

USING THE SCENARIO APPROACH IN KCE STUDIES

KCE PROCESS NOTE



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LIST OF ABBREVIATIONS

ABBREVIATION	DEFINITION
AI	Artificial Intelligence
DIY	Do-It-Yourself
FR	French-speaking
GBN	Global Business Network
GCP	Good Clinical Practice
GP	General Practitioner
HSR	Health Services Research
HTA	Health Technology Assessment
KCE	Belgian Health Care Knowledge Centre
NEED	Needs Examination, Evaluation and Dissemination
NL	Dutch-speaking
PEST	Political, Economic, Social and Technological
R3	Rapid Response Report
RT	Research Team
SC	Steering Committee
US	United States
WG	Working Group

■ SCIENTIFIC REPORT

1 INTRODUCTION

1.1 The scenario approach

Rooted in sociology and policy sciences, the field of future studies is a multidisciplinary discipline that aims to explore and understand potential futures.¹ Among the various tools used for future studies, the scenario approach – also called scenario planning – reflects the main principles of the discipline and allows to think thoroughly about the future, which is, by nature, uncertain.² A **scenario** is a consistent description of a possible and plausible future situation as well as the path(s) leading to that future situation. In its narrow definition, a scenario is a narrative story describing an alternative future. This story has an inner logic, which can be generated using various methods, based on historical trends, empirical data, expert insights or stakeholders' views. Although scenarios can be built in many ways, only processes with specific steps (see section 2.2) can be qualified as scenario approach.

The historical development of the scenario approach can be traced back to the 1950s when military strategists such as Herman Kahn utilised it to anticipate various geopolitical scenarios. In particular, the US Department of Defence used the approach developed at RAND Corporation^a as a method for military planning.^{3, 4} At the same time in France, Gaston Berger developed a method called *la prospective*, that combined qualitative and quantitative techniques.⁵ Over time, these methods were adopted by other fields, moving from the military (US) and socio-political analysis (France) to business, urban planning, and environmental studies.

The most used scenario technique was developed by Pierre Wack in the 1970s at Royal Dutch Shell to guide strategy regarding future oil market. It was popularised by Schwartz (1991)⁶ and Van der Heijden (1996)⁷ and is known as the Global Business Network (GBN) approach² or 2x2 matrix technique. Although the 2x2 matrix is considered as a gold standard in corporate scenario generation,⁸ other methods and variations exist to develop scenarios.^{2, 5, 9, 10}

1.2 Aim of the report

KCE is increasingly asked to analyse future uncertain developments, which can be done using the scenario approach. The method has been formally used in previous KCE reports but, so far, no systematic approach has been developed for using the method in the context of a KCE study. This methodological report (or process note) aims to fill this gap.

The objective is twofold. First this report aims to provide guidance for KCE researchers willing to use the scenario approach autonomously. Second, it develops a systematic approach which should ensure the method used is reproducible and consistent across KCE reports.

This report does not intend to give an exhaustive overview of all possible methods for developing scenarios. It rather adopts a pragmatic approach, detailing a step-by-step method (with possible variations) that can be applied in a KCE study.

^a Founded in 1948, the RAND Corporation is a non-profit, non-partisan research organisation based in the United States. This global policy think tank works on topics such as national security, healthcare, education, international relations, technology, and social policy. The name 'RAND' is an abbreviation of 'Research and Development'. More information about RAND is available on <https://www.rand.org/>.



1.3 Methods

First, an overview of existing methods was drawn based on a (non-systematic) review of the scientific literature and grey literature including technical manuals. A particular attention was paid to the scope as the term “scenario” is used beyond the context of the analysis of future uncertain developments. Relevant elements for use in KCE studies were selected and described in a consistent document (see chapter 2). This document was reviewed by an external expert (Rafaël Ritondo – see colophon). The theoretical elements are illustrated by examples (presented in green boxes) and common pitfalls (presented in orange boxes). To ensure the method can be followed through, most steps are illustrated by examples from the same case study (on future workforce in England), presented in blue boxes.

Second, an analysis of past KCE reports was performed. Reports published between January 2015 and July 2025 were screened for the occurrence of the word “scenario”. In addition, all current KCE researchers and managers were asked to identify reports where the scenario approach was used. Results from this analysis are presented in chapter 3.

Third, a selection of current KCE researchers were consulted. In-depth interviews were carried out in October 2025 with the principal investigator of the KCE reports identified in the previous phase (two interviews) and with one KCE researcher having experience with scenarios outside KCE. An interview guide was developed for the interviews (available upon request). The general themes addressed were the reasons to use the scenario approach, encountered issues, advantages and disadvantages, barriers and facilitators, lessons learned, and usefulness for future projects. The same researcher conducted all three interviews and subsequently compiled a summary for each. The lessons learned from these consultations have been integrated in section 4.2.

In addition, a workshop was organised on 6 October 2025 with nine current KCE researchers, with or without previous experience with the scenario approach. Participants received the theoretical background document (chapter 2) which they were asked to read in advance. During the 3-hour workshop (protocol available upon request), participants were provided with a casus and had the opportunity to experience in practice the main steps described in the theoretical document. The lessons learned from this exercise have also been integrated in section 4.2.

Fourth, a step-by-step guide was developed for the use of the scenario approach in KCE studies (see chapter 4), including practical tips and potential pitfalls. The development of this guide was initially based on desk-research, then enriched by the output of the consultations of KCE researchers (interviews and workshop). Along with the theoretical background (chapter 2), this guide aims to allow KCE researchers to concretely implement the scenario approach in a KCE study.

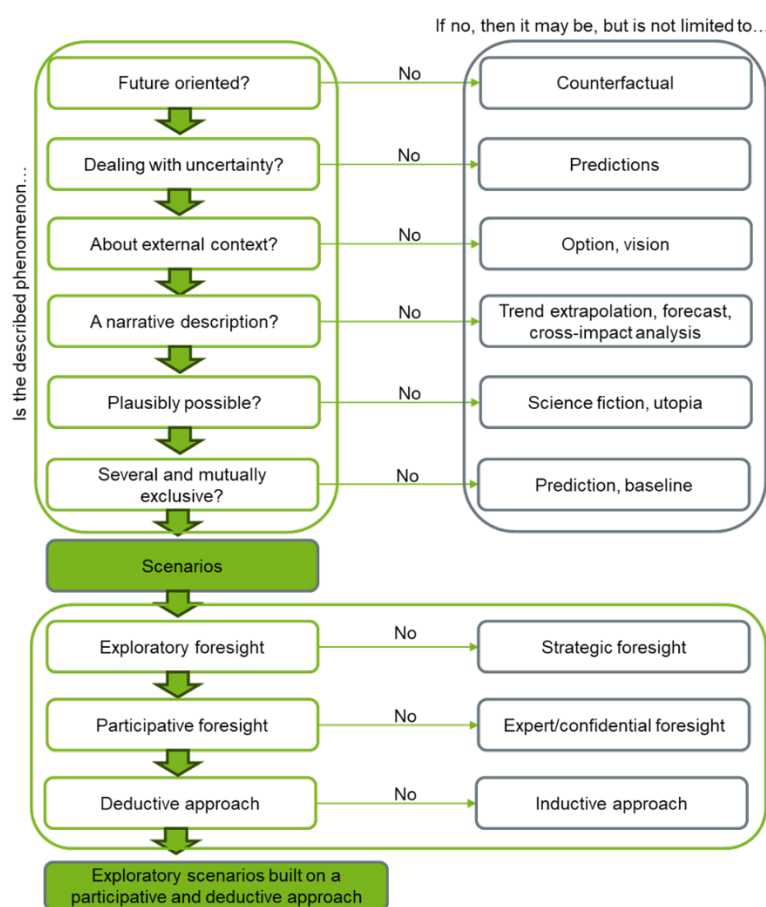


2 THEORETICAL BACKGROUND

2.1 Definition of the scenario approach

In a recent review, Spaniol and Rowland (2019) identified common characteristics to determine whether an approach can be called a scenario.¹¹ We rely on this definition to define the scope of the present report. Figure 1 summarises the discussion and can be used as a tool to determine if an approach is indeed a scenario approach and if it is in the scope of the current process note. More details are provided in the following sections.

Figure 1 – Process for classifying a phenomenon as a scenario



Source: adapted from Spaniol and Rowland (2019)¹¹

WHAT ARE SCENARIOS?

First, a scenario must describe the **future** as shaped by **uncertain** contextual elements. As stated by Cordova-Pozo and Rouwette (2023), “*without uncertainty there is no reason to explore different future worlds*” (page 9).⁵ Therefore, this report is restricted to scenario techniques aiming at dealing with future uncertainties. Pure trend extrapolation techniques (and their variations such as the Manoa technique developed by Wendy Schultz or the Systemic Scenarios technique developed by Sandra Burchsted and Christian Crews)² are out of scope. Techniques that involve a probabilistic modification of extrapolated trends (such as cross-impact analysis or trend-impact analysis)² are also out of scope.

Second, scenarios are influenced by **external** forces that are beyond the immediate control of the developers and users of scenarios. In that sense, scenarios must also be distinguished from “options”.

While scenarios refer to possible development paths (taking into account the external environment), options refer to the different choices or actions available in a given situation.

Third, scenarios take the form of a story or **narrative** description. Therefore, our analysis is restricted to the construction of scenarios that are presented in a narrative consistent way. Techniques aiming at estimating probabilities or presenting adjusted trend values or ranges of plausible values for a variable are also considered out of scope.

Fourth, scenarios should be **possible**, plausible and internally consistent. Although scenarios do not need to be probable (i.e. likely to occur with a high probability), it must be possible for a scenario to occur in reality, as opposed to science-fiction. Scenarios must also be plausible, meaning that they should be credible according to logic, evidence and current knowledge. The internal consistency refers to the absence of self-contradictions within the narrative.

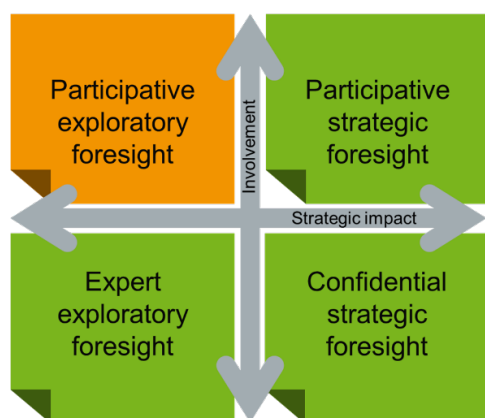
Fifth, scenarios must co-exist as meaningfully different alternatives to one another. Therefore, we only focus on methods aiming at developing several **mutually exclusive** scenarios.

WHICH SCENARIOS DO WE FOCUS ON?

Only **prospective scenarios** are examined here (even though they will often be referred to simply as “scenarios”) and predictive scenarios are considered out of scope. Prospective scenarios use various data collection methods to create a detailed and consistent picture of the future, outlining the events required for that future to occur. In contrast, predictive scenarios employ mathematical analysis techniques to detect patterns and trends within extensive datasets, offering a level of future prediction.⁵

Based on Bootz’ works,¹²⁻¹⁴ four types of prospective or foresight exercises can be identified, according to two main dimensions that differentiate foresight practices: the strategic impact and the degree of stakeholder involvement (see Figure 2).¹⁵ The strategic impact dimension questions whether the approach leads to decision making. The involvement dimension reflects the participation of stakeholders, from a limited number of participants (e.g. a small think tank) to a large stakeholder involvement in the context of a participative approach. The present report focuses on **participative exploratory foresight** (top left quadrant), in which scenarios are built as a way to mobilise stakeholders around a plausible coherent view of the future, but which is not intended for decision making.¹⁶

Figure 2 – Types of foresight exercises



Source: adapted from Bootz (2001) and *Futuribles*.^{12, 17}

Participative strategic foresight (top right quadrant) on the contrary is aimed to develop actionable results.¹⁴ Strategic foresight, as used for instance by the European Commission,¹⁸ aims to guide decision-making and to develop strategies or action plans. This participatory technique helps to



strengthen the resilience and the adaptability of an organisation.¹⁹ It comprises a series of nine steps, forming a cycle of collective reflection, decision-making, and effective implementation of actions.¹⁹

Expert exploratory foresight (bottom left quadrant) is seen as decision-making support tool and confidential strategic foresight (bottom right quadrant) generally takes place among a group of leaders who use it to share and/or challenge the current strategic vision. Due to the confidential nature of the exercise, strategic decisions issued from this approach may face resistance as individuals are asked to change their behaviour but their perception of the context is not modified.¹⁴

Finally, only the **deductive** approach is described here, rather than the inductive one. In an inductive approach, scenarios are developed from themes and storylines that emerge during open-ended discussions about the future.²⁰ While this method does not require specific tools, it is time-consuming and not ideal for those inexperienced with the scenario approach.²¹ Therefore, we prefer the deductive approach which is more structured and more commonly used.²¹ It should be noted that, even in the deductive method, there is some room for inductive reasoning. In particular, the scenario framework (see section 2.5.1.1) often emerges from inductive reasoning during participative workshops. Although out-of-scope for this report, a fully inductive approach might be considered later on at KCE, once sufficient experience has been gained with the deductive method.

ADDITIONAL STEPS ARE OUT OF SCOPE

As stated before, this report focuses on exploratory scenarios, the strategic actions derived from them being out-of-scope. In particular, the following steps listed by Bishop et al. (2007)² are out of scope: “visioning” (choosing a preferred future: envisioning the best outcomes, goal-setting, performance measures); “planning” (organising the resources: strategy, options, and plans); and “acting” (implementing the plan: communicating the results, developing action agendas, and institutionalising strategic thinking and intelligence systems). The same applies for the following steps proposed by Wulf et al. (2010):²² “strategy definition” or “option planning” (testing decisions as well as strategic options against the multiple scenarios, which have been generated); and “monitoring” (several indicators are first defined and in a second step monitored to check if strategic changes are needed).

In a similar way, the choices regarding the way scenarios are presented to the audience (including personae^b, visualisations, design fiction, etc.) are not in the scope of this report. This would correspond to the last step of Spaniol and Rowland (2019)’s logic: “decide and develop the medium for engagement”.¹¹

Finally, in many situations, it may be relevant to quantify (some elements of) the narrative scenarios. Although this has been used in the past in KCE reports,^{23, 24} this step builds on methods that are not specific to the scenario approach, and is therefore considered out of the scope of the present report. In particular, when quantitative data and statistical forecast are not available, one may rely on elicitation methods to estimate the value of key parameters identified in the narrative scenarios. The interested reader is referred to O’Hagan et al. (2006)²⁵, Godet (2007 – chapter 8)¹⁹, Willis (2015)²⁶ and Lamba et al. (2015).²⁷

2.2 Three-step approach

As stated by van Notten et al. (2003), “*a scenario analysis does not easily break down into neatly defined components, (...) techniques in scenario development are often combined, and (...) scenario processes differ from one to the next depending on context*” (page 439).²⁸ But even though methods differ, several process steps can be identified, that characterise a typical scenario approach.^{2, 11, 22} Table 1 summarises these steps, as described in the literature. Based on that, we propose a working definition for each step, that will be used for further reference.

^b A persona is a semi-fictional characterisation or representation of a typical person.

Table 1 – Three-step scenario approach

Step	Definition in literature	Working definition
Scoping	‘Framing’ = scoping the project.² ‘Scope the project’ = (a) identify a relevant case or issue of concern; (b) identify use(s) and user(s)’ needs for scenarios; negotiate and decide a future time horizon.¹¹ ‘Definition of scope’ (‘define the scope’ or ‘preparation’) = specifying important characteristics for the scenario planning project such as the time frame, scope of analysis or the participating team.²²	Defining the focal question and the time horizon
Scanning	‘Scanning’ = collecting information: the system, history and context of the issue and how to scan for information regarding the future of the issue.² ‘Identify driving forces’ = (a) brainstorm influential driving forces and trends; (b) separate pre-determined and uncertain forces; (c) rate the uncertainties in terms of their impact.¹¹ ‘Perception analysis’ (‘pioneering’ or ‘identifying the major stakeholders’) = analysing the perception of the executives participating in the scenario project.²² ‘Trend and uncertainty analysis’ (‘identify basic trends’ and ‘identify key uncertainties’; or ‘data analysis’) = analysing the most important driving forces.²²	Collecting information about drivers and determine their levels of impact and uncertainty
Scenario building	‘Forecasting’ = describing baseline and alternative futures: drivers and uncertainties, implications, and outcomes.² ‘Frame the scenarios’ = (a) plot high-impact uncertainty pairs on a 2x2 matrix; (b) describe and name the quadrant end states; (c) map causal relationships among system elements.¹¹ ‘Refine the scenarios’ = organise the elements into draft narratives.¹¹ ‘Scenario building’ (‘scenario development’) = the previously identified key uncertainties are converted into distinct scenarios that describe different future states of the world. These basic scenarios are then complemented by other driving forces to create consistent and plausible stories about the future as well as possible developments that link the present to the specific picture of the future.²²	Describing narrative baseline (= continuation of past trends) and alternative futures

The first step of a scenario approach consists in defining the scope of the scenarios to be developed. In particular, it should be precisely defined what the topic of the research is and what time horizon is considered. This is usually done by setting a focal question with a defined time horizon and if relevant defined geographical limits. During this preparation phase, also the objective and target audience of the scenarios should be determined, as well as the stakeholders to be involved in the process. This step is described in more detail in section 2.3.

During the second step, data are collected using various methods (literature, surveys, brainstorming, etc.) on contextual elements that might impact the focal question. The objective of this step is to map all these elements to get a complete view of the system and its dynamics. More details are given in section 2.4.

The third step aims at writing the narrative scenarios. To do so, assumptions are formulated regarding the elements identified during the previous step and are organised in a consistent way. Various methods are available to do so and are described in section 2.5. To refer to this step, Bishop et al. (2007) use the term “forecasting”.² However, to avoid confusion with predictive scenarios, we chose not to use it and prefer the term “scenario building”.



2.3 Scoping

2.3.1 Stakeholder involvement

Developing scenarios is a collaborative process.²⁹ It involves participants with a thorough knowledge of the topic, diverse opinions and backgrounds, and the ability to produce divergent thinking^{c,31} However, the process needs governance and guidance. Three possible levels of involvement can be distinguished:^{17, 32}

- A technical team or **research team** leads the project, carries analysis and provides syntheses, facilitates workshops, and assists the general project management (programming, resources, methods). The research team has at least two members and is involved in all steps of the project.
- One or more **working and discussion groups** produce and compare analyses. Participants to these groups (between 8 and 20 members) are carefully chosen so that diverse opinions and expertise^d are represented. For more details about selection and recruitment of participants, the reader is referred to KCE report 408 (section 12.3).³³ Regular meetings are organised for each group to create a shared culture and a sense of belonging.
- A **steering committee** or advisory committee provides opinions on the design, results and key messages at each major step of the process, the deliverables and their distribution. Members of the steering committee are typically experts who do not have the possibility to participate in a working group due for instance to time constraints, experts with a broader view than those involved in the working groups, experts who on the contrary have a specific expertise in a narrow topic but not broad enough to be involved in a working group, policy-makers, etc.

Although the scenario approach always involves at least a research team and a working group, many projects do not rely on a formal steering committee. At KCE, insights from experts and stakeholders are systematically gathered, but a steering committee that meets at different stages of the project is not necessarily set up. In any case, the roles should be well defined in advance, so that the participants of the working groups do not feel micro-managed by the steering committee or the KCE research team. The working group must take ownership of the performed work and feel responsible for the final product.

In addition to these two or three levels, experts and stakeholders can be involved in the process in various other ways. In particular, in the scanning phase (see section 2.4), information will be gathered from experts and stakeholders using panel meetings, surveys, interviews, etc.

Defining the composition of the research team and selecting participants for the working group(s) are crucial steps of the scoping process. Participants should be selected so that they can be involved in the whole process, and in particular in all meetings of the working group.

2.3.2 Focal question

During the scoping phase, the issue that will be investigated must be defined. Usually, the general topic is pre-determined and almost always too broad.³⁴ The topic needs to be narrowed down to a specific focal issue that aligns with the goals of the scenario exercise.³⁵ The feasibility of the exercise must also be considered, as too broad topics or geographical areas may require a more extensive documentation search (see section 2.4). Therefore, the breadth of the issue should be considered in

^c Divergent thinking is a cognitive process used to generate creative ideas by exploring many possible solutions. The term has first been used in 1956 by psychologist J. P. Guilford in opposition to convergent thinking.³⁰

^d Expertise does not only refer to scientific expertise but includes personal and professional knowledge. The type of expertise that is relevant for scenario building depends on the analysed topic.

relation to the resources allocated to the project. The question should be carefully phrased by the research team, as the whole process will be articulated around it. It should be open-ended, clear and avoid any ambiguity.

Practically, the **focal question** should include the three following dimensions:^{20, 34}

- **What?** The topic should be specific enough so that scenarios will focus on a particular issue or challenge. However, too narrow questions are not appropriate for scenario building. The defined problem should be coherent with the envisaged scenarios and should open up a wide range of possibilities.
- **Where?** The scope of the issue, usually in terms of geographical limits, should be stated in the focal question.
- **(Until) when?** A clear time horizon should be set. The relevant time horizon depends on the pace of change in the considered domain.¹⁷ It should be short enough so that stakeholders still feel involved, but long enough so that changes had time to occur. The types of change one wants to analyse must also be considered.³² With a short-term time horizon, only dynamics that are already in place will be analysed. Medium-term horizons allow to include more uncertainties and structural transformations. With long-term horizons, paradigm changes can be envisaged. In any case, for the scenarios to be useful, the time horizon should incorporate the agenda and operating pace of those who requested the exercise.³⁶

Focal question: examples

How might climate change-related health risks reshape public health service demands in Western Europe by 2040?

How will the GP profession in Belgium evolve over the next 20 years in light of foreseeable demographic, economic, technological, and organisational changes?

How will the Belgian hospital landscape look like in 2050?

What will the future vision for digital health look like in 2030 in Europe?

Focal question: common pitfalls

How will elderly care be shaped in 20 years in Belgium? This question is too broad. One may want to focus on a specific aspect of elderly care. Relevant questions to narrow the question could be: do we focus on residential care? Is informal care included? What about residential care?

Is task delegation between GPs and nurses going to increase in the next 10 years in Belgium? This question is too narrow, and can be answered by yes or no.

How will preventive care evolve in light of foreseeable demographic, technological, and political changes? This question does not include a geographical scope, nor clear time horizon.

Focal question: case study

Thinking up to the year 2035, what driving forces (both trends and uncertainties) may influence requirements of the future social care workforce in England?

Source: Willis and Cave (2014)³⁷



2.4 Scanning

During the scanning phase, information is gathered on key elements that either influence the studied field directly or enable the field to exert influence on its surrounding environment.³⁸ These elements are referred to as “factors”, “descriptors”, “driving forces”, “variables”, “shapers”, etc. In this report, they are referred to as “drivers”. A **driver** is an influential force in the broader environment that is expected to shape the future (around the chosen focal question).²⁰ These forces can be economic, social, technological, environmental, political, etc. They can always be expressed as variables,²⁰ meaning they can change and evolve over time, impacting how the future unfolds. However, they should be expressed in a neutral way (i.e. not suggesting a direction), hence the words “increase”, “decrease”, etc. should be avoided.

Drivers: examples

Proportion of day-care stays, compared to inpatient hospitalisation
 Proportion of multiprofessional group practices among all GP practices
 Proportion of individuals aged 65 or more in the population under study
 Prevalence of non-communicable diseases
 Attitudes against digital health software and platforms

Drivers: common pitfalls

Shift from inpatient hospitalisation to day-care. This driver suggests a direction.
Move from solo GP practices to multiprofessional group practices. This driver suggests a direction.
Organisation of GP practices. This driver is not expressed as a variable.
Ageing population. This driver suggests a direction.

Drivers: case study

During the scanning phase, 103 drivers were identified, including care accessibility, care delivery cost, level of self care, retirement age, unemployment, life expectancy, fertility.

Source: Willis (2014)³⁹

This scanning phase is sometimes referred to as “horizon scanning” although the horizon scanning method is largely used outside the context of scenario generation. Horizon scanning is the systematic collection of insights on emerging trends and weak signals of change to identify potential threats, risks, emerging issues and opportunities.⁴⁰⁻⁴² It is typically used for early detection and assessment or emerging changes. Horizon scanning can be conducted through various methods, that are for a large part similar to what is described below. Nevertheless, to avoid confusion in what follows, we purposely choose to refer to the scanning phase of scenario generation, rather than to horizon scanning. Readers interested in horizon scanning are referred to Hines et al. (2019), Amanatidou et al. (2012) and European Environment Agency (2023).⁴³⁻⁴⁵

2.4.1 Identification

The process of identifying the driving forces within the scenario approach may differ from one case to another,³⁸ but two main approaches can be distinguished. First, data can be gathered through examination of existing empirical and theoretical studies (scientific and grey literature), conducted through desk research. Second, qualitative and/or participatory methods can be used to generate the required information from experts' insights and knowledge. Futuribles^e (2025) recommends combining both approaches to get a comprehensive view of the topic.³² The purpose of participatory methods, on top of desk research, is twofold. First, it allows to validate, invalidate, and enrich the analyses, thereby increasing their robustness and relevance. Secondly, sharing analyses with experts and stakeholders allows the progressive appropriation of the results by these actors.¹⁷ Also Kossow and Gaßner (2008) insist on the importance of participatory methods to create synergy among participants and generate a sense of "ownership" that will be useful in the following phases (scenario building).³⁸

Regarding literature review, the interested reader is referred to the KCE HSR Process note on literature review and international comparison.⁴⁶ Expedited methods are described in KCE report 386.⁴⁷

Possible methods to gather experts' insight are diverse: surveys, brainstorming, interviews, nominal groups, etc. The interested reader is referred to KCE report 408.³³ Specific methods can be used in the particular context of scenario building. Among the techniques frequently used for foresight surveys, the Delphi method⁴⁰ and its derivative methods (such as Real Time Delphi)⁴⁸ are noteworthy. These methods aim to converge the panel members' insights to produce a shared or central vision of the future. Colour-coded methods (such as the Régnier abacus^f)⁴⁹ aim to highlight the convergences and divergences of viewpoints among participants and to deepen previous analyses. Using structured interviews, specific sets of questions can be used to trigger respondents' thinking about the future. Examples are provided in Box 1. Other enabling techniques are described in the KCE process note on animation techniques.⁵⁰

Box 1 – Question sets to trigger thinking about the future

Three horizons:⁴⁰

- Current systems and practices (Horizon 1): What do you take for granted, knowing that it is there and that it works in a particular way?
- Emerging innovations and transitional activities (Horizon 2): Looking at features of Horizon 1, which features are the most vulnerable? Which will you need to abandon? Which are strengthened and will still be around in the long term?
- Long-term visionary change (Horizon 3): What are the emerging issues and novel changes transforming the world in general? What are the most transformational changes you see emerging?

Six Thinking Hats:⁵¹

- White Hat (Facts): What do we know? What data is available?
- Red Hat (Feelings): What are our gut reactions or emotional responses?

^e Created in 1960 by B. de Jouvenel, Futuribles International is a think-tank for foresight thinking and studies. The name Futuribles combines the French words for « futures » and « possible ». More information about Futuribles is available on <https://www.futuribles.com>.

^f This technique, developed in France by François Régnier in the early 1970s, is based on a system of coloured votes supported by justifications.



- Black Hat (Caution): What could go wrong? What are the risks?
- Yellow Hat (Optimism): What are the benefits? Why might this work?
- Green Hat (Creativity): What new ideas or alternatives can we explore?
- Blue Hat (Process): What **is our next step? How do we organize our thinking?**

Questions for the Future:⁵²

- The vital issues: Would you identify what you see as the critical issues for the future? Suppose I had full foreknowledge of the outcome as a genuine clairvoyant, what else would you wish to know?
- A favourable outcome: If things went well, being optimistic but realistic, talk about what you would see as a desirable outcome?
- An unfavourable outcome: As the opposite case, if things went wrong, what factors would you worry about?
- Where culture will need to change: Looking at internal systems, how might these need to be changed to help bring about the desired outcome?
- Lessons from past successes and failures: Looking back, what would you identify as the significant events which have produced the current situation?
- Decisions which have to be faced: Looking forward, what would you see as the priority actions which should be carried out soon?
- If you were responsible: If all constraints were removed and you could direct what is done, what more would you wish to include?

After drivers are gathered using one or several methods, a refinement is necessary: duplicates are removed and similar drivers are combined.

2.4.2 Grouping and selecting drivers

The identification process can yield hundreds of drivers, even after duplicates are removed and very similar drivers are grouped together. However, the more drivers, the more complex and longer the scenario building process will be. As a rule of thumb, it is recommended not to select more than 40 drivers.⁵³ Typically, between 10 and 25 drivers are selected.

The selection and clustering of drivers can be done by the research team only (see section 2.3.1) or can involve the working group. The latter option facilitates better stakeholder engagement and might be especially relevant if the identification process was not based on participative methods (see section 2.4.1). This provides an opportunity for participants to add additional drivers that were not previously identified. Various facilitation techniques exist to help the group select and cluster drivers (see for instance the KCE process note on animation techniques).⁵⁰ For example, using sticky notes to write drivers allows participants to visualise the formed clusters and easily move drivers from one cluster to another.

2.4.2.1 Selection of drivers

There are two main ways to decrease the number of drivers: exclude part of them and group some of them together in a cluster. In practice, one can weave back and forth between both approaches.⁵³ The process can begin by excluding irrelevant drivers and then forming clusters with the remaining ones, or by clustering all identified drivers first and subsequently removing irrelevant clusters.

To exclude drivers (or clusters), the following **criteria** can be considered:⁵³

- Secondary driver: the driver has a secondary impact on the system under study compared to other drivers. Only primary drivers are selected.
- Inertia: the driver remains largely unchanged over time. Given the time horizon set for the exercise, the driver is not likely to change.
- Resulting variable: the driver is a logical outcome of other drivers already considered within the system. Therefore, it is a resulting variable that will be described in the scenarios through deduction. Typically, drivers related to prices are resulting variables, because their evolution results from changes in supply and/or demand.³² Only explanatory variables are selected.

A more formal technique can be used to select drivers, called **structural analysis**. This approach aims to highlight the main influential and dependent variables, and thereby the essential drivers for the future evolution of a system.^{19, 54} In particular, this approach allows to exclude secondary drivers and resulting variables. In a first step, all drivers are listed in a matrix, where the degree of influence of one driver on the other is assessed, for instance from 0 for no influence to 3 for strong influence. In a second step, the scores are summed up to identify influential variables (drivers with many or strong outgoing influences) and dependent variables (drivers with many or strong incoming influences). Variables with high ingoing influence and low outgoing influence are candidate for exclusion as they largely depend on other variables, but do not influence many other variables. In a third step, influences can be visualised using a systemic diagram (where arrows between drivers represent the influences) or on a cartesian graph where drivers are ranked according to their level of dependence (x-axis) and influence (y-axis). More complex techniques exist (where direct, indirect and potential influences are analysed). Also, IT tools are available to support these techniques.⁹ Nevertheless, structural analysis is very time consuming, therefore less systematic but more intuitive approaches are generally preferred.³² The interested reader is referred to Godet (2007).¹⁹

⁹ For instance the MicMac software (<https://micmacprospective.com/>).



Structural analysis: example

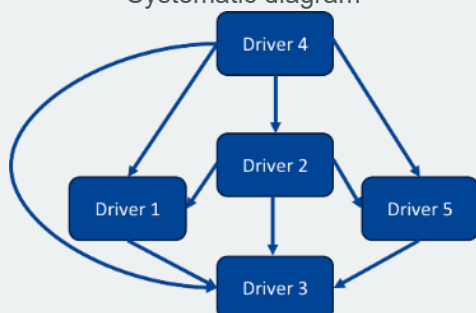
Matrix of influences

Influence of... on...	Driver 1	Driver 2	Driver 3	Driver 4	Driver 5	...	Outcoming influence
Driver 1		0	1	0	0		1
Driver 2	1		1	0	1		3
Driver 3	0	0		0	0		0
Driver 4	1	1	1		1		4
Driver 5	0	0	1	0			1
...							
Incoming influence	2	1	4	0	2		

Driver 4 influences drivers 1, 2, 3 and 5. Its outgoing influence score is equal to 4. This driver is an influential variable and will likely be kept in the analysis.

Drivers 1, 2, 4 and 5 influence driver 3. Its incoming influence score is equal to 4. This driver is a dependent variable and is candidate for exclusion.

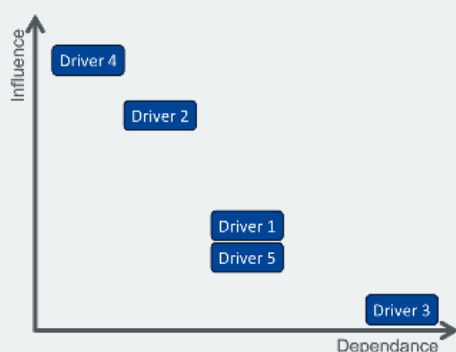
Systematic diagram



Driver 4 influences all other drivers but is not influenced by any other drivers. This driver is an influential variable and will likely be kept in the analysis.

Driver 3 does not influence any other drivers but is influenced by all the other drivers. This driver is a dependent variable and is candidate for exclusion.

Cartesian graph



Driver 4 has a high influence score and a low dependence score. This driver is an influential variable and will likely be kept in the analysis.

Driver 3 has a low influence score and a high dependence score. This driver is a dependent variable and is candidate for exclusion.

Structural analysis: case study

A matrix was used to score a pair-wise comparison of each driver with all the other drivers to which it is connected.

For drivers labelled A and B, the strength of the connection can be defined using a simple scale: 0 (the effect is zero or negligible, or occurring after a long delay), 1 (a large change in A causes only a small change in B), 2 (a change in A causes a more or less equal change in B), 3 (a small change in A brings about a disproportionally large change in B).

Two measures were then calculated for each individual driver: the sum of the influences of a single driver on all the other drivers called the active sum (AS) and the sum of the influences of all drivers on a driver factor called the passive sum (PS). Examples are given hereafter.

Driver	Active sum (AS)	Passive sum (PS)
Care accessibility	8	16
Care delivery cost	1	36
Care demand	10	24
Training quality	11	3
Workforce age	7	0
Workforce availability	5	15

Source: Willis (2014)³⁹

2.4.2.2 Grouping drivers

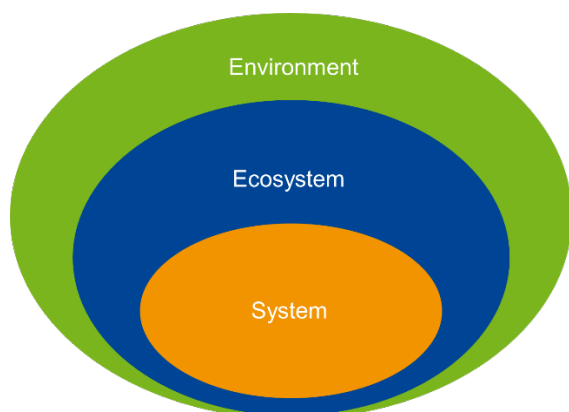
To cluster drivers into higher-level ones, an intuitive approach can be used, grouping together drivers that belong to a similar topic. Alternatively, a pre-determined framework can be used. Variations of the **PEST framework** are often used to this aim where drivers are classified into political, economic, social (or socio-cultural) and technological domains. Additional domains include environment/ecology (in the STEEP or STEPE framework), legal (PESTEL or PESTLE), ethical (STEEPLE and TEEPSE) and demographic (DESTEP).^h

Drivers can also be organised according to **three interlocking circles**: system, ecosystem and environment (see Figure 3).^{17, 32} The inner circle ('system') corresponds to the target of the focal question. It is the scope within which stakeholders are legitimate to act and have real room for manoeuvre. The intermediate circle ('ecosystem') represents drivers that interact directly with the central circle. Stakeholders have some possibility to act on the causes or effects of these drivers. The outer circle ('environment') represents the general context of the process (societal, geopolitical and environmental background). Stakeholders have little or no capacity to act on these drivers. Depending on the context, the intermediate circle and the outer circle could be grouped together, so that drivers are simply classified into two categories: internal and external.

^h PEST = Political, Economic, Social, Technological; STEEP = Social, Technological, Economic, Environmental, Political; STEPE = Social, Technological, Economic, Political, Environmental; PESTEL = Political, Economic, Social, Technological, Environmental, Legal; PESTLE = Political, Economic, Social, Technological, Legal, Environmental; STEEPL = Social, Technological, Economic, Environmental, Political, Legal, Ethical; TEEPSE = Technological, Economic, Environmental, Political, Social, Legal, Ethical; DESTPE = Demographical, Economic, Social, Technological; Environmental; Political.



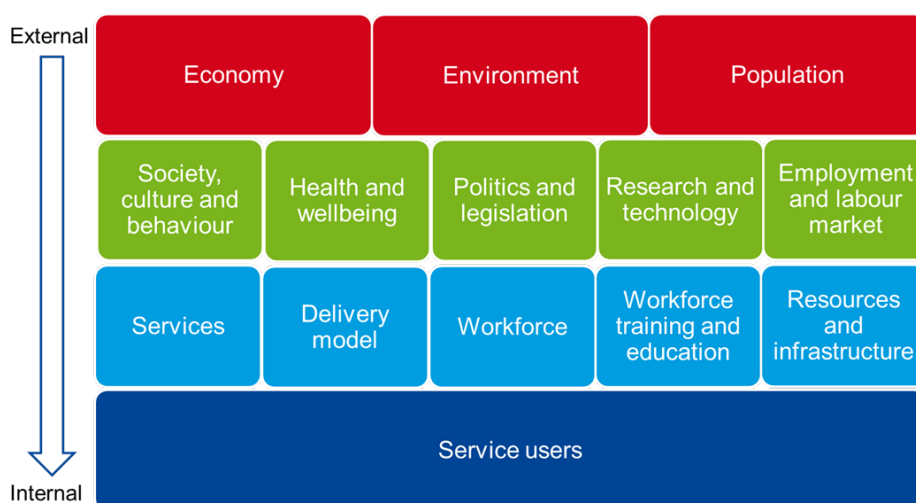
Figure 3 – Drivers in three interlocking circles



Source: adapted from *Futuribles*.¹⁷

Willis (2014) suggested a **more sophisticated taxonomy**, adapted to analyses related to healthcare workforce. It is based on a PEST-like framework, but provides greater separation between external and internal drivers (see Figure 4).³⁹

Figure 4 – Driver themes related to healthcare workforce



Source: adapted from Willis (2014)¹⁶

Classifying drivers in a framework allows to structure them, making it easier to cluster them into higher level ones. Using a framework also helps to identify any gap that should be fulfilled. The framework should be seen as a facilitating tool, not an objective. Ultimately, the choice of the framework does not impact the way scenarios will be built.

Another objective of the exercise is to get a better understanding of the system before thinking about possible scenarios. In that context, it might be relevant to deepen the analysis to determine the structure and dynamics of the system, allowing to understand under what conditions it might evolve in a particular direction. The system can be represented using a “**systemic diagram**”, in which the relationships between the drivers are represented by arrows.

Clusters: case study

The 103 identified drivers were grouped in 14 clusters. For instance: delivery model (including drivers such as: care accessibility, care delivery cost, level of self care); employment and labour market (retirement age, unemployment, etc.); population (life expectancy, fertility, etc.).

Source: Willis (2014)³⁹

2.4.3 Documenting

To ensure a solid information base, documentation must be gathered to understand the past, present and future development of each cluster of drivers. Thorough documentation and analysis distinguish a foresight exercise from a creative process.⁵³ These elements can be formalised in a “driver report” or “**driver sheet**”.^{17, 53} The research team (see section 2.3.1) is responsible for writing the sheets. One sheet is built for each cluster of drivers, i.e. each of the higher-level driversⁱ resulting from selection and clustering (see section 2.4.2). Examples of driver sheets can be found in Lambin (2017)⁵³ or in the forthcoming KCE report on GP workforce.²⁴

Lambin (2017) suggested that driver sheets should include the following sections, in addition to bibliographic references and a list of consulted experts or stakeholders:⁵³

- **Definition:** a definition must be provided for the driver, including its geographic and temporal scope and its link with the subject under study. This definition must be understood and shared by everyone. One way to ensure this is to ask the approval of the participants to the working groups.
- **Indicators:** a list of indicators should be provided as it enables participants to define the driver precisely. Indicators should be identified ex-ante (i.e. before the documentary research starts) to avoid analysing the driver solely based on the available data. “Ideal” indicators can be listed, for which no data are available, alongside proxy indicators that can be documented.
- **Retrospective:** the past evolution of the driver should be described. The timeframe should correspond, if possible, to the one set in the focal question (i.e. if the foresight exercise uses a time horizon of 20 years, the retrospective analysis should ideally go back at least 20 years). Indeed, past changes are informative of future changes. In domains where evolutions are slow, significant changes cannot be detected by looking only at the near past. The retrospective is built using time series for the selected indicators. For indicators that cannot be quantified with hard data, information can be gathered through expert interviews. For “policy” indicators, a method consists in drawing up a list of events (decision, implementation, etc.) over time. The retrospective analysis also describes the causes of past evolution.
- **Dynamics of change:** the retrospective analysis helps to detect possible changes in future trends. Various dynamics can be identified and placed in an impact-uncertainty matrix (see Figure 5):^{32, 53}
 - **Strong trends:** dynamics rooted in the distant past, that cannot be stopped suddenly.
 - **Critical uncertainties:** phenomena with a significant impact but open to several different possible futures.
 - **Emerging trends:** recent trends which potential to solidify or reach an inflection point remains uncertain. These inflections are often preceded by “weak signals”, i.e. events that appear fairly insignificant during the study but could cause a break, bifurcation or disturbance in an existing trend.

ⁱ These higher-level drivers will further simply be referred to as “drivers”.

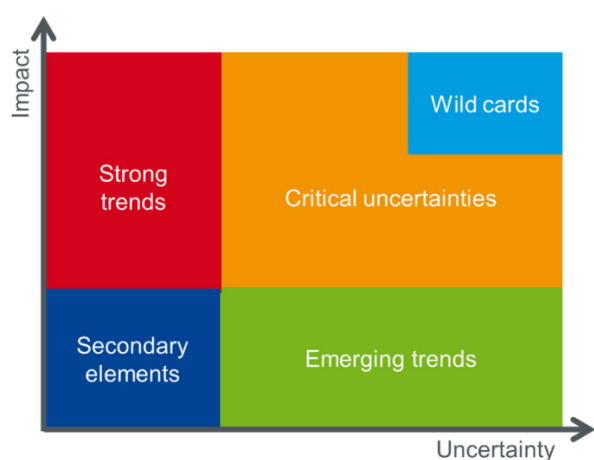


- Wild cards: events considered unpredictable (i.e. a timeframe for its occurrence cannot be determined), but which can have significant and immediate consequences if it were to happen.

Figure 5 schematises these dynamics depending on the level of uncertainty and the level of impact. Simplified versions can be used, as illustrated in Figure 6.

- Assumptions for the future: possible future developments of the driver are described using the identified dynamics. A convenient reference point is a “trend assumption” in which the future evolution of the driver is assumed to continue in the same way as in the past. This assumption is not necessarily the most likely. Assumptions of changes (or “contrast assumptions”) deviate from past trends. Typically, two to five assumptions are built for each driver. They must be mutually exclusive, i.e. if one assumption is true, the other assumptions cannot be true.

Figure 5 – Impact/uncertainty grid



Source: adapted from Bisali et al. (2025)³²

Dynamics of change: examples

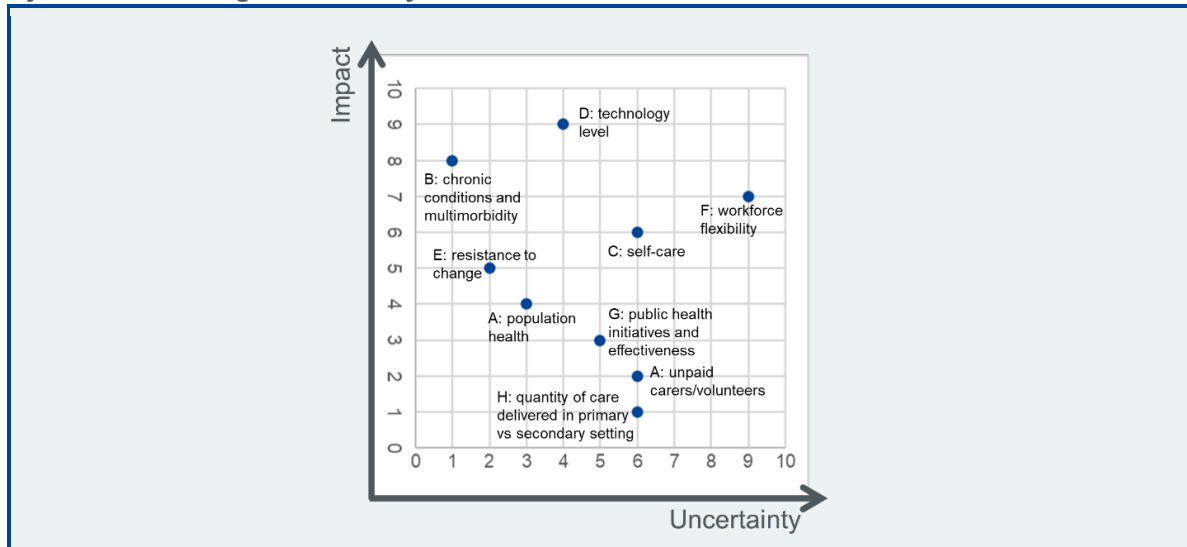
Strong trends: ageing population

Critical uncertainties: task shifting between healthcare professionals

Emerging trends: development of new vaccines

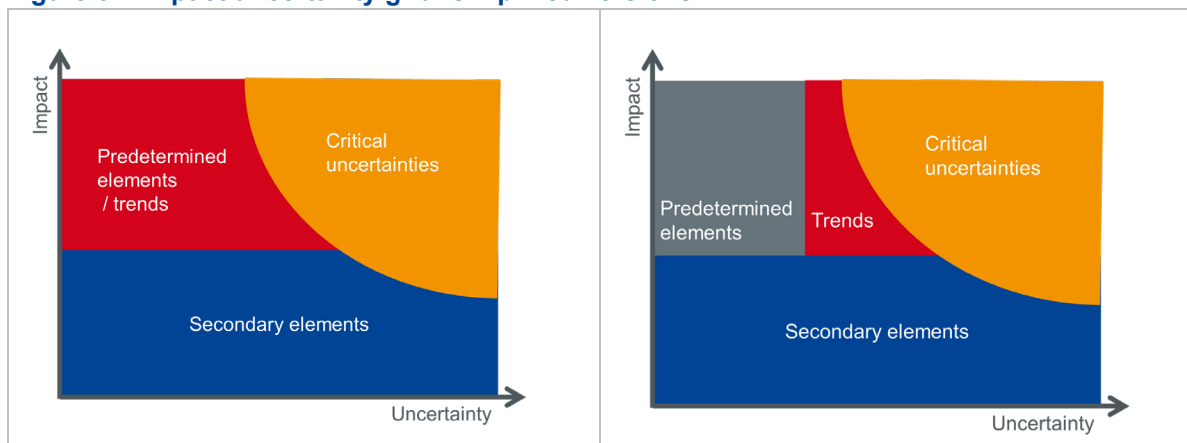
Wild card: new pandemic

Dynamics of change: case study



Source: Willis and Cave (2014)³⁷

Figure 6 – Impact/uncertainty grid: simplified versions



Sources: adapted from Wulf et al. (2010)²² and European Environment Agency (2023)⁴⁴

Although the research team is responsible for writing the driver sheets, the involvement of others, including the working group, is valuable:

- The definition of the driver is formalised by the research team, but is largely issued from the clustering exercise that likely took place with the working group.
- Indicators and retrospective analysis result from desk research that is usually carried out by the research team. Involvement of experts, stakeholders or the steering committee might be relevant to identify information that is not available in written documents.
- Dynamics of change can be identified during a workshop with the working group. The workshop serves as a means of collectively analysing information, that has been previously collected by the research team (desk research). A pragmatic method consists in locating each driver (materialised as a sticky note) on an impact/uncertainty matrix. Two questions are used to guide participants: “how much impact will the driver have in shaping the future staked out by our focal question?” and “how uncertain is the way in which the driver will manifest itself in the future?”²⁰ Alternatively, participants can be asked to give each driver a score out of 10 (or low/high/medium scores) on the level of impact, and degree of uncertainty they perceive.⁵⁵ Although such workshop still



belongs to the scanning phase, it can be seen as the first step of scenario building and carried out together with further scenario building steps.

- Assumptions for the future can be suggested by the research team but are rooted in previous discussions within the working group, in particular those emerging when identifying the dynamics of change. This step is essential if morphological analysis is used later on (see section 2.5.2). Otherwise, this step may be considered as optional.

Assumptions for the future: examples

Assumptions for the driver “task shifting between healthcare professionals”:

1. Large shift of tasks from physicians to nurses and other healthcare professionals
2. Large shift of tasks from physicians to nurses, but not to other professionals
3. Moderated shift of tasks from physicians to nurses and other healthcare professionals
4. Status quo
5. Reverse shift: tasks formerly shifted to other healthcare professionals are performed by physicians

Assumptions for the future: common pitfalls

Assumptions for the driver “task shifting between healthcare professionals”:

Most tasks are performed by AI instead of healthcare professionals. This assumption introduces another driver (shift to AI).

Task shifting decreases patient’s outcomes. This assumption is about the impact of the driver, not the driver itself.

Nurses are more trained. This assumption is not about the driver itself. Training can facilitate task shifting but this will be discussed in the scenario building phase.

Large shift of tasks from physicians to nurses, only if nurses are more trained. This assumption is about two drivers (task shifting and training) at the same time.

Assumptions for the future: case study

Workforce flexibility

1. Low level of flexibility in the workforce
2. High level of flexibility in the workforce

Self-care:

1. Low level of self-care by the population
2. High level of self-care by the population

Technology:

1. Low level of technology availability
2. High level of technology availability

Source: Willis and Cave (2014)³⁷

2.5 Scenario building

In what follows we describe two widespread techniques used in scenario building: the **2x2 matrix** (see section 2.5.1) and the **morphological analysis** (see section 2.5.2). For each of them we describe the process in several steps, from using the material gathered during the scanning phase to writing full narrative scenarios. It is important to note that, although it is a prerequisite to both methods, the documentation phase (see section 2.4.3) tends to be more extensive when morphological analysis is employed for scenario building, compared to the 2x2 matrix. Morphological analysis allows a broader exploration of the topic and can handle high complexity (consider many uncertainties simultaneously). However, it requires more time and resources than the 2x2 matrix. In many cases, the 2x2 matrix is preferred, especially when the number of critical uncertainties is limited and/or when the scenario building exercise aims at providing maximum four clear and contrasted possible futures. In the context of a KCE study, when scenarios are used in a mixed-method approach, the 2x2 matrix should be preferred. The use of the morphological analysis should be limited to studies whose objective is to provide an exhaustive exploration of the future, mapping the entire possibility space. Table 2 provides some elements to consider when selecting a method for scenario building.

Table 2 – Overview 2x2 matrix vs. morphological analysis

	2x2 matrix	Morphological analysis
Purpose	Exploring the future in a context of uncertainties Producing clear contrasting scenarios	Broader exploration of the future Producing clear contrasting scenarios Encouraging innovative ideas (less obvious combinations of drivers)
Complexity	Moderate complexity (the variables describing the system can be clustered and two dominant critical uncertainties can be identified)	High complexity (many critical uncertainties are handled simultaneously)
Resources	Limited time and resources	Time consuming and resource intensive
Facilitation	Easy communication of the framework to the participants But risk of oversimplification	More difficult to communicate to non-experts without simplification
Output	Max 4 scenarios	No upper limit but minimum 4 scenarios

For methods other than the 2x2 matrix and the morphological analysis, or for variations thereof, the reader is referred to Bishop et al. (2007) who identified more than twenty different techniques used for scenario building.² In addition, several computer software programmes exist to support the scenario construction, such as the Eidos tool distributed by Parmenides or the package “Scenaring Tools” from Futuribles. Such tools have, to our knowledge, never been used in a KCE project. A comparative analysis of such tools is beyond the scope of this report.

2.5.1 2x2 matrix

The 2x2 matrix method is a qualitative approach that originates from Herman Kahn at the Rand Corporation in the 1960s and Pierre Wack at Royal Dutch Shell in the 1970s. This method is often considered as the default option for scenario building,^{2, 5} although many variations can be envisaged.

The largest part of the exercise is carried out by the working group, facilitated by the research team (see section 2.3.1). One to three workshops are required, each lasting four to six hours.^{40, 55} If the workshops are held online, at least 6 hours are necessary, split into several sessions.⁴⁰

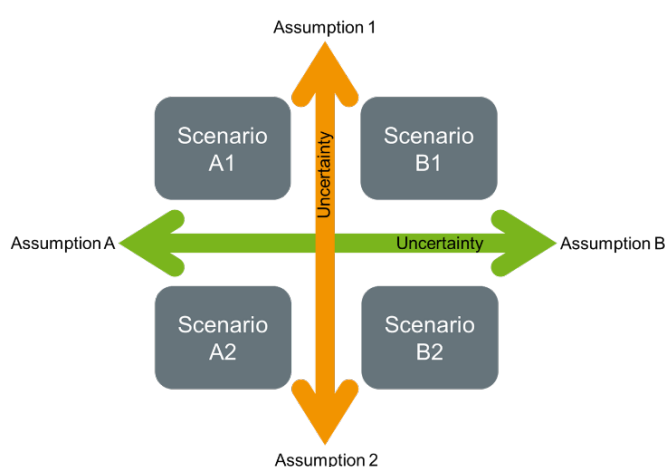


Examples of workshop scripts, including timelines, are available in Save the Children UK and School of International Futures (2019)⁵⁶ or Government Office for Science (2024)⁴⁰.

2.5.1.1 Scenario framework

Critical uncertainties are drivers that combine a high degree of uncertainty and a high level of impact on the focal issue. On Figure 5 and Figure 6, they are located in the top right quadrant. From these drivers, the group identifies at least two, that appear relevant for building scenarios. These are used to build the 2x2 matrix (see Figure 7), an orthogonal graph with a vertical and a horizontal axis, each representing one of the selected critical uncertainties. At each side of the axis, extreme assumptions are written, selected from previously defined assumptions (see section 2.4.3). The four formed quadrants define the framework to build four different scenarios.

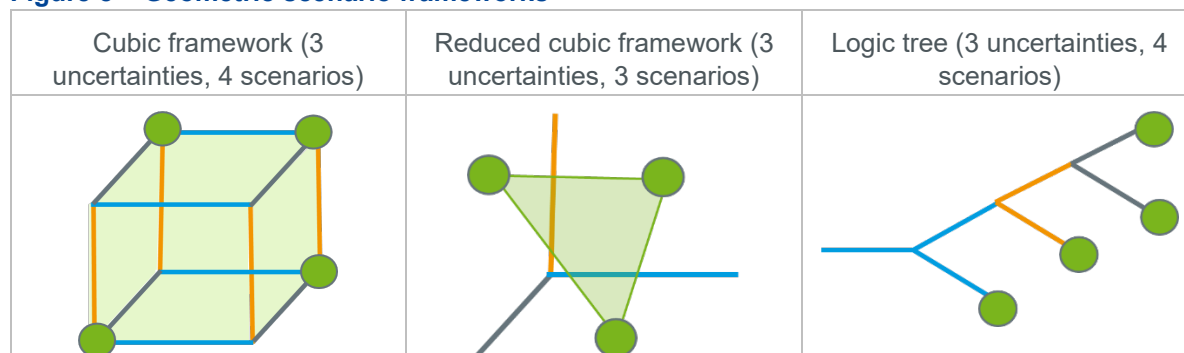
Figure 7 – 2-by-2 scenario framework



Source: adapted from Bisali et al. (2025)³²

If more than two drivers are identified, it is sometimes possible to cluster some of them further into a more broadly defined one.⁵⁵ Also, other geometric forms can be considered instead of a 2-by-2 matrix, to account for more than two critical uncertainties (see examples in Figure 8).²⁰ In addition, in a 2-by-2 matrix, sometimes one of the quadrants appears to be less interesting than the other three, for instance because it is too close to the current situation. In that case, other axis combinations may be attempted, but, particularly with a small group, it may be decided to continue with three scenarios only.⁵⁵

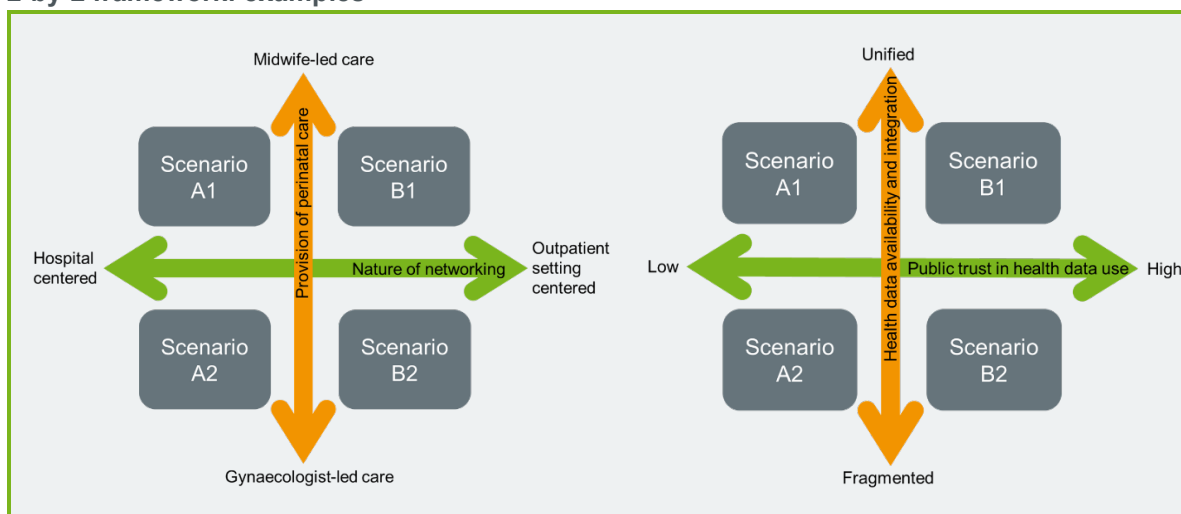
Figure 8 – Geometric scenario frameworks



Note: each colour represents an uncertainty, each circle represents a scenario. Source: adapted from Vandebroek (2018)²⁰

Selecting the two most relevant critical uncertainties may be an iterative process, where several sets of two critical uncertainties are paired together and the final selection is made by a trial and error process.³² The initial choice of the group usually consists of the critical uncertainties with the highest scores (i.e. the further at the top right of Figure 5), but they should consider the interest and relevance to the focal issue of the four spaces created by different pairs of critical uncertainties. There are two main reasons to choose critical uncertainties that differ from the ones with the highest score.⁵⁵ First, these two drivers may be largely interdependent. If that is the case, they are likely to evolve together in the same direction in the future, meaning that two quadrants of the 2-by-2 matrix would be irrelevant. Second, if the two drivers belong to the same category (for instance in a PEST framework – see section 2.4.2), the scenarios could be enriched by choosing a critical uncertainty from another category.

2-by-2 framework: examples



2-by-2 framework: common pitfalls

On elderly care: axis 1 = main provider of elderly care (formal vs. informal); axis 2 = main setting for elderly care (residential vs. home). The selected critical uncertainties (axes) are too much correlated so that some scenarios are not plausible (i.e. it is unlikely that care is mainly provided by informal carers in residential settings).

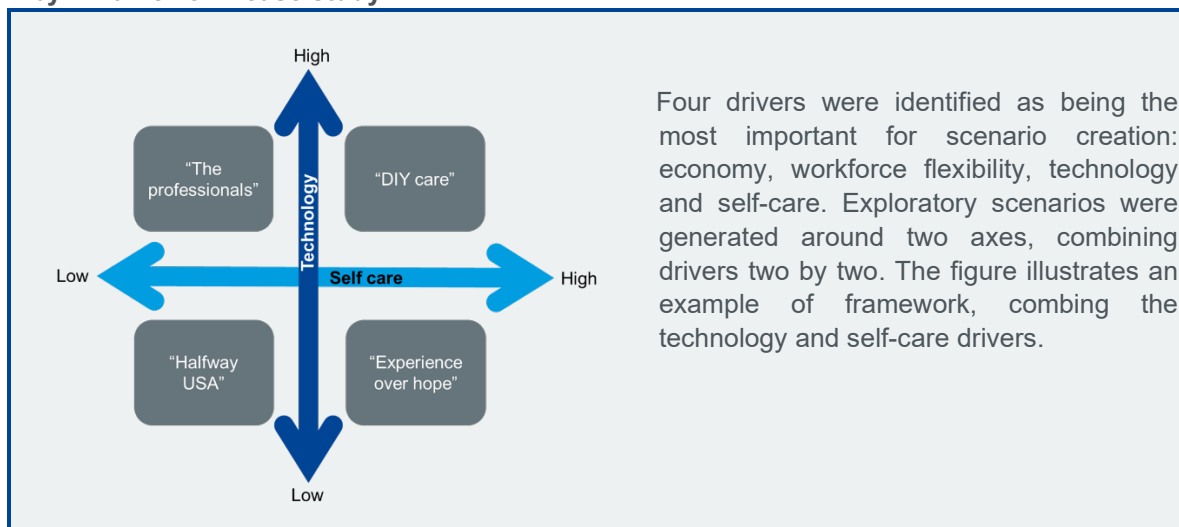
On GP care: axis 1 = age structure of the population (ageing vs. rejuvenation); axis 2: remuneration system (fee-for-service vs. flat rate). Axis 1 does not represent a critical uncertainty but a strong trend (i.e. rejuvenation is unlikely).

On healthcare: axis 1 = level of public or private healthcare funding (mainly public vs. mainly private); economic growth (stagnation vs. growth). Both axes belong to the same PEST category (economy)

On paediatric care: axis 1 = economic growth (stagnation vs growth); axis 2: migration (low vs. high). The selected critical uncertainties (axes) are not the most relevant to the topic.



2-by-2 framework: case study



Source: adapted from Willis and Cave (2014)³⁷

Although the choice of axes (critical uncertainties and extreme assumptions) may be made by the research team, it is recommended to discuss them during a workshop with the working group.⁵⁵ It should be noted that choosing the axes aims at structuring the scenarios. It does not imply that other drivers are not important for building the scenarios.⁵⁵ Precisely, left out drivers will be included in the narrative later on.

2.5.1.2 Scenario seeds

Once the framework is established and the number of scenarios is defined, the working group may be asked to identify some of the salient characteristics, in the form of three to five bullets for each scenario. Participants are then separated into smaller groups, each of them being allocated one quadrant of the matrix (i.e. one scenario). Groups have three to ten members, but experience shows that groups of six work well.⁵⁵

Each group is asked to build a narrative consistent with the logic of the framework, especially with regard to the axes. They start with the bullet points that were previously established, which they can modify if necessary.

2.5.1.3 Narrative scenarios

Each group then reflects on the possible outcomes, within the considered scenario, for some of the drivers identified in the scanning phase. Based on that, they explore connections and interactions between the drivers, introduce events and develop a story that leads to the scenario endpoint.⁵⁵ A few constraints are imposed: consistency (within the scenario), relevance to the focal issue, and reference (direct or indirect) to the drivers.⁵⁵

A variety of narrative strategies can be used, that can be triggered by one of the following questions: "What are some of the key characteristics of this future?", "How will things look like at the time horizon?", "How do we get there?", "How would life be different from today?", "What would be a day in your life in that future?".^{20, 40} By crafting scenarios, participants may also outline potential trajectories to reach the endpoint.⁵⁵

Participants should also choose a name for each scenario, that captures the essence of the scenario, is evocative, and highlights its distinctiveness.^{20, 40}

Typically, each narrative scenario (or a summary) is presented to the participants from other groups. From that, a comparative table between scenarios can be built and narrative scenarios can be fine-tuned if necessary.

Examples of narrative scenarios can be found in KCE report 271 (Alternative scenarios for the forecasting of the midwifery workforce) and KCE report 312 (Future scenarios about drug development and drug pricing).^{23, 57} An example from the latter is also reproduced in Appendix 2.

2.5.1.4 Variants

Although it is typical when using a 2-by-2 matrix that each group is allocated a quadrant, the exercise can also be structured as a rotating system where each participant is successively engaged in the discussion about all four quadrants.⁴⁰

In another alternative model, the research team writes up the narrative, based on bullet points established by the groups and each group validates or adapts the narrative afterwards.

2.5.2 Morphological analysis

Morphological analysis is issued from the qualitative and quantitative approach (called “*la prospective*”) developed in France by Michel Godet, based on previous work of Gaston Berger.^{19, 58} The approach is more comprehensive than the 2x2 matrix method but also more complicated, time consuming and therefore less commonly used.²

2.5.2.1 Combining assumptions for all drivers

As the 2x2 matrix, morphological analysis is also built on elements identified during the scanning phase, namely the drivers and their assumptions. But rather than selecting two drivers and their two extreme assumptions, here each scenario is the combination of one assumption selected for each driver. The process involves five steps:⁵⁹

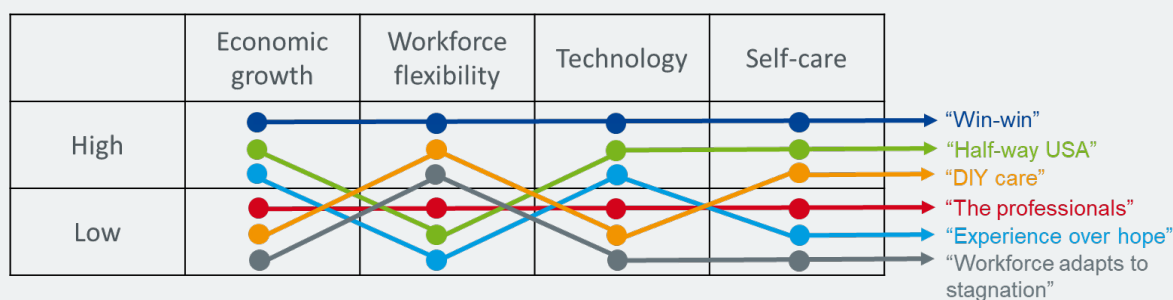
1. Assumptions table: the first step in a morphological analysis involves creating a table with the drivers listed in rows and the identified assumptions in columns. If possible, drivers are ordered from most to least influential, or from most specific to most general. It must be ensured that everyone fully understands the complete definitions of the assumptions, which are summarised briefly in the table for readability. The terms chosen to define each assumption in the table should be clear and meaningful.
2. Trend scenario: to ease the start of the exercise with the working group, the optional second step involves identifying the assumption that best represents past trends for each driver (i.e. each row). Combining these assumptions creates a “trend scenario”. This scenario allows for examining the coherence of continuing all past trends without any changes. Sometimes, this trend scenario needs adjustments for coherence. It generally serves as a convenient and educational reference, showing what would happen if nothing changes, and if trends continue in a linear way.
3. Non-trend scenarios: next, alternative scenarios to the trend scenario are created by exploring assumptions that deviate from the trend. The starting assumption for an alternative scenario can be from any row in the morphological table. This step encourages participants to use their creativity to construct and narrate alternative combinations. The first few scenarios often reflect participants' initial ideas and opinions, while more original and innovative scenarios are typically developed later. These various assumption combinations are then recorded in the morphological table using different colour codes or typographic styles.
4. Scenarios selection: three to seven combinations are then selected, focusing on the most contrasting ones. These combinations will form the scenarios. Similar scenarios are identified and either considered variants or the most evocative one is chosen. The aim is to retain contrasting scenarios that illustrate different, distinct evolutions.

5. Narrative scenarios: in the last step, a narrative is developed for the selected scenarios. This detailed writing uses precise definitions of assumptions and narrates the evolution from the present to the future, ensuring internal consistency.

The assumptions table is prepared by the research team (based on material from the scanning phase) and presented to the working group. The working group is responsible for combining assumptions and selecting scenarios. A meeting that lasts half a day should be foreseen for that exercise.⁵⁹ A draft of a narrative scenario is usually written by one person (from the working group or the research team). This occurs after the workshop, but time should be foreseen for the members of the group to revise the drafts. After that, the final scenarios can be validated.⁵⁹

Morphological analysis: case study

Four drivers were identified as being the most important for scenario creation: economy, workforce flexibility, technology and self-care. Workshop participants worked in groups to ascertain which combinations of projections for the four key drivers were consistent, and therefore relevant for development into scenarios. The consistent combinations of the key factors allowed the identification of six consistent scenarios.



Source: adapted from Willis and Cave (2014)³⁷

2.5.2.2 Nested morphological analysis

The process described above may appear challenging when dealing with a large number of drivers (usually more than 10). To manage many drivers, it is recommended to group them into several subsets, either because they are related to the same topic, or because they are dependant of each other.⁵⁹ In practice, each subset should have a roughly equal number of drivers, but which driver belongs to which subset is less important as all subsets (therefore all drivers) will be considered at the end.

A table is constructed for each subset, following the principles described above. The combination of assumptions allows for the creation of scenarios for each subset, called micro-scenarios. These are partial scenarios for a subset of drivers. For each subset, three to seven micro-scenarios are typically developed, including one trend scenario and several contrasting ones.

Once the micro-scenarios are developed for each subset, their possible combinations are examined in a global morphological table, allowing to build overall scenarios. The steps of morphological analysis are repeated to achieve this global table.

To build the micro-scenarios, half a day should be foreseen per subset of drivers. In addition, one full day should be dedicated to the development of the overall scenarios.⁵⁹ To build the overall scenarios, it is important that participants have a good knowledge of each micro-scenario.

An example of nested morphological analysis found in Lambin (2020).⁵⁹

3 LEARNING FROM PAST KCE EXPERIENCES

The search for KCE reports that use the scenario approach yielded three studies.^{23, 24, 57} The identification process is described in Appendix 1.

Table 3 summarises the main steps of the scenario approach used in the three selected studies. In all three projects, a subcontracting team (from the same company) was responsible for facilitating the scenario building workshops. Strong stakeholder involvement is observed in all three projects, although the duration of workshops was much shorter in the last KCE project on GP workforce (and workshops were organised online). In that last project, the involvement of the KCE team in the scanning/documenting step was more extensive than in the other two.

In KCE report 271 on drug development and drug pricing, interviews were used to identify building blocks rather than driving forces.⁵⁷ In that report, scenarios were seen as possible solutions rather than possible futures. Each scenario was expected to describe the rationale behind and the working of an alternative drug development and pricing mechanism that would be more effective and cheaper in providing access to drugs for the people who need them. In that context, the building blocks were functional elements that needed to be part of such alternative systems. Scenarios were built using a technique close to morphological analysis, combining building blocks (rather than assumptions). This exercise led to 8 scenario seeds. After refinement (clustering and selection of relevant scenario seeds), four narrative scenarios were developed.

KCE report 312 (midwifery workforce) and the ongoing project on GP workforce both used a 2x2 matrix framework to build narrative scenarios about the future of a healthcare profession.^{23, 24} Drivers were identified based on a literature review. In KCE report 312 on the midwifery workforce, the literature review was supplemented by a survey, while in KCE project 2024-05 on the GP workforce, the literature review was used to write driver sheets for each cluster of drivers.^{23, 24} Although the topics were quite similar, the scientific literature was much more abundant in the latter case. The critical uncertainties selected to build the axes of the 2-by-2 framework were also different (hospital vs. outpatient setting centred and midwife-led vs. gynaecologist-led on the one hand, low or negative impact vs. high and positive impact of technology and GP activities centered on coordination tasks vs. clinical tasks on the other hand). Also, in KCE report 312, two quadrans were grouped, resulting in three narrative scenarios instead of four.



Table 3 – Scenario approach in three KCE studies

Step	KCE report 271 (drug development and drug pricing) ⁵⁷	KCE report 312 (midwifery workforce) ²³	KCE project 2024-05 (GP workforce) ²⁴
Scoping			
Research team (see section 2.3.1)	Subcontracting team	Subcontracting team + KCE team	Subcontracting team + KCE team
Working group (see section 2.3.1)	29 stakeholders (international)	14 midwives + 17 other stakeholders (17 FR + 14 NL together)	20 general practitioners (10 FR + 10 NL together)
Working group meetings	2 workshops (1.5 day each), in person	4 one-day workshops, in person	4 workshops (2 to 2.5 hours), online
Steering committee (see section 2.3.1)	Not formally defined	Not formally defined	Not formally defined
Focal question (see section 2.3.2)	Explore new drug development and pricing models to provide patients sustained access to the safe and effective drugs they need, with particular attention to the role of pricing	How will the midwife profession in Belgium evolve over the next 20 years in light of foreseeable demographic, economic, technological, and organisational changes?	How will the GP profession in Belgium evolve over the next 20 years in light of foreseeable demographic, economic, technological, and organisational changes?
Scanning			
Identification (see section 2.4.1)	Semi-structured interviews	Literature review (peer reviewed and grey) + survey	Literature review (peer reviewed and grey)
Grouping (see section 2.4.2)	Building blocks derived from the interviews by the research team + refinements by the working group	Clusters made by the working group	Clusters made by KCE team + refinements by the working group
Selection (see section 2.4.2)	Working group based on refined building blocks	Working group	Working group based on refined clusters
Documenting (see section 2.4.3)	Interim report with description of building blocks, written by research team	Answer to questions by KCE team during workshops	Driver sheet for each cluster, written by KCE team
Scenario building			
Technique (see section 2.5)	Morphological analysis	2x2 matrix	2x2 matrix
Framework	Combination of building blocks resulting in 8 scenario seeds	2-by-2	2-by-2
Narrative scenarios	4	3	4

4 A PRACTICAL GUIDE TO USE THE SCENARIO APPROACH IN A KCE STUDY

4.1 When to use the scenario approach?

The following criteria provide guidance on whether it is relevant and possible to use the scenario approach in a KCE study.

Yes if:

- The research question focuses on long-term issues or future developments.
- There are multiple uncertainties that could significantly affect future developments.
- There are uncertainties regarding the persistence of historical trends.
- There is an interest in exploring multiple plausible futures rather than predict one.
- Stakeholder involvement (willingness and availability) can be ensured.
- Sufficient resources (e.g. time and money) and skills (e.g. animation, facilitation) are available.

No if:

- The research question focuses on short-term evolutions.
- Future evolutions are quite predictable, or potential disruptions are already known.
- Future evolutions can be statistically forecasted.
- The aim is to build several policy options, rather than analysing external forces (beyond the immediate control of the developers and users of scenarios).
- The aim is to predict the future, rather than exploring a range of possible futures.
- Resources are not available to plan and facilitate participative workshops.

4.2 Step by step guide and practical tips

Figure 9 shows a timeline of the major steps to be undertaken when using the scenario approach in a KCE study. The time needed for building scenarios depends on a number of methodological choices (e.g. the drivers are listed by means of literature search, key person interviews, triangulation of several methods), practical circumstances (e.g. size of the research team, familiarity of the team with the scenario approach, ease of expert recruitment for the working group) and the complexity of the topic. However, in general, the following time frame can be used as a *minimal* indication:

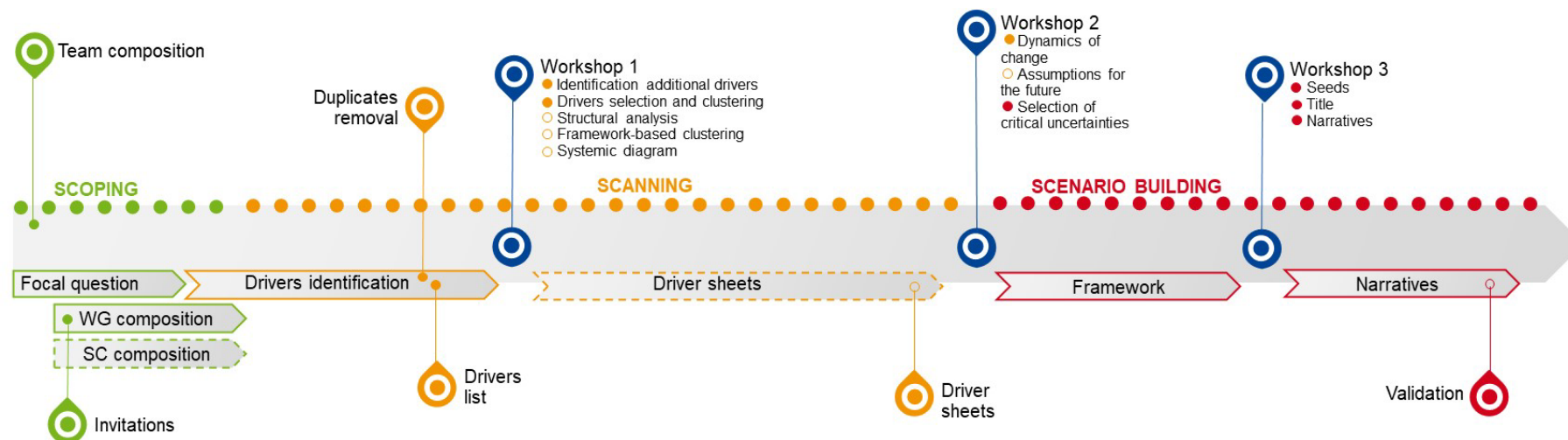
- Scoping phase (i.e. formulation of focal question and working group composition): 2 months.
- Scanning phase (i.e. identification of the drivers and first workshop): 2-3 months. If driver sheets are used, additional time is required (minimum three working days per sheet).
- Scenario building phase: 1-2 months, mostly depending on the time interval between the second and third workshops, which would ideally be at least two weeks.

Table 4 to Table 6 provide a more detailed overview, including a distinction between tasks realised by the research team, those involving the working group, and optionally those concerning the steering committee. These tables also present some practical tips. References are provided for elements retrieved from external sources. Otherwise, these elements were identified from the consultation of KCE researchers (interviews and workshop).

Note that only the commonly used 2x2 matrix approach (see section 2.5.1) is explicitly described here. Indeed, it is seen as appropriate for use at KCE (see section 2.5). In addition, KCE has already some experience using the 2x2 matrix approach (see chapter 3). However, many of the practical tips described here would also apply in the context of a morphological analysis. The reader interested in this more extended approach is referred to section 2.5.2.



Figure 9 – Timeline for the scenario approach at KCE



Note: WG = working group(s), SC = steering committee. Mandatory steps are indicated using solid lines or filled bullets, while optional steps are represented by dashed lines or empty bullets.

Table 4 – Step-by-step guide for the use of the scenario approach at KCE: scoping

Step	Optional?	Who?	Do's & don'ts
Composition research team (see section 2.3.1)	Mandatory	RT	Consider whether or not the KCE team should be complemented with subcontractors. Workshops exercises require a minimum of two experienced facilitators and careful planning.⁶⁰ A moderator keeps the discussion structured and on topic and manages the flow of a discussion. A facilitator's role however demands an active involvement in the process. A facilitator guides a group towards a predefined goal or outcome, in this case the building of future scenarios. Both remain however entirely neutral to the content.⁶¹ The development of scenarios hence demands a strong facilitator who is familiar with the methodology to guide the participants to the process. A moderator would not be sufficient for that purpose.
Composition working group(s) (see section 2.3.1)	Mandatory	RT	Ideally a working group consists of 10 to 25 participants, representing a wide range of expertise and drawn from different backgrounds.^{55, 60} Scenario building requires a minimum of 8-12 participants⁴⁰ (for the whole exercise, therefore at least 2-3 participants per scenario). Regarding participant selection, see KCE report 408, section 12.3.³³ To ensure different profiles are selected, a selection matrix can be used. A diverse group of participants is needed with divergent opinions in order to come to rich discussions. Participants should be involved in the field of the study, but they should also be open-minded and capable of creative thinking. They should be willing to invest time also in-between the workshops to read preparatory documents. Participation is personal, hence participants cannot be representatives of a larger group. It is not evident to engage experts, high-level people to engage in a time-consuming and intense process. Try to involve as much as possible the same participants in the scanning step and in the scenario step. The understanding that they build up by being involved in successive stages adds greatly to the results.⁶⁰ Be clear in what you expect from the participants, in order to avoid them to have expectations that cannot be met. Regarding the establishment of a good collaboration, inspiration can be found in KCE report 340 and its complement on animation techniques.^{50, 62} Even though it is not the objective of exploratory scenarios, the development of such scenarios might create seeds of change. Indeed, the process of developing scenarios can unintentionally plant ideas or inspire actions that lead to change. The RT and the WG should be aware of that. Be aware that another group would lead to a different outcome. Make sure the participants are also aware of that. Do not hesitate to repeat it during workshops. Ideally, all participants should meet at the same time. For the organisation of bilingual groups, see KCE report 408, section 15.7.³³



Step	Optional?	Who?	Do's & don'ts
			Face-to-face meetings are preferred to create a dynamic participation, especially with bilingual groups. Group meetings should be long enough to avoid the participants to feel "rushed" into making choices. Breaks should be organised to allow for informal interactions to create connections between participants and to maintain concentration. One to three workshops of approximately 6 hours each should be budgeted with venue and catering included.^{55, 60} A minimum is 4-5 hours.⁴⁰ You need sufficiently long working sessions. For example, 2h per working session is too short to balance instruction and discussion time. The method needs to be well explained. Participants need to be well informed about the process and the different steps. This takes time which cannot be used for the exercise itself. The methodological aspects should be presented in a dynamic way and be applied directly afterwards to maintain participants' awareness. It might also be useful to organise a first meeting (independently of the working sessions) to launch the project and explain the methodology, before going to the scanning phase. In case meetings can only be organised online, a minimum of 6 hours will be required in total, to be split into more than one session.⁴⁰ Online meetings should be shorter than face-to-face meetings to avoid "zoom fatigue". For more guidance, see KCE report 408, section 12.5.2.³³ However, the use of online workshops for scenario planning is strongly discouraged. Rich and intensive interaction between participants is crucial in the process. The screen has been experienced as hampering interaction in previous projects. Even add-ons such as MIRO cannot replace face-to-face interaction, because not everybody is familiar with it, not even after instructions are provided. Also zoom translation services might not function well and disturb the process, as was the case in a previous KCE project. The use of break-out rooms was experienced as inappropriate, because the discussions within a subgroup were interrupted abruptly when time was up. In real life, researchers get more of a feeling with the subgroups, they can easily adapt the timing or other aspects of the process in function of their needs. Researchers should reflect well on when (period of the year) the series of workshops are planned. For example, just before summer holidays is not a good plan because once summer holidays started people are no longer reachable. Additional feedback needed in function of drafting the results is hard to get in that period.
Composition steering committee (see section 2.3.1)	Optional	RT	Similar to an expert group in another KCE study, that is consulted throughout the duration of the project.
Definition focal question (see section 2.3.2)	Mandatory	RT	Defined according to: What? Where? (Until) when? The focal question should not be too broad and should be well defined. If it appears later in the process the question was not well defined (for instance, because participants of the WG ask questions about what

Step	Optional?	Who?	Do's & don'ts
			is included in the scope of the research), do not hesitate to come back to this step and redefine the focal question. Time horizon should be at least five years, but generally a minimum is 10-20 years.⁴⁰ Depending on the topic (i.e. for things that change very fast such as the development of AI applications), a shorter time horizon can be relevant.

Note: RT = research team, WG = working group(s), SC = steering committee.

Table 5 – Step-by-step guide for the use of the scenario approach at KCE: scanning

Step	Optional?	Who?	Do's & don'ts
Identification of drivers via desk research (see section 2.4.1)	Mandatory	RT	Various methods possible (can be combined): literature review, survey, interviews, etc. Input from the WG and/or the SC can be considered. Ensure that each driver is expressed as a variable (i.e. whose value can change).⁵⁵ Use short, descriptive phrases to make the drivers very clear.⁴⁰
Identification of drivers via participative methods (see section 2.4.1)	Optional	WG	Optional but recommended especially if little literature is available or in case the topic concerns highly sensitive or even secret information (e.g. national security). Provide time with the working group already during the scanning phase. This helps them to get involved, gain ownership and creates connections between participants. This step does not necessarily require a workshop/meeting as interaction between participants is not needed. The list of identified drivers can be sent by e-mail to the participants who are then asked to complete it (e.g. via an online survey). If participants are not formally involved in the identification process, it is recommended to give them the opportunity to complete the list of drivers. Provide some time to do so before selection and clustering.
Duplicates removal	Mandatory	RT	
Drivers selection and clustering (see section 2.4.2)	Mandatory	RT and/or WG	Select between 10 and 25 drivers. Exclusion criteria: secondary drivers, inertia, resulting variable. Prepare one sticky note per driver before the workshop, so that participants can easily move and group them. Foresee blank sticky notes for additional drivers that may emerge during discussion. If the exercise is done in sub-groups, prepare several sets of sticky notes.



Step	Optional?	Who?	Do's & don'ts
			Time should be foreseen (during or before the meeting) for participants to familiarise themselves with the drivers already identified. A pre-clustering can be done by the RT, but the WG should be responsible of the ultimate selection and clustering. This step requires interaction among participants and should therefore be organised during a workshop, preferably face-to-face. Such workshop shares many similarities with the nominal group technique: see KCE report 408, section 18.⁵³ The quality of the animation/facilitation is crucial. The facilitator needs to be both a methodological (animation techniques) and a topical expert. He/she must speak with a certain authority to be able to guide a group with strong personalities throughout the process.
Structural analysis (see section 2.4.2.1)	Optional	WG	Drivers with high ingoing influence and low outgoing influence are candidates for exclusion.
Framework-based clustering (driver mapping) (see section 2.4.2.2)	Optional	WG	Choose one framework for clustering (PEST (or variation), three interlocking circles (system, ecosystem and environment) or other taxonomy) which is relevant to the focal question. Avoid too complicated frameworks: assignment of a driver into a category should be straightforward. Participants should not take too long to perform this task, as the aim is to facilitate the reflection. The framework itself is not used later on, it only helps to structure the clustering exercise and to identify missing drivers. Alternative: rather than using it for driver clustering, a framework can be used ex post by the RT (or possibly by the WG) to check that no important categories of drivers are missing.
Systemic diagram (see section 2.4.2.2)	Optional	WG	Relationships between the drivers. Also called 'causal loop diagram' or 'system map'.
Driver sheet (see section 2.4.3)	Optional	RT	Driver sheets are especially recommended when there are many drivers from diverse areas, requiring a broad range of expertise or knowledge that few WG participants can claim to have. For each cluster, the driver sheet includes definition, indicators and analysis of past data. Optional: revision of each driver sheet by the SC. Make it concise to be useful. Aim for summaries with references to full source documents.⁵³ Avoid too condensed driver sheets (e.g. 2 pages) as well as too long sheets (15-20 pages) that will not be read.⁵³

Step	Optional?	Who?	Do's & don'ts
			If participants are expected to read the driver sheets before the scenario building phase, make sure to foresee enough time for the RT to write them and the WG to read them before the following meeting. At least two months should be scheduled between driver selection and the presentation in individual driver sheets.⁵³ At least two working days are necessary to properly document and structure each driver sheet.⁵³ In total, three working days should be scheduled per driver sheet, drafted and approved.⁵³ Experiences show this can take longer.
Dynamics of change (see section 2.4.3)	Mandatory	WG	The workshop serves as a means of collectively analysing information, but it should be based on data that have been previously collected by the research team (desk research) and possibly formalised in the driver sheets. In the absence of driver sheets, the research team should present these data during the workshop. Prepare one sticky note per driver (cluster) and a board with the impact/uncertainty matrix so that participants can place and move sticky notes on the grid. This step requires interaction among participants and should therefore be organised during a workshop, preferably face-to-face.
Assumptions for the future (see section 2.4.3)	Optional	RT and/or WG	Mandatory if morphological analysis is used later on. Can be formalised in the driver sheets. Can be schematised by axes (as preliminary step for scenario building): only two extreme assumptions. When using the 2x2 matrix, determining only two extreme assumptions is sufficient. This step is optional but can help participants to correctly formulate critical uncertainties (see later). A pragmatic approach is to define two extreme assumptions for the drivers that are located on the upper right quadrant of the impact/uncertainty matrix. A facilitating question can be, for each critical uncertainty: "Can you think of two quite different ways it may manifest in the future?"⁵⁶ The same driver can have multiple interpretations. It is important to explore different possibilities and decide what would work best to create contrasting scenarios through which to explore the focal issue.⁵⁶

Note: RT = research team, WG = working group(s), SC = steering committee.



Table 6 – Step-by-step guide for the use of the scenario approach at KCE: scenario building

Step	Optional?	Who?	Do's & don'ts
Selection of critical uncertainties (see section 2.5.1.1)	Mandatory	WG	Ideally two critical uncertainties are selected. Criteria: impact/uncertainty score, relevance to the focal question, independence from each other, different PEST/PESTEL categories. A first suggestion can be made by the RT. Write the focal issue on a flipchart/whiteboard and remind everyone of the time horizon.⁵⁶ Ask the group to think about which of their critical uncertainties might combine to generate a set of four interesting scenarios.⁵⁶ Make sure the two uncertainties are not correlated. This ensures distinct and plausible scenarios. Avoid having two drivers from the same PEST category.⁵⁶ Scenario axes and quadrants are a basic separation device which ensures that the scenarios created possess some fundamentally different characteristics.⁵⁵ "Megatrends" such as demographic trends, use of information technology and climate change will influence a wide range of scenarios. Given their relative predictability, these are however, usually not regarded as "critical uncertainties" but are likely to be taken into account naturally in the development of most scenario narratives.⁵⁵ The choice of the two critical uncertainties can be revised if it appears later on (typically when choosing the scenario framework, or even when building scenario seeds) that the two uncertainties are correlated. This step requires interaction among participants and should therefore be organised during a workshop, preferably face-to-face. At least 45 to 60 minutes should be provided.^{40, 56}
Choice scenario framework (see section 2.5.1.1)	Mandatory	RT	2-by-2 framework or variants. Express the axis descriptor in neutral language and check to see whether it can take different directions (or polarities). For example, use "migration" or "movement of people", rather than "emigration" or "immigration".⁵⁵ Similarly, use "organisation of care" rather than "centralisation of care". Avoid overlapping scenarios. Make sure scenarios are clearly distinct. Foresee enough time between workshops to build the scenario framework. This process can be repeated. If multiple alternatives are created, the WG can decide to go back and choose different drivers if it does not feel like a right fit.^{55, 56}
Scenario seeds (see section 2.5.1.2)	Mandatory	WG	One sub-group per scenario. Form sub-groups of participants (from three to ten participants, but experience shows that groups of six work well).

Step	Optional?	Who?	Do's & don'ts
			Assign one scenario to each sub-group and ask participants to write a quick list (up to three bullet points) to describe the essential features of the scenario.⁵⁶ Alternative: 2 sub-groups (two scenarios per group) or no sub-group (four scenarios per group).⁵⁶ Sub-groups should work autonomously, with little intervention of the facilitator. It is not advised to have a member of the research team involved in sub-group discussions, because participants may feel "observed" by this person or search for his/her validation. Participants may find it difficult to make choices about an uncertain context. The facilitator should reassure them and make sure they stay engaged. Some scenarios seem more probable than others. Participants should be aware of that but accept to engage in the process in a similar way whatever the type of scenario they have to work with. Participants may feel some discomfort when working with pessimistic scenarios. The facilitator should be aware of that and make efforts to keep the participants engaged. This step requires interaction among participants and should therefore be organised during a workshop, preferably face-to-face. At least 80 to 120 minutes should be foreseen to build the scenario seeds in each sub-group.^{40, 56} Once each sub-group has built the scenario seeds, one person from each group could give a brief overview of the scenarios they have generated in a plenary session, allowing further discussion from the whole group. This optional step requires 45 to 120 minutes depending on the desired depth of the discussion.^{40, 56}
Scenario title	Mandatory	RT and/or WG	Give names to each scenario, a distinctive, memorable title that encapsulates key characteristics. This helps when discussing the scenario and its implications.⁵⁵ If done during a workshop, 30 minutes should be foreseen.⁴⁰
Narrative scenarios (see section 2.5.1.3)	Mandatory	WG	Alternative: first draft by the RT based on scenario seeds, then validation by the WG (can be by e-mail to save time during the workshops). Even if the narrative scenarios are fully drafted by the WG, the participants are not considered as co-authors of the KCE report. Deviations from this rule should be discussed in advance with the participants. Avoid assigning probabilities. None of the scenarios created will happen. The purpose of constructing scenarios is to make people aware of how many uncontrollable factors will shape the future. A scenario's value lies in the fact that it enables participants to think through what kind of things could happen.⁵⁵ AI can be used as a supportive tool (always with human verification afterwards), but ownership of the working group must not be replaced.



Step	Optional?	Who?	Do's & don'ts
			When drafting the scenarios, participants should keep in mind they should be plausible and consistent.⁵⁶ When drafting scenarios, participants should reflect on the drivers that were not selected to build the 2-by-2 framework. These drivers will evolve differently in different scenarios. These elements will help participants to build the narratives. Do not write scenarios in bullet points. Detailed narrative text is important to identify inconsistencies. A summary or list of bullet points can be written afterwards, but the narrative step should not be skipped.⁵⁹ A comparative table between scenarios can also be built afterwards. This can be supported by AI (with human verification afterwards). If full narratives are written in subgroup during a workshop, a validation of the narratives must be performed by other participants either during the working or by e-mail at the end of the process. The research team should verify the consistency of scenarios and the tone of narrative to avoid the desirability bias. If financial incentives are offered to participants, they should be conditional upon attending the workshops as well as completing this final task.
Validation	Optional	SC	Make sure this step is announced in advance and the roles are carefully explained so that the WG still feels responsible for the final product.

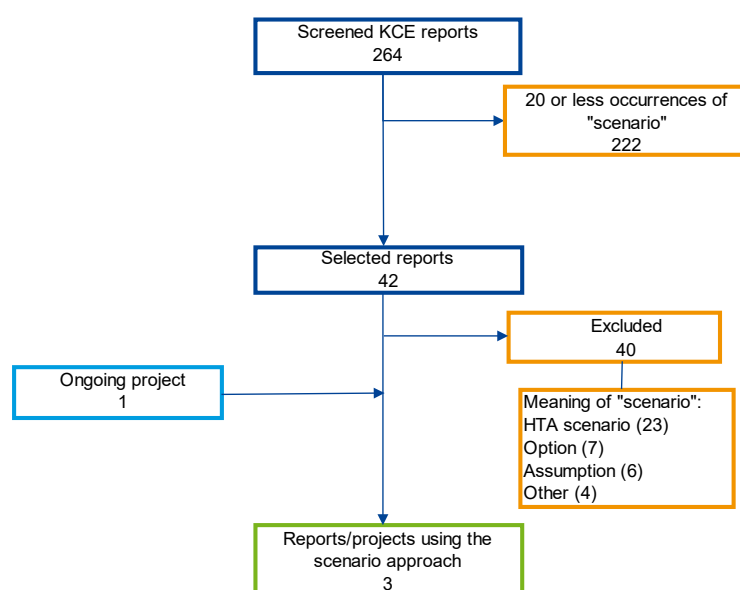
Note: RT = research team, WG = working group(s), SC = steering committee.

■ APPENDIX

APPENDIX 1. IDENTIFICATION OF PREVIOUS KCE REPORTS USING THE APPROACH

A text search was performed within past KCE reports, published between 2015 and July 2025. A total of 264 documents (133 HSR, 53 HTA, 55 GCP and 23 others) were analysed. The word “scenario” (in English, Dutch or French) was used at least once in 76 HSR reports, 47 HTA reports, 16 GCP reports and 16 other reports – Method, NEED, R3 and Right to be forgotten. Among these, we selected reports showing at least 20 occurrences (see Figure A. 1).

Figure A. 1 – Selection flow



Among HSR reports, 17 reports were selected based on the text search. Based on the full text of the HSR reports, 2 reports were using the scenario approach as described in chapter 2.^{23, 57} The remaining 15 reports were excluded for the following reasons:

- “Scenario” refers to possible option or choice (n=7).⁶³⁻⁶⁹ In one report, “scenario” refers to a proposed future system for child and adolescent mental health care service.⁶⁹ Although the scenario is aimed to be consistent, concerns the future and its development was largely based on stakeholder involvement, it does not qualify as scenario as defined here. Indeed, the scenario is not built based on the method described in chapter 2, it is not a narrative description of the future, it is normative, and it is not compared to other possible scenarios.
- “Scenario” is used to describe alternative assumptions in a model or analysis (n=6)⁷⁰⁻⁷⁵
- Different “scenarios” mean in fact different definitions (n=1)⁷⁶
- “Scenario” is used with different meanings through the report, none of them relating to the scenario approach as described in chapter 2 (n=1)⁷⁷

Twenty-two HTA reports qualified for selection based on the text search. In these reports, the word scenario is mainly used to refer to alternative assumptions used in complementary analyses. Although these scenarios address future uncertainty, they are not full narrative descriptions of a possible future. Furthermore, they do not employ stakeholder-driven deductive methods as described in chapter 2. Therefore scenarios in HTA reports do not refer to the scenario approach in the sense given here.



Also one methodological report extensively uses the term scenario, but this report concerns the method for economic evaluations and budget impact analyses, therefore using the HTA sense of the word scenario.⁷⁸

In GCP reports, only two reports used the word scenario more than 20 times.^{79, 80} In both cases, the term scenario is used to describe alternative assumptions when modelling the impact of vaccination or screening strategies, not scenarios as defined here.

The call to KCE researchers did not bring any additional reports. However, at the time of the study, an ongoing project (KCE project 2024-05) used the scenario approach.²⁴ Although the report was not published yet, the scenario building phase was already completed, therefore this project was also selected.

APPENDIX 2. EXAMPLE OF NARRATIVE SCENARIO

The following example is a reproduction of scenario H-M (hospital-centred scenario in which midwives play a central role) published in KCE report 312.²³

Appendix 2.1. Scénario centré sur l'hôpital dans lequel les sages-femmes occupent une place centrale

Dans ce scénario pour le futur, les réseaux de soins pré, péri et postnatals seraient organisés principalement par les institutions hospitalières. Dans ce scénario, les sages-femmes assumeraient la responsabilité de définir l'ensemble du trajet de soins autour de la grossesse, ainsi que la supervision et, si nécessaire, la coordination avec les autres services. L'hôpital serait donc le point central de délivrance des soins et par conséquent, la plupart des sages-femmes seraient liées à un hôpital. Parce que les hôpitaux permettent une prise en charge rapide, le besoin de développer des soins extra-muros resterait assez limité. Toutefois, pour répondre à ce besoin, l'hôpital mettrait en place des centres locaux organisés en satellites reliés à l'hôpital. De cette manière, une couverture des soins de qualité serait assurée sur tout le territoire et l'accessibilité serait améliorée. Un dossier médical digitalisé serait un élément essentiel de ce scénario pour que les informations relatives aux patientes puissent circuler rapidement et de façon exhaustive entre les prestataires de soins impliqués dans la prise en charge.

Dans ce scénario, les sages-femmes endosseraient une grande responsabilité pour l'élaboration du trajet de soins avant, pendant et après la grossesse. Le premier contact, le suivi de la grossesse et la gestion de l'accouchement seraient principalement du ressort des sages-femmes. En outre, les sages-femmes assumeraient la responsabilité de la première analyse des risques et assureraient la coordination de l'ensemble du trajet de soins. Elles s'occuperaient également du référencement et du suivi par des spécialistes lorsque cela s'avèrerait nécessaire, comme par exemple, lors de l'identification d'un risque particulier, de la survenue inattendue d'une pathologie ou encore du besoin d'un soutien psychologique ou social.

Les sages-femmes occuperaient également une place plus importante à l'hôpital dans la préparation et la conduite de l'accouchement ainsi que dans le post-partum, ce qui rendrait les médecins spécialistes plus disponibles pour les situations problématiques, sévères ou urgentes. Les sages-femmes seraient donc impliquées dans les consultations pré- et postnatales et réaliseraient des échographies fonctionnelles et morphologiques. Cela s'inscrirait dans une vision du futur où la grossesse et l'accouchement physiologiques redeviendraient la norme tandis que la médicalisation de la grossesse et le recours à la césarienne se limiteraient à des situations réellement critiques. Cette vision du futur est rendue possible et réaliste car la plupart des accouchements (sauf cas exceptionnels) auraient lieu à l'hôpital, où des médecins spécialistes pourraient intervenir en cas de problème aigu. Dans ce scénario, les compétences de la sage-femme comprendraient l'aide à la décision concernant la gestion de la douleur via, par exemple, le recours à l'anesthésie péridurale ou le recours à des méthodes alternatives de gestion de la douleur.

L'entrée dans le trajet de soins se ferait principalement via une sage-femme, soit en milieu hospitalier soit dans un centre satellite de l'hôpital. Cependant, l'entrée dans le trajet de soins pourrait occasionnellement se faire via un médecin spécialiste (obstétricien) ou un médecin généraliste. Cette étape serait suivie par l'analyse de risques qui serait discutée par une équipe multidisciplinaire afin de prévoir, le cas échéant, l'adoption de mesures spécifiques. La sage-femme coordonnerait ensuite toutes les activités pendant toute la durée du trajet de soins avec tous les acteurs impliqués. Dans le cas de grossesses à risque, la responsabilité du suivi de la patiente serait dévolue au médecin spécialiste ; la coordination des soins par la sage-femme resterait toutefois souhaitable.

Au sein de l'hôpital, les modèles de soins 'one-to-one' et les prises en charge en groupe 'centering pregnancy' pourraient se développer en fonction des choix des patientes et de la politique de soins prônée par l'institution. Dans les deux cas, la sage-femme resterait la personne centrale et coordonnerait le suivi des patientes.

Un objectif important de ce scénario est que le nombre de soignants impliqués par patiente resterait limité tout en permettant des soins personnalisés (par exemple «one-to-one») et une meilleure organisation pour respecter les contraintes budgétaires et le souci d'efficacité dans l'organisation des soins.

Dans cette vision du futur, il serait nécessaire d'élargir (voire même de prolonger) la formation des sages-femmes pour acquérir de nouvelles compétences, incluant des compétences organisationnelles. Il faudrait également envisager d'élever la formation à un niveau de master. Logiquement, la nomenclature devrait être adaptée aux nouvelles tâches dévolues aux sages-femmes.

Dans ce scénario, la profession de sage-femme évoluerait donc principalement dans un contexte hospitalier. On peut donc s'attendre à ce que les sages-femmes relèvent principalement du salariat. Les sages-femmes avec un statut indépendant pourraient également travailler dans un hôpital, via des accords de coopération précisant clairement les responsabilités de chacun.

Une plus grande responsabilité des sages-femmes dans ce scénario pourrait rendre l'exercice de la profession plus varié, plus visible et par conséquent plus attractif. A l'inverse, cette plus grande responsabilité pourrait être liée à une plus grande exposition aux risques. Des tensions pourraient aussi se créer entre obstétriciens et sages-femmes dans un climat de compétition.

Appendix 2.2. Scenario waarbij het ziekenhuis centraal staat en waarbij vroedvrouwen een centrale plaats innemen

In dit toekomstscenario worden de pre-, peri- en postnatale zorgnetwerken vooral georganiseerd door de ziekenhuizen. Zij worden dus het centrale punt van de zorg, en de meerderheid van de vroedvrouwen is aan een ziekenhuis verbonden. De vroedvrouwen stippelen het volledige zorgtraject rond de zwangerschap uit, en zijn verantwoordelijk voor de supervisie en eventueel de coördinatie met de andere diensten. De behoefte aan zorg buiten het ziekenhuis blijft daarbij eerder beperkt, maar om toch aan deze eventuele nood te beantwoorden, kunnen ziekenhuizen lokale satellietcentra oprichten. Op die manier wordt een kwaliteitsvolle zorg over het hele grondgebied verzekerd, en wordt de zorgtoegankelijkheid verbeterd. Een elektronisch medisch dossier is hierbij essentieel, zodat patiëntinformatie snel en volledig kan worden gedeeld tussen de betrokken zorgverleners.

In dit scenario dragen de vroedvrouwen een grote verantwoordelijkheid voor het opzetten van het zorgtraject voor, tijdens en na de zwangerschap. Zij staan in voor het eerste contact, de opvolging van de zwangerschap en de begeleiding bij de bevalling. Bovendien voeren zij de eerste risicoanalyse uit en coördineren zij het volledige zorgtraject. Indien nodig, kunnen zij ook doorverwijzen naar een specialist, bijvoorbeeld bij een bepaald risico, een onverwachte pathologie of een behoefte aan psychologische of sociale ondersteuning.

De vroedvrouwen spelen een belangrijke rol in het ziekenhuis, zowel bij de voorbereiding van en de bevalling zelf, als bij het post partum. Dat maakt de specialisten meer beschikbaar voor ernstige of dringende situaties. De vroedvrouwen worden ook betrokken bij de pre- en postnatale consultaties,



en voeren functionele en morfologische echografieën uit. Dit past in een toekomstvisie waar een fysiologische zwangerschap en bevalling opnieuw de norm worden, terwijl de medicalisering van de zwangerschap en het uitvoeren van keizersneden beperkt worden tot effectief kritische situaties. Deze toekomstvisie wordt mogelijk en realistisch, omdat de meerderheid van de bevallingen (behalve de uitzonderingen) plaatsvindt in het ziekenhuis, waar er specialisten kunnen tussenkomen bij acute problemen. In dit scenario nemen vroedvrouwen ook beslissingen rond pijnbeheersing met, bijvoorbeeld, een epidurale verdoving of andere methodes.

De instap in het zorgtraject verloopt hoofdzakelijk via de vroedvrouw, die werkt in een ziekenhuis of in een satellietcentrum van een ziekenhuis. Daarnaast kan het zorgtraject occasioneel worden opgestart via een specialist (verloskundige) of een huisarts. Na de instap wordt er een risicoanalyse uitgevoerd, die besproken wordt door een multidisciplinair team, om indien nodig specifieke maatregelen te nemen. Vervolgens coördineert de vroedvrouw alle activiteiten van het zorgtraject met alle betrokken actoren, ook bij een risicozwangerschap. In dit laatste geval is de specialist wel verantwoordelijk voor de opvolging van de zwangere vrouw.

Binnen het ziekenhuis kunnen de zorgmodellen 'one-to-one' en de opvolging in groep ('centering pregnancy') worden opgezet, in functie van de keuze van de patiënte en van het zorgbeleid van de instelling. In beide gevallen blijft de vroedvrouw de centrale persoon die de zorg coördineert.

Een belangrijk doel van dit scenario is het beperken van het aantal zorgverleners per patiënte, terwijl de zorg toch gepersonaliseerd blijft (bv. one-to-one) en de zorgorganisatie wordt verbeterd. Op die manier houdt men rekening met de budgettaire beperkingen en de behoefte aan efficiënte binnen de zorgorganisatie.

Volgens deze toekomstvisie moet de opleiding van de vroedvrouwen worden verbreed (of zelfs verlengd) om nieuwe competenties (waaronder organisatorische) te verwerven. Er moet ook worden overwogen om de opleiding naar een universitair niveau te brengen. Uiteraard moet ook de nomenclatuur worden aangepast aan de nieuwe taken van de vroedvrouwen.

Het beroep van vroedvrouw evolueert dus hier vooral in een ziekenhuiscontext. We kunnen dan ook verwachten dat de vroedvrouwen voornamelijk het statuut van werknemer zullen hebben. Zelfstandige vroedvrouwen zullen echter ook in een ziekenhuis kunnen werken, via samenwerkingsakkoorden die heel precies de verantwoordelijkheden van elke partij bepalen.

Het vergroten van de verantwoordelijkheid van de vroedvrouwen kan het beroep meer gevarieerd en zichtbaar, en dus ook aantrekkelijker maken. Anderzijds betekent meer verantwoordelijkheid ook meer risico's. Er kunnen ook spanningen ontstaan tussen gynaecologen en vroedvrouwen, omdat zij elkaar kunnen gaan beschouwen als concurrenten.

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