



Bispebjerg og Frederiksberg
Hospital

Behovsfabrikken

CLINICAL COLLABORATION



Preface

In this book, we present why and how we work with clinical needs at the Innovation Unit at Bispebjerg and Frederiksberg Hospital. The Innovation Unit is located at Bispebjerg Hospital within the Department of Quality and Education.

The vision, philosophy, and methodology behind what we call Behovsfabrikken (The Needs Factory) are explained, and it is outlined why we find partnerships valuable in the goal of addressing clinical needs that are often are "dealt with".

The purpose of this book is to be fully transparent about our experiences. There are many great ways and methods for working with health innovation. In this book, we share our approach, and we hope that it can be useful to others.

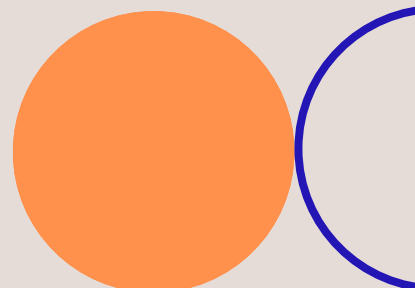
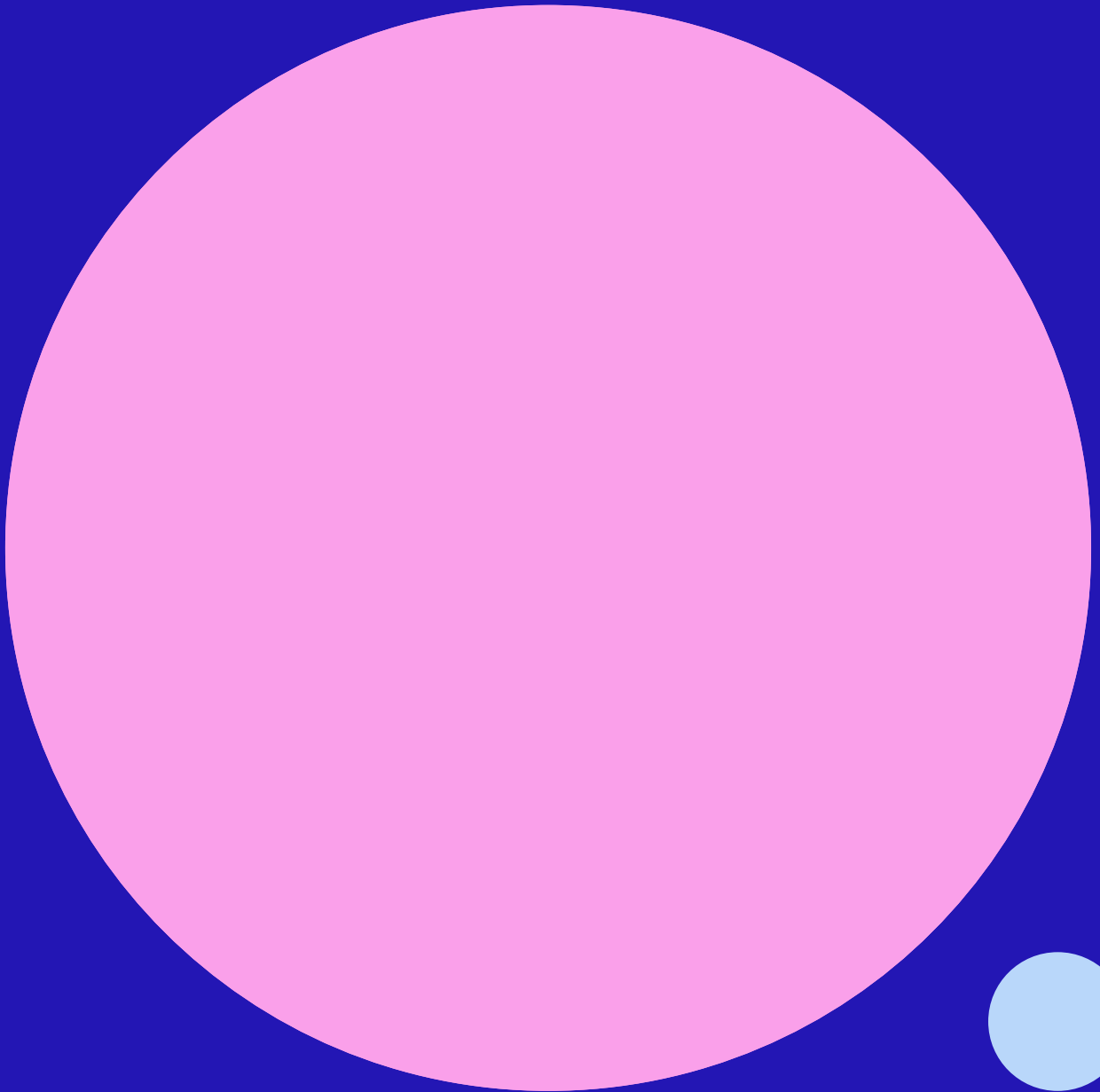


Table of Contents

Vision	p. 3
Philosophy	p. 6
Context	p. 12
Methodology	p. 21
Cohesion in nurses' workflows	p. 40
The pipeline of innovationpartnerships	p. 56
Other projects at Bispebjerg and Frederiksberg Hospital	p. 57



Vision



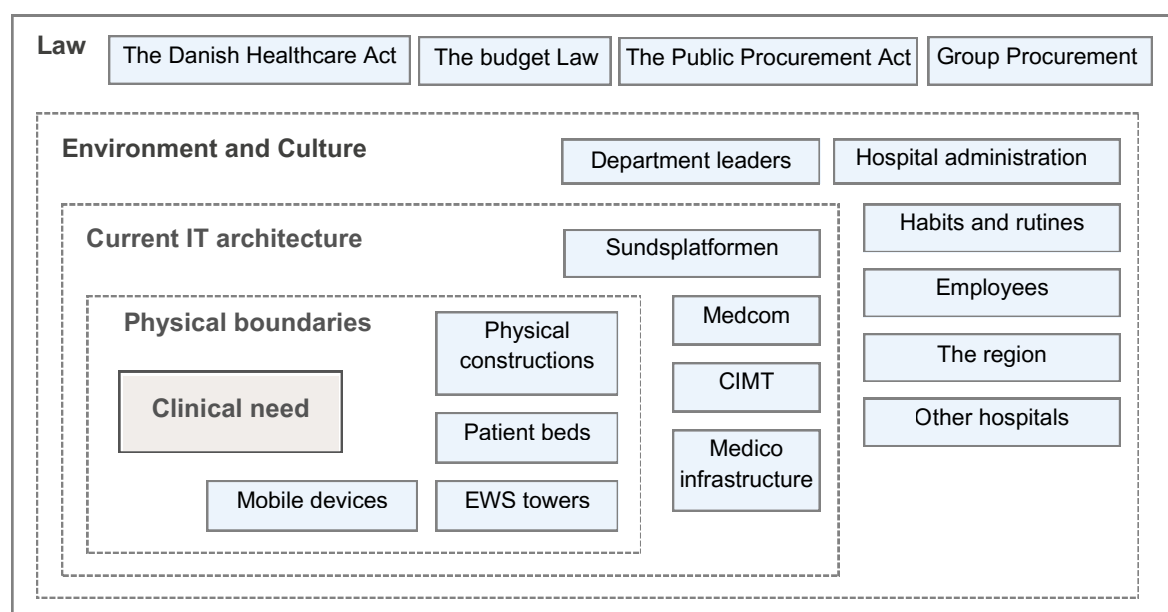
To centralize and consider the clinical needs within the constraints of the environment and to leverage the needs through partnerships when needed

To consider the need within the constraints of the environment

In Behovsfabrikken, we often differentiate between the word "technology" and the word "solution." While we consider a technology as a system, a camera, an app, etc., we add on more value to the word "solution".

In our view, a solution is something that mitigates a clinical need through full implementation. We are quite indifferent to what that "something" is, as long as it works optimally in a clinical everyday setting

To do this, it often means that we need to consider a lot of stakeholders in addition to the clinicians. Moreover, we must consider the constraints and boundaries these additional stakeholders are subject to. It is our experience that it is nearly impossible to create solutions if the need is not considered within the context it exists in. Thus, the clinical need must be central, though considered surrounded by constraints as the physical environment, current IT infrastructure, culture etc. The figure below is a simplified version of how we consider needs.



Go to p. 51
to view our
take on this
in practice

Thus, we view a solution as something that is considered holistically and not developed in isolation from all or parts of the Danish healthcare sector

It is our assertion that successful implementation requires ones to understand the procurement and acquisition process in reverse. In other words, it is beneficial to understand the prerequisites that need to be in place before even starting to work with a need. If hospital-involved innovation does not result in a formal procurement, we have most likely failed.



Philosophy

01

**The Need Must
Reside in People**

02

**Start and End
With a Need**

03

**Let The Market In
and be Transparent**

01 The Need Must Reside in People

For something to be considered a need, there must be an individual or a group of people who own it. In other words, someone must be an 'need owner', i.e. an end user. Sometimes, people know they have a need because something brings challenges and consequences to themselves or others. Sometimes, people have to see an opportunity before a need arises.

The need-owners are the main drivers. Without the need owners, implementation becomes an impossible task because the solutions are not valuable to anyone

Therefore, need owners, our clinicians, represent the foundation for all of our work. Clinicians are experts in their needs, and it is our intention to create a space where they can articulate and define their needs, while we remain objective and facilitate the process towards the implementation of a solution. This is the essence of what we have chosen to call "Behovsfabrikken".

02 Start and End with a Need

In addition to the need residing in people, the need owner must also be considered as the main stakeholder throughout the entire process. Therefore, our clinicians are considered as key stakeholders from the identification of the need to the implementation of the solution. To ensure successful implementation, it is essential that proposed solutions constantly are evaluated against the need, evaluated by the need owners, and designed for the reality in which the need exists. We believe that the possibilities of implementing a solution are increased by working closely with the need from the start to the very end. In practice we do this by involving the need owners and respecting the limitations and boundaries, e.g. IT architecture, the need is placed within.

03 Let the Market in and be Transparent

The market is skilled at developing technologies, but as an organization, we sometimes struggle with acquiring such. To improve on this area, we believe that we must be transparent to the market about where the clinical workflows are challenging. Moreover, we must be willing to invite the market into the hospitals and allow them to help us solve the needs. In other words, we believe we must utilise the competences where they are the strongest: The clinicians as need owners and the market as developers, and facilitate partnerships between the two when needed.

Behovsfabrikken

Behovsfabrikken is a method which purpose is to facilitate systematic handling of needs, and it originates from the Innovation Unit at Bispebjerg and Frederiksberg Hospital. An innovation unit might sound like an extensive place in which many gadgets are developed. However, we are the complete *opposite*. We do not develop gadgets, and we are a small and close unit with few employees. Our employees have diverse academic backgrounds and are both newly graduated and experienced people. We work this way for one specific reason:



Innovation must take place where the need resides. That is in the clinical departments where the need owners are

To have a strong understanding of clinicians' needs and to be able to understand their language, some of our employees are nurses. Two of our nurses are employed in shared positions, spending half of their time with us and the other half as clinical nurses in the Department of Geriatric and Palliative Medicine. This constellation brings valuable clinical knowledge to our work. Our third nurse also has a degree in innovation, and together with our other employees specialised in innovation, IT, organization, and management, it becomes possible to drive Behovsfabrikken and practice its philosophy locally.

Contact information can be found at the back of the book



Our collaborations

To address clinical needs and facilitate change on a larger scale, it is important for us to collaborate with a wide range of associates.

Our collaborations with other associates contribute to a deep and holistic understanding of what our organization requires when we address the clinical needs.

To increase the likelihood of success, we cannot only focus on the clinical needs. We must also consider and understand the constraints of our entire organization but also the possibilities it holds in terms of development.

Some of our associates:

- Group Procurement
- Regional Development
- Public-Private Innovation
- Group of Health
- CIMT (IT organization)
- Erhvervshus Hovedstaden
- Danish Life Science Cluster
- Innovation units across hospitals and regions
- Clinical departments across hospitals and regions

... and many other organizations.





Context

01 Why Establish a Behovsfabrik?

02 Lack of Willingness to Pay

03 The Gap Between the Market and Hospitals

04 Summary

01 Why Establish a Behovsfabrik?

Unfortunately, it is a well known challenge that the Danish healthcare system is under higher pressure. The population is aging while having difficulties recruiting enough healthcare professional to meet the demands. A phenomenon we also refer to as the double demographic pressure. Additionally, the complexity of diseases increases, and the patients' expectations are increasing.

To maintain the delivery of high quality care, patient satisfaction and patient safety, we believe it is essential to address and centralize the clinical needs. It is tempting to say “that we wish to make the needs central to all innovation”. Though we do not believe all needs are solved through innovation. On the contrary, we believe that we must understand needs thoroughly enough to even consider whether innovation is needed or not in the process of solving a need.

Why Do We Not Just Procure a Lot of Products?

One might wonder why we do not just procure a vast amount of products. Especially when considering the pressure on hospitals. One could wonder even more when considering how fast new technologies are developed, and the fact that current technology aims to save lives by addressing some of the most complex clinical needs. So why do we not just place a lot of orders?

There are by far many qualified answers to this question. In this book, we will focus on the lack of willingness to pay and the gap between the market and hospitals.

02 Lack of Willingness to Pay

The economy in the healthcare system is limited and therefore, bed wards and hospital management teams carefully consider how they spend their annual budget. In terms of procurement, this means that the willingness to pay generally is low if the value is not significantly reflected on a clinical everyday basis and in the budgets as well.

Sometimes, this means that...



The clinicians deal with the problems

- Emilie Caroline Udsen, Nurse, Cand.Tech, Innovation BFH

Rephrased, clinicians often accept the challenges they are facing on an everyday basis, and sometimes this even applies not only to the simplest but also to the most complex needs.

Most likely, there will always exist needs that clinicians wish they could have solved. However, when we ask clinicians if they are willing to pay to solve the needs, some of the needs are considered less pressing and urgent from a clinical perspective. Usually these needs are the ones, they are willing to **deal with** or to solve in another way. These needs are typically characterized by having less impact on the daily clinical practice, being less complex, and sometimes they can be solved internally if even necessary.

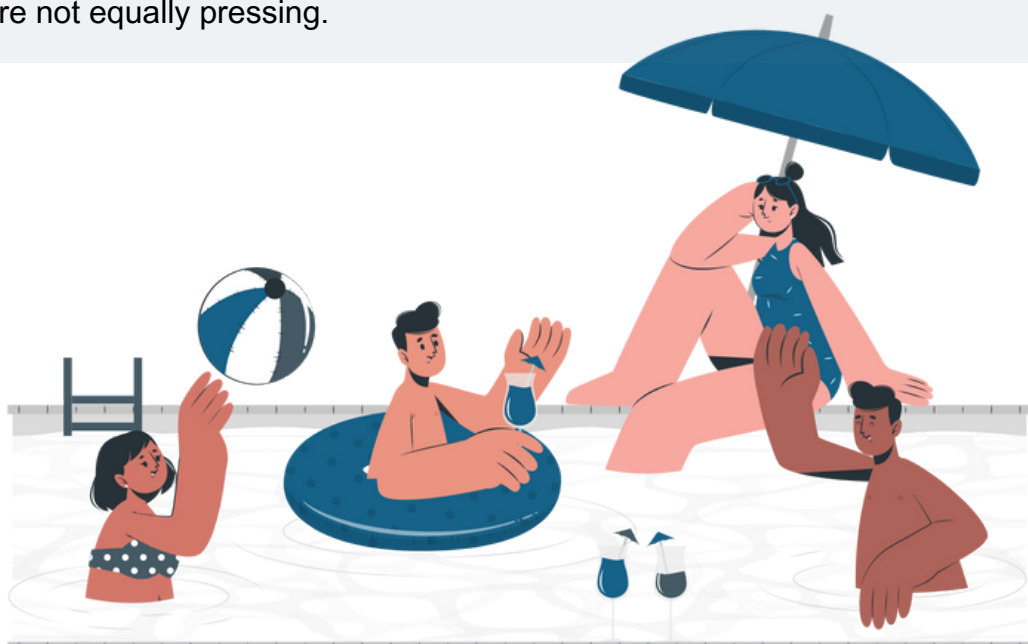
What is left, is the most complex needs which they sometimes are willing to financially invest in. Maybe you can recognize this scenario from yourself?

A Swimming Pool in Your Backyard - What's Not To Like?

Most people would probably think that having a large swimming pool in the backyard would be lovely on a hot summer day. You could jump in whenever you feel like it, get your daily exercise, and create a lot of memories with friends and family.

But do you have a swimming pool in your backyard? Most people would probably say no. Why? Because most people feel like their needs in a swimming pool are fulfilled when going to the public pool or even the beach. And then we have not even mentioned the cost of installing a swimming pool and the budgets required to maintain it. Not to mention the amount of time it takes to clean the pool so it can actually be used.

For these reasons, most people would probably agree that they are not willing to install a swimming pool in their backyard, but rather prefer to go to the public pool area. Likewise, clinicians and the healthcare system are not willing to pay to solve every need since all needs are not equally pressing.



03 The Gap Between Market and Hospitals

But clinicians are enterprising people and great inventors, which is a good competence. They are typically good inventors because they are need owners. They know exactly what they need and possess lots of unique clinical knowledge that must be used for something to be considered a solution. This is why the process from need to solution sometimes is quite short when clinicians are involved throughout the entire process.

However, the downside of this is that implementation sometimes becomes a great challenge,

The Public Procurement Act Ensures Legal Compliance

In Europe, it is a legally required that purchases exceeding the financial threshold 200,000 euros (1,6 million DKK) must be performed through tenders. This financial threshold is often exceeded when procuring medical equipment. Thus, many procurments in Denmark are made through tenders. Tenders ensure that all private companies have had the opportunity to aquire the right to sell their products to, for instance, a hospital in a timeframe. In other words, tenders promote fair competition and equal treatment of the private market. It also supports wisely useage of the citizents' paid tax money.

Equal treatment of the market also refers to the fact that all companies bidding on a tender must have had access to the same information. In the worst case, this means that if a clinician comes up with an idea and independently or in partnership with a private company develops a solution by feeding it with their clinical knowledge and experience, that clinician or company might not be able to bid on the tender. Consequently, the clinician or company will loose their opportunity to sell a potentially value creating solution to the healthcare sector. This is the consequence even if the solution addresses a complex clinical need.

This scenario is also illustrated on the next two pages.



What Often Happens...

1

A Clinical Need

The clinical staff discover a need without an obvious solution



2

Idea Generation

Clinicians begin to explore potential solutions



3

Collaboration

Clinicians form a collaboration with a private partner and start a business, or they start their own company



4 Solution Development

Independently or with a partner, clinicians begin to develop prototypes and/or identify commercial solutions

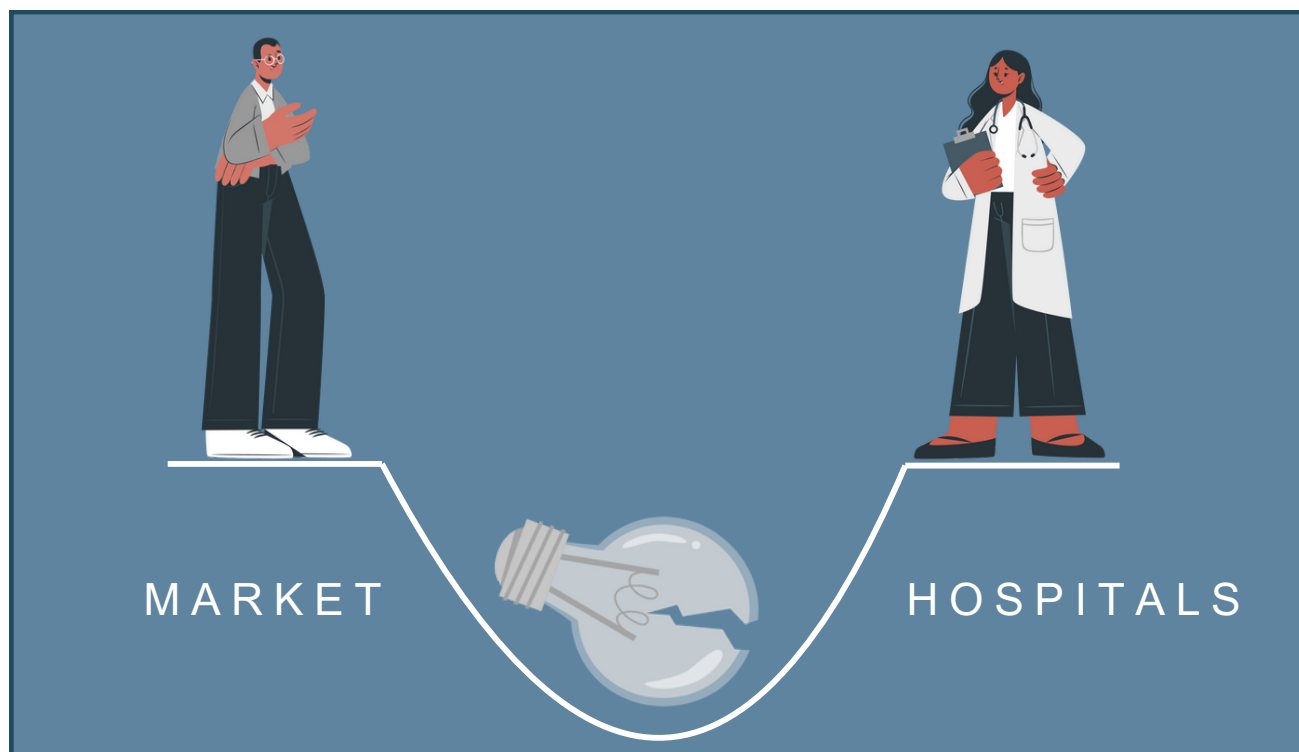


5 Back to Scratch

The clinicians wish to have the organization procure the product. However, this is often difficult because the product has not been integrated into the entire ecosystem as shown in the figure on page 5, and because the need is not thoroughly investigated enough. Consequently, this often make it impossible to ensure legal compliance in terms of procurement, leaving some needs unsolved.



One could argue that there is a gap between the market and hospitals, which complicates and at times makes it impossible to facilitate a meeting between the owners of the needs and the developers. As a result, much of the development occurs isolated from the hospitals, as collaboration between clinicians and companies may jeopardize the company's competitive standing in future tender processes.



When the market develops solutions in isolation from hospitals, hardware and software often end up being poorly adapted to the actual needs and the context in which they arise, as illustrated in the figure on page 5. This often results in products that are significantly overpriced relative to hospital procurement budgets and fail to fully address the clinical need meaning they cannot be considered true solutions in our view

Even if a product were perfectly aligned with departmental or hospital leadership procurement budgets and could provide us with unlimited information, it wouldn't necessarily lead to a purchase. In fact, having continuous information about every patient would impose a workload that the healthcare system simply cannot manage. Just imagine knowing the pulse of every patient at all times...

The gap between market and hospitals also means that we don't request the markets technologies simply because we are unaware that, for example, an existing sensor could help address safety during night shifts.

In the clinic, this also means that clinicians don't always find new products relevant, and that even purchased products sometimes end up unused on a shelf in the department, with the explanation that...



It's not working

- Lene Thomsen, Nurse, Innovation BFH

It's a shame, because in Denmark we actively support startups and SMEs through a strong and well-established accelerator and incubation ecosystem.

From our perspective, there is a lack of a broader agenda for engaging them, so that we can benefit from the market and in return support the strong culture of development and entrepreneurship.

04 Summary

The Classical Barriers to Procurement

- ✘ **Lack of willingness to pay.** The product is not considered to meet a need that justifies a purchase.
- ✘ **The sales price is too high.** The product's sales price exceeds the procurement budget of the hospital management or department leadership.
- ✘ **Violation of the Public Procurement Act.** A clinician has developed a solution, either independently or in partnership with a company, using unique clinical knowledge that the rest of the market hasn't had access to.
- ✘ **Lack of understanding of the procurement ecosystem.** The right stakeholders are not strategically involved from start to finish. As a result, their needs are often not addressed, and the product cannot be implemented.

There are many suggestions on how to overcome some of these barriers. Our contribution lies in what we call a "Behovsfabrik" where the vision is to centralize clinical needs and involve the surrounding ecosystem as early as possible.

Therefore, at the Innovation Unit at BFH, we have a close collaboration with the Center for Economics, which is the procurement part of the Capital Region of Denmark. More specifically, we work closely with Corporate Procurement, whose staff have developed a business process that successfully centralizes clinical needs and strategically invites the market in, enabling the procurement of value-creating solutions in a legally compliant manner.



Methodology

01

Value-Based Procurement

02

The Methodology of Behovsfabrikken

03

Behovsfabrikken and Value-Based Procurement

04

Our Organizational Tree

05

Technologies Can Also Drive Needs

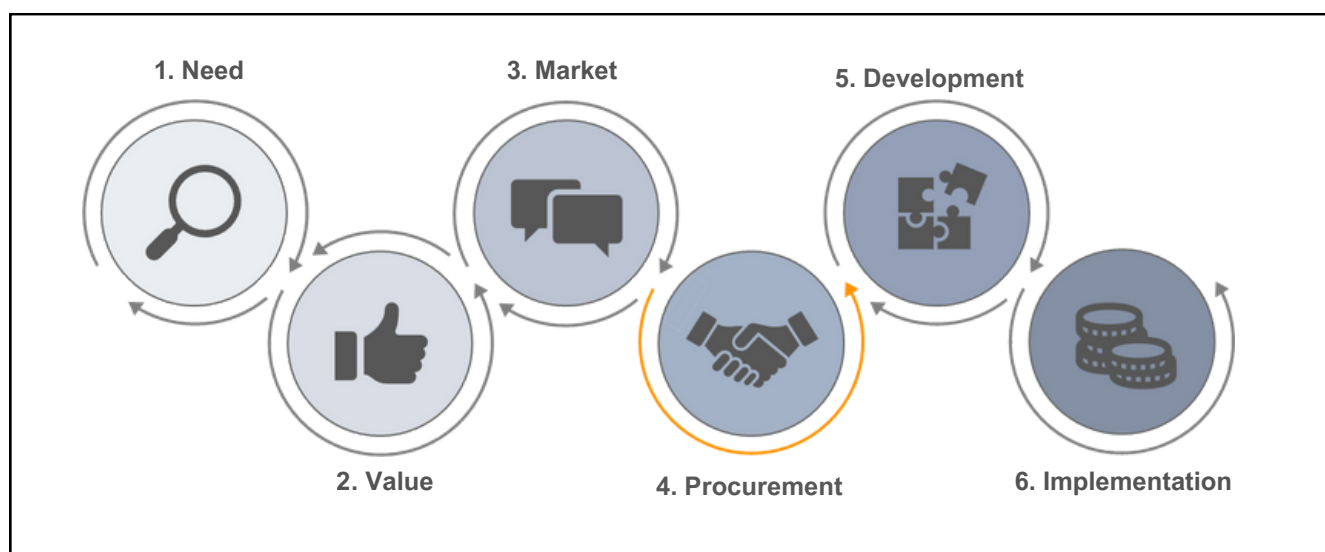
06

The Needs Catalog

01 Value-Based Procurement

The business process for value-based procurement has been developed by employees at the Center for Economics - Corporate Procurement. It outlines the process for how procurement should be organized, so that future health solutions procurements create value at scale while remaining compliant with legislation. The business process enables an assessment of whether a procurement is necessary, as well as the choice of procurement method if a purchase is to be made.

This is ensured as the process starts with a clinical need (Step 1), which is valued (Step 2) and presented to the market (Step 3) before decisions are made about whether a procurement is necessary and the choice of procurement method (Step 4). These decisions in Step 4 are what the orange arrow refers to. This means that steps 1, 2, and 3 are used in the process regardless of the procurement method.



In 2016, a new version of the procurement legislation was released. This opened up the possibility of using innovation partnerships as a procurement method, which remains a relatively rare procurement procedure within healthcare in Denmark. Innovation partnerships can be used as a procurement method when a clinical need is so complex that no solution exists on the market, and solving the need is expected to bring regional and national value to the healthcare sector.

In an innovation partnership, a partnership is formed between a public and a private partner, who will jointly work toward finding a solution. For the business process, this means that innovation partnerships involve a co-development phase (step 5) and a procurement (step 6), provided that a solution has been developed after the co-development phase. These two steps are unique to the procurement method: innovation partnership.

The Advantages of The Business Process

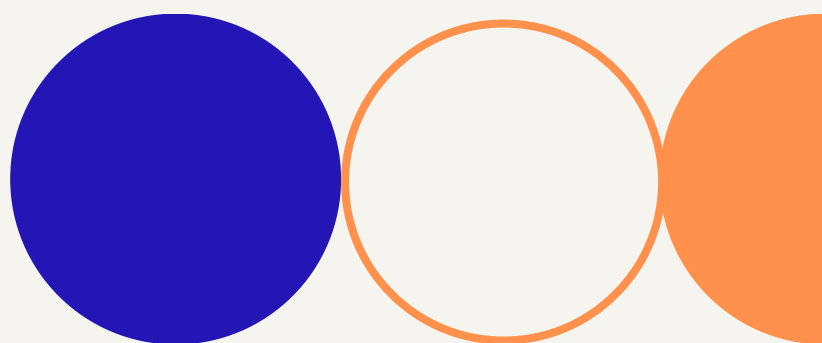
- ✓ **Addressing Unmet Needs.** The business process ensures that it is the clinical needs that are the focal point for all other work. In other words, the process starts with a need, not with the specification of a certain product.
- ✓ **Decision on procurement.** Using the business process, steps 1 (need), 2 (value), and 3 (market) are followed before deciding whether a procurement is necessary (step 4). If a procurement is needed to address the need, a decision is made regarding the choice of procurement method.
- ✓ **Systematic and Early Involvement of Stakeholders.** Corporate Procurement and clinicians are involved in every step. This means that a collaboration is established between the region's procurement muscle and the need owners from the start. This means that all needs can result in a regular procurement and cannot be considered a project. Additionally, IT organizations and the private market are involved as early as possible.
- ✓ **Competition Exposure.** By opening the procurement to competition (step 4), the market can be invited into step 3 and gain insights into the clinical needs without affecting the legality of the procurement process. In this way, the gap between the market and the public sector is being closed – a gap that currently often acts as a barrier to the development of solutions that address clinical needs.

This book emphasizes innovation partnerships as a procurement method. Therefore, the next three pages provide a more in-depth explanation of the six steps shown on page 23.

1. The Needs

A value-based procurement starts with mapping a specific area where the quality and efficiency of public services are desired to be improved, as well as analyzing the underlying challenges that hinder the region's ability to deliver healthcare services of the expected quality and efficiency. The goal is to gain a clear understanding of unmet needs, success criteria, objectives, and the timeframe for achieving improvements.

To provide the best possible conditions for the scalability, compatibility, and cost-effectiveness of solutions, the assessment should include the entire group of users that represent the potential market for new solutions. This also forms the basis for ensuring that as many relevant public authorities as possible can participate in contracts with purchase options and have an influence on the design of future solutions. This contributes to solutions being implemented quicker and easier, creating value at scale, lower development costs, and a more affordable prices.



2. Value

Business cases are a tool used to support investment and project management decisions before and during a value-based procurement. They provide the basis for viewing new procurements as investments in society, rather than just expenses on the procurement budget. The focus is on the derived effects of improvements that can be achieved through new solutions. Such effects could include labor savings resulting from, for example, reduced readmissions. Value clarification supports the economic justification of the procurements. It also forms the foundation for prioritizing the requirements for new solutions. Value clarification also provides insight into how the procurement should be practically organized to maximize expected effects while keeping costs and risks at an acceptable level. For example, it can help determine what the maximum budget for the procurement should be to keep costs proportionate to the expected benefits.

3. Market

The purpose of a market analysis is to cross-check the realism of the assumptions that the region bases the value-based procurement on, ensuring the best possible tender material. Additionally, market analyses are used to examine the necessity of further development – i.e., whether the need can be met by purchasing existing solutions through a traditional procurement process. The market analysis in connection with a value-based procurement typically focuses on the following topics:

- Prior art analysis and regulatory/standardization environment
- Desired minimum requirements for solutions
- Key assumptions in the business case
- Essential contractual set-up and terms for the procurement

4. Procurement

The procurement process starts with the publication of a procurement notice. After this, one of the 5 procurement procedures is selected, depending on which best fits the collected need. This decision is visualized by the orange arrow in the model for value-based procurement (see p. 23). The procurement material is prepared based on the choice of procurement procedure. As mentioned, this book focuses solely on innovation partnerships.

The 5 Procurement Procedures

1. Restricted Procedure
2. Public Procedure
3. Procurement with negotiation
4. Competitive Dialogue
5. Innovation Partnership

Innovation Partnership Procurement

In an innovation partnership procurement, a partnership is offered with the goal of solving a complex clinical need. A partnership is specifically formed between a private company or a consortium of private companies and a public partner, such as a hospital. This is a public-private partnership.

What characterizes innovation partnership procurements is that the need is the dominant focus in the tender material. The need is defined through both soft and hard requirements, and these are developed in close collaboration with the need owners (clinicians) across hospitals. This means that the specification of requirements in the tender material does not address existing solutions or point to a specific solution, as the solution is still far in the future. It must first be co-developed once a partnership agreement is in place. The tender material also specifies the maximum price at which the public partner can procure the solution, and the innovation must therefore take place within this price framework.

After the publication of an innovation partnership procurement, an application period starts. During this period, companies have the opportunity to form consortia or bid independently on the procurement. This means that an innovation partnership opens up opportunities for SMEs and startups to participate. Once the application deadline has passed, a selection process begins with the goal of finding the most qualified partner for the development period. Due to the opportunities offered by this type of procurement, methods such as prequalification, microsprints, and negotiations can be used to select a partner.

Once the partner is chosen, a partnership agreement is signed between the private and public partners for the development period. This marks the start of an 18-month development phase. A procurement agreement with purchase options is prepared for possible signing after the development period ends. The procurement contract is only signed if the need is solved within the framework and requirements outlined in the tender material. In other words, both the private and public partners are fully committed for 18 months when an innovation partnership is formed.

5. Development

Innovation takes place at this stage. Over the course of 18 months, the public and private partners must work together to develop a solution. It is the private partner's responsibility to plan the development period, while the public partner must ensure relevant support throughout the process and facilitate the execution of the planned activities.

The development period is divided into phases, and the effort of the partner(s) is systematically evaluated throughout the development process to ensure that the solutions being developed meet the requirements – i.e., the need described in the tender material, and that the partner(s)' efforts align with the agreement. After the development period ends, the private partner is given an additional 12 months to obtain any necessary certifications, such as MDR and CE marking.



6. Implementation

Once a solution that fully meets the requirements outlined in the tender is developed, it can be procured, implemented, and its benefits realized. This can happen directly and at scale. Both the region and any other public actors who have signed a procurement option can proceed with the solution procurement and implementation. The procurement option should not be used if the development has not been successful.

02 The Methodology of Behovsfabrikken

To work within the business process for value-based procurement, a method is needed that enables structured, holistic, and thorough work with clinical needs. This also requires support from top management and the freedom to experiment and innovate.

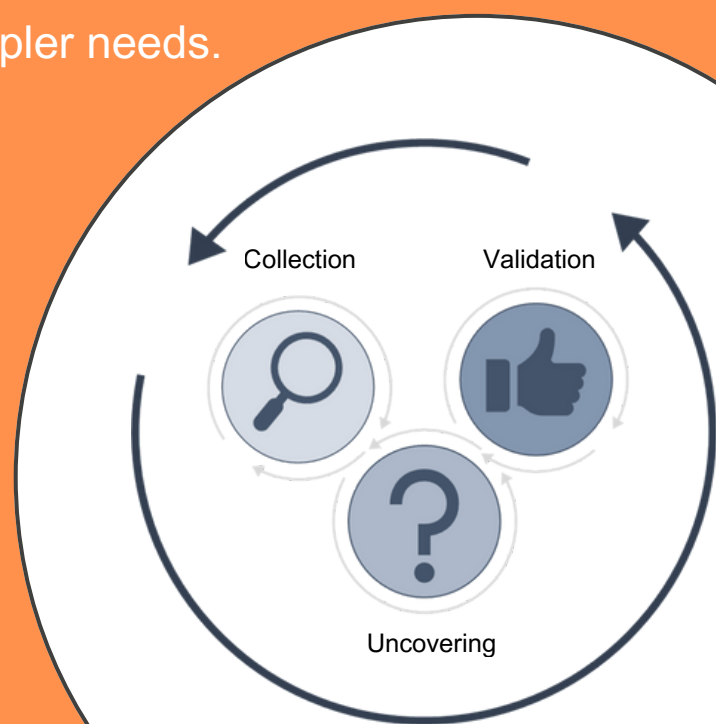
All of this is for the benefit of the organization.

The following section presents Behovsfabrikken's methodology and organizational structure, is our approach to working with clinical needs in an effective, appropriate, and quality-conscious way.

Behovsfabrikken is an ambiguous term. It refers to an internal "factory" at a hospital that systematically 1. collects, 2. uncovers, and 3. validates clinical needs. These three phases contribute to identifying the most complex needs, which we connect to an external "factory" – a company, through innovation partnerships.

The three phases are anchored at a local, regional, and national level with the goal of conducting holistic and in-depth analyses of needs and creating momentum behind them. The phases are facilitated through various activities and with the involvement of different stakeholders.

The work through the three phases ensures a segmentation of needs, so that only the most complex needs are tendered as an innovation partnership, while other, less resource-intensive methods can be used to address simpler needs.



Gathering of Needs – Locally at a Hospital

The purpose of this phase is to identify clinical needs. The needs are typically formulated as a simple statement. We therefor also refer to them as "need expressions" or "immature needs," as they have not yet been explored. Below are descriptions of the activities we use to facilitate this phase.

On-site visits at clinical departments

During this activity, all types of departments that might experience a need and wish to explore it further are visited. It does not take much more than actively listening and asking clinicians:



What is bothering you, today?

It is our experience that a visit typically lasts about an hour, and during this time, one can collect between 5-12 need expressions per department through this activity. Everyone is welcome on such a visit – doctors, therapists, biochemists, porters, nurses, managers, and both experienced and new staff.

Digital Platform

The purpose of the digital platform is to collect and categorize all needs. The platform is still under development, as it will be beneficial to have a platform for collecting needs at a regional and national level. Our vision for the platform is that it should be a digital tool where the market can access information about where the clinic needs assistance. Our current proposal for a platform is the "Need Catalog," which you can read more about on page 38.

Need Bazaar

In this activity, clinicians meet with the market. The concept is similar to a fair, but here it's the clinicians who staff the booths and share their needs. Meanwhile, companies have the opportunity to get very close to the clinic by listening to and discussing clinical needs with the need owners themselves. In collaboration with Erhvervshus Hovedstaden, we held the first Need Bazaar in February of 2022. Around 50 companies participated, and the event was well-received by both the clinic and the market.



Click [here](#) to watch the video from the day.

Top-down Strategies

During this activity, we embrace organizational changes and health policy decisions that, in various ways, influence the way we manage the healthcare system. This is essential, as needs also arise as a result of organizational and political interventions. One example of this is the decision to build all quality fund buildings with single rooms instead of multi-bed rooms, as this creates a need to rethink clinicians' workflows.

Uncovering Needs – Regionally and Nationally

The purpose of this phase is to dive deep into the collected needs and investigate what the need actually entails. It is our experience that there often are many details hidden in a need expression, and these typically evolve as we explore them further. It is challenging to prioritize which needs we should start uncovering, and we do not have a final solution for how prioritization should occur. What we do is look for momentum behind the needs, but also allow clinicians to assess which needs they are willing to allocate time and resources for to explore further.

Workshops with Clinicians

This activity involves gathering clinicians from various hospitals, specialties, and municipalities to explore their needs. Anyone with an interest in the need is welcome. The purpose of bringing clinicians and stakeholders together across different areas is to create a broad needs assessment. Through group work, innovation methodology, and both diverging and converging work, the needs are examined in detail and concretized.

It is our experience that three to four full day workshops with several stakeholders need to be conducted for the needs to be considered sufficiently explored and concretized. It is essential to validate the findings with the participants between the workshops to ensure that the work is heading in the right direction and that possible adjustments can be made for any omissions.

To keep the further work on the need open, it is our experience that the details of the need can be categorized into "must be solved," "preferably solved," and "not yet within the scope of the solution." This way, the solution space remains open.



Copenhagen Health Innovation

To support a broad needs assessment, we work closely with Copenhagen Health Innovation (CHI), which connects students to practice. CHI collaborates with various educational institutions and serves as a strong resource in our goal to facilitate broad and in-depth analyses of needs. CHI has connections to programs in fields such as rhetoric, healthcare, engineering, communication, IT, anthropology, and more, and is skilled at matching students with relevant competencies to different needs.



As previously mentioned, a visit to a department can result in anywhere from 5-12 needs, but it is our experience that it is 1-3 of them that the departments are willing to invest their time and resources in. After the visit, the departments receive their list of needs statements and are asked to prioritize and elaborate on 1-3 needs. The selected needs are sent to CHI, and these are the needs that CHI connects students to.

Click [here](#) to read more about the CHI-collaboration.

We are therefore happy to act as case providers and support the students throughout their semester arrangement and course. We do our best to give the students access to the clinic and to us, so they receive the relevant guidance during their course.

It is our experience that the students find it very rewarding to work with real needs. Additionally, both we and the clinicians get fresh, unbiased perspectives on sometimes very familiar needs.

Validation of Needs - Regionally and Nationally

The purpose of this phase is to examine the existing solution space and screen the needs through a business case. We facilitate these activities to investigate whether solutions already addressing the needs exist in the market, and to highlight the value creation potential of addressing the need. It is difficult to prioritize which needs should be valued, but here we use the findings from the exploration phase and consider the momentum behind the needs to determine whether we should continue working on the individual need and value it.

Market Dialogues

In this activity, the market and the need owners (clinicians) meet. The purpose is to discuss the identified needs with those who are experts in developing solutions – namely the companies. The market dialogues are held as workshops, where the identified needs are presented to the companies. This leads to a discussion of the existing solution space, technical feasibility, development costs, etc. All stakeholders in the market should ideally have the opportunity to participate, and it is our experience that two to three market dialogues need to be held to achieve the purpose of the dialogues.

Business Case

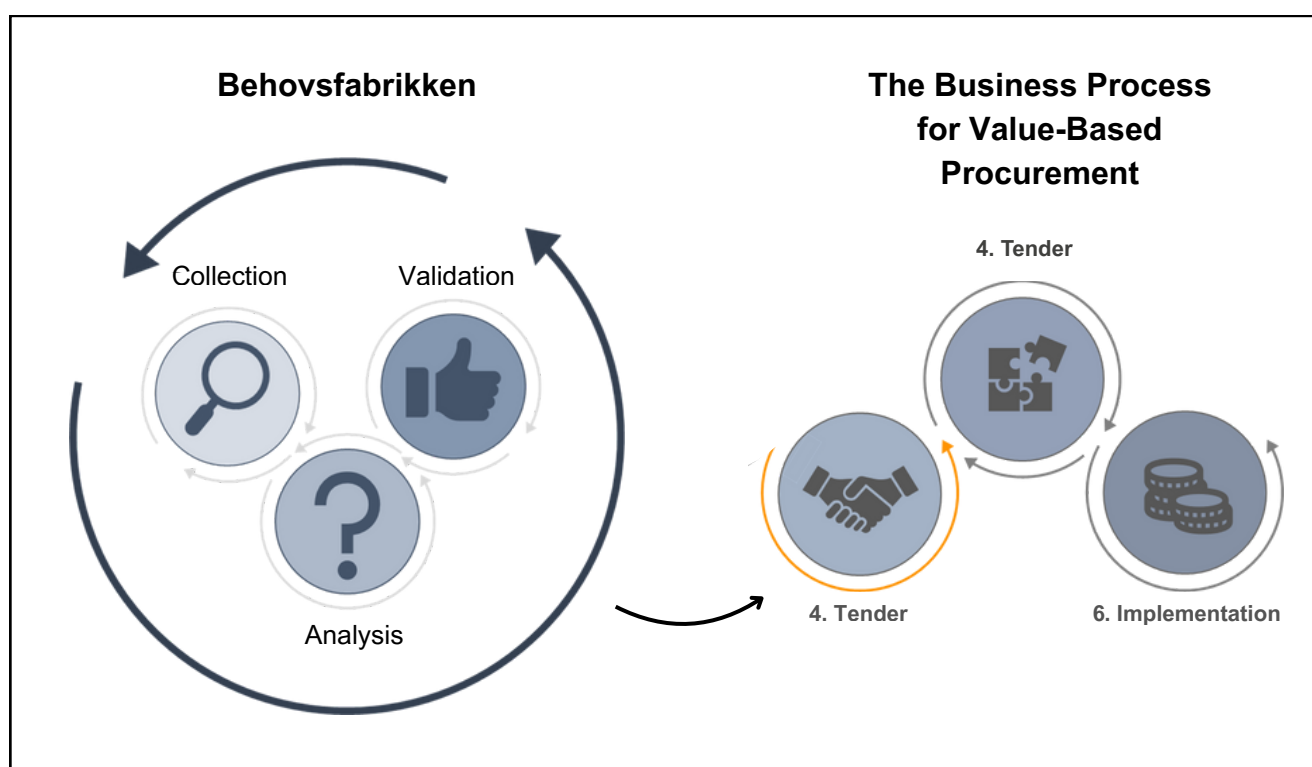
We build a business case to investigate the value creation of a potential solution to the identified need. The focus is on examining both hard and soft value creation. For example, it is defined whether the implementation of a solution will be profitable for the hospital, but equally important is whether clinicians will feel secure and believe that a potential solution will support them in their daily clinical work.

It is a challenging task to value a clinical need, and we do not have the final recipe for how to do this in the best possible way.

Read about how we have valued the need for cohesion in nurses' workflows on page 45.

03 The Needs Factory and Value-Based Procurement

As mentioned, Behovsfabrikken works within the framework for value-based procurement at the Center for Economics. We do this to support the corporate procurement department's ability to purchase value-creating solutions. In practice, this means that corporate procurement is involved from the collection of a need — the very first phase of Behovsfabrikken's methodology. The connection between the two can also be visualized in the following way:



In practice, this means that Behovsfabrikken's methodology aligns with the first three steps of the procurement process: 1. Need, 2. Value, and 3. Market — thereby activating the process. If the identified need is to be addressed through a purchase, it continues into step 4 (tendering), where the appropriate tendering procedure is determined. In other words, needs only progress further in the process if it is assessed that they should be addressed through procurement.

See page 40 and onwards to read about the first project that follows the business process.

04 Our Organizational Tree

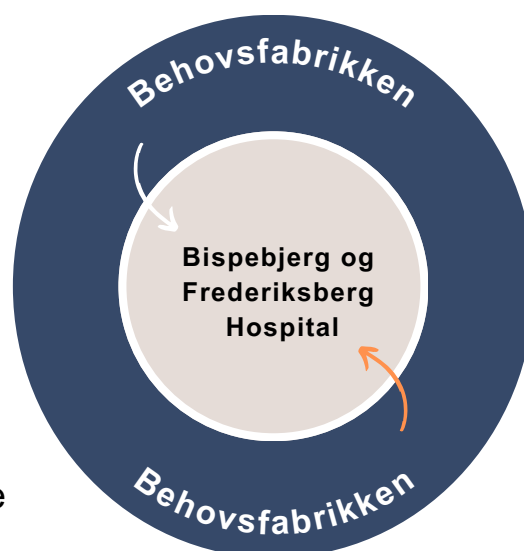
One thing is having a structured, methodological approach to addressing needs. Another is translating that approach into practical actions that create real value. Based on our experience, this requires both momentum and strong support from top management to experiment, innovate, and maintain full transparency about the insights and outcomes we gather. Ultimately, as an innovation unit, we must embody innovation in our own processes as well.

Before we started Behovsfabrikken, we discussed the entire concept vision with our hospital director and deputy directors.

In the discussions with the management, it was especially essential to ensure momentum and support to be fully transparent about where it is difficult to be a clinician, precisely because we want to open the hospital to the market so that the needs can be solved together.

In other words, as an innovation unit, we needed to be allowed to 'air the dirty laundry' in a needs catalog.

We are very grateful for the support from our management and the freedom to try something new for the benefit of the entire hospital, and we see our organizational structure best visualized as shown on the right.



05 Technologies Can Also Drive Needs.

It is our experience that it can be difficult to articulate a need. This may be because, as a clinician, you aren't always aware of what is technically possible or what options are available on the market. Another reason is that most people typically adapt to the routines and habits that exist in the workplace. This means that one doesn't question why routines are the way they are but simply deals with them because that is the way it has always been.

Therefore, we also see it as a strength to allow companies, SMEs, and startups to enter the hospital and introduce their products to clinicians. It is our experience that the clinicians' meeting with the market often is an eye-opener for them and creates a good starting point for discussing underlying clinical needs that otherwise would not have been articulated.

Maybe you've experienced this yourself? You probably wouldn't have had the need for an app before you were introduced to an iPhone...

In practice, this typically happens through an inquiry from a company, start-up, or others who want clinical feedback on their products. Sometimes the inquiry is directed to us in the innovation unit, and other times directly to a clinical department.

On page 60, you will find an example of how existing products and technologies are used to explore the clinicians' needs.



06 The Needs Catalogue

The Needs Catalogue is a representation of all the needs that have been collected by visiting various departments at Bispebjerg and Frederiksberg hospital.

The needs are divided into categories and subcategories, and the catalog can be found by clicking the link [here](#).

As seen in the catalog, all the needs are outlined as simple sentences, as if they were stated by the clinicians. These are what we call 'needs expressions' or 'immature needs'.

It is clearly visible in the catalog how many unresolved needs exist, which are **dealt with** daily by various need owners. Note how different the needs are, but also how many similarities exist across departments, despite the fact that the departments represent different specialties.

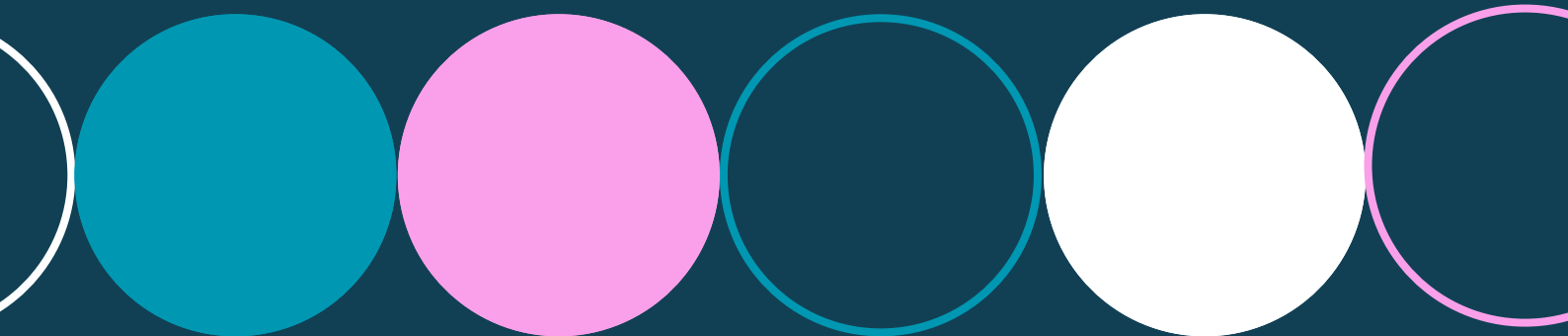
For each need, it is mentioned which department owns the need.





Cohesion

in Nursing Workflows



01 Purpose

02 Methodology

03 Stakeholders

04 EU Funding

05 Timeline

06 Moving Forward

01 Purpose

Ensuring cohesion and enhancing a sense of security in nursing workflows in general hospital wards.

02 Methodology

The Clinicians' Tender

The need for cohesion in nursing workflows follows the procurement process for value-based purchasing, and is therefore also used as the first stress test of the methodology.

The project is also known as the "Monitoring Project," but since we are keeping the solution far in the future and are unsure if monitoring will be part of it, we refer to the project here as "Cohesion in Nursing Workflows."

The need owners, our clinicians, have been involved from the very beginning and have consistently served as the primary stakeholder group. In other words, clinicians have had the most influential voice in the room and will continue to play a central role in the decision-making process.

Since it is the clinicians and an external partner that will collaborate for a full 18 months, the clinicians have also been actively involved in selecting the partner. In practice, this means that the clinicians, over several days, discussed the applicants' submitted project materials and tested collaboration potentials with five different pre-qualified companies.

1. The Gathering of Needs

The need for cohesion in nursing workflows is a strategically collected need.

The need stems from the transition from multi-bed hospitals to single-bed configurations, a requirement that extends to the construction of all Quality Fund buildings in Denmark.

This transition has established a basis for examining the needs that clinicians may encounter as a result of the transition, particularly in the context of the double demographic pressure—namely, an increasing number of patients requiring care alongside a shrinking workforce.

In the coming years, it is expected that 12,000-14,000 single-bed rooms will be established in Denmark, with approximately 500 at the New Bispebjerg Hospital. This development is not only a trend in Denmark but also globally in other healthcare systems.

2. The Investigation of Needs

Three workshops were held with clinicians across specialties, hospitals, and regions with the aim of understanding the needs that clinicians might experience during the transition to the new **Quality Fund buildings**.

This resulted in a 20-page needs description, which can be accessed via the following [link](#).

The conclusion was that nurses expressed a need for having a sense of “eyes and ears on the wards” when they weren’t physically present.

The nurses assessed that this was necessary to maintain a valid and secure clinical overview of the patients in the departments and to provide them with cohesion in their new workflows. Although the project originates from the transition to single-patient rooms, it is also believed that a potential solution would be of great value in departments with multi-bed rooms.

Clinicians across hospitals and specialties in the Capital Region of Denmark later further specified the need, so the three central needs in the tender are:

1. Detection and transmission of respiratory rate and another vital parameter over a distance.
2. Detection and transmission of falls over a distance, enabling staff to respond safely and efficiently.
3. Convey information about whether the patient is in the room or not, so clinicians do not have to spend time searching for them.

These needs are surrounded by requirements from other organizations, such as CIMT, to accommodate the needs of the ecosystem.

3. Validation of Needs

Two market dialogues were held with clinicians and private companies to explore the solution space, technical feasibility, and pricing.

It turned out that there are several solutions on the market that can address the need and more, but not a comprehensive solution for non-critical patients that fits within a price cap of 100 DKK per bed per day. This price cap was set to accommodate the general ward's ability to acquire a potential solution.

A business case was also developed to highlight the value creation.

In general, a challenge with business cases is that they can be tailored to highlight the value one wants to showcase. Therefore, it was a significant and difficult task to create the right business case—one that, in our view, provides value for clinicians, department management, and hospital leadership.

To develop the business case, we worked with staffing plans, among other things, to examine how these could look with a potential implemented solution.

We examined whether staffing levels could be reduced by one or more employees without leading to layoffs.

We found this angle relevant as we look towards a future with vacant positions and therefore need to explore how healthcare solutions can address this challenge.

We also developed various scenarios that depict some of the challenges faced by a general ward when recording respiratory rate, detecting falls, and searching for patients. These scenarios were used in the procurement material to evaluate the submitted solution proposals in a clinical everyday context.

We don't have the recipe

For us, it is important to be transparent about how difficult it is to value clinical needs. There are surely many other angles that could be explored, and we don't have the recipe for how to do this.

Our experience is that the most important thing is that the business case is with the stakeholders who are affected by the project, and that we are dealing with real, not fictional, money. Therefore, the number of saved steps or the significant time savings on various procedures was not our focus in the business case.

Many other methods could certainly be used to assess clinical needs, and it could be considered whether the need is critical for this.

In summary, the anticipated value creation in the monitoring project includes enhanced oversight of department patients, optimized allocation of staff resources, improved patient satisfaction, better employee well-being and satisfaction, as well as optimization of material resources and sustainability.

4. Tender

The assessment and validation of the need showed that there is no comprehensive solution on the market that addresses the highly complex clinical need in a way that is deemed to deliver the necessary value for the Capital Region of Denmark, and within a price limit of 100 DKK per bed per day. As a result, the project continued through the business process for value-based procurement and was issued as an innovation partnership tender in March 2024.

Specification Requirements: MK, K-requirements, and KP

The use of minimum requirements (MR), K-requirements (K), and competition parameters (CP) in the tender material ensured that we could keep the need open and avoid defining a solution through specification requirements.

In the tender, quality is weighted 70% and price 30%, as opposed to traditional tenders where price constitutes 50% or more.

The weighting is essential because we need to collaborate with a partner on a solution for a full 18 months. Therefore, the microspint accounted for 17.5% of the tender.

Sub-criteria	Overall Weighting	Part-criteria	Weighting	Deliveries
Quality	70%	Partnership potential	50%	Microspint, timeline and process plan
		Intelligent monitoring and communication	25%	Offer & solution-description
		Safety and well-being	20%	
		Sustainability	5%	
Price	30%	n/a	n/a	

A Total of 11 Companies Tendered For The Contract

To find the most qualified partner, we facilitated a prequalification, a negotiation round, and a microspint. The prequalified companies were allowed to submit two offers – an initial and an adjusted offer. Clinicians from both AHH 321 and BFH G16 actively participated throughout the entire selection process, which lasted approximately 0.5 years.

Step 1: Prequalification

Purpose: Prequalify 5 applicants for submitting offers based on the need for cohesion.

Activity: Review of submitted references from other innovation projects.

Evaluation Criteria:

- Experience with innovation processes (40%)
- Productive co-creation with users and recipients of the solution (30%)
- Breadth of collaboration and task-solving (20%)
- Handling of high complexity in collaboration and task-solving (10%)

Scoring Scale: 0-20-40-60-80-100

Step 2: Submission of The First Offer

Purpose: Evaluate the first submitted offers.

Activity: All pre-qualified bidders were allowed to submit an offer (including a solution description and a timeline and activity plan) that would address the need for cohesion in nurses' workflows. To ensure that the offers would address the need as defined in the tender, we had developed six scenarios that could challenge a nurse's workflow in different ways, and these had to be addressed in the solution descriptions.

- | | |
|-----------------------------|---|
| 1. Patient in isolation | 4. The searching nurse |
| 2. Patient with delirium | 5. Missing documentation option |
| 3. The device without power | 6. The patient who had forgotten their abilities and skills |

The Device Without Power

Karin is a nurse working on the Geriatrics and Palliative Care Department, G16, at Bispebjerg Hospital. It's 07:30, and she is about to measure the vital signs of her three patients. She drives one of the department's EWS towers to her patient and informs them about the procedure. She then connects the patient to the EWS equipment. When she's ready to take the measurements, the EWS tower indicates that it's out of power. Karin must therefore detach all the equipment and take the tower out to charge it. She then begins her search for another EWS tower, but since it's morning and a new shift has started, all the department's EWS towers are in use. As a result, Karin must wait to measure the vital signs of her patient until an EWS tower becomes available.

Scoring Scale: 0-20-40-60-80-100

Step 3: Negotiations

Purpose: Alignment of expectations, clarification of uncertainties, and feedback on the bidders' initial offers. Mutual dialogue.

Activity: Negotiation round with prequalified bidders. No discrimination. Discussion of K-requirements in the tender, as these can be converted into minimum requirements and competitive parameters.

Minimum Requirements (MR)

- Must-have requirements
- Requirements that must be met by the bidder.

K-Requirements (K)

- Requirements that the contracting authority is willing to negotiate and potentially amend during the tender process.

Competitive Parameters (KP)

- Requirements that are part of the evaluation of the bids.
- Who performs the best?

Step 4: Micro-sprint

Purpose: Assess the collaboration potential

Activity: 6-hour sprint facilitated by each of the 5 pre-qualified bidders, based on the case provided by the Capital Region of Denmark.

Evaluation Criteria:

- Ability to facilitate the innovation process?
- To what extent does the solution address clinical needs?
- To what extent has co-creation been involved in the design of the solution description?
- To what extent is the proposed solution innovative and value-creating?

Scoring Scale: 0-20-40-60-80-100

Step 5: Submission of Final Offer and Selection of Partner

Purpose: Evaluate the final submitted offer and select the partner.

Activity: All pre-qualified bidders were given the opportunity to submit a new offer after the negotiations. Some offers were strengthened, and others made minor adjustments.

Evaluation Criteria:

- The bidder's solution description in accordance with the requirements for safety and well-being in the tender material.
- The bidder's process and timeline and response to competitive parameters in the tender material.
- Price, possibly revised in relation to the initial offer.

Scoring Scale: 0-20-40-60-80-100

Step 6: Award of Contract

Dräger Danmark was awarded the partnership contract and declared the winner of the innovation partnership. Dräger Danmark has formed a consortium with Sibel Health.

The following procedure was then followed:

- Notification of all prequalified bidders about the outcome of the tender with a subsequent standstill (objection) period.
- Final drafting of the partnership contract based on the winning bid and signature.
- Offering feedback meetings to the bidders who did not win the tender.
- Signing of the partnership contract between Dräger Danmark and Region Hovedstaden to mark the beginning of the 18-month co-creation period.

The Value of a Prequalification, Microsprint, and Negotiation Round

- ✓ **The Prequalification** process provided clinicians and innovation staff with an understanding of a potential partner's experience with previous innovation projects and enabled a selection based on past experiences and documented competencies
- ✓ **The Microsprint** gave clinicians, CIMT, and innovation staff an opportunity to sense a potential collaboration and allowed all stakeholders to meet each other. Conversely, it also gave the prequalified companies the chance to meet us, their potential partner.
- ✓ **The Negotiation Round** allowed for the clarification of ambiguities and misunderstandings in the tender material for the bidders. At the same time, Region Hovedstaden gained an overview of any issues in the material and clarity on whether changes could be made to the requirements that were open for negotiation.



5. Development

The 18-month development period began in November 2024 and takes place at two of the hospitals in the Capital Region of Denmark – specifically at Bispebjerg and Frederiksberg Hospital (BFH) and at Amager and Hvidovre Hospital (AHH).

From BFH, G16, a medical ward for geriatric patients, participates. From AHH, 321, a gastro-surgical ward, participates. In other words, two different hospitals, two different specialties, and both a medical and surgical ward are involved, which brings valuable clinical knowledge into the project and increases the likelihood of implementing a solution that can work across hospitals and wards. This is the scaling aspect, which is the intention of the procurement process for value-based purchasing.

A total of three clinicians have been freed up, corresponding to 1.5 full-time equivalents per ward, to participate in the entire project period. At G16 BFH, this involves two nurses, and at 321 AHH, this involves one nurse and one doctor. These clinicians have also been involved in defining the need and selecting the partner.

Project Organization

The partnership is organized into a steering group, a project group, and a reference group.

The steering group consists of representatives at the vice-director level from both hospitals, an innovation manager, and three representatives from the partner's side.

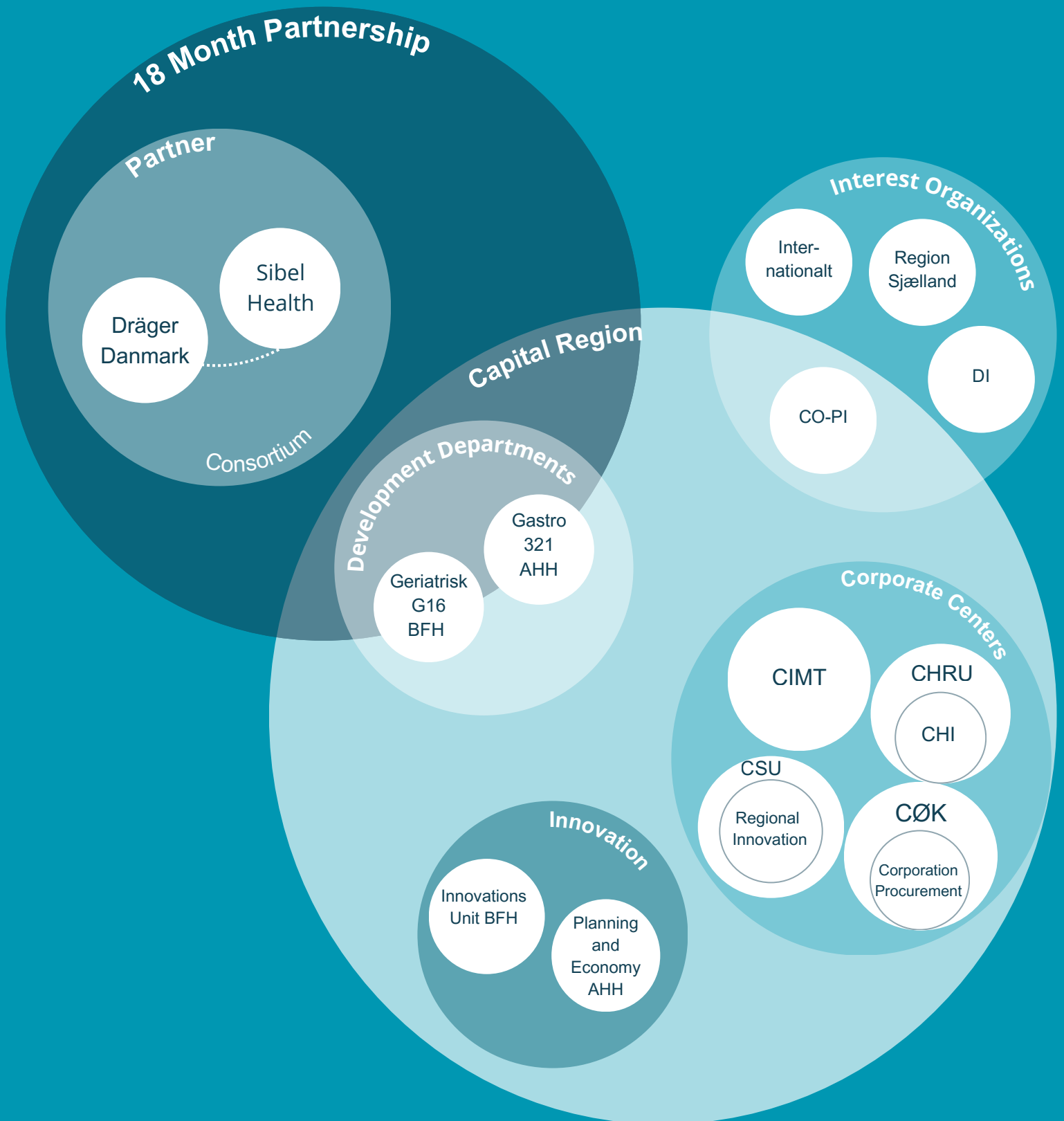
The project group is led by a project manager from the Capital Region of Denmark, and the group includes departmental managers from G16 BFH and 321 AHH, individuals with innovation training, and representatives from the partner's side. The purpose of the project group is to ensure that the planned activities are carried out in the best possible way, with weekly consultations and updates on the project.

The reference group consists of various interest organizations that are in different ways involved with the project. Among them is Region Zealand (FIERS), which follows the project and contributes to consultations with the aim of regional scaling.

6. Implementation

This phase will only be considered once the development period is completed. See the timeline on page 54.

03 Stakeholders



04 EU Support

The support for the 18-month development period comes from the EU's Social Fund Plus (SFPRO-2023-0036) and from Decentralized Business Promotion Funds (DEM). This support enables the release of clinicians from both development departments, the hiring of a project manager, and the management and operation of the entire development period on the part of the hospitals.

Social Fund Plus: 4.244.310 DKK.	The Danish Business Authority's Business Promotion Grant: 1.631.385 DKK.	Total eligible expenses for support: 9.383.850 DKK.
---	---	---

The Social Fund Plus is one of the two focus areas under Denmark's Business Promotion Board. In the summer of 2023, the board announced a pool of 72 million DKK aimed at implementing and scaling welfare technology. The pool is divided into two focus areas, including the Social Fund, which aims to ensure competency development and lifelong learning for involved stakeholders.



05 Timeline

Strategically gathered as part of the construction of the New Bispebjerg Hospital.

Collection of needs

Mar
2022

Two market dialogues with companies and clinicians, as well as a business case.

Validation of need

Okt
2022

Published on 13.03.24.

Tender published

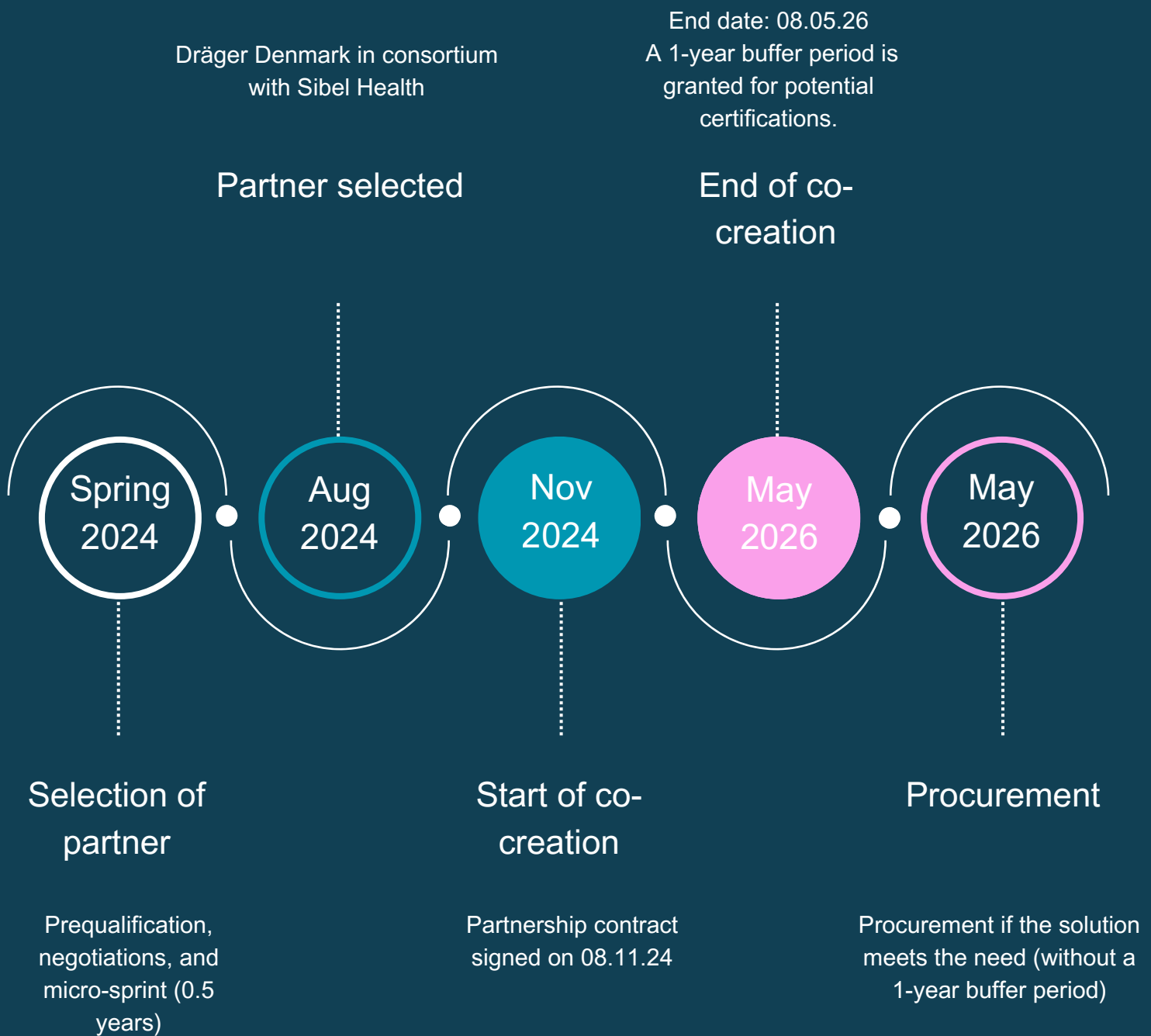
Mar
2024

Identification of needs

Three workshops with clinicians across hospitals.

Generation of tender material

Development of minimum requirements (MR), mandatory requirements (K-requirements), competition parameters (CP), scenarios, etc.



06 Moving Forward

We still have unanswered questions...

Even though we have successfully launched an innovation partnership, selected a qualified partner, and initiated the collaboration phase, there are still areas where we lack answers for facilitating future innovation partnerships.

Buyout of clinical resources is difficult but essential

In this innovation partnership, clinicians have been bought out using acquired grant funds. We believe that the buyout of clinical resources is essential for innovation partnerships, as it ensures that clinicians have the necessary time to collaborate with the selected partner. Our experience shows that applying for funding to buy out clinicians is a complex task. Moreover, it is crucial that there are funding calls available on the market with the specific intent to support projects of this nature to secure funding through such means.

To support the facilitation of future innovation partnerships, we believe there is a need to explore how we can leverage clinical resources in a sustainable and environmentally friendly manner without necessarily requiring external financing.

Shared positions between innovation units and clinical departments are valuable

At the Innovation Unit at BFH, we established two shared positions between G16 BFH and the Innovation Unit. These two positions are held by the two participating nurses from G16 in this innovation partnership.

One position is co-financed by the Government's Life Science Strategy and G16, while the other is co-financed by G16 and the Social Fund Plus (managed by the Business Promotion Board) for direct participation in the 18-month co-creation period.

The Pipeline

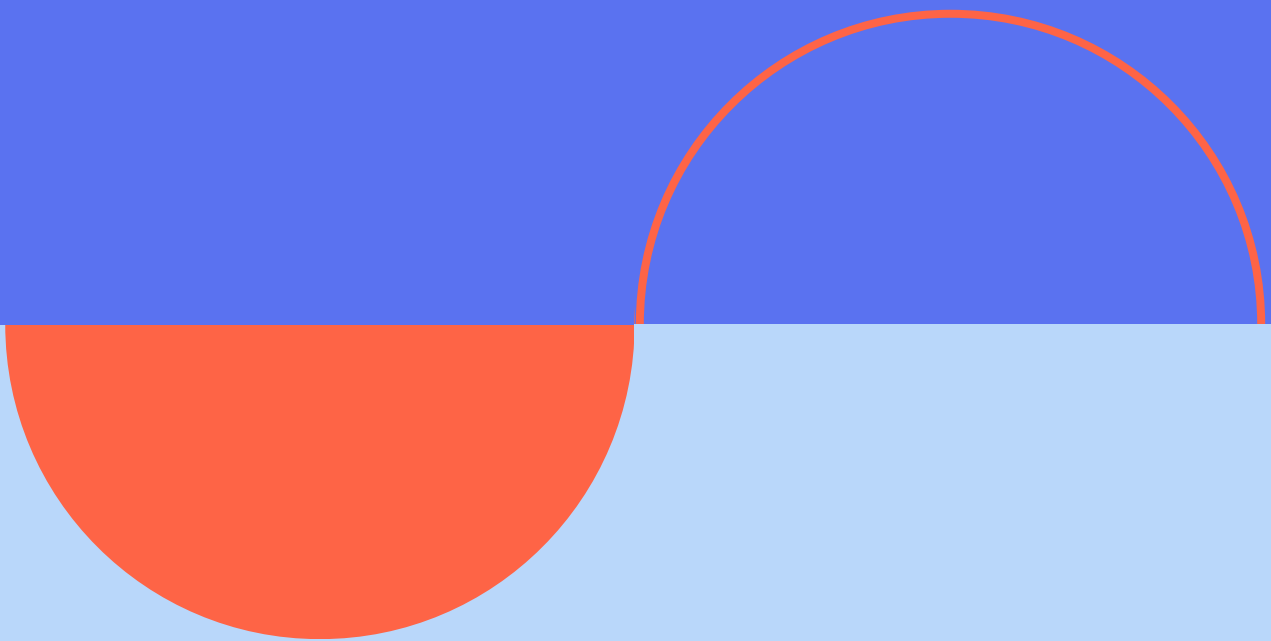
of innovation partnerships at the
Center for Economics - Corporate Procurement

- Postoperative complications
- Automated constant checks
- Precision medicine for immunotherapy
- Digital skin cancer diagnostics
- Activation and mobilization during hospitalization
- Home respiration
- Oxygen therapy in the home
- Virtual training for staff
- Polypharmacy



Other Projects

at Bispebjerg & Frederiksberg Hospital



01 Hygiene

Focus on patients' hand hygiene

04 IV Overview

What is the status of IV infusion in the department?

02 VR-Training

Training using VR-technology

05 Robots

A helping hand for the nurses

03 Flow

Flow in an emergency department

06 Way Finder

A guide for patients and relatives



01 Hygiene

The purpose of the project is to support the work of infection control nurses by providing insight into the hand hygiene practices of patients, relatives, and staff after using the toilet. To achieve this, flow sensors have been installed on toilets at the cistern as well as on the pipes supplying hot and cold water to the sinks. The sensors measure the water flow in the systems, enabling the detection of whether hand washing occurs after toilet visits. This provides infection control nurses with insight into the need for optimizing hand hygiene.

The project aims to introduce behaviorally incentivizing measures to increase motivation for hand washing after toilet visits. This can help foster a better hygiene culture, where patients, relatives, and staff are more aware of the importance of proper hand hygiene.



02 VR

The purpose of using VR technology in training situations is to motivate and support patients to remain physically active during their hospitalization to promote the rehabilitation process. VR headsets have been implemented, among other places, in the neurological department at Bispebjerg and Frederiksberg Hospitals, where they are used in collaboration between physiotherapists and patients. The potential of the technology is also being tested for use in other departments.

03 Flow

The need for flow was gathered by visiting the emergency department at Bispebjerg and Frederiksberg Hospitals. Here, clinicians expressed the need to manage patient flow more effectively. The need has since been further explored by students through the CHI collaboration. The need has proven to be highly complex with many facets.

Two companies, Netcompany and Systematic, have visited the hospital and presented their thoughts and potential solutions, with clinicians present. Currently, the new chat feature, "Secure Chat," is being tested in the hospital's emergency department. The purpose is to investigate whether asynchronous communication can support better flow.

04

IV Overview

The need for an IV overview emerged from a meeting between the market and clinicians, where a company introduced various products related to IV treatment. It turned out that clinicians were not particularly interested in the primary product but in one of the features that came with it—specifically, continuous monitoring of ongoing IV infusions. It was clear from the clinicians' reactions that they had not considered this before, perhaps because they didn't know it was possible. This is an example of a need where technology drives the requirement, and the exposure to products for clinicians helps uncover clinical needs that might otherwise not have been identified.

05

Robots

The purpose of the clinical robot "Buddy" is to support nurses' workflows by saving them time and steps spent retrieving equipment. Buddy is a self-driving clinical robot that contains various tools and equipment that nurses frequently need when they are on a patient's room. Instead of leaving the patient, nurses can call Buddy via a tablet in the patient room, and Buddy will roll over with the necessary supplies. The nurses themselves have defined their need for a "helping hand" and what Buddy should carry around. It is being explored whether Buddy can also be used for clinical logistics. Buddy is being tested and developed in the hospital's neurology department with great interest from other departments.

06

Way finder

The purpose of the project is to help guide patients to the right place. It is a well-known issue that it can be difficult to find one's way around a hospital. The project is running at Bispebjerg Hospital, and the hope is that it will become easier to guide patients to the correct department.



Feel free to contact us.

The Email of the Innovation Unit

innovationsenheden.bispebjerg-frederiksberg-hospitaler@regionh.dk

Brian Holch Kristensen

Head of Innovation BFH

Tlf.: 23 29 18 30

e-mail: brian.holch.kristensen@regionh.dk

Anders Hoffmeyer Uhre

Innovation Consultant BFH

Tlf.: 22 16 92 12

e-mail: anders.hoffmeyer.uhre@regionh.dk

Emilie Caroline Udsen

Nurse, MSc.Tech. Project Manager - Innovation BFH

Tlf.: 24 40 61 01

e-mail: emilie.caroline.udsen.01@regionh.dk

Lene Thomsen

Nurse G16 BFH og employed at Behovsfabrikken

e-mail: lene.thomsen.03@regionh.dk

Rie Schou Kristensen

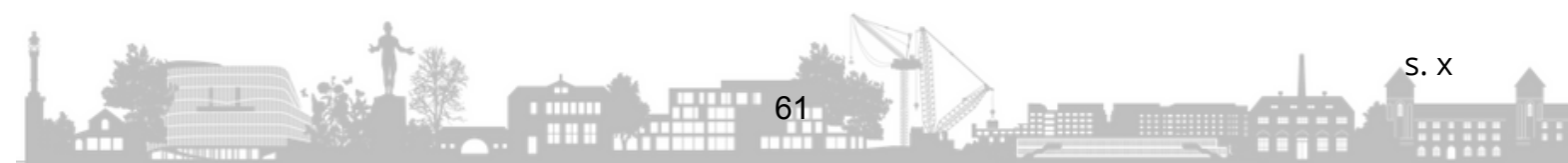
Nuse G16 BFH og a part of the Monitorering Project.

e-mail: rie.schou.christensen@regionh.dk

Daniel Freyr Pálsson

Student Worker BFH - MSc in DataScience

e-mail: daniel.freyr.palsson@regionh.dk





Handbook Regarding Behovsfabrikken Innovation Unit

Bispebjerg og Frederiksberg Hospital

Bispebjerg Bakke 23, 2400 København N
Bygning 20D, 2 sal

Website:

<https://www.bispebjerghospital.dk/afdelinger-og-klinikker/behovsfabrikken/Sider/default.aspx>