



# Material Supply Strategy in a Crisis

PART 1

Supply strategies and their  
consequences in the Netherlands

This research is funded  
by ZonMw as part of the  
COVID-19 Programme



This research is a collaboration between:



UNIVERSITY  
OF TWENTE.



IRSPP  
International Research Study of Public Procurement

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September, 2021

Final editing: PPRC

Cover and illustrations: Spankracht

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## Management summary

### Research goal and focus

In ‘normal’ times, the supply management of personal protective equipment (PPE) and intensive care unit (ICU) equipment is a routine operation. Relatively, demand is predictable, products are not high value, and supply-side risks are low. In just a few weeks, the situation changed dramatically as the COVID-19 pandemic caused both unprecedented demand peaks and supply chain disruptions. The scarcity of medical materials threatened to become a bottleneck for the capacity of healthcare systems worldwide. With regular supply chains seemingly unable to fulfill demand, central governments and healthcare providers responded – with varying levels of effectiveness – implementing additional measures to secure sufficient face masks, gloves, aprons, hand sanitizers, ICU ventilators, and other scarce medical supplies.

This study draws lessons from these responses. It addresses four questions regarding the crisis procurement of medical materials that became scarce during the COVID-19 pandemic: (1) what happened, (2) why did this happen, (3) what has been learned, and (4) what can be done to prepare for a future crisis? While there is merit in answering the first three questions on their own, understanding the interrelatedness of the events, actions, and consequences across the network of involved actors is necessary to address the fourth question. We have thus adopted a holistic system view in the analysis, allowing a thorough analysis of possible future measures.

This report presents the findings of Part I of the study, which focuses on the Netherlands. Part II adds an international perspective, with an analysis of over 25 countries worldwide; it will be reported separately. We called the overall study “MaSSC”: Material Supply Strategy in a Crisis.

### Setup of the research

Part I of the MaSSC study analyzes the Dutch response in depth. This research provides a holistic system-wide view of events, actions, and their consequences concerning the response to medical material shortages, including views and lessons learned about how to prepare for such crises.

During the COVID-19 crisis, many organizations played a role in the procurement and distribution of medical materials in the Netherlands. This includes individual healthcare providers, such as hospitals and providers of long-term care that bought PPE and other materials through a variety of approaches. We study this “local perspective” and complement it with the “regional and national perspective” that includes the measures, views, experiences, and lessons learned from the multitude of organizations that played a role in regional and national procurement and distribution of medical materials. We unpick the interrelatedness of events, actions, and their effects from these different perspectives.

The research process delivered valuable, evidence-based insights into what happened in the first wave of COVID-19 regarding the procurement of medical materials and the lessons learned by various parties in the system. We conducted over 60 interviews with senior procurement practitioners at healthcare providers, experts at involved regional

organizations, and experts at national-level organizations. We systematically coded and analyzed the interviews. An extensive document study including over 200 documents complemented the interview data. These documents helped check facts, add richness, and provide network overviews of involved actors and timelines of relevant events.

## Crisis structures and timeline of events

### *Before COVID-19*

In stable times, Dutch healthcare providers in the cure and care sector are individually responsible for the procurement of medical materials. Within this decentralized structure, many hospitals and other care providers source a part of their resources (decided on a case-by-case basis) through collaborative organizations. Some of these organizations act as coordinating platforms for a range of functions including procurement, while others are purely group procurement organizations. Under normal circumstances, medical materials within the scope of this research are considered to be routine procurements, for which the supply strategy emphasizes low cost and transactional efficiency.

Before the COVID-19 crisis hit the Netherlands, there was no established crisis structure specifically for the procurement of medical supplies. There were, however, crisis organizations for other purposes in the Netherlands, such as the National Institute for Public Health and the Environment (RIVM) and the Outbreak Management Team (OMT). As well as these (crisis) organizations, there were networks of coordination organizations such as the Regional Collaboration for Acute Care (ROAZ) and for Non-Acute Care (RONAZ) and the organization for Regional Medical Preparedness and Planning (GHOR). These organizations took on a specific role in the national response to medical material shortages.

### *During COVID-19*

At the start of February 2021, the first signs of delivery problems with face masks became apparent in the Netherlands. From there, the situation escalated quickly and early March the Ministry of Health, Welfare and Sport (VWS) – without prior hands-on experience in procurement - started buying PPE and other medical supplies as a backup for the Dutch healthcare sector. On the 17<sup>th</sup> of March, the National Consortium Medical Equipment (LCH) was established as a collaboration between the government (VWS), the healthcare sector, wholesalers of health supplies, and logistics experts. The LCH was set up as a national initiative to provide a safety net for the Dutch medical sector, buying PPE and other medical supplies and distributing to providers facing shortages. Chapter 3 provides a detailed account of events and involved actors in the Dutch context.

## National procurement response in the crisis

Material scarcity, newly established national procurement (LCH) and (re)distribution initiatives and accompanying measures to regulate for example the use of PPE faced – and caused – many new challenges. The interrelatedness of these challenges resulted in extra levels of complexity. For example, in the earliest phase of their operation, the terms for calling upon LCH supplies were unclear to healthcare providers. This led to uncertainty to what extent healthcare providers could rely on LCH as a safety net. When these providers were then asked to provide information on their PPE stock levels and usage rates, they were reluctant to provide accurate information – anticipating the risk of “excess stocks” being

seized for redistribution and facing a stockout soon after. As a result, shortages may have been overestimated and stocks may not have been optimally distributed. This example, discussed in more detail and nuance in Chapters 3 and 4, illustrates the complexity of the challenges and especially their interrelatedness. Measures to overcome one challenge caused new problems.

In this research, we aimed to identify, connect, and categorize Dutch procurement challenges at a national level, which were reflected in the interviews and other sources. We break down the key problem of (perceived) shortages of medical materials in three different main categories:

1. *The lack of an adequate (and pre-existing) national crisis structure for the procurement of medical products on this scale, in combination with a decentralized national healthcare structure.*
2. *A regular procurement strategy focused on price and efficiency.*
3. *The lack of an adequate EU-wide crisis structure for procurement of medical products on this scale.*

Figure 5 in Section 3.3 maps all identified challenges and observed actions and their interrelatedness in this research.

#### *Lack of pre-existing national crisis structure for procurement of medical materials*

When COVID-19 hit the Netherlands, the lack of a national crisis structure for the procurement of medical products meant healthcare providers, organizations at regional and national level had to improvise. The crisis structure was setup from scratch, with new (and fast changing) protocols, expectations, responsibilities, and activities. Many of the challenges encountered in the early stages can be attributed to this lack of preparedness:

- The prioritization scheme neglected the care sector in early stages, meaning that the care institutions were left on their own, consequentially decreasing trust in the national approach,
- Tasks assigned to GGD are not within core responsibilities, so GGD did not have the necessary organizational structure or experience,
- A lack of procurement expertise and experience within the central procurement (by VWS) in the very early stage,
- The hurried establishment of LCH led to insufficient or unclear communication, leading to uncertainty among providers and suppliers,
- The absence of an information system and reliable data on demand and actual stock levels, and
- All the above led to increased competition between providers as well as between providers and centralized procurement structures.

#### *Regular procurement strategy focused on price and efficiency*

In normal times, sourcing strategies for standard medical products are focused on low prices and efficiency. Supplies are sourced from East Asia through wholesalers, in supply chains that are vulnerable to disruption. To make matters worse, this limited resilience was hidden for most healthcare providers because of the lack of insight into their supply chains beyond the first tier. As a result, buyers had to resort to new unknown suppliers and new markets, leading to issues with reliability, requiring new distribution channels, presenting quality

problems, and amplifying uncertainty. To mitigate dependence on East Asia, there were initiatives for domestic production and to build safety stocks.

#### *Same Challenges, Different Level: International perspective*

Internationally, opportunities for a collaborative approach to the problem of shortages – for example at the level of the European Union – were not seized effectively. Even within the EU, countries closed their borders to exports to other EU member states. Rather than joining forces by consolidating demand and building a more powerful market position (which was attempted in a joint tender but failed), EU member states began competing against each other and other countries and continents in an already overcrowded market.

#### Care and cure provider procurement response in the crisis

From February 2020, scarcity of supply placed procurement center stage within Dutch healthcare providers in the care and cure sectors. For many elderly care, disabled care, or mental healthcare organizations, this meant the procurement task had to be picked up by individuals or teams who hitherto were not officially designated as “procurement”. Healthcare providers found they could not rely solely on existing suppliers; they had to be creative to obtain sufficient scarce materials. This meant finding new suppliers, sometimes in new industries (e.g., distilleries making hand sanitizer), and at other times bypassing previous intermediaries to source directly from manufacturers (arranging shipments directly from China), or often through new middlemen, with the risk of dealing with “cowboys”. Despite the inherent risks, overall, the results were positive.

Notwithstanding the establishment of the LCH and the regional coordination of suppliers (through these organizations: ROAZ, RONAZ, and GHOR), care and cure providers felt that local ingenuity was needed as well. In the earliest phase of the crisis, the national support structures could not provide materials in sufficient volumes. Some providers relied significantly on national support structures, while others used them only as a backup option. While providers’ perceptions of the effectiveness of national interventions varied, the predominant view in the care sector was that they felt left behind, as LCH prioritized cure providers.

Frequent changes in directives on what PPE to use around COVID-19 patients exacerbated challenges for procurement, as newly acquired stocks of certain types of facemasks would suddenly become obsolete when a new ruling was published. The lack of clear protocols in the first wave of COVID-19 also meant that PPE would be consumed more rapidly than strictly necessary, adding to the material shortages.

Healthcare providers had to deal with three main procurement-related challenges. First, healthcare providers became part of new, rapidly developing network structures: within the provider organization, between provider organizations, across providers in regional and national structures, and in new supply chains. Second, procurement had to act flexibly, but also within regulatory bounds. EU tendering regulations that were loosened in the crisis need to be adhered to again in normal times (although in the Dutch system, only the seven academic hospitals are public contracting bodies). However, more flexibility can be sought in other areas. Where procurement, especially in the cure sector, traditionally has faced difficulty in changing product assortment because of users’ strong preferences of certain brands and types, the crisis showed that there are many satisfactory alternatives available in

the market. Third, the crisis drew attention to pre-existing shortcomings: the lack of supply chain transparency, a lack of inventory visibility, and inaccurate demand forecasting. Investments in systems to enable supply chain transparency are long overdue in the healthcare sector.

#### Key measures for future preparedness

Each crisis is unique; it is not possible to preempt all the procurement challenges a new crisis will bring. Nevertheless, there is much to be learnt from challenges brought by the COVID-19 pandemic. Whilst their adoption could not fully mitigate procurement challenges in a future pandemic, the evidence from this study points to a set of measures that, taken together *in an integrated approach*, could avoid a repeat of our experiences from COVID-19.

Based on detailed analysis of the 60 in-depth interviews conducted by the MaSSC team, six key measures to address the challenges are identified, two each relating to: increasing supply, building procurement capability, and facilitating coordination. These measures address different facets of a highly complex and dynamic situation; they are interconnected, and not to be regarded in isolation.

Supply-side measures:

1. *Increase resilience through stockpiles*
2. *Increase domestic production capacity*

Capability measures:

3. *Setup integrated information system(s) for data sharing*
4. *Shift towards category management*

Coordination measures:

5. *Setup an organization for increased central procurement power*
6. *Establish crisis procurement protocols*

We demonstrate this by using one measure as an example: stockpiling. One of the main challenges indicated was the dependency on Asian firms for medical supplies. Stockpiling could be a measure to increase resilience and decrease immediate and short-term dependency. However, there are downsides to consider including the high associated costs and the uncertainty in usage (when and which products). Before implementing stockpiles, there are many questions to address: *Which products should be stockpiled? How many items of each product? Where to store them? When to implement stockpiling?* and practical considerations: *the risk of expiry of products, costs of coordination, and management skills required*. Recognizing these questions and challenges, interviewees mentioned six different courses of action: *rolling stockpiles, selling and buying arrangements, uncoupling ownership from stockholding, stockpiling raw materials, industry involvement, and EU stockpiles*. Chapter 5 explains these measures and Table 5 summarizes them. Tables 6 to 10 and Figures 6, 7, and 8 (Chapter 6) summarize the objectives, questions, considerations, and actions for all the other measures.

#### Towards an integrated approach for preparing the procurement system for future crises

This study provides a nuanced, holistic account of what happened – and why – in the procurement and supply of critical healthcare materials in the Netherlands during the first

18 months of the COVID-19 pandemic. Chapters 3 and 4 of this report explain the procurement challenges encountered from a national perspective, and the viewpoint of providers in the care and cure sectors, respectively. Thus, this study brings together insights from key parties across the whole procurement system, neither privileging the national policy perspective nor the experiences of those ‘at the front line’.

The wide range of views on what was happening and what needed to happen was apparent in news media reports. In the short-term, aspects of the challenges were a popular topic of conversation; they were highly visible. Only by a deeper consideration of the way the system is organized – in stable times and during crises – can we identify the systemic structures that underpin these more visible patterns and events. The MaSSC analysis takes us beyond noticing high profile events and interventions, to pay attention to underlying patterns and drivers, and onwards to addressing pre-existing and ongoing vulnerabilities in the procurement system.

Preparing for future pandemics (and other crises leading to critical shortages) depends on identifying and addressing these structural features of the system. Analyzing the wide variety of insights from interviewees led to the identification of six relatively tangible features of the system. The measures listed above have featured in news media analysis. At the headline level, they are not new. The rigorous, systematic analysis of 60 interviews and 200+ documents however provides a deeper understanding of the measures and their implications for the procurement system as a whole.

We conclude that, in combination, these measures provide a route to building a more agile and resilient system that is (better) prepared for future crises. Any efforts towards preparedness will however falter unless two critical success factors are also taken into account in developing the procurement system. Whilst development initiatives will be centered on particular projects, people and parts of the procurement system, it is vital that all parties in the system are familiar with processes for future crisis management and develop trust in the procurement system (see Figure 9, Chapter 6). Without these, rivalry for scarce resources, confusion, and uncertainty will drive poor procurement performance in future crises.

## 1. Introduction

### 1.1 Reason for this research

The COVID-19 pandemic caused unprecedented peaks in demand for PPE, ICU equipment, and other medical materials, while supply chains have become severely disrupted because of suspended production during lockdowns, export bans, and travel limitations around the world. Under normal circumstances, medical materials such as face masks, gloves, hand sanitizer, and medical coats and aprons are routine procurements for healthcare providers. The supply of these materials in healthcare is an operational activity with an emphasis on cost-efficiency.<sup>1</sup>

In the wake of the COVID-19 pandemic, the supply of materials proved to be an essential function of the healthcare chain.<sup>2</sup> The capacity of healthcare systems around the world became bound by the availability of PPE and respiratory equipment, such as intensive care unit ventilators and related equipment. Strategies of governments to fight the spread of COVID-19, to minimize the risk for workers that encounter others, and to minimize the impact on economies have become directly tied to the availability of PPE, ventilators, testing equipment, and—in due course—vaccines. To summarize, the availability of medical equipment went from an operational routine matter to become a matter of strategic importance, with an impact on the overall strategy to fight COVID-19 and minimize its societal impact.

Traditional procurement strategies for these medical materials proved ineffective in crisis circumstances. Hospitals, care providers, and soon to follow, local and national governments were forced to improvise to gain sufficient volumes of adequate medical materials and to get these materials at the right place at the right time.

Learning from COVID-19 regarding supply strategies could save lives and reduce the overall impact on economies and societies around the world.

### 1.2 Research aim

This research aims to learn from the COVID-19 crisis regarding the *supply strategies* of scarce medical materials (*e.g., different approaches to obtain scarce medical equipment*). The overall goal is to improve our insights into successful and unsuccessful strategies for procurement and supply management in the face of a healthcare crisis. Why have governments and individual healthcare organizations responded to perceived or anticipated supply shortages as they have, and what were the consequences of their actions? What were the reasons for (relative) success, what problems were encountered, and what can organizations and governments do to be prepared better for a further crisis?

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<sup>1</sup> Livingston, E., Desai, A., & Berkwits, M. (2020). Sourcing personal protective equipment during the COVID-19 pandemic. *Jama*, 323(19), 1912-1914.

<sup>2</sup> Bhattacharya, S., Hossain, M. M., & Singh, A. (2020). Addressing the shortage of personal protective equipment during the COVID-19 pandemic in India-A public health perspective. *AIMS Public Health*, 7(2), 223.

Four questions represent the goals of the project concerning the procurement and supply of products critical to care during a coronavirus pandemic:

- What happened?
- Why did this happen?
- What have we learned?
- What can we do to prepare for a future crisis?

A crucial aspect of this study is to capture a *whole system view*, including the perspectives of parties at all levels in the system from the central government to a small care home. This study goes beyond the individual supply strategies of governments and individual healthcare organizations and their outcomes for individual organizations. Studying the interconnectedness of actors and how their courses of action regarding the procurement of medical materials during the COVID-19 pandemic influenced other actors is fundamental to this research. By taking a system-wide perspective, this study provides insights into the dynamics and interrelatedness of problems, supply strategies, and their consequences in a complex network of organizations.

In addition, we have not only focused purely on procurement actions but also the context of the organizations involved before COVID-19. The organization of healthcare systems and healthcare procurement before the pandemic has influenced possible courses of action and their consequences. This also holds for the availability of pre-existing crisis structures and protocols. These factors limit possible measures by governments and individual healthcare organizations or at least influence their outcomes.

This report provides insights into the choices made regarding procurement and supply management throughout the COVID-19 pandemic and how they worked out. While this requires looking back at past events, our findings provide insights into what we have learned from COVID-19 concerning the needs of the healthcare system to be prepared adequately for future health crises. We not only reflect on past events, but we provide recommendations that allow the Netherlands (and other countries alike) to be prepared better for the next healthcare crisis.

### 1.3 Research focus and setup

The research project “Material Supply Strategies in a Crisis” (MaSSC) is divided into two parts. In part I—reported here—we aim to provide an in-depth analysis of the response of the Netherlands to the sudden scarcity of medical materials when COVID-19 became a pandemic. In part II, we complement this in-depth perspective on the case of the Netherlands with an overview of supply strategies, lessons learned, and insights into the preparedness for future health crises from over 25 countries around the world.<sup>3</sup>

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<sup>3</sup> This report was published while Part II of the study was still ongoing, and we aim to include as many different countries as possible. The exact number of participating countries was not yet known at the time of publication of this report.

### 1.3.1 Part I—crisis supply strategy in the Netherlands

Part I of the research focuses on the Netherlands. Two linked international studies informed this part of the study<sup>4</sup>. Our aim is an in-depth study of the strategies to get sufficient medical materials and their consequences, from:

- (1) *Individual providers in care and curative healthcare*
- (2) *National government bodies, purchasing collaborations and any organization that was involved in the Dutch response to material shortages.*

Importantly, in this study, we combine insights, experiences, and views from both perspectives to provide a *whole system view*. Actions and strategies from one actor will affect other actors, especially when sourcing scarce materials within the same supply market.

The primary research question for MaSSC part I is:

What strategies they adopted in the Netherlands to secure a sufficient supply of scarce medical materials for organizations in care and cure healthcare during the first phase of the COVID-19 crisis, and what were the consequences of the adopted strategies?

To thoroughly understand the Dutch response to medical material scarcity during the COVID-19 pandemic, we first present an overview of organizations involved in both decision-making and operational activities. We summarize the organizations involved in the procurement and distribution of PPE, ventilators, and test capacity within the Netherlands. We examine their role and part within a certain strategy (whether their organizational strategy or a strategy that transcends individual organizations). We also analyze their intended and unintended consequences, their critical success factors, and the barriers or limitations that led to additional challenges.

A thorough understanding of the decisions and actions of the Dutch government and other organizations requires an understanding of the circumstances in which decisions are made. For this reason, we created a timeline of events and key actions that we deemed relevant to understand the Dutch response. The timeline provides insight into the response times between new insights and actions taken and serves as a reference point for the other findings in the report.

Against the backdrop of the overview of involved organizations and the timeline of events, we reconstruct the actions and events within the Dutch response. Given the number of organizations involved, rapidly changing circumstances, and the interconnectedness between all stakeholders and their actions, this is a very complex situation that requires a holistic research approach. Our research builds on interviews we conducted with representatives from individual care and cure providers, and with representatives from organizations that had a significant role in the Dutch national strategy. In addition, we use a wide range of sources, such as newspapers, newsletters from institutions such as the Ministry of Health, Welfare and Sport, and relevant group procurement bodies, reports, and evaluations.

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<sup>4</sup> One conducted prior to this project in May 2020, and the follow up conducted as part of this project during summer 2021.

This report focuses on part I of the study. Chapter 2 discusses the research methods. Chapter 3 first provides context: an overview of the Dutch healthcare system at normal times, a timeline of major events in the Dutch response to medical material scarcity, and an overview of the organizations involved in the Dutch response to the crisis. Chapter 3 elaborates on the Dutch national courses of action and their consequences, building on interviews and secondary sources. Chapter 4 adds the perspective from individual healthcare organizations in the care and cure sectors, their strategy vis-à-vis the national strategy, why organizations adopted their strategies, and how that worked out. In Chapter 5, we deepen the system's view on supply strategies. This chapter introduces measures for future preparedness expressed by the interviewees. Finally, in Chapter 6, we conclude this part of the research by integrating a systems perspective.

### 1.3.2 Part II—lessons learned and future crisis preparedness—an international account

In Part II of the research, we shift from a Dutch perspective to an international perspective on the procurement of scarce medical materials during a pandemic. Rather than looking back and reflecting on past strategies and events, we focus on the future. Given the crisis and consequences of medical material scarcity, what are countries doing now to prepare themselves for future similar circumstances? In effect, we aim to focus on the courses of action countries are currently pursuing (still based on lessons learned from the COVID-19 crisis) to be better prepared for future crises with a similar impact on the availability of (medical) materials.

The goal is to inform the Dutch government about the strategies of other countries, including the reasoning behind their approaches. This reasoning builds on lessons learned during the first waves of the COVID-19 crisis, and of course, these insights are still welcomed. However, we emphasize, in part II, preparedness for future crises.

The research question for MaSSC part II is:

What is happening in countries around the world to prepare for a future health crisis regarding the procurement of scarce medical materials, and why?

The research panel comprises senior public procurement experts with an overview of healthcare procurement during the pandemic in their country, although not necessarily responsible for execution. We aim to get both an objective picture of their countries' planned measures, and their expert opinions about it. The interviews focused on three key questions:

- What is happening in your country to prepare for a new health crisis (regarding material shortages)?
- What do you think about this strategy?
- What do you think should be done to prepare for future health crises?

By using the existing network from the International Research Study on Public Procurement (IRSP),<sup>5</sup> we aim to include over 25 countries across the world, varying in terms of the healthcare system, level of development, and relative success in fighting COVID-19. The final number of included countries depends on the cooperation of senior procurement practitioners and is still unknown upon completion of this report on part I of the research.

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<sup>5</sup> IRSP is an international network of public procurement scholars that organizes a biannual research workshop for government CPO's and public procurement practitioners with attendees from over 50 countries worldwide. (<https://irspp.org/>)

We will present the findings of Part II of the MaSSC research in a separate stand-alone report (which builds on part I).

#### 1.4 Scope of the research

##### 1.4.1 Medical materials in scope

This research focuses on medical materials that became scarce because of the increased demand and disrupted supply chains during the first wave of COVID-19 worldwide. This includes the supply (procurement and/or production, supply, and distribution) of materials for care: PPE (face masks FFP2, surgical face masks, gloves, coats, aprons, hand alcohol), ICU equipment (respiratory equipment and pumps), and testing materials (nose swabs). While we recognize that this is a variety of different medical products, each with its supply challenges during COVID-19, we do not differentiate our study regarding the supply strategies and consequences. Both the involved organizations, their approach, and the consequences are, to a large extent, similar for different products. When facts and findings are only relevant to a certain type of product, we specifically address this in the report.

##### 1.4.2 Organizations in scope

For Part I of this research, we included representatives/senior procurement practitioners from individual hospitals and care providers, as well as the organizations that were part of the Dutch national procurement and distribution strategy.

##### 1.4.3 Scope regarding procurement, healthcare governance, and crisis management

For both the national government and the individual healthcare organizations, supply strategy options during the COVID-19 crisis were bound by aspects such as existing crisis structures, available information systems, available procurement skills and competencies, insights into the structure of supply chains (beyond the first tier) and procurement regulations. The courses of action cannot be properly understood or valued without a thorough understanding of this “context.” Therefore, we take a broad view of “supply strategies” and include an analysis of the organization of healthcare in the Netherlands and a timeline of relevant events regarding COVID-19 both in the Netherlands and abroad.

## 2. Research strategy, design, and implementation

### 2.1 Research strategy and design parameters

The research process was designed to deliver valuable, evidence-based insights on what happened in the first wave of COVID-19 regarding the procurement of medical materials and the lessons learned by various parties in the system. In both parts of this research, the primary mode of data collection was interviews with experts. Evaluative questions elicit their learning and views about the future. Often, there is an alignment between interviewees' insights. It is also often the case that interviewees' comments diverge significantly. This diversity is recognized and valued in the analysis and reporting of the findings. We do not aim to reconcile all views and make specific recommendations—this is not an audit. Rather, this study aims to capture and synthesize various perspectives and insights into a coherent account of the sense actors made of their experiences and responsibilities in the highly dynamic and uncertain context of the COVID-19 crisis.

To deliver the project objectives, the research process needed to:

- Both describe and explain—besides describing what happened in the Dutch healthcare system, it is important to understand why things developed as they did.
- Provide a holistic account and system-wide view, which captures the dynamics and uncertainties of the pandemic—shortage of goods has multiple causes and is influenced by multiple actors working at many levels. This study draws together data provided by individuals from across the system and documentary data to build an integrated account of what happened and why, to develop a timeline of actions and to map respondents' emerging understanding of the situation, and the many uncertainties they faced. It provides a decentered account, not focused on any actor, event, or initiative.
- Encourage reflection, elicit learning, and accommodate diverse views and experiences—the vast range of views on what was happening and what needed to happen was clear from media reports. Understanding this diversity and its implications is important for providing an integrated, system-level account, but also for drawing out lessons that are relevant across all stakeholder groups enabling them to respond to future crises.
- Follow best practices in open science and research integrity

Given these objectives, the design is centered on interviewing participants in the system at two levels: procurement experts working at the “front line” in care and cure providers, and experts at regional and national levels (procurement professionals and those with policy influence on the procurement system). Interview data are complemented by an extensive body of documentary data from a wide range of government sources and news media. The documents mostly informed the factual account of events, and interviews provided facts and reflections, experiences, and views on future preparedness. In the subsequent phase of this project, further interviews with international experts from over 25 countries will be conducted. Here, we describe the research process for the first part.

## 2.2 Data collection and management

### 2.2.1 Data overview: interviews and documents

The primary data sources were interviews; design, questions, and the sample are described below. Complementing this, many documents have been gathered during the study, from multiple sources, including government, health organizations, specialists, and mainstream media. These resources provide a context for issues raised in interviews and are especially important for developing timelines. These sources are referenced in the footnotes of Chapters 3 to 5.

To develop a whole system view, interviews were conducted with experts at the national, regional, and local levels. Local contributions came from senior procurement personnel in care and cure organizations. Regional-level interviews were conducted with experts involved in coordinating supplies, some specializing in emergency management, others in procurement, and national-level interviewees who had many roles in leading procurement and/or health policy.

### 2.2.2 Interview design and respondent profiling

Interviewing was organized into two streams: (1) national and regional, and (2) local care and cure organizations. The researchers in each stream aligned the interview questionnaire design, coding framework, and report structuring to optimize a systems approach. The key themes of the interview design are listed in table 1. A detailed set of questions was developed, which is available on request. These served as a checklist for the interviewer and not as a strict guide. The interviews were conducted as structured conversations, providing plenty of scopes for interviewees to elaborate on their learning, and for dialogue.

*Table 1: Summary of themes covered in the interviews*

Key themes for national-regional interviews	Key themes for local interviews
Role of organization	Adapting internal procurement protocol
The procurement process of an organization	Selecting suppliers
Organizational structure during the pandemic	Changing aspects of procurement
Collaboration	Collaboration and competition in the healthcare field
National communication	Adapting the communication with international and external stakeholders
Learning process: challenges, successes, lessons learned, and future preparedness	Learning process: lessons learned, challenges, successes, and future preparedness

The research team used their knowledge of the Dutch healthcare (procurement) system to identify key national and regional actors to interview, and they recommended others. The aim here was to secure insights from a wide range of actors influencing policy and emergency response arrangements. Forty-five people were approached for an interview, of which one declined and 25 did not respond. Nineteen interviews with 21 participants were conducted between October 2020 and June 2021. The interviews with relevant ministries, LCH, ROAZ, GGD, GHOR, and multiple procurement collaborations<sup>6</sup> were complemented by over 200 documents.

For local organizations, the aim was to interview procurement experts with experience of working at the procurement “front line,” responsible for sourcing pandemic critical products along with all the normal products and services needed for the everyday operation of care and cure organizations. A list of organizations to approach was developed using three criteria to ensure variety among respondents:

4. *Geographic location: Three zones: south Netherlands, Randstad, and the rest of the Netherlands. The south was selected because it was where COVID-19 took hold first, with no time to plan. Urban areas were also highly affected.*
5. *Type of provider: Hospital-based procurement experts represented the cure sector. Providers of care for physically disabled persons, persons with mental health problems or disorders, and older persons were approached.*
6. *Scale—Within each type of provider, both larger and smaller organizations were included.*

Of the 61 providers contacted, 5 declined, 17 did not respond, and 39 providers accepted to be interviewed: 16 in cure and 23 in care. The first round of interviews was conducted in October and November 2020, with the second round in January and February 2021. Table 2 summarizes the variety of the interviews. While the variety of organizations is good, it is not perfect—especially reflecting the difficulty of interviewees to find the time to talk while dealing with sourcing emergencies.

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<sup>6</sup> In line with the ethical approval for this project, details are not provided here. For further information, please contact research organization Public Procurement Research Centre (PPRC).

Table 2: Overview of variety of the interviews in the care and cure sector

	South		Randstad		Rest of NL	
	Larger	Smaller	Larger	Smaller	Larger	Smaller
Mental health organizations	0	0	1	1	1	2
Disabled care organizations	1	1	2	3	2	1
Elderly care organizations	1	2	1	2	2	0
<b>Total for Care</b>	<b>5</b>		<b>10</b>		<b>8</b>	
Academic Hospitals	0	0	3	0	1	0
General hospitals	4	2	1	2	3	0
<b>Total for Cure</b>	<b>6</b>		<b>6</b>		<b>4</b>	
<b>Total all-local</b>	<b>11</b>		<b>16</b>		<b>12</b>	

### 2.2.3 Data processing, management, and integrity

This study complies fully with the university and ZonMw standards for research ethics and open science. Ethical approval and data management processes were managed by the University of Twente. While for most research funded by ZonMw, ethical and data risks lie in human tissues and medical data privacy (for example), in this study, the focus was on commercial confidentiality and ensuring interviewee identity would be sufficiently safeguarded to encourage a genuinely reflective and critical stance in the interviews. Without this, the research team's prospects of capturing participants' learning from experience would have been reduced.

The full document setting out the ethics and data management processes is available on request. Key aspects include:

- Recording interviewees' explicit consent
- Providing the opportunity to review the interview transcript
- Anonymizing/pseudonymizing interviewees in reporting findings
- Uploading metadata on the data collected in the public domain so that future researchers can be aware of this study.
- Establishing a process by which requests from other researchers to access the data can be considered and determined in a way that considers the interests of all stakeholders.

All interviews were recorded, transcribed, corrected, and redacted where necessary, translated, and loaded into the project databank (see Figure 1, columns 1 to 3). Transcripts and documentary data were uploaded to Atlas.ti software for the analysis of qualitative data.

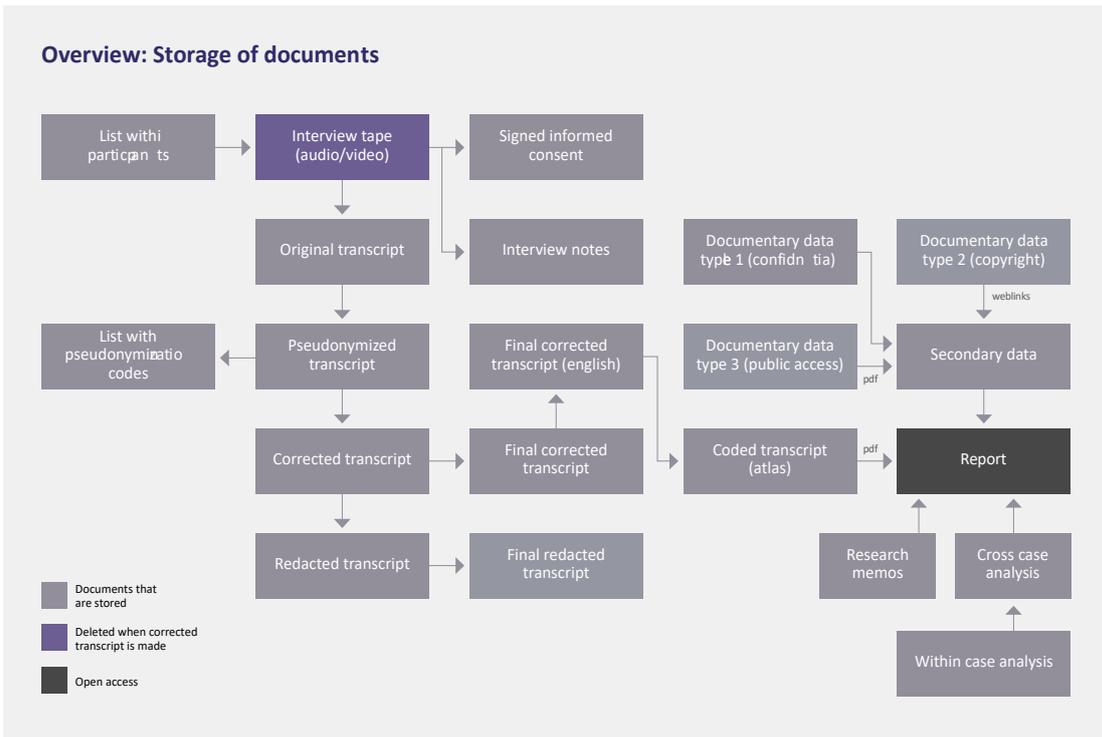


Figure 1: Data management plan

## 2.3 Data analysis and reporting findings

### 2.3.1 Coding and interpreting data

Interviews and documentary data were analyzed to develop timelines, actor-network maps, and narratives.

Using software for qualitative analysis ([Atlas.ti](https://atlas.ti.com/)), all interview transcripts were coded against two lists of codes:

- Five themes developed from a linked, exploratory international study undertaken in early summer 2020<sup>7</sup>:
  - *Governance*: coordination and rivalry; organization and maturity
  - *Skills and Competences*: individual professionalism; supply chain management
  - *Information systems*: digitalization
  - *Regulations and procedures*: procurement laws and existing crisis procedures
  - *Supply-side issues*: vulnerabilities and commitments to the supply base
- Four management related elements: challenges, actions/interventions, evaluations, future developments

Data coded to these themes and elements were then cross-tabulated. National interviews provided a 20-page data table. Each item of the coded data was labeled with its source. From this summary, it is then possible to systematically review and organize the insights from interviewees, compare their views, develop descriptions of what happened and explanations

<sup>7</sup> Researchers from IRSPP, UT and PPRC together conducted 58 interviews in 23 countries in April 2020 to gather the first thoughts on public procurement successes and challenges during the COVID-19 crisis.

by identifying causal relations between factors. In Chapter 5, the detailed accounts and explanations (described in Chapters 3 and 4) are synthesized and abstracted to develop more generalizable representations as possible measures. In Chapter 6, Chapters 3 to 5 are integrated into a system view, emphasizing the underlying foundations of the Dutch procurement system in times of crisis.

### 2.3.2 Reporting descriptive and explanatory analysis

National and regional interviews and documentary data are the basis for the timelines and actor-network maps presented in Chapter 3. The timelines were important for cross-referencing the facts and views provided by various interviewees, especially given the limitations arising from recall and social desirability bias. The many variables and how they interconnect are presented in Figure 5, which is described section-by-section throughout the chapter.

Chapter 4 describes and explains local procurement experts' experiences of leading healthcare procurement during the pandemic. It reflects the crisis in sourcing and distributing critical products as experienced by care and cure providers. The account is illustrated with vignettes and quotes based on specific comments from interviewees.

Whilst often there was alignment, there were also many instances in which interviewees provided conflicting and/or highly critical explanations. In both chapters, we aim to show the diversity of actions and views and not privilege one perspective over another. Having developed core descriptions of what occurred at various levels in the healthcare (procurement) system, the analysis was focused on developing a whole system view and understanding the key determinants of the events, actions, and outcomes described by participants.

### 2.3.3 Reporting reflections and lessons learned

In Chapter 5 on measures, we also present a wide diversity of insights from the interviews and evaluate the points made considering the other data—regarding considerations, steps that could be taken, and questions that should be asked. Questions were designed to elicit interviewees' critical assessment of what occurred (understanding the "why") and insights that could lead to developments to reduce the risk of future failure and ensure better future responses. In reporting these findings, we do, of course, pay particular attention to the points of consensus. However, we also consider data outliers—points rarely made and/or which present an opposing interpretation or unusual suggestion for future preparedness.

We noted some actions are often mentioned, though not always in a detailed, evaluative way. For example, an obvious response to shortages is stockpiling. However, it is easy to oversimplify this matter. In this study, the depth and detail of the issue discussed were more important to the analysis than the frequency with which a point was made. For the analysis, care was taken to consider the context and underlying assumptions shaping the interviewees' views. Thus, the findings are close to the data and are discussed *in the context of evidence from the data*. These are not recommendations for change, as one would find in, say, an audit or inquiry report, and should not be read in those terms.

### 3. National level: Nationwide response

Section 3.1 provides background information on healthcare procurement structures, responsibilities, and strategies in the Netherlands before COVID-19. Section 3.2 summarizes the Dutch response during the COVID-19 pandemic. Both sections are vital to understanding the challenges that arose during the COVID-19 pandemic (Section 3.3) and the possible measures to be better prepared for a possible future crisis presented in Chapters 5 and 6.

#### 3.1 Dutch procurement strategies and structures

It is important to comprehend the structure of the Dutch healthcare system before COVID-19 (under normal circumstances) to understand and assess the actions taken in time of crisis. The organizational structures and responsibilities regarding healthcare and procurement of healthcare-related materials influence the possible courses of action in a crisis, the consequent challenges that may arise, and the relative success of the adopted actions. For example, moving to centralized procurement in a short timeframe is more complex in a country where procurement is highly decentralized under normal circumstances. Hence, in Section 3.1.1, we describe the Dutch healthcare structure. In Section 3.1.2, we discuss pre-COVID-19 procurement strategies concerning Kraljic's portfolio model, elaborating the fundamental shift in procurement strategy during the crisis. Last, we explain the pre-existing crisis structures in the Netherlands, which serve as a guideline for the adopted organizational crisis structure during the COVID-19 pandemic (regarding healthcare procurement).

##### 3.1.1 Healthcare structures and procurement responsibilities in the Netherlands

Healthcare systems around the world are commonly divided into generic models. The characteristics of healthcare models influence procurement decisions. The type of healthcare system includes the degree of regulation and centralization, which influences actions taken during a crisis. A commonly used typology for healthcare systems includes four models: the Beveridge, Bismarck, National Health Insurance, and out-of-pocket models.<sup>8</sup>

- The Beveridge model is owned and funded (through taxation) by the government, and healthcare is free for all. In this model, we would assume a centralized governmental approach to hospital procurement during a pandemic (UK, Spain, Scandinavia, New Zealand, and Hong Kong).
- The Bismarck model is a multi-payer model that includes any non-profit insurance system financed jointly by employers and employees. It includes strong regulations and focuses on the health and productivity of workers (Netherlands, Germany, France, Belgium, Japan, and Switzerland).
- The national health insurance model is an insurance program run by the government paid for by all citizens (Canada, Taiwan, and South Korea).
- Individuals and families pay out-of-pocket payment models themselves, which is especially apparent in underdeveloped countries. This model is based on the ability to pay, demand, and is market-driven (Africa, India, and China). This might indicate a more fragmented approach to procurement during a pandemic.

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<sup>8</sup> Reid, T. R. (2010). *The healing of America: A global quest for better, cheaper, and fairer healthcare*. Penguin.

The Dutch model is most like the Bismarck model, in which insurance is financed partially by employers and in part by citizens. The model includes strong regulations and focuses on the health of citizens. Compared to the Beveridge and out-of-pocket models, the Bismarck model is in between a completely centralized, government-driven, and completely market-driven approach. Similar to other countries that implement the Bismarck model, regulated competition is a feature in the Netherlands.<sup>9</sup> This entails that most care and cure providers in the Netherlands are privately owned and operate on a not-for-profit basis. Due to regulated competition, these privately owned, not-for-profit institutions operate in a decentralized manner, so healthcare providers are individually responsible for the procurement of medical equipment. All privately owned hospitals have to behave according to ethical standards but do not have to adhere to EU public procurement regulations. Differences between privately owned and publicly owned healthcare providers go beyond the formal responsibilities and adherence of EU public procurement regulations. This means that healthcare providers have full authority over their procurement processes, including supplier selection and procurement strategy. It includes full control over the employee's pay rate. Healthcare providers can act solely on their own.

There is one exception to the above: the seven academic hospitals are subject to the EU directive on public procurement. These academic hospitals, therefore, must use public procurement procedures laid down in EU directives, including EU-wide publication of contracts for medical equipment, if the contract value exceeds the relevant threshold. Academic hospitals themselves are still responsible for their procurement of medical equipment and the associated processes.

Whereas all the above is in line with the Bismarck model, the Dutch system is unique in operating what is often referred to as the “polder model”, with consensus and cooperation as spearheads.<sup>10</sup> While consensus and cooperation are aimed at collaboration and inclusivity, they might be too slow in times of crisis.<sup>11</sup>

While healthcare providers may act in a completely individualistic manner regarding procurement of medical equipment, many choose not to; hence, many procurement collaborations exist. While the procurement responsibilities of medical equipment are decentralized in the Netherlands, many care and cure providers have united through procurement collaborations to bundle expertise, while utilizing economies of scale and improved power in the market.<sup>12</sup> For example, all academic hospitals collaborate for some procurement activities within the procurement collaboration “Netherlands Federation of University Medical Centers (NFU). Next to the NFU, there are many other procurement collaborations for general hospitals, including Purchasing Alliance Hospitals (IAZ), Santeon, Zorgservice XL, and Purchasing Collaboration Frisian Hospitals (IFZ). Likewise, care providers also use group procurement. By far, the biggest procurement collaboration for care (and cure) institutions is Intrakoop. Typically, these procurement collaborations establish

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<sup>9</sup> Figueras, J., Robinson, R., & Jakubowski, E. (2005). *Purchasing to improve health systems performance*. McGraw-Hill Education (UK).

<sup>10</sup> Van de Bovenkamp, H. M., Trappenburg, M. J., & Grit, K. J. (2010). Patient participation in collective healthcare decision making: the Dutch model. *Health Expectations*, 13(1), 73-85.

<sup>11</sup> Berg, M., Van Der Grinten, T. & Klazinga, N. (2004). Technology assessment, priority setting, and appropriate care in Dutch health care. *International Journal of Technology Assessment in Health Care*, 20, 35-43.

<sup>12</sup> Plasier, M (2021). Verbind en Heers, Zeven handvatten voor succesvolle (inkoop) samenwerking. Inkoop Alliantie Ziekenhuizen

contracts with suppliers in which individual hospitals or care institutions may decide on a case-by-case basis whether to take part in a contract. Depending on the procurement collaborations, different rules apply. An example within the IAZ is that affiliated organizations must partake in at least 80% of the awarded contracts.<sup>13</sup> Besides the cost and knowledge advantage of procurement of products collaboratively, procurement collaborations provide increased opportunities for information sharing.

To summarize, the Dutch healthcare system is decentralized, with regulated competition and a consensus- and cooperation-based approach. Except for the seven academic hospitals, care and cure providers are privately owned and, hence, can take an individualistic approach. Many hospitals and care institutions are members of a procurement collaboration, although individual organizations sometimes use group procurement only for a small part of their spending. The characteristics unique to this system influenced the approaches and strategies during the pandemic. One might expect distinct challenges and strategies when comparing countries with highly centralized healthcare systems.

### 3.1.2 Procurement strategies

The non-crisis procurement strategy for medical products within this research is of similar importance to the non-crisis healthcare landscape in the Netherlands. The procurement strategy is influenced by and influences—among others—the key performance criteria (price, quality, efficiency, availability), the supplier base (number of suppliers and geographical location), and availability of supply (natural scarcity versus abundant supply). The qualifications of the products regarding price, supply availability, and supplier base influence the procurement strategy in stable times, which consequently influences potential challenges in times of a pandemic.

The Kraljic matrix<sup>14</sup> is often referred to for procurement strategies<sup>15</sup> based on product differentiation, in which the strategy depends on two factors: profit impact and supply risk. These two factors lead to four quadrants, differentiating between four different procurement strategies based on the type of product. During the pandemic, many challenges arose in sourcing PPE. However, before the pandemic—in non-crisis times—PPE was typically categorized as a so-called “non-critical item,” with low-profit impact and low supply risk. Items in this category, in stable times, have an abundant supply and steady demand for buyers. The strategy to procure these routine items focuses on (low) prices and efficiency. However, the pandemic caused a shift in availability, supply risk, and arguably the profit impact of medical equipment, especially PPE. The procurement strategy changed to bottleneck strategies (low-profit impact, with high supply risk), where ensuring supply and searching for alternatives was the primary aim.<sup>16</sup> By a temporary change in strategy, forced by external events, key performance criteria change, sources/suppliers change, decision

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<sup>13</sup> Plasier, M (2021). Verbind en Heers, Zeven handvatten voor succesvolle (inkoop) samenwerking. Inkoop Alliantie Ziekenhuizen

<sup>14</sup> Kraljic, P. (1983). Purchasing must become supply management. *Harvard Business Review*, 61, 109-117.

<sup>15</sup> Procurement strategies of Kraljic differ from the supply strategies introduced in our introduction. With supply strategies we imply any approach to battle scarcity, such as establishing central organizations or national production. Procurement strategies by Kraljic are strategic buying considerations on how and where to source.

<sup>16</sup> Tip, B., Vos, F.G.S., Peters, E & Delke, V. (2021). A Kraljic and Competitive Rivalry Perspective on Hospital Procurement During a Pandemic (Covid-19): A Dutch Case Study. *Journal of Public Procurement* (in press).

authority changes, and delivery timeframes change. A radical, though temporary, change in procurement strategy and supply circumstances requires unique skill sets, flexibility, and adaptability, and consequently brings with it many challenges. Many of these challenges have become apparent during the COVID-19 pandemic.

### 3.1.3 Pre-existing crisis structures in the Netherlands

Before the COVID-19 pandemic, the Netherlands did not have a national procurement crisis organization, system, or protocol in place. However, crisis organizations for other purposes existed in the Netherlands.

The National Institute for Public Health and the Environment (RIVM) plays a significant role in the battle against pandemics (infectious diseases). RIVM focuses on infectious diseases and vaccinology, public health and health services, and environment and safety. During a pandemic, the RIVM acts as a liaison between the government, the World Health Organization (WHO), and the European Centre for Disease Prevention and Control (ECDC). The RIVM also convenes an Outbreak Management Team (OMT) when an infectious disease breaks out. The OMT comprises experts specifically appointed for a pandemic or infectious disease, which will provide policy advice to VWS. The OMT provides this policy advice to the Administrative Consultative Committee (BAO), who assesses the advice on feasibility and implementation abilities, who advises the Ministry of Health, Welfare, and Sport. Only the Dutch government, specifically the Ministry of Health, Welfare, and Sport, has the authority to make formal decisions, such as those about infection prevention measures.<sup>17</sup>

In parallel, there is a crisis management structure involving the national coordination of all crisis management tasks. The Minister of Justice and Security is the coordinating minister in crisis management. The national coordinator for counterterrorism and security (NCTV) coordinates crisis management tasks. Simultaneously, the NCTV has a national crisis center (NCC), supporting the national crisis structure by providing a 24/7 information desk for involved parties. At the highest level, crisis management decisions on measures are made by the Ministerial Commission for Crisis Management (MCCb), to ensure a coherent approach. This was led by the Prime Minister. The MCCb is supplied with information from the Interdepartmental Commission for Crisis Management (ICCb). The ICCb is supported by the Interdepartmental Consultative Committee (IAO), which consists of different compositions, depending on the matters at hand. All crisis communication at all levels is handled by the National Core Team Crisis Communication (NKC).<sup>18,19,20</sup>

All the organizations mentioned above are involved in advice regarding policy measures that could influence procurement regulations and demand, such as mandatory mask-wearing. When establishing future procurement protocols, it is important to include these organizations in the construction of new plans and to communicate changes between these organizations and the procurement structure.

The Netherlands also has crisis organizations with operational purposes. At the national level, this organization is the “National Operational Coordination Center” (LOCC), which is a multidisciplinary partnership between all operational emergency services including the fire

<sup>17</sup> [https://www.rivm.nl/sites/default/files/2020-05/Folder%20landelijke%20advisering%20bij%20infectieziektedreigingen%20en%20crises\\_0.pdf](https://www.rivm.nl/sites/default/files/2020-05/Folder%20landelijke%20advisering%20bij%20infectieziektedreigingen%20en%20crises_0.pdf)

<sup>18</sup> <https://www.ifv.nl/kennisplein/Documents/20181010-IFV-BNK-7-Infectieziekte.pdf>

<sup>19</sup> <https://www.nctv.nl/actueel/nieuws/2020/03/09/nationale-crisisstructuur-actief-voor-coronavirus>

<sup>20</sup> An overview of the Dutch crisis structure can be found here:

<https://www.rijksoverheid.nl/documenten/rapporten/2020/03/13/tk-bijlage-grafische-weergave-crisisstructuur-covid-19>

department, police, defense, safety regions, GHOR, and municipalities. The LOCC performs these activities in coordination with the National Crisis Center.<sup>21</sup> Next to national coordination, safety regions exist to prepare regionally for disasters and crises and to coordinate their management.<sup>22</sup> The board of safety regions comprises all mayors within that region, often with the mayor of the biggest city serving as the chair. Safety regions handle the mandatory administrative cooperation between the emergency services board (fire department and GHOR) and the regional police board, to coordinate preparation for joint action in disaster and crises, and all chairs combined (of the 25 safety regions) form the safety council, which collaborates with the Ministry of Justice and Security. Members of the safety council, such as MCCb and ICCb, are involved also in crisis commissions. The GHOR is an organization for Regional Medical Preparedness and Planning: “During major accidents and disasters, the GHOR coordinates the cooperation between the various medical emergency services, so that they unite to form one emergency service chain. In addition, during a disaster or crisis, the GHOR is the central contact point of the medical assistance chain.”<sup>23</sup> Hence, whereas the safety regions focus on (regional) crisis management, the GHOR focuses on medical emergency services.

Table 1 summarizes different organizations and commissions that existed before COVID-19 at both the national and regional levels. The focus of these crisis organizations is crisis and healthcare management. Whereas LOCC and GHOR are executive organizations, no one is specifically appointed for the procurement and redistribution of medical materials.

*Table 1: National crisis structure (pre-COVID-19)*

National	Crisis management	<ul style="list-style-type: none"> <li>• LOCC (operational), NCTV (coordinator), NCC (part of NCTV), and NKC (communication) advise the IAO.</li> <li>• IAO supports the ICCb, which advises the MCCb, which decides on crisis management measures</li> </ul>
	Healthcare management	<ul style="list-style-type: none"> <li>• RIVM <i>appoints</i> OMT,</li> <li>• OMT <i>advises</i> BAO</li> <li>• BAO tests for feasibility and informs VWS</li> </ul>
Regional	Crisis management	<ul style="list-style-type: none"> <li>• Safety regions form national safety council</li> </ul>
	Healthcare management	<ul style="list-style-type: none"> <li>• GHOR</li> </ul>

<sup>21</sup> <https://www.rijksoverheid.nl/ministeries/ministerie-van-justitie-en-veiligheid/organisatie/organogram/directoraat-generaal-politie-en-veiligheidsregio%E2%80%99s-dgpenv/landelijk-operationeel-coördinatiecentrum-locc>

<sup>22</sup> <https://www.rijksoverheid.nl/onderwerpen/veiligheidsregios-en-crisisbeheersing/veiligheidsregios>

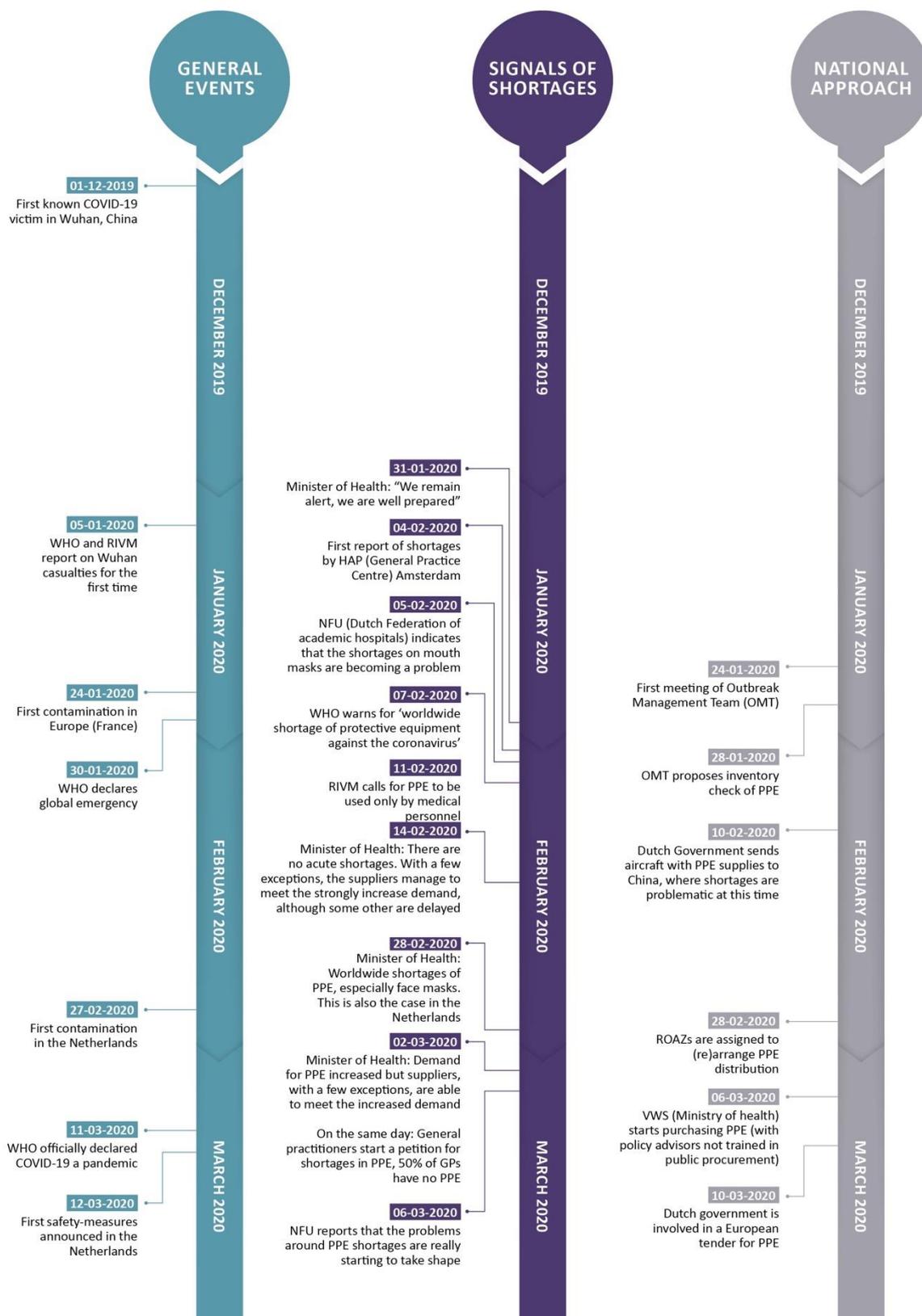
<sup>23</sup> <https://ggdghor.nl/home/wat-doet-de-ghor/>

## 3.2 Dutch national response during COVID-19

In Section 3.2, we display the national response to the pandemic through timelines and network structures (representation of factual connections between all organizations involved). First, we sketch the actions taken by the Dutch government about warning signals provided by the government and in relation to general worldwide events. Based on these actions, we reconstructed and visualized the newly emerged public procurement national crisis structure. In this network structure, we discuss affiliated organizations and their roles.

### 3.2.1 National response

In Section 3.1, we discuss healthcare and crisis structures and procurement strategies pre-COVID-19. In December 2019, the first known case of COVID-19 was reported. From there onwards, governments worldwide acted in response to these events, unaware of the fact that it would become a pandemic. The timeline comprises three sub-timelines, in which the first one displays events and activities worldwide regarding COVID-19 as a reference point. The second timeline provides signals that the Dutch government provided about shortages. These signals are not concrete actions but provide a line of thought of the Dutch government on the current state of the Netherlands. The third timeline reflects the major actions taken at the national level regarding PPE procurement and distribution. We can compare the main actions taken at the national level with the signals and worldwide activities, to shed some light on the timing and context of the Dutch response. Hence, the timelines can be read vertically and compared horizontally. The information in the timelines originates from a document study of over 200 documents besides the interviews.



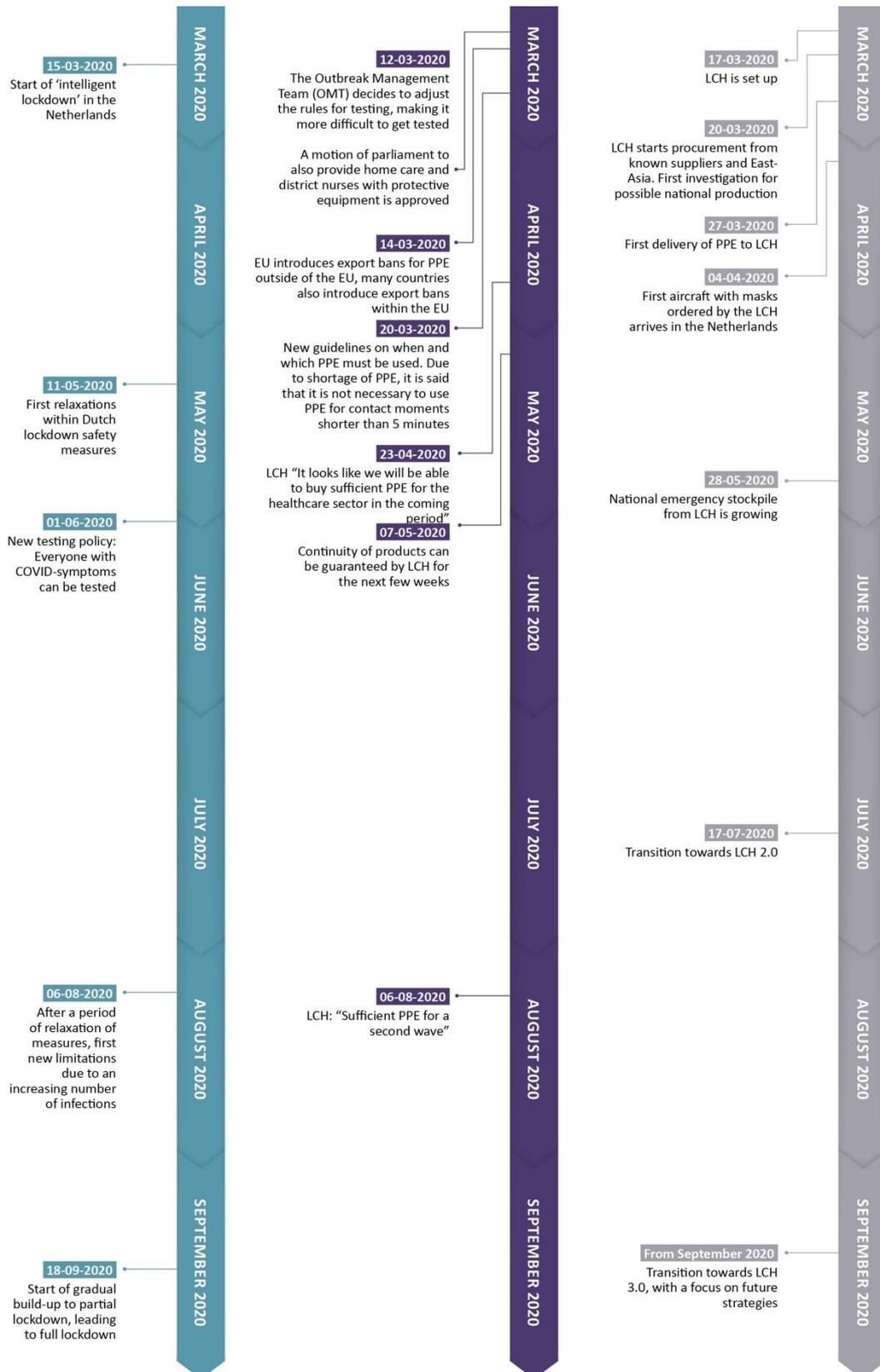


Figure 2: Reconstruction of general events, signals, and national approach during the COVID-19 crisis

December 2019 & January 2020

At the end of December and the beginning of January, news about a 'mysterious pneumonic virus' in China, spread through Europe.<sup>24</sup> With less than 50 known infections and one fatality on the 11<sup>th</sup> of January, the state of concern was relatively low. On the 11<sup>th</sup> of January, a Belgian news site reported that "the worst was already over, and no new infections were reported"<sup>25</sup> However, on the 24<sup>th</sup> of January, the first known contamination hit Europe in France.<sup>26</sup> Shortly after that, the Dutch government took their first action: the OMT came together.<sup>27</sup> The OMT proposed an inventory check of PPE, especially for healthcare providers that were not hospitals.<sup>28</sup> One week after the first OMT meeting, the World Health Organization (WHO) declared a global emergency.<sup>29</sup> One day later, on the 31<sup>st</sup> of January, the Minister of Health did not have many concerns arguing "We remain alert, we are well prepared."<sup>30</sup>

February 2020

In the first week of February, signals of PPE shortages arose from multiple sources: the NFU, WHO, and general practitioners' center (HAP) in Amsterdam.<sup>31</sup> Immediately after this news hit, airplanes with PPE left for China, on the 10<sup>th</sup> of February to help out the Chinese.<sup>32</sup> Even though the RIVM emphasized that PPE should only be used by medical personnel on the 11<sup>th</sup><sup>33</sup>, the Dutch Ministry of Health still argued that no acute shortage was present: "*With a few exceptions, the suppliers managed to meet the strongly increased demand, although some orders are sometimes delayed. [...] In total, there is not yet an acute shortage of protective equipment for the whole of the Netherlands.*"<sup>34</sup> This occurred well ahead of the first known Dutch contamination, which occurred on the 27<sup>th</sup> of February.<sup>35</sup> One day after the first known Dutch contamination, the ROAZ was tasked with managing the re-distribution of PPE.<sup>36</sup>

March 2020

On the 2<sup>nd</sup> of March, the Minister of Health argued that no acute shortages of PPE existed: "The current situation is that the demand for protective equipment has increased, but that suppliers, with a few exceptions, can meet the strongly increased demand, albeit that some orders are sometimes delayed."<sup>37</sup> On the same day, general practitioners started a petition

<sup>24</sup> <https://www.volkskrant.nl/nieuws-achtergrond/mysterieus-longvirus-eist-eerste-dode-in-china~b5857bcd/>

<sup>25</sup> <https://www.demorgen.be/nieuws/mysterieus-longvirus-eist-eerste-dode-in-china~b5857bcd/?referrer=https%3A%2F%2Fwww.google.com%2F>

<sup>26</sup> <https://www.newscientist.nl/nieuws/coronavirus-mogelijk-eerder-in-europa-dan-we-dachten/>

<sup>27</sup> <https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdlijn/januari-2020-eerste-signalen-corona>

<sup>28</sup> <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/01/28/kamerbrief-over-nieuwe-coronavirus-wuhan>

<sup>29</sup> [https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov))

<sup>30</sup> <https://www.rijksoverheid.nl/documenten/mediateksten/2020/01/31/letterlijke-tekst-persconferentie-na-ministerraad-31-januari-2020>

<sup>31</sup> <https://www.reuters.com/article/us-china-health-who/who-warns-of-global-shortage-of-coronavirus-protective-equipment-idINKBN2011EK>

<sup>32</sup> <https://www.volkskrant.nl/nieuws-achtergrond/nederland-stuurde-in-februari-ondanks-who-waarschuwing-miljoenen-medische-hulpmiddelen-naar-china~b15ecd46/#:~:text=Coronavirus%20in%20Nederland-,Nederland%20stuurde%20in%20februari%20ondanks%20WHO%2Dwaarschuwing%20miljoenen%20medische%20hulpmid delen,het%20Chinese%20Wuhan%20te%20sturen.>

<sup>33</sup> <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/02/11/aanbiedingsbrief-over-geannoteerde-agenda-epsco-raad-13-februari-2020>

<sup>34</sup> <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/02/14/kamerbrief-over-nieuw-coronavirus-vervolgbrief>

<sup>35</sup> <https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdlijn/februari-2020-eerste-coronabesmetting-in-nederland>

<sup>36</sup> <https://www.rijksoverheid.nl/documenten/brieven/2020/02/28/brief-over-advies-van-outbreak-management-team-over-covid-19>

<sup>37</sup> <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/03/02/beantwoording-kamervragen-over-berichten-uitbraak-coronavirus-in-italie>

citing shortages in PPE, claiming that 50% of general practitioners had no PPE.<sup>38</sup> On March 6<sup>th</sup>, the NFU reported that shortages became apparent and they asked the Ministry of Health, Welfare, and Sport to help with the procurement of PPE. The Directorate of Medicines and Medical Technology (GMT) of the Ministry of Health, Welfare, and Sport started procurement of PPE—as a policy department.<sup>39</sup> Several days later, the Minister also informed the government that the Netherlands was involved in a European tender for PPE.<sup>40</sup>

On the 11<sup>th</sup> of March, the WHO officially declared COVID-19 a pandemic.<sup>41</sup> A day later, on the 12<sup>th</sup> of March, the OMT adjusted indications for testing because of the scarcity of test materials and PPE.<sup>42</sup> On the same day, a motion of parliament was passed to provide PPE for the care sector, which was not included in the prioritization scheme.<sup>43</sup> This was also the day when the first safety measures for the whole of the Netherlands were announced.<sup>44</sup> Three days later, the intelligent lockdown started.<sup>45</sup> Between the first safety measures and the lockdown, the EU introduced export bans for PPE on the 14<sup>th</sup>.<sup>46</sup> These bans were meant to prevent the export of medical equipment outside of the EU but not within the EU.

The 17<sup>th</sup> of March is an important date in the Dutch procurement timeline reconstruction. On this day, the National Consortium Medical Equipment (Landelijk Consortium Hulpmiddelen or LCH) was established, providing a centralized national crisis structure for PPE and other medical equipment. This consortium was established in collaboration between the market (healthcare sector, wholesalers, and logistic experts) and the government, to facilitate a national approach for the procurement of medical equipment, as a safety net for the medical sector. This happened exactly 6 weeks after the first signs of shortages (4<sup>th</sup> of February), 2.5 weeks after the first contamination in the Netherlands (27<sup>th</sup> of February), and less than a week after the pandemic officially started (11<sup>th</sup> of March). On the 20<sup>th</sup> of March, the LCH officially started functioning, and the first deliveries were made on the 27<sup>th</sup> of March.<sup>47,48</sup> More information on the role of the LCH is provided in the network structure.

At the same time that the LCH was established, new guidelines on PPE were introduced. On the 20<sup>th</sup> of March, owing to a shortage in PPE, guidelines indicated that it was not necessary to use PPE for contact moments shorter than 5 minutes.<sup>49,50</sup>

*April 2020*

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<sup>38</sup> <https://huisartsvandetoekomst.nl/steun-noodkreet-huisartsen-bij-uitbraak-covid-19>

<sup>39</sup> information from interview

<sup>40</sup> <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/03/10/kamerbrief-over-covid-19-nieuwe-maatregelen-advies-bestuurlijk-afstemmingsoverleg-en-internationale-ontwikkelingen>

<sup>41</sup> <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>

<sup>42</sup> <https://www.rijksoverheid.nl/documenten/brieven/2020/03/12/advies-outbreak-management-team-omt-over-covid-19>

<sup>43</sup> <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/03/12/kamerbrief-over-covid-19-nieuwe-maatregelen>

<sup>44</sup> <https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdlijn/maart-2020-maatregelen-tegen-verspreiding-coronavirus>

<sup>45</sup> <https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdlijn/maart-2020-maatregelen-tegen-verspreiding-coronavirus>

<sup>46</sup> <https://www.belastingdienst.nl/wps/wcm/connect/bldcontentnl/berichten/nieuws/douane/verbod-op-export-van-persoonlijke-beschermingsmiddelen>

<sup>47</sup> <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/03/31/kamerbrief-covid-19---update-stand-van-zaken-31-maart>

<sup>48</sup> Newsletters LCH 23 March 2020

<sup>49</sup> <https://lci.rivm.nl/covid-19/PBMbuitenziekenhuis>

<sup>50</sup> <https://www.igi.nl/actueel/nieuws/2020/03/25/mondmaskers-in-de-zorg-buiten-het-ziekenhuis-alleen-als-het-echt-nodig-is>

In the first week of April, the first aircraft with face masks ordered by the LCH arrived in the Netherlands.<sup>51</sup> On the 23rd of April, a little over a month after the establishment of the LCH, the LCH was confident about the amount of medical equipment procured: "It looks like we will be able to buy sufficient personal protective equipment for the healthcare sector in the coming period."<sup>52</sup>

#### *May 2020*

According to the LCH, product continuity could be guaranteed by the LCH from the 7<sup>th</sup> of May onward.<sup>53</sup> On the 11<sup>th</sup> of May, the first measures as part of the first lockdown were relaxed.<sup>54</sup> At the end of May, the first mention of a national emergency stockpile was made, in which the LCH communicated that the national emergency stockpile was growing.<sup>55</sup>

#### *June 2020 until August 2020*

On the 1<sup>st</sup> of June, the testing policy was once again adapted based on sufficient supply, ensuring that everyone with COVID-symptoms could be tested.<sup>56</sup> On the 17<sup>th</sup> of July, exactly four months after the LCH was established, the LCH entered a transition period, working towards the future of the organization and focusing on preparedness for future crises, which would be LCH version 3.0. The reason behind this transition was the completion of the emergency phase (information from *the interviews*). This transition also included transitions of staff, as the LCH downsized during this period. On the 6<sup>th</sup> of August, the LCH communicated that it had "sufficient PPE for a second wave."<sup>57</sup> On that same day, after a period with limited measures, the government announced the first new safety measures, gradually building up to a new lock-down, after an increasing number of infections.<sup>58</sup>

#### *October 2020 until June 2021*

On October 1<sup>st</sup>, the Centraal Informatiepunt Beroepen Gezondheidszorg (CIBG) (an executive organization of VWS) was formally instructed to take over the LCH from the GMT Directorate. In 2020 and 2021, the CIBG aims to shape the transition of the LCH to an organization focused on preparedness for future crises. For this purpose, Bureau LCH was established, employing about 35 people in June 2021. This group of employees consist of around 10 people who also worked in the LCH, newly hired workers, and internal employees of the CIBG. The goal is to transfer and secure knowledge while simultaneously structuring the work done by the LCH since the start of the pandemic. These activities are in addition to their primary occupation of managing the emergency stockpile, which is still an ongoing activity. Concurrently, the CIBG is also exploring options for selling or donating stock above the threshold of a 6-month stockpile.

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<sup>51</sup> <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/03/31/kamerbrief-covid-19---update-stand-van-zaken-31-maart>

<sup>52</sup> Newsletter LCH, 23<sup>rd</sup> April 2020)

<sup>53</sup> Newsletter LCH, 7 Mei 2020

<sup>54</sup> <https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdlijn/mei-2020-economische-gevolgen-financiele-steun-en-versoepeling-maatregelen>

<sup>55</sup> Newsletter LCH, 28 May 2020

<sup>56</sup> <https://www.rijksoverheid.nl/actueel/nieuws/2020/05/27/vanaf-1-juni-testen-mogelijk-voor-iedereen-met-milde-klachten>

<sup>57</sup> Newsletter LCH, 06 Augustus 2020

<sup>58</sup> <https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdlijn/augustus-2020-wij-zijn-klaar-met-het-virus-maar-het-virus-is-nog-niet-klaar-met-ons>

In terms of safety measures, the Netherlands was also gradually building up to a partial lockdown from October 1<sup>st</sup>, which eventually led to a full lockdown from the 13<sup>th</sup> of October.<sup>59</sup> After months of partial and full lockdowns, on April 28<sup>th</sup> 2021, the number of patients in the intensive care unit and the infection number decreased enough to have the first relaxation of the COVID-19 measures.

### 3.2.2 National procurement network structures during COVID-19

During the COVID-19 crisis, multiple healthcare providers and departments, directorates, and committees from the government worked together to combat the shortages of medical equipment. In Figure 3 and Figure 4 we provide an overview of the newly emerged structures. Figure 3 provides an overview of the governmental network structure of responsibilities and the procurement of medical and non-medical PPE. Figure 4 shows the procurement network structure within the healthcare sector during COVID-19. While the structure is complex, it describes the tasks and connections of organizations involved in healthcare procurement during the crisis.

#### *The governmental network structure of responsibilities and procurement*

The roles of different ministries and departments/directorates of VWS differed throughout the pandemic. Table 3 captures the division of the roles within the ministries and departments/directorates regarding the procurement of medical products. First, the action was taken by the directorate of the GMT, which started procuring PPE and ventilators before the establishment of the LCH. After some time, ventilators were temporarily bought by the directorate of curative care (Directie Curatieve Zorg; directie CZ) before turning back to the GMT directorate. In addition to PPE for the healthcare sector, PPE was also necessary for the public sector, such as PPE for so-called “vital professions” (those employed in food supply chains, public services, public transport, and others). Within the Ministry of VWS, the public sector was represented by the Directorate of Public Health (Directie Publieke Gezondheid; directie PG).<sup>60</sup> At the same time, other ministries were involved in the procurement of PPE for non-health-related sectors and professions, including the Ministries of Justice and Security (Ministerie van Justitie en Veiligheid; J&V) and the Ministry of the Interior and Kingdom Relations (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties; BZK).

Testing equipment and capacity, on the other hand, were the responsibility of different departments and directorates and, to make things more complex, the responsibility of procurement of testing equipment changed between institutions throughout the pandemic. The procurement of equipment was the responsibility of the COVID Directorate in the beginning. With the establishment of the LCH, the LCH took over the procurement of testing equipment, but not the capacity arrangements or the responsibility for testing capacity or materials. From the 1<sup>st</sup> of January 2021, “service testing” (Dienst Testen) took over responsibility for testing capacity, testing materials, and quality of testing.<sup>61,62</sup>

Hence, different directorates focused on different sectors and products throughout the pandemic. It is important to note that VWS was involved in the procurement for the

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<sup>59</sup> <https://www.rijksoverheid.nl/onderwerpen/coronavirus-tijdljn/oktober-2020-tweede-golf-en-gedeeltelijke-lockdown>

<sup>60</sup> <https://www.rijksoverheid.nl/ministeries/ministerie-van-volksgezondheid-welzijn-en-sport/documenten/publicaties/2018/01/09/organogram-ministerie-van-vws>

<sup>61</sup> <https://www.diensttesten.nl/over-dienst-testen/historie-van-dienst-testen>

<sup>62</sup> <https://www.diensttesten.nl/over-dienst-testen/taken-van-dienst-testen>

healthcare sector, but the procurement of medical products goes beyond the medical sector. Other ministries, including VWS, Defense, BZK, and J&V, were involved in the procurement of PPE for the non-healthcare sectors.

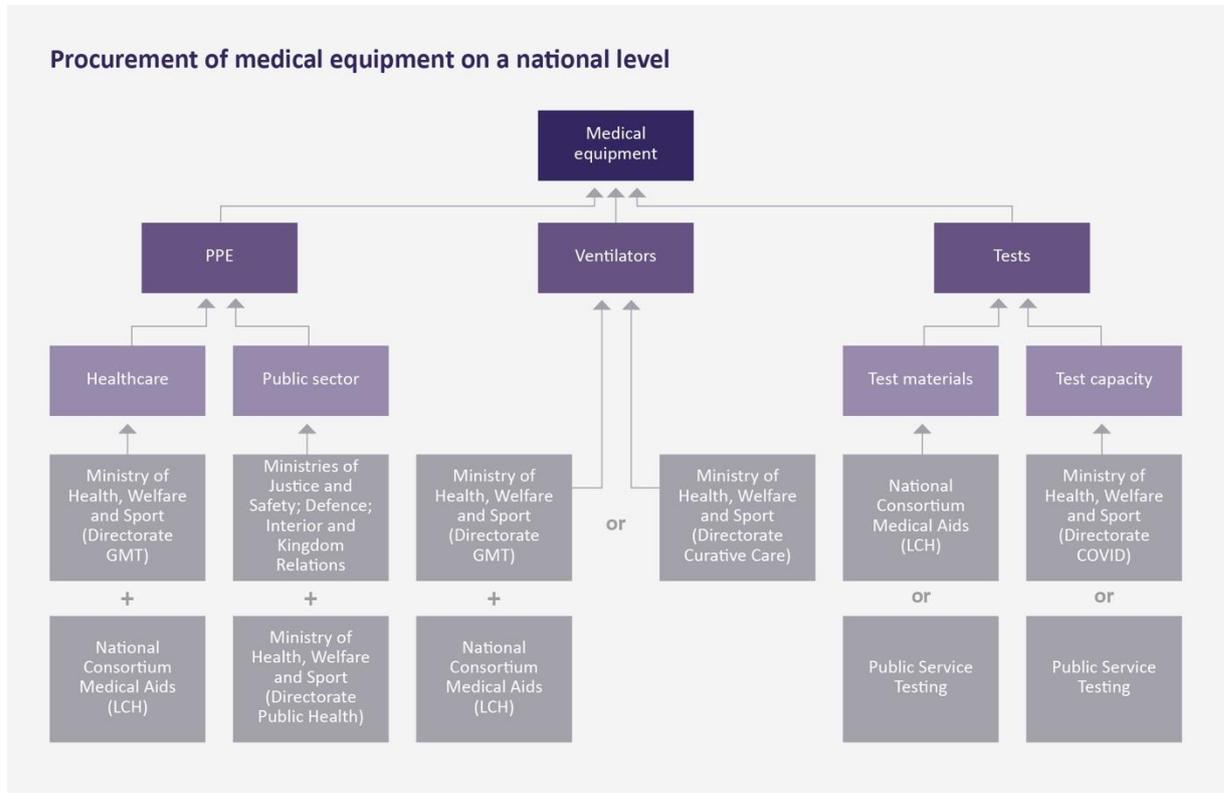


Figure 3: The division of the roles within the ministries and departments/directorates regarding the procurement of medical products

*The procurement network structure for the healthcare sector*

Policy advice on PPE and other medical equipment regulations was delivered through the pre-existing crisis structure (see 3.1), involving the RIVM that convened the OMT and advised VWS along with the BAO, who assessed the advice on feasibility and implementation abilities of the OMT. Advice from the OMT and BAO included an inventory check, options on the reusability of PPE, and policies on when to wear PPE and testing policies. These structures and policies were consistent with the MCCb.

The role of VWS changed with the establishment of the LCH. The LCH was established in the middle of March to provide a safety net through a central procurement organization for the Netherlands—not to fully centralize procurement as some healthcare providers or wholesalers thought. This establishment was in collaboration with VWS and purchasing collaborations, such as the NFU. Since the LCH is not a formal legal entity, formal responsibilities remained with VWS. Purchasing collaborations that represented different providers within the healthcare sector collaborated with the LCH by providing employees with experience in procurement, and by providing advice and signals from the market, such as the needs and challenges of healthcare providers.

The LCH collaborated with two existing wholesalers: Mediq and OneMed. Both had pre-existing systems in place for the distribution of medical equipment. Mediq distributed PPE to providers in the care sector and OneMed distributed medical equipment to providers in the

cure sector. Care providers ordered their medical equipment through the order portal of Mediq, and the cure providers ordered their medical equipment through the order portal of OneMed. Mediq fully organized financial aspects from procurement to sales. Another key collaboration included Centraal Boekhuis (CB), which supported LCH with logistics.

Before the establishment of the LCH, the government included the ROAZ, GGD, and GHORs into the (re-)distribution process, dividing the products procured by the GMT directorate and redistribute them between healthcare providers. Of the ROAZ, GGD, and GHOR, only the GHORs are a crisis organization of origin. With no established national crisis structure for procurement of medical equipment, a crisis team within the organization "GGD GHOR" was constructed—from scratch—to take a national coordinating role. At the same time, the pre-existing 11 ROAZs took a regional coordinating role. Within each ROAZ, one person from the GGD GHOR organization was appointed as the regional PPE coordinator. As the ROAZ was a pre-existing organization with different structures throughout different regions, effectiveness, tasks, and team compositions differed between the 11 different ROAZs. Essentially, the GGD coordinated (re)distribution of PPE on a national level through information with the ROAZ, whereas the ROAZ re(distributed) within the region between individual healthcare providers. At the same time, both the ROAZ and GGD/GHOR national coordination crisis team gathered insights into the degree of shortages and anticipated demand within the region or country, passing this information down to VWS. At first, this was done separately and differently between the ROAZs, but this changed with the implementation of a software tool that was available for all ROAZs to gain insights into anticipated demand and anticipated shortages. While this was the official task for all the ROAZs, some ROAZs added other tasks to their portfolio, including regional procurement of PPE.

The role of the GGD/GHOR and ROAZ changed shortly after the establishment of the LCH, from the 11<sup>th</sup> of April onwards when the LCH was put in charge of (re)distribution. Again, the exact role of the ROAZ depends on the region and construction of the team. Some ROAZs remained independent and procured individually, while simultaneously arranging redistribution between healthcare providers in their region. Other ROAZs continued to redistribute between healthcare providers while gathering information. The least active ROAZs simply gathered and passed information from the healthcare providers through to the LCH and vice versa, leaving all distribution to the LCH.

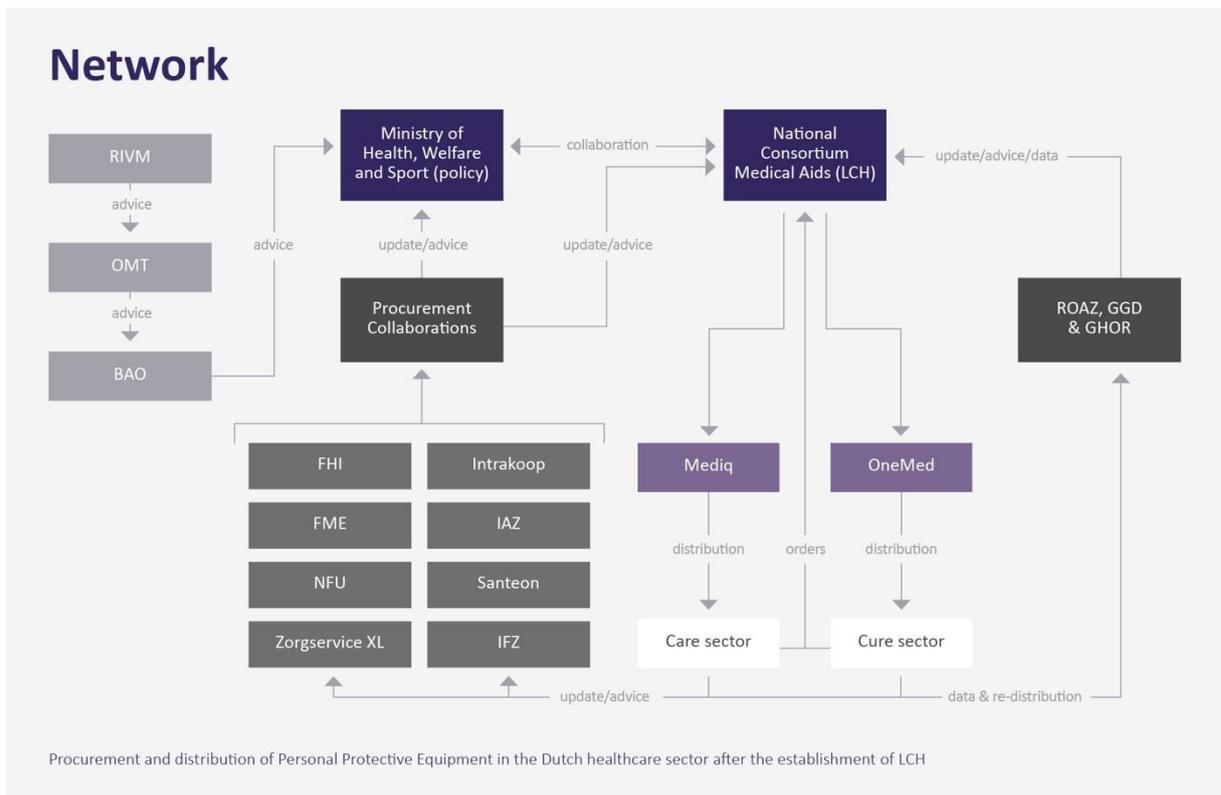


Figure 4: The procurement and distribution of PPE in the healthcare sector on a national level

### 3.3 Dutch challenges encountered during COVID-19

The government, care, and cure providers, and procurement collaborations encountered many new challenges during the COVID-19 pandemic due to a sudden increase in demand and disrupted supply chains (export bans and consequences of local lockdowns). The interrelatedness of these challenges resulted in new levels of complexity. Often, challenges encountered by one were a consequence of the actions of another. Similarly, actions to overcome a challenge had consequences that may have resulted in new challenges. To understand the challenges that arose during the pandemic, we must try to grasp the degree of interconnectedness between them. During the analysis of interview data, we kept track of all (major) encountered challenges concerning the availability of scarce medical materials, and we constructed a network of challenges, how they relate to other challenges or the responses of stakeholders to other challenges.

Challenges that arose during the pandemic regarding the supply of medical equipment had one common denominator: (the perception of) medical equipment shortages during the COVID-19 pandemic, and consequently the increased demand. The perception of shortages is in between brackets, as multiple respondents indicated that the Netherlands did have enough supply, but products were not in the right places, and hence it was a distribution problem. This does not mean that no shortages occurred at the institutional level. These shortages of medical equipment (especially PPE) during the COVID-19 pandemic have led to multiple (sub)challenges and unintended consequences. Figure 5 provides an overview of the connectivity of the main challenges mentioned in the interviews and other sources.

Within Figure 5, the challenges are hierarchically structured in five layers: challenges in layer four can be consequences of actions taken in layer three, which can be an action taken to

solve or decrease the challenge taken in layer two. For example: LCH was established (layer 4 action) due to a lack of national crisis structure in procurement (layer 2 challenge), which is necessary to solve the overarching issue: the (perception of) medical equipment shortages (layer 1). The unintended consequences of the establishment of LCH are layer 5 problems.

The colors of the rectangles represent the nature of the challenges:

- *Turquoise* includes all challenges that relate to governance (including structure, collaboration, and rivalry issues)
- *Yellow* represents regulatory challenges
- *Light blue* represents challenges regarding skills and competences
- *Orange* indicates challenges regarding information systems and technology
- *Purple* includes all challenges that relate to supply-based vulnerabilities.
- The *dark blue diamond shapes* represent actions taken by the government in response to challenges that arose

As shown in Figure 5, we argue that medical product shortages are a consequence of three main challenges:

1. *The lack of an adequate national crisis structure for procurement of medical products of this scale.*
2. *A regular procurement strategy that was, to a large extent, focused on price and efficiency.*
3. *The lack of an adequate EU-wide crisis structure for procurement of medical products on the required scale.*

Each of these three main overarching challenges is explained in more detail in the next sections. There are two important disclaimers: First, it is important to distinguish between challenges that arose purely in relation to the crisis—where things would have worked perfectly in stable times—and challenges rooted in underlying fragilities in the stable procurement system that were amplified by the pandemic. Put simply: not all challenges arising during the COVID-19 pandemic reflect the fragilities in the procurement system. Second, there is not one problem or challenge nor only one solution for the given challenges. This model merely illustrates the interconnectedness between the challenges that are most often brought to light in the interviews. This does not imply that other connections or challenges do not exist.

### 3.3.1 No adequate national crisis structure for large scale procurement of medical products

#### *Uncertainty about strategies to deal with increased demand*

In the Netherlands, there was a lack of a readily available and adequate crisis structure for the procurement of medical supplies at the beginning of the COVID-19 pandemic. The LCH was established only after the PPE crisis hit. At the same time, the healthcare sector is decentralized to a high degree in the Netherlands. Care and cure providers are responsible for their procurement, even though to a certain degree, providers procure through procurement collaborations. This led to many uncertainties about a possible centralized approach or strategy for dealing with the increased demand.

Within this context, the GMT directorate started to procure medical products on a national level to supply to individual providers in need. This task was later taken over by LCH. However, with no “off the shelf” available structures and protocols and, facing increased demand, the government had to improvise. In the early stages of the LCH, their supply was not sufficient to meet the excess demand of all Dutch care and cure providers. Therefore, the government established a priority scheme: a guide indicating which providers had priority for receiving products procured centrally. Over time, both supply and demand varied, and the priority scheme was adjusted multiple times. In the early stage, prioritization did not include the care sector, consequently increasing challenges for those providers. This was especially exacerbated since compared to cure providers such as hospitals, many care providers did not have a professional procurement department. Being excluded from the prioritization scheme in the early stage of the pandemic led to a degree of distrust in the care sector throughout the pandemic, which some interviewees expect would endure in the long term. Care providers felt unsupported and left to manage shortages on their own. A feeling of not being supported and consequent lack of trust influenced the willingness to share information about PPE stock levels and the actual medical products by those with higher inventory levels. The fact that most care providers often did not have a professional procurement department influenced the challenges related to procurement skills and competencies.

Shortly after GMT started buying on behalf of the Netherlands, the government appointed the GGD GHOR to be the national coordinators of PPE. This task is not within the duties of the GGD GHOR under normal circumstances. Hence, they did not have a structure or protocol for these activities, and they needed to improvise. Similarly, ROAZs were regionally structured and organized without a nationally standardized approach. This contributed to different experiences with ROAZs, as their capabilities and team compositions differed. Interviewees’ experiences with the ROAZ were divergent: while some argued “it is not an optimal structure, because they are amateurs, well-intended amateurs, but still amateurs,” others declared the ROAZ very professional, and they were able to help each other out.

#### *Challenges with the establishment of a national consortium for procurement of PPE*

Shortly after the policy department, GMT of the Ministry of Health (VWS) started procurement of PPE, the LCH was established in collaboration with academic hospitals, the Ministry of Health, PPE suppliers, and private organizations in the PPE supply chain. One of the reasons for the establishment of the LCH was the inexperience of VWS regarding procurement. The directorates are policy departments that normally do not procure medical products. Hence, procurement expertise and experience were limited.

During the establishment of the LCH, the strategy was threefold: to procure from regular suppliers, to set up national production, and to procure from new suppliers in East Asia. Therefore, the LCH was partly procuring in the same market as care and cure providers in the early stages of the pandemic. At that time, the LCH informed existing suppliers about possibly commandeering their products. However, this letter to suppliers was unclear. Rather than providing clarity, the letter resulted in uncertainty among suppliers on whether they were allowed to sell their products directly to care and cure providers. This, in turn, increased competition (or rather reduced available supply for care and cure providers) in the market. These challenges were resolved after a few weeks when the LCH stopped procurement in the regular market. This unclear letter related to the communication between VWS and the LCH, which was often criticized by interviewees. For some even, the role and strategy of the LCH were not understood. Some interviewees commented that they were uncertain if the LCH

functioned solely as a safety net, or whether the LCH was a new supplier for individual healthcare providers. Consequently, healthcare providers utilized the services of the LCH in different ways and to different extents. This inadequate communication also led to uncertainties in deliveries from the LCH. Many interviewees indicated that uncertainty arose in the quality, quantity, and timing of the delivery of medical equipment.

#### *No central information system*

There was no centralized information system that provided insights into stock and anticipated demand. The action to start central procurement on a national level also introduced the need for up-to-date information on demand and stock levels of care and cure providers, and a system to keep track of the same. This resulted in the development of multiple information systems during the COVID-19 crisis, including by the Ministry of Health, Welfare and Sport, GGD GHOR, ROAZ, and even by individual healthcare providers. However, a centralized system that captured stocks and anticipated demand across all care and cure providers in the Netherlands was lacking. Without up-to-date insights into actual stocks and demand levels, coordinating stocks and redistribution of products were very challenging. Difficulties increased due to the reluctance of healthcare organizations to share reliable inventory levels. Organizations were reluctant to share reliable inventory levels because of uncertainty (will my stocks be redistributed if other organizations have more urgent shortages?) and a lack of trust in the LCH, leading organizations to prioritize the protection of their interests. Of course, sharing stock levels of scarce medical materials with a national central organization was not a common practice for Dutch healthcare organizations, let alone in times of scarcity and uncertainty. The reluctance is possibly related to the lack of trust due to inexperience with data sharing. According to interviews, the lack of trust in the care sector was enhanced by the exclusion from the priority scheme at first.

Hence, one of the main challenges was the lack of insight into individual stock levels and anticipated demand during the pandemic, due to the lack of a centralized information system. This raises the question: if we look at the Netherlands as a whole, was there really a shortage of PPE in the Netherlands, or was it a matter of how products were distributed among healthcare organizations? Many interviewees suspected the latter. They indicated that there was enough PPE available in the Netherlands, but there was a perception of shortages because there was no central information system and no mandate to check all inventories of all care and cure providers.

#### 3.3.2 A procurement strategy focused on price and efficiency

Products such as PPE are often referred to as routine procurement items, with corresponding procurement strategies focusing on price and efficiency (see Section 3.1.2). As a result, standard medical products were often sourced from East Asia through wholesalers. At the same time, for some products, oligopolies existed. This was the case for medical gloves in Malaysia and Indonesia. This increased procurement difficulties.

Many interviewees indicated that, for medical products, their regular suppliers or wholesalers could not keep up with increased demand. Therefore, healthcare providers had to search for medical products elsewhere, often also ending up in East Asia, most often through (un)solicited proposals or network contacts. However, direct sourcing from East Asia was often unknown territory for healthcare providers and the LCH. Hence, buyers had limited knowledge and experience. This enhanced difficulties in the search for new (alternative) trustworthy suppliers, especially regarding the reliability of supply, including quality control

and distribution guarantees. Consequences of limited knowledge about testing and certification included fraud by suppliers, which became an increasingly important and new problem for the procurement function to deal with. At the same time, challenges with distribution were, at least, twofold: non-deliveries or delayed deliveries by unreliable or less reliable suppliers, and second, export regulations. These export regulations included restrictions for landing on certain airports, in certain countries, but also nationwide export bans and other disruptions in local supply chains due to lockdowns.

Based on interviews, as an alternative to sourcing from East Asia, three other main strategies could be applied: using alternative suppliers, usage of emergency stockpiles, or national production. The latter two did not exist before the COVID-19 pandemic on a national level. At the institutional level, healthcare providers had suppliers closer to home, but it turned out that most suppliers were wholesalers and consequently still sourced their products from Asia. This highlights the importance of supply chain knowledge beyond tier 1. Whereas most individual providers had a certain degree of stockpiles, in most cases, it was very limited. Some academic hospitals had established a stockpile because of Brexit, but these stockpiles differed per hospital. Another strategy is to find alternative suppliers. During the pandemic, new alternative suppliers were found in two ways: through networks of individual employees or unsolicited proposals. In both cases, supplier reliability in terms of quality and delivery guarantees was the main challenge. Concerning the challenges of quality and delivery guarantees of single suppliers, the new task of sorting through thousands of unsolicited proposals was an additional challenge for the procurement function.

### 3.3.3 No adequate EU procurement strategy and structure—for medical products—during a crisis

The two overarching challenges explained above relate to the national challenges that arose during the COVID-19 pandemic. However, internationally, opportunities were missed due to challenges that arose in international collaborations and coordination. At the European level, the main challenge lay in the absence of an adequate EU procurement strategy during a crisis. This led to challenges in exports. On March 15<sup>th</sup>, the export of medical products outside of Europe was prohibited.<sup>63</sup> However, simultaneously, countries in the EU also closed their borders for export within the EU; examples from the interviewees included those from France and Germany. Furthermore, the EU tried to establish a joint tender in the middle of a crisis<sup>64</sup> but this initiative failed. Hence, it was mostly a case of each country for themselves during the crisis. A consequence of buying individually in the same market was the increased competition between continents, countries, and individual providers, all jostling for supply on the same overcrowded international market.

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<sup>63</sup> <https://trade.ec.europa.eu/doclib/press/index.cfm?id=2123>

<sup>64</sup> [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_20\\_523](https://ec.europa.eu/commission/presscorner/detail/en/IP_20_523)



## 4. The impact of COVID-19 on the Care and Cure Sectors

To deepen our understanding of how healthcare providers in the Netherlands responded to the COVID-19 pandemic, Chapter 4 provides insight on both procurement responsibilities and adaptive strategies implemented during times of crisis, providing a comprehensive overview of both the accomplishments achieved and the unanticipated obstacles and mistakes. This chapter begins by laying the groundwork in terms of how procurement team configurations changed from a provider's perspective (4.1) and delves into how buying procedures shifted during COVID-19 (4.2). In doing so, we both highlight the care and the cure sectors. The distinctions seen in both sectors during times of crisis will reveal how COVID-19 response mechanisms instigated adaptive changes in provider operations (Section 4.3). This is done by explicating the thematic challenges and successes that arose for individual providers, calling attention to newly established networks, the flexibility of providers, and supply chain opacity and transparency. This answers the question of how the care and cure sectors in the Netherlands responded to the challenges because of the COVID-19 pandemic, particularly to imminent and experienced shortages in supplies.

### 4.1 Procurement structures and responsibilities in stable times

In normal times, various stakeholders are involved in the procurement of goods and services to ensure the efficient operation of healthcare providers. Not only the procurement function but also budget holders (such as (clinical) department managers), and end-users of supplies (such as clinicians, nurses, other staff, and top management) play a role in procurement. These stakeholders are involved to ensure that the most suitable materials are purchased within the provider's budget. Procurement must be aligned with the provider's mission and primary objectives and maintain successful relationships with supply chain partners. Procurement decisions are influenced by key performance criteria (price, quality, efficiency, delivery reliability), the structure of the supply base, and availability of supply (ranging from scarcity to abundant supply). Procurement departments, teams, or individuals occupy an integral role in an organization to ensure the proper functioning of the provider. Procurement is not necessarily the central point of decision-making, but buyers are involved in a variety of key activities, such as influencing and guiding the end user's decision-making process, managing orders, building relationships, and managing inventory. However, these activities were altered in response to the COVID-19 outbreak in the Netherlands.

In Section 3.1, healthcare- and crisis structures, along with procurement strategies established before the COVID-19 pandemic, are discussed in relation to the Dutch healthcare landscape. The Dutch healthcare landscape is fragmented and complex given the different types of providers within the country. Organizations in the care and the cure sectors differ in terms of size and function. Of all the healthcare providers in the Netherlands' care and cure sectors, only seven university hospitals must adhere to the EU public procurement directive. The care sector is composed of a few large nationwide care providers and many medium-sized or small regional providers of elderly and home care, mental healthcare, and care for people with disabilities. The cure sector is composed of a mix of large academic hospitals and medium-sized teaching and general hospitals. These differences were amplified during times of crisis. The biggest disparities in the Dutch healthcare sphere were seen between these two sectors, as they experienced the gravity of the pandemic to different degrees. The following

sections discuss how procurement structures impact how COVID-19 influences (the lack of) opportunities to deal with crises in generalized forms based on the interviews that were conducted during the crisis. The changes in procurement practices will be explained in this section in terms of team configurations, changing responsibilities, and the position of procurement in provider organizations. These elements suggest that, with COVID-19's presence in the Dutch healthcare realm, procurement departments sought out more autonomy and gained a more prominent role and position within each provider. First, we discuss the adaptations in the care sector, after which we examine the cure sector.

#### 4.1.1 Impact of COVID-19 on the procurement structures and responsibilities of care providers

The exploration of the care sector during times of crisis provided insight into how procurement roles, teams, and departments function, and how their positioning influences their authority. When COVID-19 affected healthcare providers in the Netherlands, these factors played a large role in managing outbreaks and procuring critical supplies. We should note that the most profound distinction was how procurement team roles were organized within care providers. Compared to cure organizations, care providers often had smaller departments, and fewer employees involved in procurement. Procurement was either decentralized and spread over a multitude of care provider locations, or centrally organized where one location bought supplies for multiple care facilities. These differences are significant when considering the structure of each procurement team within these organizations, and especially significant when looking at newly formed crisis teams.

Care organizations discovered that it was especially important to maintain clarity during a crisis. This was done by setting boundaries, and/or creating crisis teams. As all care providers predicted, this would become an issue, procurement heads were quick to assign roles and allocate tasks to maintain proper structure within an organization. This began at the start of the pandemic when crisis teams were formed within each care provider. These teams intended to contain and mitigate the impact felt of the crisis, and to structure and monitor a multidisciplinary plan of action. The crisis teams that were formed in the care sector varied according to the participants, their size, and their level of influence. These organized groups were named "corona working groups," or "corona crisis teams," and initially acted as a team that made authoritative decisions. When the need for this structure was reduced, they acted as an advisory board. Experts from procurement, doctors or caregivers, communication departments, human resources, policy advisors, and higher management were members of such teams.

A few large care providers used a "purchasing department with professional buyers," within each location, besides which they "had a national team" at their disposal to guide central decision-making. This was a luxury, as smaller care providers were not in the same position and did not have access to multiple levels of procurement expertise. Providers with a small-scale procurement department rarely had a professional buyer on location, nor did they have self-regulating procurement departments. Regular procurement processes in these smaller facilities were usually a shared effort or a small part of the interview respondent's position in the organization. Their function as a buyer was usually an additional task allocated to them during the crisis, giving them two agendas, or sometimes "two full-time jobs."

*“So, I turned into a little bit of an informal leader of the PPE team; [I] assessed the [regulations that were coming in] to then constantly translate that into practice. There is also the fact that I am a wound care nurse at night, which means I also understand what is going on, on the floor. If I had just been purchasing, I would have had it easier.” (Care)*

As stated, this “demanded a lot from the procurement officers” at smaller care providers that, for example, only had “one procurement officer with an ad interim procurement officer and five operational buyers,” or small care providers with four full-time employees that were composed of “ICT, real estate, facilities and personnel procurement.” At some care providers, there were more vacancies than operating employees. Employees involved in procurement often needed to assist with tasks outside of their expertise or comfort, but because of the heavy need for supplies and morality, this was done without hesitation.

*“I drove [supplies] myself when the need was very high. I also had a box here at home, and then twice in the evening I was called up by someone saying, ‘You have to do something’. What I would have found worse is if I would have declined and said no. You can't do that. People are already scared, and so you can't say no.” (Care)*

These newly formed teams had control over the buying process and the delivery process when times were dire, despite having only a minimal say in what and how supplies were purchased. All care providers with newly shaped teams or roles successfully maneuvered themselves in the market, even though this happened under different terms and involved different stakeholders. When allocating a buying role to, for example, a facility manager or human resource specialist, the organization around the procurement process was found to be less structured in the beginning, but not less effective. Because smaller care providers often utilized employees close to, but not necessarily in, the field of procurement to gain access to PPE in times of crisis, the COVID-19 pandemic had a profound impact on these internal team roles. This impact was seen regarding whom to report to and what roles to take on.

*“I once purchased 50,000 euros worth of materials. Normally, I am not authorized. But I just did [it]. Yes, just a call to the Chairman, like: ‘I spent 50,000’. And the Chairman said: ‘Yes, that's fine [...] you make sure it's there, you take care of the critical factors for the distribution, and for the application of everything that is presented’.” (Care)*

In smaller organizations, an informal leader took charge and guided decision-making instead of a formal procurement officer. When a clear structure was established, role allocation became a success factor.

#### 4.1.2 Impact of COVID-19 on the procurement structures and responsibilities of cure providers

For some cure providers, the reason for this was Brexit, because more products were purchased to avoid Brexit’s repercussions before the onset of COVID-19. Other cure providers were changing their procurement methods because of the news that COVID-19 was affecting multiple countries around the world. When the news hit that COVID-19 had made an appearance in the south of the Netherlands, cure providers had already positioned themselves at the forefront of purchasing channels. This was because they “clearly saw

COVID coming at [them],” giving them a reason to respond in January 2020 with a couple of buyers. This ensured that cure providers were actively prepared for the crisis to come. The quick response highlights the importance of demand forecasting and inventory management, both of which were emphasized and expanded upon during this time.

Cure providers were the first to be affected by the COVID-19 crisis. Because of the professionalism that was seen within each cure provider, the shift towards preparing for a crisis occurred quickly and provided a solid safety net. These solid safety nets were often pulled together by large procurement departments, sometimes composed of 15 buyers or more, centralized around one location. In each interview, operational as well as tactical procurement was discussed. Operational procurement focused on contract management, supplier databases, and sorting through new suppliers and deliveries, and tactical procurement regarding supplier selection, the efficiency of the procurement process, and preparing tenders. These teams were often seen as well structured. Providers stressed how important it was for all employees to find clarity within their own role allocation and that sticking to protocols was the right approach to a crisis. Having a solid plan on how to contain clear boundaries and withhold proper role divisions saved time in both procuring in crisis mode and delegating tasks.

*“You have to get good people, the right people, together to be able to make the decisions. However, this came about by itself. We saw very quickly who was good, or who was not good [within their role]. And if someone was not good enough [in doing their tasks], then they felt that.” (Cure)*

It was of interest here that employees’ roles were to be focused on, as decisions were finalized using their expertise surrounding that particular role. With a vast number of highly skilled buyers within many cure departments, buyers were well aware of what was going well and what was not, when it came to understanding the navigation of one’s “crisis mode.” Being a part of a large hospital meant steep increases were seen in procuring critical goods because buyers were kept in their “own lane” due to them adhering to structured buying schemes, which clarified role divisions. If a buyer did not seem fit for a particular position, it was clear that the position was not meant for them, and they would be rotated in the department. Profound differences were seen in terms of care and cure providers. The care providers’ procurement roles were often more fluid than cure providers’ role allocation.

Within cure departments, there were a variety of roles. Cure providers often had enough employees to create the “luxury of having many people who could do this together,” each allocated an individual role. For example, one cure provider stated they had “three teams” within procurement channels, “a facilities team, a medical team, and the lab team.” Cure interviewees noted that when employees were limited to specific divisions, the department as a whole was able to run smoothly. Final decisions were made within these procurement divisions using little department-wide help. This is where crisis teams often stepped in.

*“We had a materials team with people from procurement, logistics, care management, marketing communication, the pharmacy, and hygiene and infection prevention.” (Cure)*

Crisis teams within cure providers were formed at the beginning of the COVID-19 crisis to combat product shortages. These multidisciplinary crisis teams were molded after national crisis teams and functioned similarly. Instead of only focusing on current events and

navigating shortages and communication lines, crisis teams also took part in searching for new strategies to get a hold of supplies or how to best use people's strengths and weaknesses at each exact moment. Many cure providers had the space within their trajectories to incorporate feedback into the evaluation of their team by looking ahead at what was to come.

*“And there's a big role for the product coordinators, they're also there to look at what materials we can use [...] where do you need to do dual sourcing, and maybe even more. What can you get alternatives for how quickly can we scale up if things go wrong? We have those discussions.” (Cure)*

Procurement officers within cure providers often noted that they could not manage COVID-19 with a smaller team using “one and a half persons,” because “that [would] be a real disaster.” This was also partly because some cure providers found themselves to be in the luxurious position of “[getting] a lot of help from the big 4 consulting companies.” Cure providers had access to stable financial resources that enabled them to enlist consultants to lay out the framework of how this crisis would be dealt with. This was a luxury only granted to select hospitals.

During the COVID-19 crisis, as procurement played a more important role within a hospital than before COVID-19, the department began influencing more than just purchasing decisions. One observed consequence of the crisis was the desire of procurement departments within cure providers to be more “in control” than before. Buyers realized they desired levels of “autonomy within a framework,” meaning they desired more independence, though confound by the boundaries of procurement guidelines. During the pandemic, this became clear as cure providers made certain to adhere strictly to procurement protocols, more than care providers, while also maintaining levels of flexibility. This likely came to the foreground during the COVID-19 crisis because one can see how cure providers' procurement teams are a foundation for their provider, making all of their own decisions without director approval, or informal leader integration. The academic hospitals had this demeanor already, as large hospitals were the catalyst in giving rise to the LCH, which arose later in the COVID-19 crisis.

#### 4.2 Procuring supplies during COVID-19

The central actions taken and guidelines set out by the Dutch government are laid out in Chapter 3. They are used as stepping stones to dive deeper into what these turning points signify for both care and cure providers. Based on the Dutch government's actions and consequent steps, we discuss the reactions of care and cure providers in this section. Based on the interviews, shortages were experienced for facemasks, gloves, aprons, hand gel, oxygen masks, tests/testing capacity, but were not felt by all providers, and fluctuated over time. Even within regions, some providers experienced shortages, while others had a surplus.

##### 4.2.1 How the care sector responded to COVID-19

When the COVID-19 outbreak reached the Netherlands, care providers were made aware of a possible healthcare crisis. However, cure providers dominated the media and were in the spotlight during the month of February. This meant that care providers, relying on the media, did not instantaneously respond to growing concerns until March; instead, care providers acted upon the crisis once they were alarmed by internal procurement concerns. These

concerns often stemmed from suppliers signaling their inability to deliver, or their announcements that supplies would be delivered later than expected. Some care providers, primarily those with more proactive buyers or providers in the South, immediately prepared their procurement team to scale up procurement activities in February. Most care organizations began adapting their purchasing procedures around the end of March when neighboring providers worried about their PPE stock. These providers were purchasing supplies based on the information available among other providers in their networks and the media. Waves of shortages were already seen in the Netherlands and because care providers were predominant in the media, care providers felt care providers “were hijacking everything.” During this time, multi-disciplinary crisis response teams were formed within care providers to simplify procurement pathways by reducing bureaucratic barriers and administrative hindrances. This was necessary because the consequences of these shortages were causing disturbances in internal teams, and this impeded the clarity and stability that providers needed during this time.

First, there was a disinfectant shortage, such as hand alcohol and cleaning supplies. The scarcity of masks, aprons, and gloves rapidly followed this. Most of these supplies were thus first purchased without the knowledge of what materials would be critical in the crisis, and without sight of the magnitude of what was to come their way. Because of the urgent demand for PPE, supplies were more often claimed by care organizations who were taking on most COVID-19 cases. Thus, care organizations were thus left with limited options. For many care providers, this was because of the lack of in-house expertise in terms of crisis procurement, product knowledge, and shifting gears.

Care providers were waiting to hear from a government body about the various kinds of masks, in terms of which ones to use and when. As the regulations set out by the government kept changing, there was significant confusion regarding the proper use of PPE. Care organizations were thus in the dark for some time concerning what protocols to follow around COVID-19 infected clients. As a result, they sometimes used less or more PPE than needed. In March, the consensus was still that surgical masks should be worn, while in April, it quickly changed to FFP1, which soon after became FFP2. These regulation changes confused care organizations regarding their use of PPE.

*“It was clear that something was going to happen [to the market] and that there would be a shortage. There were all kinds of contradictions regarding what should and should not be used. So very quickly, we turned straight into the alternative circuit.” (Care)*

Care providers struggled with their procurement departments when trying to stockpile critical supplies. This was mainly because of the smaller sized teams that were seen at care providers. This resulted in some care providers having limited outreach and networking capabilities. Alternative suppliers were still found through personal networks of buyers, through networks of other employees at the care provider, and regional networks. As stated above, alternative suppliers were swiftly leveraged to increase supplies because it became increasingly difficult to get supplies through regular suppliers. Regular channels could often not follow through on previously set arrangements. It was thus difficult to keep regular suppliers in their supplier base rotation when PPE regulations experienced high-paced regulatory changes.

The alternative suppliers contacted by care providers were often smaller organizations, shops, or companies. Goods also came in through other public and private channels as gifts. These gifts came from either the government, as equipment, or private companies, such as for example beer brewing companies, who handed out protective gear or disinfectant material. The combination of these stakeholders provided them with sufficient supplies, thereby avoiding drastic shortages. This occurred both before, after, and while the LCH was being shaped behind the scenes, and while the ROAZ, the RONAZ, and the GHOR were configuring centralized procurement and the redistribution of supplies. These gifts were usually given to providers who needed it most, so they could “keep their head above water,” or look for further supply bases while mitigating the danger of running out of supplies at their locations.

The LCH helped care providers attain PPE in a centralized, regulated manner, but not without challenges and critique in the early stages. Care organizations began contacting and building relationships with the LCH in March and April for support. For some providers, this support was brief, since prices increased and the quality of supplies from the LCH was in some cases insufficient. This disappointment arose from the LCH’s communicative skills, especially in the early stages of the pandemic, and the lack of a professional well-developed ordering system.

*“We are now also in the process of returning FFP2 masks because according to us [those received from the LCH] are not satisfactory. So, a box was returned; and we’re talking about 1,000 euros [of masks here that] we’re not going to use. So that’s something [we are dealing with at the moment].” (Care)*

However, it was not just the form of communication, which was unstructured at the start because of the rapid set-up of the institution, but also the assigned allocation of goods that hindered the procurement of sufficient PPE supplies within care providers.

*“All the focus from the government was on the cure, and care was [truly] at the bottom of the list. We just didn’t get a chance at the LCH. [Even though they were set up early on], there was no stock behind them. So, I thought: [the LCH] is just a name, but there is nothing behind it, there’s nothing on the shelf there. Then we went [and just contacted] regular suppliers ourselves.” (Care)*

A multitude of care providers experienced issues with the coordinated allocation of supplies; the allocation of supplies elicited negative feedback from providers in the care sector as these providers were often forgotten. Their smaller networks and the lack of product expertise held them back. A significant amount of frustration was observed about why supplies were primarily going to the cure sector. Even when agendas were focused on finding new suppliers and doing their own procurement of PPE, because of this allocation, lobbying for the care sector continued.

Organizations that attempted to combat these supply coordination issues were the ROAZ and RONAZ. Organizations involved in coordinating regional non-acute care included those handling disabled care, elderly care, and care for vulnerable patients who could not receive care within hospitals. Contact with ROAZ, however, differed depending on the region in which a provider situated. ROAZ’s were set in place to redistribute goods in all regions across the Netherlands. The care sector was generally content with the work they were doing, as it was a well-known institution and focused on the fair distribution of supplies. This meant that when supplies were scarce, the ROAZ was more actively involved. The sector had a positive

relationship with the RONAZ and only used the organization to gain access to a network of other regional providers or to put in a request for the supply of PPE.

#### 4.2.2 How the cure sector responded to COVID-19

As soon as the COVID-19 outbreak spread to the south of the Netherlands in late February 2020, hospitals were alerted and consequently started preparing for the impact it would soon have on their own institution.

Some hospitals had already built some safety stocks in anticipation of Brexit, which helped them to absorb some shortfalls. Hospitals experienced shortages early on in the pandemic and responded promptly by immediately contacting their regular suppliers and contacts abroad. Given the confusion about what masks needed to be used, and in what circumstances they had to be worn, this was desirable, especially during March and April 2020. Because of these doubts, all masks were still available on the market. However, hospitals used and purchased different masks after each regulation change, creating more work for procurement departments. For example, at the start, surgical masks had to be worn strictly only in COVID-19 units, which were changed into FFP1 masks. During this time, many purchasing departments became more schooled in the masks available on the market. As soon as FFP1 and FFP2 masks were mandated to be used, a surplus of masks could not be used in the field, as other masks were said to be less effective. The unusable masks were still used at times in combination with other masks but were also left for employees for their off-duty time, as shortages were seen across the Netherlands at large. The high level of expertise and the size of procurement teams in the cure sector allowed these transitions to run relatively smoothly, and the confusion that was experienced in the care sector was largely avoided. During this time, in academic hospitals, providers built on their relations with existing suppliers, strengthening their trust in deliveries as their regular suppliers could withstand the constant order changes. Academic hospitals often mentioned that their relationships with regular suppliers were resilient because of the vast amount of business that academic hospitals brought in for big medical suppliers, meaning that their relationship was not severed in times of scarcity and large suppliers still made certain to pull through with supplies.

However, for many general hospitals, regular suppliers could not come through with their orders because of scarce supplies and a backlog of orders. In most cases, this was because the borders to surrounding countries were closed, and their stock was in a surrounding country, making it inaccessible. Interviewees felt that many countries were strictly thinking about themselves when it came to this hindrance, as there was no leeway or way of getting to their fresh supplies. Both academic hospitals and general hospitals used the LCH as a back-up option for procurement, and ROAZ conducted inter-organizational stock coordination. This required some patience, but as soon as the LCH was set up at the end of March, these relations developed. The hospitals that actively used the LCH often had positive connotations surrounding the LCH, but only after the start-up problems of March and April were solved.

*“So, the LCH, that actually took a very long time [...] in March and April, that channel just wasn't working yet. And I have to say that a little later, at the end of April and May, we involved the LCH. And that eventually led to good things. So, I have to be honest about that now, because, in the end, it did work.” (Cure)*

Hospitals placed a lot of focus on sourcing from well-established suppliers, and thus preferred their regular suppliers. While the LCH was also an approved supplier, as it was set up as a governmental institution, their interactions with the LCH were not always positive.

*“The LCH could buy gloves, and then we asked for gloves, for example, and [we] got gloves that were very thin. And there is a certain logic behind that, but it doesn't always make the work safe for the employees.” (Cure)*

Although communication with the LCH might have run more smoothly, the LCH was also confronted with product quality issues. This led to either the switch from regular suppliers to alternative suppliers besides the LCH and ROAZ, the switch from regular suppliers to the LCH and ROAZ, or the switch from regular suppliers to the combination of both the LCH and ROAZ, alongside alternative suppliers. These alternative suppliers did not play a big role in a hospital's procurement processes, as the cure providers did not have any room for mistrust and “cowboys.” Providers often contacted suppliers on their own, through more reliable networks. Alternative suppliers, to cure providers, were large well-known suppliers that were temporarily manufacturing PPE, or well-known medical suppliers they had previously not done any business with.

#### 4.3 Thematic multi-level challenges experienced by Care and Cure providers

Provider procurement configurations resulted in various setbacks and consequences because of the COVID-19 pandemic. The consequences differed in terms of actions taken, and the sector a provider pertained to. In this section, these differences are distinguished within thematic response mechanisms that outline significant events. Three overarching thematic response mechanisms are identified: (1) newly established networks, (2) the flexibility of providers, and (3) supply chain opacity and transparency. These overarching themes cover a multitude of challenges that the care and cure sector addressed during this time. This section combines the findings of all interviews and addresses the themes one by one.

##### 4.3.1 Theme 1: Newly established networks

New network structures were created at different levels in order to cope with crises. Within provider organizations, new communication channels and new team structures emerged. Between provider organizations, existing networks were used for mutual support, and new relationships were forged. Both existing regional and national organizations (such as ROAZ/RONAZ, GHOR, GGD) stepped in, and a new national organization emerged to fulfill coordinating roles (LCH). Finally, the existing supplier base was complemented by new suppliers.

##### *Varying axes of network communication*

New communication and collaboration channels emerged during the COVID-19 pandemic. These new channels and restructuring techniques arose out of the need to communicate quickly and efficiently and ensure sufficient supply. This manifested between differing stakeholders, and is explored at an intra-organizational level, from a buyer to buyer standpoint, and within buyer to supplier relations. The first team structure is explained in terms of a department's internal communication, after which buyer-to-buyer mutual support is explored, ending with a buyer's communication with suppliers.

One of the most notable internal changes that occurred during this period was the internal restructuring that led to the inception of crisis response teams, often referred to as corona working groups, corona crisis teams, or corona directing teams. These multi-disciplinary teams navigated crisis responses, facilitated decision-making, and acted as an advisory board for their respective organizations. This meant distributing responsibilities in a new way to ensure all stakeholders were on the same page in times of chaos. Crisis teams also procured medical supplies and coordinated courses of action; new dynamics were established when a director's role became more directly connected with suppliers, as seen within care providers.

*"In the beginning we had a corona work group, that's what we called it, anyway. We deliberately didn't call it a crisis team. So, we created a corona working group, and that comprised key officials, so some managers of care, a director, but also a behavioral expert, and someone who took care of the coordination of a corona hotline. They still meet to this day, three times a week, and back then they also met to evaluate measures, the impact of restrictions, to follow up, and monitor if they could lift some restrictions, or if adjustments could be made to regulations."*

*(Care)*

The internal changes that were made to procurement during this time required strategic planning to anticipate demand and ensure that a provider's needs were being met. To do so, it quickly became clear that another form of communication, as opposed to the regular form of emailing, would help speed up supplies. This was because of a significant volume of emails that were received from alternative suppliers; these included unknown suppliers who were difficult to trust, who overloaded inboxes to gain visibility. As a result, regarding internal communication, both care and cure organizations relied on mobile applications, phone communication, and inter-organizational support to secure these supplies promptly. These alternative forms of communication quickly became internal WhatsApp groups or internal intranet data platforms. This informal communicative practice ensured that providers could easily contact their colleagues.

*"In the beginning, there were a lot of app-groups. Because often people who just worked together a bit more often said, hey, let's create an app-group. So, after a while, you just had a lot of different app groups, with which you communicated [...] Normal communication was, of course, always just via email. But over time, if you needed someone quickly, it just went into the app. For example, we had an order for test materials that had to be decided within 5 minutes [...] And that was then about a few tons, and you have to reply yes or no. Well then, I sent an app to the board of directors, can we order it like that? And then it was, 'Yes, go ahead.'"*

*(Cure)*

Multiple stakeholders and varying skill sets were involved in informally taking charge of procurement at the provider level, which informal communication often secured. Core processes and ways of working were reinvented, and speed became a vital factor in terms of communication. Internally, providers had to adapt to volatile demands by organizing and coordinating new roles and configurations and using new information-sharing channels, such as WhatsApp groups. This helped departments stay in close contact with colleagues and create better work relations. These mobile groups quickly branched out from including colleagues from the same provider, to adding new channels to stay in contact with other providers.

Buyer-to-buyer procurement support started up after the initial shock of the crisis because providers primarily focused on their own facilities first. The mutual support that came after was facilitated through WhatsApp groups to both ensure streamlined operations and to reduce administrative barriers. Whether it was a WhatsApp group with buyers or a WhatsApp group that included directors, the groups aided quick informal communication to internally inform one another of activities or receive updates about other providers. This was an efficient way to communicate with other providers to ensure mutual support with haste and urgency, overcoming the hindrances of unnecessary bureaucracy and administrative barriers. With great openness, weekly calls and messages were facilitated to share information about the reliability of products and suppliers.

*“And we as procurement managers of the [name region] also very quickly had ourselves actually just sort of conference call with each other by phone. I had arranged a KPN number at the very beginning so that you could make a conference call. At a certain point, those numbers ran out. And then we agreed that we would just call each other every week on Thursday at three o'clock.”*

*(Cure)*

Mutual support existed both within and across the care and cure sectors. However, should be noted that multiple care providers stated there was more mutual support between care providers than across the care and cure sectors. The same applied to the cure sector; across the sectors there was little contact and information being shared about supply channels and contracting PPE. These cooperative channels were used to share supplies when providers were in dire need. For example, an organization that ran out of a particular apron size contacted one care provider. As this informal quick medium was set in place, the provider in need received a load of the aprons hand-delivered by the organization. Procurement managers within various individual providers thus relied on this informal, supportive cooperation between providers. Besides gaining access to physical supplies, these cooperative channels were especially prominent among care providers who used them as informal informative media to gain access to information about supply channels. In both cases, relations were strengthened because of the support that was given to providers within each sector. Regional providers felt they could count on each other if something were to impede their journey to supplies.

#### *Existing centralized organizations active in the crisis*

New inter-organizational communication structures emerged and gained prominence in early April 2020. Informal networks and adaptive communication channels kept these existing coordinated communication channels afloat. Long-term care organizations also used Actiz (an existing branch-organization for long-term care), which distributed information to the whole of the Netherlands, including the LCH. Given the external demands created by COVID-19, it quickly became known that new production lines were required. Since there was limited progress in supply production, by the end of February, it became clear that suppliers were running out of capacity, and that the cure sector community relied on their long-term relations with big suppliers, such as Mediq, and Medeco, a Mediq competitor in the south of the Netherlands. During this time, mutual support became pervasive, connecting various organizations within group purchasing organizations, such as for example the Procurement Alliance of Hospitals (InkoopAlliantie Ziekenhuizen, IAZ) or the Santeon collaboration of hospitals.

Through these channels, informal networks pervaded. Special teams were formed, and new relationships between various actors supported status monitoring and resource allocation, individually or through third parties. Other group purchasing organizations, such as the NFU Procurement Board of the Dutch university hospitals, were also essential to share information and resources. These networks were essential in monitoring the flow of supplies, and understanding how COVID-19 affected each cure provider uniquely. Their usual role comprised promoting interests inside and outside of the provider, connecting hospitals with one another, and striving for common goals. During the pandemic, this intermediary role provided the opportunity to exchange information, such as which supplier had a surplus stock of critical material available and ready for distribution, which supplier delivered goods on time, or what masks were preferred by healthcare workers and thus outmatched the rest. They went the extra mile in providing this form of support to cure providers who required this help. However, these networks were not used by all cure providers. When providers did not have any supply issues, as their supplier was persistently delivering goods or because they were less affected by the pandemic, these networks were used purely as a back-up and for awareness of the situation instead of active deployment of their services.

*“In no time at all we had set up an informal network in which we had agreed: we need to help each other. So, if one of us is short of one thing or another, he can call the other. We soon had a network. And exchanging information was extremely important; where do you buy the jackets, where do you buy the gloves, is there anything else that I need to know about?” (Cure)*

Alternatively, the RONA and ROAZ were other existing regionally centralized groups responsible for medical product distribution to care and cure organizations. The RO(N)AZ facilitated the coordination of procurement in each region, acting mostly as a re-distributor, and played a large role during this time. During the crisis, the RO(N)AZ required providers to share their stock statistics and COVID-19 cases to receive supplies, but this created barriers and hindrances because some organizations were uncertain if they were qualified with their current statistics to be supplied with extra PPE. Sometimes facilities received nothing from the RO(N)AZ even though they needed material. Whenever a facility had a surplus of PPE, it had to be sent into the RO(N)AZ to be redistributed. These terms and conditions differed per RO(N)AZ region, which called for additional confusion to be felt amongst providers. The unclarity outed itself in providers relying on themselves and not trusting other parties.

*“We were in contact with the suppliers all the time. There were also agreements that it would be distributed regionally through the RONA, so there would be a central delivery. But our supplies could also be claimed from that central distribution.” (Care)*

As a result, some care and cure organizations were insecure about their product supply and were reportedly hesitant about this arrangement with RO(N)AZ. They submitted no or adjusted numbers to receive supplies from RO(N)AZ. Organizations with members of their team on the ROAZ Board reported pleasant experiences. In addition, the ROAZ also prioritized support for the cure sector, leaving care organizations with fewer options.

*New centralized organizations active in the crisis*

During this time, the LCH gained momentum and settled into its role as an advocate for providers, with a focus on delivering supplies. The LCH became the most notable backup

group that provided procurement assistance. This new national structure was set in place to ease a provider's difficulties by getting a hold of supplies and is why organizations relied on centralized organizations to secure personal protective equipment. Before the inception of the LCH and other formal procurement networks, informal informative collaborations and other alternative product distribution pathways were generally unstructured. Because of this, the LCH was set up only after the PPE crisis hit to assist organizations who could not lean solely on their own channels, giving the LCH the authority to give a new point of reference in terms of purchasing.

During the first wave (March- June 2020), providers used some support from the LCH after its inception in late March; however, because of the inconsistent outcomes in terms of both communication and quality of supplies, providers prepared and stockpiled supplies from a variety of channels in a "corona warehouse" in anticipation of a second wave. By doing this, providers strengthened their response capacity and reduced the need for further help from the LCH. During this time many providers outsourced their logistics functions to an external warehousing partner.

Both care and cure providers had mixed experiences with LCH supplies. LCH was recognized for its active role in testing products before delivering them to providers, its role in regulating the market prices for products, countering price gouging facilitated by informal suppliers, and for being a reliable product procurement source.

*"What the LCH has helped [greatly] is to normalize prices again. Because at a certain point it really [wasn't funny anymore]. And then the first stocks came in from the LCH, and you just knew: hey, I can buy a face mask from the LCH for 1 euro. This led to all the cowboys, asking for 3 euros for an FFP2 mask, on the market to go immediately out of business. That was very nice, as that, fortunately, put an end to the ridiculous market forces that existed at that time. And [thanks to the LCH] you knew you always had a backup." (Cure)*

Even though the LCH was recognized as having more "reasonable prices" than the "cowboy" market, supplies from the LCH were sometimes unreliable and of poor quality. This was recognized in the quality of their "paper-thin aprons," "extremely thin gloves," and their masks, which would snap because of the poor quality of the band that needed to hug the face tightly to prevent leakage. It was, however, a party you trust based on how it was set up and who the LCH was affiliated with. However, this did not affect their performance. Care providers were especially taken aback by the LCH, who sometimes even left a temporary mark on the provider. Various care institutions were thus critical about LCH's outcomes and pricing, and they chose to source supplies (e.g., gloves, masks, insulation aprons) through their own channels in parallel to the LCH route.

*"Surgical face masks are more than sufficient, but the consumption is explosive. The costs are skyrocketing, but here too we are constantly looking for an advantageous price. The LCH is simply too expensive. We monitor prices tightly, whether scarcity is emerging. We actually only pulled centrally when there was scarcity. When there was scarcity in terms of gloves, for example, when scarcity was high, after which we decentralized it again. But pretty soon, that turned out not to be feasible. Then it was pulled centrally again. And every time an item comes up that we think 'we can't get that anymore' I go to central purchasing." (Care)*

LCH also helped providers. Even though providers felt limited in their choices of support organizations, the LCH managed to alleviate many providers that were burdened during the crisis. This was seen after their initial rocky start-up, when the LCH had figured out how to process orders successfully and deliver quality goods that would pass quality tests. Thus, it was later claimed that the LCH provided fast delivery.

*“Well, I must say when I look at the LCH, the delivery time was actually always quite fast. Look, if we had placed a delivery in the system, then it was maybe three or four days after that it would be in the planning. But often after two days it was already there, so that was actually pretty good. Later on, during that time, you did notice that it sometimes took a little longer, that if you had four days, then delivery would also take place on the fourth day. Sometimes we really had to hold our breath to find out whether we would get it in time. But actually, it was always like that, and if we didn't get it one way, we tried another.” (Care)*

Among the providers who used the LCH as a means to steadily acquire PPE after the organization had settled into the market, most providers perceived the communication and delivery to be satisfactory. Because hospitals preeminently stood high on LCH's priority list of providers to supply, it was often cure providers who frequently made use of centralized purchasing network when communication ran smoothly. However, care organizations reported similar experiences with the LCH even though they did not feel that they were on LCH's priority list.

*“In the beginning, when you ordered from the LCH, you just didn't know how it would arrive, or if it would arrive, and if so, how much? That was difficult in terms of planning and your time. Because yes, it's just very difficult. Because you never do it right, you either do too much, or too little.” (Care)*

Despite LCH centralizing the procurement of personal protective equipment in both care and cure sectors, organizations often combined the use of LCH resources, the regular market, interpersonal relationships, and informal production lines to ensure regional supply continuity since the LCH was sometimes incapable of supporting every region and sometimes provided inconsistent quality of service and supplies.

*“We placed our orders to the LCH and you could do that once a week. Then in the week that followed, you saw what you actually got. So, if I needed 1000 gloves, I didn't know if I would get 1000 gloves. So, it could have been 500.” (Cure)*

#### *New and existing suppliers in the market*

The relationship between both care and cure providers and their normal suppliers was also heavily affected by COVID-19. Normal suppliers became less reliable with their deliveries given the rapid increase in demand and limited supplies, and cure organizations sought extra supplies and required further third-party quality control. A large reason for this was also because of the lack of support that providers felt from the LCH, ROAZ, and RONAZ. Because of these barriers, cure institutions began relying on local innovations, repurposed from other sectors, to meet demands. For instance, one organization got washable surgical gowns made in the Netherlands to avoid a dependency on other countries or regular suppliers, and instead keep production local and dependable.

*“We had surgical gowns designed and made together with the [provider’s laundry service], so now we only use washable surgical gowns for the corona department. We only buy a few more for [the] department that also needs a coat once in a while. I think that’s a really positive thing because we also had it made in the Netherlands, just by a Dutch [laundry service]. That circle simply remained in the Netherlands, so we were not so dependent on China or other countries for that.”*

*(Cure)*

Cure organizations, however, seldom needed to use these sustainable innovations, as supplies were never short enough to have the necessity for sourcing with these alternative suppliers. Amid the shortage in late March, procurement of protective equipment and health supplies was also frequently achieved through irregular channels and new suppliers to meet the high demand. Informal communication was thus extended to include suppliers new to the medical market. Providers started communicating with alternative suppliers to keep stockpiles saturated. This meant reaching out in unseen ways, through Whatsapp or by phone. While this contact was more executed more by email and through professional, formal channels, plans of action were discussed over the phone. The benefits of this outweighed the possible adverse consequences. In particular, the care sector focused on informal communication with these new suppliers, as they aimed to find enough suppliers and ensure competitive bargaining power.

*“We were offered a lot, but there were so many cowboys in the country that we had to screen them all. But the most we tried to do was with those suppliers that we already knew, that we knew were reliable suppliers.” (Cure)*

Organizations were forced to perform extensive due diligence before selecting unknown suppliers because the quality of supplies was often compromised. This led to many providers choosing to work with familiar suppliers where possible. However, given the shortage of supplies and stagnant state of manufacturers who were overcome with orders, unconventional routes were essential during the COVID-19 crisis. Formal channels were less reliable in terms of whether they could deliver products, while unknown suppliers (sometimes referred to as “cowboys” by interviewees) found unconventional ways of obtaining products. These alternative routes made certain that unknown suppliers could enter the market, supply providers with PPE, and ease any immediate scarcity. They did this while influencing prices because of disproportionate demand. The price of PPE exponentially increased because manipulation was possible until the LCH stepped in to lower prices and took control.

#### 4.3.2 Theme 2: Flexibility of providers

##### *Responding to fluctuating degrees of shortages*

During the COVID-19 outbreak in the Netherlands at the start of February the healthcare realm started shifting because of changes in the medical market. Providers attempted to keep up and understand where and who to turn to. The pandemic emerged as an unpredictable force that no provider was able to successfully prepare for. Even though the impact was not immediately felt within the walls of most providers, it cascaded down to an immediate reaction depending on the provider’s location in the Netherlands and type of care being. As the outbreak’s epicenter was located in the south of the Netherlands, some providers immediately dealt with its consequences.

However, for all locations, as a result of the news of the incoming virus the influx of PPE distribution and material utilization regulations needed immediate examination to prevent a shortage of goods. Those that were fortunate, however, had previously stockpiled protective equipment and medical supplies in response to Brexit, which ensured sufficient stock at the start of COVID-19's presence in the Netherlands. The stockpile that was created in response to Brexit lowered immediate stress levels and allowed for a buffer to understand and plan for new procurement needs. Respondents never declared "that the Brexit helped [them], but the Brexit [helped] a little bit." Because the larger academic hospitals knew Brexit's impact was on the way, they had increased their stocks significantly and "reaped the benefits of that during the first wave." It should be noted that this was not "a solution to all the woes," but that it provided a slightly better buffer than what would normally have been there. Others needed to dip heavily into their inventories while working on a steady surplus of supplies.

The shift to crisis-mode procurement was often successful, even though the success that was seen was not communicated within the health sector. One care sector respondent stated it was to be made clear within the organization that they had no shortage of resources and that employees would not have to worry about diminishing supplies. This needed to be made clear as there "were many articles and nurses at the time who said that nursing homes had nothing at the time the crisis was already happening." It is to be noted here that the employees of many provider locations believed that "because the media says there's a problem, [they] all have a problem," which procurement departments in many organizations did not experience. Although the scarcity of PPE was an issue for all providers, it was not a dire situation for all affected parties like the media made it seem. This meant that the idea of a unified consensus on the alarming lack of critical material did not reflect reality. Chaos was seen in the field to prevent shortages from occurring, and because of the hustle to PPE that was seen early on, there were almost no providers who were sending their employees into the field without PPE. This made room for flexibility, as without dire shortages there was space to tactically organize ways to keep the provider afloat. Most providers made certain their employees always had PPE, and whilst the bringing in of the PPE was done with a lot of effort, providers were never stuck without a plan or without gear. While some care providers only had "goods left for 2 days," others "ordered very little during the big peak in March and April." The same held for the care sector, where there were "periods in which there was simply no soap or alcohol" and thus "panic football was played" within an organization, while others clearly stated that they struggled to procure materials but did not experience immense shortages. Instructing employees on PPE usage was especially difficult in smaller care organizations because employees were not familiar with drastic protocol changes. After all, some care organizations did not provide clients with the intense physical caregiving that is seen in hospitals, and thus did not have a background in adhering to these rules and regulations. These differences had one thing in common, that providers did anything they could to supply to their locations and their employees, and that they made sure their employees never needed to go into the field without protective equipment. Understanding how to properly use PPE, or how to communicate with new suppliers, became a priority during this time. Within this journey providers were confronted with the fact products beyond regular brands, or specific colors that medical professionals often preferred were sufficient and adequate enough for medical professionals. This was a positive outcome that made it known that procurement departments are able to make sound decisions on their own and have full control of buying medical goods without dire consequences from medical professionals.

### *Circumventing regulations*

To ease the scarcity that was present, sufficient stock needed to be fashioned through all channels. This tested providers during the crisis as many support structures during the months of February and March were still configuring their own pathways and were unable to successfully assist providers until the following months. This highlighted the need for teamwork and collaboration, and placed a provider's buying procedures and communication channels at the forefront of both providers and hospitals. Procurement departments thus held an important role within providers as time progressed. This was because of the backlog of healthcare procedures because of capacity issues on the supplier side, making way for procedural changes. This backlog pertained to the outstanding tasks that were left incomplete as the focus of providers shifted to the COVID-19 pandemic. Elective healthcare and normal procurement procedures thus came to a standstill. Their regular, set in stone ways of working were now shifting away from routines. With a new authoritative role granted by informal leaders in the workplace and the need for speed, buyers were given greater control over purchasing decisions. Where some care providers routinely set barriers in place to regulate purchases, these were now broken down, and control was handed over to the informal leaders in charge. This meant that several regulations were bypassed in buying procedures, and that "a lot of freedom of action was given" to those in charge of procurement, particularly within care providers. Often, directors gave way to this, and stated, "you make sure it's there, you take care of the critical factors," and higher-level management shifted to focus on surrounding matters. This outed itself in "trial and error" within both care and cure providers.

*"I went off all routes, and I didn't follow a procedure, I found a supplier, and I thought yes [...] Completely against the rules, right? Normally we have a very orderly process, but I paid in advance, and I hoped it would be delivered [...] And that worked [...]." (Care)*

Within care providers, these flexible roles helped circumvent regulations. The freedom they were given as informal leaders, within some care providers, or as the new head of procurement in other provider's, allowed them to be more lenient than usual. This leniency was sometimes imbedded in risk factors, as providers were exposed to falsified records and certificates. For example, some buyers had never been in that position before the COVID-19 crisis, and now approved purchases, either alone or in groups. Because purchases were made with speed, and using informal networks, concerns arose. This also made room for creativity within procurement.

This was less commonly seen within cure providers, where roles held more structure and only loosened slightly regarding PPE shortages. This was also because the buyer approving purchases held the same position. The leaps some providers made were also due to "personal attitude" and motivation. Buyers within care providers were determined to keep supplies high and avoid all shortages. Some care providers exhausted all channels of action to ensure that no shortages would be seen. The outcome of this determination was sometimes questioned by other care providers in the region. The providers who were actively easing scarcity issues "received a lot of questions from other providers asking how [they] went about it," as buyers who were less active in the field found it to be "unimaginable" that other providers could get large amounts of products. These more active buyers stated they were "there for patient safety, and it [didn't] matter how, but you have to make sure you arrange [your supplies]." Understanding priorities and the consequences of approach played a big

part in how motivation gave a provider more control over building stockpiles. Many care providers preferred to arrange these supplies themselves, as they then had control over what came in and what actions were taken.

*“I did get the question from the ROAZ as to why they are having trouble and not getting any stuff. They were asking why [our] depots were overflowing. But then I say, you have to do business how I do business. And they said, ‘yes, but you can’t be seizing everything that we need.’ Then I would say, no, I understand that and we also support you when we have to, but still, if you let go of the regular route and start doing business via WhatsApp and are prepared to pay for orders late at night, so that people will start running for you.” (Care)*

Hierarchies were slow-moving to accommodate the influx of informal leaders and the changing of procurement roles within a department. This broke down silos and made certain that unnecessary bureaucratic participation was suspended for providers. This was done so that those at the forefront of buying schemes could assess and use all supply channels. The elimination of bureaucratic hindrances aided this. This included payment arrangements that were disregarded because of the vast amount of money spent on PPE. When providers were informed that the government would partially compensate their spending, they were given leeway to purchase a higher quantity of supplies without dire consequences.

This flexibility changed processes in various ways within the care and cure sectors. The care sector benefited from this freedom, as they had space to take full advantage of their informal routes. These informal routes included paying for orders in advance, signing onto deals through WhatsApp, approving alternative suppliers that were gathered through personal networks, and physically going to pick up supplies from a location. For cure organizations, this looked slightly different. Cure organizations were more willing to interact tactically with suppliers and other buyers and manage their relations with other institutions. Their way of using this control was to resist the mandate of oxygen masks, and not disclose to the ROAZ the right amount of stock they had, despite that being the provider’s duty.

#### *Consequences of flexibility*

Calling off existing regulatory frameworks and rigid hierarchies gave way to the flexibility of both appointed and non-appointed leaders. Their flexibility was seen in how buyers circumvented regulations and disregarded guidelines to supply their organization or hospital with quality material, with haste. This highlighted the need for clear communication and a provider’s priority system in terms of the importance of their agenda points. Whether it was following the law, focusing on internal processes, or communicating with suppliers, all interviewees shared how their flexibility benefitted them when they were in crisis mode. While utilizing informal leaders meant flexibility was emphasized, this did not mean that the structure was forgotten or overlooked. The structure was important and remained in place to keep procedures running and keep buyers operating as close to their tasks as possible. Managing in times of crisis requires a very different skill set than managing in a normal situation, which is why this resulted in better forms of support and structure. Within a multitude of interviews, both in the care and cure sectors, finding the balance between flexibility and structure was the answer to maintaining order within any department. Using of strong regulatory communication channels and crisis teams were scaled up while maintaining flexibility. However, how these guidelines were introduced to a provider, and within a department mattered. This also included how it was tweaked and customized for

the individual team. This brought out the importance of not steering away from the structure, and that guidelines could help maintain stability in times of chaos.

*“We still meet every week, three times a week actually, on Monday, Wednesday and Friday about the measures, about the impact of restrictions, about those infections, the consequences, and the impact of that, that has just become a part of our business. That's not going to stop either, that's going to continue.” (Care)*

This was the start of the formation of flatter structures within the procurement department. Procurement rules could not hinder the reimagining of hierarchies and procurement structures. The clear allocation of roles and multidisciplinary teams played a large role in steering away from hierarchical interactions. When all employees within a procurement department understood their position, and task communication became faster. Flatter structures meant that the system could respond quickly to emerging challenges and opportunities, with fewer middle managers. Making space for autonomy while still holding onto binding regulations can have successful consequences. The bypassing of regulations and protocols should not break laws or circumvent guidelines. Autonomous decision-making manifested itself in overspending, and not closely adhering to instructions, but also in buyers successfully contracting new suppliers on their terms, understanding new quality regulations, and making informed decisions based on them. Buyers could use their judgements, and demonstrate great success. Although role divisions may have resulted in some confusion during the start of the crisis, understanding the role division scheme meant employees knew who to turn to for particular issues or prospects, which allowed buyers to get to know their work environment better, aiding in better relationships and decision-making.

*“The communication in some areas has gotten better when you talk about logistics and purchasing and say infection prevention. I used to know that there had to be an infection prevention department at [name university medical center], but I didn't know about them. And now you know them by name.” (Cure)*

Buyers seek out new experiences, contacts, and control, and thus what is commonly regarded as a traditional hierarchical structure, is a flexible, dynamic network of teams. With high amounts of internal involvement within procurement departments, providers themselves also became acclimatized to the acceleration of communication. This because of ample supply and market capacity, which, by inflicting stress, highlighted the need for strong communication and flexibility. This was necessary as fewer people adhered to bureaucratic regulations, which needed to be monitored. Although a positive light was shone on flexible working environments within procurement, this also opened providers, institutions, and independent suppliers to procurement with a lack of transparency.

#### 4.3.3 Theme 3: Supply chain opacity and transparency

*Low provider visibility and the allocation of goods to the care and cure sector*

The scarcity of resources and the effects of COVID-19 on the public catalyzed a nationwide response to make crucial resources accessible. While strict rationing was the only viable response at the start of the pandemic, the issue of the shortage of critical materials in the supply chain remained a pressing issue, even after the LCH, ROAZ, and RONAZ started playing a role in procurement. The goal of these establishments was to manage the crisis, handle resource allocation, and ensure that no provider was left without PPE. Thus, the intention was to prioritize the providers that were worse off; here, this was the cure provider. Cure

providers were broadcast in the media to have been badly affected by COVID-19 cases, to the point that PPE and space in the hospital were running out. However, this priority scheme was not attuned to all the healthcare establishments involved. All care and cure establishments recognized the importance of catering to the care sector as “supplies were going more towards the hospitals, where it was needed according to the [distributors].” Thus, the care sector thus felt as if they were overlooked by both national structures and large suppliers. Providers were not advocating for these stronger national structures to influence the market, as their priorities differed from those of healthcare providers in the field. Providers did not agree with the authoritative role of national structures. This was a prominent feeling in the care sector.

*“Yes, we were definitely at the bottom of the list. I immediately thought, yes, we're not eligible for anything. And we're just often forgotten, also because everyone thinks that mental healthcare is not very vulnerable. But we do have vulnerable people.... Far too little attention is paid to them and they are precisely the people who cannot take care of themselves and who are just very susceptible to all sorts of things [...] you have to draw attention to yourself every time so that you can be on the list after all. We have to lobby very hard to show that we are a prominent discipline in the health sector, not like the hospitals of course.” (Care)*

It was because of this skewed allocation that the mental healthcare sector needed to start “lobbying again, including through the branch organization, to ensure that several target groups are put in the front row.” The mental healthcare sector was not the only sector that felt this way.

*“But the allocation formula was that approximately 90% went to the hospitals, and only about 10% to the VVT (Verpleeg- en Verzorgingshuizen en Thuiszorg; Nursing Care Homes and Home Care) institutions. And that had everything to do with a conviction, particularly at the Ministry of Health, Welfare, and Sport, but also at the ROAZs, that they needed it and we did not.” (Care)*

If buyers were a part of a “large professional organization,” with a large “purchasing department with professional buyers” that had a national team at their disposal,” more could be achieved in terms of attaining products from existing or parallel suppliers. This is because buyers had higher levels of authoritative control in those situations; which was not the case for many care providers. However, this skewed allocation fortunately did not seem to interfere with a care provider’s procuring skills; however, the skewed allocation did affect their confidence in the stability of their supplies, and created haste to procure the right products. Because the LCH often targeted the same suppliers as care and cure providers, some providers felt as if they were competing with the LCH. When a provider had recognition in the healthcare field however, clear communication and solid networks positively impacted stable stockpiles and their relations with the LCH.

#### *Low transparency and traceability within supply chains*

Regardless of COVID-19’s presence and effects on procurement, supply chain transparency has been an issue for a longer period, targeting traceability and data sharing. Supply chain transparency encompasses the visibility of the supply chain from 1<sup>st</sup> tier all the way back to the suppliers of raw materials. As traditional supply chains are composed of many tiers that lack cross-tier communication about their processes and progressions, and thus often keep

information within their own tier, the issue of transparency was expected. Dutch providers were also affected by a lack of available information. This lack of transparency carried through a provider's entire sourcing journey within the crisis, starting with their communication with regular suppliers, communication with procurement collaboration groups, and their known independent suppliers. This was primarily attributed to underdeveloped data-sharing systems, alongside inadequate inventory management.

Information drives procurement processes, but the lack of detail during the start of the COVID-19 crisis in the Netherlands made it difficult to make informed decisions and stand behind a provider's own choices. There was little communication with regular suppliers about why their deliveries had halted or ended, even though a contract had been signed. Suppliers themselves were unclear about how their supply chains were functioning; however, they did not inform the providers about the issues they were experiencing promptly. Providers noticed "that [regular] suppliers indeed could not report the time at which they were supposed to deliver," which made it difficult to predict inventory levels, the severity of the shortages at their location, and how much PPE to keep ordering. This had a significant effect on the entire procurement department, as complaints were coming in about "the delivery times, which went up," without their knowledge. Providers were often unaware of these undesirable aspects, as providers did not communicate these properly. Orders with the LCH, for example, were settled through an online ordering system that only provided the information that the order had gone through. When providers realized their orders were not coming in on time, they contacted the LCH by phone, who then told them the news that their order was coming in later. This was often the same case for regular suppliers. Delivery tracking for this was not possible, and when asked for a time frame, it was also not available. This made contract performance tracking very difficult, and left out the possibility of analyzing and predicting stockpiles or shortages.

*"At first you were only allowed to place an order once a week. That was also based on the number of employees. We had only gotten a small percent of what we requested every time [...] and you didn't know why you didn't get it. You just didn't get it. And if it wasn't there, your order was cancelled, but you didn't get any notice of that either." (Care)*

Healthcare systems were not prepared for the extent and duration of these disruptions, as issues regarding delivery times and the quantities of products were not discussed with the supplier and thus were not expected. Besides regular suppliers, there was minimal information was made public about the LCH's efforts to supply providers with the critical products they required in the early changes of LCH's appearance. This was perceived amongst both care and cure providers, who both made a point of being left in the dark with the orders that were placed. When the LCH took on a supplier role, providers noted "when you ordered from [the] LCH, you just didn't know how it would arrive, or if it would arrive, and if so, how much [would arrive]." This became concerning especially because whenever products arrived, they were often not up to standard or in smaller quantities than expected.

*"After that, when the LCH had a more vigorous presence, we connected with the LCH [...] it was a very good initiative, let's start with that first. It needed to be organized. But there was poor communication, a lot of ambiguities, a lot of doubt as to whether the products had been tested properly. One week you would get*

*these products, and the next week you would get more from another manufacturer. That also caused a lot of unrest in our organization.” (Cure)*

When these issues were regarded to the ROAZ, they were regarded as the redistribution criteria and means of redistribution. The blurred cut-off point of when a provider would be eligible for extra supplies was unclear and made providers doubtful of what figures to send into the data system. If they sent in data that made it seem like their stockpile was doing fine in terms of the COVID-19 cases entered their system, which could have been the case, there was a chance the provider would not be sent any new supplies and instead, have supplies taken away from them and given to other locations. From the perspective of the provider, however, having a sufficient stockpile did not mean that they had sufficient supplies to feel confident about the crisis. Supply chain integrity was a critical component in understanding the healthcare procurement playing field, and gaining clarity on what procurement plans of action to use at what points in a crisis.

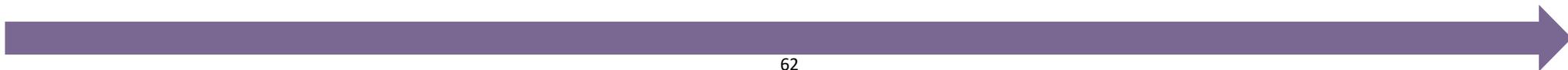
*“Moral of the story, we just didn't trust the ROAZ at all and we just did our own thing. At some point, it became an obligation to pass on your stocks to the ROAZ. I know everyone did that. I also know that everyone cheated. Because nobody wanted to reveal their actual position. Everybody gave up I think a little less than their stock. You had to declare your stock and your consumption. And you do it all together, but you never want to run out yourself.” (Cure)*

Table 4 summarizes the main challenges and effects of COVID-19 on the care and cure sector according to the explored themes. The challenges and effects are displayed in chronological order per theme and coincide with the descriptions of each theme. The left side depicts the challenges that arose due to COVID-19, and the right side depicts their improvised solutions that combatted possible consequences.

Table 4: Summary of thematic encounters within both care and cure sector trajectories accounted for by problems and their improvised solutions

**Theme 1 Newly established networks**

Reshaping Means of Communication		Strengthening Relations		Navigating New Territories		Finding Support in External Structures		Utilizing Alternative Channels	
Reconfiguring internal structures	Creating informal internal communication channels	Focus on own provider	Relations were strengthened within sector	Grey areas in terms of data sharing	Exploring guidelines and boundaries	Limited support structures	Support structures alleviating those in need	Challenging procurement terrain	Circumventing regulations
Due to the uncertainties that arose during the crisis, new role allocations were configured; a more operational approach was considered.	Informal communication channels were set up through varying mediums such as WhatsApp, telephone, and other messaging channels.	Product shortages led to a lack of formal cross-sector collaboration ; because the care and cure sectors primarily collaborated amongst themselves, they had limited across-sector contact.	The cure sector strengthened their relations with regular suppliers, whilst the care sector strengthened their relations with surrounding providers. Both sectors witnessed the importance of team efforts.	Some ROAZ regions requested stockpile numbers to see if more supplies were needed or if supplies would be redistributed. This led providers to tactically maneuver themselves around the support structures to ensure they would receive more material.	The changing regulations during the crisis highlighted protocols and sourcing decisions; they reconsidered single-sourcing as a whole to further explore dual sourcing and sourcing from manufacturers closer to the provider to avoid dependence on Asia.	Providers were limited to the support structures sketched out by the government. Some providers were unable to make use of these structures; sometimes due to the prescribed resource allocation scheme set in place by VWS.	Providers that didn't have a strong procurement department were taken care of; some got to use these structures to meet their supply needs fully while other providers used them as a backup option.	Given the increased risk of doing business with unfamiliar partners and pushing boundaries, providers were at risk of wasting money due to issues with quality control and fraud. Providers were also confronted with changes in regulations and the closing of borders during this time.	To prevent risky ventures, buyers' proactive mentalities ensured the stabilization of their supply by circumventing hierarchies and internal procurement regulations. Care providers did this more creatively, while cure providers did this more strategically.



## Theme 2 The flexibility of providers

Rethinking Suppliers and Products		Internal and External Communication Skills		Internal Sharing of Responsibilities		Room for Procurement Creativity		Balancing Levels of Authority	
Product availabilities shifted	Informal networks highlighted employee flexibility	Instability of buying factors	Highlighting the need for teamwork	Lack of field knowledge	Creation of multi-disciplinary teams	Risk of partnering with wrong suppliers	Flexibility in procurement	Boundaries holding providers back	Finding the balance between regulations and control
Because of product shortages, a slight panic occurred, slowing down the setting up of a proper internal structure, and clouded thinking about the types of products to buy.	The crisis taught providers that there are many good products beyond the brand and color the medical professionals were used to; medical professionals should focus on treating patients, and let procurement take care of procurement.	Many support structures still needed to figure out their own pathway before helping other providers; this was seen in terms of communicative skills, procurement platforms, the quality of products, and delivery times.	New, and old support structures highlighted the effects and need for both teamwork and collaboration. Support systems became the backbone of successful endeavors.	When employees without a procurement background had procurement tasks allocated to them, there were uncertainties regarding their plan of action and approach.	New knowledge was gained by employees without a background in procurement, through which procurement had a multi-disciplinary nature and was seen as an essential part of a provider.	Because of the fast-paced reconfiguration of teams, the risk of doing business with “cowboys,” coming in close contact with falsified records and a lack of certificates became much greater. Providers had to rediscover the market.	Flexibility was seen within procurement departments paving the way for creative, fast-paced decision making. This was done by setting up informal networks.	Because of EU tendering regulations, some providers did not feel they could use the flexibility provided by the pandemic to their advantage. Due to the boundaries laid out for providers, some cure providers were hesitant to break protocol to procure supplies.	Procurement departments were given more authority and control, which during this time proved to be valuable. Procurement departments were capable of having large responsibilities and catering to strategic procurement decisions.

### Theme 3 Supply chain opacity and transparency

Miscommunication Between External Structures		Supply Chain Knowledge		Procurement Positioning		Utilizing Data Systems	
Differing goals of same support organizations	Understanding the supply chain	Lack of information about supply chains	Insight into what information is essential and should be available	Challenging circumstances surrounding procurement	Procurement gaining importance and support	Confusion caused by changing regulations	Highlighting the need to advance data systems
External support structures such as the ROAZ and RONAZ were not on the same page in terms of their goals or level of influence. Differences were seen in different regions within the Netherlands, which confused providers as they stayed in close contact.	Collaborations with external stakeholders made providers look beyond their own organization or hospital and think closely about the future; a more complete understanding of their supply chains was gained.	Suppliers, and both new and existing structures, lacked information on their own trajectories. This included information in the form of the traceability of supplies, thus where products came from and how they were acquired, quality, how differing structures functioned, and delivery updates.	Due to the fact not a lot of information was available to the providers, providers reevaluated what is important in a supply chain for their individual organization or hospital.	The path to a steady stream of supplies was more difficult than usual, especially with borders closing, and suppliers halting production because of several backorders.	The mentality of procurement as a vital part of a provider came to the forefront when difficult scenarios presented themselves and shortages were experienced.	The government was bringing out regulations that brought to light what PPE should be used, where, and when. These regulations kept changing and thus confused providers. This catalyzed internal changes, and set the precedent for employees to be constantly updating themselves using their intranet, or the internet.	Data systems needed to be more advanced during the pandemic to accommodate both the changing regulations and standards of care. This placed the need for new data systems on the horizon and brought awareness to the fact that more advanced, predictive, and analytical systems are required in all sectors.



## 5. Possible measures to manage challenges

### 5.1 Towards system thinking

We have tried to unpack interconnectedness between events at the national level and within the care and cure sectors. In this section, we discuss possible measures, as suggested by interviewees, to overcome or at least mitigate the negative effects of the challenges discussed above and build on the positive lessons learned. In this chapter, we first categorize these suggested measures into six themes. It is important to note that the measures on their own cannot overcome or diminish the challenges encountered during the pandemic. To understand the feasibility of the measures proposed by the interviewees, we discuss the trade-off between security and costs. Sequentially, to assess the implementation possibilities, we discuss the importance of structural solutions, trust, and market involvement.

Actions, as proposed by interviewees, were categorized into six measures in three categories and related to institutional, national, and international levels. The key measures to consider are:

Supply related measures:

1. *Consider building stockpiles*
2. *Consider increasing domestic production capacity*

Capability-related measures:

3. *Consider integrated information system(s) for data sharing*
4. *Consider a shift towards category management*

Coordination-related measures:

5. *Consider an organization for increased central procurement power*
6. *Consider a systematic approach through crisis procurement protocols*

We explain each measure in the next six sections, addressing different scales of application, from individual procurement professionals to the EU level. The measures follow an integrated approach, integrating the care and cure perspective with the national perspective. For each measure, a table summarizes the overarching aim, the questions that should be addressed, aspects to consider in determining objectives/performance criteria, and possible key actions as part of the implementation. This provides a comprehensive overview of possible next steps.

### 5.2 Consider building stockpiles

One strategy for building resilience is the establishment of safety stocks. Although the advantages of stockpiling are relatively straightforward to build security, their disadvantages are more complex. First, to build stockpiles, one needs temperature-controlled warehouses, and second, if stockpiles are not used, expenses are high, while the benefits are absent. Stock management is necessary to ensure that stock does not expire. Hence, some interviewees were skeptical that the costs of security often outweighed the benefits.

To decrease the costs of national stockpiles, we could consider multiple actions. First, a rolling stockpile could be considered. With a rolling stockpile, the government procures a national stockpile through regular procurement contracts. Well ahead of the expiration date, the government sells the medical equipment, either at the market price or for a discount. There are multiple potential buyers in this scenario: other countries, the private industry, healthcare providers, or back to the supplier. For the latter two, this could either be voluntary or mandatory. For example, it could be a clause in the contract of the contracted suppliers, that if the products are not sold “X” months before the expiration date, the suppliers take them back for a specified percentage of the price. Similarly, it could be a regulation that it is mandatory for healthcare providers to buy medical products from the government, either at market prices or discounts. In this way, the costs of the stockpile diminish, whereas the advantage of security does not suffer.

Another option could be to decrease the warehousing costs by—partly—warehousing national stockpiles at the premises of healthcare providers who already have the infrastructure and are the expected recipients of these products, essentially splitting the costs and diminishing distribution costs at a later stage. This option could be complementary to the first measure of (re)selling stock. Another way of optimizing economies of scale is through a European stockpile, such as RescEU.<sup>65</sup>

A fourth measure could be for the government to stockpile raw materials, bypassing the disadvantages of the expiration date. This solution could work well with a measure to start national production. With an established national production, contracts could be established to produce medical products with the raw material stockpile of the Netherlands, guaranteeing supply early in the crisis. In the same line of thinking, medical products close to the expiration date could also be recycled and repurposed.

While cost-sharing may reduce the disadvantages of costs, rethinking warehouse logistics, reselling stock, and/or increasing the expiration date, there is another disadvantage of stockpiling, which is more complex to solve, namely which products to stockpile. It is very difficult to anticipate the correct medical products for stockpiling. While there is no single solution or measure to solve this, interviewees considered two approaches that could minimize the possibility of a wrong choice. The first and most important one included an open dialogue with the industry (healthcare providers and suppliers) to get a comprehensive view of the most important products for any pandemic. A second option, complementary to the first, is to invest in raw materials that are essential for multiple medical products and hence serve multiple purposes.

Table 5 summarizes the considerations for increasing resilience by stockpiling. These considerations apply at multiple levels. Stockpiles could be organized at different levels: from European stockpiles (high economies of scale, high coordination) to the institutional level (low economies of scope, low coordination).

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<sup>65</sup> [https://ec.europa.eu/echo/what/civil-protection/resceu\\_en](https://ec.europa.eu/echo/what/civil-protection/resceu_en)

Table 5: Summary table of stockpiles

Aim (of the measure)	Questions (before implementing)	Considerations (IF implemented)	Possible actions (how to implement)
<b>Increasing resilience by stockpiling</b>	Which product to stockpile?	Risk of expiry	Rolling stockpiles
	Which quantity of which product to stockpile?	Costs of coordination	Selling and buying arrangements
	Who to appoint to organize and coordinate?	Management Skills	Uncouple ownership and storage site cooperation
	Where to store?		Stockpile raw materials rather than finished goods Consult industry EU stockpile

### 5.3 Consider increasing domestic production capacity

Similar to stockpiles, increasing national production capacity provides security, but comes at a steep price. National companies cannot produce the same products at the same prices offered by Asian companies. This is the reason interviewees thought people would gradually shift towards procurement from East Asia again. Many studies indicated that a national supplier or at least dual sourcing is important to decrease supply risk and increase resilience.

Interviewees recommended different approaches that would diminish the cost disadvantages of increasing national production capacity. First, we can explore options regarding the involvement of national suppliers in the establishment of the national stockpile, keeping in mind the procurement regulations. This would ensure a steady stream of income for the national suppliers. Second, healthcare institutions can be financially encouraged to buy local. Examples include subsidies or tax advantages on the buyer or supplier side. A more drastic measure would be to mandate that a percentage of the total procurement of selected products be sourced nationally by healthcare providers. Another method to regulate national production capacity is to invest a majority of shares, on behalf of the government, into domestic production companies.

Besides the cost disadvantage, increasing national production capacity has secondary advantages. These advantages include long-term employment and options for sustainable growth. The challenges of visibility, transparency and traceability of the supply chain can be addressed. Table 6 summarizes the aspects of increasing national production capacity.

Besides an increase in national production, another method would be to scale production up to European production. This could decrease costs by increasing economies of scale and possibly lowering wages in other European countries. Most of the same questions, considerations, and actions in Table 6 apply. However, the complexity of coordination should be added to the considerations. There would also be a possibility of rivalry in crises, as the number of stakeholders would significantly increase and the likelihood of compliance could reduce. Long-term national employment also becomes less relevant if EU production is not

based in the Netherlands. Other options combining increases in domestic production capacity and EU production capacity are also possible.

Table 6: Summary table for increasing domestic production capacity

Aim (of the measure)	Questions (before implementing)	Considerations (if implemented)	Possible actions (how to implement)
<b>Increase resilience and decrease supply risk by initiating domestic production capacity</b>	Which product to produce domestic?	The higher price of products	Subsidize via tax or price for suppliers
	Which quantity of which product to produce domestic?	Policy for times of low demand	Subsidize via tax or price for buyers
	Who to appoint to organize and coordinate?	Long-term employment and sustainability	Enforce care and cure providers' requirement to buy (partly) domestically
	Where to produce?	Need for increased visibility, transparency, and traceability of supply chain	Integration with stockpiles
			EU production Pricing CO2 emissions

#### 5.4 Consider integrated information system(s) for data sharing

Challenges encountered during the pandemic included difficulties in information and data sharing. This included uncertainties in deliveries, uncertainties in allocation, lack of oversight of inventory and expected demand, and difficulties in transparency and visibility between organizations. This was partly because of underdeveloped and absent information and data systems. Therefore, a popular measure would be to establish a—ready for use—connected information system.

A connected information system could have multiple purposes, such as providing information on all stocks of domestic healthcare providers and an overview of anticipated demand. This would provide insights into the type and extent of procurement challenges occurring at the national level. It could help address the “shortages versus distribution problem” debate. However, clear considerations of the objectives and functionalities of the system would be needed.

Next to the objectives and functionalities of the system, the expected users should be identified. Does the information system focus solely on buyers and crisis institutions, or are suppliers integrated? Similarly, decisions would be needed regarding the management of the system and the type of products for which this predictive system would be put in place.

User-friendliness and user-familiarity should consider the interviewees. The trust of the user has influenced the rate of user implementation in the system and the organization managing the system. To increase the level of trust, familiarity with both the organization and the system during stable times would be necessary. This would also ensure that the system stayed up-to-date and complement and connect existing providers' systems. Another advantage of an information system that is already in use before the crisis is the issue of familiarity with users. Simultaneously, it became apparent in interviews that there was momentum to implement such systems, as the pandemic emphasized the importance of the care and cure sector. In summary, the information system should always be in baseline use and ready to be scaled up in times of crisis with additional functionality. In this way, the familiarity of the data system/product will exist, and thus more people will feel comfortable and easily adapt to newly integrated tools within their existing system.

This measure is—and should be—complementary to many of the actions mentioned in this chapter, according to the interviewees. First, the information system should be part of the crisis protocol. Second, the national procurement organization could coordinate the information system. Third, the information system could include options for ordering products of the national stockpile or ease the implementation of a regionally centered stockpile in healthcare providers internally. Table 7 summarizes the reflections on the information and data-sharing systems.

*Table 7: Summary table of integrated information system(s) for data sharing*

Aim (of the measure)	Questions (before implementing)	Considerations (if implemented)	Possible actions (how to implement)
<b>Information sharing through information systems (visibility of stocks, demand anticipation, traceability, data sharing)</b>	Which products need to be monitored?	Lack of trust and confidence in (quality of) the data	Continuous national information system for some products
	Who to appoint to organize and coordinate?	Policy for use of information system	Developing a national information system that can be switched on in times of shortage or crisis
	When to use this system?	Transparency	Information system connecting with crisis planning
	How to align with day-to-day business and systems?	Standardization-Connections with existing systems	National procurement agents can coordinate Information system
	What is the scope of the system?	Keeping the system up to date	
	Who are the expected users of the system?	Inter-adaptability (ease of use of the system)	

## 5.5 Consider a shift towards category management

One of the re-occurring themes includes the procurement and crisis skills and competencies to act adequately in times of crisis. According to interviewees, a shift to category management and strategic procurement should be implemented. The pandemic exposed vulnerabilities in procurement strategies regarding supply chain transparency and flexibility, highlighting the importance of:

- Knowing one's supply chain regarding the geographical spread of suppliers and the importance of visibility on second-and third-tier suppliers. The natural scarcity of raw materials, the disadvantages of wholesalers as suppliers, and the oligopoly for gloves were vulnerabilities that came to light during the pandemic.
- According to interviewees, the pandemic amplified the need for dual sourcing and risk mitigation: having sufficient and reliable suppliers and strong relationships with suppliers are key elements in the procurement equation.
- Next to working on exposed vulnerabilities, the need to be flexible and gain new skills became clear, including the increased need for quality assurance and dealing with unsolicited proposals. The importance of all the different aspects of a procurement strategy amplified the need for adequate skills and competencies of procurement officials and clarity on role divisions/role allocations—in the right places.
- The importance of being well connected and establishing relationships and networks with both buyers and suppliers
- The need for increased traceability and knowledge of suppliers and supply chains, including wholesalers

Table 8 summarizes the reflections related to the skills and competencies of the procurement system.

Table 8: Summary table of the shift toward category management

Aim (of the measure)	Questions (before implementing)	Considerations (if implemented)	Possible actions (how to implement)
<b>Increase Market intelligence and category strategies through skills and competences</b>	What should be the tasks of the procurement department?	Supply chain transparency and visibility	Mapping the supply base and supply base beyond the first tier
	What should be the position of the procurement department in the organization?	Supplier and process flexibility	Mapping supply risk -Market concentration -Supplier capability -Relationship quality
	Which products should form a category?	Supply base capacity and capabilities	Developing resilience strategies as: -Dual sourcing -Preferred customer status/ relationship building
	At which level is category management needed?	Role of procurement in the organization	Building product capacity, flexibility, and speed
	Which skills are needed in which situation?	Role of wholesalers	Build skills of procurement personnel

### 5.6 Consider an organization for increased central procurement power

A measure to manage a new medical crisis, often indicated by interviewees, is to centralize procurement and distribution for the medical sector during a crisis. One challenge was the power, volume, and competencies required to buy medical equipment in the international market with increased competition. With decentralized procurement by individual providers, there was less power, and volume compared to a collaborative approach. Centralizing procurement solely during times of crisis placed heavy demands on healthcare providers' capabilities, resources, and trust, and underutilized the skills, competencies, supplier-network, and organization-specific know-how of these institutions, according to interviewees. Complete trust in outsourcing procurement during a crisis was not easily established and thus not currently achieved. Hence, interviewees indicated that a completely centralized system was not yet attainable nor desirable.

A measure mentioned by interviewees was to semi-centralize the procurement of the medical sector, at least in crisis times, but also in stable times. A measure could be to establish a central procurement department at the national level, similar to the current LCH. According to interviewees, the main aim of a central procurement organization should be to pool procurement capacity, gain experience, build a supplier network and gain trust, and collaborate with healthcare providers (through familiarity) to be prepared adequately to take on future crisis procurement together. While the newly established LCH had its initial challenges (inconsistencies, delivery uncertainties, quality and reliability issues, and

communication problems), the ongoing central procurement organization could build on this learning curve.

On the risks versus costs spectrum, this recommendation would be high for security and building resilience, but equally high on costs. As a response, interviewees identified multiple approaches that this organization could simultaneously coordinate: increasing the activities of a central procurement organization and decreasing the costs of building such an organization. These activities include, but are not limited to, building and managing a national stockpile, managing national production, constructing and managing the national procurement crisis protocol, and maintaining international relations with both suppliers and national buyers. These approaches are described below.

Interviewees emphasized the importance of a national organization to work in crises and establish procedures and trust throughout stable times. This makes collaboration and centralization during a crisis like the COVID-19 pandemic easier, as the structure readily exists, and trust does not need to be built during a crisis. To increase market participation, industry (both buyers and suppliers) should be involved in establishing a national procurement organization from the beginning.

*Table 9: Summary table for an organization with increased central procurement power*

Aim (of the measure)	Questions (before implementing)	Considerations (if implemented)	Possible actions (how to implement)
<b>Central procurement Power</b>	Which activities need to be centralized?	Building central capability whilst also leveraging local capabilities	Agree on crisis arrangements ahead of need
	What products can be procured in this central organization?	Possible lack of trust of care and cure sector in government organizations	Partial centralization to maintain local and central capabilities during stable times
	What kind of mandate is needed in the crisis protocol?	Multiplex networks: - between buyers - buyers to the central agency - buy-side to supply base - between central agencies	Flexibility to centralize in times of crisis
	How to align with day-to-day business?	Central information system	Build relationships with supply base in stable times
	When to use the organization?		Coordinate with other (national) agencies—especially on EU level
	Who to appoint to organize and coordinate?		Build trust through familiarity
	What is the scope of the system?		Cooperate over stockpiles, crisis protocols, international relations

## 5.7 Consider a systematic approach through crisis procurement protocols

Interviewees emphasize the need for a procurement crisis protocol on *what* needs to happen, *when*, *who* takes the lead, and who has the mandate to make important decisions. It is important that, in this protocol, it is clear which institutions qualify for extra support. The protocol should provide guidance and uniformity during a crisis, decreasing the need to improvise. This also includes a communication strategy and a clear national strategy in times of crisis.

This crisis protocol should include a different mindset compared to the famous Dutch “polder model,” where everyone can express their opinion, lengthening the decision process. Hence, mandate and hierarchical preferences and the expectation of compliance are important. In the protocol, it needs to be clear who gets the mandate on what, in which situation, decreasing the need to improvise. It is important that the protocol also supports worst-case scenario thinking, so the Netherlands is prepared for all situations. For example, it needs to be clear who handles the distribution of national stocks and redistribution of hospital stock in times of a crisis. The extent of national interference should also be clear: is it a safety net or more?

Multiple organizations in the Dutch crisis structure are suitable for taking responsibility, depending on the tasks at hand. It is also possible to establish a new organization, specifically established to take responsibility for procurement during a crisis. Obvious candidates would be the Ministry of Health, Welfare, and Sport or the LOCC for national control, defense for distribution and transport, and the GHOR for regional coordination, based on their affinity for crisis management. However, other options are also available.

Interviewees emphasized the importance of preparedness and readiness of organizational structures when or if a crisis hits. Organizations should be prepared to take on appointed roles, which their organizational structures should allow. Their network should fit the context, and employees should have the right skills and competencies. The preparedness of an organization to handle assigned tasks trumps the potential fit based on the current composition of organizations. All options and organizations can be considered; the most important aspect is that organizations know their assigned role and can adequately prepare for it, including a change of organizational structure, an adequate network, and the right—procurement—skills and competencies.

An example includes the (un)availability of a national crisis coordination organization, a role that was first assigned to the GGD. However, the GGD was not a crisis organization and did not have procurement experience or knowledge, or crisis management skills and competencies. It did, however, have an elaborate network including the regional crisis organizations of the GHOR. The GGD is also a trusted and well-known party within the field. Hence, GGD could be considered as a national coordinator for future crises. However, if this is the case, the GGD must start preparation by acquiring adequate skills and competencies and change its organizational structure to facilitate nationwide coordination in a crisis. The same applies to other candidate organizations for the role of the national coordinator.

Other lessons learned during the crisis include appointing one organization responsible to handle the crisis, preferably one that has been functioning for a while already. This ensures familiarity with individual healthcare providers and consequently enhances trust and collaboration, something that was currently missing according to interviewees. It also

increases inter and intra-collaborations within the team, as people will have experience working together. To increase trust in the newly established or appointed organization, it is equally important to involve the industry (e.g., potential buyers and suppliers) in the decision-making of both the protocol and the responsible organization. Interviewees either mentioned appreciation for involvement in the process or criticized the decision-making process because of the lack of involvement of the industry (e.g., buyers and suppliers).

While the extent of activity of the crisis organization influenced the familiarity, trust, and experience of an organization, which is important in times of crisis, is also very costly. Hence, the activity of a crisis organization is a trade-off between security and costs: a continuously active organization is more expensive compared to an organization that is only active during crises. A “sleeping” organization would be an option to reduce costs, but it would still be important to implement a crisis organization and protocol. However, interviewees indicated that most challenges related to the COVID-19 crisis in Section 3.3 stemmed from a lack of familiarity and inexperience with the processes.

*Table 10: A systematic approach through crisis procurement protocols*

Aim (of the measure)	Questions (before implementing)	Considerations (if implemented)	Possible actions (how to implement)
<b>Increase systematic approach and decrease uncertainty in a crisis through a crisis protocol for procurement of medical equipment</b>	What is the scope of the protocol? (What needs to happen when?)	Clear scope and mandate	Roles and responsibilities for all organizations established clearly
	Who has the mandate? Who to appoint to organize and coordinate?	Widely understood	Ensure appropriate skills for each role
	When to initiate the protocol?	Compliance when activated	Communication and preparedness strategy
	How to align with day-to-day business?	Trust in an organization that has the mandate in a crisis	Alignment with the national crisis management structure
			What if scenarios

## 6. The Dutch public procurement system: Priorities for preparedness

### 6.1 Report summary

#### **Recap of challenges, themes, and measures (Chapter 3, 4 and 5)**

The overall challenges relate to the perceived shortages of medical equipment during the COVID-19 pandemic.

On a national level, three overarching challenges were identified:

1. *The lack of an adequate national crisis structure for procurement of medical products on the required scale.*
2. *A regular purchasing strategy that was, to a large extent, focused on price and efficiency.*
3. *The lack of an adequate EU-wide crisis structure for procurement of medical products on the required scale.*

Overarching themes dissect a multitude of problems that the care and cure sector addressed during this time:

1. *Leveraging network ties*
2. *Leveraging flexibility*
3. *Fighting for visibility*

The following possible measures address the issues identified by national, regional, and local procurement experts:

Supply-side measures:

1. *Increase resilience through stockpiles*
2. *Increase domestic production capacity*

Capability measures:

3. *Setup integrated information system(s) for data sharing*
4. *Shift towards category management*

Coordination measures:

5. *Setup an organization for increased central procurement power*
6. *Establish crisis procurement protocols*

In Chapter 5, six priorities for preparing the procurement system for future crises are identified and analyzed (see sections 5.2 to 5.7). Below, three figures summarize the six measures and associated questions, considerations, and actions, synthesizing Tables 5 to 10. Figure 6 illustrates a brief overview of the questions that are important for each measure. Figure 7 shows the considerations in the decision-making process of whether or not to implement one measure. Figure 8 provides a compact overview of the approaches that can be taken when implementing one measure.

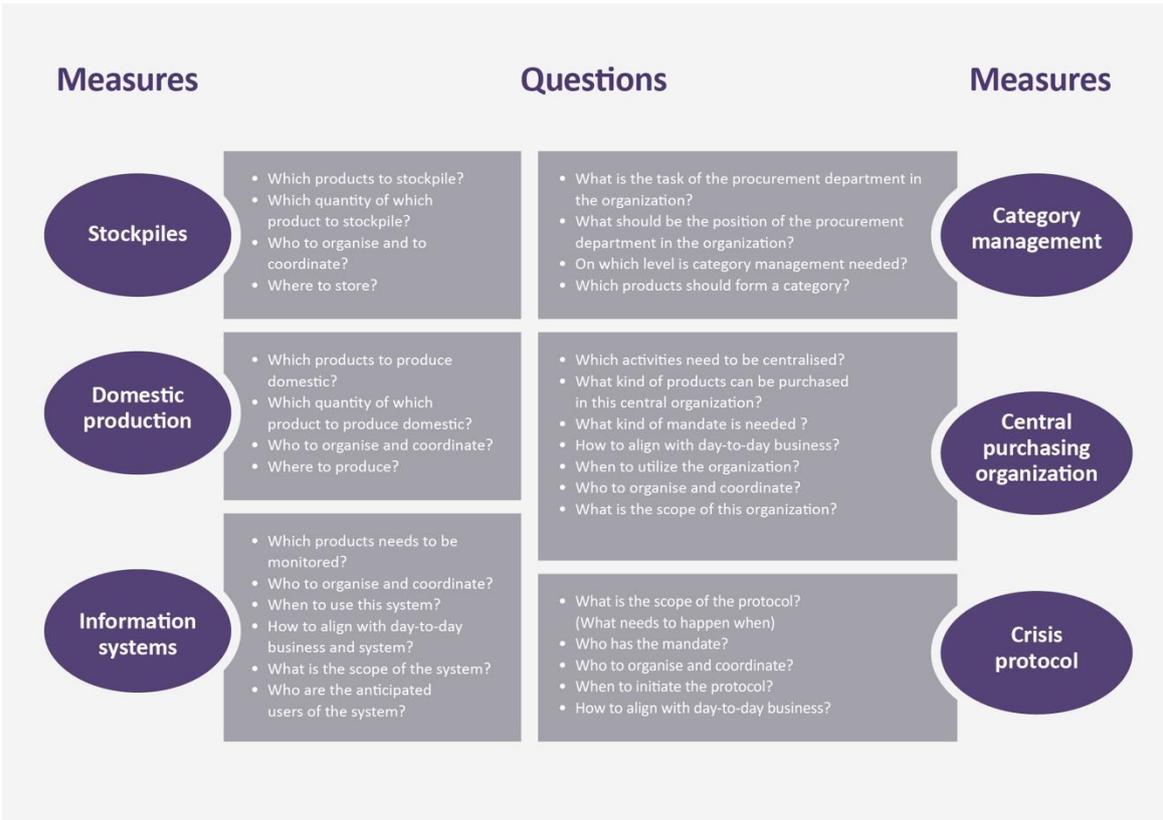


Figure 6: Overview of the corresponding questions to the possible measures

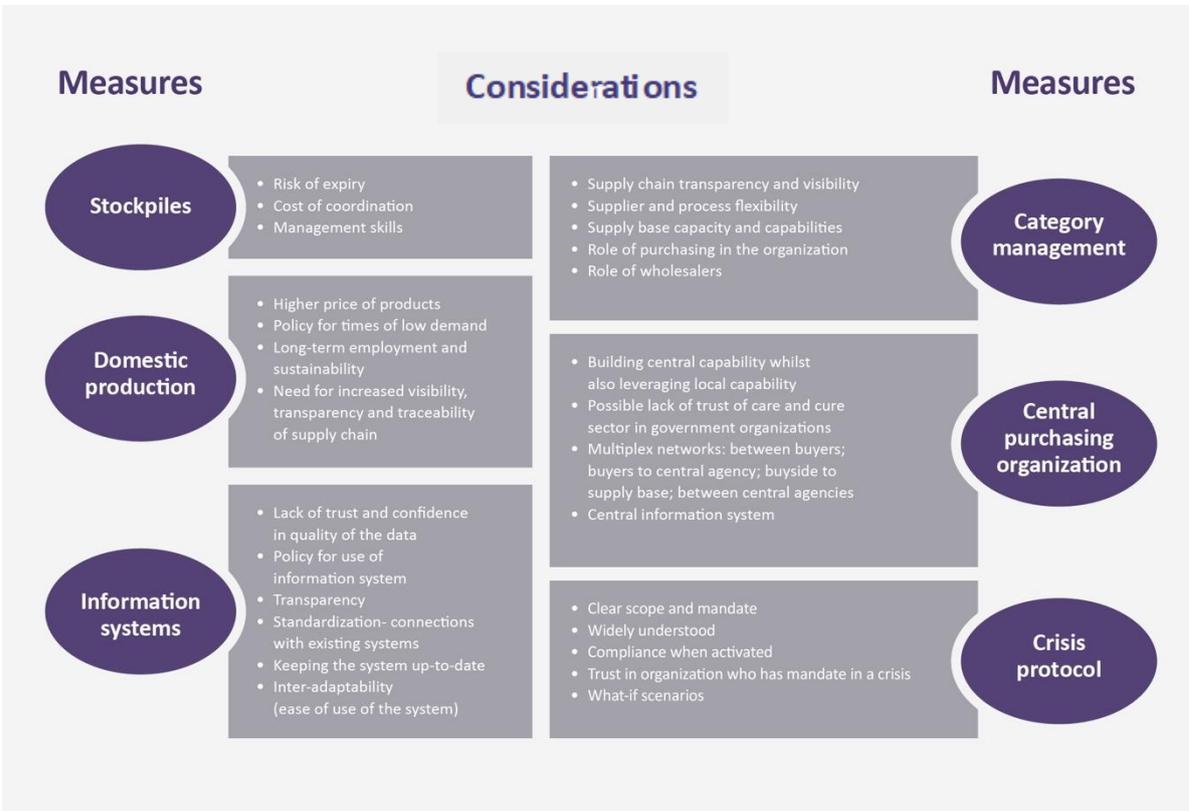


Figure 7: Overview of the considerations for each measure

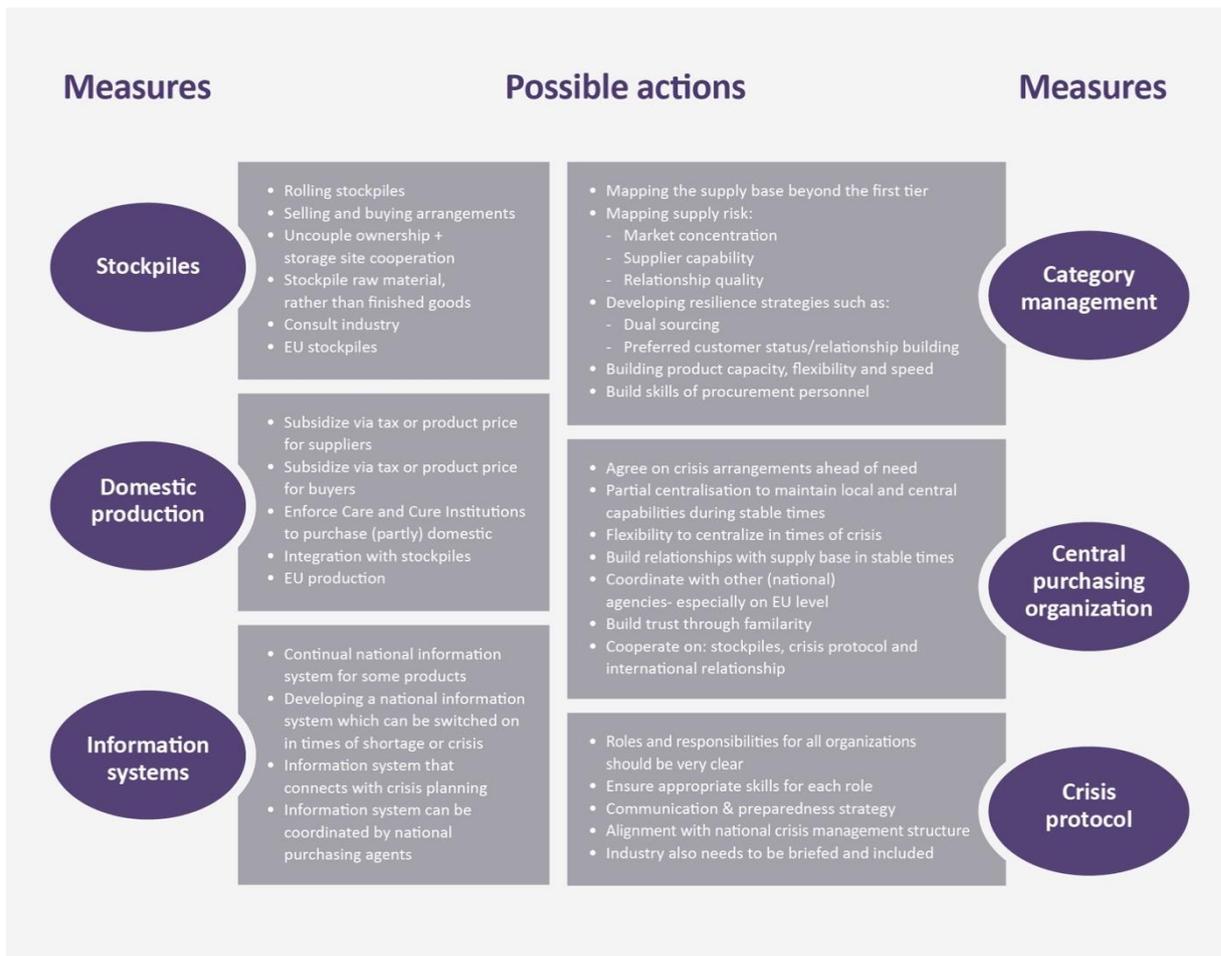


Figure 8: Overview of which approaches could be taken for each measure

## 6.2 Conclusions

*“We live in an event-oriented world, and our language is rooted at the level of events. We usually notice events much more easily than we notice patterns and systemic structures even though it is systems that are actually driving the events we do see.”<sup>66</sup>*

The research reported here was commissioned by ZonMw in late summer 2020. Our initial brief was to describe and explain the events that transpired. The project has progressed in parallel with participants’ knowledge and expertise. Eighteen months on from the start of the pandemic, key actors at all levels in the procurement system have a much better understanding of the challenges and have developed strategies and routines to cope. A report focusing only on looking back would contribute, but only in a limited way, so we have extended the goals of the study to address preparedness for future crises.

The findings presented in this report add to the emerging knowledge base in two ways. First, the report provides a holistic and integrative perspective, connecting insights from individuals working in diverse organizations across the system, and highlighting areas of consensus and ongoing debates. It provides what might be termed a helicopter view, going

<sup>66</sup> Kim, D.H (1999) Introduction to Systems Thinking. Pegasus Communications, Inc., retrieved from <https://thesystemsthinker.com/introduction-to-systems-thinking/>

beyond what any single procurement expert within the system can perceive from their standpoint. Experts working at a national level may deepen their understanding of the experiences of procurement personnel in care institutions (coping with the crisis) by reading Chapter 4. Conversely, Chapter 3 provides national level insights for local procurement experts.

The accounts in these two chapters capture the dynamics and uncertainties of the pandemic: shortages of goods have multiple causes and are positively and negatively influenced by multiple actors working at many levels. The wide range of views on what was happening and what needed to happen was clear from media reports. Understanding this diversity and its implications is important for drawing out lessons that are relevant across all stakeholders involved in responding to future crises.

For the second contribution to the emerging knowledge base, drawing on the expertise and critical reflections of 60 experts interviewed across the entire system, we go beyond “noticing events” to noticing patterns, and yet further to addressing shortcomings in systemic structures. Preparing for future pandemics (and other crises associated with critical shortages) depends on identifying and addressing these structural features of the system.

In Chapters three and four, three challenges and three themes provide a framework for making sense of the complex series of events and responses described by interviewees who represented the national, care, and cure provider perspectives. These short-term events were often in the news and were a popular topic of conversation; they were highly visible. Underlying patterns and systemic structures were less visible. Presenting these in a hierarchy linked to modes of action provides the “iceberg model,” as illustrated in Figure 9. Chapters three and four address the upper layers of this hierarchy.

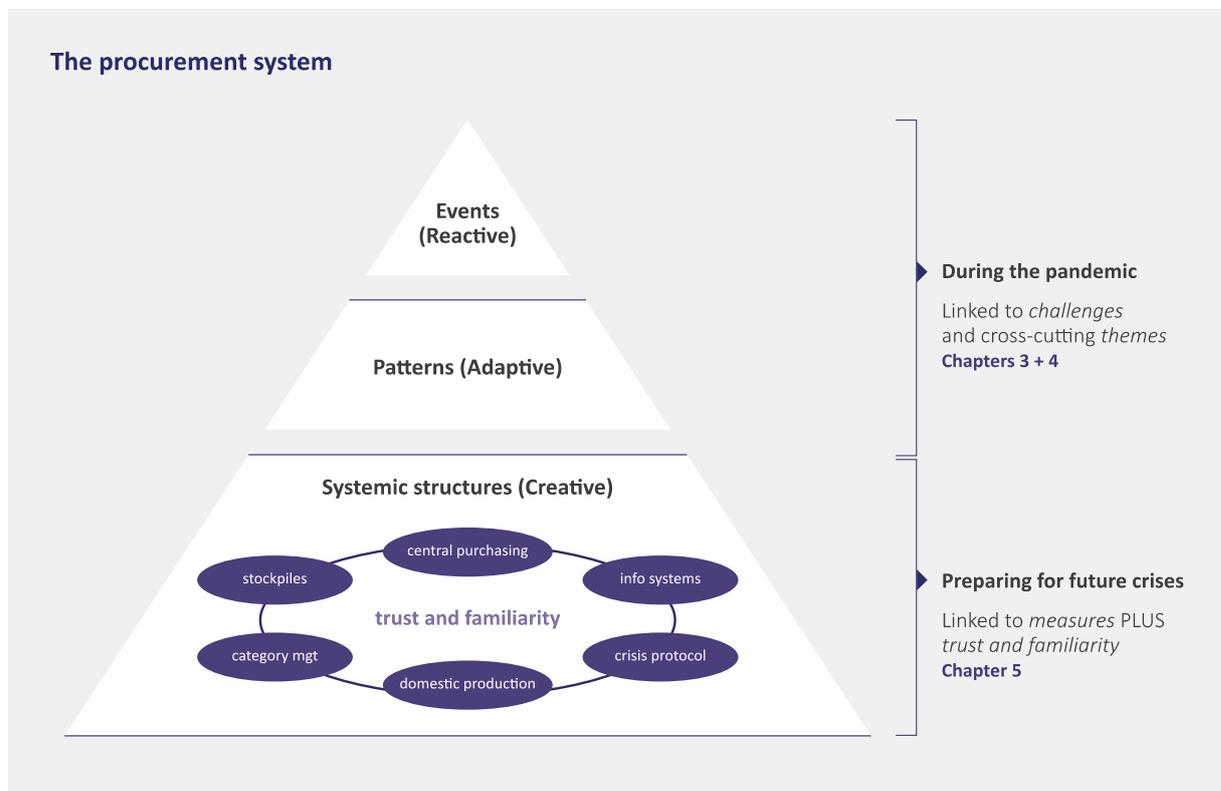


Figure 9: The procurement system and modes of actions for system development (based on Kim (1999))

Only by a deeper consideration of the way the system is organized—in stable times and during crises—can we identify the systemic structures that generate more visible patterns and events. Analyzing the wide variety of insights from interviewees led to the identification of six relatively tangible structural features of the system. These can be developed to build a more agile and resilient system that is appropriate for future crises.

Any efforts towards preparedness will however falter unless two critical success factors are also taken into account in developing the procurement system. It is vital that all parties in the system are familiar with processes for future crisis management and develop trust in the procurement system. Without these, rivalry for scarce resources, confusion, and uncertainty will drive poor procurement performance in future crises.