



National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Global Risk Assessment for Public Health in the Netherlands

Better prepared for the future

RIVM report 2026-0097



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Colophon

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DOI 10.21945/RIVM-2026-0097

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This study was commissioned by the Ministry of Health, Welfare and Sport, International Affairs Department (IZ).

Published by:
**National Institute for Public Health
and the Environment, RIVM**
PO Box 1 | 3720 BA Bilthoven
The Netherlands
www.rivm.nl/en

Synopsis

Global risk assessment of public health in the Netherlands

Better prepared for the future

Global developments affect the health of the Dutch population, now and in the future. Examples include conflicts, climate change or pandemics caused by pathogens from abroad. Therefore, being better prepared for the future is important for our health in the Netherlands.

For this purpose, RIVM has made an update of the main international risks to health in the Netherlands. The risks previously identified by RIVM in 2019 are still relevant and new risks have emerged.

The main risks for the coming decade include antimicrobial resistance, climate change, environmental pollution, among others. Newer threats include disinformation and lower willingness to get vaccinated. RIVM recommends that the threats are considered both separately and in combination, because they can reinforce each other or happen at the same time.

RIVM also looks at risks for the BES islands: Bonaire, Sint Eustatius, and Saba. Many risks are widely felt, regardless of geographic or cultural differences. However, not all risks are identical. The BES islands, due to their location, are much more vulnerable to natural disasters. In addition, they are confronted with low availability of staff for health care, because skilled workers are leaving the islands. These differences require a tailored approach to risks for Caribbean Netherlands.

RIVM describes what policymakers can do to better prepare the Netherlands for international risks to public health. An important point here is that different ministries are often needed to properly tackle the threats. Good cooperation is essential in this regard. The Netherlands will also have to continue to work closely with the European Union and global organisations such as the World Health Organization. The better the world deals with international threats, the smaller the impacts on public health in the Netherlands.

Keywords: risks, threats, international, cross-border, signaling, public health, Health in All Policies, Caribbean Netherlands

Publiekssamenvatting

Risicoscan internationale dreigingen voor de Nederlandse volksgezondheid

Nederland beter voorbereid op de toekomst

Ontwikkelingen in de wereld hebben invloed op de gezondheid van de Nederlandse bevolking, nu en in de toekomst. Denk aan klimaatverandering, oorlogen, of pandemieën door ziekteverwekkers uit het buitenland. Het is belangrijk dat Nederland hierop is voorbereid.

Het RIVM signaleerde in 2019 voor het eerst de belangrijkste internationale dreigingen voor de gezondheid in Nederland. Het RIVM heeft dat nu opnieuw gedaan omdat de wereld is veranderd. De eerder gesignaleerde dreigingen zijn er nog steeds en daar zijn nieuwe bij gekomen.

De belangrijkste dreigingen voor de komende tien jaar zijn onder andere antimicrobiële resistentie, klimaatverandering en milieuvervuiling. Nieuwere dreigingen zijn onder meer desinformatie en dat minder mensen zich willen laten vaccineren. Het RIVM beveelt aan om de dreigingen zowel apart als in samenhang te bekijken, omdat ze elkaar kunnen versterken of tegelijk kunnen gebeuren.

Het RIVM kijkt ook naar ontwikkelingen voor de BES-eilanden: Bonaire, Sint-Eustatius en Saba. Veel dreigingen zijn daar hetzelfde, maar er zijn ook verschillen. Zo zijn de BES-eilanden door hun ligging veel gevoeliger voor natuurrampen. Daarnaast is er steeds minder personeel voor de zorg, doordat mensen de eilanden verlaten. Deze verschillen vragen om een aanpak op maat voor Caribisch Nederland.

Het RIVM geeft aan wat beleidsmakers kunnen doen om Nederland beter voor te bereiden op internationale dreigingen voor de volksgezondheid. Een belangrijk punt hierbij is dat vaak verschillende ministeries nodig zijn om de dreigingen goed aan te pakken. Het is daarom essentieel dat zij goed samenwerken. Ook zal Nederland goed moeten blijven samenwerken met de Europese Unie en mondiale organisaties zoals de Wereldgezondheidsorganisatie (WHO). Hoe beter de wereld is voorbereid op internationale dreigingen, hoe kleiner de mogelijke gevolgen voor de volksgezondheid in Nederland.

Kernwoorden: dreigingen, internationaal, grensoverstijgend, signaleren, volksgezondheid, Health in All Policies, Nederland, Caribisch Nederland, interdepartementaal

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1 Introduction

Today's world is characterised by rapid and far-reaching changes that can have major consequences for public health, also in the Netherlands. Global risks such as climate change, pandemics and geopolitical tensions affect the health of the Dutch population, both directly and indirectly. As such, it is important to anticipate potential health risks associated with these developments.

RIVM has been producing the Public Health Foresight Study (PHFS) for over thirty years, addressing the most important future developments for public health and healthcare [1]. The PHFS describes developments such as the ageing population, the increase in chronic diseases, health inequalities and rising healthcare expenditures. While the study also includes international developments, the PHFS has a strong national focus.

In 2019, a risk assessment was published with a more international focus, partly to complement the PHFS: Foreign threats to public health in the Netherlands. A quick scan [2].

1.1 The world has changed

Since the publication of the risk assessment in 2019, the international risk landscape has changed. We are still dealing with known risks such as climate change and increasing global connectivity. At the same time, however, the world has changed, and major developments are taking place on the world stage. International cooperation is under pressure, partly due to conflicts, trade wars and the emergence of new power blocs.

One impactful development is the United States' withdrawal from various international treaties and organisations, including the Paris Climate Agreement and the World Health Organization (WHO). This significantly affects the global health architecture (international coordination and cooperation), which is needed to effectively tackle cross-border health risks.

1.2 An update of the 2019 risk assessment

For the Netherlands, these developments mean that public health policy must respond to the changing world. The Ministry of Health, Welfare and Sport (VWS) has therefore commissioned RIVM to update the risk assessment. A renewed analysis also includes newer risks, such as the changing global health architecture. These new risks can also amplify existing risks. For example, the risk of infectious diseases increases when international coordination and cooperation weaken. In this update, more attention is paid to the interconnection of risks.

As in 2019, this risk assessment provides insight into the most important international risks to public health in the Netherlands. In addition, it aims to identify options for action for policymakers for a selection of the most important risks. These options for action inform

present and future policy to improve preparedness for international risks. Some developments, such as AI, will bring both opportunities and risks. Potential opportunities arising from the risks have not been considered in this study, as the focus is on the risks. Nevertheless, opportunities for policymaking have been identified in the options for action.

The study examined risks to public health in the Netherlands. In addition to its territory in mainland Europe, the Netherlands also includes Bonaire, St Eustatius and Saba (the BES islands, also called the Caribbean Netherlands). Where necessary, a specific deeper analysis has been added for the BES islands, as international threats there may differ from those faced by the European Netherlands.

1.3 Reading guide

Chapter 2 explains the approach and design of the risk assessment. Chapter 3 answers the question of which international risks are most important for the European Netherlands and the BES islands. In Chapter 4, we zoom in on the options for action for five risk clusters, discussing the impact on public health, current Dutch policy and policy options for each risk cluster. We also take a closer look at the situation in the Caribbean. In chapter 5, we discuss how the complexity of the related risks requires a different approach. Finally, in the reflection (chapter 6), we zoom out to highlight the key themes of this risk assessment and propose overarching options for action for policymakers.

Details of the methodology, a list of consulted experts and an overview of sources can be found in the appendices. The appendices also include the longlist of threats, accompanied by a brief explanation.

What is the Caribbean Netherlands?

The Kingdom of the Netherlands consists of the Netherlands, Aruba, Curaçao and Sint Maarten. The islands of Bonaire, St Eustatius and Saba (BES islands) are special municipalities within the Netherlands. They are called the Caribbean Netherlands. Since 2010, the BES islands have had the status of a public entity, comparable to a Dutch municipality. Dutch legislation applies, albeit often in an adapted form. Aruba, Curaçao and Sint Maarten are autonomous countries within the Kingdom of the Netherlands, with their own governments, parliaments and healthcare systems. The BES islands fall under the responsibility of the Ministry of Health, Welfare and Sport. However, due to their special status and unique circumstances, the implementation of health policy may differ from that in the European Netherlands. There is close cooperation in areas such as infectious disease control and crisis response.

2 Approach to this risk assessment

This report depicts the most important international risks to public health in the Netherlands in the coming ten years. To map these, a number of methodological choices have been made. This chapter briefly describes the approach and the choices made.

2.1 What do we mean by public health?

There are varying definitions of public health, from narrow to broad [3]. In this document, we consider public health to mean the state of health of a population, which can be expressed in the prevalence of diseases, mortality and burden of disease, for example. This risk assessment focuses on the health status of the Dutch population, but social and economic aspects are also included, such as health inequalities and healthcare expenditures for individuals and society as a whole.

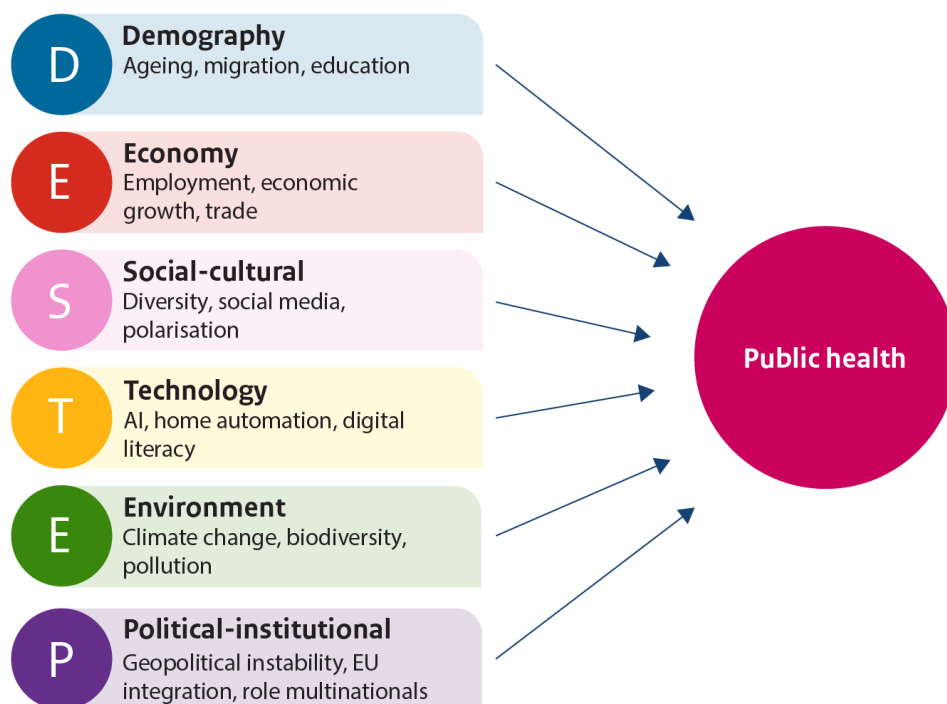
A risk can affect public health through various paths. For example, a risk can have a direct impact (such as human-to-human spread of infectious diseases), modify determinants of health (such as smoking and exposure to heat) or complicate the delivery of care (such as treatments or medicines). A risk can also hinder prevention, health protection and vaccination in general.

Health risks can also accumulate if several risks occur at the same time or reinforce each other. This is especially true for vulnerable groups such as people with chronic conditions or socioeconomic vulnerability. This can increase health inequalities.

2.2 Horizon scanning with the DESTEP method

The horizon scanning method was used to establish a broad inventory of relevant risks. Horizon scanning systematically and structurally identifies the most important future developments and how they affect health [4]. For the horizon scan, we use the DESTEP method (Figure 1). DESTEP stands for: Demography, Economy, Socio-cultural, Technology, Ecology and Political-institutional. The methodology helps to identify risks that are relevant to Dutch public health (see also Appendix 2).

Figure 1 The DESTEP methodology for mapping broad developments affecting public health



2.3 Risk selection via desktop study and experts

A desk study was conducted to make an initial inventory of risks based on recent national and international literature, including studies by the Joint Research Centre (JRC), World Economic Forum (WEF), World Health Organization (WHO), Scientific Council for Government Policy (WRR), National Coordinator for Counterterrorism and Security (NCTV) and the Rathenau Institute. A list of the literature consulted is included in Appendix 3.

This initial inventory identified over 150 risks and classified them within the DESTEP categories. For each of the identified risks, we assessed whether they are 1) relevant for the next 10 years, 2) relevant to Dutch public health and 3) relevant to the policy area of the Ministry of Health, Welfare and Sport. This led to the exclusion of topics such as extraterrestrial risks (e.g., solar storms and meteorite impacts) and reduced the number to a list of 60 risks that meet these criteria.

Those 60 risks were then presented to the RIVM advisory group. The advisory group was set up specifically for this project and consisted of eight RIVM experts with a wide range of expertise, including infectious diseases, behaviour, climate and the environment, external security and international relations (see Appendix 1). Based on feedback from the experts, the list has been reduced to a *longlist* of 34 risks, plus two additional risks that are only relevant to the BES islands (see Appendix 4).

2.4 From longlist to shortlist via questionnaire research

The longlist of risks was presented to experts via a questionnaire. Two questionnaires were sent out: one for the assessment of the risks to the Netherlands as a whole and one specifically for the BES islands. The questionnaire of the BES islands includes two additional risks, namely *brain drain* and natural disasters. Brain drain refers to skilled workers leaving to look for better opportunities abroad.

The questionnaire was widely distributed to experts to achieve adequate coverage of expertise for all DESTEP categories. We also aimed to ensure diversity in the sectors involved, such as research, policy and non-profit organisations. The questionnaire was also distributed to members of the Global Health Hub, a network of partners established by the Ministry of Health, Welfare and Sport and the Ministry of Foreign Affairs [5].

Respondents scored the risks on a 5-point scale, ranging from very small to very large. In addition, they selected their top 3 risks (for the Netherlands) or top 5 risks (for the BES islands). By 'risk' we mean the combination of the probability that a threat will occur and its impact or severity. A threat is therefore the underlying cause (the danger), while risk is the combination of the probability that this danger will occur and the severity of its consequences.

A score was then calculated for all risks based on the average risk assessment. This provides a prioritisation of the most important risks based on the average score (Figure 2). If the average scores of risks were the same, the results of the selection of the top 3 (the Netherlands) or top 5 (BES) were used to establish a ranking.

A total of 84 respondents completed the general questionnaire, and 19 respondents completed the questionnaire specifically for the BES islands. The various fields of expertise of the DESTEP categories are well represented among these respondents. In addition, there was broad coverage of the various sectors, such as research, policy and non-profit organisations. The scores are not weighted for expertise or relevant sector. Appendix 5 provides an overview of the respondents' background characteristics. The smaller number of respondents to the BES islands questionnaire means that the spread of average scores is slightly larger than in the general questionnaire.

Figure 2 Steps taken to select and prioritise the most significant risks to public health



2.5 Options for action through interviews

The questionnaire resulted in a top 15 of risks for the European and Caribbean Netherlands. These have been merged into five risk clusters. Options for action have been developed for the ten most relevant individual risks within these five clusters. Interviews were held with experts with expertise on specific risks to provide input on the policy options. During the interviews, three main themes were discussed: 1) what is the nature and impact of the risk(s) on public health, 2) what is the current policy, and 3) what are the options for action for new policy. A total of 14 interviews were held (see Appendix 1). For the BES-specific policy options, an additional group discussion was held in which the most important risks to the BES islands were discussed.

A desk study was conducted in addition to the interviews. Recent documents were used to gain insight into the current policy and identify possible options for action. Documents used include reports from the European Commission, the European Centre for Disease Prevention and Control (ECDC), the Council for Public Health and Society (RVS), and the WHO.

2.6 Reflection on the approach

While using a questionnaire among experts is a valuable method for prioritising risks, this approach also has limitations. Without the input of experts, we would not have been able to make a well-founded prioritisation, but there may also be bias. First of all, it should be noted that at the time of the questionnaire (January and February 2026), including the military operation in Venezuela and the attack on Iran by Israel and the US. During the same period, there was also extensive discussion in the Netherlands about the proposed cuts to pandemic preparedness. This may have affected the assessment of the risks. Experts also assess risks based on their own background, experience and knowledge, which can influence the outcomes.

To deal with this, we apply triangulation, combining insights from the questionnaires with other sources and methods to avoid blindly relying on the results of one approach. This also applies to the in-depth interviews about the options for action, which have also been viewed within a broader context and supplemented with other sources of information.

The study did not take into account that the risks can differ in scale level (global-European-national), time span (from 0-1 year to more than 10 years), nature of the health impact (direct or more indirect) and causality (what influences what). Follow-up research is needed for this.

3 Main international risks to Dutch public health

The results of the desk study and the questionnaire among experts show which international risks are considered to be potentially the most impactful for public health in the Netherlands. This chapter discusses the most important risks to the Netherlands and the BES islands. We will also briefly discuss the differences and similarities between the two top 15 lists.

3.1 What are the biggest risks to the Netherlands?

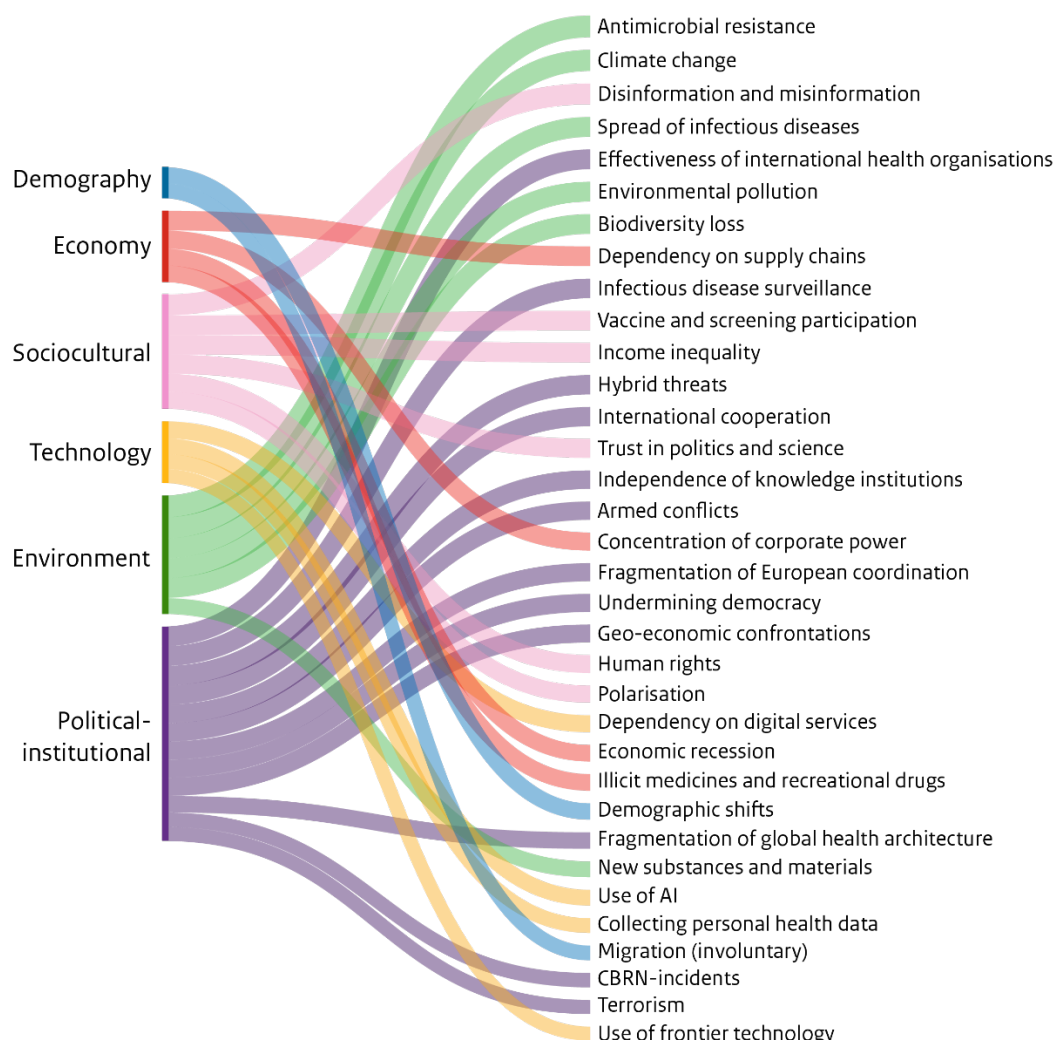
The research shows that the biggest concerns involve the increase in resistance to antimicrobials. The consequences of climate change, such as higher temperatures and more weather extremes, as well as the rapid spread of disinformation and misinformation, also score high.

Other important risks are the spread of infectious diseases, the declining effectiveness of international health organisations and environmental pollution. The loss of biodiversity, the growing dependence on global supply chains and the reduced effectiveness of international infectious disease surveillance and response are also seen as serious risks.

The experts also point to declining willingness to participate in vaccination and screening programmes, the increase in global inequality and hybrid risks, including cyberattacks, sabotage of critical infrastructure and espionage. Finally, increasing pressure on multilateral international cooperation, declining trust in politics and science, and pressure on the independence of knowledge institutions emerge as relevant risks, although these are scored slightly lower.

The results of the study show that the biggest risks to public health cover a broad spectrum. Figure 3 shows the risks ranked by their score and sorted by the different DESTEP categories (Demographics, Economy, Socio-cultural, Technology, Ecology and Political-institutional – see Chapter 2 for an explanation of DESTEP).

Figure 3 The 34 most important international risks to Dutch public health, sorted by DESTEP category (left) and risk score (right)



AI: artificial intelligence

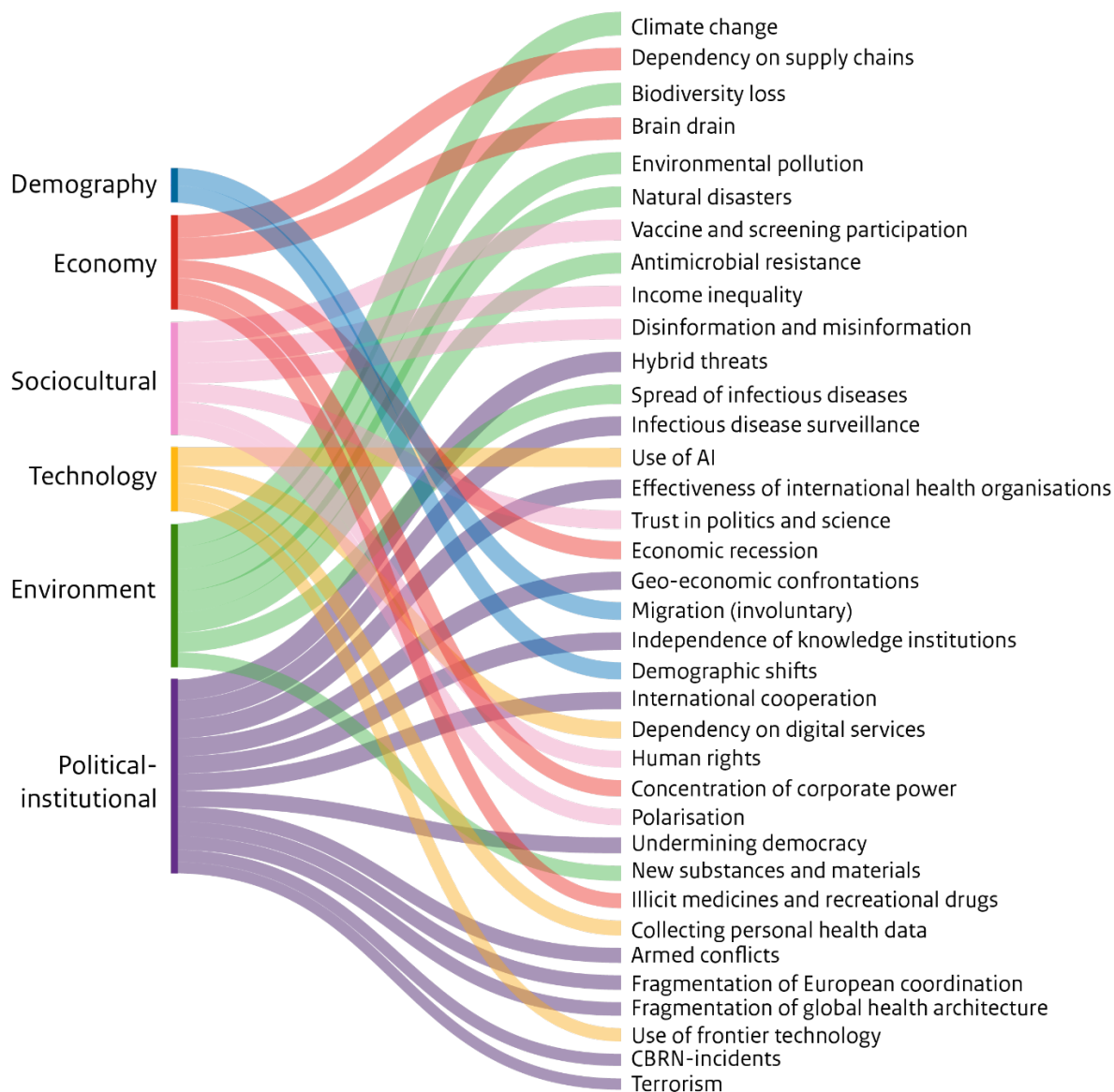
CBRN Incidents: Chemical, Biological, Radiological and Nuclear Incidents

3.2 What are the biggest risks to the BES islands?

For the BES islands, the increase in temperature and weather extremes due to climate change ranks highest, followed by the increasing reliance on global supply chains and the loss of biodiversity. The departure of skilled workers (brain drain), declining willingness to participate in vaccination and screening programmes, and increasing resistance to antimicrobials are also cited as major risks. There are also concerns about increasing environmental pollution and the risk of natural disasters, along with growing global income inequality, the spread of disinformation and misinformation and hybrid risks.

Other important risks are the spread of infectious diseases and the pressure on international infectious disease surveillance and response. Finally, the increasing use of artificial intelligence (AI) and the declining effectiveness of international health organisations were relatively often mentioned as major risks.

Figure 4 Results of the questionnaire for the BES islands. The risks are sorted by DESTEP category (left) and score (right)



AI: artificial intelligence

CBRN Incidents: Chemical, Biological, Radiological and Nuclear Incidents

3.3 Similarities and differences between the Netherlands and the BES islands

The results of the questionnaire show clear similarities, but also some differences between the Caribbean Netherlands and the Netherlands. In particular, the differences require a differentiated approach in public health policy.

Figure 5 The top 15 results of the questionnaire for the Netherlands and the BES islands



* included in the top 15 for the Netherlands only

** included in the top 15 for the BES islands only

3.3.1

Environmental risks score high in both areas

Environmental risks, such as climate change with rising temperatures and weather extremes, score high in both the European and Caribbean Netherlands. This underlines the realisation that climate change is a universal risk, regardless of geographical location. Environmental pollution of air, water and soil, as well as the loss of biodiversity, are also environmental risks that are seen as urgent in both regions. These

results align seamlessly with the '*triple crisis*' of climate change, biodiversity loss, and pollution, which is receiving increasing attention within the topic of planetary health [6, 7].

The spread of infectious diseases and resistance to antimicrobials are also important risks. For example, AMR is a global problem that risks the effectiveness of antimicrobials and has a direct impact on public health.

Social risks such as disinformation and misinformation, inequality and willingness to participate in vaccination and screening programmes are prominent in both top lists. Political-institutional risks, such as pressure on international infectious disease surveillance and the clout of global health organisations, can also be found in both top lists. Finally, there are also some economic risks in the top lists, such as dependence on supply chains.

While risks can vary greatly in nature, the associated risks are widely felt, regardless of geographical or cultural context.

3.3.2 *Differences partly explained by the location of islands*

Although the top 15 of the Netherlands and the top 15 of the BES islands show many similarities, there are also clear differences. These differences can partly be explained by the geographical, socioeconomic and administrative context of both areas. The main differences are described here.

Firstly, it is striking that the dependence on supply chains scores considerably higher in the Caribbean Netherlands (2nd vs 8th). The two additional risks, brain drain and risk of natural disasters, which are only included in the BES questionnaire, also score high. It is also striking that the respondents to the BES questionnaire score the use of artificial intelligence (AI) as a high risk, while it does not appear in the Dutch top 15.

A risk that falls outside the top 15, but which scores a lot higher for the Caribbean Netherlands, is migration. The Caribbean Netherlands has a relatively strong population growth due to migration. Most new residents—from the European Netherlands, Colombia, Venezuela and Curaçao, among others—settle on Bonaire. St Eustatius and Saba are also growing due to migration [8]. This can put pressure on public services through increased demand for care, for example. It also increases the pressure on waste processing, which poses potential risks to the environment and public health.

The European top-15 list features more political-institutional risks that do not appear in the BES lists, including pressure on science and multilateral international cooperation, declining trust in politics, and the independence of knowledge institutions.

The differences between the Caribbean Netherlands and the European Netherlands are reflected not only in the prioritisation of risks, but also in the options for action. This is further elaborated in Chapter 4.

3.4 New risks identified since previous risk assessment

Many risks identified by RIVM in the 2019 risk assessment still play an important role. For example, extreme weather due to climate change, antimicrobial resistance (AMR), the spread of infectious diseases, and a declining willingness to vaccinate once again score high on the list of risks. This applies to both the European Netherlands and the BES islands.

However, there are also clear differences between the global risks in 2019 and those in 2026. For example, disinformation and misinformation are very prominent in the current prioritisation. Another important difference from 2019 is the high scores for political-institutional risks. Hybrid risks, pressure on international cooperation and the effectiveness of international organisations are now becoming more pronounced.

4 Options for action aimed at the risks

The previous chapter shows the top 15 risks. In this chapter, we discuss the options for action: what can the Netherlands do to better prepare for the international public health risks? Because risks and the options for action are intertwined, we do not discuss the options for action for individual risks but instead address them across five thematic clusters.

4.1 Five Risk Clusters

The risks are thematically divided into five clusters (Figure 6):

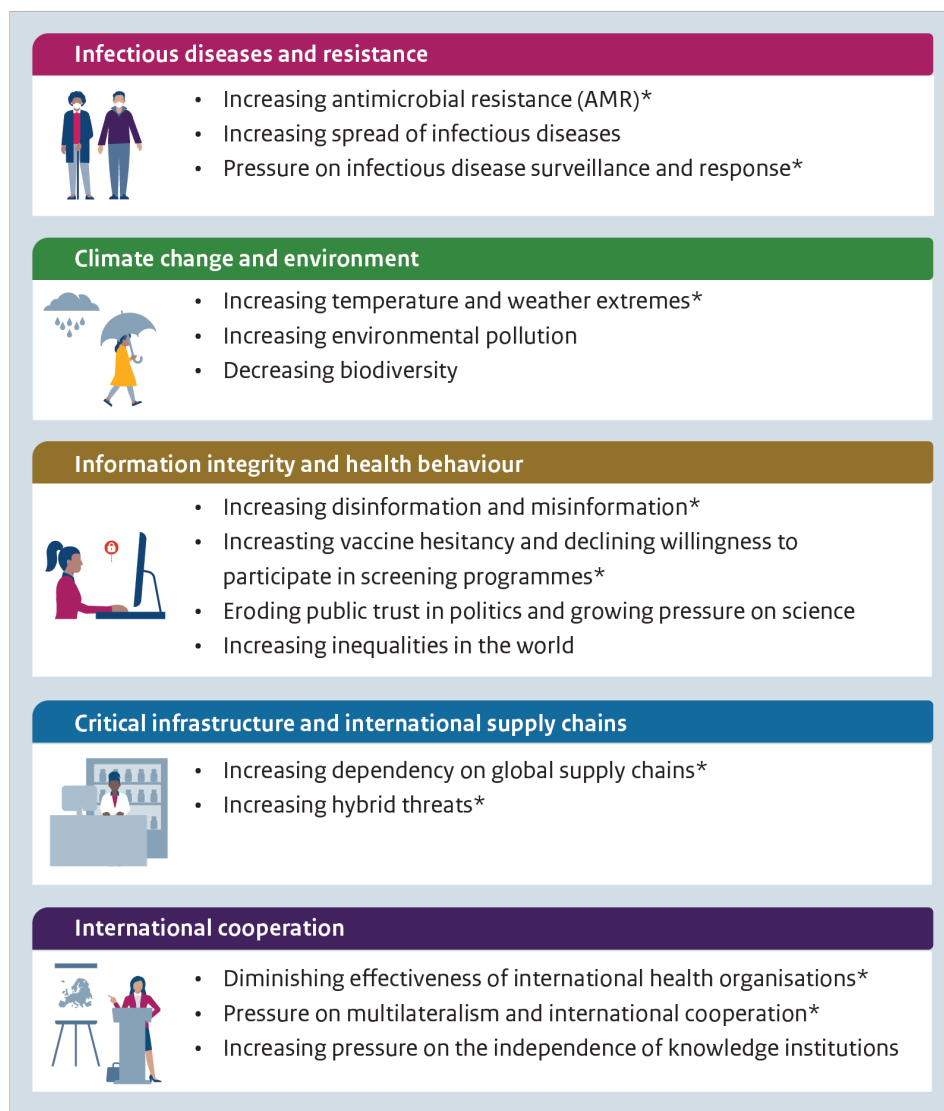
1. Infectious diseases and resistance
2. Climate and environment
3. Information integrity and health behaviour
4. Critical infrastructure and international chains
5. International cooperation

Risks can exist in multiple clusters. Within these clusters, relevant risks from the top 15 have been selected for further elaboration, with at least one risk per cluster. This takes into account risks that are most relevant to the policy domain of the Ministry of Health, Welfare and Sport.

For each cluster, we first discuss the nature of the risks and the possible health impacts, with an emphasis on impacts within the coming ten years. Long-term effects, such as malnutrition due to land degradation, fall outside the scope of this analysis. We then provide a brief overview of the current policy, covering both national and international policy. Then we discuss the most important points of attention for additional policy, the options for action. These can be aimed at reducing risks (mitigation) as well as reducing the possible impacts of the risk (adaptation). This is not further specified in the elaborations of the options for action. We do indicate whether the options for action are national or international in nature.

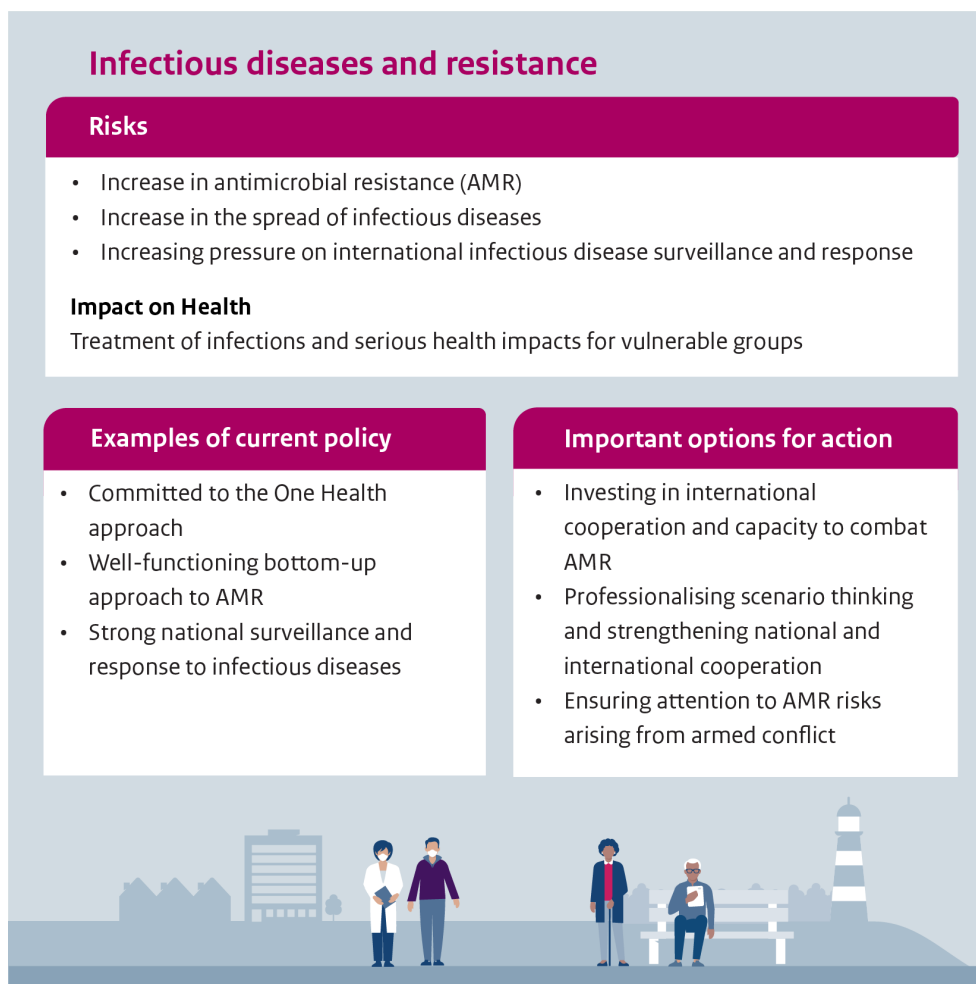
The options for action generally apply to both the European and Caribbean Netherlands. Specific points of attention for the Caribbean Netherlands will be further described at the end of this chapter.

Figure 6 Risks clustered from the options for action (the risks that have been further elaborated are marked with an *)



We do not make statements about expected effectiveness or concrete health gains. There is often insufficient knowledge available about this, and the complex interplay between various risks makes an impact assessment too complex for the scope of the current project. Finally, it is important to emphasise that the overviews of policy and options for action are not exhaustive, partly because of the broad scope and ongoing policy developments.

4.2 Infectious diseases and resistance



This cluster includes three strongly connected risks: the increase in antimicrobial resistance (AMR), the increase in the spread of infectious diseases and the increase in pressure on international infectious disease surveillance and response.

There is a significant possibility that another outbreak of an infectious disease with pandemic potential could occur in the near future. This is partly due to increasing global movement of people and goods, climate change, urbanisation, armed conflicts and the intensive contact between humans and animals [9-12]. Pathogens are constantly adapting, which further increases the likelihood of the emergence of new and difficult-to-control variants of infectious diseases [13]. Due to the subtropical climate, tropical infectious diseases such as dengue also occur in the Caribbean Netherlands [14, 15]. In addition, microorganisms (bacteria, viruses and fungi) are becoming increasingly insensitive to antimicrobial agents, resulting in antimicrobial resistance.

Antimicrobial resistance occurs in humans, plants and animals [16]. The overuse of antimicrobials in the healthcare and livestock sectors is the main cause of AMR. The growing presence of drug residues in surface water, for example, also plays a role. Another cause is inadequate

access to care, often leading to infections being left untreated, treated too late, or treated with inappropriate dosages [17, 18]. When resistance to several or all available drugs develops, infections become virtually untreatable. More and more people are at high risk of contracting resistant infections due to the ageing population, an increase in chronic conditions and increasing use of immunosuppressive medication. These people are also more vulnerable to the consequences of these infections [19].

The role of armed conflict in the spread of AMR is a major international concern [20, 21]. In conflict zones, including Ukraine, healthcare infrastructure and laboratories are being destroyed. Antibiotics are often low quality or issued without a prescription. Wounds can become infected under conditions where adequate surgical care is hardly possible [22, 23]. There is a risk that resistant pathogens may spread through human movement or enter the environment, allowing them to circulate long after a conflict has ended. These infections are often especially difficult to treat due to their resistance to multiple drugs [24, 25].

Budget cuts to international surveillance and response mechanisms for infectious diseases and AMR erode knowledge and capabilities. As a result, outbreaks and changes in pathogens are harder to detect quickly, making timely intervention more difficult [11, 26, 27]. This can lead to a faster and wider spread of infectious diseases. As an internationally connected country, these developments increase the risk of outbreaks of infectious diseases for the Netherlands.

4.2.1 *Current policy*

The Netherlands is an international leader in the responsible use of antibiotics in humans and animals. The Netherlands maintains a *One Health* approach, which takes into account the interconnections between the health of people, animals and the environment [28, 29]. Both the National Action Plan for Strengthening Zoonotic Disease Policy (2022-2026) and the Dutch Action Plan for the Reduction of Antimicrobial Resistance (2024-2030) are rooted in this approach [30]. RIVM plays a coordinating role in national surveillance, risk assessment and advice on infectious diseases. Municipal health services (GGDs) and specialist laboratories are actively involved in this process [31, 32]. The various professional groups working on these topics are well organised in the Netherlands, with internationally leading research centres focusing on the full spectrum of infectious diseases (including viral, bacterial and fungal infections) [33, 34].

The Netherlands has well-organised laboratory networks, clear risk assessment protocols and rapid response mechanisms. This is evident from a comprehensive assessment by the WHO and the ECDC [35]. The Netherlands also has a strong reputation for responsible antibiotic use [36]. The national government and implementing organisations contribute to UN- and EU-led international initiatives on surveillance, prevention and awareness of infectious diseases and antimicrobial resistance (AMR) [37-39]. The Dutch government is also allocating a structural 177 million euros to improve the pandemic preparedness of the Netherlands [40].

There are also areas of concern. To improve the exchange of data in infectious disease control, the Ministry of Health, Welfare and Sport is working on an amendment to the Public Health Act [41]. It is important to create clear conditions for data exchange to be able to quickly resolve any bottlenecks in times of crisis [35]. To that end, RIVM will launch a new national surveillance platform in 2026 to facilitate the exchange and analysis of data for the purpose of pandemic preparedness between different Dutch laboratories [42]. The implementation of the European Health Data Space (EHDS) from 2029 onwards offers further opportunities to improve the linking and sharing of data between different sectors and domains [35].

Another point of attention emerged in the approach to the COVID-19 crisis. During the fight against the pandemic, the broader societal perspective received insufficient attention [43]. The government states explicitly that it has learned that health crises affect all sectors of society [43], yet its plans lack measures to foster a society-wide dialogue on risks during the next prolonged crisis. It is important to involve all ministries in times of crisis and ensure broad ownership of the crisis approach [43].

Finally, awareness of and structural preventive policy on AMR in the environment resulting from the use of plant protection products are important priorities for strengthening the national One Health approach to AMR [44]. Tackling and raising awareness of resistant fungi is also an important point of concern internationally [44].

4.2.2 *Options for action*

Important options for action for this cluster are described below. For infectious diseases and resistance, in addition to the interviews, the recent *Joint External Evaluation-Public Health Emergency Preparedness and Response Framework* (JEE-PHEPA) evaluation is an important source for the options for action included here [35]. This report provides 86 recommendations to improve preparedness and response plans.

Continue to invest in international capacities in the fight against AMR

Focus not only on building capacity through new cooperation agreements with countries that are less advanced in their approach, but also on fostering political and administrative support. This can be done through existing European collaborations, such as the European Joint Action on AMR, but also by formally formalising cooperation on this subject in a memorandum of understanding. It is important that the resources and manpower are available to implement these agreements. By strengthening capacity to address AMR in other countries, the Netherlands also reduces its own risk of exposure [45].

Stimulating the development of new antibiotics internationally

The development of new antibiotics can be stimulated through public-private partnerships and targeted financial incentives for pharmaceutical innovation. The Netherlands can join European and global initiatives aimed at stimulating antibiotic development [46-48].

Putting the risk posed by resistant microorganisms in conflict zones on the international agenda

As a 'best-practice country', the Netherlands can call attention to this issue, for example, through the WHO, the EU Global Health Strategy and the European Partnership on One Health AMR [49, 50]. The Netherlands can provide targeted support in strengthening infrastructure and surveillance to limit the international impact of AMR in conflict zones.

Consider appointing a special envoy for AMR with a clear mission and mandate to serve as a linking pin between the various policy domains and the international field

Like in the United Kingdom and Sweden, this envoy can keep AMR visible to administrators in the relevant ministries and international bodies [51, 52]. This can be done by disseminating knowledge about the broader societal impact of AMR on food systems and the global economy, among other things. AMR is not only a complex technical issue but also requires sustained international political commitment.

Professionalising and strengthening scenario thinking, including at the EU level

This provides tools for communicating value considerations and policy consequences to society in times of crisis, as well as reflections on strategic objectives [43]. Encourage further coordination with other EU member states or the WHO to clarify who is responsible for what in times of crisis. Numerous EU agreements and initiatives aimed at addressing the risk of infectious diseases and AMR have been initiated in recent years; this creates a risk of double mandates around coordination and upscaling, which could lead to tensions.

Stimulating further national cooperation between the GGDs, the RIVM and academic workshops to strengthen infectious disease control.

This also offers opportunities to arrive at a cohesive interdisciplinary assessment framework embedding social perspectives in decision-making on infectious diseases.

4.3 Climate and environment

Climate and environment

Risks

- Increase in temperature and weather extremes due to climate change

Impact on Health

Deterioration of mental and physical health due to heat stress, poor air quality, infectious diseases, pollen or other allergies and floods, among other things

Examples of current policy

- National Climate Adaptation Strategy
- Climate Plan 2025-2035
- National Delta Programme
- Heatwave plans (national and regional)

Important options for action

- Taking the lead and providing policy frameworks for climate adaptation
- Strengthening cooperation with other ministries for an integrated climate approach
- Putting health more at the heart of national and international climate policy

Climate change leads to higher temperatures, extreme precipitation and periods of drought, among other things, and has a large and multifaceted impact on public health. Some examples are heat stress, poor air quality (which poses particular risks for people with respiratory diseases), UV radiation (higher risk of skin damage), infectious diseases and pollen or other allergies. Mental health is under pressure through various routes, such as in the event of damage to the home as a result of floods or fires, or stress among young people about the future [53]. Existing vulnerabilities, such as prior exposure to trauma or low socioeconomic status, may further amplify the impact of climate change on mental health [54]. The WHO recently declared climate change an international public health risk [6].

Climate change has clear consequences for both the European and Caribbean Netherlands, but the nature and urgency differ. In the Caribbean Netherlands, the consequences of heat, drought and extreme weather conditions are greater. They pose a direct risk to the infrastructure and quality of life of the islands [55-57]. Also, due to their location, the BES islands are more susceptible to natural disasters such as hurricanes, earthquakes or floods. The risk level also differs between the individual islands. Hurricanes pose a particular risk for the Windward

Islands of St Eustatius and Saba, and a much lower risk for the Leeward Island of Bonaire.

This cluster also includes the risk of increasing environmental pollution. This risk is also much more acute in the Caribbean Netherlands than in the European Netherlands. This is partly due to an outdated form of waste processing, which is hardly able to cope with the amount of waste that washes up and the waste stream of the emerging mass tourism. Waste is deposited in landfills, which can pose health risks, such as exposure to toxic substances, air pollution (due to fires), and an increased risk of diseases from pests [58].

4.3.1 *Current policy*

The Dutch government has various policy instruments to manage or prevent health risks from climate change. These measures include reducing greenhouse gas emissions (climate mitigation). In The Climate Plan 2025-2035, the government has formulated four principles that should ensure a fair climate policy for the next ten years [59]. Where relevant, the Ministry of Health, Welfare and Sport is involved in the consultations.

In addition to climate mitigation, the policy is aimed at climate adaptation to make society and the design of the Netherlands resilient to climate change [60]. For example, public health legislation and crisis plans pay attention to identifying and combating infectious diseases that are increasing as a result of climate change. The National Heat Plan is a warning system that is activated during a period of sustained high temperatures [61]. In addition to the National Heat Plan, local heat plans have also been drawn up [62]. The Local Heat Plan guide helps to develop local heat policy and is intended for municipalities, employees in the care and welfare sector, GGDs, housing corporations and other local parties that are committed to vulnerable groups. There are also plans for crisis response to extreme weather and flooding.

A new National Climate Adaptation Strategy (NAS 2026) will be published at the end of 2026 [63]. The NAS is a government-wide strategy in which a large number of ministries, including the Ministry of Health, Welfare and Sport, are cooperating. The NAS describes a coherent approach for a climate-resilient Netherlands now and in the future [64]. The national Delta Programme is also helping to make the Netherlands climate-proof [65]. The programme takes measures against flooding, ensures sufficient freshwater and makes the design of the Netherlands climate-proof. The government works with municipalities, health services and other partners to draw up heat plans, emergency plans and prevention programmes. Internationally, the Netherlands monitors developments, exchanges knowledge and works together to strengthen resilience to climate-related health risks.

The Paris Agreement and the obligations derived from it only apply to the European part of the Netherlands. Specific programmes with climate measures have been developed for the Caribbean Netherlands, such as the Nature and Environmental Policy Plan for the Caribbean Netherlands (NMBP) and the Spatial Development Programme for the Caribbean Netherlands [66, 67]. In early 2026, the court ruled that this is not

sufficient. Climate plans for the islands are being developed, along with a recalibration of the National Climate Adaptation Strategy (NAS), of which the Caribbean Netherlands will be a part.

Although policies are implemented in different ways to reduce and prevent the negative effects of climate change and environmental pollution on health, there are various options for action to achieve even more.

4.3.2 *Options for action*

In recent years, many publications have offered recommendations for policy in the field of climate mitigation and adaptation. Many of these recommendations touch on the field of public health. Based on these recommendations from the literature and suggestions from experts, we list important options for action below.

Putting health more at the heart of national and international climate policy

Actively propagate that health aspects should be included in climate policy as standard. Conversely, it is important to play an active role in the health-related policy of other ministries (such as the Climate Plan 2025-2035 [59]). Internationally, health can also be given a more prominent place in climate negotiations and agreements, for example, through the WHO agenda for climate and health and the EU mission on climate adaptation [68, 69].

Investing in better identification and surveillance of the health impacts of climate change

Combine meteorological data with health data, such as emergency and hospital admissions, heat-related illness and mortality, respiratory complaints and allergies, emerging infectious diseases and reports of health complaints. Use innovative technologies such as apps and digital platforms to pick up signals of health problems caused by a changing climate more quickly, including in extreme weather situations.

Taking national control and providing policy frameworks in the field of climate adaptation

There is a need for this within the healthcare sector. For example, the Ministry of Health, Welfare and Sport can work with health insurers to provide clear frameworks on the financing of climate-adaptive measures in healthcare institutions [70].

Strengthening cooperation with other ministries

Collaboration with other ministries, such as Infrastructure and Water Management, is important to promote an integrated climate approach and health protection. The Ministry of Health, Welfare and Sport, together with other ministries, can develop legal frameworks and climate-adaptive measures that better protect people against the consequences of climate change. This could include standards for buildings, mandatory action plans for healthcare institutions, and adaptation of public spaces (such as cool zones, ventilation and green areas). Cooperation between ministries is going well in the field of policy and diplomacy, but still leaves much to be desired in the implementation of concrete action.

Joining existing national collaborations already working on climate change and health

The Green Deal Sustainable Care (GDDZ [71])—a voluntary cooperation agreement—may provide the infrastructure and governance to work towards various climate and sustainability goals in healthcare.

Better preparing healthcare professionals, municipalities and citizens for the health impact of climate change and weather extremes

This can be done, for example, through training and sharing *best practices*. Structurally include the subject of climate-related health risks in the training of healthcare professionals.

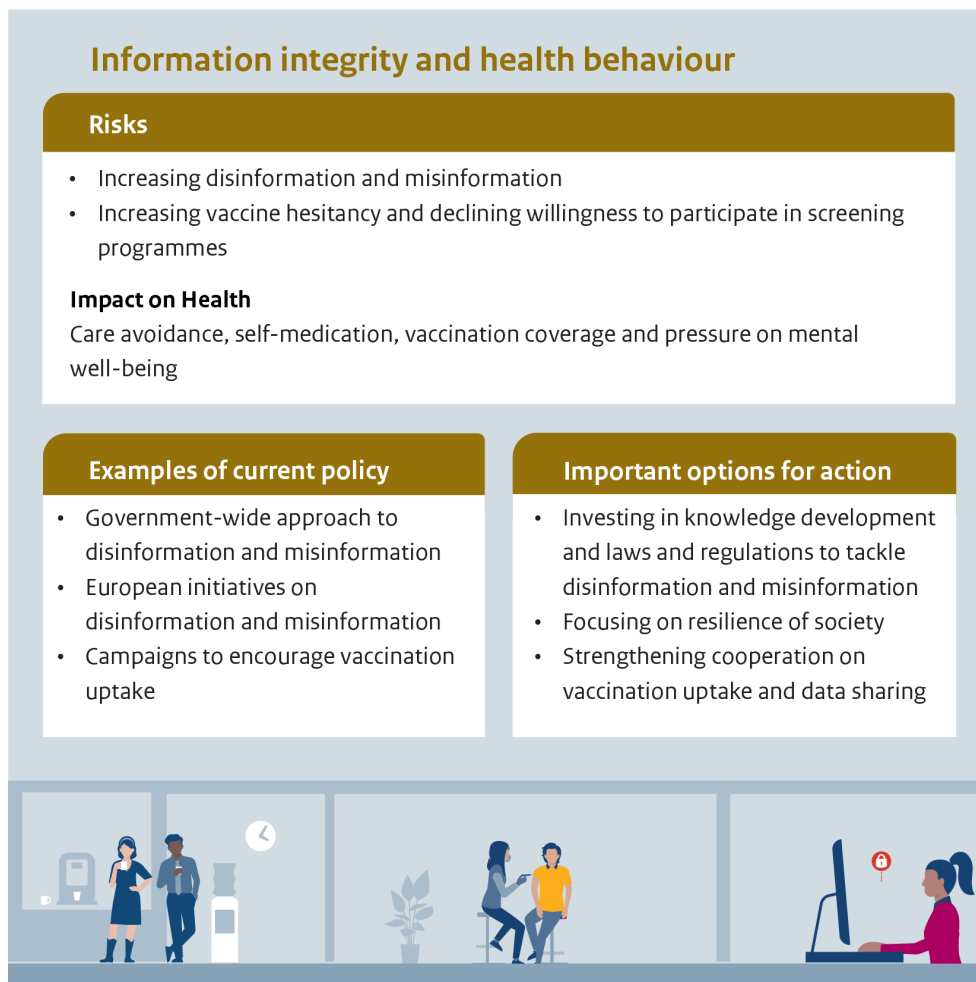
Developing public campaigns to inform people

It is important to inform people (especially at-risk groups) about how to protect themselves from climate-related exposures (such as heat, UV radiation, pollen, extreme precipitation and floods, and wildfires) and to emphasise the importance of these preventive measures. This is already happening during heat waves, for example, by means of commercials on the radio.

Collaborating with local authorities and civil society organisations

This helps to identify vulnerable groups and neighbourhoods, so that they can be actively sought out and supported by ensuring sufficient drinking and cooling during heat periods, for example. These connections are also needed to make people more resilient to the long-term impacts of climate change and to address risk-leading factors. Some neighbourhoods may face an accumulation of risks, such as when homes become too hot and there are few opportunities for cooling in the neighbourhood.

4.4

Information integrity and health behaviour

This cluster encompasses two closely related threats: the rise of disinformation and misinformation, and the declining willingness to participate in vaccination and screening programmes. These international threats are mutually reinforcing and together pose an increasingly significant risk to public health in the Netherlands.

Due to rapid digitalisation and global interconnectedness, disinformation and misinformation have become a persistent risk. Disinformation is the deliberate spread of false or misleading information. Misinformation is false information without malicious intent [72]. Disinformation and misinformation spread mainly through digital platforms [73]. Big tech companies such as Meta and TikTok are focused on getting people to stay on their platforms for as long as possible, the so-called 'attention economy'. Their algorithms sometimes show users shocking or polarising content, without checking whether that information is correct, causing disinformation to spread faster and groups to grow further apart [74]. A significant danger of this is not only that people develop false beliefs, but that it undermines the common ground on which democracies are built. Disinformation is therefore increasingly a hybrid risk.

Both disinformation and misinformation undermine trust in the government, healthcare professionals and science [75, 76]. This can lead to reduced mental well-being, polarisation, less trust in official bodies and greater vulnerability among people with limited health literacy and older people [77]. The impact on public health is significant. Misleading claims about vaccines, contraception and regular care lead to care avoidance, postponement of treatments, dangerous self-medication and vaccine hesitancy [78].

The number of people participating in vaccination programmes is declining worldwide, partly driven by disinformation and misinformation. As a result, vaccination coverage in the EU and the Netherlands is falling below the recommended level [79, 80]. Low vaccination coverage makes it easier for infectious diseases to spread. A declining willingness to be vaccinated outside the Netherlands is also a direct international risk to public health within the Netherlands.

Disinformation and misinformation also play a role in participation in screening programmes (such as breast cancer screening). Incorrect information can discourage people from taking part in such programmes. However, the impact of declining willingness to participate in screening is less international in nature than the decline in vaccination uptake, as the diseases targeted by screening programmes are only transmitted across borders to a very limited extent and do not rely on herd immunity to prevent their spread. For this reason, willingness to participate in screening programmes will not be further addressed in this report.

4.4.1 *Current policy*

A lot is already happening in the field of disinformation and misinformation, both nationally and internationally. Due to the considerable amount of policy, the focus here is on the current policy of the Ministry of Health, Welfare and Sport and on international policy.

The approach to disinformation and misinformation is coordinated by the Ministry of the Interior and Kingdom Relations, with the Ministry of Health, Welfare and Sport being specifically responsible for medical disinformation. The focus is on ensuring reliable and accessible information, strengthening communication during crises and promoting trust in official sources. This is done, among other things, by making reliable online information available, mobilising healthcare professionals who can refute false medical claims as an expert and trusted source, and influencers who reach a wide audience via social media and thus contribute to spreading reliable information instead of disinformation. In addition, international measures are being taken to counter the spread of medical disinformation. Furthermore, the impact of disinformation and misinformation on citizen behaviour, such as willingness to be vaccinated and compliance with measures, is being closely monitored [81-83].

At the European level, there are various initiatives, such as the WHO's European Infodemic Preparedness and Response Alliance (EIPRA), which focus on combating infodemics during health crises [84]. An infodemic refers to a situation in which, during a crisis, there is an overabundance

of information that spreads rapidly and can be both accurate and inaccurate. Furthermore, the EU Digital Service Act requires online platforms to adequately deal with illegal content and disinformation and holds them accountable for what happens on their platforms [85].

In the field of vaccinations, the Netherlands has implemented the National Immunisation Programme (NIP), which protects children at an early age against serious infectious diseases [86]. The vaccination coverage within the NIP is declining slightly, which is reason for additional campaigns [37, 87, 88]. These campaigns focus on increasing accessibility, safeguarding trust, and improving the provision of information about vaccinations. In addition, RIVM conducts research into factors that influence willingness to be vaccinated [89]. The Netherlands also works with international partners such as the WHO and other European countries for vaccine production, procurement, and data exchange [90]. Outside the NIP, vaccination policy is fragmented, for example, with regard to travel, occupational, and risk group vaccinations [91].

The Netherlands lacks a robust infrastructure to quickly organise large-scale vaccination campaigns, such as in the event of a pandemic. Communication towards hard-to-reach groups is also often insufficient [91]. Partly due to the introduction of the opt-in system for vaccination data, in which people themselves must actively give permission for the sharing of data, the insight into the actual vaccination coverage is also limited.

Despite the measures in place, strengthening the fight against disinformation and misinformation and increasing vaccination uptake remain of paramount importance, especially due to the rapid developments on digital platforms and the cross-border nature of these risks.

4.4.2 *Options for action*

For the cluster information integrity and health behaviour, important options for action are described below. These have been informed by interviews and relevant reports, such as *Reinforcing global health resilience amidst geopolitical change* by the European Commission [92], *Fractured Realities* by the JRC [73] and *Facts not fakes* by the OECD [72].

Actively contributing to European cooperation and coordination on vaccination readiness and disinformation

A great deal of European legislation and regulation is currently being developed. It is important that the Netherlands actively contributes to this process, translates European guidelines and best practices quickly and effectively into the Dutch context, and shares Dutch knowledge and experiences with other EU member states [78].

Investing in the development of knowledge on disinformation and misinformation, both at the national and European level.

Tackling disinformation is not just about providing the right content. The government must ensure clear and understandable information, but it is also important to reach groups who receive their information through

other, less traditional channels. Think of rapidly changing digital platforms such as TikTok, where algorithms determine what information people see. It is important to develop knowledge about how these platforms work, so that digital developments can be responded to quickly and effectively. In addition, actively exchange knowledge and experiences with other EU member states. Furthermore, focus on actively debunking disinformation and misinformation to combat incorrect information in a targeted manner [93].

Strengthening transparency and regulation of digital platforms and information sources

In the attention economy, the accuracy of information is subordinate to keeping users engaged on digital platforms for as long as possible. Algorithms are used as a means to this end, systematically favouring shocking, emotional and polarising content over high-quality and reliable information [73]. The EU already has some tools to address this, such as the Digital Services Act (DSA) [94]. Nevertheless, additional European legislation and regulations are needed. Focus on legislation and its active enforcement, both nationally and internationally. This obliges digital platforms to be more open about their risks, working processes, algorithms and data flows to ensure that their market power and commercial interests do not result in a disproportionate spread of disinformation [72].

Optimising vaccination data within and outside the Netherlands

Work towards a robust system for recording all vaccinations (both within and outside the National Immunisation Programme), with careful attention to privacy, accessibility, and the easy exchange of data between systems (interoperability). This will support both the monitoring of vaccination coverage and the ability to respond quickly in the event of outbreaks.

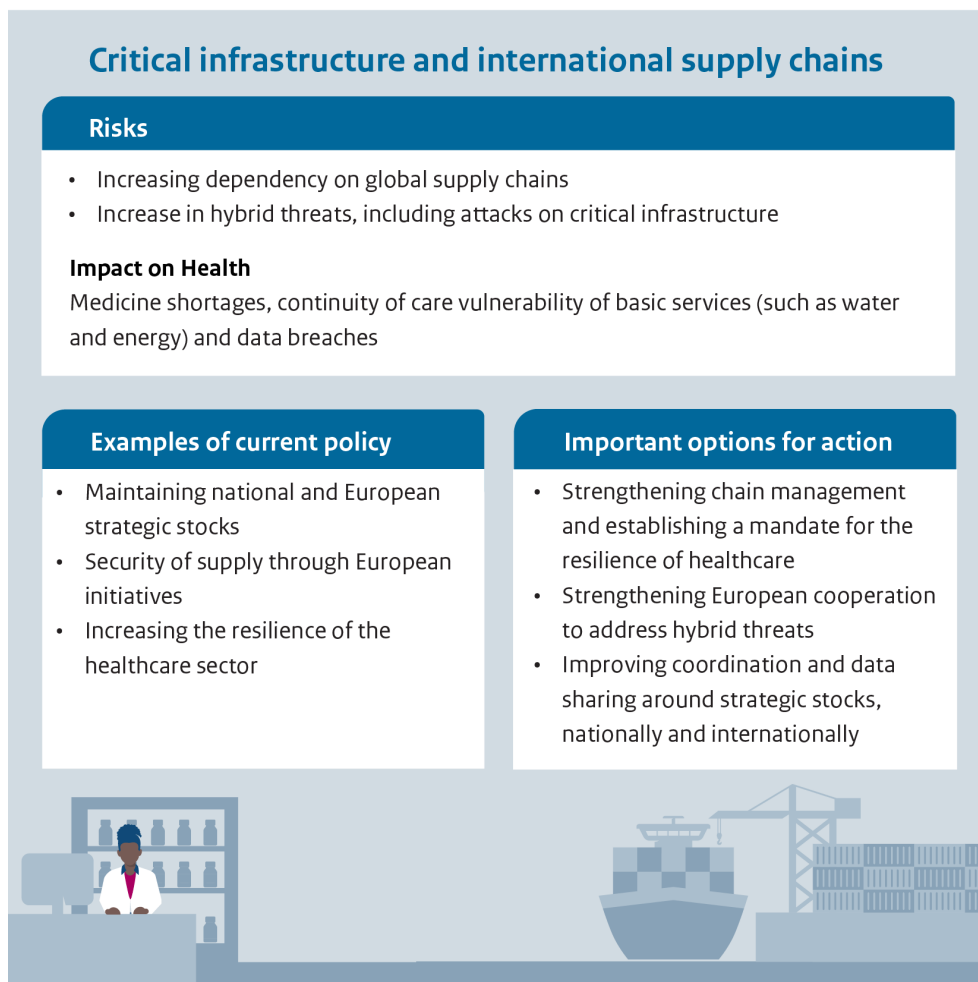
Increasing resilience in the Netherlands by strengthening digital skills *and investing in active, tailored communication about vaccinations*

Invest in education and public information, with special attention to hard-to-reach groups such as people with low trust in science and institutions. Teach citizens how to assess online information critically [72, 92]. Ensure that information provision also covers vaccinations outside the National Immunisation Programme, such as occupational vaccinations, vaccinations for risk groups, and travel vaccinations.

Improving vaccination infrastructure in the Netherlands

In addition to data registration, the fragmentation of vaccinations outside the NIP must be addressed. This includes occupational vaccinations and vaccinations administered at general practitioner practices. Overall, these measures contribute to robust systems that can quickly organise large-scale vaccination campaigns [91].

4.5 Critical infrastructure and international supply chains



This cluster comprises the risks of dependence on international supply chains and the emergence of hybrid threats that may affect critical infrastructure. The Dutch healthcare system is highly dependent on international supply chains for essential medical products. Disruptions caused by geopolitical tensions, pandemics or trade restrictions, for example, can lead to shortages, postponed treatments and even increased mortality, with particularly severe consequences for vulnerable groups [95, 96].

The BES islands are even more dependent on international supply chains than the European part of the Netherlands, making them especially susceptible to shortages of basic necessities such as water, food, and medicines in the event of disruptions [97].

Furthermore, the international risk of hybrid threats is on the rise. These include sabotage, espionage, the spread of disinformation, cyberattacks on critical infrastructure, and unwanted foreign interference [98]. Such threats increase the vulnerability to disruptions in hospitals, laboratories, communication systems, and water and energy supplies, with serious consequences for public health and the continuity of care

[99]. The uncertainty and fear associated with hybrid threats can also lead to public panic and a decline in mental well-being [100].

4.5.1 *Current policy*

Dutch policy regarding supply chains is based on three interrelated pillars: diversification of supply chains, production close to home (within the EU or the Netherlands), and the maintenance of strategic stockpiles. Nationally, work is being done to build up safety stocks of medicines and to increase production capacity for medical devices, vaccines, and personal protective equipment such as face masks [101].

At the European level, several initiatives have been launched to strengthen the security of supply for critical medical products. The European Commission, through HERA (the Health Emergency Preparedness and Response Authority), has established strategic stockpiles of medical countermeasures, including vaccines and personal protective equipment. These are available to member states that have exhausted their own national capacities [102]. The EU FAB, a network of EU vaccine manufacturers, promotes flexible and rapidly scalable production capacity [103]. The Critical Medicines Act further strengthens supply security by fostering diversification, production within the EU, and better coordination of stockpiles [104]. The Netherlands actively participates in and co-finances these initiatives.

Regarding hybrid threats, the policy of the Ministry of Health, Welfare and Sport primarily focuses on digital resilience within the healthcare sector. The Cybersecurity Act (NIS2) obliges healthcare institutions to conduct risk analyses and report incidents [105]. The Critical Entities Resilience Act (Wwke), currently under development, targets physical and organisational security in cases of sabotage or power outages [106]. The Ministry of VWS is also preparing a regulation for the healthcare sector that will include critical laboratories in addition to healthcare institutions. Based on specific criteria, the minister is expected to designate institutions that will be required under these laws to identify potential risks and implement appropriate measures. The Health and Youth Care Inspectorate (IGJ) is responsible for monitoring compliance [106, 107].

Healthcare institutions of a certain size must comply with the NEN7510 standard for digital information security, supported by Z-CERT, the knowledge centre for digital safety in healthcare. The Ministry of VWS also promotes awareness and safe digital behaviour through certain programmes [105, 108]. The *Weerbare Zorg* (resilient care) programme prepares the sector for emergency scenarios such as cyberattacks, wars, and pandemics.

In addition, the policy of the Ministry of VWS is embedded within a broader national resilience approach, focusing on strengthening the physical and digital resilience of vital infrastructure and addressing state and hybrid threats. This is coordinated by the National Coordinator for Security and Counterterrorism (NCTV) [109]. The Netherlands also participates in European initiatives such as ENISA (European Union Agency for Cybersecurity), the Cyber Resilience Act, and the Cyber Solidarity Act [110, 111].

4.5.2 *Options for action*

Important options for action for this cluster are described below. In addition to the interviews, relevant literature was also consulted [92].

Actively engage in European cooperation to address hybrid threats

By collaborating with European partners (such as ENISA and the EU health security committee), hybrid threats can be addressed more effectively [99]. It is also important to ensure that the perspective of public health and healthcare is properly represented, as hybrid threats are not always directly linked to these domains.

Strengthening data sharing and coordination within the Ministry of Health, Welfare and Sport and with international partners regarding strategic stockpiles

Improved data exchange and coordination within the Ministry and with international partners can provide timely insight into stockpiles, supply disruptions, and potential risks [112].

Ensuring structural funding for strategic stockpiles and investments in European production capacity for medicines and vaccines

Ensure active implementation of the Critical Medicines Act and make targeted use of the Medical Countermeasures strategy, joint crisis response, and strategic partnerships within the EU to secure access to essential medicines [92].

Strengthening national chain management, clarifying mandates and developing joint frameworks for risk analysis

Clearly coordinate which organisation or ministry is responsible for the resilience of the entire healthcare chain, including smaller healthcare providers. It is important that a central body identifies chain-wide risks, but the mandate should also allow for ownership at different levels and within different domains. Develop joint frameworks for implementing the risk analyses required by the Cybersecurity Act (focusing on digital resilience) and the Critical Entities Resilience Act (Wwke, focusing on physical and organisational risks). This ensures organisations use a common language and results are comparable.

Strengthening the resilience of small healthcare providers in the Netherlands and tightening requirements for ICT suppliers

Large hospitals are generally relatively resilient to hybrid attacks. However, smaller practices, such as general practitioners and physiotherapists, often fall outside the scope of the Wwke. These providers tend to have limited knowledge and resources and are more likely to experience incidents such as system failures. Their resilience can be increased by providing simple tools and facilitating knowledge transfer through umbrella organisations. Additionally, requirements for ICT suppliers should be tightened.

4.6 International cooperation



This cluster includes the following risks: declining capacity of international health organisations and pressure on multilateralism and international cooperation.

International cooperation is under pressure due to a confluence of factors, such as geopolitical tensions, cuts to development cooperation and multilateral organisations, declining solidarity between countries, and a broader rise in nationalist politics. For example, the US is withdrawing from multilateral partnerships such as the WHO. These kinds of developments are increasingly giving rise to changing alliances and bilateral collaborations rooted in strategic and commercial interests [113, 114]. Weakened multilateral cooperation forces regional actors such as the EU, the African Union and ASEAN (the Association of Southeast Asian Nations) to take more responsibility, such as by taking the lead in coordinating international cooperation [114-116]. This offers opportunities but also calls for coordination and clear shared ambitions. The Netherlands must position itself in relation to these new alliances and power dynamics.

Some countries will be able to adapt to declining development funding. Some suggest that this offers an opportunity to recalibrate and

strengthen national health systems [117]. However, disruptions will have serious short-term consequences for vulnerable populations in countries that depend on development cooperation. Pressure on global mechanisms to fight diseases such as polio, HIV and tuberculosis could endanger the lives of tens of millions in the coming decades [118-120]. Sexual rights and reproductive health (SRHR) are also coming under pressure worldwide [121, 122].

Scientific research is fragmenting, with a decrease in international cooperation [26, 123, 124]. This affects ongoing processes to establish shared international standards, resulting in fewer shared international guidelines and frameworks. For example, the development of a WHO blueprint on pathogenic fungi has been stopped.

The global health architecture is only as strong as its weakest link. For an open, internationally connected country such as the Netherlands, these developments can eventually lead to negative consequences for public health.

4.6.1 *Current policy*

As an open economy and an active participant in international health cooperation, the Netherlands has a direct interest in a well-functioning international health architecture. The importance of international cooperation on health is anchored in the Dutch Public Health Act and national crisis plans [41]. The Dutch Global Health Strategy (2023-2030) provides government-wide guidance for international efforts on the topic of health [125]. The aim of this strategy is to make a coordinated and targeted contribution to improving public health worldwide, including in the Netherlands. In part, these priorities are being pursued through the Dutch Global Health Hub [5].

The Netherlands has an agenda-setting role in multilateral forums in various areas, such as the health impact of climate change and AMR. By exchanging knowledge and starting new collaborations, among other efforts, the network of counsellors and the Global Health Partnerships Programme work bilaterally with various partners on capacity building on various topics. The Netherlands also participates in initiatives related to the procurement and development of vaccines, medicines and personal protective equipment [40, 126].

In the wake of the COVID-19 pandemic, the EU explicitly includes reducing dependence on external parties in health crises as a goal for strategic autonomy [116, 127]. The European Commission has the ambition for EU Member States and European financial institutions to act more often as blocs and enter collaborations in the field of health ('Team Europe') [128]. The European Commission has also long had the ambition to act with one voice within the WHO [129, 130].

The Netherlands is an active member of the WHO and provides flexible financial resources in addition to the mandatory contributions. Dutch knowledge institutions also facilitate 23 WHO Collaborating Centres that support the WHO with knowledge development [131]. A reform process of the global health architecture, the WHO Joint Process, is currently taking place with the aim of addressing the fragmentation of

international initiatives. The process should lead to concrete reforms from May 2027 [132, 133].

The United Nations (UN) as a whole is not functioning optimally as an international partnership. The UN80 initiative, named after the 80th anniversary of the UN, aims to change this by making the system more efficient and effective. This can be achieved by better aligning the mandates of different organisations and leaving more decisions to countries and regions themselves, for example. The UN Secretary-General speaks of a 'regional reset', in which regional cooperation between UN organisations is strengthened to tackle problems in a coordinated manner [133-135].

4.6.2 *Options for action*

Important options for action for this cluster are described below. These are grounded in interviews, but reports from the Scientific Council for Government Policy, the Advisory Council on International Affairs and the Ministry of Foreign Affairs were also used.

Using health to advocate for broader international reforms

This can be applied within the UN system, for example. Health is a common good that connects people and countries; especially when trust is under pressure, it can serve as a starting point for restoring said trust and strengthening international cooperation.

Strengthening alignment between the different levels of governance in the field of health

Coordination can be improved by better aligning the Netherlands' efforts in Europe with the efforts at the global level, for example. It is also important for the EU to better position itself in global partnerships. This requires joint and coordinated European commitments at the global level. Avoid a one-sided focus on health security in the West. Strengthening and positioning regional organisations offers opportunities in this respect [115]. Encouraging multilateral solutions is important to avoid a patchwork of agreements, but the Netherlands can also join 'minilateral' coalitions, in which a limited number of countries with similar objectives work together [114].

Proactively working with like-minded EU Member States to advance public health on the European agenda

Deepening knowledge of the EU as the 'fourth layer of government'—among civil servants at the Ministry of Health, Welfare and Sport, VWS Counsellors and embassies, for example—could contribute to this [136]. This allows signals from Brussels to be recognised and acted on at a higher pace. Focus on the importance of good health, and guard against reasoning from commercial interests. Good coordination between experts and governance is important for this.

Actively advocating for reforms and prioritisation at the WHO, and working with EU Member States in the reform process

The WHO has a unique normative and technical role. It is important to identify areas where the WHO has a clear added value, and to prioritise on that basis. Broadening the financial base makes the organisation less vulnerable to the withdrawal or dominance of one large member state,

such as the US or other parties. Since the withdrawal of the US, the EU27 as a bloc has been the largest donor to the WHO [137]. It is important that the Netherlands uses this influence strategically to achieve a decisive and equitable global health architecture.

4.7 Options for action for the BES islands

Options for action have been formulated above for five risk clusters. These options for action largely apply to both the Caribbean and the European part of the Kingdom of the Netherlands. However, interviews showed that the implementation of the options for action for the BES islands requires a specific approach, given the administrative and geographical context of the islands.

In addition to the identified risks, the BES islands face administrative challenges associated with their special status as 'public entities'. These governance challenges transcend the subject of this study, which is international risks to public health. We explain them separately here because dealing effectively with these challenges is often necessary to be able to respond properly to identified risks and to implement proposed options for action.

The first challenge is that the BES islands are so-called public entities, a special form of government within the Kingdom of the Netherlands. Unlike municipalities in the European Netherlands, they fall under their own legal regime: the BES Public Entities Act. As a result, they do not have a provincial intermediate layer like the European Netherlands, but the island council combines tasks from the municipality and the province. Due to the disappearance of this administrative 'intermediate layer', islands lack part of the administrative infrastructure and resources to implement policy. As such, the islands usually do not have the same infrastructure and implementation capacity as the Netherlands, which makes it difficult to implement and monitor policy effectively.

Secondly, data on health, the environment and population are often limited, making it more difficult to draw up and adjust policy. Furthermore, the policy on the islands is often temporary and project-based in nature. Initiatives are regularly set up as separate projects, without structural embedding or coherence with other policy areas [138, 139]. As a result, an integrated, sustainable approach to complex problems in the fields of public health, the living environment and social inequality is lacking.

Thirdly, the local government is small-scale and varies in composition. The relationship with the Netherlands is sometimes sensitive, partly due to the colonial past; help and guidance from the Netherlands can be experienced as interference or a lack of autonomy. For some services, such as the supply of goods, the islands are dependent on neighbouring countries, so they have only limited control over their own situation.

Finally, a specific challenge for the BES islands is that Dutch laws and regulations are often not properly applicable to the local context of the islands, leading to implementation problems [140]. This, in turn, leads

to practical problems, such as the recognition of diplomas of foreign healthcare personnel or meeting environmental quality standards [140-142].

The following options for action have been formulated for the above challenges:

Investing in local capacity and basic infrastructure

This means that more attention is paid and more resources are devoted to improving essential services. For healthcare, this means more and better medical facilities, such as general practitioners, hospitals, pharmacies and ambulance care, but also better epidemiological registrations. Modernising waste collection and processing to reduce environmental problems and health risks is also a key priority.

Developing an integrated health plan for the Caribbean Netherlands in collaboration with the public entities on the islands and the Ministry of the Interior and Kingdom Relations

The investments in basic services are essential, but they should also be part of a larger plan aimed at improving the health status on the BES islands. This involves improving the accessibility and quality of care, as well as prevention and health education. The plan should also include the creation of a healthy living environment through investment in basic infrastructure, such as clean drinking water, good sanitation and modern waste disposal. This combined approach not only strengthens healthcare but also significantly improves the general living conditions on the BES islands.

Consider a tailored approach that better accommodates the socio-cultural, climatic and geographical characteristics of the BES islands. It is also important to mutually invest in sustainable, long-term relationships between the Netherlands and the BES islands.

5 The bigger picture: interconnected risks

The preceding chapters show that Dutch public health is under pressure from a wide range of international risks. These risks do not exist in isolation. In the previous chapter, five clusters were used to illustrate the overlap and coherence between related risks and their associated policy options. In reality, risks from different clusters can also reinforce one another. When several risks of very different natures coincide, the impact on Dutch public health can be significant. The greatest risk, therefore, lies in a combination of risks occurring simultaneously. This chapter outlines the bigger picture, taking a closer look at how interconnected risks can be analysed and understood.

5.1 Interdependence between risks increases complexity

Risks are often related, as many respondents emphasised in the questionnaire. Some risks are strongly interlinked and can reinforce each other.

Risks such as pandemics, climate change, globalisation and disinformation are examples of risks that reinforce one another. For example, disinformation and misinformation contribute to declining vaccination coverage, leaving more people susceptible to infectious diseases. Globalisation, in turn, can accelerate the spread of these diseases worldwide. At the same time, international agreements and multilateral cooperation are under pressure, hampering the exchange of knowledge and the joint monitoring of infectious diseases. Disinformation is also deployed as an instrument to undermine societies, increasing pressure on political institutions and scientific authority, deepening polarisation and eroding democratic foundations. Ultimately, such chains of mutually reinforcing risks can have serious consequences for public health in the Netherlands.

An initial assessment was made of the interdependencies among the 34 risks listed in Chapter 2. What stands out immediately is that certain risks act as nodes. Antimicrobial resistance (AMR), climate change, and disinformation and misinformation are each linked to a wide range of other risks, which they can also amplify. This has direct implications: addressing risks in isolation risks missing the potentially compounding effects that arises when several risks are present simultaneously.

Interconnectedness also creates opportunities. Risks that function as nodes offer a natural starting point for policy. Measures that reduce these risks can have a broader effect across the risk landscape as a whole. Tackling disinformation and misinformation or strengthening international cooperation, for example, can positively affect a range of other risks.

Figure 7 The interrelationship of 34 risks. The size of the circle represents the score of the threat, the colour indicates the DESTEP categorisation and the lines denote the strength of interconnectedness of the risks.



5.2 Increased risk of a polycrisis

Given the interdependence of risks and their cross-border nature, risks can no longer be treated as separate, isolated events. There is growing recognition of the risk of a polycrisis: a situation in which multiple interconnected crises occur simultaneously and amplify one another's effects, with an impact greater than the sum of their parts. The term 'perfect storm' is also used to describe a situation in which several adverse factors converge at the same time, giving rise to an exceptionally serious problem or multiple simultaneous crises [143, 144]. Preparing for a polycrisis requires a fundamentally different approach than managing individual risks.

5.3 An additional methodology is needed

The interconnectedness of different risks requires a broader analytical approach than just mapping individual risks. Because risks can influence and reinforce each other, it is important to systematically analyse their interdependence. This was also emphasised more often in the interviews. The COVID-19 pandemic also illustrates how an immediate health risk—and the response to it—can coexist with economic, social and governance effects. Understanding and addressing complex, interconnected risks requires more integrated and cross-domain analysis methods. Some approaches and methods are highlighted below.

5.3.1 *The VUCA concept*

The VUCA concept can help to better understand and analyse the interconnectedness of risks. VUCA stands for Volatility, Uncertainty, Complexity and Ambiguity. The concept describes a world in which developments can take place quickly and unexpectedly, are difficult to predict, are influenced by many different factors and are not always easy to interpret [145]. The VUCA concept is now being applied more widely, including in the public health domain [146, 147]. Distinguishing the different VUCA dimensions helps to better understand and analyse the risks.

5.3.2 *All-hazards analyse*

The all-hazards approach starts from a broad set of possible risks, regardless of their nature or origin, such as infectious diseases, climate, conflict, and technology [148, 149]. The all-hazards approach emphasises that knowledge and cooperation must be organised in such a way that people can respond adequately to known and unknown crises. Instead of focusing on one type of risk, the system as a whole is analysed. Such a system analysis does not look at individual risks within a single domain, but at the interplay of all relevant factors and the possible knock-on effects. An essential part of this analysis is the ability of systems to anticipate, absorb, adapt and transform in the face of changing circumstances; this is referred to as system resilience [150].

5.3.3 *Health as a connecting framework*

Using health as a connecting analytical framework offers the possibility of addressing multiple risks simultaneously and bridging different (policy) domains. Health is influenced by a wide range of factors [151]. The 'Health in All Policies' (HiAP) approach provides a systematic framework for incorporating health considerations into the analysis of factors such as income, education, housing and the living environment. This requires multidisciplinary and cross-sectoral data analysis, the identification of causal relationships and the mapping of mutual effects between domains. This HiAP approach is also applied in the Netherlands [152, 153].

5.3.4 *Cross-scale analysis*

Many of the risks identified operate across multiple scales. What happens at a global level, such as disruptions in international supply chains or an emerging pathogen on the other side of the world, can also rapidly affect the health of people elsewhere in the world. Conversely, local virus outbreaks or regional vulnerabilities can quickly scale up to

national or international crises due to conflicts. The interconnection between scale levels means that an effective approach to health risks must incorporate multiple levels of governance into the analysis.

5.3.5 *Strategic foresight and scenario approach*

Strategic foresight is a valuable approach to building knowledge about relevant future developments, including emerging risks. In the Netherlands, foresight studies are being conducted across a wide range of policy domains [154]. Strategic foresight studies, such as the Public Health Foresight Study (PHFS), can serve as a connecting instrument to identify risks at an early stage and to develop policy options for multiple scale levels simultaneously [53]. By developing different future visions or scenarios in which the interplay of different risks is central, options for action can be formulated that are robust to both expected and unexpected developments.

6 Considerations and recommendations

The previous chapters described the international risks to Dutch public health, the associated options for action and the importance of considering the risks in conjunction. Chapter 4 provided options for action for five clusters of risks. Chapter 5 showed that risks from different clusters can coincide and reinforce each other. This chapter describes which approach can help the Dutch government to deal with the interconnectedness of risks. In this concluding chapter, the most important findings are summarised, after which overarching policy recommendations are given.

6.1 Overview of key findings

This study identified a large number of international risks that affect Dutch public health. More than a hundred experts were consulted to identify the most important risks. Antimicrobial resistance (AMR), rising temperatures and weather extremes, disinformation and misinformation, the spread of pathogens and vector-borne diseases, environmental pollution, the decline in the global effectiveness of international health organisations, and lower vaccination willingness are major risks. For a selection of important risks, an overview of the current policy has been given, and options for action have been formulated to address the risk.

In addition to the individual risks, we also examined these risks, clusters of risks. Many risks are strongly related or overlap in possible options for action. The clusters of risks show that the risks to public health can be regarded less and less as separate problems. The mutually reinforcing risks and associated complexity make the possibility of a polycrisis real. A polycrisis requires an approach that is more comprehensive, flexible and coherent.

6.2 Overarching recommendations

In addition to the options for action identified for the clusters of risks and the specific risks, overarching recommendations have also emerged from the study. These overarching recommendations provide direction for the Netherlands to be better prepared for the future.

6.2.1 *Keeping what is good, strengthening where necessary*

The Netherlands has been a frontrunner in addressing certain risks for many years, most notably in the field of antimicrobial resistance (AMR). This approach has enabled the Netherlands to build a strong reputation worldwide and within Europe. Other examples where the Netherlands is doing well are the National Heat Plan and the National Adaptation Strategy [61, 155]. This pioneering position also offers opportunities for the Netherlands to be distinctive by taking the lead on topics such as AMR and climate and health.

At the same time, there are signs that the lead over other countries is shrinking and that the Netherlands cannot afford to sit back [91]. It was explicitly mentioned in the interviews that the Netherlands must make an effort to maintain its lead. This requires extra attention, commitment

and investment to maintain and strengthen this leading position. The Netherlands must invest not only nationally but also actively contribute to the European and international agendas and ensure good coordination between these layers. There is a lot of collective uncertainty within the EU, and although priorities do not vary widely between countries, the degree of implementation and effectiveness of policies differs. The Netherlands is still seen as a reliable partner, but that can change quickly if the policy is not congruent.

Alongside preserving what works well, the Netherlands also has to build knowledge about newer risks. An example of this is the approach to disinformation and misinformation. This requires not only a substantive response, such as clear and accessible public information, but also a structural approach: investing in knowledge about the functioning of digital platforms and algorithms that facilitate the spread of misinformation and disinformation. Although hybrid risks are discussed primarily in the context of national security, the potential impact on public health must also be considered. Ideally, these problems should be tackled in cooperation with like-minded countries, possibly at the European level.

Specifically for the BES islands, the risks may have greater consequences because the foundation is not always solid. Sufficient healthcare staff, good healthcare facilities, reliable supply of medical resources, and strong monitoring and surveillance remain important conditions for making the islands more resilient to international risks. Investing in this foundation is a prerequisite for building resilience, both against acute disasters and against latent risks such as infectious diseases, environmental pollution and social inequality.

6.2.2

Promoting policy coherence, with health as a connecting theme

Addressing interconnected risks—which often span several policy domains—requires intensive cooperation and coordination across ministries, known as horizontal policy coherence [156]. There are several organisations that emphasise the importance of shared goals, shared knowledge platforms and structural cooperation across ministries to achieve true policy coherence [157].

Although awareness of the need for cross-domain cooperation is growing, practice is lagging due to siloed working methods and insufficient shared responsibility. Structural forms of consultation, joint policy development and shared ownership are crucial in that regard. Health can serve as a connecting theme, bridging policy domains such as the environment, the economy, defence and social affairs, given that health is influenced by a wide range of factors across these domains. The 'Health in All Policies' (HiAP) approach provides a policy framework for translating this ambition into practice. For example, the Netherlands already has the government-wide policy agenda on 'health in all policy areas' [152, 153]. The Netherlands can also learn a lot from countries such as Sweden, Finland and the United Kingdom, which explicitly use public health as a central and unifying starting point in their policies.

It is equally important to emphasise the reciprocal relationship between health and other policy domains, captured in the concept *Health for All*

Policies (H4AP) [158]. Health is not only shaped by other domains, it also contributes to them: a healthy population supports a well-functioning military, a productive workforce and better educational outcomes. Internationally, the emphasis is often on economic consequences, whereas health deserves equal weight as a consideration in policy options and decisions.

The One Health approach, in which the health of people, animals and the environment is viewed in conjunction, is a good example of how better cooperation between, for example, public health, agriculture and the environment can lead to more effective and coherent policy. The emergence and spread of AMR in conflict areas, among military personnel, for example, also requires better coordination between the Ministries of Defence and Health, Welfare and Sport. In 2022, the Advisory Council on International Affairs (AIV) also noted the link between safety and health and the importance of involving the Ministry of Defence in global health policy [159].

To further promote horizontal policy coherence, it is important not only to stimulate bottom-up connections but also to facilitate cross-ministerial connections. The complexity of this task calls for experiments with different forms of interdisciplinary governance, with the following principle in mind: the sooner experts are involved in the policy process, the greater the likelihood that their expertise can make a meaningful difference [160]. This can be done by appointing a government commissioner or special envoys on priority themes to act as figureheads and transcend ministerial boundaries [157]. There are also several good examples from other countries, such as the Future Generations Commissioner in Wales and the AMR envoys in Sweden and the United Kingdom [51, 161, 162].

Special envoys can act as a driving force, bridge builder and central point of contact for cooperation, knowledge sharing and joint strategy development. This requires a specific mandate and a clear cross-ministerial remit. In addition, these envoys can gather signals from practice and feed them back to policymakers, ensuring that policy is better aligned with needs and developments in the field. This has already been identified as a policy option in the context of AMR and climate change, but applies equally across all risks.

6.2.3 *Strengthening vertical policy coherence for international health risks*

To respond effectively to the complexity, it is essential that the Netherlands develops a structural and coherent policy framework in which global, European, national and regional measures and responsibilities are aligned. This requires a clear division of tasks, better coordination between ministries and relevant agencies, and a systematic translation of international agreements into national policy. This vertical policy coherence can only be achieved through active organisation and structured information sharing.

At the global level, the Netherlands could more explicitly connect its contributions to WHO processes, the Pandemic Agreement and international health regulations (IHR) to national policy priorities, ensuring that international obligations and agreements are translated

into national policy in a timely manner, and vice versa. The Netherlands' Global Health Strategy provides a starting point for this. However, this requires clear short- and long-term goals, robust funding and an implementation structure involving relevant ministries [163]. Attention will also have to be paid to regional actors, such as the Pan American Health Organization (PAHO) and the Africa Centres for Disease Control and Prevention (Africa CDC), which, given the pressure on the WHO, may be able to fill a vacuum in the global arena.

At the European level, Dutch input could be better coordinated at the cross-ministerial level. This applies to the Netherlands' role in HERA (Health Emergency Preparedness and Response Authority), the Health Security Committee, the Critical Medicines Alliance and European pharmaceutical legislation. This involves not only the Ministry of Health, Welfare and Sport, but also the Ministry of Economic Affairs, the Ministry of Foreign Affairs and the Ministry of Finance. European policy developments should also be systematically translated into national implementation frameworks, such as in the areas of security of supply, pandemic preparedness and One Health.

At the national level, an integrated health security agenda is needed that addresses public health risks, including infectious diseases, medicine shortages, disinformation and misinformation, climate-related health risks and AMR, not in isolation but in a coherent and unified manner. The Pandemic Preparedness Policy Agenda provides a foundation but should be broadened into a health security agenda that encompasses non-infectious risks and is structurally embedded in the government-wide security strategy.

At the subnational level, GGDs, security regions and healthcare providers form the first line of response to international risks. However, they are often insufficiently equipped with the information, resources and authority needed to fulfil this role. A complicating factor is that the Netherlands has a remarkably large number of regional administrative structures that do not always align with one another, making policy coherence more difficult [164]. The absence of an administrative intermediate tier compounds this challenge further on the BES islands.

6.2.4 *Focus on resilience*

In a world where risks can change quickly, are unpredictable and can mutually reinforce one another, strengthening resilience is crucial. Resilience refers to the ability of a person, organisation or system to adapt to changes and recover from setbacks.

Resilience to international health risks is not solely the sectoral responsibility of the Ministry of Health, Welfare and Sport; it is a government-wide task with ramifications for almost all policy areas. The COVID-19 pandemic has undeniably demonstrated the far-reaching consequences of a health risk to the economy, education, and society as a whole. Future risks could have the same broad fallout, whether it is a new pandemic, a disruption of medical supply chains, climate-related health risks or antimicrobial resistance. This underscores the need for a coherent resilience approach.

Resilience can be strengthened through both short-term and long-term investments. In the short term, this means concrete preparedness measures, including strategic stockpiles, redundant production capacity within the EU, clear scale-up protocols and well-practised crisis structures. In the long term, the goal is a robust system that is not dependent on a single supplier, region or technology, and which can withstand the convergence of multiple risks simultaneously.

Communication should not be treated as an afterthought but as an integral part of the strategy. Public trust requires clear and honest communication. The European approach, with HERA, the Critical Medicines Act, EU FAB (an EU network of vaccine manufacturers) and the European Health Union, provides a useful frame of reference that embeds health resilience in a broader strategic autonomy agenda. The Netherlands can use these instruments as a lever for national policy. The Netherlands can also strengthen its own contribution to European decision-making and benchmark national preparedness against European standards.

6.2.5 *From reactive to proactive: invest in exploring the future*

The current approach by the Dutch government is often reactive; measures are often taken after major disruptions. A more proactive approach to the policy process is recommended [43]. Foresight studies, including risk analyses, can support this shift. This is underlined by several other organisations [165-167]. For example, the Dutch Safety Board emphasises the importance of developing and practising scenarios that are less likely but potentially very impactful [43]. The Organisation for Economic Co-operation and Development (OECD) and the European Commission's Joint Research Centre (JRC) stress that ministries must also be well prepared for the future [165-167]. The OECD advocates for increased investment in foresight and strategic planning across government [168]. This makes it incredibly important that ministries continue to invest structurally in futures studies.

The Netherlands already has a long and distinctive tradition of conducting foresight studies across a wide range of domains. Knowledge institutions such as the planning bureaus, RIVM, WRR, the Rathenau Institute and the Clingendael Institute each produces their own foresight studies [154]. The Netherlands could make better use of this collective capacity. Through stronger embedding of foresight in the policy process, combined with greater coordination and mutual alignment between these studies, Dutch policy can be better calibrated to future developments and global challenges. Foresight can also be used to strengthen the strategic capacity of policy departments [160, 168].

6.3 **Final remarks**

The world is constantly changing, and so are the risks to public health in the European and Caribbean Netherlands. The findings from this risk assessment show that the risk landscape for Dutch public health has changed significantly since the previous risk assessment in 2019: risks such as AMR and climate change remain present, while new important risks such as disinformation and misinformation and the increasing pressure on international cooperation have emerged. This makes

preparedness and adaptation essential, not only for the government but for society as a whole.

The risk landscape for the Netherlands is not unique. Many risks are international, which makes this risk assessment relevant to other countries, albeit with possibly different priorities. Sharing the approach and results of this risk assessment can support other countries in their own ambitions to be better prepared for the future. With its many years of experience in foresight studies, the Netherlands is well-placed to actively support other countries in this regard. The better prepared the world as a whole is for international risks, the lower the impact on Dutch public health.

Acknowledgments

This report was made possible thanks to the contribution and cooperation of many people, without whom this study would not have been possible.

First of all, we would like to thank all respondents who took the time to fill in the questionnaires carefully. Your contributions provide an indispensable empirical basis for this report. We also thank all interviewees for their openness and willingness to share their knowledge and experiences with us. Your insights have enriched this study qualitatively and provided it with a solid foundation.

We would like to thank Nicolette Kupper and Cindy Deuning for the visualisation and text editing. Their creativity, sharp eye and positive energy were crucial in producing an attractive and highly readable report.

Special thanks are due to the internal RIVM Guidance Group for the pleasant cooperation and thoughtful advice regarding this study.

We would also like to thank our colleagues Maartje Harbers, Loes Kreijtz and Marit de Vries, who participated in the Scientific Review Consultation. We would also like to thank Nikkie Post for leading the first phase of the project, and the RIVM management for their valuable feedback.

Finally, we are grateful for the feedback from the Ministry of Health, Welfare and Sport (VWS) and the Ministry of Foreign Affairs (BZ). Their substantive input from a policy and international perspective has contributed to a sharper and more relevant end result. In particular, we thank Mark van Passel for his trust and for his constructive and enthusiastic involvement.

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Glossary and List of Abbreviations

Term	Description
Africa CDC	Africa Centres for Disease Control and Prevention. The African Union's Continental Public Health Agency, established in 2017, which focuses on disease prevention, surveillance, and response on the African continent.
AI	Artificial Intelligence. AI is a machine's ability to exhibit human-like abilities, such as reasoning, learning, planning, and creativity.
All-Hazards approach	Policy approach based on a broad set of possible risks, regardless of their nature or origin (infectious diseases, climate, conflict, technology), rather than preparing for one specific threat
AMR	Antimicrobial resistance. The phenomenon in which microorganisms such as bacteria, viruses and fungi become resistant to the drugs normally used to treat infections, including antibiotics.
BES islands	Refers to the three Caribbean islands that have had the status of special municipalities or public entities within the country of the Netherlands since 10 October 2010: Bonaire, St Eustatius and Saba.
Brain drain	Skilled workers and/or talented people leaving a country or region to work elsewhere, where there are better opportunities, higher wages or better living conditions. It also includes young people who leave for education and then do not return.
CBRN incidents	Chemical, Biological, Radiological and Nuclear Incidents.
DESTEP	Demographic, Economic, Socio-cultural, Technological, Ecological and Political-institutional developments (trends and changes) in the external macro-environment.
Threat	Concrete or imaginable dangers that can cause damage (such as terrorism, cyber-attacks, floods).
EU FAB	The HERA-funded network of vaccine manufacturers with standby production capacity
ECDC	European Centre for Disease Prevention and Control. EU agency set up in 2005 with the aim of strengthening Europe's defences against infectious diseases.
EHDS	European Health Data Space. European regulation that will ensure better availability of electronic health data and better regulation of the market for health information systems at the national level and across national borders.

Term	Description
Functional risk	The likelihood that a system will not perform as expected, leading to inefficiencies or the lack of desired benefits, for example, due to suboptimal collaboration
GGD	Municipal health service that protects, monitors and promotes the health of the inhabitants of the Netherlands.
HERA	Health Emergency Preparedness and Response Authority. The European Agency for Health Crisis Preparedness and Response, established in 2021 as part of the European Commission, with the mission of anticipating, preventing and responding to cross-border health crises.
HiAP	Health in All Policies. An approach in which the government takes the impact on public health into account in all decisions, such as about housing, the environment, work or mobility.
IGJ	Health and Youth Care Inspectorate. The Dutch regulator in the field of healthcare, youth care and youth protection. The IGJ falls under the Ministry of Health, Welfare and Sport (VWS) and its core task is to monitor and promote the quality and safety of care.
JEE-PHEPA	A combined international evaluation that assesses how well prepared a country is for public health risks and emergencies. It combines the Joint External Evaluation (JEE) and the Public Health Emergency Preparedness Assessment (PHEPA) to map a country's capacities in terms of prevention, detection and response.
JRC	Joint Research Centre. The European Commission's internal knowledge organisation, which conducts independent scientific research in support of European policies in areas such as health, the environment, energy and security.
Landfill	Landfill. A location where waste is dumped on or into the soil in a controlled or uncontrolled manner. Landfills are a source of soil and groundwater pollution and contribute to greenhouse gas emissions.
Ministry of VWS	Ministry of Health, Welfare and Sport.
NCTV	National Coordinator for Counterterrorism and Security. The Dutch government organisation responsible for coordinating national policies in the field of counterterrorism, national security and crisis management.
OECD	Organisation for Economic Cooperation and Development. International organisation in which 38 countries work together to discuss, study and coordinate social and economic policies.

Term	Description
One Health	A comprehensive approach to health focused on cooperation between experts in the fields of people, animals and the living environment.
Risk	Risk equals the likelihood of a threat occurring multiplied by its impact (Risk = Probability x Impact). A threat is the cause (the danger), while the risk is the assessment of the probability and severity of the consequences.
RVP	National Immunisation Programme.
RVS	Council for Public Health and Society.
SDG	Sustainable Development Goals. The seventeen Sustainable Development Goals adopted by the United Nations Member States in 2015 as the global agenda for sustainable development up to 2030, in the areas of health, education, climate, equality and economic growth.
SEH	Emergency Care
UN80 initiative	United Nations initiative in the context of the UN's eightieth anniversary in 2025, aimed at reforming and strengthening the multilateral system and the effectiveness of UN organisations in the face of contemporary global challenges.
WEF	World Economic Forum. An international non-governmental organisation based in Geneva, which meets annually in Davos and focuses on public-private cooperation on global economic, geopolitical, health and sustainability issues.
WHO	World Health Organization. A specialised agency of the United Nations founded in 1948, responsible for international public health, disease control, standard-setting and health policy worldwide.
WRR	Scientific Council for Government Policy. An independent Dutch advisory body that advises the government and parliament on long-term developments and policy challenges in the social and scientific field.

Appendix 1 Experts and RIVM guidance group

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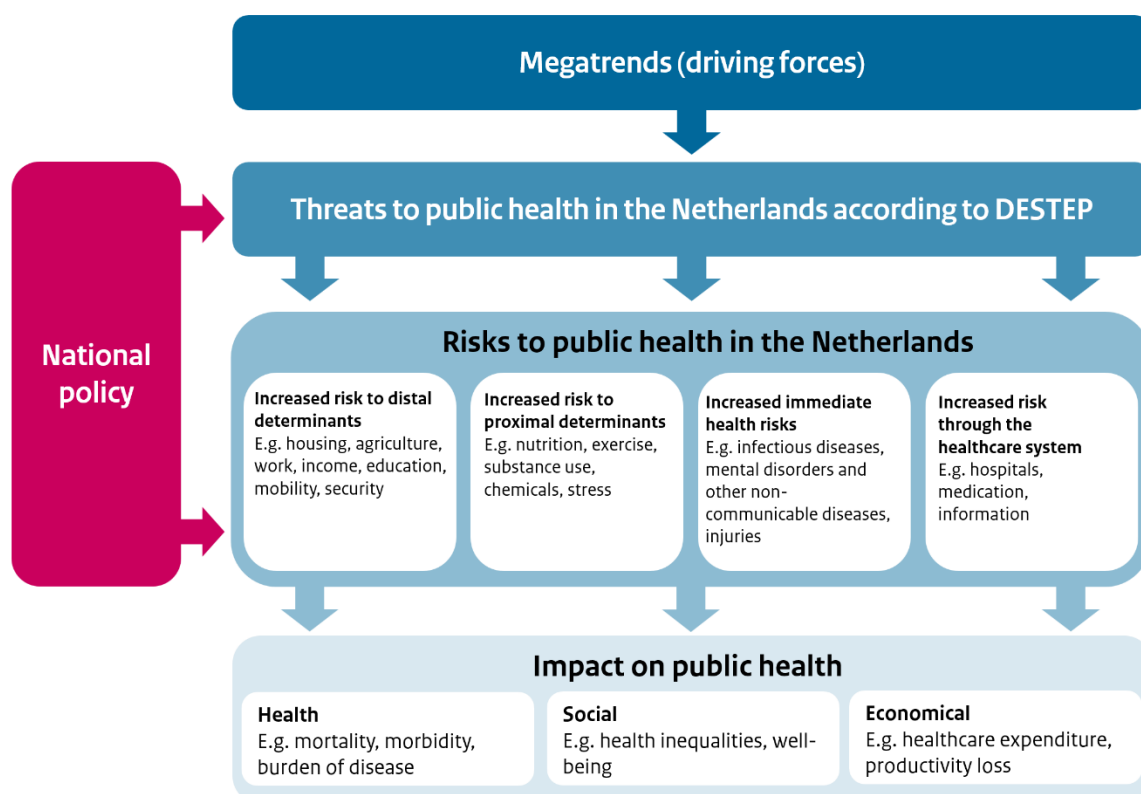
Interviewees BES islands

Izzy Gerstenbluth & RIVM internal group (Marieta Braks, Coen van Gool, Koen Hulshof, Werner Hagens, Hans Lobach, Marlous Rodriguez, Dorothee Rosskamp, Eva van Tol)

Appendix 2 Conceptual framework

This conceptual framework was used to provide insight into the possible health impacts of the risks. It is based on the standard Driving forces-Pressure-State-Impact-Response (DPSIR) format.

Figure A The conceptual framework for the risk assessment



Appendix 3 Literature for identifying risks

Table A Overview of the reports used for the initial threat longlist

Organisation / author	Year	Title
AIV (Advisory Council on International Affairs (AIV))	2025	Nederland, Europa en het mondiale Zuiden in een veranderende wereldorde
AIVD	2025	Dreigingsbeeld statelijke actoren
Analistennetwerk Nationale Veiligheid	2024	Trendanalyse Nationale Veiligheid 2024
AXA	2025	Future Risks Report
Clingendael	2025	Geopolitiek changement op het wereldtoneel - EEN FORESIGHTSTUDIE
De Nederlandsche Bank	2025	Voorjaarsraming Juni 2025
ECDC	2025	Future challenges for infectious disease prevention and control - A strategic foresight approach to enhance European public health preparedness and resilience
ESPAS	2024	Global trends to 2040 - Choosing Europe's Future
European Environmental Agency (EEA)	2024	European Climate Risk Assessment
EuroHealthNet	2023	The future of public health in Europe
European Commission	2025	Resilience 2.0: Empowering the EU to thrive amid turbulence and uncertainty - Strategic foresight report
European Commission	2025	Preparing the EU for the next health crisis : a Medical Countermeasures Strategy
European Commission	2025	Annexes to the Preparing the EU for the next health crisis : a Medical Countermeasures Strategy
HM government	2025	Chronic Risks Analysis
Institute For Health Metrics and Evaluation	2023	Global Burden of Disease 2023 - Findings from the GBD 2023 Study
Ipsos (in opdracht van NCTV)	2025	Risico- en Crisisbarometer voorjaar 2025
JRC	2024	Analysis of risks Europe is facing
JRC	2025	Cross-border and emerging risks Europe is facing
JRC	2025	Drought in Europe
NCTV	2025	Dreigingsbeeld terrorisme
PBL	2024	Klimaatrisico's in Nederland - De huidige stand van zaken
PWC	2022	Megatrends - Five global shifts reshaping the world we live in
Rathenau Instituut	2020	Digitale dreigingen voor de democratie - Over nieuwe technologie en desinformatie

Organisation / author	Year	Title
Rathenau Instituut	2022	Wetenschappelijk onderzoek in het Caribisch deel van het koninkrijk
RIVM	2024	Gezondheidseffecten van klimaatverandering. Actualisatie van de huidige klimaatrisico's voor gezondheid
RIVM	2019	Dreigingen uit het buitenland voor de volksgezondheid in Nederland. Een quickscan
Staatscommissie Demografische Ontwikkelingen Caribisch Nederland 2050	2024	Gerichte groei – Rapport van de Staatscommissie Demografische Ontwikkelingen Caribisch Nederland 2050
UN	2024	Navigating New Horizons
UNEP	2025	The Weight of Time Facing a new age of challenges for people and ecosystems
US	2025	America First Global Health Strategy
US government	2025	The U.S. Government and Global Health
VWS	2025	Kamerbrief Aanbieding JEE-PHEPA Report - 4186630-1086649-IZB
WHO, ECDC	2025	Joint external evaluation of the International Health Regulations (2005) core capacities and the European Centre for Disease Prevention and Control public health emergency preparedness assessment the Netherlands
WHO	2025	Health emergencies preparedness and response The Independent Oversight and Advisory Committee for the WHO Health Emergencies Programme – A78/12
World Economic Forum	2026	Global Risks Report 2026
World Economic Forum	2025	Global Risks Report 2025
World Economic Forum	2024	Quantifying the Impact of Climate Change on Human Health insight report January 202
WRR	2025	Met de mondiale demografie mee - Anticiperen op krimpend arbeidsaanbod in het buitenland
WRR	z.d.	Nederland in een vergrijzende wereld
WRR	2024	Nederland in een fragmenterende wereldorde

Appendix 4 Longlist risks

The table below shows the longlist of 36 risks. Of these, two were only requested for the BES islands, namely 'Brain drain' and 'Risk of natural disasters'. For the sake of readability, the report does not always use the full name of the threat. Short names are also used in the figures.

Table B Overview of the risks, with the short name and explanation

	Risk	Short name risk	Explanation of risk
1	Increase in (involuntary) migration and displacement	Migration (involuntary)	Forced displacement or labour migration across borders or within national borders is increasing, resulting from discrimination and persecution, among other things; lack of economic development opportunities; man-made disasters; natural disasters and extreme weather events, including the effects of climate change; internal or international conflicts. The number of people migrating to the Netherlands is also increasing, which is putting pressure on housing, healthcare and social services.
2	Shifts in global demography	Demographic shifts	Demographic shifts are taking place worldwide (ageing, population growth in certain regions). Ageing in other countries affects access to trade and the Dutch economy. The increasing ageing of the population outside the Netherlands is also putting pressure on the recruitment of the necessary knowledge and workforce for healthcare, among other things.
3	Increasing risk of global economic recession	Economic recession	The likelihood of a global economic recession is increasing as a result of various developments. For example, ongoing geopolitical tensions are causing uncertainty in global markets. Economic growth in the Netherlands is being held back by international trade and geopolitical tensions. These are causing increased economic uncertainty and lower world trade growth. In addition, inflation rates remain high in many countries, prompting central banks to raise interest rates. At the same time, the debt burden of many countries is increasing, which limits the scope for stimulus. This inhibits investment and economic growth and can lead to recessions.

	Risk	Short name risk	Explanation of risk
4	Increasing concentration of power of large companies	Concentration of corporate power	A limited number of large companies and countries are gaining more and more control over markets, strategic raw materials, technologies and data management. This increases dependency, reduces competition and creates a growing risk of disruption or abuse of their dominant position.
5	Increasing dependency on global supply chains	Dependency on supply chains	The Netherlands is becoming more vulnerable to disruptions in the international supply of medicines and equipment, among other things.
6	Brain drain*	Brain drain	Especially on the BES islands, more and more well-trained personnel are leaving for other countries. This is also the case among people working in healthcare.
7	Increasing online trade in illicit medicines, drugs, tobacco products, vapes and dietary supplements	Illicit medicines and recreational drugs	Medicines of which the quality is not guaranteed are becoming increasingly easy to order online from abroad. In addition, the European Union Drugs Agency (EUDA) sees rapid changes in drug markets with new risks. New and sometimes very powerful synthetic and designer drugs are appearing on the market at a rapid pace. Tobacco products, vapes and food supplements are also increasingly being bought via illegal internet trade.
8	Increasing social polarisation	Polarisation	Societies worldwide are becoming more divided, which is increasing tensions and conflicts, including in the Netherlands. Algorithms on social media and in news services can promote commotion and 'bubble formation'.
9	Eroding public trust in politics and growing pressure on science	Trust in politics and science	Globally and in the Netherlands, trust in politics is declining. Trust in science is also under pressure.
10	Increasing pressure on human rights and civic freedom worldwide	Human rights	Loss of protection of human rights and the freedoms that form the basis of civic space. This includes, but is not limited to, the right to life and liberty, work and education, freedom of expression, non-discrimination and privacy.
11	Increasing vaccine hesitancy and declining willingness to participate in screening programmes	Vaccine and screening participation	Worldwide, more and more people are against vaccinations, which means that vaccination coverage is declining and outbreaks of infectious diseases are increasing. Early detection and the willingness to screen may also decrease.
12	Increasing inequality (wealth, income) in the world	Income inequality	More people are living in poverty worldwide, and the gap between rich and poor is widening. This in turn increases health inequalities. Inequality also affects social cohesion.

	Risk	Short name risk	Explanation of risk
13	Increasing disinformation and misinformation (e.g. through the use of social media, generative AI chatbots)	Disinformation and misinformation	There is a global increase in disinformation (creating and spreading false or manipulated information with the aim of misleading people) and misinformation (the unintentional spread of such false information). Both forms pose risks to society, in particular to vulnerable groups, the economy and national security. For example, disinformation campaigns can undermine social cohesion or further fuel existing tensions, including in the Netherlands.
14	Increasing use of artificial intelligence (AI)	Use of AI	AI is being used more and more. Unintended effects or malicious use of AI can lead to significant indirect risks, such as disruption of critical sectors and infrastructure, major cyber incidents, and lowering thresholds for biological or nuclear threats. Also, some work can be taken over by technology and AI, leading to job loss.
15	Increasing innovations and use of frontier technologies	Use of frontier technology	Innovative technologies can have both positive and negative impacts on individuals, businesses, ecosystems, and economies. This includes developments in the field of brain-computer interfaces, biotechnology, geoengineering, bioengineering and quantum computing.
16	Increasing collection of personal and biological data	Collecting personal health data	The acquisition and use of personal health and fitness data and biological data by smartphones, wearables and other means is increasing. While this can provide benefits for healthcare, well-being, and service personalisation, it also carries risks of misuse and invasion of individuals' privacy for strategic benefit to bad actors.
17	Increasing dependence on digital platforms and services	Dependency on digital services	Digital platforms are playing an increasingly central role in essential activities and the functioning of society. Disruption of digital services and platforms can therefore have far-reaching consequences, such as major debit card failures or the failure of software systems such as Microsoft.
18	Increasing spread and diversity of pathogens and vector-borne diseases	Spread of infectious diseases	Pathogens (such as bacteria, viruses and parasites) and their vectors (such as mosquitoes and ticks) are more common and spread more easily, partly due to climate and environmental changes and intensive contact between humans and animals. Climate change can change the distribution and timing of vector-borne diseases relative to the season. New pathogens are also emerging, for example, because microorganisms present in permafrost are released by climate change. In addition, more food- and water-borne infections occur via contaminated drinking water, bathing water or food.

	Risk	Short name risk	Explanation of risk
19	Increasing antimicrobial resistance (AMR)	AMR	More and more pathogens are becoming insensitive to existing medicines, due to incorrect use in human and veterinary healthcare, but also due to use as plant protection products. At the same time, rising global temperatures can increase the development and spread of resistance.
20	Decreasing biodiversity (marine, freshwater, terrestrial)	Biodiversity loss	The number of different species of plants and animals in the sea, freshwater and on land is decreasing. Due to the loss of biodiversity, a selection mechanism takes place in animals that poses risks to human health.
21	Increasing temperature and weather extremes due to climate change	Climate change	Rising temperatures are leading to an increase in heat waves, extreme precipitation, storms, hurricanes, floods, droughts (affecting water quality and availability) and wildfires. In the long term, this also causes the melting of glaciers and sea level rise.
22	Risk of natural disasters*	Natural disasters	The risk of earthquakes, tsunamis and volcanic eruptions remains present and even increases.
23	Increasing environmental pollution (air, water, soil) by oil, chemicals (including PFAS), plastics (micro, nano)	Environmental pollution	Worldwide, the amount of pollution of air, water and soil is increasing.
24	Increase in newly developed substances and materials	New substances and materials	New materials and chemicals are being developed whose impact on humans, animals and the environment is still unclear.
25	Increasing pressure on multilateralism, international cooperation and shared international frameworks	International cooperation	The "rules-based international order" is no longer leading; international frameworks such as the Sustainable Development Goals (SDGs) are under pressure. International forums, including the United Nations (UN) and its agencies (such as the WHO), the WTO, NATO, the World Bank, are facing major challenges. This affects negotiation processes (e.g., on the Pandemic Treaty) and support for the International Health Regulations (IHR).

	Risk	Short name risk	Explanation of risk
26	Increasing undermining of democracy by autocratic third countries	Undermining democracy	States are increasingly using means to undermine democratic processes, stability and security in other countries. This interference can manifest itself in disinformation campaigns, cyberattacks on government agencies and other forms of influence. Pressure on the democratic rule of law can have an impact on the relationship between politics and the judiciary, trust in security services and government measures to protect public health.
27	Increasing armed conflicts (between states, within states, proxy wars, coups, etc.)	Armed conflicts	Countries and power blocs will come into conflict with each other more often in the future than they do now. The number and intensity of armed conflicts and coups is increasing. Proxy wars are also on the rise, with major powers/third countries interfering in wars and civil wars with logistical/military support to put pressure on other major powers.
28	Increasing geo-economic confrontations (sanctions, import duties, investment restrictions, etc.)	Geo-economic confrontations	Power is exercised in more and more and changing places and domains. Strategic dependencies are used as an economic and political means of pressure. Countries and companies are competing increasingly fiercely for access to critical raw materials. This competition can lead to geopolitical and trade tensions and disruptions in security of supply and possible price increases of energy, food and critical products (including medicines, PPE, and chips).
29	Increasing hybrid threats; including attacks on critical infrastructure	Hybrid threats	Growing risk of coordinated, non-traditional actions by state actors such as Russia and China, including cyberattacks, sabotage of critical infrastructure, espionage, disinformation and economic pressure, without openly declaring war. Increased risk of physical and digital sabotage and attacks with an impact on telecom facilities, the internet, train traffic and the functioning of healthcare. This can have an impact on the functioning of society due to food, water and energy insecurity.
30	Increasing terrorist threats	Terrorism	Terrorist threat in the Netherlands remains substantial (level 4), with a real risk of attacks due to rapid online radicalisation of young people in jihadist, right-wing terrorist and anti-institutional circles. Although exact numbers are not given, the unabated high threat level indicates as many or possibly more attacks, partly due to international tensions and online networks.

	Risk	Short name risk	Explanation of risk
31	Increasing incidents involving chemical, biological, radiological, nuclear and/or explosives, including illicit trafficking in nuclear and radioactive materials	CBRN incidents	Growing likelihood of incidents involving chemical, biological, radiological and nuclear (CBRN) substances and/or explosives as a result of accidents or deliberate use of such substances by state actors, terrorists or extremists. An increase in unauthorised transfer, theft or sale of nuclear and other radioactive material outside the control of the authorities increases the risk of accidents.
32	Increasing pressure on the independence of knowledge institutions; less access to international health data and scientific knowledge	Independence of knowledge institutions	Scientific research is becoming fragmented and international cooperation is declining due to security policy and budget cuts. This limits open knowledge sharing and comparative analyses. Some partners no longer work evidence-based and spread disinformation, often driven by political interests. This can lead to fewer shared international guidelines and less willingness to follow them.
33	Increasing pressure on international infectious disease surveillance and response; slower detection of outbreaks and changes in pathogens	Infectious disease surveillance	The loss of funding (from the US and others) puts pressure on international surveillance and response mechanisms for infectious diseases, making outbreaks and changes in pathogens in affected countries (including the US) less likely to be detected and less effectively controlled. This comes on top of existing challenges, such as data exchange across the domains of humans, animals and the environment.
34	Diminishing effectiveness and shifting roles of international health organisations	Effectiveness of international health organisations	The global capacity to coordinate and combat international health threats is diminishing and tasks are shifting to national and regional institutions. For example, the WHO receives less political and financial support worldwide; not only the US, but also the UK, France and Germany are reducing their contributions. This leads to the loss of FTEs and programmes, which puts pressure on the position of the WHO in the multilateral system. Other health organisations (such as the World Food Programme and the Global Fund) are also affected by cuts in health-related development funds.
35	Fragmentation of European coordination on prevention, preparedness and response to health threats	Fragmentation of European coordination	Fragmentation and discontinuity of funding and competences across different EU programmes (Horizon Europe, EU4Health, HERA) makes coordination and decision-making between EU Member States a (permanent) challenge. Budgets for civilian disasters and health response and preparedness will be pooled.

	Risk	Short name risk	Explanation of risk
36	Declining Dutch influence on global health policy due to fragmented governance in the global health architecture	Fragmentation of global health architecture	The loss of predictable funding and changes in the global health architecture will make the international health agenda less predictable for the Netherlands. Financing shocks and pressures on multilateral cooperation are changing the nature of cooperation; Strategic (commercial/economic) interests are given more emphasis. Themes such as sexual and reproductive health and rights (SRHR) are coming under pressure, while regional players are gaining influence. The Netherlands and its allies must adapt to new alliances and force fields.

Appendix 5 Background characteristics of the respondents

The figures below show the distribution of the respondents over the surveyed background characteristics. These were not taken into account in the final scores.

Table C Number of times an expertise field was ticked by a respondent. Respondents could select more areas of expertise

Expertise	Number of respondents
Demographics	9
Economy	5
Sociology	10
Technology	6
Environment	9
Political/institutional	28
Health	87
Security	7

Table D Number of respondents by sector. Respondents could select only one sector

Sector	Number of respondents
Knowledge or research institution	41
Policy	39
Not-for-profit/non-profit	19
Private sector	3

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Published by

**National Institute for Public Health
and the Environment, RIVM**

P.O. Box 1 | 3720 BA Bilthoven
The Netherlands
www.rivm.nl/en

July 2026

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