after phase').

*Integrated advice (instead of separate advice per scientific discipline) makes it possible to...*

- ... **realise an integrated clarification, which can be quantitative or qualitative in nature**

Various formats are available for delivering integrated advice. For example, a quantitative analysis can be realised via a social cost-benefit analysis (SCBA<sup>7</sup>), in which the costs and benefits are determined for each package of public health measures. Qualitative analyses, on the other hand, do more justice to variables that are difficult to quantify. Analyses can also be performed simply by defining challenging dilemmas that cannot always be expressed in terms of costs and benefits. In this way, integrated analyses can prevent the underrepresentation of key effects or certain subgroups.

How these analyses can best be presented in integrated advice remains unclear (see also Lesson 3).

*For example: One of the dilemmas is whether years of life lost or loneliness can be converted into euros to enable comparison, for example, with the costs of closing the hospitality industry. In such a case, a choice must be made for the weighting ('value of a year of life')<sup>8</sup>. It is uncertain whether such a weighting is possible or desirable.*

## 6. Communicating advice

The last step is communicating advice to politicians, policymakers and the general public.

*Integrated advice (instead of separate advice per scientific discipline) makes it possible to...*

- ... **jointly communicate towards the public**

Joint communication allows different disciplines to explain the joint recommendations to the general public, politicians, and policymakers in a more effective and substantiated way. Part of the advice itself can even include recommendations about how the decision is communicated.

*For example: First testing the text of an advisory document with communication experts can ensure it is accessible and understandable for all groups in society.*

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<sup>7</sup> Societal costs and benefit analysis.

<sup>8</sup> A standard measure in pharmacy is that a year of life gained may cost a maximum of €80.000 otherwise a different expenditure is preferred.

## Lesson 3: Unanswered questions remain

As described above, the two short simulations revealed that integrated advice has potential added value. Before this framework of providing advice is used in practice, the steps described above need to be fully elaborated. This includes analysing the feasibility and added value of providing integrated advice, with a more extensive simulation.

### Preparatory research for an integrated decision-making framework

Providing integrated advice requires an expansion of the integrated decision-making framework described above. The short simulations revealed several important and as yet unanswered questions, although further open questions are likely to exist beyond those listed in this paper. Crucially, if research is already ongoing for some of the subjects mentioned, existing expertise should be utilised as much as possible.

**1 Can a knowledge infrastructure be designed to efficiently share knowledge between domains?**

A method that can be used to share knowledge between different domains is critically important for the provision of joint advice. At present, this infrastructure is inadequate.

**2 Which parameters are required as input for each domain? What is the desired measurement frequency?**

For example: the number of hospital admissions, the prevalence of loneliness or poverty, and levels of unemployment. Which parameters are crucial to examine during a pandemic? And how often should the choice of key parameters be updated, depending on the pandemic situation?

**3 To what extent can desired parameters be measured or monitored, and what is still required to achieve this?**

For example, how quickly can the daily incidence of infections be determined, or how can it be determined if the population's mental well-being is adversely affected at the start of a pandemic? Is it possible to (frequently) determine all parameters in a quantitative manner? And is that always worthwhile? This also requires consensus as to how much uncertainty is acceptable. To what extent can the degree of certainty provided be improved?

**4 How is knowledge pooled within the economic and social sciences?**

It is important that representatives from each domain agree on the integrated recommendations so that there are no longer any major points of discussion during the process of providing joint advice. To some extent, the OMT ensures that a clear organisation is already in place for the biomedical sciences.

**5 Which public health measures is society prepared to accept?**

These are not questions to which science can give the answers. However, scientists may be able to describe which questions to evaluate in advance. Is it, for instance, possible to distinguish groups with varying support of public health measures from the moment they are implemented? This could help with recommending specific measures that only apply in a certain province, or only to a certain age group.

**6 Which knowledge is needed to determine the weight of each parameter for a values framework?**

A scientific method is needed to describe the values that are upheld in society. Ideally, it is important to determine social values, and any differences within subgroups, prior to a new pandemic, so that these can be immediately included in the advice provided. A collection of relevant public values must therefore be determined.

**7 Which consequences are society prepared to accept? What are the no-goes? How should these be described?**

Addressing these research questions can help initiate crucial discussion and perhaps reduce the chances of polarisation. For example, if society considers it unacceptable that access to acute care becomes difficult (due to full hospitals and ICUs) then this also needs to be included in the weighting.

**8 Which weighting factors belong to which value system? How should uncertainty be measured? How are short versus the long-term consequences compared?**

Although final decision-making on public health measures is conducted by politicians, considerable benefit can be obtained from explicitly stating which underlying values have a role to play. The weighting can also be dependent upon the phase of the crisis. For example, strict measures to prevent ICU admissions may be desirable in the acute phase, whereas that may change over time.

**9 How should synthesised advice be tailored for politicians?**

Scientists and experts do not determine which policies are recommended, but they can ensure that the most important deliberations are taken into consideration. How far scientists should go in providing specific recommendations merits further research.

**10 How should scientists describe the different variables to consider? How can scientists think through challenging dilemmas?**

How do scientists ensure that all effects of public health measures and values are included? A pandemic and the associated public health measures inevitably give rise to ethical dilemmas. How can polarisation be prevented, and a dialogue be encouraged? From which perspective do you provide advice and which outcome measure is associated with that (quality-adjusted life years, (QALYs)? Euros?). Research addressing these research questions is already taken place within various organisations such as the Dutch SIT<sup>9</sup>.

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<sup>9</sup> The aim of that research is also to elaborate an integrated decision-making framework.

**11 How can expertise from different disciplines be used, and how can the provision of advice be separated from decisions-making?**

The risk of providing integrated advice is that advisors are tempted to wear the politician's hat. How advisors and politicians learn from each other, whilst ensuring all parties provide recommendations only on their own field of expertise?

**12 How should integrated advice be designed? Which advice structure is appropriate?**

Applying an integrated decision-making framework in practice also requires an examination of the best organisational structure and delivery method for providing advice. For example: what does the advice structure currently look like during a crisis, who will present the conclusions of joint recommendations, etc.? For this, it is important to harness expertise from disciplines and organisations that have experience in providing integrated advice.

**13 What can be learned from the experience other countries have with providing integrated advice?**

Ireland is an example of a country in which integrated advice was already provided (in part) during the COVID-19 pandemic. Integrated consultation also takes place in other countries. Lessons learned from parts of the world that have experience to share should be included as much as possible.

## **A more extensive simulation**

Further research is needed to determine the feasibility and added value of providing integrated advice during a pandemic. A solid evidence base for this approach is necessary before it is implemented in practice. The possible consequence of deviating from monodisciplinary advice needs to be outlined, for example, the effect on the speed at which recommendations can be delivered. The extensive process required for providing integrated advice could result in a delay when rapid action is required. It is important to investigate this in advance and aim for a consensus about how to address these drawbacks in various situations. Decision-makers and policymakers should also be involved in new simulations to incorporate their perspectives on integrated advice and how it could best be presented to them during a pandemic. This approach makes it possible to immediately take a step towards implementing integrated advice in practice.

The conclusions in this document are based on two short simulations, and we propose carrying out an additional extensive simulation once the above research questions have been answered. In this extensive simulation, the participants will receive a new case in which they will first issue advice from within their separate disciplines, and subsequently realise an integrated advice document across the domains. By regularly repeating this simulation, we aim to ensure that the knowledge acquired, and network built will remain up to date.



## Appendix: Approach underlying this document

During the meeting on 15 February 2023, two surveys were carried out in which the focus was not so much on the outcome as on the methodology and the possible added value/challenges of providing integrated advice.

### Simulations

Two simulations were carried out:

1) The reopening of society on 23 April 2021

The simulation started with three presentations, which described the biomedical, social and economic situation regarding the pandemic knowledge on 22 April 2021<sup>10</sup>. Subsequently, the three multidisciplinary groups were asked to issue advice concerning a choice between three packages of measures: the complete opening of society, the partial opening of society or postponing the opening of society.

2) Avian influenza on 15 February 2023

The simulation started with a brief introduction to avian influenza and the risks and uncertainties of this virus. Subsequently, three multidisciplinary groups received several requests for advice:

- What should policymakers do now?
  - Should policymakers do something already?
  - Which preparations must policymakers make now?
- What does the roadmap look like?
  - What are the next steps and when should these be taken?

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<sup>10</sup> See "Learning from a crisis" – PDPC, for a description of the state of knowledge.

## Form of advice

For the final form of the advice three methods were introduced:

- 1) Advice in three independent science domains that are, however, brought together in a single joint overview (Figure 3) Figure 3: Possible methodology for providing advice per scientific domain.<sup>3</sup>

		Biomedical		Social			Economic	
		ICU	..	Mental wellbeing	Loneliness	...	GDP	..
Package of measures 1	Effect							
	With optimal accompanying policies							
	Uncertainty							
Package of measures 2	Effect							
	With optimal accompanying policies							
	Uncertainty							

Figure 3: Possible methodology for providing advice per scientific domain.<sup>3</sup>

- 2) Clarification of the challenges/questions. In doing so, the choice/answering of these questions should, however, be left to the policymakers. For example, it is still uncertain whether the number of ICU admissions is decreasing but there is a lot of loneliness in society and the support for the measures is decreasing.
- 3) A qualitative or quantitative decision-making framework. This analysis weighs the parameters from Figure 3 to determine the costs and benefits of each package of measures. The simulation makes it clear that the weighting of the factors (which factor weighs heavier than another) depends on which values are important within society (e.g. freedom, health, the protection of vulnerable people). Figure 3: Possible methodology for providing advice per scientific domain.<sup>3</sup>

In the simulation, all groups used a qualitative decision-making framework for which it still has to be decided how the final weighting of values takes place: by scientists or by politicians.

## Present during the simulations

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