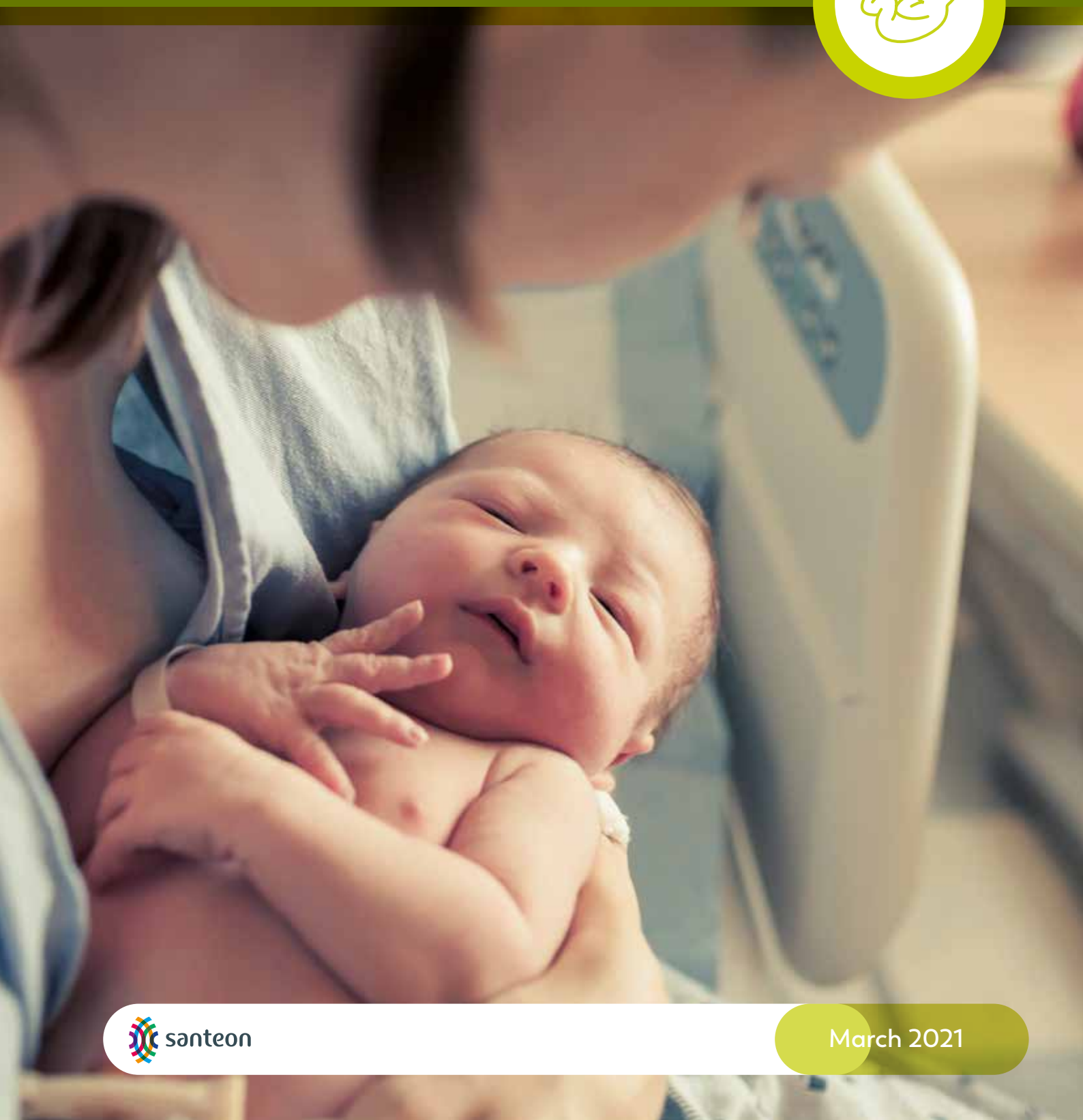
Better Together
Birth Care



santeon

March 2021

Santeon is a group of seven top-class clinical hospitals. Together, we are committed to improving care in our hospitals and throughout the Netherlands by looking at each other's work, learning from each other and pursuing continuous improvement.

Santeon Utrecht, www.santeon.nl
Canisius Wilhelmina Hospital Nijmegen • **Catharina Hospital** Eindhoven
Maasstad Hospital Rotterdam • **Martini Hospital** Groningen
Medisch Spectrum Twente Enschede • **OLVG** Amsterdam
St. Antonius Hospital Utrecht/Nieuwegein

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Summary

In the Better Together Birth Care programme, we improve birth care by means of the Value-Based Healthcare methodology. Santeon hospitals have 16,000 clinical deliveries each year, amounting to 45 per day. Because of these large numbers, there is plenty of data to analyse and ample opportunity to learn from each other. We discuss these data and our working methods openly with each other, in order to learn as much as possible from each other's challenges and successes.

We measure outcome, cost and process indicators for a predefined group of women every six months (January through June and July through December). In previous cycles, this group consisted of all women who gave birth clinically in a Santeon hospital with a gestational age of 32 weeks or more. We collected data on all the care they and their child or children received during pregnancy up until two months after delivery. Carefully drawing up definitions and extensive validation took a long time, but provides a solid basis of reliable data. Since the launch of the programme in 2017, hospitals have now completed four iterations of the improvement cycle. In the cycle that was completed in the first half of 2019, we collectively decided to focus on the following improvement initiatives:

1 Reducing the number of unplanned caesarean sections

From the first improvement cycle, we focused on charting unplanned caesarean sections, specifically in women in the NTSV group (women pregnant with their first child, a singleton who is in the vertex position on the delivery date). Preventing unplanned caesarean sections in this group has many benefits for this birth and any subsequent ones, as it leads to fewer complications and faster recovery. This is a complex topic involving many different factors, such as induction, transfer during labour, augmentation, analgesia and push time.

Close collaboration between Canisius Wilhelmina Hospital and Catharina Hospital, following the figures that emerged from the first benchmark, shows that the structural and detailed comparison of working methods can lead to a reduction in the number of unplanned caesareans (25% less in these two hospitals). Subsequently, this topic was discussed in detail across Santeon, but the figures still vary among Santeon hospitals, even after analysis. It is something we will continue to work on.

2 Reducing the incidence of complete ruptures, episiotomies, and bleeding during delivery

Together, the Santeon hospitals have also made great strides with regard to reducing the incidence of complete ruptures, episiotomies and postpartum bleeding. Augmentation regimens have been compared and are being adjusted. Structurally reflecting on specific choices during delivery together proved particularly effective in reducing the number of episiotomies (12% in MST). In addition, OLVG has developed a training course that is now used to train gynaecologists, obstetricians, nurses and primary care representatives in all Santeon hospitals in the hands-on method, which has reduced the number of complete ruptures. The St. Antonius Hospital even managed to halve the percentage of complete ruptures.

"So far, a surprising lesson we have learned from the improvement cycles is how important patience and awareness are in birth care. Whether it's unplanned caesarean sections, episiotomies, or complete ruptures: as a rule of thumb, we need to have the courage to wait longer before intervening, and we need to discuss the choices gynaecologists and obstetricians make during childbirth afterwards to learn from them right away, making sure to involve the entire group."

Simone Kuppens, gynaecologist at Catharina Hospital

3 Improving important outcomes for the child

We focus on suspicion of neonatal infection and duration of administering antibiotics. To that end, the St. Antonius Hospital launched a sepsis calculator, Medisch Spectrum Twente is working on providing insight into reasons for administering antibiotics and Maasstad Hospital introduced an additional checkup after three days because they administer antibiotics for a longer period of time. We are awaiting the results, based on which we will formulate joint practices.

4 Improving the efficiency of birth care

We are working together to optimise the postpartum checkup process. Specific improvements include: selecting who comes in for checkups, having checkups performed by primary care professionals, having checkups performed by nurses and having checkups performed via phone or video calls. Santeon hospitals have taken follow-up actions in order to reduce overall length of stay for women by modifying existing procedures.

What's next

In recent improvement cycles, we have managed to achieve results to be proud of. In future cycles, Santeon hospitals will continue their efforts to improve even more. In addition, we will focus on several main themes for the time to come: continuing and expanding close collaboration (via the Value-Based Healthcare methodology) throughout the birth care chain, including primary care and academic centres, more national and international benchmarking, expanding indicators (e.g. pain relief) and establishing a joint development agenda and introducing PROMs (Patient Reported Outcome Measures).

There is always room for improvement

“Internationally speaking, birth care in the Netherlands is of a high standard, and it can therefore be tempting to think that we are doing everything right. Collaboration within Santeon has opened our eyes in that regard. Rather than comparing ourselves to nearby academic centres with a completely different population or smaller local hospitals, we started measuring our performance with that of similar top-class clinical hospitals.

By working together, we gained insight into how much leeway protocols and scientific standards still allow, and although the potential changes are nuanced, these nuances could prove to have major consequences. Consequences that make the difference between needing a caesarean section or not, between a complete rupture or an uncomplicated delivery, and between being able to go home with your child quickly or having to stay in the hospital longer.

What struck us most is that every hospital has its strengths and weaknesses. No one hospital came top of the class in all metrics, serving as a reminder that we all have room to improve and that we have colleagues sitting right next to us who can help.

This is what makes Santeon so valuable: it is a positive, safe space in which we can help each other improve. Making that effort is not optional: it is driven by an organisation with project leads, data analysts and a central coordinating body. We believe this to be an ironclad combination that helps us put our figures in perspective and to understand which concepts lie behind those data.

We are proud of what we have accomplished together, but we also see many ways in which we could do even better. For example, in addition to gynaecologists, we now involve paediatricians to look more comprehensively at the impact of our actions on the child’s health. The next step is to involve anaesthesiologists as well, so that we can comprehensively assess the outcomes of the various pain relief options. Furthermore, we want to include the experience of pregnant women and outcomes reported by them (PROMs) in the care process in a much more targeted and structured way, for example through digital questionnaires.

Ultimately, we have to strive to provide the best possible care. That is why we chose to do what we do and that is why Santeon hospitals decided to work together. As long as we see opportunities to improve the outcomes and experiences of mothers, their partners and their children during pregnancy, childbirth or the postpartum period, we have a responsibility to make every effort to do so.”

Fleurisca Korteweg and David van der Ham
Medical leads of birth care and gynaecologists at the Martini Hospital

Chapter 1

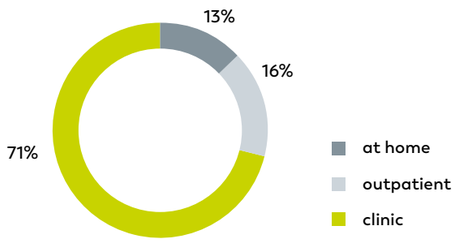
What is birth care?

In this chapter, we explain what birth care entails and outline the different ways of giving birth.

By birth care, we mean the care given to pregnant women and their children during pregnancy and for two months after delivery. In 2018, approximately 160,000 women gave birth in the Netherlands. Of the 160,000 women who gave birth in the Netherlands in 2018, 13% gave birth at home, 16% in an outpatient setting and 71% in a clinical setting (See figure 1).

figure 1

Delivery location



Source: CBS StatLine. Volksgezondheidenzorg.info (an RIVM service) and Perined (the most recent figures available in early 2021)

Almost 14% of these women gave birth in a clinical setting in one of our Santeon hospitals (See figure 2).

Women who give birth without a medical indication under the supervision of their own midwife in a hospital or birth centre are considered to have given birth in an outpatient setting. Deliveries that take place in a hospital due to medical necessity or (increased risk of) complications are considered to have occurred in an inpatient clinic. Women who give birth in a clinical setting are treated by a gynaecologist and are supervised by a clinical obstetrician or assistant physician. Women given pain relief are also considered to have given birth clinically. RIVM figures show that the percentage of women giving birth in an inpatient setting has increased in recent years: rising from 63% in 2000 to 71% more recently. This is presumably because women are more likely to request pain relief, because more women have previously undergone a caesarean section, because the number of pregnant women with co-morbidities (including obesity) is rising and because women are older on average at the time of delivery.

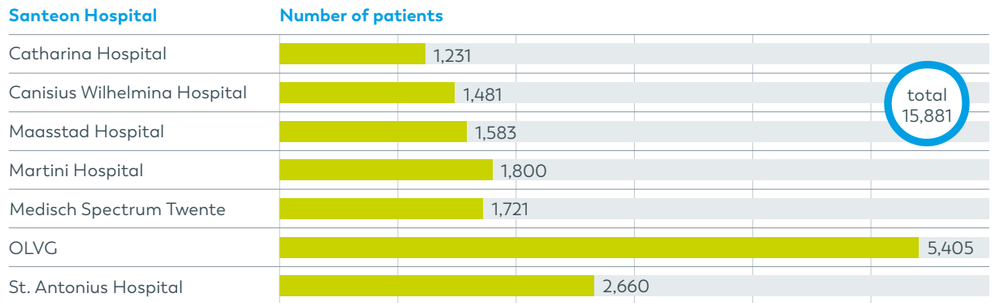
Most deliveries involved women between 30 and 35 years old

Nationwide, nearly 40% of women who gave birth in 2018 were between the ages of 30 and 35. The vast majority of women who gave birth in 2018, almost 90%, were between 25 and 40 years old (See figure 3). The age distribution of clinical deliveries in Santeon hospitals is similar to the national distribution of all deliveries. The age group percentages vary slightly among our hospitals. For example, the percentage of women under 20 who give birth at Maasstad Hospital in Rotterdam is greater than in the other Santeon hospitals, while a relatively large number of women over the age of 35 gave birth in OLVG in Amsterdam.

figure 2

Number of clinical deliveries

In the Santeon hospitals in 2018

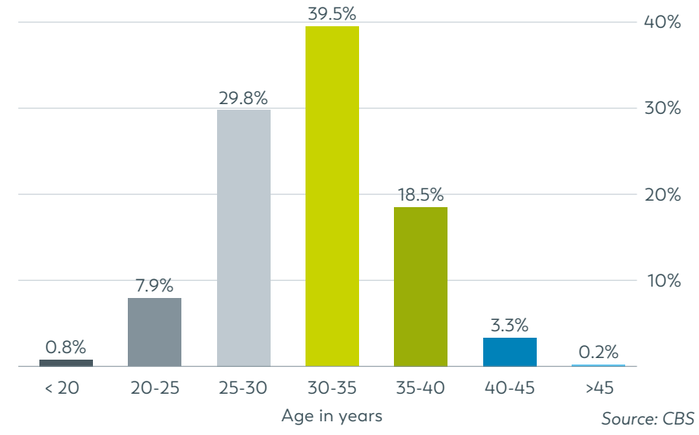


Source: volksgezondheidenzorg.info (an RIVM service) and Perined (the most recent figures available in early 2021)

figure 3

Maternal age at time of delivery

Deliveries in 2018



Source: CBS

The members of the improvement teams for the Better Together Birth Care programme can be found in the appendix on page 45

Deaths due to pregnancy or childbirth hardly ever occur in the Netherlands

In the Netherlands it is fortunately rare for women to die as a result of the members of the improvement teams for the **Better Together Birth Care programme** can be found in the appendix on page 45 pregnancy or childbirth. Within Santeon, we studied this outcome in the first half of 2019, looking at women with a gestational age from 32 weeks. In this group, we did not find any maternal deaths due to pregnancy or childbirth.

Unfortunately, some children do still die during childbirth or within 28 days after birth. This happened in less than 0.1 percent of cases in Santeon hospitals in the first half of 2019.

Three ways to start labour: spontaneous, induced, or caesarean section

In most women, childbirth begins spontaneously, which is to say that the contractions start naturally. However, in some cases, delivery must be induced in consultation with the parents, e.g. because the woman is past her due date, because the woman's water has broken but contractions have not started yet, or because of pregnancy-related high blood pressure or pregnancy-related diabetes if the infant is estimated to be either large or small for gestational age.

If necessary, labour can be induced by ripening the cervix. This is called priming. This is done, for example, by inserting a balloon and slowly filling it with water to allow the cervix to open, or by administering hormones. After the balloon has been inserted, the woman may even be allowed to go home to wait for her cervix to ripen, before returning to the hospital the next day to have her cervix reassessed. If it has dilated sufficiently, labour can be induced.

Once a stage of sufficient dilation has been reached, the woman's membranes can be ruptured, which, in some women, will start the contractions.

If this does not happen, the woman can be given hormones via an IV drip to start the contractions.

The third option for starting labour is through a planned caesarean section. Reasons for suggesting a planned caesarean section include: a previous caesarean section, the placenta obstructing the cervix or baby positions that make vaginal delivery impossible or too risky. When a child is breech, it is up to the woman to decide how she wants to give birth. After counselling, a large number of women will opt for a planned caesarean section rather than vaginal delivery in this case. Finally, pregnancy complications may occur that leave insufficient time for natural delivery. In these cases, there may be no other option but to opt for a planned caesarean section.

Three ways to end labour: spontaneous, operative vaginal delivery or caesarean section

After labour has begun spontaneously or has been induced, the majority of women give birth spontaneously, i.e. without requiring additional assistance. Situations may arise during labour that prevent a woman from giving birth vaginally without assistance or require the delivery to be expedited, for example, due to distress in the child or lack of expulsive force. In consultation with the parents, operative vaginal delivery (using a vacuum pump or forceps) may then be chosen so that the child can still be born naturally.

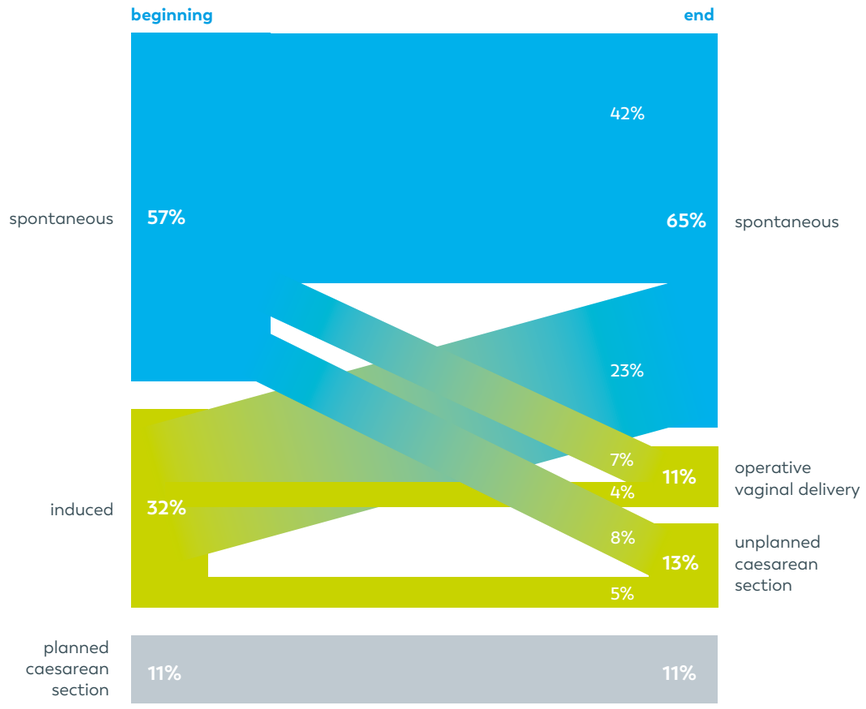
In some cases, operative vaginal delivery may not be possible, e.g. if there is no full dilation, if the child has not dropped enough yet or if the doctors suspect foetal distress. The gynaecologist may then suggest proceeding with a caesarean section during labour. This is called an unplanned caesarean section.

Flowchart

Examining deliveries that took place in Santeon hospitals in the first half of 2019 (including both deliveries that began clinically and deliveries that began at home or in an outpatient setting and that were transferred to the gynaecologist during labour), we see that over half (57%) of deliveries begin spontaneously. It also appears that of the deliveries that begin spontaneously or are induced, the majority (65%) end spontaneously as well. In 11% of all deliveries in Santeon hospitals were operative vaginal deliveries, while 13% of deliveries involved an unplanned caesarean section. A planned caesarean section was performed on 11% of women (See figure 4).

figure 4

Flowchart from beginning to end of labor



Chapter 2

Value-driven care

In this chapter, we discuss what Santeon stands for, what we want to achieve and how we go about accomplishing our goals

Santeon is a group of seven top-class clinical hospitals. Together, we strive to provide the highest-quality care and act as role models in terms of how we organise hospital care. To achieve this, we are pursuing five ambitions:

1 Keeping patients actively involved in treatment decisions
2 Fostering close collaboration, development and improvement among professionals
3 Joining forces for research and innovation
4 Providing insight into quality of care for patients
5 Keeping healthcare affordable and accessible

The Better Together programmes are an important part of our approach. In these programmes, we take a closer look at specific conditions/groups and openly discuss practices and outcomes, so that we can learn from each others' challenges and successes. We then share our insights with the rest of the healthcare field to give other healthcare professionals the opportunity to learn from our experiences.

For each condition, we set up a multidisciplinary improvement team in each hospital, consisting of medical specialists, nurses, data analysts, project managers, other healthcare professionals and, where possible, patients. After all, this is how we can truly improve healthcare together.

Value-Based Health Care as a core principle

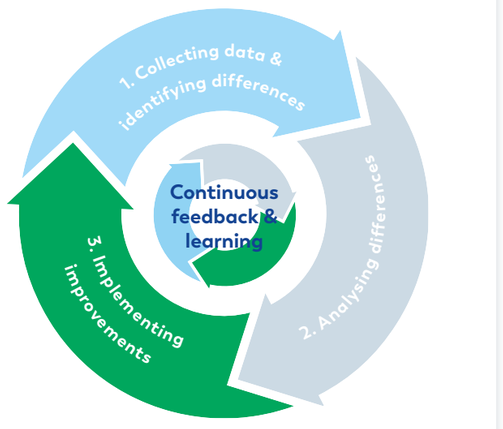
Our methodology is based on the principles of Value-Based Health Care, which revolves around maximising patient care outcomes and then designing this very best care as efficiently as possible. Important questions we ask ourselves include: "Can we make the procedure less stressful for patients?", "Which surgical technique is least likely to cause complications?", and "Does this activity contribute to the patient's quality of life? By seeking answers to these questions, we work towards creating an efficiently organised care process that delivers the best possible results and is fully tailored to patients' needs.

Transparency is key

Transparency is the driving force behind our approach to improve our care. We believe that you can only improve if you are open about what you do and about what effects this has. We make the results of treatments transparent and compare our practices with each other by using data and objective indicators. We foster an atmosphere of continuous learning based on collecting, sharing and comparing data, analysing differences and implementing improvements (See figure 5).

figure 5

Santeon improvement



> *"Transparency is easy when you only get high scores. The great thing about our approach is that everyone had the guts to be honest about areas that they did not score as well in. Only then can you maximise the lessons you learn from each other.*
>
> *Elisabeth Blokhuis, gynaecologist at the St. Antonius Hospital*

Our discussions are based on data wherever possible, as this lays the groundwork for an objective discussion about facts rather than opinions. We use data as a mirror to find differences and formulate hypotheses about how we can do better.

Laying the groundwork with scientific evidence

Scientific evidence plays a prominent role in all our discussions about how our care processes differ and about our improvement initiatives. We keep a close eye on the latest science and use it as input for our discussions. On top of that, we look closely at the latest developments in the field when testing any improvements we manage to identify. Conversely, the quantitative comparisons between our hospitals also produce insights that we study in more detail in scientific projects.

Better outcomes for our patients

In our Together Better programmes, we give healthcare professionals access to structured information, based on scientific data and, above all, viewed from the patient's perspective. We do not look solely at medical outcomes and costs, but also consider factors that matter to our patients, and we are working hard to make information about these outcomes more understandable for patients. By doing so, we empower them to play an active role in the decision-making process about where and how they want to be treated. In order to structurally integrate patient perspectives into our working methods, we strive to give patients a permanent position in our improvement teams.

In the short term, we are improving outcomes and aiming to reduce costs. In the long run, we are bringing about a culture change. We are working to create an environment in which healthcare providers openly share results and have the opportunity to learn from each other, and an environment in which patients and providers decide together - based on outcomes - which treatment is best for the patient.

The members of the improvement teams for the Better Together Birth Care programme can be found in the appendix on page 45

Chapter 3

Scorecard and patient selection

In this section, we detail our approach to improvement as we apply it to birth care. We outline the process and explain the outcomes we have focused on.

For birth care, four full six-month improvement cycles have now been completed. An improvement cycle consists of three steps:
1 data collection and analysis, **2** analysing differences, and **3** implementing improvements. The improvements include insights that are implemented across all hospitals, but also ideas that hospitals will work on individually.

"We are developing a dashboard with VBHC indicators that is updated weekly. This will allow us to chart if, for example, the number of caesarean sections has increased in recent weeks, so that we can intervene quickly. It would be even better if we could track these metrics across all Santeon hospitals, so that we could compare ourselves in real time, rather than in 6-month intervals."

Susanne Tielemans, project manager at Catharina Hospital

Testing and establishing the scorecard and patient group

Santeon improvement processes start with testing and drawing up the scorecard. The scorecard is the set of indicators that we will be investigating during the six-month improvement cycle. A scorecard consists of three sections:

- Outcomes - e.g., mortality, complications, and readmissions.
- Costs – e.g., use of drugs, length of stay in the hospital and duration of surgery.
- Processes - e.g. number of outpatient contact points and accessibility of pain management.

The scorecard for the birth care improvement cycle also has these three sections (see figure 6). The fourth improvement cycle, the Santeon-wide review of which took place in 2019, focused on women who gave birth clinically at a Santeon hospital in the first half of 2019 and all care received by them or their child(ren) during pregnancy until two months after delivery.
Pregnancy durations shorter than 32 weeks - with the exception of foetal death from the 28th week of pregnancy onwards - are not included in order to compare a homogeneous group.

In creating the scorecard, existing indicators were used wherever possible, e.g. indicators from the Dutch National Healthcare Institute, Perined and the International Consortium for Health Outcomes Measurement (ICHOM). As a result, the scorecard does not require healthcare professionals to log more indicators and can be harmonised with existing, validated standards, which will allow us to compare our outcomes with Dutch and international peers in the future.

The set of indicators specified above is monitored every improvement cycle, and this level of continuity allows us to monitor indicators over time and improve the efficiency of the provision of information across Santeon through automation. With each new improvement cycle, several indicators are selected for in-depth analysis, e.g. to explore whether there is a link between different augmentation regimens for contractions and the chance that a women will give birth spontaneously, or whether operative vaginal delivery or an unplanned caesarean section will still be necessary.

figure 6

Birth care scorecard

OUTCOME	Maternal (postpartum) & infant (before, during and after delivery) death
	Blood loss (postpartum bleeding) and blood transfusions
	Complete rupture
	Episiotomy (snipping)
	Maternal rehospitalisation
	Child admitted to NICU
	Apgar after 5 minutes
	pH of umbilical cord
	Preterm birth, spontaneous & non-spontaneous
	Oxygen deficiency in child
	Neonatal infection
	Breastfeeding, intention & at discharge
COSTS	Length of stay mother and child
	Number of caesarean sections, in and out of office hours
	Caesarean section operating times, gross & net
	Number of outpatient visits
	Pregnancy counseling
	Use of drugs: analgesia during childbirth
PROCESS	Pain management, in and out of office hours
	Postpartum checkups: outpatient visits & telephone consultations

Data collection, validation and analysis

After the scorecard has been drawn up, the hospitals' data analysts will start collecting the necessary data for the selected indicators. It sounds simple, but it certainly is not. Data is often stored in different systems, definitions have to be aligned with each other very precisely and data are, unfortunately, not entered completely and uniformly. As such, medical specialists are closely involved in the process to validate the data.

"Improving data is and will continue to be important. The trick is to recognise potential for improvement even if the data cannot or not yet provide conclusive evidence. Because even if the data aren't 100% perfect, you still see differences that can only be explained by different methods, which means you have to get to work."

Fleurisca Korteweg, gynaecologist at Martini Hospital

Discussing differences and identifying improvement initiatives

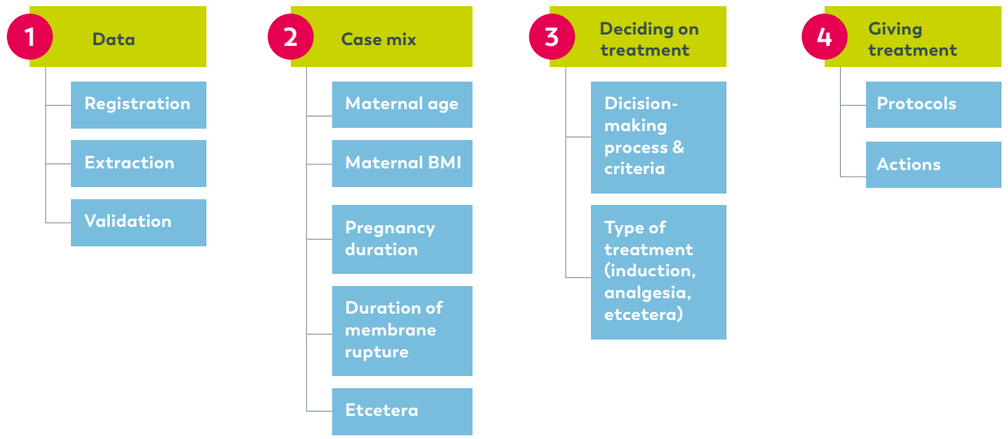
Every six-month improvement cycle ends with a Santeon-wide review with representatives from the improvement teams of the seven hospitals: medical specialists, project managers and data analysts. They discuss the analyses and take a deep dive into any differences between hospitals. For each difference they find, they go through a four-step process to outline the difference in as organised and accurate a way as possible (See figure 7).

In addition, other topics are also discussed at Santeon-wide reviews, such as current issues or innovative ideas developed by individual hospitals, e.g. on care or on data and healthcare systems.

In the following chapters, we will explore specific analyses, agreements made to improve care processes, and individual improvement ideas that have come out of the current and previous improvement cycles.

figure 7

Steps for interpreting variation



Chapter 4

Results across Santeon

In this chapter, we present our collective insights and the improvements we have made across our hospitals.

The improvement initiatives described here are clustered around four topics that have emerged from the improvement cycles over the past two years:

1 Reducing the number of unplanned caesarean sections
2 Reducing the incidence of complete ruptures, episiotomies and postpartum bleeding
3 Improving indicators that are particularly important for the child
- More targeted use of antibiotics in newborns
- Optimally facilitating breastfeeding

4 Improving the efficiency of birth care
- Targeted postpartum checkups
- Shortening length of stay for mother and child

1 Reducing the number of unplanned caesarean sections

In some cases, an expectant mother may have to go to the operating suite for an unplanned caesarean section halfway through labour. We strive to avoid these situations, but we do not rule them out entirely if the health of the mother or child demands it. Unplanned caesarean sections lead to a higher risk of complications, including in subsequent pregnancies, and longer recovery after delivery. Therefore, we do everything we can to reduce the number of unplanned caesarean sections as much as possible.

Significant variance between unplanned caesarean section rates in NTSV deliveries

To better understand the processes and decision-making surrounding unplanned caesarean sections, the hospitals specifically focused on NTSV deliveries in their analyses. The NTSV group consists of women having their first pregnancy with a singleton (i.e. not a multiple) baby born at or beyond a gestation of 37 weeks in the vertex presentation. Specific attention was paid to this group, as there are necessarily no effects of a previous pregnancy to consider and because the benefits of a successful delivery are greatest in this group. If a caesarean section can be avoided in a first delivery, subsequent deliveries may be more likely to take place outside the hospital and the chances of the woman having a caesarean section in a subsequent pregnancy are low.

Comparing the unplanned caesarean section rates in NTSV deliveries among the seven Santeon hospitals, substantial differences emerge (See figure 8).

Induced labour increases the risk of an unplanned caesarean section

To explain the observed differences, a statistical analysis (specifically, a logistic regression) was applied focusing on three metrics: gestational age (37-41 weeks compared to beyond 41 weeks), maternal age (younger or older than 35 years), and mode of onset of labour (spontaneous or induced). This analysis found that babies with a longer gestational age and an older mother were slightly more likely to be delivered with an unplanned caesarean section. However, the onset of labour, i.e. spontaneous or induced, was found to have a much greater effect: at the mean age (30 years) and mean gestational age (40 weeks), the likelihood of an unplanned caesarean section in most hospitals was about two times greater for an induced delivery than for a delivery that starts spontaneously (See figure 9). The reason for inducing labour was not considered in this analysis.

The results do not mean that inducing labour should be avoided in general. Indeed, for certain indications, inducing labour has been proven to be the best solution for mother and child. However, women do run a higher risk of developing complications if labour is induced, as labour is induced for a reason.

Low rate of unplanned caesarean sections does not lead to poorer newborn health

The Catharina Hospital and Canisius Wilhelmina Hospital are the Santeon hospitals with the lowest rate of unplanned caesarean sections in the NTSV group. This is the result of close collaboration between the two hospitals, which is addressed in greater detail in the next chapter.

In response to the differences between hospitals with respect to unplanned caesarean sections, we examined whether there is reason to believe that the rate of unplanned caesarean sections could be too low, leading to suboptimal outcomes for the child. In fact, situations may arise during childbirth in which a caesarean section is the preferred solution.

The hospitals selected five indicators to indicate the health of the child after birth: umbilical cord pH, apgar score, antibiotic use within four days of birth, antibiotic use from three days after birth and admission to the paediatrics department. These indicators were chosen based on availability and reliability. Establishing the optimal indicators to monitor child health after delivery would have taken too much time for this cycle, particularly due to implementation in the information systems. Even if such indicators had been selected, hospitals would not be able to gain insight into child health until after several more cycles.

The results of this analysis give no reason to assume that the low rate of unplanned caesarean sections at Catharina Hospital and Canisius Wilhelmina Hospital leads to suboptimal outcomes for the child. This is also consistent with the picture painted by the scientific literature. For this reason, and also based on the available data, it seems to make sense to adopt the approach taken in these two hospitals. We will closely monitor child outcomes across

figure 8

Unplanned Caesarean section in NTSV delivery

Clinical deliveries in the second half of 2018 and first half of 2019

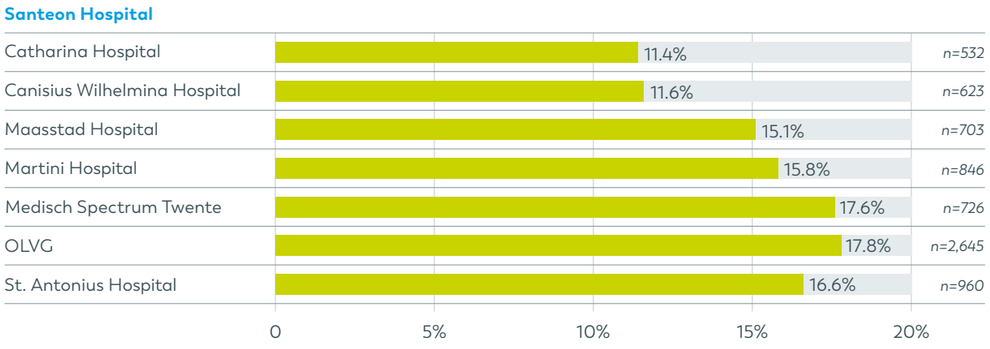


figure 9

Statistical probability of unplanned Caesarean section in NTSV births with mean age and gestational age

Based on clinical deliveries in the second half of 2018 and the first half of 2019

Santeon Hospital	Spontaneo	Induced
Catharina Hospital	8.1%	17.4%
Canisius Wilhelmina Hospital	7.7%	20.6%
Maasstad Hospital	9.8%	27.1%
Martini Hospital	14.2%	19.4%
Medisch Spectrum Twente	15.2%	27.6%
OLVG	12.8%	22.0%
St. Antonius Hospital	13.1%	22.2%

A gynaecologist on VBHC

“Without Santeon, we would have never analysed unplanned caesarean sections as thoroughly and carefully as we have now. Working together with other hospitalshas given us the opportunity to take a close look at this topic and make significant improvements together.”

Leonoor van Eerden, gynaecologist at Maasstad Hospital

Santeon hospitals and, if necessary, add other outcomes to the dataset to provide clearer insight into the outcomes.

Hospitals examine the impact of several factors

The need for an unplanned caesarean section is determined by many factors, which makes it a complex subject. The hospitals selected various factors to compare and investigate in more detail:

- Inducing labour: the induction process and criteria and the method used.
- Push duration: the maximum amount of time spent actively pushing.
- Augmentation: the time at which you start augmenting labour and the dosage and rate used.
- Epidural: the combination of medications, the dosage, and the method, location, and timing.
- Transfer: the time at which a woman who is giving birth at home or in an outpatient setting is transferred to the inpatient clinic.

An inventory table was drawn up to provide insight into several of these factors. As a follow-up step, hospitals are working on in-depth analyses of these factors individually and in pairs. Maasstad Hospital and Medisch Spectrum Twente, for example, are analysing the differences with regard to inducing labour, which will be addressed in more detail in the following chapter. OLVG and Martini Hospital have taken a closer look at their augmentation regimens (for more information, see the section on postpartum bleeding) and are paying more attention to unplanned caesarean deliveries in internal meetings and training sessions. All unplanned caesarean sections are explicitly addressed in handovers, for instance, to shed light on why certain choices were made and which actions were taken to prevent the caesarean section, so as to learn from each other’s approach and vision.

In future cycles, the various Santeon hospitals will synthesise these analyses in order to discuss results, coordinate follow-up analyses (possibly Santeon-wide) and share insights. In addition, once registration has been optimised, new factors will be looked at more closely, such as the mother’s BMI and characteristics of the child.

Additional Information:

- *Modified augmentation regimens at OLVG and Martini Hospital in section on postpartum bleeding in chapter 4*
- *In-depth information on induced labour in the section on Maasstad Hospital in chapter 5*
- *Background on the cooperation between Catharina Hospital and CWH in the section on CWH in chapter 5*

2 Reducing the incidence of complete ruptures, episiotomies and postpartum bleeding

Fewer complete ruptures and episiotomies through hands-on training and other interventions

During childbirth, the child passes through the pelvis, pelvic floor and vagina, which can cause the skin, mucous membranes,
or muscles to tear. These tears are also known as ruptures. We distinguish between the following types of ruptures:

- First-degree: the skin or mucous membrane of the vagina is ruptured
- Second-degree: the underlying connective and muscular tissue is also ruptured
- Third-degree: the sphincter is also ruptured
- Fourth-degree: the lining of the rectum is also ruptured

The severity of a rupture depends, among other things, on the speed and force with which the child is born and the stretchability of the skin, mucous membranes and muscles, which varies from woman to woman. The body can recover from minor first-degree ruptures on its own, while complete ruptures require sutures after delivery.

In some cases, an episiotomy is performed during childbirth, which is a cut of the vaginal wall and pelvic floor to enlarge the vaginal opening to help the child pass through. Reasons for performing an episiotomy include:

accelerating labour in case of foetal distress or

stagnation due to an excessively rigid pelvic floor that does not allow for operative vaginal delivery. In addition, when operative vaginal delivery is performed, an episiotomy is generally performed to reduce the risk of a third- or fourth-degree rupture.

Significant differences between different hospitals

Third- or fourth-degree ruptures occur in 1% to 5% of clinical deliveries in Santeon hospitals. In addition, episiotomies are needed in approximately 22% to 40% of clinical deliveries (See figure 10).

Santeon hospitals are committed to reducing the number of third- or fourth-degree ruptures and episiotomies because these complete ruptures can cause permanent damage, including incontinence. Gynaecologists and obstetricians at Santeon hospitals therefore participated in training sessions between April 2019 and January 2020, which were taught by an OLVG gynaecologist specialised in the pelvic floor.

Maasstad Hospital scored low on the number of total ruptures even before the joint training sessions and the Santeon-wide focus on the subject.

Consistent practices across all hospitals through hands-on training

The Santeon-wide training sessions focused specifically on the hands-on method, which involves the obstetrician supporting the perineum from just before the head is delivered until the head has been delivered in its entirety. From that point on the obstetrician carefully supports and guides the head with both hands. After the shoulders have been delivered, the obstetrician may move back to supporting the perineum. Both internal studies conducted at OLVG and recent international scientific publications show the hands-on method to have a beneficial effect on preventing complete ruptures.

There was no clear preference for the hands-off method and there is no suggestion that the hands-on method was avoided, but it appeared that gynaecologists or obstetricians simply

They had previously held training sessions and coordination meetings for hospital staff and for the primary care obstetricians they work with. They also have strict requirements for the training undergone by new physician assistants.

figure 10

Rupture and episiotomy

Clinical deliveries in the first half of 2018 and the first half of 2019

Santeon Hospital	3rd-degree rupture or more		Episiotomy	
Catharina Hospital	2.0%	n=956	33.9%	n=956
Canisius Wilhelmina Hospital	3.3%	n=1,193	28.7%	n=1,193
Maasstad Hospital	1.4%	n=1,218	29.3%	n=1,218
Martini Hospital	4.1%	n=1,378	29.2%	n=1,378
Medisch Spectrum Twente	2.7%	n=1,210	39.4%	n=1,210
OLVG	2.6%	n=3,853	22.6%	n=3,853
St. Antonius Hospital	4.8%	n=1,912	23.8%	n=2,029

The St. Antonius Hospital does not use the same denominators for ruptures and episiotomies, because rupture records are incomplete for approximately 120 women.

used the method they were most accustomed to. Obstetricians are trained in both the hands-on and hands-off method and are recommended to prioritise the hands-off method, while Santeon hospitals now recommend the hands-on approach for deliveries.

The training courses and structural focus have ensured that the hands-on method is now consistently applied in all Santeon hospitals and the exact implementation of the method has been fine-tuned, which has also improved cooperation and handovers.

Training courses rolled out in hospitals and primary care

The hands-on training courses consisted of presenting state-of-the-art scientific insights and explaining the techniques in careful detail, supported with videos. The hospitals then passed on these insights to their own gynaecologists, clinical obstetricians and nurses. The method has also been incorporated in degree programmes and training sessions.

> *"I was very glad to see that nurses were also involved in the improvement process, as we may well interact with the women and their partners the most. We are the first to see the actual effects of improvements and often play a key role in implementing new ideas."*
>
> *Mayra van Dinteren, nurse at the Catharina Hospital*

At several Santeon hospitals, primary care professionals have also been invited to the hands-on training courses. The St. Antonius Hospital, for instance, has organised evening training sessions on the hands-on method and post-delivery stitching techniques for local obstetricians. The next step is to involve the other two hospitals and more primary care obstetricians in the region. The St. Antonius Hospital is also considering transforming the course into an online module to improve accessibility. Together, all these initiatives strengthen cooperation in regional birth care.

Focus on ruptures and episiotomies pays off

We have now seen the number of ruptures and episiotomies drop in several hospitals. In the St. Antonius Hospital, we have seen the percentage of total ruptures decrease significantly (See figure 11). In addition, between the first quarter of 2019 and the first quarter of 2020, Medisch Spectrum Twente managed to reduce the percentage of episiotomies from 42.4% to 30.7%, a reduction of almost 12 percentage points. More on that in the next chapter.

Preventing postpartum bleeding by comparing methods

All women experience blood loss during delivery, but when a woman loses more than one litre of blood within the first 24 hours after delivery, we call it postpartum bleeding (PPB). When a woman loses more than two litres of blood, they may experience symptoms such as unconsciousness or shock. In fact, PPB is one of the main causes of maternal death in the Netherlands.

PPB can have various causes, but the most common cause is when the uterus does not contract properly after delivery, which means the blood vessels that run to the placenta remain superficial and do not close. However, PPB can also be the result of the placenta failing to separate, damage to the vagina or uterus, or underlying problems such as a coagulation disorder.

How PPB is treated depends on the cause and severity of the situation.

Options include: administering uterotonics (medication that causes the uterus to contract) or surgically removing the stuck placenta or the remainder thereof. Depending on the amount of blood lost, the decision may be made to give the mother a blood transfusion, possibly in consultation with the mother.

Comparison of augmentation regimens leads to first hypothesis for reducing PPB

Santeon hospitals strive to prevent postpartum bleeding. In doing so, they improve outcomes for women by preventing complications and lower costs at the same time, as reducing the incidence of postpartum bleeding also reduces the number of surgeries and blood transfusions needed.

There are many differences between hospitals with regard to postpartum bleeding. In Maasstad Hospital, 3.0% of clinical deliveries involved postpartum bleeding, compared with 9.9% in OLVG (See figure 12).

figure 11

3rd-degree rupture or more

Clinical deliveries at the St. Antonius Hospital

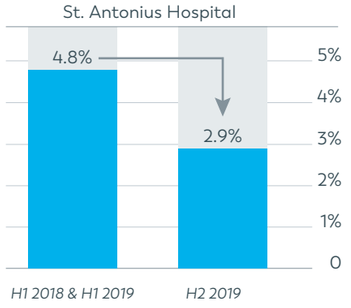
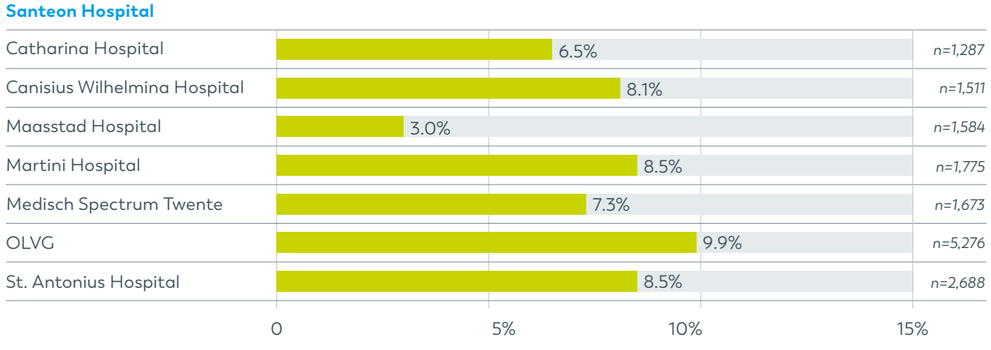


figure 12

Postpartum bleeding

Clinical deliveries from the first half of 2018 to the first half of 2019



To improve postpartum bleeding rates, OLVG compared the augmentation regimens for oxytocin, a hormone that plays an important role in inducing labour (See figure 13). The main reason for looking into this was that the entire delivery is likely to take longer with a slower augmentation regimen and that longer deliveries carry a higher risk of postpartum bleeding. As a result of the analysis, OLVG decided to switch to a starting dose of 2 milli-units per minute, with an increase of 4 milli-units per minute every 20 minutes to a maximum of 30. This has made their new regimen similar to that of Catharina Hospital, Canisius Wilhelmina Hospital, and St. Antonius Hospital.

The figure also shows that hospitals with faster augmentation regimens have a lower caesarean section rate in NTSV deliveries. As a result of this finding, Martini Hospital is preparing to update its augmentation regimen.

Following the example set by Maasstad Hospital: structural focus on postpartum bleeding

Santeon hospitals also studied the approach taken by Maasstad Hospital, which scored best on this metric, more closely. For them, the low score seems to stem from a structural focus on the subject. Maasstad Hospital, for example, has an extensive training programme for hospital employees and primary care obstetricians. During the training sessions, participants get ample opportunities to practice dealing with postpartum bleeding. An important aspect of dealing with PPB is weighing rather than estimating blood loss, as underestimating the extent of PPB is a common mistake. At Maasstad hospital, Gynaecologists also liaise with primary care providers in advance to perform a risk assessment for all pregnant women who experienced PPB in a previous delivery. The other Santeon hospitals are working on improving awareness in their own hospitals, following the example of Maasstad Hospital.

3 Improving on indicators that are particularly important for the child

More targeted use of antibiotics in newborns

Newborn children have barely built up any resistance and are therefore extra vulnerable to infections that may occur in utero, during labour or shortly thereafter. Because infections in newborn infants are difficult to diagnose, antibiotics are started at a low threshold in specific cases. This gives the paediatrician time to examine cultures and inflammation levels in the blood to determine if there really is an infection.

Despite guidelines, much variation in antibiotic use

There are guidelines for administering antibiotics to newborn children in the Netherlands, based on a set of risk factors related to the situation of the mother and the child. Beyond a certain number of risk factors, the protocol dictates that antibiotics must be administered. Precisely because there is a national protocol for this, it was expected that the number of children who are administered antibiotics and the duration of the courses given would be similar across hospitals. However, considerable variation was found (See figure 14).

This variation can be explained by the leeway allowed for by the guidelines and paediatricians making reasoned decisions to deviate from those guidelines based on their own experiences and insights, particularly by not administering antibiotics if they believe the risk of infection to be low.

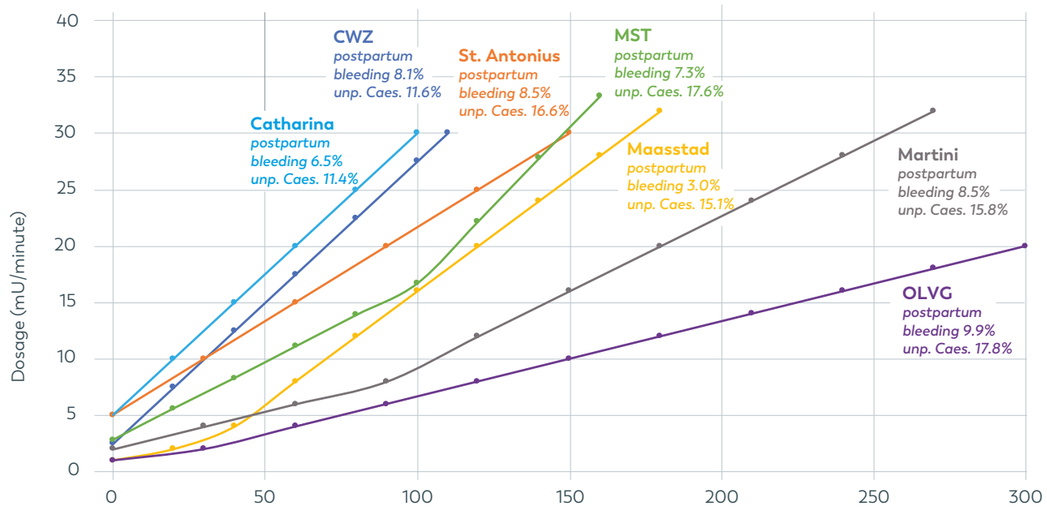
Hypothesis that antibiotic use in general could be decreased

The complicated thing about antibiotics is that they can have profound consequences if children who need them do not get them, but that administering them unnecessarily is also detrimental. Antibiotics disrupt the process of developing normal intestinal flora, which can have very long-lasting effects. It is therefore difficult to determine an optimal policy. However, Santeon hospitals believe, based on this analysis, that antibiotic use among newborns could be reduced in general.

figure 13

Oxytocin augmentation regimen with postpartum bleeding and unplanned caesarean section rates in NTSV deliveries

As used in Santeon hospitals in early 2020



unp. Caes.: unplanned Caesarean section

figure 14

Percentage of children receiving antibiotics within 4 days of delivery and course duration in days (median)

Clinical deliveries in the second half of 2018 and the first half of 2019

Santeon Hospital	Antibiotics administered within 4 days	Course duration in days	
Catharina Hospital	6.3%	3	*n=1,226*
Canisius Wilhelmina Hospital	6.5%	4	*n=1,545*
Maasstad Hospital	5.3%	5	*n=1,680*
Martini Hospital	5.6%	3	*n=1,860*
Medisch Spectrum Twente	6.7%	3	*n=1,733*
OLVG	5.2%	4	*n=5,415*
St. Antonius Hospital	2.9%	2	*n=2,605*

Local initiatives - such as the sepsis calculator - to use antibiotics in a more targeted way and, if possible, to reduce course lengths

In May 2020, St. Antonius Hospital launched a sepsis calculator, which calculates the risk of infection based on data about the mother, her pregnancy and delivery and the child's condition.

In addition, Medisch Spectrum Twente is conducting a follow-up analysis on birth weight and gestational age to better understand exactly which children are receiving antibiotics. Maasstad Hospital introduced an additional checkup after three days because of their longer course length.

The Santeon hospitals are awaiting the results if whether the sepsis calculator used at St. Antonius Hospital will affect antibiotics use. Several studies on the use of antibiotics are already underway. In February 2018, a multicentre study was started (RAIN) with the aim of investigating whether it is safe to give newborns with a suspected infection oral antibiotics. This could shorten length of stay as well, since the newborns who are put on oral antibiotics do not always need to stay in the hospital. Several Santeon hospitals have since joined this initiative.

Optimally facilitating breastfeeding

Breastfeeding contributes to the health of both mother and child. There is scientific evidence that breastfed children are less likely to contract certain infectious diseases. In addition, breastfed children seem to be less likely to be overweight and asthmatic for a longer period of time. Breastfeeding also has a positive effect for mothers, as it lowers the risk of diabetes, rheumatism and high blood pressure. Of course, it is up to the mother herself to decide whether or not to start breastfeeding after receiving counselling.

Hospitals have similar breastfeeding rates

Five of the seven Santeon hospitals record whether women intend to breastfeed during pregnancy and whether they actually do so upon discharge from the hospital. These records show that about 72% to 81% of women start breastfeeding after they are discharged from the hospital (See figure 15). The fact that, at some hospitals, the number of women who start breastfeeding at discharge is lower than the number of women who intend to do so is because breastfeeding is not always possible for physical or psychological reasons.

figure 15

Breastfeeding intention and breastfeeding at discharge

Clinical deliveries in the first half of 2019

Santeon ziekenhuis	Intentie tijdens zwangerschap		Bij ontslag	
Catharina Ziekenhuis	79%	n=309	81%	n=616
Canisius Wilhelmina Ziekenhuis	77%	n=550	75%	n=254
Maasstad Ziekenhuis	79%	n=409	80%	n=816
Martini Ziekenhuis	82%	n=804	81%	n=786
Medisch Spectrum Twente	77%	n=700	72%	n=754
OLVG	*Wordt niet goed geregistreerd*			
St. Antonius Ziekenhuis	*Wordt niet goed geregistreerd*			

Next steps: providing education and support & improving registration

The Santeon hospitals are committed to ensuring that women are given the right information while they are still pregnant so that they can make an informed choice about whether or not to breastfeed. The hospitals also offer support before and after childbirth, for example through lactation consultations and pumping programmes.

Several Santeon hospitals have started focusing on improving the registration of breastfeeding and breastfeeding intention. The hospitals do not register breastfeeding data structurally enough, do not employ uniform querying methods and intervals and would do well to add an extra checkup several weeks after discharge from the hospital (simultaneous with the postpartum checkup). This information will also help us gain a better understanding of why women decide to breastfeed or not and why women who did initially intend to start breastfeeding opted against it.

4 Improving the efficiency of birth care

Targeted postpartum checkups

The postpartum checkup consists of a consultation at an outpatient clinic, or a phone or video call with the gynaecologist or obstetrician within six weeks of delivery (42 days). Medically speaking, not all women need to go to the hospital for their postpartum checkup and can go to a primary care provider instead.

The purpose of the postpartum consultation is to discuss how the delivery went, to answer questions and remove uncertainties surrounding choices made during delivery, and to ask specifically about the woman's physical complaints and discomforts. In

addition, this checkup is important for identifying a possible Post Traumatic Stress Disorder (PTSD), so that treatment can be started for this immediately. During the consultation, information is also provided on recovery, contraception and any future pregnancies and deliveries. The health and development of the child are also discussed, although this is mainly a job for maternity consultation clinics.

Follow-up care is particularly important for women who wish to have children again. After all, you do not want them to be left with questions, concerns or complaints that will cause them to abandon or postpone their desire to have children. Moreover, it is important to discuss bad labour experiences in good time, as labour may have been particularly traumatic for some women, causing them to prefer a caesarean section instead of vaginal delivery in the future. Talking about their experiences can help prevent this.

Hospitals adopt different policies regarding postpartum checkups

Santeon hospitals compared the percentage of patients who had a postpartum checkup and found considerable differences between hospitals. (See figure 16).

The Santeon-wide review revealed that these differences are largely the result of policy differences. Maasstad Hospital and Medisch Spectrum Twente, for example, have a catchment area with, on average, a somewhat lower socioeconomic status. They are a more vulnerable group who typically benefit more from additional support from the hospital.
Therefore, it is not surprising that the figures show that these hospitals see more patients for postpartum checkups.

More and more alternative forms of postpartum checkups

All Santeon hospitals are investigating how to use postpartum checkups in the most targeted way possible, which means they are mainly inviting women who had their first caesarean section, a vacuum extraction, a third or fourth-degree rupture or a complicated pregnancy or delivery.

The hospitals are also looking at ways to redesign the approach to follow-up checkups. For example, checkups can also take place in primary care settings or be done by nurses, and hospitals - especially after the emergence of Covid-19 - used phone and video calls to perform a large number of checkups in the spring of 2020. The hospitals and women who had just given birth were so satisfied with this method that hospitals are now considering taking this approach more often. Despite the many initiatives surrounding these checkups, however, a personal check-up at an outpatient clinic will stay an option for anyone who wants it.

Shortening length of stay for mother and child

No one likes to stay in the hospital longer than necessary, and this is no different for brand new parents. Hospitals also prefer short stays, simply because every extra day spent in hospital costs capacity and therefore money. Quality of care is, however, always paramount.

Length of stay around delivery is two to three days

Santeon hospitals have compared the length of stay for mother and child after childbirth, showing that the median length of stay for mother and child is two days at five of the seven hospitals and three days with a caesarean section (See figure 17).

A shorter length of stay could lead to more readmissions. To test that effect, the hospitals compared the number of readmissions within 42 days of the mother giving birth (See figure 18).

Comparing length of stay with readmissions shows that a longer length of stay does not reduce the number of readmissions. As such, the analyses provide ample grounds to investigate ways to shorten length of stay.

figure 16

Mothers with postpartum checkup at the outpatient clinic (within 42 days of delivery)

Clinical deliveries in the first half of 2018 and the first half of 2019

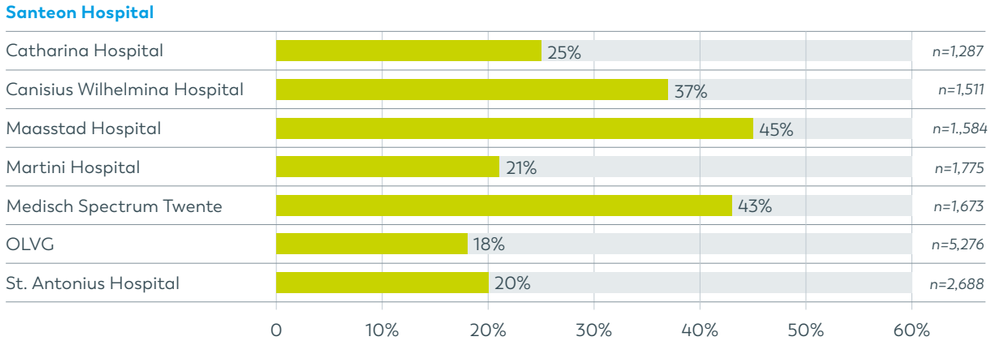


figure 17

Length of stay in days for mother and child (median)

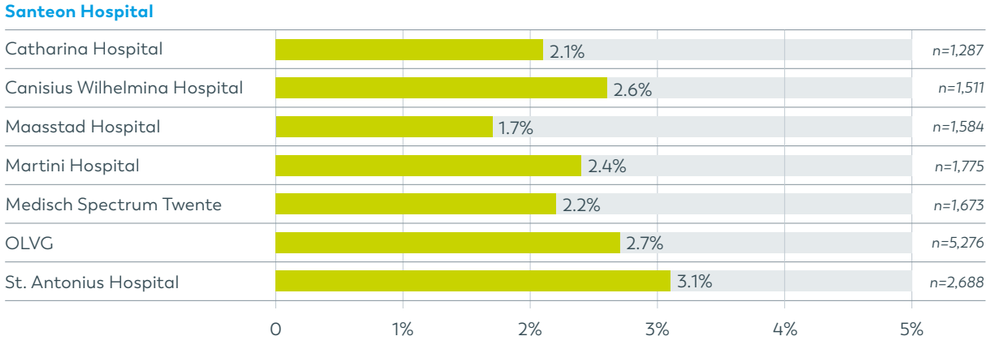
Clinical deliveries in the first half of 2019

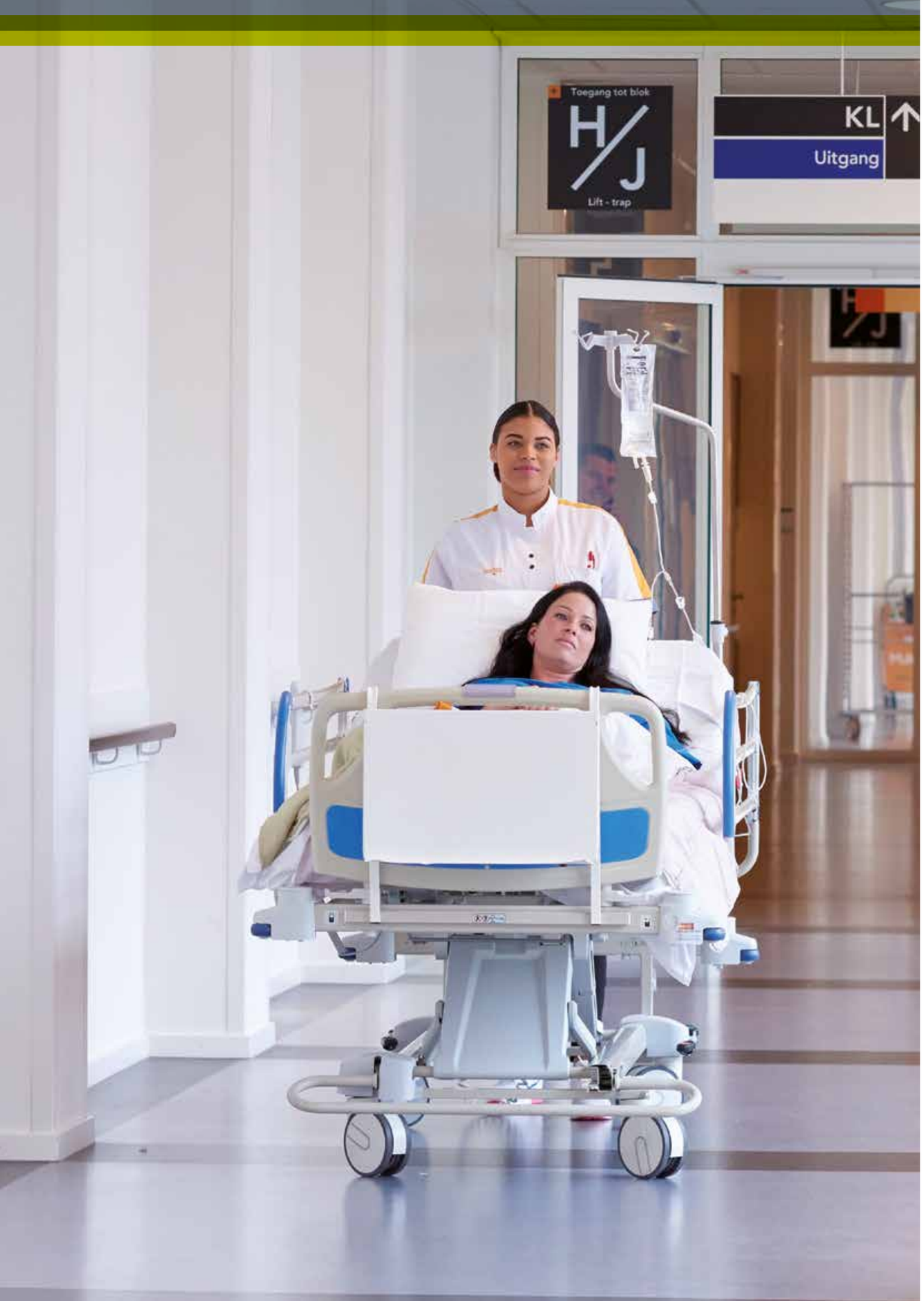
Santeon Hospital	Mother totaal		after Caesarean section		Child totaal	
Catharina Hospital	2	n=625	3	n=143	2	n=637
Canisius Wilhelmina Hospital	3	n=776	3	n=156	3	n=788
Maasstad Hospital	2	n=825	3	n=175	2	n=838
Martini Hospital	2	n=899	4	n=199	2	n=918
Medisch Spectrum Twente	2	n=829	3	n=244	2	n=841
OLVG	2	n=2,593	4	n=731	2	n=2,643
St. Antonius Hospital	3	n=1,286	3	n=287	1	n=1,310

figure 18

Mothers with one or more readmissions (within 42 days of delivery)

Clinical deliveries in the first half of 2018 and the first half of 2019





OLVG took a closer look at its score on maternal readmissions and saw that a significant proportion of readmissions were caused by fever after a caesarean section, before opting - prompted by scientific evidence and following the example of the Catharina Hospital - to introduce vaginal disinfection for caesarean sections.

Local initiatives to reduce length of stay

The analyses prompted individual hospitals to address length of stay. Martini Hospital, for instance, has taken efforts to expedite removal of the bladder catheter after a caesarean section (explained in more detail in the next chapter). At St. Antonius Hospital, the procedure of inserting a balloon catheter to induce labour has been modified in order to shorten the mother's length of stay surrounding a delivery. Previously, women were admitted immediately after insertion. Now, the balloon catheter is inserted at the outpatient clinic and the woman can return home to get some rest in the comfort of their own home, before returning the next day so that hospital staff can reassess the cervix.

Canisius Wilhelmina Hospital suspects its longer admissions are caused by the fact that they routinely admit every child born by vacuum extraction for six hours for observation and because they use maternity suites. This makes it possible for the child to stay with the mother, which reduces the stress of admission for the parents and makes it an easier option to choose. The hospital will test these hypotheses and take action to improve the situation where necessary.

Chapter 5

Improvement initiatives per hospital

In this chapter, we provide an example of a local initiative for each hospital. The initiatives listed here either emerged from shared insights or emerged locally and serve as inspiration for Santeon-wide discussions and analyses.

We will outline the following improvement initiatives in this chapter:

- Canisius Wilhelmina Hospital: fewer unplanned caesarean sections thanks to cooperation with
- Maasstad Hospital: in-depth analysis on unplanned caesarean sections - induced labour
- OLVG: fewer caesarean sections thanks to SIMPLE II predictive model
- Martini Hospital: shorter length of stay due to catheter policy after caesarean section
- Catharina Hospital: fewer complications and caesarean sections due to version consultation
- Medisch Spectrum Twente: fewer episiotomies due to awareness
- St. Antonius Hospital: supporting vulnerable pregnant women with Mind2Care

Canisius Wilhelmina Hospital: fewer unplanned caesarean sections thanks to cooperation

In 2018, Canisius Wilhelmina Hospital started working closely with Catharina Hospital to gain more insight into the reasons for their caesarean section rates. The interesting thing about this collaboration is that both hospitals are very similar in size, population and profile but initially scored very differently on caesarean sections. At the start of the collaboration, Canisius Wilhelmina Hospital already had a low caesarean section rate, while Catharina Hospital had a relatively high rate. Whereas hospitals looked primarily at the total number of caesarean sections (planned and unplanned) in the first cycles, later analyses focused specifically on unplanned caesarean sections in the NTSV group.

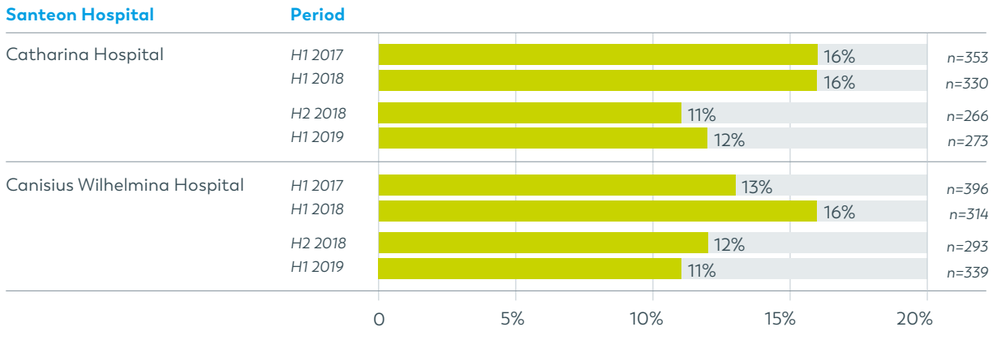
A joint working group including gynaecologists, obstetricians, and nurses from both hospitals compared the practices of both hospitals in detail in order to identify differences. Important lessons Catharina Hospital has learned from the approach taken at Canisius Wilhelmina Hospital include: encouraging the mother to push for longer, opting for a vacuum extraction rather than an unplanned caesarean section more often, starting labour augmentation more quickly and using different methods to induce labour. Overall, for Catharina Hospital, it mainly came down to being more patient and waiting longer before proceeding with an unplanned caesarean section.

The close cooperation between the two hospitals has produced spectacular results. Since the start, the percentage of unplanned caesarean sections within the NTSV group has fallen sharply at Catharina Hospital, to the point that it is now among the best Santeon hospitals in this area. At the same time, Canisius Wilhelmina Hospital has continued to perform well (See figure 19).

figure 19

Unplanned Caesarean sections in NTSV deliveries - Catharina Hospital and CWH

Clinical deliveries from the first half of 2017 to the first half of 2019



"Working with Catharina Hospital has given us great insight into the processes and decisions leading to unplanned caesarean sections. In fact, it helped Catharina improve to the point that they outperformed us in the second half of 2018. This was a tremendous result, while also serving as an incentive for us to keep improving."

Barbara Nolens, gynaecologist at Canisius Wilhelmina Hospital

Maasstad Hospital: in-depth analysis on unplanned caesarean sections and induced labour

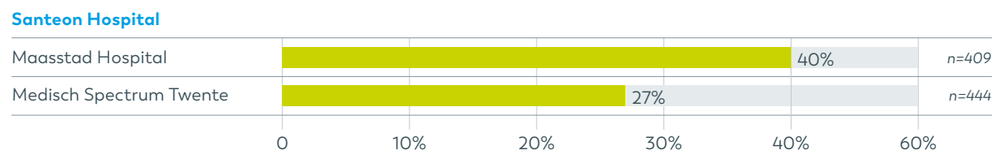
As we saw in the previous chapter, the logistic regression showed that women in the NTSV group in whom labour is induced at Maasstad Hospital, among others, have a relatively high risk of an unplanned caesarean section. This prompted the hospital - together with Medisch Spectrum Twente - to take a deeper look at induced labour in the NTSV group.

As a first step, the hospitals examined how often they induce labour in a woman in the NTSV group, which appeared to be significantly more common in Maasstad Hospital than in Medisch Spectrum Twente (See figure 20).

figure 20

Induced labour at Maasstad Hospital and Medisch Spectrum Twente

Inducted deliveries in the NTSV group, second half of 2019



Maasstad Hospital and Medisch Spectrum Twente then investigated the indications for inducing labour in these cases, with clear differences emerging between the two hospitals (See figure 21).

At both hospitals, a late-term pregnancy or serotiny (a gestational age of more than 41 or 42 weeks, respectively) is the main indication for inducing labour. At Maasstad Hospital this was true for 25% of women, while it was true for almost 50% in Medisch Spectrum Twente. Other indications with significant differences between the two hospitals were: persistent decreased liveliness (decreased foetal movement), excessive stress, gestational diabetes, PE (pre-eclampsia, or protein loss through the urine which can lead to convulsions, among other things) and PIH (pregnancy-induced hypertension).

figure 21

Indication for induced labour - Maasstad Hospital and Medical Spectrum Twente

Percentage of total inducted clinical deliveries in the NTSV group, second half of 2019

	Maasstad Hospital		Medisch Spectrum Twente	
Serotiny	26%	n=43	47%	n=57
Persistent decreased liveliness	12%	n=19	3%	n=4
FGR	11%	n=18	9%	n=11
Excessive stress	11%	n=18	2%	n=3
Gestational diabetes	10%	n=17	2%	n=2
PE	9%	n=14	16%	n=20
PROM	5%	n=8	0%	n=0
Macrosomia	4%	n=7	2%	n=3
PIH	4%	n=7	11%	n=14
Cholestasis	3%	n=4	2%	n=2
Meconium-stained amniotic fluid	1%	n=2	0%	n=0
Diabetes Mellitus	1%	n=1	0%	n=0
Other	3%	n=5	5%	n=6

"We see that we induce labour more often than our colleagues in Medisch Spectrum Twente. This is an issue we have to address, as inducing labour appears to increase the risk of an unplanned caesarean section. First, we will start exploring ways to induce labour less often. Perhaps we need to be more patient sometimes."

Leonoor van Eerden, gynaecologist at Maasstad Hospital

Several follow-up actions emerged from this analysis for Maasstad Hospital. First of all, the hospital committed itself to reducing the number of cases of induced labour - working with Medisch Spectrum Twente again- to delve even deeper into the subject. The teams will be examining the characteristics of the women in whom labour is induced (term, age, physical condition, etc.) and explore whether specific indications or characteristics lead to an unplanned caesarean section more often. Finally, the hospitals will expand the number of data points in their analysis to draw more reliable conclusions, for example by also adding the first half of 2019 to the data and including data from other Santeon hospitals.

OLVG: fewer caesarean sections thanks to SIMPLE II predictive model

Women who have previously given birth by caesarean section have a greater risk of complications and of an unplanned caesarean section. Therefore, women should be extensively educated about the advantages and disadvantages of vaginal birth versus a planned caesarean section, and it is important to discuss possible complications and the likelihood of a successful vaginal delivery.

To support this discussion, OLVG uses the SIMPLE II predictive model, which uses factors such as the reason for the previous caesarean section, the woman's BMI and the size of the child to predict the likelihood that the woman will be able to deliver vaginally. With this digital decision aid, doctors can start the conversation with the woman and her partner and help them make an informed decision.

The other Santeon hospitals are also considering using the SIMPLE II decision aid to try to reduce the number of caesarean sections in second births.

"The figures show that SIMPLE II is effective: we are seeing more and more women who had a caesarean section previously opting for vaginal delivery without seeing any increase in our unplanned caesarean section rate."

Mariëlle van Pampus, gynaecologist at OLVG

Martini Hospital: shorter length of stay due to catheter policy after caesarean section

In the previous chapter, we saw that women who give birth by caesarean section in Martini Hospital stay in the hospital longer than in the other Santeon hospitals. Because it is suspected that this does not contribute to quality of care, Martini Hospital has taken action and made two improvements.

First of all, it has modified its catheter removal protocol. While it used to be standard practice to remove the catheter on the second day after the caesarean section, this has now been brought forward to one day after, which helps mobilise women at an earlier stage, partly because they have to get out of bed earlier to go to the toilet.

The second modification consisted of a more explicit focus on expectation management. Right from admission, the nurses discuss the process leading up to discharge, which gives women an end point to focus on. Nurses also benefit from having a clear picture of all the guidelines involved, and this information is communicated even before a woman is admitted. Information about the process and expected length of stay in the hospital are also included in various presentations and brochures, and it is discussed during the consultation in which the procedure and course of the caesarean section are explained.

The data shows that the improvements have had a clear effect. Since they were introduced on April 1, 2019, the median length of stay for planned caesarean sections has been reduced from 4 days to 3 days.

The idea underpinning this initiative is based on ERAS, or Enhanced Recovery After Surgery, an international programme aimed at speeding up recovery after surgery. Martini Hospital is the first hospital in the Netherlands to start working with

ERAS and has now started seeing positive effects in various different domains.

"Our shorter length of stay after a caesarean section is the result of a collaborative effort. Our nurses played a very important role, embracing the change and adapting how they work and think."

David van der Ham, gynaecologist at Martini Hospital

Catharina Hospital: fewer complications and caesarean sections due to version consultation

When a child is positioned in the womb head up, it is called a breech baby. A vaginal breech birth can cause more complications. To avoid this, attempts can be made before delivery to rotate the child to a vertex position. This procedure is called version and is performed by an obstetrician and gynaecologist, with one of them lifting the baby's bottom up and to the side, while the other pushes the baby's head upwards and down so that the child practically rolls over in the womb. Before the version takes place, the child's condition is assessed by means of a heart monitor, called a CTG. During the procedure, the child's condition and position are constantly monitored via ultrasound. All in all, a version need take only a few minutes, and another CTG is performed after the procedure.

Catharina Hospital is specialised in versions and has been performing them since 2004. The hospital has one of the highest success rates in the Netherlands and has published several scientific papers on the subject. See, for example, the article: 'Minder keizersneden wegens stuitligging dankzij geprotocolleerde uitwendige versie in een speciaal spreekuur', published in Nederlands Tijdschrift voor Geneeskunde in June 2008. The hospital also shares its methods on YouTube; search for 'External Cephalic Version (ECV) for breech position at Catharina Hospital The Netherlands'.

The hospital works with a strict protocol based on the four R's: rest, routine, regularity and relaxation. Rest means that the team performing the version, consisting of a gynaecologist, obstetrician and nurse, can focus their full attention on the versions, do not have any other procedures scheduled in between and are not on call. Routine and regularity mean that a small team of healthcare providers (three gynaecologists, three clinical obstetricians, and four nurses) very regularly (about once a week) carry out version consultations so that they build up very targeted experience and become fully attuned to each other. Relaxation is all about making sure the woman is as relaxed as possible. She is welcomed and treated in a quiet environment in a comfortable bed. On top of that, the woman is given a contraction inhibitor (ritodrine) to help the muscles of the uterus relax and warm gel is used to make the whole experience as pleasant as possible.

Following in the footsteps of Catharina Hospital, Martini Hospital has expressed its intention to start its own version consultations. In the short term, they need the necessary resources to set this up properly, e.g. by preparing and making available the necessary rooms and freeing up sufficient capacity among gynaecologists, obstetricians and nurses.

"Women from all over the Netherlands and Belgium come to us for our version consultation, including women in whom a previous attempt to rotate the child failed. We wear this fact as a badge of honour. A successful version has enormous impact: it prevents a delivery that is already complex and risky in advance."

Simone Kuppens, gynaecologist at Catharina Hospital

Medisch Spectrum Twente: fewer episiotomies due to awareness

In the previous chapter, we saw that Medisch Spectrum Twente performs more episiotomies than other Santeon hospitals, which prompted the hospital to take action in February 2019 to structurally reduce the number of episiotomies performed.

The initiative taken by Medisch Spectrum Twente primarily revolves around raising awareness. It was already standard practice to discuss all deliveries as part of the handover, but the decision has now also been made to have attending gynaecologists of obstetricians explicitly notify others of an episiotomy, as well as the reasons for performing one. The atmosphere during these meetings was positive and open: the goal was not to criticise each other, but to learn from each other.

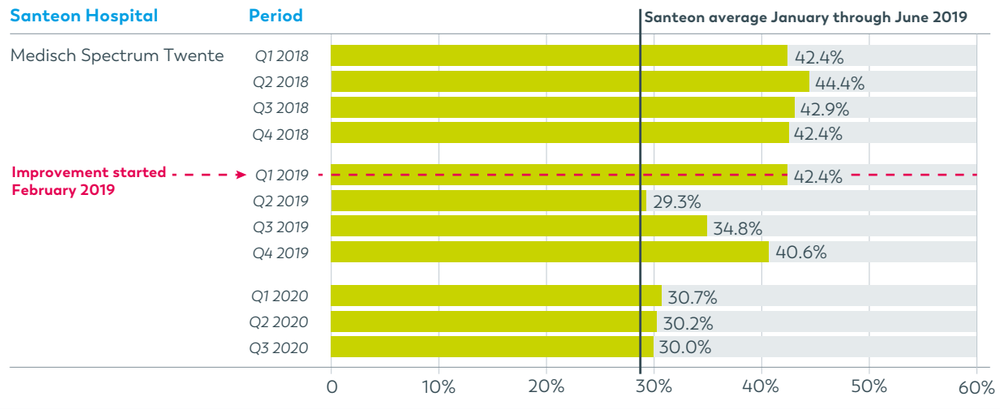
The result of this improvement was immediately reflected in a decrease in the number of episiotomies (See figure 22), without an increase in the number of complete ruptures or jeopardising foetal condition.

The increase in the number of episiotomies in the second half of 2019 can be attributed to a temporary dip in the attention paid to the subject, after which interest in the topic was renewed in the first quarter of 2020, emphasising the importance of continued focus. The figure also shows that Medisch Spectrum Twente, even in the best quarters, is still only just better than average, compared to all other Santeon hospitals. This illustrates that, although the hospital has made good progress, there is still plenty of room for improvement.

figure 22

Episiotomies in Medisch Spectrum Twente

Percentage of total clinical deliveries (excluding unplanned Caesarean sections) first quarter of 2018



"The point is to perform an episiotomy only when truly necessary, which requires a great deal of feeling and intuition. You should not be impatient but also avoid waiting too long. Knowing when to act comes with experience, and our shared discussions help us build experience more quickly. It has been incredibly useful especially for young doctors in training, but it has been just as useful for more experienced doctors."

Arjanne Kroese, gynaecologist at Medisch Spectrum Twente

St. Antonius Hospital: support for vulnerable pregnant women with Mind2Care

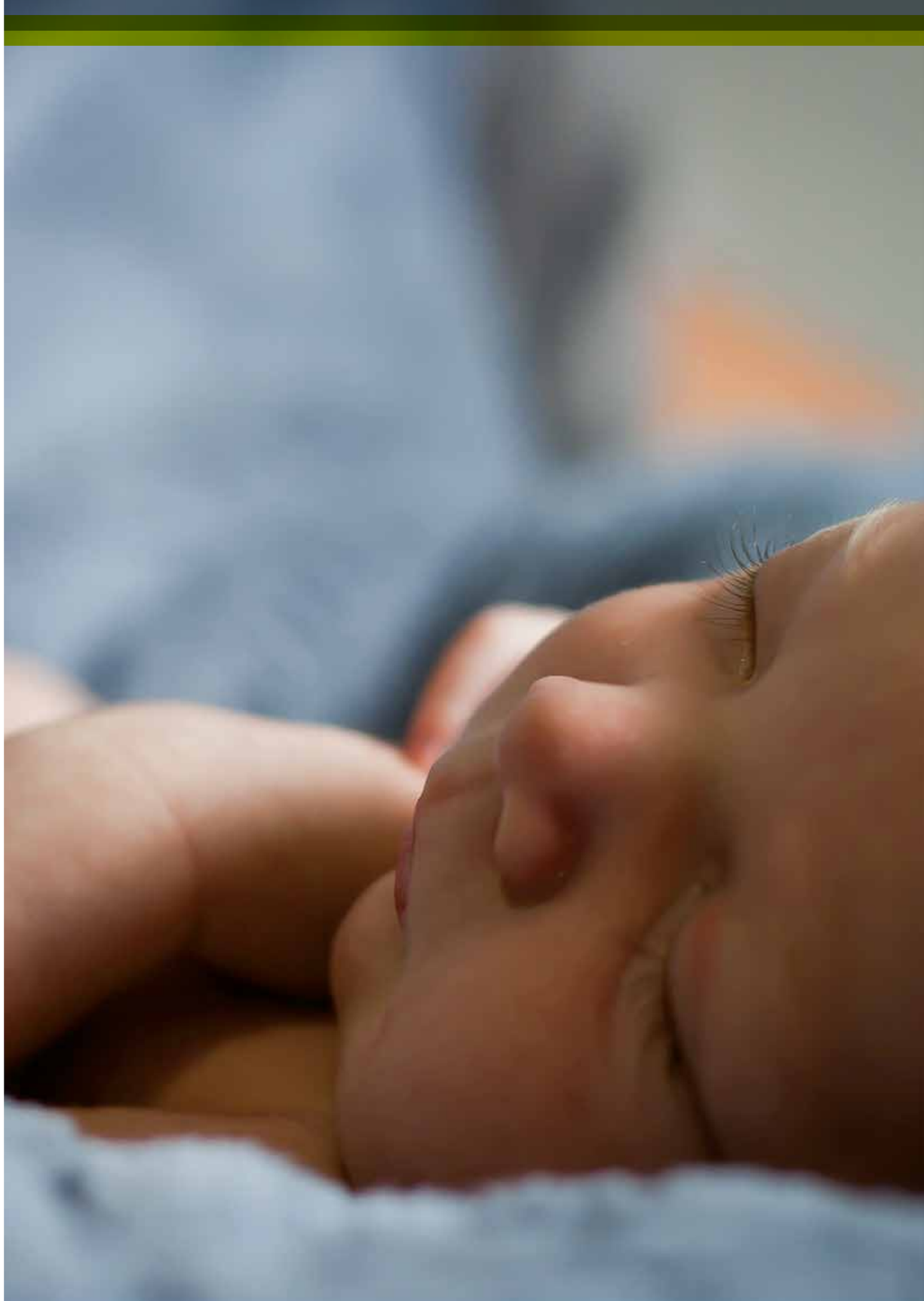
Mind2Care is a scientifically validated questionnaire developed by Erasmus MC and the National Knowledge Centre for Psychiatry and Pregnancy (LKPZ), among other parties. With Mind2Care, pregnant women are screened for mental health issues, psychosocial problems, and drug and alcohol addiction. Pregnant women complete the questionnaire online and discuss the results with a care provider, such as their general practitioner, gynaecologist or obstetrician.

St. Antonius Hospital has been working with Mind2Care since 2019. Thanks to the questionnaire, the hospital has been able to identify vulnerable pregnant women at an earlier stage, after which they can be referred to the go to the POP (Psychology, Obstetrics and Paediatrics) outpatient clinic, where a multidisciplinary team consisting of a gynaecologist, psychiatrist, paediatrician, medical social worker and a specialist nurse supports them. Sometimes, this can take place entirely in the hospital, while other third-party experts, e.g. addiction professionals or financial assistance professionals, may also have to be involved in certain cases. Together, they work to improve the woman's health, and therefore also the child's health, to ensure that the child ends up in a stable family situation.

In St. Antonius Hospital, people are very satisfied with the results achieved with Mind2Care. They are now attempting to roll out this approach throughout the Utrecht region, together with other hospitals and with primary care institutions. The Mind2Care questionnaire is also used by VSV-Twente. The other Santeon hospitals are following developments closely and are considering adopting Mind2Care.

"The other day, I was assisting a woman who told me she was having financial problems. Thanks to Mind2Care, we found out that she was fighting a drug addiction, but that she felt too ashamed to say. Finding out the true nature of the problem allowed us to provide much more targeted support to her and her child."

Elisabeth Blokhuis, gynaecologist at the St. Antonius Hospital



A gynaecologist on VBHC

“Shared care is already widely used in our region. All pregnant women are counselled by a primary care obstetrician in the first trimester. Pregnant women with a medical history are then discussed in a joint meeting with primary, secondary and tertiary care professionals, so that we can prepare a joint care plan or refer them if necessary.”

Barbara Nolens, gynaecologist at Canisius Wilhelmina Hospital

Chapter 6

What’s next?

In this chapter, we explain the steps we intend to take to continue to improve maternity care in our hospitals and throughout the Netherlands.

Good results have been achieved in previous iterations of the improvement cycles, especially with regard to unplanned caesarean sections, complete ruptures and episiotomies. In the coming cycles, the Santeon hospitals will continue their efforts to improve on these topics and will examine which other indicators give rise to more in-depth analyses and possible improvement plans.
On top of that, Santeon will focus on three main themes in the near future:

Value-Based Health Care throughout the birth care chain

The divide between primary and secondary birth care has become increasingly blurred in recent years. Locally and regionally, systems and structures have been emerging in which gynaecologists, obstetricians, birth centres, and maternity care providers work together. Santeon is committed to expanding and intensifying this form of collaboration in order to accomplish its end goal of VBHC throughout the chain: from primary care obstetricians and maternity nurses, through to gynaecologists and obstetricians in clinical settings, to experts in academic medical centres. The main goal here is to ensure proper cooperation in terms of care, but also to make a joint effort to actively share and discuss outcomes and experiences (the Value-Based Healthcare methodology) in order to lift birth care to a higher level across the board.

More national and international benchmarking

Santeon’s strength is that hospitals openly and transparently share and discuss outcomes, working methods and experiences, which fosters open discussions and allows people to learn from each other. With this approach, the seven hospitals have managed to significantly improve their outcomes in recent cycles. However, as more data are made available, we will be able to draw better comparisons and learn more. Would it not be great if hospitals could not only compare themselves to their immediate neighbours in the future, but could learn from the best hospitals in the Netherlands or even the best clinics in the world? Organisations such as Perined and ICHOM can play an important role in this.

Future cycles: zooming in on pain relief and drawing up a development agenda

In future improvement cycles, the hospitals will delve deeper into various pain relief methods and their effect on the outcomes for mother and child. To this end, paediatricians and anaesthesiologists are also explicitly involved in the improvement process. In addition, the Santeon hospitals are working on a joint development agenda in which they outline which indicators deserve attention in the future, not only in the regular improvement cycles but also in joint scientific research projects. For certain indicators, the hospitals are looking at defining coordinated signal values to continue to monitor performance in a careful, data-driven fashion.

Epilogue

PROMs allow us to scrutinise deliveries even more closely

“We have made wonderful strides in the field of birth care in recent years. By addressing caesarean sections, complete ruptures, postpartum bleeding and episiotomies, we have managed to make important improvements. We will continue to pay attention to these topics, but we are eager to expand our scope at the same time, e.g. by involving paediatricians and anaesthesiologists in our improvement cycle, and by drawing up a PROM plan together with all other Santeon hospitals.

PROMs is short for Patient Reported Outcome Measures, outcomes that cannot be measured objectively but must be reported by patients, in our case pregnant women or women who have recently given birth.

The goal of PROMs is to get a handle on a new category of outcome measures. PROMs are also an important tool in encouraging participation in care choices. They help us to provide insight into what effect certain choices have on how a woman experiences her delivery, how she recovers from it, and how her child develops in the first days and weeks, not just by referring to scientific studies, but by explaining how other women who faced similar choices felt about their decisions in retrospect. This makes the conversation between us - gynaecologists, paediatrician and obstetricians - and pregnant women more informative and effective.

Other healthcare disciplines have been working with PROMs for some time and have shown how valuable it can be. We are yet to reach this stage in birth care. The International Consortium for Health Outcomes Measurement (ICHOM) has recently developed an internationally supported set of indicators and Erasmus MC has launched a pilot in which the PROMs were implemented within six VSVs.

Our aim is to send out the first questionnaires in all Santeon hospitals this year. This is also one of the biggest challenges we face, as these scientifically validated questionnaires are quite long and are therefore far from easy to complete. We are therefore considering shorter questionnaires, which would, however, be less suitable for scientific and international comparisons. It is a difficult consideration that we must make together.

It is clear, though, that PROMs will help us enormously in charting the care provided surrounding pregnancy and childbirth, comparing it with each other, communicating about it and improving it. It is therefore not a question of ‘if’ but of ‘how’ and ‘when’.”

Mariëlle van Pampus
Medical lead of birth care and gynaecologist at OLVG

Appendix 1

Improvement Teams

Appendix 1

Birth care improvement teams

Canisius Wilhelmina Hospital

Barbara Nolens	Gynaecologist, medical lead
Jan de Kruif	Gynaecologist
Ben Semmekrot	Paediatrician
Jeanine Kamp	Manager of operations
Jolanda van Geffen	Obstetrics team leader
Rianne Cuppen	Clinical obstetrician
Bart Ament	VBHC Project manager
Jennifer Cheng	Data analyst

Catharina Hospital

Simone Kuppens	Gynaecologist, medical lead
Edwin Knots	Paediatrician
Keetje Sars - van de Donk	Team leader obstetrics
Inge Serdons	Clinical obstetrician
Ann Thijs	Clinical obstetrician
Mayra van Dinteren - Benita	O&G Nurse
Susanne Tielemans	VBHC Project Manager
Stefan Heinen	Data analyst

Maasstad Hospital

Leonoor van Eerden	Gynaecologist, medical lead
Esther Klompmaker	Gynaecologist
Helene Stas	Paediatrician, neonatologist
Martin Baartmans	Paediatrician, neonatologist
Jacqueline Huijer - van der Es	Neonatology nurse
Janneke Kooiman	O&G nurse
Madeleine Jonkers	Clinical obstetrician
Bianca van Roon	Neonatology nurse specialist
Ilona Mastwijk - de Jong	Obstetrics and maternity hotel team leader
Josine van der Kooij - van der Wal	Obstetrics and maternity hotel team leader
Marie-Louise van de Hoef	Neonatology team leader
Ellen Parent	VBHC Project manager
Gerdine Pols	Data analyst

Martini Hospital

David van der Ham	Gynaecologist, medical lead
Fleurisca Korteweg	Gynaecologist, medical lead
Hannah Buiter	Paediatrician, neonatologist
Hans de Boer	Anaesthesiologist
Gerdien Gunnink	Secondary care obstetrician
Mirjam Bouwsema	Neonatology nurse
Heleen van der Velde	Nurse
Jannie Remminga	O&G Nurse
Aly Hoekstra	Unit head of obstetrics
Daniëlle Huiting	VBHC Project Manager
Monique Eissens-van der Laan	VBHC Project Manager
Heleen Hoogeveen	Data Analyst

Medisch Spectrum Twente

Arjanne Kroese	Gynaecologist, medical lead
Florine Eggink	AIOS gynaecology
Ageeth Kaspers	Paediatrician
Nienke Bijen	Physician Assistant - clinical obstetrician in training
Verena Dietze	Physician Assistant - clinical obstetrician
Marloes Lammers	Delivery room nurse
Petra Ruiterkamp	Delivery room nurse
Marieke Vos - Klein Rot	Maternity Centre department manager
Arlette van den Berg	W&C Advisor
Hanneke Jansen	VBHC Project Manager
Marlies Zwerink	Data Analyst

OLVG

Marielle van Pampus	Gynaecologist, medical lead
Brenda Hermsen	Gynaecologist
Anne van Kempen	Paediatrician
Maartje van den Heuvel	Paediatrician
Sandra Simons	Obstetrician/Physician Assistant clinical obstetrician
Simone Cobelens	Obstetrician/Physician Assistant in training
Pauline Walkers & Iris Rossenaar	Neonatology nurses
Michel Kraima	Operational manager of paediatrics
Belinda Ebbeling	Anna Pavilion Team Manager
Jennie van Tilburg	Neonatology clinic team leader
Toine Smulders	Quality & Innovation Officer
Heleen Donker	Clinical nurse specialist
Marieke Ruesink	Clinical nurse specialist
Floor Blekxtoon	Patient
Lies van der Weide	Operations manager
Rob Hardeman	Operations manager
Birit Broekman	Psychiatrist
Lucilla Overdijk	Anaesthesiologist
Sanne Vos	VBHC Project manager
Sophie Beems	Data analyst

St. Antonius Hospital

Elisabeth Blokhuis	Gynaecologist, medical lead
Minouche van Dongen	Paediatrician, neonatologist
Maartje Bloemsaat	Obstetrics nurse
Carlien Blonk - de Jong	Neonatology nurse
Marijke Steijn	Neonatology nurse specialist
Loes Moll	Clinical obstetrician
Herman Satter	Department head
Christien Kamps	VBHC project manager
Robert Fetter	Data analyst

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Santeon is a group of seven top-class clinical hospitals. Together, we are committed to improving care in our hospitals and throughout the Netherlands. by looking at each other's work, learning from each other and pursuing continuous improvement.

For more information, please visit santeon.nl

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