

Gupta Strategists

No Place Like Home

An analysis of medical care at home – Revised edition



2017



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Preface

In 2016 Gupta Strategists published an independent study entitled *No Place Like Home* in which we discussed the emerging potential for moving care from hospitals to the home. We stated that 46% of medical care currently provided in hospitals in the Netherlands could be provided to patients in their own homes. The study received an overwhelming amount of attention and we've had the opportunity to further explore the topic with a variety of stakeholders, from healthcare providers and patients to health insurance companies and journalists. These conversations over the past year have inspired us to publish this revised edition.

Although the reactions the study drew were varied, one commonly shared belief clearly stood out: that medical care should be structured from the patient's point of view. Without exception, everyone we spoke to recognised and acknowledged that providing medical care at home can be in the patient's best interest, leading to a better quality of life and better medical outcomes. Furthermore, the Dutch organization *Patiëntenfederatie Nederland*, an alliance of patient advocacy groups, endorses the movement toward providing healthcare at home and actively promotes shared decision making and remote monitoring.

In addition to the numerous comments it received, our study also gave rise to many questions because, although it may be clear why medical care should be moved to the home, how to best go about doing so is somewhat less obvious. Questions about how to best organise healthcare at home and how realistic it is to transfer as much as 46% of healthcare out of hospitals are certainly justified. After all, shifting medical care from hospitals to homes is no simple matter – if it were, it would have already been done.

New in the revised edition

The revised edition of *No Place Like Home* reflects feedback, insight and examples gathered from our discussions with various stakeholders. We identify four main obstacles that may be encountered when moving healthcare from hospitals to the home, including (1) people and mindsets, (2) data-driven decision making, (3) financial incentives and (4) infrastructure and logistics, and we describe how to overcome these obstacles based on the practical experience of existing home-based healthcare initiatives.

The more examples we encountered of medical care being provided to patients at home, the more it became clear that initiating healthcare at home is not a problem in and of itself, but that difficulties arise when it comes to scaling up home-based medical care. Hospitals will have to make drastic changes if they hope to come close to providing 46% of medical care at home. Encouraging the odd initiative will therefore not suffice; hospitals must take sweeping hospital-wide and portfolio-wide measures.

To significantly scale up home-based medical care, hospitals will also have to closely collaborate with other hospitals to avoid constantly reinventing the wheel. Our analysis of patient journeys that could be moved home has revealed that, although there are thousands of patient journeys per hospital, which may initially seem discouraging, between hospitals there is much overlap. This means that hospitals stand to benefit greatly from exchanging best practices. Only through serious collaboration and the full commitment to improving healthcare instead of protecting ostensibly hospital-specific protocols, can scaled up medical care at home become a reality.

Misconceptions about providing medical care at home

Here, we also take the opportunity to address several common misconceptions we encountered. First, moving medical care into the home does not mean a shift to primary care. Although people may assume that medical care at home falls under the oversight of a GP instead of a specialist, generally speaking we think this should not be the case. Medical care at home for patients that are now hospital patients often requires the involvement of a relevant medical specialist. However, the patient does not necessarily have to be in the hospital to receive this medical attention. Bringing medical care home creates a unique opportunity to redesign the patient journey. When constructing a patient journey from scratch from the patient's perspective, the responsible professionals (whether GPs or specialists) will follow from that.

Another misconception we encountered was that some patients simply do not want to receive medical care at home. Interestingly, it was generally healthcare providers rather than patients who believed this. Doctors and nurses should be careful not to undervalue their patients' opinions or assume they know what their patients are thinking. Being at home is very important for many patients, so much so that hospitalised patients ask 'when can I go home' more often than 'when will I be better'. Although providing medical care at home may not always be feasible, we don't believe that cases where it is not feasible should hold hospitals back from being innovative in cases where it is. Look, for example, at how we do our banking. In the last ten or so years, an

enormous change has taken place in consumer banking. We have gone from using hardcopy forms that had to be brought into the bank in person or by mail to real-time internet banking on smartphones from anywhere. If banks would have waited until every single customer was ready before implementing this radical change, we would all still be spending a lot more time at banks today. Just by introducing a new system that is customer-based, or in our case patient-based, it's possible to gradually increase acceptance of it. Moreover, it doesn't matter if not everyone makes use of the new system – there will always still be banks and hospitals – but it does become a problem if innovation for all is obstructed by the preferences of a few.

A third misconception we often encountered was the idea that moving care home is much more expensive than providing care in the hospital. This would certainly be the case if you simply copied and pasted current protocols – just moving all hospital activity, carried out at the same frequency and by the same people – to the home, for instance if haemodialysis were assisted by a nurse at home as it is in a hospital setting. However, that is not the case. We reiterate that bringing healthcare home provides an opportunity to redesign the patient journey. The roles of doctors, nurses and patients change, and patients (assisted by technology) take on new responsibilities. As such, new protocols are created in which healthcare does not have to be more expensive and, in fact, may even be more cost-efficient. This is the case, for instance, when patients carry out tasks for their own care with the reduced involvement of nurses and/or doctors (e.g., self-performed haemodialysis), and when it comes to monitoring real-time results for the early detection of deterioration (e.g., in cardiac patients or those with chronic obstructive pulmonary disease, COPD), which prevents the medical costs of exacerbations.

Scenarios for the future of medical care at home

Although we know that moving medical care from hospitals to the home can have numerous benefits, we do not have a crystal ball and cannot predict how such a shift will be received and whether it will ever fully materialise. We have identified three possible scenarios for how stakeholders could collectively impact the future in this area.

In the first scenario, people are paralyzed by a variety of fears: fear of the new, fear of the unknown, fear of risk and fear of liability. The healthcare system becomes more conservative and focuses on preserving past achievements. In this scenario, there is no wide-spread movement to transfer medical care to the home.

In the second scenario, two opposing schools of thought arise: one that holds on to what is known (i.e., medical care in the familiar hospital setting), and another that pursues the great potential of the unknown (i.e., redesigning patient journeys to include medical care at home). In this scenario, there is movement to bring medical care home but it is relatively slow. Once the shift begins, however, it may gain momentum and support as those in the first group see the positive results it produces.

In the third and final scenario, all stakeholders collaboratively contribute to the rapid adaptation of medical care at home. This requires the concerted effort of doctors, nurses, hospital boards, manufacturers and health insurance companies. By keeping the patient front and center, it is possible to overcome the various obstacles together. In this scenario, patients take optimal advantage of new possibilities to receive care at home. At the same time, the Dutch healthcare system maintains and strengthens its position as a global forerunner.

Remarkable parallels can be drawn between this trend in healthcare and the introduction of self-driving cars. When Tesla developed the first self-driving car it stated that such cars would be more efficient, safer, and more convenient than conventional cars. Other companies, including Google and Uber, have also since begun actively developing such radically innovative vehicles. Yet what happens if a Tesla crashes while the car is driving itself? Who is to blame? Does that then imply that self-driving vehicles are unsafe? Such accidents grab our attention in the immediate term while the long-term safety benefits remain less obvious. How will society choose to respond to these questions? Will people be motivated by fear of the unknown and move to prohibit this radical new technology until it is 100% safe (scenario 1)? Such an idea is somewhat paradoxical, since the technology can only be improved through use. Will two schools of thought arise: those who support this new trend and those that don't (scenario 2)? Or will there be a collective push to make the new technology widely available while, at the same time, continuing to improve it (scenario 3)? Much as with self-driving cars, the fate of home-based medical care remains unknown, and only time will tell what the future has in store.

We enjoin all healthcare professionals and other stakeholders to join hands and take responsibility for redesigning patient journeys so that home-based medical care becomes the rule rather than the exception.

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Summary

Approximately 46% of hospital patients in the Netherlands today could be sent home and receive the care they need remotely, in the comfort of their own homes rather than in the hospital itself. This is possible thanks to numerous technological advances. If managed well, the move of patients out of the hospital and into the home could have significant financial benefits and improve patients' quality of life. At the same time, it will require stakeholders to take on new roles: individuals will be able to collect medical data on themselves and monitor their own health, nurses will take a less active and more supporting role in patient management, and doctors will have to shift their perspective from $N=1$ to $N=\infty$. Hospital management will become IT companies, and medical technology companies will become consumer technology firms. Once the movement of patients out of hospitals begins, it will be unstoppable and irreversible, and innovation will spread quickly.

In this study we analyse the feasibility and the impact of moving patients out of hospitals and providing them with the care and treatment they need in their own homes. We begin by looking at the types of activities that could safely and realistically be done at home given the current state of technology, then we go on to assess the impact that such a change would have on the various stakeholders involved.

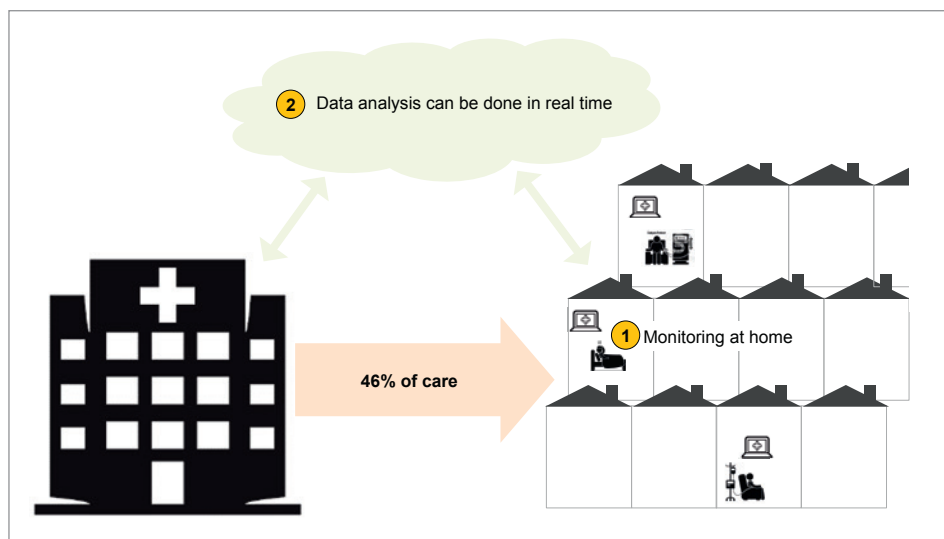


FIGURE 1:

About 46% of care can be moved out of the hospital, thanks to remote monitoring and data analysis

Remote monitoring and data analysis enable bringing patients home and growing data availability accelerates it

The past several decades have already seen a sizable decrease in the duration of hospital stays. Although on average the Dutch today live longer than before and disease incidence is rising, every year they spend less time in the hospital. After surgery, for example, people get discharged much sooner today than they did 20 years ago, and many surgical procedures that used to be inpatient are nowadays outpatient. The move away from hospitals will continue to gain momentum in the coming years, and the next big change will be that patients do not even go to the hospital at all, but instead are treated entirely at home.

Remote monitoring and electronic patient records are the two big enablers of moving patient care out of the hospital and into the home, and they are rapidly becoming more commonly used (Figure 1). The availability of large sets of digital data is accelerating the transition to care at home in two important ways. First, doctors are more likely to decide to send a patient home because they can make a good risk assessment about whether the patient is likely to encounter complications when recovering or receiving treatment at home. Second, doctors can closely monitor the patient at home and intervene when necessary. This makes sending patients home safer than ever before.

Drastic changes in stakeholders' roles and responsibilities

Patients as pilots of their own healthcare

While in the past patients were like passengers in an airplane that was controlled by a doctor, they become pilots themselves when care is moved home (Figure 2). Patients can collect medical data and interpret its meaning continuously thanks to readily available technology and information that enables them to easily do so. Formerly, medical data was only collected for people with a medical condition. Now, it is becoming increasingly possible for everyone – whatever is their state of health – to collect their own personal medical data, and more and more people are opting to do so. In this way, it is almost as if everyone has become a patient. Yet with access to so much information, it is crucial that people receive the education they need to deal with this data in a constructive manner. Once people are able to understand and make use of their own medical data, it becomes possible to outsource certain tasks from nurses and doctors to patients themselves. Allowing patients to be the pilots of their own healthcare is empowering and results in more efficient care processes and better health outcomes.

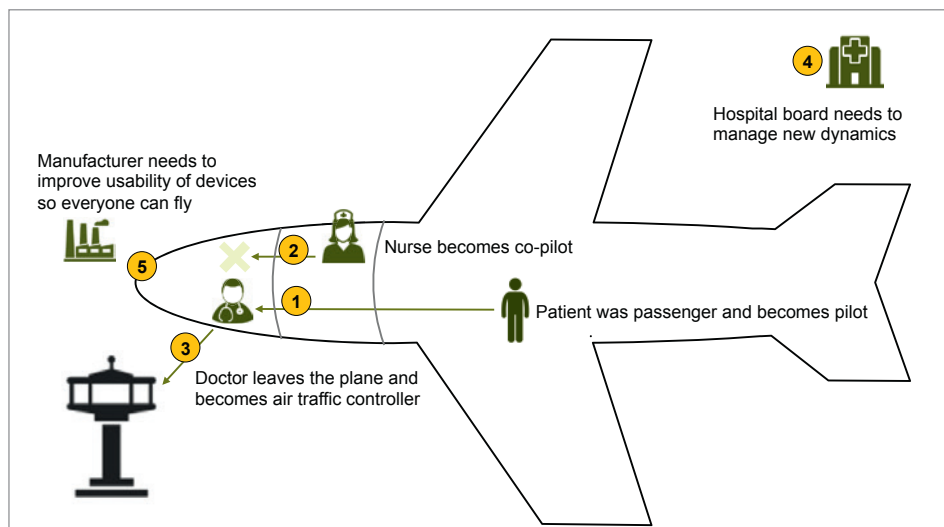


FIGURE 2:

The role and responsibilities of the stakeholders change drastically

Nurses become patients' co-pilots

Of course, many patients will need assistance in piloting their own healthcare. Nurses will be the first in line to provide this help. As patients' co-pilots, nurses will be expected to jump in and take control in certain situations. Yet in these situations it is important that patients do not lose their status as pilot and aren't relegated back to the role of passenger once again.

This will be a new role for nurses and a break from the hands-on proactiveness that tends to define the work of nurses today. Many nurses take great pride in making sure patients get the attention and care they need, but in their role as co-pilots they will have to shift their focus to observing patients and transferring their knowledge to them. Rather than fixing each problem themselves, their aim will shift to ensuring that their patients become great pilots. The impact of this work will be less immediate, and this could be very frustrating for those nurses who thrive on being able to see the instant results of their work. This new work will require a different set of skills from nurses, but they will adapt. Positive patient feedback can accelerate the process.

Doctors' role shifts to air traffic controller

Most doctors are used to interacting with their patients in a one-on-one setting, and their responsibility for each patient is limited to the period that that patient is in the hospital. Once the patient is discharged from the hospital, the patient is on his or her own again. As more and more

treatments are administered by patients themselves outside the hospital, doctors' responsibilities will radically change.

In this new situation, doctors will have to transition to being air traffic controllers while they turn over command to patients, who will have the technology available to them and the training needed to become the pilots of their own healthcare. Doctors as air traffic controllers will be necessary to ensure each individual patient is headed in the right direction. This will be a very demanding job, as the amount of information that these air traffic controllers will need to process and the speed at which they will need to do so is much higher than in the one-on-one situations they are used to. Of all healthcare workers, doctors will be the most capable of making this shift, but not every doctor will be a good air traffic controller.

Hospitals transform into IT companies to help support patients, nurses and doctors in their new roles

We determined that about 40% of hospital buildings will become obsolete as patient care moves to the home. Although this sounds significant, it will only have a budget impact of 1-2.5% of hospital costs. The real challenge will not be how to manage obsolete buildings, but how to manage the technology that enables the new care processes.

In the last 6 years IT-related costs in hospitals already increased by 60%. The recent surge in investment in electronic health records will only accelerate in the coming years. However, the impact is not the cost of IT itself but how it affects other cost drivers. The million-dollar question for hospital management is how to make the business process redesign successful, such that hospitals are ready to outsource care to patients wherever possible and are able to ensure care can be safely provided at home. In addition, hospital management will need to find the right technology companies to partner with to ensure the security of patient data.

Healthcare technology companies become consumer technology companies

While consumer technology goods have developed significantly over the past 20 years into easy-to-use, intuitive devices, medical devices have not. The latter remain as difficult to use as they were many years ago, despite the fact that they are increasingly used by patients instead of nurses and doctors. Therefore, manufacturers will need to invest heavily in research and development to find ways to make devices as easy to use and as intuitive as possible so that patients can use them without intensive training.

In addition, healthcare technology companies' relationship with hospital procurement departments will change. The procurement process will be less technology based and more outcome based. To get the best outcomes, the user interface will be as essential as the technical features. Healthcare technology companies will have to extend their responsibility to make sure that their solutions deliver the promised results.

Putting this study into context

Trend analysis is tricky business. If all trend analyses were correct, the human race would have already died from starvation in a world without heating, cooling or transportation. Although perhaps it is the trend analyses that give us the sense of urgency to act – to put all of our energy together to prevent the predicted outcomes from coming true. This might also be the case for the findings of the analyses we did for this study. Trend analyses have been warning us for years that, without change, we will need more nurses, doctors and facilities, yet we found that the opposite is just as possible.

Our study could easily be mistaken for trend analysis, but it isn't. We assessed the impact that current technology could have on the delivery of care in common practice. There is no speculative part in it. That's why the conclusions of this study are so powerful and should be taken very seriously.

Frame 1: Collaboration is crucial to moving medical care into the home on a large scale

Although 46% of hospital care at home sounds inspiring, where do we start to achieve this? This is an enormous struggle for hospitals, doctors and other stakeholders. In practice, home-based medical care starts relatively randomly (as described in Figure 9) with the idea of one patient and/or doctor), without prior analysis on how to achieve the most value for the invested effort of moving medical care home. This is not a problem in and of itself. It does, however become a problem when trying to scale up home-based medical care within a reasonable timeframe.

Each hospital has hundreds of thousands of individual patients, with thousands of different patient journeys. The average Dutch hospital covers about 4,500 patient journeys per year (Figure 3). Here, we define a patient journey as a unique combination of Diagnosis-Related Groups and activity type(s). For example, 'outpatient visits for asthma or COPD' is one patient journey, distinct from 'outpatient visits for coronary heart disease' and 'outpatient visits and diagnostic activities for asthma or COPD'.

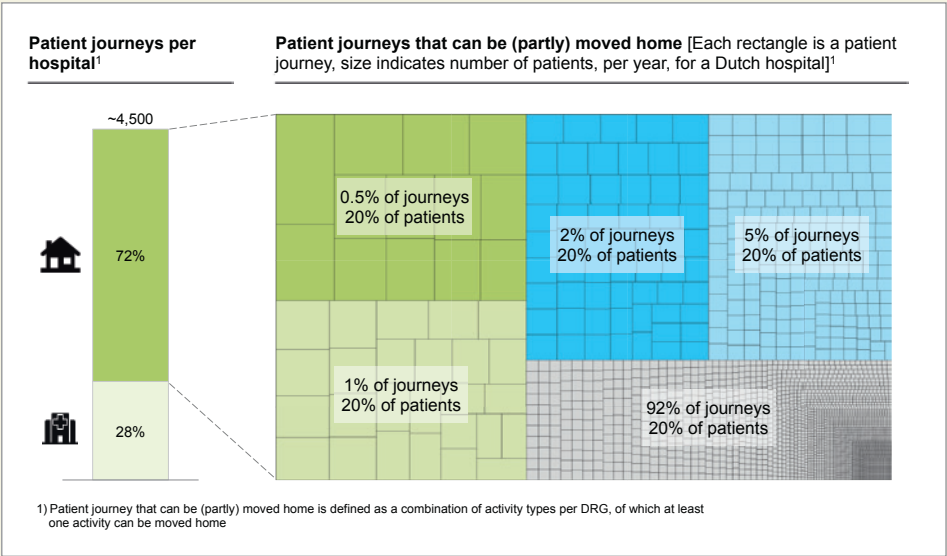


FIGURE 3:
Hospitals need to redesign thousands of patient journeys to bring care home

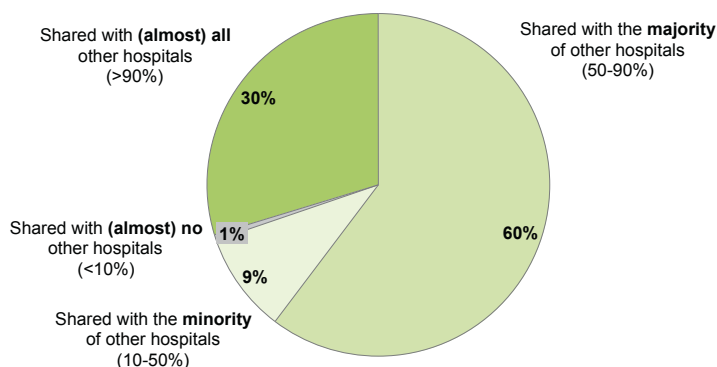
When judging whether a patient on a particular patient journey can be moved home, it appears that over 70% of all patient journeys (covering over 60% of patients) can be (partly) moved home. This number is even higher than the 46% of care activities that can be moved home, since patient journeys that can be partly moved home are also included. This implies that the average hospital needs to redesign over 3,000 different patient journeys to bring 46% of care activities home. This is an enormous task.

Of course, not all patient journeys are alike. A few patient journeys are very common, while others are rare. Ten to fifteen patient journeys per hospital (~0.5% of patient journeys that can be partly moved home) collaboratively cover about 20% of patients. This category includes, for instance, 'outpatient visits for diabetes', 'outpatient visits and surgical interventions for skin cancer' and 'outpatient visits and diagnostic activities for hearing problems.' With another 25 patient journeys (~1%), another 20% of patients are covered. However, the patient journeys become smaller and smaller in terms of individual patients per patient journey and to bring the last 20% of all patients home, about 92% of all patient journeys need to be redesigned. Such patient journeys are far too small to each be redesigned individually. In addition, the number of patients per journey per hospital are far too small to yield reliable data for data-driven decision making.

It is a serious task to redesign all of these patient journeys from the patient's point of view and bring the corresponding medical activities home. It appears logical, therefore, to start with the large ones. However, it is even more sensible to start with the ones that have already been redesigned by other hospitals.

Our analysis of the medical care portfolio of Dutch hospitals reveals that there is huge overlap in patient journeys between hospitals. Sharing patient journeys with other hospitals is the rule rather than the exception. On average, 30% of patients in Dutch hospitals acquire care on a patient journey that is shared by almost all, if not all, other hospitals in the country (Figure 4). This means that it doesn't make sense to start redesigning these patient journeys from scratch, but rather it is best to collaborate with other hospitals that have experience in redesigning medical care for these patients. Another 60% of patients are covered by patient journeys that are present in the majority of hospitals. For these, the same recommendation for collaboration and sharing protocols with other hospitals applies. Only less than 10% of patients have a patient journey that is offered by a minority of hospitals (which still is a few hospitals in the country), and about 1% is unique or almost unique per hospital.

Overlap of patient journeys that can be (partly) moved home¹ between hospitals
 [% of patients for which patient journeys are shared with other Dutch hospitals]



1) Patient journey that can be (partly) moved home is defined as a combination of activity types per DRG, of which at least one activity can be moved home

FIGURE 4:

Hospitals can learn from each other, since they mostly have the same patient journeys

Thus, to bring medical care home on a large scale within a reasonable amount time, collaboration is key. This may sound easier said than done. However, it fits perfectly within the timeframe we are in now, in which hospitals collaborate at an increasing scale to reach, for instance, better outcomes and better purchase results. An increasing amount of hospitals are united in partnerships such as Santeon or NFU. Also in geographical regions, collaboration and partnerships generally have been consolidated in recent years. In addition to these hospital-level collaborations, associations for medical specialists also have a role and responsibility in sharing knowledge and experience about redesigning patient journeys and bringing care home. Only together can we help patients into the pilot position.

Hospital use has significantly changed and decreased over past decennia

Even though we are living longer, we spend fewer years in a state of good health: the average number of years spent with a chronic disease has grown by even more than life expectancy has. Nowadays 5 more years are spent with a chronic disease than 15 years ago¹. One might assume this has resulted in more time spent in the hospital, but that has not been the case. Although people visit hospitals approximately as frequent as they did 30 years ago, the average duration of their stay is approximately 60% shorter (Figure 12 in appendix).

Thanks to improved technology, recovery time for many surgical interventions has significantly decreased. Due to minimally invasive surgery, wounds are smaller and heal faster, and better targeted radiation for patients with cancer means that fewer healthy cells are damaged and hospitalisation time can be shorter. Ten years ago, after a hip replacement patients had to stay in bed for more than 10 days², whereas today patients can slowly begin to walk again within just a few days. In more extreme cases improved technology has resulted in a shift from inpatient care to outpatient care. In 1995, 35% of surgeries were performed in an outpatient setting and by 2013 this number had already grown to 56%. For certain surgeries, such as cataract surgery, inguinal hernia surgery and angioplasty, the difference is even larger (Figure 13 in appendix).

These developments have had an impact on hospital building requirements over the past 20 years. The number of hospital beds has decreased, while numbers of consultation rooms and inpatient and outpatient operating rooms have increased. In total, the required physical space of a hospital has significantly decreased (Figure 5), even though the population has grown older and suffers from more chronic diseases. Note that actual hospital space is not always aligned with the required space based on provided care, since there is a mismatch between the number of required and the number actual hospital beds (Figure 14 in appendix).

The movement from inpatient to outpatient care will continue to decrease hospitalisation time. However, this effect is already flattening out. The next step in the process is from inpatient or outpatient care to actually providing care at the patient's home. The first careful steps have already been taken: patients are discharged earlier when they haven't yet recovered fully from surgery.

¹ Statistics by Statistics Netherlands (CBS) show that the average life expectancy of men grew by 4 years between 1998 and 2013 to reach 79, and life expectancy among women grew by 2 years, reaching 83 in 2013. However, the average number of years spent with a chronic disease for both men and women grew by 5 years, to 30 and 41 years respectively.

² Statistics by CBS.

However, this is mainly driven by financial incentives for the hospital: discharging patients early means fewer costs while the reimbursement remains primarily unchanged since it is based on fixed packaging. Moving the entire care process to a patient's home has limited or negative incentives for the hospital. Haemodialysis, for example, is a highly profitable activity for hospitals. In 2013 in the Netherlands, in only 4.5%³ of cases was haemodialysis done at home, even though the required technology for this is available. Some other countries have much higher percentages of home dialysis, such as New Zealand and Australia, where 10 years ago 25% and 13% respectively of all haemodialysis was already being done at home⁴. Compared to on-site dialysis, home dialysis can save up to 50% of costs⁵ and over 45 hours in travelling time per patient per year, and it gives patients more freedom in their lives. It even results in better quality of life, since more dialysis sessions are possible at home, which in turn results in better health outcomes.

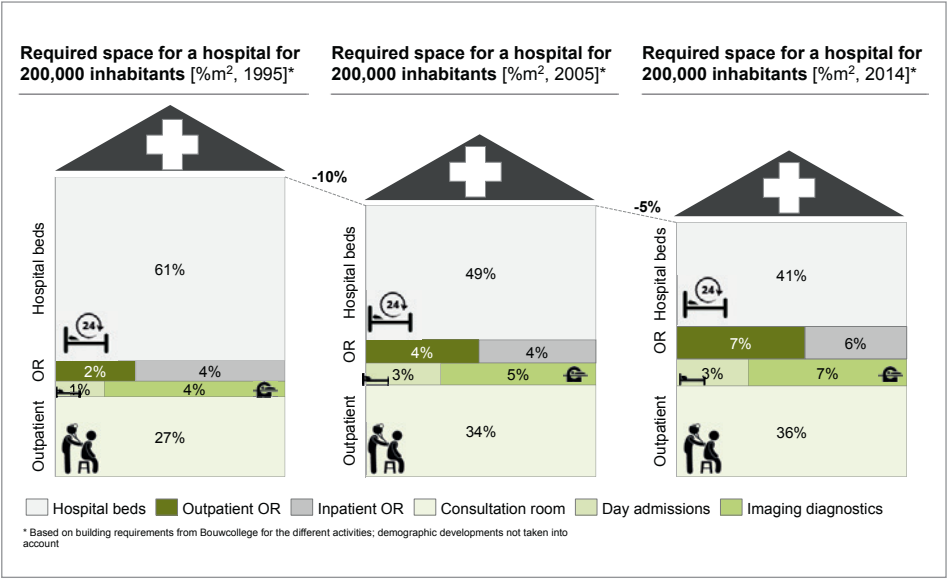


FIGURE 5:
The current hospital has a very different use of space than the hospital of 20 years ago

³ Analyses on Gupta Strategists' database.
⁴ MacGregor, M., Agar, J. and Blagg, C. (2006). Home hemodialysis – trends and variations. Nephrol Dial Transplant. Vol 21, pp. 1934-1945.
⁵ Based on the assumptions that the number of patients per nurse will significantly increase, that the reimbursement of taxi rides is not needed anymore, and that materials can be bought at prices comparable to those in Germany and America.

Radical change in the hospital environment

Approximately 46% of all care activities currently provided in a hospital setting could potentially be provided at home within 10 years. This estimation is determined by analysing which type of activities for each of the ~160 Diagnosis-Related Groups (DRGs) could be safely performed at home with currently existing technology. To this end, all activities have been divided in 7 categories. We have defined specific assumptions for each category:

1. Outpatient visits can be done by video call when no physical tests need to be performed and no difficult message needs to be told. This already happens on a very small scale, for example, for dermatology and diabetes patients. A more extreme scenario would be doctors visiting patients at home. In the latter case, although most outpatient visits would be performed outside the hospital, this would cause so much logistical overhead that we did not consider this scenario in our analysis.
2. Imaging diagnostics consists of ultrasounds, X-rays, MRIs and CT scans. Given the nature of current technology, ultrasounds could be done at home, but X-rays, MRIs and CT scans still require large machines and must be done in specially designed rooms.
3. Surgical interventions should still be done almost exclusively in the hospital building, except for certain low risk interventions, such as inserting a contraceptive device, skin interventions and cataract surgery.
4. Diagnostic activities can be done from home when the activities themselves are not dangerous. Some diagnostic activities are already primarily performed at home, such as sleep studies, where the patient can apply the required patches by following video instructions. Other activities are more complex logistically to arrange at home but can nonetheless still be done there, for example, pulmonary function tests.
5. Other therapeutic interventions consist of a large, diffuse set of activities, where many are part of the surgical pathway and can therefore not be separated from surgical intervention. However, some specific therapeutic interventions, such as haemodialysis, light therapy and chemotherapy, are already performed at home to a small extent and can be performed at home on a much larger scale.
6. Nursing days can take place at home when the main purpose is to monitor the patient, for example, when a patient stays overnight in the hospital to perform a sleep study or is largely recovered from a surgery but the doctor needs to monitor the status of the patient frequently. Also, patients that are stable but still need to recover can, in many cases, do so at home. An example of this is patients with bone fractures. However, patients that are hospitalised for severe conditions, such as older people with pneumonia for example, should probably remain in the hospital.

7. Day admissions are mostly related to surgical or therapeutic interventions. Only when these interventions can be performed at home completely are day admissions in the hospital no longer needed for these patients.

We classified care activities to be provided at home if the technology to do so already exists. However, these technologies might at the moment be too expensive, large or cumbersome to use at home.

From the distribution of care that can be provided at home over the different type of activities displayed in Figure 6, it can be seen that nursing days, therapeutic activities, day admissions and diagnostic activities in particular can be done at home. Even though the number of nursing days has already decreased significantly over the past 20 years (Figure 12 in appendix), the impact of moving care is still most significant for the nursing days due to their high costs and the potential to be moved to patients' homes. This will further impact the way a hospital needs to be organised and the requirements on its building.

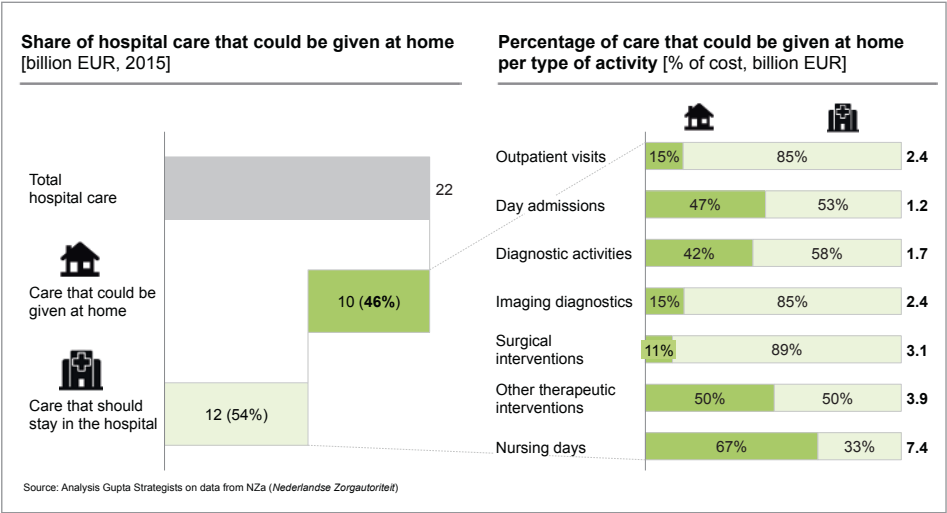


FIGURE 6:
46% of hospital care can be provided at home, especially nursing days and certain therapeutic interventions

Figure 6 displays the distribution of care that can be provided at home over the different diseases grouped by ICD10 chapters, where each of the 20 ICD10 chapters consists of several related DRGs. This shows that diseases of the respiratory system, genitourinary system, circulatory system,

nervous system, and digestive system in particular are treated more in the hospital now than they will be in 5 or 10 years. These diseases also differ in the type of activities that can be provided at home. For patients with heart disease a lot of monitoring that happens during nursing days in the hospital can be done from home. On the other hand, for patients with genitourinary diseases, for which kidney failure is a large portion of costs, home dialysis especially has a large impact on the number of therapeutic interventions that can be done at home.

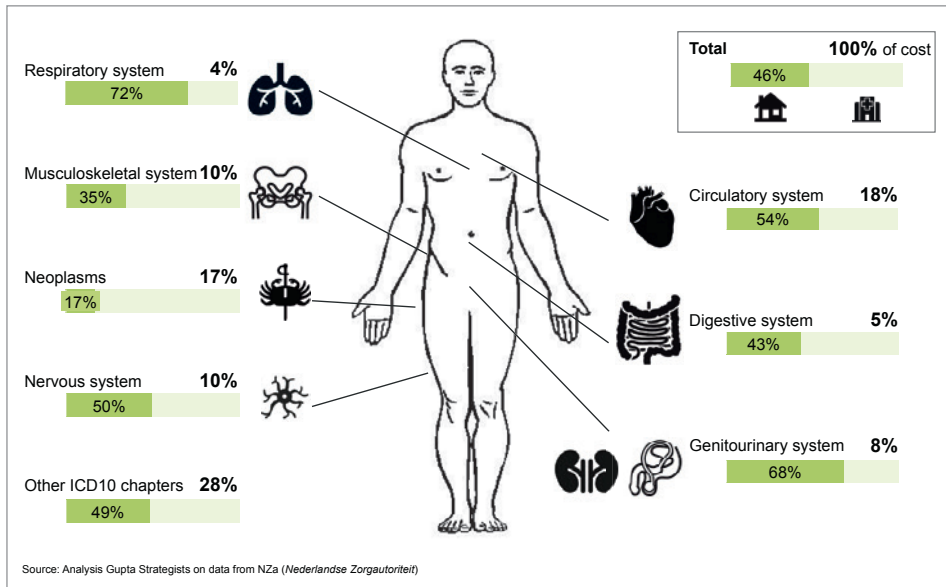


FIGURE 7:

Care for some types of diseases are more suitable to be provided at home than others

When more and more care is moved to the home, it will impact the way caregivers perform their work and the requirements on the hospital organisation and building (Figure 8). In this study, we describe the effects of taking care out of the hospital setting for the average Dutch hospital. However, due to an accumulation of effects, the consequences can be more severe for rural hospitals than for other hospitals (see Frame 3 for further details).

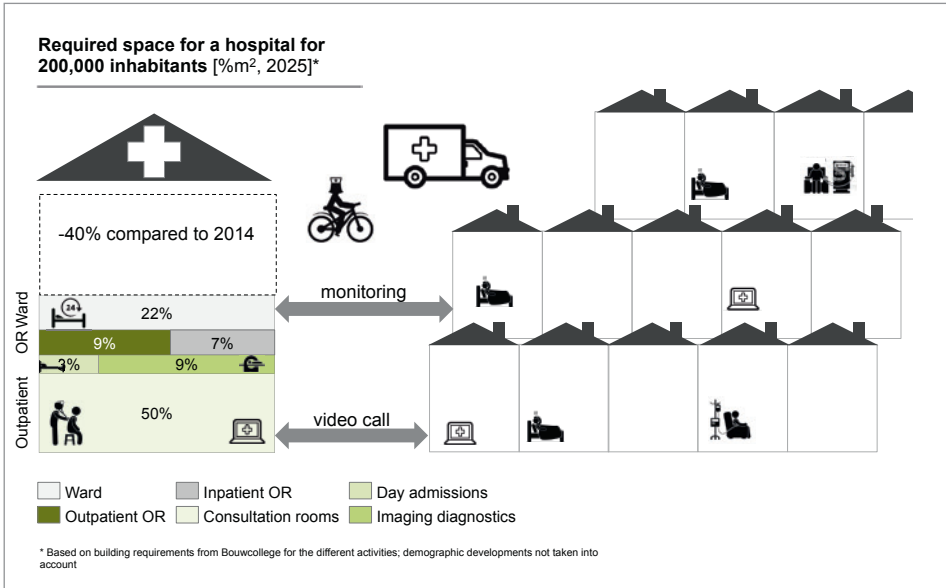


FIGURE 8:

With patients treated at home, data and personnel also leave the hospital building

Most patients prefer treatment at home to hospitalisation whenever possible: treatment at home is less cumbersome for patients, prevents hospital infections and saves valuable time. Together with safety considerations, this preference should take priority above all other considerations. Therefore, we believe the development towards less inpatient care is only a matter of time.

Growing data availability accelerates the transition to medical care at home

The main driver for the continuing decrease in inpatient days is improved medical technology. Compared to 5 or 10 years ago, surgical procedures nowadays are less invasive, more accurate and make it increasingly safe to send patients home earlier than ever before. Secondly, wearable technology is emerging that enables performing procedures or treatments at home. This technological progress is accelerated by the increasing availability of (digital) data. Where patient files used to be on paper, they are now mostly digital. Hospitals were relatively late in digitalising data, since they were frightened of harming patients' privacy and dreaded the high initial costs. While lab results were mostly digitalised, patient files, especially X-rays, were still often in hardcopy form as few as 5 to 8 years ago. Besides digitalising existing data, increasingly more data is collected since it is much easier to save. Data is an important driver of care at home since the burden of proof of safety for care at home is many times higher than for any process performed in a hospital setting. Also, with data digitalised in the cloud, decentralised care is highly simplified, since it enables information to be viewed from any place.

The increased availability of data makes the shift towards care at home possible in two main ways:

- Improved risk assessment on whether a patient can safely go home after a surgical intervention or during treatment such as chemotherapy lowers the threshold for care at home. Given the high stakes involved in deciding to send a patient home, doctors are logically risk-averse. With unknown chances, a doctor will decide to keep even an almost completely healthy patient in the hospital just in case something might happen. However, the world becomes a clinical trial when a certain scale of data availability is achieved: decisions can be made based on facts instead of intuition. With good risk assessment, the doctor does not gamble with patients' lives but instead takes a calculated risk to send the patient home. Improved risk assessment cannot guarantee that no dangerous or fatal incidents will ever happen when a patient is recovering or is treated at home. However, when risk measures are part of a widely accepted protocol, the doctor will not be liable for sending the patient home.
- Better monitoring at home further lowers the threshold for care at home. When doctors are certain that they will be alerted in a timely manner when the safety of a patient is endangered, the decision to send the patient home becomes easier. By closely monitoring patients, caregivers can intervene when needed and the risks of complications are thereby minimised.

This process of bringing patients home for treatment, which is made possible by technological developments and the availability of data, is further accelerated in a process described below in using two data-driven driving forces (Figure 9):

- Moving patient care out of the hospital always starts with a pioneer who believes a specific treatment can be given at home just as well as in the hospital. This doctor will send home more patients when first experiences are positive. By increasing the number of patients at home, more and more data is collected to validate the initial hypothesis that care at home can be as good as in the hospital. The collection of this data will convince other doctors to also treat patients at home. Moreover, with the increasing number of patients treated this way, this process becomes the norm and labour intensity decreases, making it increasingly easy to include more patients in the new home process.
- Transparency with respect to quality of care makes it possible to compare the quality of care provided at home to care in the hospital, such that doctors can make a fair, quality-based assessment on whether to shift specific care to the home. Either existing quality of care measures for the hospital setting are applied to care at home or, when they don't yet exist, new measures need to be developed. Good results will convince other doctors to also send their patients home. Eventually health insurers will also consider treatment at home as the default process and will design the buying process accordingly.

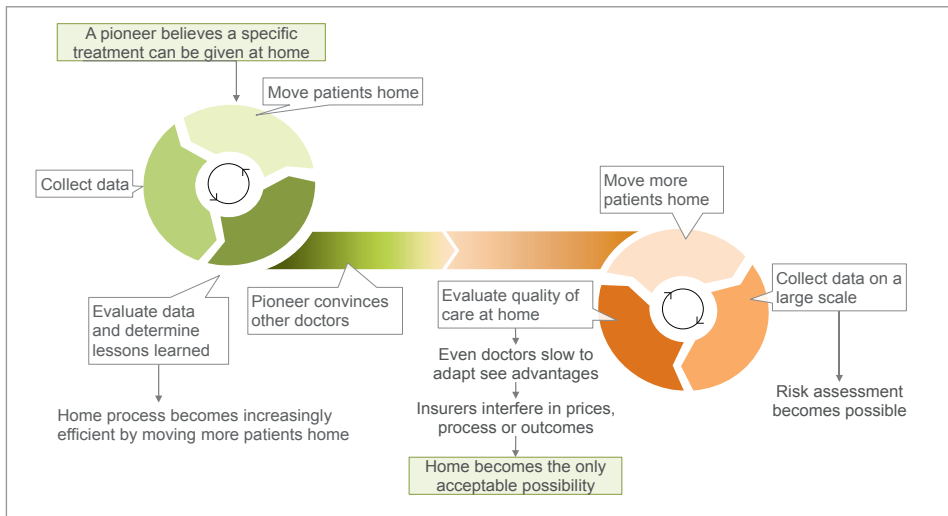


FIGURE 9:

A pioneer initiates the transition for a specific type of care from hospital to home and evidence accelerates it

Frame 2: Home-based medical care places new demands on manufacturers

Most home-based medical care requires one or more medical devices. Manufacturers of these devices therefore stand to be significantly impacted by the movement of patients from hospital to home. Through targeted innovation they can even help accelerate the movement towards home-based healthcare.

Historically, the choice of which type and brand of medical device to use has mainly been left up to doctors and based on medical considerations. Doctors could choose their preferred product from the devices available from different manufacturers. However, in recent years price has begun to play a more important role in choosing which device to use. This is due to several reasons. Firstly, insurance companies have started to put pressure on costs in certain areas. For example, when treating diabetes the choice of which device to use is now based mainly on a combination of functional requirements and price. Furthermore, it is now suppliers rather than doctors who decide which product is best suited for patients' needs. Secondly, hospital procurement is currently undergoing a period of professionalization and procurement departments are trying to cut spending for the benefit of hospitals as a whole. This means procurement managers are also beginning to have a greater say in which devices to use and their decisions are more heavily based on objective functionalities in relation to price rather than on doctors' preferences.

Bringing medical care into the home places new demands on medical devices and their manufacturers. Compared to devices used in hospital settings, devices used at home require additional functionalities and greater usability. For instance, devices used at home need to be connected – preferably wirelessly – to the internet and to other devices. They also need to be integrated into a doctor-patient communication system. There is also a great need for proper automatic warnings – no false positives and no false negatives.

Even more important, medical devices used at home must be extremely easy to use. Doctors have been trained to use complex medical devices and they develop expertise through years of experience, but the same is not true for patients. Devices therefore need to be intuitive and easy to use so patients can understand how to operate them right from the start. This is a big change considering the current interfaces of medical devices. Today's smartphones may be leagues ahead of cell phones from a decade ago but the interfaces of medical devices, such as blood glucose or

blood pressure meters for example, have not improved significantly over the past decade. Thus, manufacturers will need to invest in research and development to quickly improve the usability of medical devices.

In the meantime, hospitals and doctors do not have to wait for manufacturers to take the first step. A recent initiative by five European hospitals illustrates how hospitals can accelerate the development of medical devices. With financial support from the European Union, these hospitals collectively form Project Nightingale⁶. They put out a *call for tender* for new systems, thereby encouraging innovation. The requirements for the new systems include the ability to identify the risk of deterioration, analyze big data to improve treatment for future patients and promote active patient involvement in care. If manufacturers present innovative systems, whether or not reinforced by tenders or other financial incentives, they can accelerate the movement of bringing medical care to patients at home.

⁶ See <http://www.nightingale-h2020.eu/>

Multiple obstacles need to be overcome to bring medical care home

Moving medical care from hospitals to homes all started with a simple idea: that bringing medical care into the home is better for the patient. However, we all know there are many steps between the conception of an idea and its realization in practice. Through looking at multiple home-based medical care initiatives, we've identified the primary obstacles that initiators have come across while putting their ideas into practice. Interestingly, most initiators encountered very similar obstacles. Fortunately, through the process of collating these experiences we were also able to identify several ways to overcome these obstacles.

We identified four main obstacles that impede the transition of moving medical care from hospitals to patients' homes (Figure 10). The first and most important obstacle is on people. Skilled people who are open to this new change are crucial to bringing medical care home, and having the right people in the right roles is key to successfully overcoming this hurdle. The second obstacle is on data-driven decision making. It is imperative to do proper, evidence-based risk assessments before sending patients home. The third is financial incentives. The current system does not always fund home medical solutions and is devised in such a way that providing medical care in the hospital is more lucrative. The last obstacle is the infrastructure and logistical organization required. This may sound like a confusing and frightening challenge, but in fact should be the simplest hurdle to overcome.

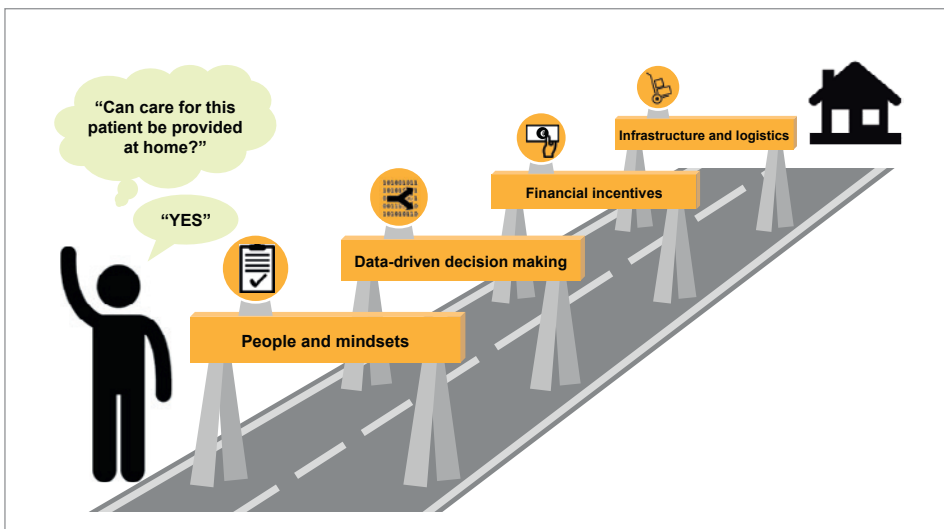


FIGURE 10:

There are four main obstacles that must be overcome to bring medical care into the home

Some of the requirements for overcoming these hurdles are general, and ensuring they are properly in place in the hospital creates the right foundation for providing medical care at home for multiple patient groups. At the same time, certain requirements are specific to individual patient journeys. Examples of these include specific protocols and devices. It is important to note that general requirements do not have to start big or at a high level. In fact, they often start with an individual patient journey. Once a pioneering person has set up the right IT infrastructure or collaboration with healthcare providers for one patient journey, this has often laid the foundation of a system that may be scaled up to a general, hospital-wide level.

People and mindsets

Almost without exception we heard that people are at once the most important factor in the transition of providing medical care at home and the greatest obstacle or delaying factor. This is mainly due to stakeholders' mindset and required skills. Once the different stakeholders are willing to bring medical care home, the other obstacles are relatively easy to overcome.

Mindsets of doctors and nurses

Providing hospital care at home undeniably requires a different mindset for all stakeholders. For some, this is achieved quite easily and intuitively, while others are more prone to remaining stuck in familiar patterns of providing medical care at the hospital. The mindsets of doctors and nurses are the most important in the change process. If they see no clear benefits for their patients, patients will stay in the hospital. The mindsets of other stakeholders, including hospital boards and health insurance companies, are less important in starting initiatives for home-based medical care.

It is not surprising that the mindsets of doctors and nurses are not immediately geared toward providing medical care outside the hospital setting. Healthcare professionals by nature want to take care of their patients, and it usually feels like they can do that best by keeping patients close by to keep an eye on them. For healthcare professionals it may feel like moving patients home is irresponsible, even though responsibility and liability are covered by hospital policy (see next section).

Similarly, even if healthcare professionals do, in principle, agree with the idea of providing medical care at home, they often lack the time required to initiate such a change and don't see it as an urgent priority. As a result, initiatives to provide medical care at home are only slowly embraced

and extended. For instance, if a hospital's intravenous antibiotic therapy is already being provided at home for patients with infections, you would think it would be relatively easy to extend this to patients needing another intravenous therapy, such as immunoglobulins or chemotherapy. However, a whole new team of doctors and nurses would be required to get this new initiative up and running and a lack of time or sense of urgency may stand in the way of applying existing knowledge and experience to other patient journeys.

An example of medical care being transferred to the home for which an enormous change in mindset is required is end-of-life care for ICU patients. When it comes to ICU care, patients and relatives as well as doctors and nurses usually want to use whatever high-tech medical options are available rather than end active treatment. However, end-of-life patients and their relatives highly appreciate spending the final moments in a familiar home environment without the interference of machines. For healthcare professionals, including both ICU personnel as well as GPs and home nurses, it often feels unnatural to end treatment in the hospital and allow patients to die in their homes.

Breaking through the tough barrier of doctors' and nurses' fixed mindsets can be achieved in two mutually reinforcing ways. First, hospitals can provide a top-down framework of knowledge, infrastructure and financial support for providing medical care at home. Second, those initiating home-based medical care can inspire and convince their colleagues by sharing their results and experiences (as indicated in Figure 9).

Policy on responsibility and ethical questions

Once the mindsets of relevant stakeholders are set toward providing medical care at home, healthcare professionals must be supported by hospital boards and the proper legal framework should be put in place. Individual responsibility must be clear when it comes to providing and receiving medical care outside of a hospital setting. Furthermore, ethical questions should be discussed in advance instead of as and when they arise. An example is already stated in the preface using the analogy of the self-driving car: what should be done if someone dies or suffers injury while receiving medical care at home? If these types of questions are answered rationally beforehand, people will be less afraid of this new unknown and the path will be clear to continue providing medical care to patients at home.

Such policy on responsibility and ethical questions is typically an example of general measures for a hospital. Once these are established and have been answered for one type of home-based medical care, expanding them to other initiatives is just a small step. Set the other way around: having a general policy on providing medical care at home simplifies the process of putting new initiatives into practice.

Close collaborations with other healthcare providers

Providing medical care at home can be more complex than providing medical care in the hospital because it often involves additional healthcare providers and actors. Home nursing care may be involved, for example, when it comes to intravenous therapies, wound therapy or elderly care at home. Since often there are multiple home nursing care providers in a region, this may require extensive consultation. In addition, devices and consumables need to be at the right place at the right time and this requires arrangements with suppliers. For instance, a pilot initiative for providing chemotherapy at home was a close collaboration between a hospital, a home nursing care provider and a supplier. Other healthcare providers and actors that are required for collaboration are GPs (when responsibility shifts towards primary care, as in end-of-life care for ICU patients), pharmacies, ambulance services and hospital transfer offices. Experience from multiple initiatives shows that the transfer office is essential in bringing all these healthcare providers together.

New skills for healthcare professionals and patients

Providing medical care at home requires different skills than providing it in the safe and well-known environment of the hospital. Doctors become like air traffic controllers and nurses like co-pilots (Figure 2). As we've learned from the different examples of moving medical care into the home, the additional skills these new roles require are often underappreciated. There is often little focus on actively teaching doctors, nurses and other stakeholders how to perform their new roles. This is regrettable, since proper training can accelerate the change in mindset that is required. A general, hospital-wide policy for home-based medical care should therefore provide healthcare providers with the necessary training, although the actual training process may be specific to each type of medical care that is transferred home.

In addition to training healthcare professionals, patients should also be trained for their new role as pilots. For each type of care, patients will require specific skills, such as how to operate devices, assess risks, weigh possible benefits and side-effects and perform medical procedures, including applying infusion systems. Providing training is often seen as an obstacle by healthcare providers and therefore in many cases deploying nurses is preferred over training patients. For instance, only patients that need infusion therapy for a prolonged period (multiple months) learn how to apply these themselves, while in most cases home nurses come to perform this procedure. However, when patients perform such tasks themselves, their involvement and self-management are much stronger, which has a positive impact on outcomes. Importantly, it must be kept in mind that relatives may also be very well suited to execute medical procedures at home, as is often the case for haemodialysis.

Data-driven decision making

Patient data and scientific insights are increasingly important in the field of medicine. Personalised medicine is now within reach, but on the other hand it becomes harder for individual doctors to stay informed about the latest developments. For the transition of medical care to homes, data-driven decision making is crucial. Which patients can safely receive care at home? When do you need to intervene with patients who are at home? Data analysis for risk assessments, scientific publications and ascertaining proper, scalable protocols are important necessities in bringing patients home.

Data analysis for risk assessment

Risk assessment is one of the principles in bringing care home, and therefore data analysis is required. We cannot just send all patients home, nor do we want to keep all patients in the hospital forever. In practice, risk assessment (e.g., when it comes to releasing patients after hospitalization) is often based on a combination of scientific insight and professional experience. Remote monitoring when providing medical care at home adds a new source of information in the decision-making process. Data that is collected at home can be connected to treatment outcomes and the need for rehospitalization. Based on these insights, a more reliable assessment can be made concerning which patients to send home.

To date, risk assessment based on data is mainly in its infancy. In practice, medical professionals are cautious in deciding which patients to treat or monitor at home. For example, remote monitoring is used as an additional way to keep an eye on COPD patients that would normally stay out of a doctor's scope for months, but it cannot yet replace hospital visits. In addition, among elderly people who are hospitalised, only a small proportion are eligible for receiving care from at home in the context of Hospital@Home. Of course, it is always wise to start on the safe side, but expanding the provision of medical care at home to other patients is the next step that must be taken.

Childbirth is a perfect example of proper risk assessment in deciding whether to provide medical care at home versus in the hospital. In the Netherlands giving birth at home has long since been common practice, and healthcare professionals have extensive experience in assessing which deliveries can safely take place at home and which ought to take place in the hospital. From the risk analysis involved, childbirth teaches us it is important to realise that risk assessment is not equal to excluding all risks. Home-based medical care always carries some degree of risk, as does hospital-based medical care. It is imperative that healthcare professionals and patients have adequate information about these risks to be able to make the appropriate decisions.

In the end, people would ultimately like to be able to perform risk assessment and clinical decision making based primarily on data insights. Big data indeed provides the possibility to do so based on patient fingerprints. We recently described a method to use data from electronic health records to predict disease progression⁷. This algorithm can be used in support of scientific insights along with doctors' personal experience. Sharing these outcomes further accelerates our common knowledge about the risks assessment of sending patients home for their medical care.

Scientific publications

Sharing insights is essential for extending the impact of care at home and to prevent all doctors from having to perform their own risk assessment and thus constantly reinvent the wheel before transferring medical care to the home. Scientific publications are therefore important for sharing knowledge about what type of home-based medical care is successful for which patients and what is not. Success in this case is the combination of medical outcomes and patient experience. Multiple initiatives, including Hospital@Home and home birth risk assessments have already resulted in published or soon-to-be published scientific papers. However, the medical field tends to be conservative and is prone to waiting for scientific evidence until adjusting proceedings. This attitude may severely delay innovation. Pioneers are necessary to bring about change, and pioneering requires exploring the yet unknown and unpublished.

Protocols

Whether or not they result in a scientific publication, procedures for providing care at home for a specific patient group need to be described in a protocol. This protocol needs to include inclusion criteria based on risk assessment. Creating protocols as such is a necessity, but not a barrier for bringing care home.

However, the exchange of protocols between hospitals is still poor and forms an obstacle to further expand bringing medical care into the home. A proper protocol for providing medical care at home ensures scalability of the initiative. Once a hospital has fulfilled general conditions like establishing a hospital-wide policy on responsibility and collaboration with other healthcare providers, it should be possible to relatively easily copy initiatives from one hospital to another based on their protocol. At present, we found that the exchange of protocols for home-based medical care is uncommon, although initiators confirm that by sharing protocols others can adopt their initiative. Initiators do not feel a strong responsibility to share their experiences, and others tend to start new initiatives without properly checking what is already in place elsewhere. Thus, quite some time and effort is unnecessarily lost.

⁷ The World as a Clinical Trial – Using Patient Fingerprints to Enhance Clinical Decision Making, Gupta Strategists, 2017

Financial incentives

When discussing the transition of medical care to patients' homes, it is only a matter of time before finances come into play. First, people often assume that home-based medical care is less efficient and therefore more expensive than care in hospitals. Second, people have the experience – or belief – that there are financial incentives that prevent bringing medical care home or that home-based medical care won't be reimbursed. Third, when financials are not a barrier to initiating medical care at home, they may be a barrier for expanding and scaling up the initiative in the future. To enable both initiating and scaling up home-based medical care, it is necessary that new, suitable financial agreements are made. Luckily, we observed that in practice financial incentives are not as much of an obstacle as may seem at first sight.

Cost-effectiveness of home-based medical care

To start with, let us address the misconception that moving medical care to the home is much more expensive than providing medical care in a hospital. This would indeed be the case if the medical care process were simply copied and pasted from hospitals to homes. In that case, medical care at home would be more dispersed and therefore less efficient. However, most possibilities for medical care at home involve a newly designed patient journey with new technology-assisted roles for doctors, nurses and patients. When patients need less intervention from professionals and when remote monitoring prevents excessive healthcare costs, home-based medical care is much less expensive than traditional hospital care. When initiating medical care at home, cost-effectiveness should certainly be taken into account. However, the outcomes for patients (both medical outcomes and patient experience) should ultimately be the deciding factor.

In the examples we encountered of medical care at home, almost all were less expensive in the long run than their hospital equivalents. Home-based medical care can be divided into four types (Figure 11), depending on the type of medical care and the intensity of nurse deployment.

Type of care at home	Examples	Total costs	Main requirement for funding
1 Monitoring	<ul style="list-style-type: none"> • COPD monitoring • Heart monitoring • Diabetes monitoring 		<ul style="list-style-type: none"> • Funding of doctor's new role as 'air traffic controller'
2 Self-executed*, tech-assisted care	<ul style="list-style-type: none"> • Cardiotocography (pregnancy) • Self-assisted haemodialysis • Machine-assisted respiration • Sleep analysis 		<ul style="list-style-type: none"> • Hospital funding (dbc)
3 Hospital nurse-assisted care	<ul style="list-style-type: none"> • Nurse-assisted haemodialysis 		<ul style="list-style-type: none"> • Hospital funding (dbc)
4 Home nurse**-assisted care	<ul style="list-style-type: none"> • Antibiotic infusion therapy • Chemotherapy • End-of-life care ICU patients • Care for vulnerable elderly 		<ul style="list-style-type: none"> • Agreements on budget for homecare nursing providers

* Executed by patients or relatives
 ** MSVT or regular home nursing

FIGURE 11:
 Home-based medical care requires appropriate funding, and funding for the 'air traffic controller' role is not sufficient yet

- The first type of home-based medical care is monitoring patients with chronic diseases, such as COPD or high blood pressure. For these patients, intensive remote monitoring results in the early detection of deterioration and thereby prevents future health costs.
- In the second type of home-based medical care, patients or their relatives execute medical procedures that would otherwise be done in the hospital. Examples of this type of care are sleep analysis, cardiotocography during pregnancy, haemodialysis and machine-assisted respiration. These examples of home-based medical care are less expensive than the equivalent care in the hospital, since home-based medical care does not require expensive hospital infrastructure or overhead and requires far less medical personnel, especially nurses.
- The third type of home-based medical care is care at home with the assistance of hospital nurses. This may also include the second type of home-based medical care, such as haemodialysis or cardiotocography, which are sometimes performed by nurses instead of patients. In such cases, these types of care may be more expensive than in the hospital, since a nurse must sit and wait until the procedure is done, instead of simultaneously assisting multiple patients as would be done in the hospital.
- For the fourth and last type of home-based medical care, hospital care is (partly) taken over by nurses from home nursing care providers. This is, for instance, the case for intravenous antibiotic or chemotherapy treatment, as well as for care for vulnerable elderly and end-of-life ICU patients. All initiators indicate that these types of care cost the same or less than their hospital counterparts.

This breakdown of care types is not rigid and one initiative of medical care at home can fall under different types, or can shift to another type over time. Mainly types 2, 3 and 4 are interconnected. For example, antibiotic infusion therapy is most often performed by home nurses, but some patients are trained to perform it themselves. On the other hand, types 3 and 4 can sometimes be provided by either hospital nurses or home nurses, depending on what is most appropriate.

Enabling home-based medical care: specific funding

Although cost-effectiveness is often not an issue for providing medical care at home, the funding system can be. It may be unattractive for hospitals or private practice doctors to move medical care to the home because it decreases their income. In some cases, reimbursing home-based medical care is not even possible in the current system.

Most hospital care that is provided at home is funded from the hospital budget via a DOT⁸. Sometimes a specific DOT for home-based medical care exists, for example for haemodialysis, with a distinct price. Most often, home-based medical care is reimbursed via the same DOT as care in the hospital. Reimbursement of such a DOT requires face-to-face interaction between the patient and the doctor.

However, in the movement of medical care into the home, doctors are becoming more like air traffic controllers and less like pilots. This is already the case for type 1 home-based medical care, where remote monitoring replaces periodic monitoring in the hospital and the doctor intervenes when the monitoring results indicate this is necessary. Often, when patients are stable, this is less frequent than it would be in a hospital setting. Sometimes, doctors intervene sooner or more often, thereby preventing deterioration and associated healthcare costs. In types 2, 3 and 4 the role of the doctor also shifts to be more like that of an air traffic controller and the requirement for face-to-face contact between doctor and patient is motivated by input from patients, nurses or monitoring results instead of being a standard periodic event.

Currently there is no dedicated funding for doctors in this air-traffic-controller-like role. Hospitals and doctors are being paid for performing one-on-one activities for each patient, but not for overseeing a patient's health and refraining from intervening when unnecessary. Thus, a new type of funding for doctors is required to enable doctors' new role and responsibility. This funding includes a fixed fee per patient under the doctor's responsibility as air traffic controller, regardless of whether the doctor takes medical action or not. GPs are already partly funded in such way now. Initiators of HartWacht together

⁸ Funding for hospital care that is a price for an average collection of care activities for a certain diagnosis.

with health insurance companies and the Dutch Healthcare Authority (NZa) are currently searching for such fee-for-service reimbursement possibilities. Until then, patients must visit their doctors regularly, even if remote monitoring indicates there is no reason for that.

Type 4 home-based medical care is performed by home nursing care providers. This can be either via regular home nursing or MSVT⁹. In most cases, there are no financial barriers to bringing care home with the assistance of home nursing care providers. However, depending on the region and the health insurance company, home nursing care providers may have budget caps that hamper moving patients home. This can sometimes be overcome by deploying hospital nurses (type 3), or by training patients to perform medical procedures themselves (type 2). However, this is not always the case and deciding whether type 2, 3 or 4 home-based medical care is appropriate should be patient-led rather than financially based.

Enabling expansion of home-based medical care: portfolio agreements

In addition to specific measures to enable reimbursing home-based medical care, particularly when it comes to doctors in the air traffic controller role, general agreements have to be made at the hospital level. This is mainly because when it comes down to it, cost-effective healthcare at home ultimately means decreased revenue for hospitals. In some hospitals there are extra demands for healthcare, either induced by technology (new medical care that was not executed before) or demographic changes (more demand for medical care because the population grows or ages). Moving medical care home can free up capacity to manage these extra demands and limit cost increases. However, in other hospitals – particularly rural hospitals, see Frame 3 – moving medical care to the home will result in significant income reduction. It is important that hospitals and health insurance companies make long-term agreements on budget development in such a way that hospitals have the chance to seriously restructure their healthcare supply and reduce costs.

It is crucial that hospitals and health insurance companies make agreements on a general, hospital-wide level instead of agreements for the funding of each individual home-based medical care initiative. Most importantly, by making such portfolio-wide agreements, financial savings on one type of medical care (either at home or in the hospital) and spending on another can be seen as part of the bigger picture. Finances should not be the focus, medical outcomes and patient experiences should be. Looking on the portfolio-level gives insight into the net result of home-based medical care that costs extra (such as

⁹ Medisch-specialistische verpleging in de thuissituatie; funding for specialist nursing at home, which is a price per hour of nursing. MSVT is executed by home nursing care providers, but the funding is separate from regular district care.

some examples of type 3), and types of care that save money (such as types 1 and 2). In addition, there's a practical reason for not making individual financial agreements: if every initiative from every hospital were to make an agreement with every health insurance company, this would result in an enormous bureaucratic workload.

In the context of moving medical care into the home, funding via integral or chain prices is often suggested. Although this may be applicable in some cases, it also has numerous drawbacks. First, chain funding would only be suited for patient journeys involving multiple caregivers, but many patient journeys are primarily in hospital care, even after being moved home. Second, such chain funding systems incentivise the cheapest care option. Although home-based medical care is often both cost-effective and preferred by patients, a patient's preference should ultimately be the decisive factor. If patients really prefer to be treated in the hospital this should be possible. Conversely, if patients prefer care at home that is more expensive, this should be possible as well. Chain funding contradicts this principle of patient-led care. Additionally, chain funding is rather hard to get in practice. Examples from obstetrics in the Netherlands, for example, illustrate that realizing chain funding is complex, time consuming and energy demanding. Finally, working with chain funding results in an extra administrative load for all healthcare providers involved.

Infrastructure and logistics

When people imagine home-based medical care, images of a logistic nightmare may come to mind. How is it possible to make all IT and telecommunications work? What is to be done with all of the freed up space in the hospital? What about the nurses that need to go to patients' homes? And how is it possible to get all these machines, devices and consumables to patients at home? Despite all of these seemingly hard-to-answer questions, it appears that infrastructure and logistics are the least of the obstacles to bringing care home. Once other obstacles have been overcome, infrastructure and logistics are not insurmountable. Nevertheless, a hospital must make changes in this area both on a general and on a specific level. Particularly for practical issues of infrastructure it's wise to collaborate with other hospitals that already have experience with these issues instead of reinventing the wheel.

IT system

The IT system for facilitating monitoring, telecommunications and tracking information in the electronic health record is crucial to moving medical care to the home. The available options are almost endless and

have seriously improved in both quantity and quality over the last decade. Therefore, new initiatives in moving medical care into the home do not have to develop a whole new IT application but can cleverly make use of what is already there. Ideally, all IT systems should be integrated, thus preventing patients, doctors or nurses from using multiple systems in parallel. To date, this situation is not the case. Hospitals struggle with implementing electronic health records and other IT applications. The development of moving medical care to the home emphasises the need for a solid, future-proof IT system.

Destination plan for building

Once 46% of care is indeed moved home, about 40% of hospital buildings will become obsolete (Figure 8). In terms of costs, this is of minor impact (1-2.5%). However, the faster hospital boards are aware of how hospital space will be used in the future, the better. By being prepared, one can avoid making investments that will be outdated in a few years.

Conditions for providing medical care at home

As described, the roles of doctors and nurses significantly change when medical care is moved into the home. This requires the fulfilment of certain basic infrastructure and logistical conditions. For example, nurses will perform their work (partly) in patients' homes (type 3 home-based medical care) and may therefore need modes of transportation and a tablet and/or smart phone for communication and administration. There will also be an added dimension to nursing schedules, since part of the team of nurses will be working offsite.

Devices at patients' homes

Lastly, providing medical monitoring or care at home requires all necessary devices and consumables to be available to patients in their homes. In the case of a blood pressure monitor, this is not too complex, but installing a haemodialysis machine is more radical. This puts new demands on the technical department of hospitals. However, these activities can also be outsourced to manufacturers or suppliers. Hospitals may decide not to buy devices but to lease them (and provide servicing), as is the case, for instance, with cardiotocography devices for pregnancy monitoring.

Frame 3: The unique case of rural hospitals

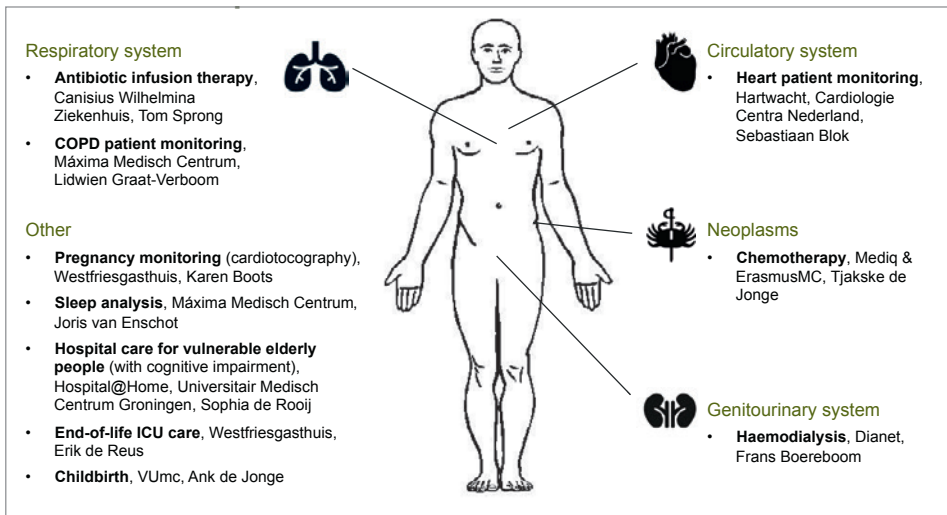
For Dutch hospitals in general, building obsolescence is not a substantial problem; the effect is manageable when anticipated and the cost of the building, including equipment, is limited to about 9% of total hospital costs. However, the situation for hospitals in rural areas is different. These hospitals are experiencing a triple depopulation:

1. By 2040, the population is predicted to decline by almost 10% in certain rural regions of the Netherlands (Figure 15 in appendix).
2. Patients are increasingly treated in specialised centres due to the basic treatment mix of rural hospitals. That this development is already taking place is especially visible from the development of the number of hospital admissions for different types of hospitals. Admissions for academic hospitals have grown almost 7% in 5 years, and in large and medium hospitals they have grown about 3%, but in small rural hospitals admissions have fallen by about 3% compared to 5 years ago (Figure 16 in appendix).
3. Care in rural hospitals can be moved home as much as care in other hospitals even though the treatment mix of these hospitals differ significantly. That is, we found that still about 46% of the remaining hospital care in rural hospitals can potentially be provided at home.

Due to all these developments, it is not attractive for rural hospitals to move patients home. Since patient do wish to be treated at home, this presents a new social dilemma. Hospitals most likely won't be able to break even when a significant part of care moves outside the hospital walls, and the government will have to decide whether or not to financially support hospitals so that they can remain open to fulfil their role as care centres for their regions. The other option is to make certain areas especially progressive by either completely closing a hospital or arranging a highly flexible hospital structure for the area. In the first case, care that cannot be provided at home will have to be accommodated by other hospitals in the region, which would increase driving times to the hospital to a potentially unacceptable level. In the second case, a hospital could be further dismantled into an extremely flexible structure that calls off doctors when needed. Most care that can be planned will be performed in nearby hospitals and ambulances will occasionally have to transport patients or doctors last minute.

Sources of inspiration

In the process that led to this revised version of the study No Place Like Home, we spoke to various stakeholders. Their enthusiasm as well as criticism inspired us to draft the supplements in this edition. In determining the four obstacles to providing medical care at home, we used experiences from multiple examples of medical care that are already being provided at home. The following list describes the main examples used.



About the study

No Place Like Home is an independent study conducted by and for Gupta Strategists. This is a revised and extended edition, based on the original study No Place Like Home published in 2016. Gupta Strategists regularly publishes independent studies on a variety of healthcare issues. For more information, see www.gupta-strategists.nl/studies.

About the authors

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Appendix

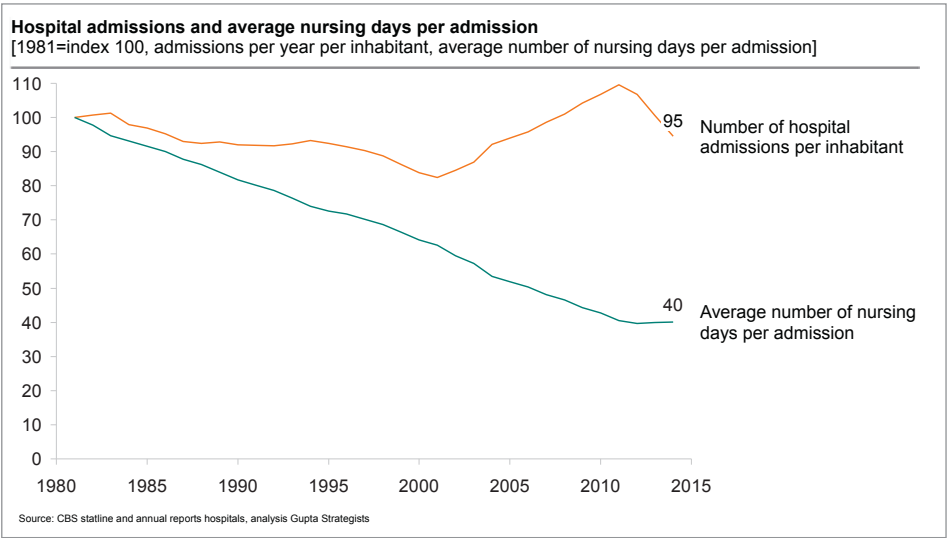


FIGURE 12:
We are admitted to the hospital almost as often as 30 years ago, but we stay in the hospital significantly shorter

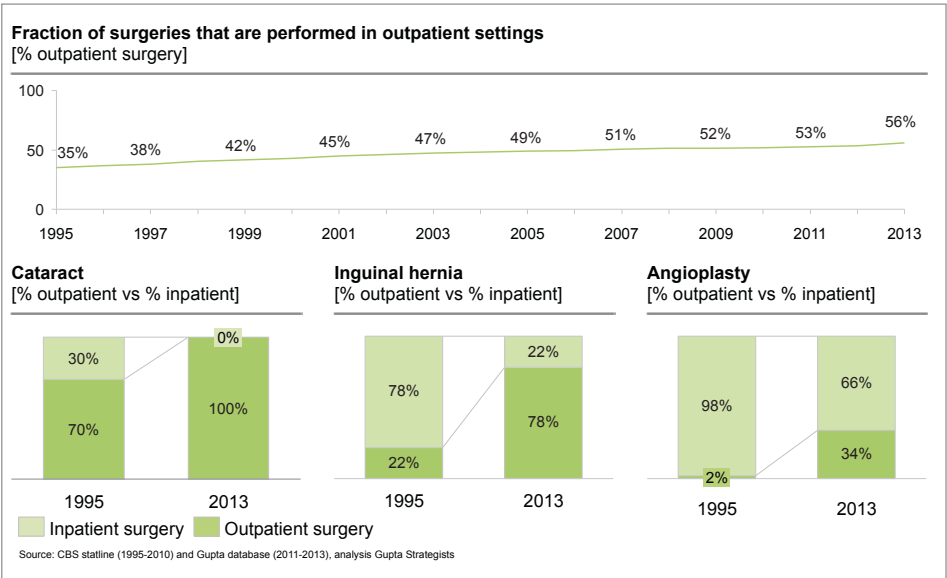


FIGURE 13:
The share of outpatient surgery has increased significantly over the past 15 years, especially for specific surgeries

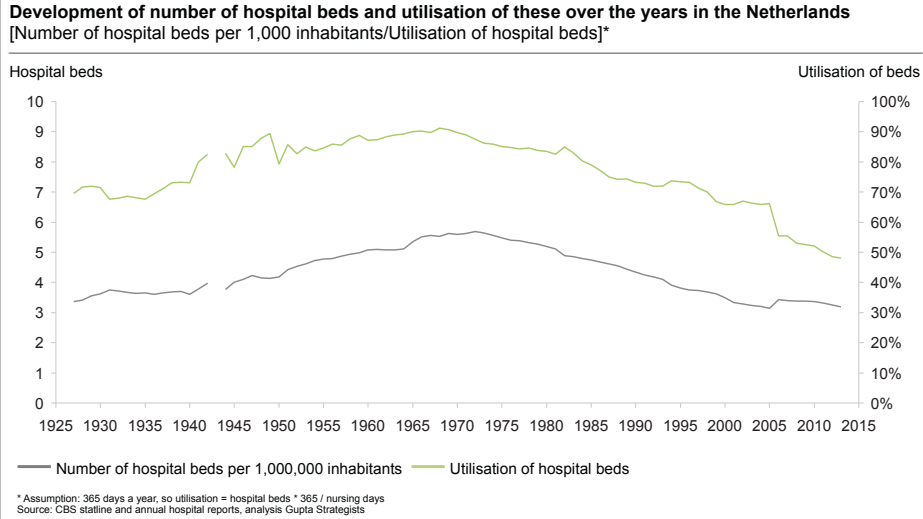


FIGURE 14:

The number of hospital beds has slightly decreased over past 40 years, but is still too high for actual demand

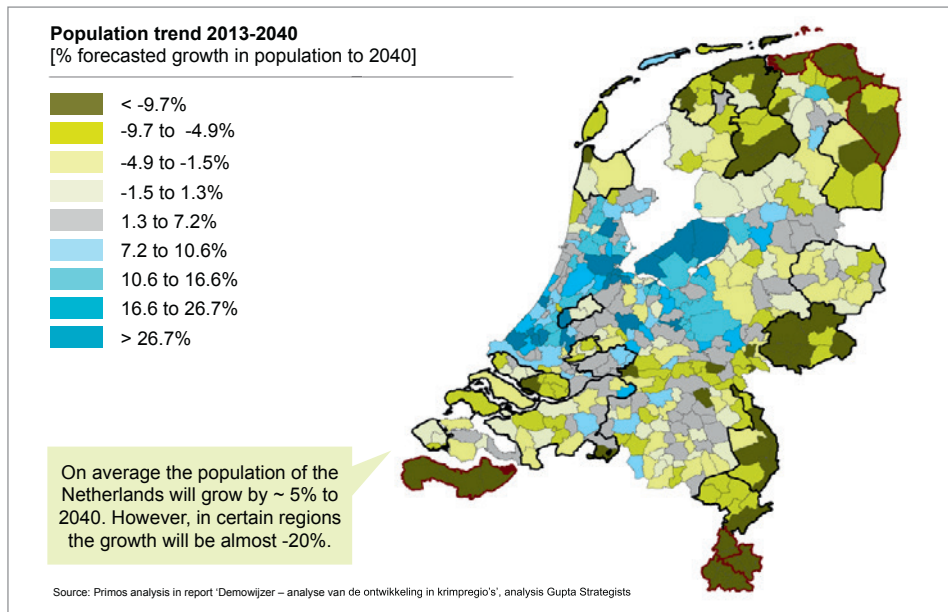


FIGURE 15:

In certain regions in the Netherlands population is forecasted to decline by more than 10%

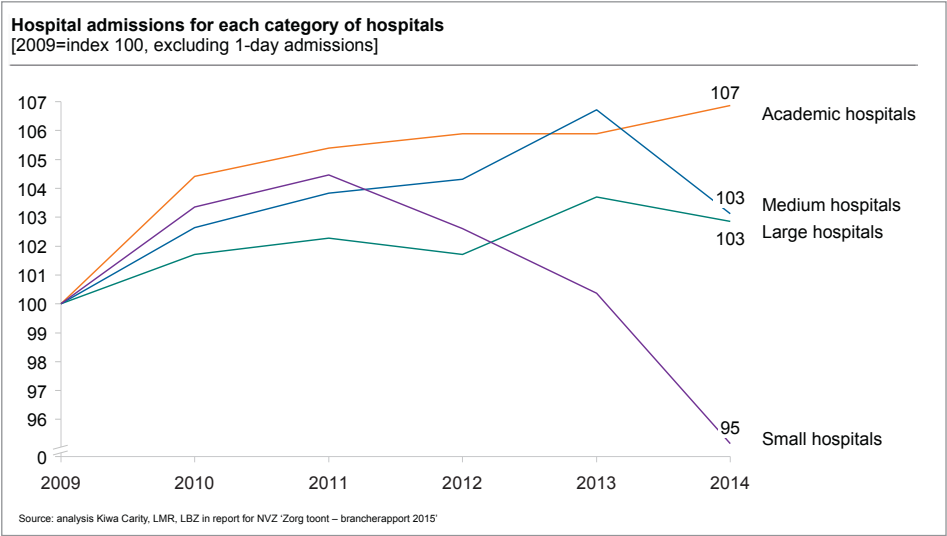


FIGURE 16:
Hospital admissions have increased for all types of hospitals except for small hospitals that faced a significant decrease

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