

# Annual Review 2023



**KAROLINSKA**  
UNIVERSITY HOSPITAL



WE ARE PART OF  
REGION STOCKHOLM

# A day at Karolinska University Hospital

 **77** ongoing Phase I studies and  
**1,612** studies ongoing or in planning

 **465** patient visits to the emergency departments  
**104** by ambulance and **2** by helicopter

 **1,071** ongoing in-patient episodes

 **256** surgeries and interventions

 **7** helicopter flights from  
Solna and Huddinge

 **900** students

 **162** radiation therapies

 **1,173** pathology reports

 **3,445** doctor's appointments,  
**150** counselor appointments and  
**1,697** nurse's appointments

 **22** deliveries

 **4,769** physical visits, **123** video consultations and  
**933** telephone consultations

 **217** chemotherapy treatments

 **659** radiological examinations

 **120** dialysis treatments

 **5,069** medical dictations





## Patient focus guides Karolinska University Hospital through challenging times

2023 witnessed an economic crisis that heavily impacted the global healthcare sector. Unlike during the pandemic, the crisis came without the prospect of financial support. Around the world, many healthcare systems responded by scaling back their services, focusing primarily on cost reduction. Karolinska took a different approach.

Karolinska University Hospital navigated this challenging period by strategically reducing costs, investing in development, and simultaneously increasing its productivity. This approach was grounded in the hospital's commitment to patient-centered care, decentralization, process improvement, and efficient administration. The need for healthcare remains constant, even in an economic downturn.

Karolinska's response to the economic crisis underscores the importance of patient-centered care and innovative management, setting an example for healthcare institutions facing financial challenges.

Björn Zoëga, MD, PhD

CEO

Karolinska University Hospital

# Together We Are Karolinska



## VISION

We will **cure and relieve tomorrow** what no-one can cure and relieve today



## MISSION

We are **best at the most difficult.**  
We take **responsibility for our common resources.**



## VALUES

**Responsibility**  
**Compassion**  
**Holistic Approach**

## OUR PRINCIPLES

- A. Together as ONE hospital
- B. Empowering local leaders
- C. Simplifying and reducing administration
- D. "Saying YES" and finding solutions

## OUR FOCUS AREAS

1. Karolinska – a global provider
2. Capacity and access – at all times
3. World leading competence
4. Best quality and patient safety
5. From research to patient benefit
6. The smartest hospital

# The state of Karolinska University Hospital is strong even in adverse times

Karolinska University Hospital has emerged from a challenging year with its reputation for excellence intact. Despite economic hardships and global uncertainties in 2023, the hospital has continued to work towards its vision of curing and relieving tomorrow what cannot be cured or relieved today. This year, marked by various challenges, saw the hospital's staff unite more than ever to find solutions and enhance healthcare services, solidifying its position as a stronger institution.

Faced with tough economic and production conditions, including inflation and increased pension costs, along with capacity reductions due to a strategic reduction in the use of travel nurses, Karolinska University Hospital has navigated these challenges effectively. Hospitals nationwide have reported significant financial deficits, but through collective efforts and decisive action, Karolinska managed to deliver a better-than-expected financial result, with a deficit of 736 million SEK. Structural measures, particularly through necessary layoffs to adjust the hospital's administrative support, have stabilized the financial performance in the second half of the year, positioning the hospital to better meet the challenging economic conditions expected in the coming years.

In 2023, Karolinska University Hospital successfully reduced its use of travel nurses by 88 percent while maintaining high service availability. Structured efforts to improve resource coordination and optimized surgery scheduling, including the implementation of "standby patients", have been critical. The hospital continues to refine its model for production planning and coordination of its complex resources and shares these practices with interested hospitals nationally and internationally. Avoiding long surgery waiting lists remains a priority.

Karolinska University Hospital is a vital resource for Sweden and the global community. In 2023, the hospital was granted 9 new licenses for national high-specialized care, now holding a total of 33 such assignments. The number of care contacts from other regions and countries increased by 6 percent in inpatient care and 10 percent in outpatient care compared to 2022. The complexity of these care contacts has also increased, contributing to a turnover of over 2 billion SEK for care provided to other regions or countries. The hospital is dedicated to extending access to its expertise to more patients.

Karolinska's healthcare maintains high quality, with open-heart surgery outcomes continuing to rank among the world's best in terms of 30-day postoperative mortality. The hospital also reports low mortality rates in elderly patients undergoing heart valve replacement (TAVI). Improvements in acute patientflows and surgery have been notable, with hip fracture patients now receiving surgery within the first day.

Additionally, Karolinska shows positive outcomes in treating rheumatoid arthritis, with the disease measurement DAS 28-CRP significantly better than the Swedish average. The hospital is committed to open reporting and comparison of quality results, a proud tradition in Sweden. Efforts are underway to make it easier for patients and the public to access these outcomes. Over the year, the hospital has focused on developing the use of patient-reported outcome measures (PROMs) to facilitate individual care decisions and, at the group level, to tailor resources and interventions.

2023 has also been a year of innovation at Karolinska. Significant investments in precision medicine, advanced cell and gene therapy, modern diagnostic technology, Karolinska@Home, and artificial intelligence exemplify the hospital's drive to harness its innovation potential. These initiatives are crucial in driving development that can make a real difference for patients.

Karolinska University Hospital's ambitious development agenda and solid performance have continued to gain international recognition. In the global hospital ranking conducted by Newsweek magazine, the hospital has been placed in the top 10 for the fourth consecutive year, ranking sixth globally and as the best hospital in Europe in 2023.

*With powerful measures, Karolinska has been able to deliver better results than expected.*



## One university hospital in several locations

Karolinska University Hospital is Stockholm Region's appointed university hospital with a specific task of providing specialized and highly specialized healthcare. Karolinska also treats patients from other regions and from other countries. Karolinska has been given the primary responsibility in the region to undertake research and to educate students in cooperation with the Karolinska Institute and other higher-education institutions and universities.

The hospital has some 16,000 staff across approximately 150 professions. Services are provided primarily in two locations: Solna Municipality just north of Stockholm city center and Huddinge Municipality to the south.

The hospital organization, divided into six theme areas and three functions, has been designed to follow the patient's path through the healthcare process. Central administrative functions support core clinical operations.

### Theme Areas and Functions:

- Emergency Medicine and Reparative Medicine
- Pediatrics (Astrid Lindgren Children's Hospital)
- Cancer
- Heart, Vascular and Neuro
- Inflammation and Ageing
- Women's Health & Allied Health Professionals
- Medical Diagnostics Karolinska
- Perioperative Medicine and Intensive Care
- Perioperative Medicine and Intensive Care – Pediatrics

In each of these theme areas and functions, there is significant freedom to employ an organizational structure that meets specific needs. Several have chosen what is known as a two-legged structure: instead of having a traditional set-up with just one head of department, often a physician, this role works in tandem with the person, usually a nurse, who heads the care unit and is in charge of nursing.

# Europe's Best Hospital according to Newsweek's ranking

For the fourth consecutive year, Karolinska University Hospital was ranked as one of the world's top ten hospitals by Newsweek magazine. According to Newsweek, in 2023, Karolinska is ranked the sixth best hospital globally, and is the highest rated among all European hospitals.

"This is a significant recognition for the staff at Karolinska and for Swedish healthcare, especially as the number of countries and hospitals in the ranking has increased. We know that we are among the best in the world, and through Newsweek's ranking, the world gets to know this too. After having combated the pandemic, we have continued to reduce queues and waiting times, further improve our quality, and develop new treatment methods," says Björn Zoëga, CEO of Karolinska University Hospital.



## Ranked as the World's Tenth Smartest Hospital

In 2023, Newsweek also compiled a list of hospitals that best utilize the most advanced technology in healthcare, 'World's Best Smart Hospitals'. Karolinska placed tenth in the world and, according to the magazine, stands out in the areas of artificial intelligence, robotics, and telemedicine. Karolinska University Hospital, along with the German university hospital Charité in Berlin, are the only two European hospitals to reach the top ten.

"It is a strength that for the third year in a row we are ranked as one of the world's ten most innovative hospitals when it comes to using new technology. At the same time, we see that hospitals in other parts of the world are advancing. It is therefore important that we increase the pace so that our patients can benefit from the latest technology," says Björn Zoëga.

## World-class Specialized Care

In the fall of 2023, Newsweek also released its ranking of the 'World's Best Specialized Hospitals 2023', where Newsweek assesses different medical fields at many hospitals worldwide. Cardiology is the specialty at Karolinska that achieves the highest global ranking (18th) while neurosurgery reaches the highest in Europe (5th). Just like in last year's ranking, Karolinska is completely dominant in the Nordic region with a total of eight first-place positions. The seven medical fields where Karolinska climbs in Newsweek's compilation are oncology, cardiology, pediatrics, cardiac surgery, gastroenterology, orthopedics, and neurosurgery.

"Karolinska's rise in this ranking is clear and another confirmation that our way of developing the hospital is successful. Few healthcare providers in the world can offer the same high quality to such a broad group of patients. Empowering leaders close to the actual patient care to make the key decisions, and staff who, despite a high degree of specialization, see the whole patient are two of the success factors," says Björn Zoëga.



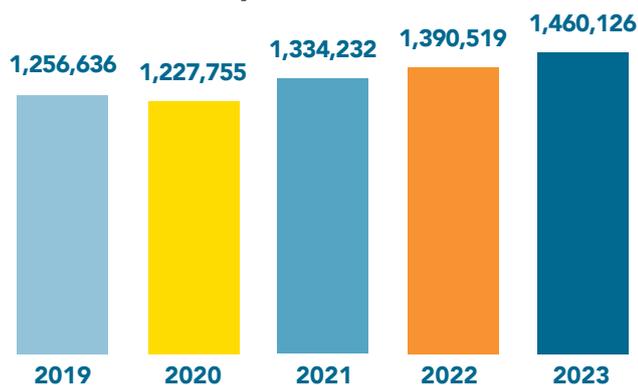
## More patients received care at Karolinska

The number of patients treated at Karolinska University Hospital continues to rise. In 2023, the hospital cared for a total of 334,486 patients, a 3% increase from the previous year. The hospital delivered 6.5% more care to Region Stockholm than commissioned. Over recent years, Karolinska has increased the number of performed surgeries, interventions, and hospital beds. These have consistently exceeded the levels of 2018-2019, aligning with the hospital's commission. The increase in care production in 2023 was primarily seen in outpatient services.

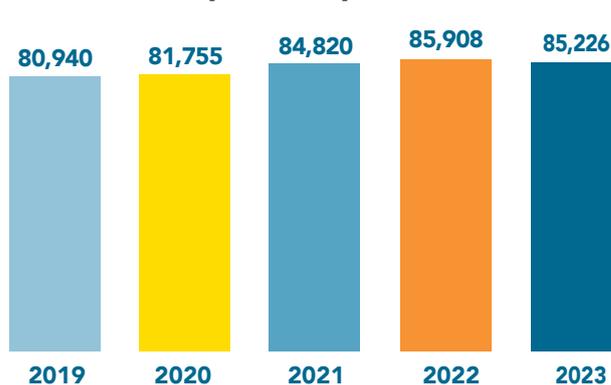
### Fulfillment of regional mandate (Transition agreement 2016–2019, Hospital agreement 2020–)



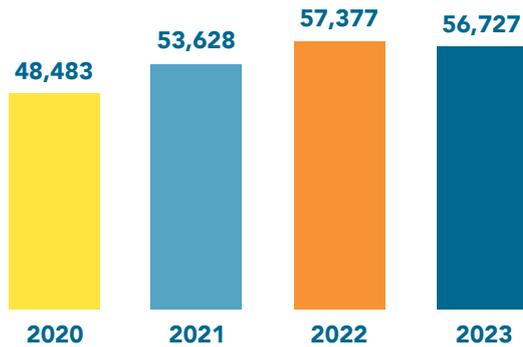
### Number of outpatient visits



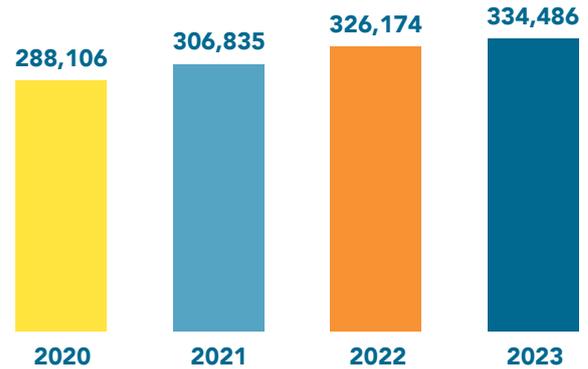
### Number of inpatient episodes



## Number of operations



## Number of patients

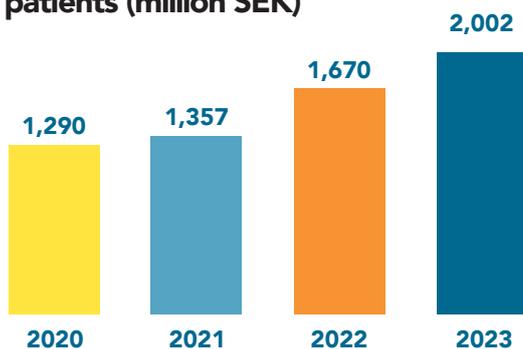


## Actions to meet financial challenges

2023 was a financially challenging year. Inflation and pension costs rose, increasing the hospital's expenses. At the same time, healthcare production was negatively impacted by the restrictive policy regarding the use of travel nurses implemented at the beginning of the year, which decreased the hospital's revenue. Karolinska acted swiftly to increase revenue and reduce costs. Efforts to improve planning and synchronization across the hospital were intensified, resulting in a series of concrete activities, such as improved discharge and admission planning and increased utilization of surgical capacity. This led to increased production and revenue. To reduce costs, in June, a layoff notice was issued for 450 administrative staff. This was preceded by a thorough analysis of the hospital's administrative functions and was carried out alongside the implementation of digital tools.

The measures taken in 2023 have been effective. Waiting times have decreased and the hospital's finances have stabilized. From July onwards, the hospital has followed the financial plan set for the year. Thus, Karolinska enters 2024 with manageable financial conditions.

## Income out-of-region and international patients (million SEK)



## Net income 2018–2023 (million SEK)



## Record number of organ transplants

In 2023, a total of 906 organ transplants were performed nationwide, of which 806 organs from deceased donors. Karolinska University Hospital conducted 257 transplants, including 226 organs from deceased donors and 31 from living donors. It was a record year for liver, kidney, and pancreas transplants. The increase is largely attributed to the rise in deceased organ donations following the introduction of donation after circulatory death (DCD) and the development of a strong culture and awareness of the importance of organ donation. Karolinska's Huddinge site performed 97 liver transplants, accounting for half of all liver transplants in Sweden. Karolinska also set a record with 147 kidney transplants and achieved its best results in pancreas transplants, with 11 conducted in 2023 compared to 6 in 2022.

## Gamma knife: Neurosurgical precision radiation in the brain

The Gamma Knife, a revolutionary neurosurgical tool, was developed in the 1950s and 60s by Professor Lars Leksell at the Neurosurgical Clinic at Karolinska University Hospital. Since its inception, it has gained global recognition and usage. Karolinska's Gamma Knife remains the only one in Sweden, making it a unique national resource. It is primarily used for treating brain tumors such as metastases, vestibular schwannomas, and meningiomas, as well as vascular malformations in both adults and children.

According to Amir Samadi, the Senior Consultant in the Neurosurgery department and patient flow coordinator for the Gamma Knife, "The procedure begins with attaching a stereotactic frame to the patient's skull under local anesthesia. The patient then undergoes a tailored combination of MRI, CT, or angiography. The treatment involves precise gamma radiation from the isotope Cobalt-60 targeting one or

several areas in the brain, usually in a single session. Patients can typically be discharged on the same day. This approach is less invasive to healthy brain tissue, even near sensitive structures like the optic nerve and brainstem, and avoids common complications associated with open surgery such as bleeding and infections."

Half of the patients treated are from outside the region or abroad. The number of treatments performed has been increasing in recent years, reaching its highest since 2017, with 472 procedures performed in 2023. This highlights the Gamma Knife's significant role in advancing neurosurgical care and offering a minimally invasive option for complex brain conditions.

■ PHOTO: JOSEFINE FRANKING



## The first hospital in the world with a new generation magnetic resonance camera in clinical operation

Karolinska University Hospital has inaugurated a new magnetic resonance camera in Huddinge. It is of a new generation and has a magnetic field of seven Tesla, the strongest ever used in routine healthcare. It also employs artificial intelligence, so-called deep learning, which provides faster examination times as well as higher resolution and less noise in the images.

"With the new magnetic resonance camera, we can perform more precise MR examinations. Thanks to better image quality for the brain, we can provide the correct diagnosis at an earlier stage and optimize treatment," says Tobias Granberg, Consultant and Head of the Neuroradiology Department at Karolinska University Hospital.

The magnetic resonance camera will be particularly significant for patients with conditions such as epilepsy, multiple sclerosis (MS), amyotrophic lateral sclerosis (ALS), Parkinson's, and Alzheimer's disease.



## Karolinska advances in robotic surgery

The Karolinska University Hospital in Sweden is at the forefront of advancements in robotic surgery, showcasing significant benefits such as smaller surgical wounds, expedited recovery, and enhanced precision.

Professor Olof Akre, a leading figure in cancer surgery and Department Head at Karolinska, elaborates, “Robotic-assisted laparoscopic surgery, or simply robotic surgery, is an evolution of conventional laparoscopic techniques. The introduction of wristed surgical instruments and a robot-controlled camera significantly improves the operative field’s visibility, making the surgical process smoother and providing clearer visualization.”

Karolinska made a pioneering leap in 2002, becoming the first in the Nordic region to perform robotic-assisted surgery. Since then, it has continued to spearhead developments in this area, particularly in urology. The hospital is a pioneer in advanced bladder cancer surgery using robotic technology, having developed a method for urinary diversion that does not require opening the abdomen.

By 2023, Karolinska University Hospital emerged as the largest robotic surgery center in the Nordic region and one of the most significant in the European Union. It boasts the longest experience and the highest number of surgeries, with over 1,400 procedures conducted in 2023. The hospital leads the way in the Nordic region for robotic surgeries in esophageal, stomach, liver, and pancreatic cancers.

Robotic surgery at Karolinska is now utilized across various fields, including urological surgery, gynecological cancer, colorectal surgery, upper abdominal cancer

surgery, renal cancer surgery, and certain types of transplantation, otolaryngology, and pediatric surgery. Prostate cancer surgery represents the largest volume, with over 300 operations in 2023, where the precision of robotic technology is particularly crucial to balance effective treatment with functional preservation.

Ernesto Sparrelid, Senior Consultant and Head of Upper Abdominal Surgery, notes the advantages of robotic-assisted technology, “Lymph node removal and dissection around vessels are much more manageable with robotic-assisted technology compared to conventional laparoscopy.”

The sector is witnessing rapid development with multiple new market entrants and the emergence of innovative robotic systems. “A new type of robot that operates through a single-entry point instead of multiple has been introduced. With ‘cobra-neck’ instruments, it can angle within the body, allowing access for various procedures through natural openings like the mouth and anus. This innovation could simplify complex and high-risk surgeries, particularly for patients with extensive abdominal adhesions,” adds Akre.

Karolinska University Hospital’s continuous innovation highlights its dedication to advancing surgical methods and enhancing patient outcomes in the realm of robotic surgery.

# World-class medical outcomes

Karolinska University Hospital continues its proud tradition of advancing healthcare excellence, improving patient outcomes and continuously improving quality. This commitment has consistently led to world-class results achieved by Karolinska's staff year after year. The hospital has made significant contributions in various areas, particularly in enhancing survival rates for patients undergoing advanced procedures.

## High survival rates and few complications in Orthopedics, Emergency surgery and Multitrauma

Karolinska University Hospital consistently measures survival rates and complications as quality indicators using the international CRAB system. The results from 2022 place Karolinska at the top globally. The hospital's survival results for surgeries in orthopedics, multitrauma, and emergency surgery improved significantly, from a ratio of 0.42 in 2021 to 0.26 in 2022. The expected outcome is 1.0, where the survival ratio is calculated by dividing the number of actual deaths by the number of expected deaths. Moreover, the number of complications associated with these types of surgeries is remarkably low compared to similar international hospitals, with a ratio actual/expected of 0.42.

Gunnar Sandersjö, Head of Karolinska's Trauma Center, attributes the success to two main factors. "Firstly, Karolinska generally maintains a high stand-

ard of care. Secondly, we have been using the CRAB system for many years, where we review our complications every month. Focus has been on identifying areas for improvement and how to achieve these improvements," he explains.

According to the CRAB annual report, 122 patients' lives were saved, and 345 healthcare injuries/ complications were avoided due to the high quality of surgeries performed at Karolinska. This achievement underscores Karolinska University Hospital's commitment to excellence in medical care and patient safety.



■ GUNNAR SANDERSJÖ. PHOTO: JOSEFINE FRANKING

### Surgical outcomes (Ortopaedic) 2022

| Hospital type                      | No. of procedures | Mortality O/E ratio | Complication O/E ratio |
|------------------------------------|-------------------|---------------------|------------------------|
| Karolinska University Hospital     | 2,786             | 0.27                | 0.45                   |
| Specialist UK                      | 3,623             | 0.20                | 1.59                   |
| District General Hospital (DGH) UK | 1,155             | 0.67                | 0.93                   |
| District General Hospital (DGH) UK | 3,525             | 0.58                | 1.07                   |
| University UK                      | 3,280             | 0.51                | 1.05                   |
| University Australia               | 3,653             | 1.01                | 0.73                   |
| University New Zealand             | 4,604             | 1.00                | 1.12                   |
| New Zealand DGH (5 years)          | 8,991             | 1.00                | 1.37                   |
| New Zealand DGH                    | 2,015             | 0.36                | 0.61                   |

The table presents survival and complication ratios for orthopedic surgery at Karolinska University Hospital, along with comparable hospitals in UK, Australia, and New Zealand. An expected result is 1.0. Results below this indicate fewer complications or deaths, and vice versa.

Source: CRAB Karolinska FY22 Annual Review Supplement, International Comparisons.

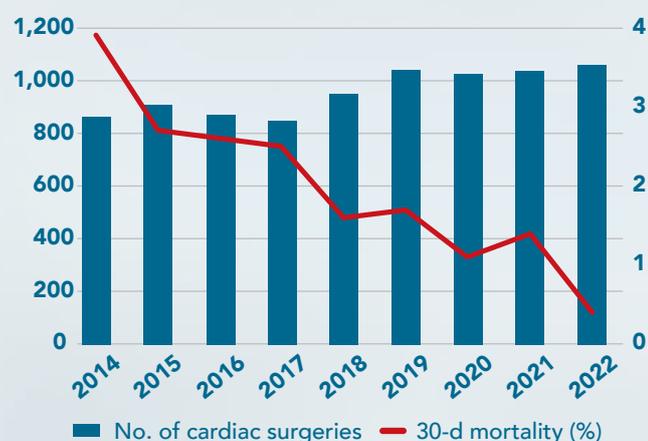
## Lowest ever cardiac surgery mortality at Karolinska University Hospital

Swedeheart's annual report shows top results once again for cardiac care at Karolinska University Hospital, where mortality within 30 days after a heart surgery is as low as 0.4 percent.

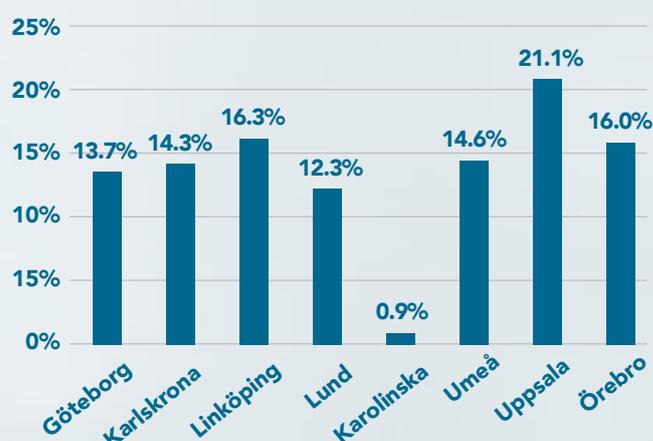
"We have the lowest mortality rate in heart surgery in Sweden and possibly internationally for the third consecutive year. This year, the differences are even greater. We perform the majority of the country's minimally invasive heart surgeries. Particularly noteworthy is our low mortality rate in high-risk operations," says Peter Svenarud, Head of Thoracic Surgery. He explains:

"Simply put, all patients who are to undergo heart surgery are risk-assessed according to a European model (Euroscore). This model predicts the risk of dying in connection with the surgery. In the highest risk class (>9% risk of dying), the differences between the various clinics are greatest – Karolinska has by far the lowest mortality rate."

### Cardiac surgery



### 30-day mortality EuroSCORE II >9%



## Success in Transcatheter Aortic Valve Implantation (TAVI) in elderly patients

Mortality rates for transcatheter aortic valve interventions (TAVI) have decreased from 7.5% to 0.2% (within 30 days after the procedure) since the procedure's introduction at Karolinska fifteen years ago. This is the lowest mortality rate ever recorded. Patients are typically given local anesthesia during the procedure, and the majority can go home within one to two days, compared to previously needing a week-long hospital stay.

"We have been working hard on this and feel very proud. Several factors play a role: the skill of the team, increased risk awareness, and focused improvement of our processes. The number of surgeons has not increased since the start, but we have improved. When a few surgeons perform more major surgeries, their expertise increases," says Nawzad Saleh, Senior Consultant at the Heart, Vascular, and Neuro Theme at Karolinska University Hospital.



# World-leading medical expertise

Karolinska aims to be the natural home for world-leading expertise, today and tomorrow. This places high demands on the hospital. Ensuring a good working environment for healthcare staff and making it attractive to work at Karolinska is one of our most important challenges in meeting future demographic changes. Therefore, we are creating stable conditions for our vital professional groups and trusting in them to lead the medical development towards top results.

## New nursing strategy launched

Karolinska University Hospital aims to lead the development of the nursing of the future. To strengthen the hospital in leadership, innovation, continuous improvement and professional development, Karolinska has launched its first nursing strategy.

“By focusing on leadership and the mandate in each employee’s daily work, and by maintaining high nursing competence close to patients, we contribute to sustainable working conditions and high-quality care,” says Yvonne Wengström, Head of Nursing at the Cancer Theme.

The nursing strategy, developed within the hospital’s strategic nursing forum, covers four different areas: leadership, professional development, innovation and improvements, and excellent nursing based on measurable results.

## Leading the future development of Nursing

Karolinska University Hospital - Strategy for Nursing



We advance and support nursing **leadership**



We drive **professional** development to create excellent care for the **future**



We co-create innovation to implement **improvements**



We provide **excellent** nursing care based on measurable results



## University Hospital Senior Consultant – a new role at Karolinska

Karolinska University Hospital has established a new role for selected outstanding clinical doctors working across the entire university hospital mission – care, research, and education – as University Hospital Senior Consultants. A special focus of this role is to secure conditions within the hospital for continuing education beyond specialist qualifications – lifelong learning. In 2023, the first fifteen University Hospital Senior Consultants were appointed at Karolinska.

# Karolinska's new intensive care helicopter

Last year, a temporary intensive care helicopter was used while waiting for the ordered one. In September 2023, the new helicopter in Karolinska's characteristic blue was finally in operation and is utilized by Karolinska's intensive care team to save lives throughout the Nordics.

The helicopter is equipped with a de-icing system that makes it possible to fly under icing conditions when other helicopters normally must stay grounded.

"We can pick up patients who need Karolinska's highly specialized care from hospitals across the country.

It essentially functions as a flying intensive care unit," says Lars Falk, Head of Intensive Care and Transport at Karolinska University Hospital.

The cabin is specially equipped, and the equipment is tailored to the helicopter type and to, for instance, carry out advanced intensive care, neonatal and ECMO transports.

"Doctors and nurses provide the same highly specialized care at Karolinska as they do during transport. This means that the newborn child is accompanied by an experienced neonatologist, and the severely ill trauma patient with an intensive care team from trauma care".

■ PHOTO: FREDRIK LARSSON





## Research & Innovation

Karolinska University Hospital provides university healthcare, meaning that care, research, and education are a threefold core mission. Together with the Karolinska Institute and the Life Science industry, the hospital collaborates to improve care and treatment for our patients in Stockholm and around the world. Innovation is a prerequisite for fulfilling Karolinska's vision to cure and relieve tomorrow what no one can cure and relieve today. Karolinska works with innovation in various ways to develop new treatment methods, work

methods, processes, and technology. The goal is to create the best possible care based on the needs of the patients.

During 2023, central innovation support to our different patient flows has been developed to further strengthen the conditions for driving development through overarching thematic and targeted initiatives. Strategic areas have been AI, highly specialized hospital care at home, and industry collaboration based on the needs of healthcare.

*During 2023, Karolinska's innovation courses attracted 411 participants from the hospital, the region, and Europe. The courses have also been digitized to the benefit of employees and managers throughout Region Stockholm.*

**2,494** active researchers

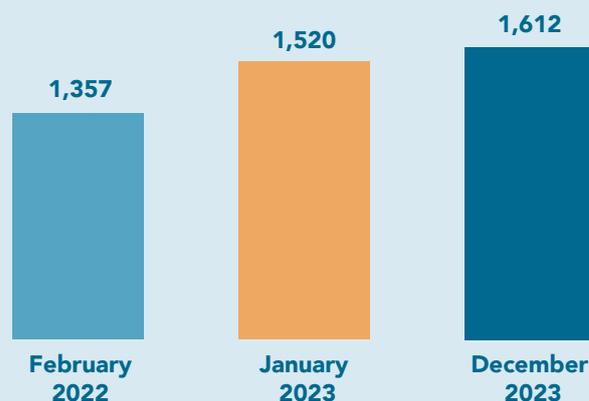
**632** principal investigators

**1.8** citation rate

**2.32** billion SEK in external research grants in collaboration with KI

**1,612** ongoing/planned clinical studies (as of December 2023)

### Planned and ongoing studies



### Karolinska Experimental Research and Imaging Center now in BioClinicum

After several years of preparation, the Karolinska Experimental Research and Imaging Center (KERIC) is now established in BioClinicum – a crucial part of the Center for Imaging Research (CIR). KERIC is one of the hospital’s core facilities offering researchers and businesses state-of-the-art services and equipment in imaging and experimental surgery.

“Having KERIC located in BioClinicum is strategic as several other core facilities are nearby. It provides researchers with a wide range of services and support while facilitating collaborations and the implementation of large projects within, among other areas, translational research, which increases the benefit to patients,” says Patrik Jarvoll, Unit Manager at KERIC.

### Karolinska has developed an application for clinical researchers

Preparations for a clinical trial are often a time-consuming task, especially for the inexperienced. Regulations and administration can vary for different types of studies, while certain factors are universal. Therefore, a team at Karolinska University Hospital and Karolinska Institute has gathered all the necessary information in a digital app that displays what is required for a specific study.

“In the app, you select the type of study you’re planning, and after a few clicks, you get an overview of the documents and permissions your particular study might need,” explains Elham Hedayati, coordinator of clinical studies and senior consultant at medical unit Breast, Endocrine Tumors, and Sarcoma.



■ ELHAM HEDAYATI. PHOTO: SANNE JONSSON

## Menopause treatments compared in five-year study

Bioidentical progesterone has become a popular alternative among Swedish women as part of the treatment for menopausal symptoms. But is it really more efficient than current hormone treatments? And is it safe from a cancer perspective? A new study at Karolinska University Hospital aims to find out exactly this.

“No similar study has been done before. The knowledge is much sought after not just in Sweden but all over the world. Our results will be significant for all women who need hormone treatment for their menopausal symptoms and, of course, for all doctors who prescribe this type of medication,” says Angelica Lindén Hirschberg, Professor of Gynecology and medically responsible at the highly specialized Gynecological Endocrinology clinic at Karolinska University Hospital.

The study is led from Karolinska University Hospital, but it is possible for patients in other Swedish regions to participate. The study will be completed in five years and includes just over 400 participants.

■ ANGELICA LINDÉN HIRSCHBERG.  
PHOTO: ANNA MOLANDER



## First to test medication from poisonous mushrooms against kidney cancer

In a new clinical study at Karolinska University Hospital, the first patient has been treated with a drug whose active ingredient comes from one of Sweden's most poisonous mushrooms, the death cap. Its poison causes serious damage to the kidneys.

The purpose of the study is to clinically test if this can become a treatment method for patients with metastatic kidney cancer. Kidney cancer is often detected late and sometimes by chance, often it has already spread, and surgery alone is not always sufficient.

“Just as the toxin in the mushroom is actively transported into healthy kidney cells, it seems to be actively transported into kidney cancer



■ PHOTO: ROLF HÖJER / SCANPIX

cells and also the cells of kidney cancer metastases. The fascinating thing is that the toxin (orellanine) appears to be completely harmless to the body's other organs and tissues and does not cause any side effects. This property opens the possibility for kidney cancer patients, who are already dependent on dialysis due to a lack of their own kidney function, to be treated for their cancer,” says Senior Consultant Jeffrey Yachnin, medically responsible at the Center for Clinical Cancer Studies at Karolinska.

The medication is developed in Sweden and is now being tested for the first time on patients in a clinical study at Karolinska, involving approximately 40 patients.

## Aiming to enhance cancer survivors' chances of parenthood

In 2013, the first Swedish baby was born with the help of ovarian tissue retransplantation, and Senior Consultant Kenny Rodriguez-Wallberg and her team made the front page of the news. Since then, a few more children have been born using this technique.

Saying every baby is a little miracle is no exaggeration in this case, as retransplantation is difficult. No surgeon who has performed such a procedure has managed to get the entire tissue to survive. Therefore, in the spring of 2023, she started a new research project to make the method more effective.

### LEARN MORE!

Watch a video where Kenny Rodriguez-Wallberg talks about her research. Scan the QR code to access the film.



"I need to research more and improve our methods if I'm going to guarantee my patients that their frozen tissue will function optimally. When we retransplant today, we see that most of the eggs disappear. They don't survive the transplantation," says Kenny Rodriguez-Wallberg, Professor and Senior Consultant at the Karolinska University Hospital's section for Reproductive Medicine.



■ KENNY RODRIGUEZ-WALLBERG. PHOTO: JOAKIM LINDBERG

## Hackathon with international expert group for unsolved diagnoses

In June 2023, a unique 22-hour hackathon took place at Karolinska University Hospital, drawing nearly a hundred international experts from 27 different countries. Their mission was to unravel the mysteries surrounding 14 patients, all lacking a diagnosis. This unprecedented event involved clinical teams, researchers, molecular biologists, and data developers working collaboratively to analyze extensive data and interact with several of the patients, many of whom were children.

Anna Lindstrand, Head of Clinical Genetics and Genomics at Karolinska University Hospital and an adjunct professor at Karolinska Institutet, played a key role in this initiative. "We conduct examinations, engage in discussions with each other and with the parents to gain deeper insights. Our Department of Clinical Genetics and Genomics has supported this initiative throughout the spring. We have managed and sequenced the samples in collaboration with SciLifeLab in Stockholm and Uppsala, ensuring they undergo the best possible analyses," she said.

Of the ten patients the experts managed to review, four were diagnosed, and potential diagnoses were identified for several others. The experts are now

collaborating to resolve these potential diagnoses, marking a significant step forward in addressing complex medical mysteries. This hackathon at Karolinska University Hospital showcases the power of international collaboration and advanced medical science in solving elusive health challenges.



■ HERE ARE PARTICIPANTS FROM SPAIN, INDIA, SWEDEN AND PAKISTAN. PHOTO: FREDRIK PERSSON

# With CAR-T against cancer – the beginning of a fantastic journey

Is it possible to modify the body's own immune cells so that they can attack aggressive cancer cells themselves? With CAR-T treatment at the Medical Unit for Cell Therapy and Allogeneic Stem Cell Transplantation (CAST), this is precisely what is being done, and with promising results.

“CAR-T treatment is a new type of therapy that hasn't existed before. What we do is take immune cells, usually from the patient themselves, and make a genetic change in them. We combine them with an antibody that can detect molecules on the surface of the cancer cells. When we then reintroduce them into the patient's body, they will seek out and attack the cancer. The immune cells then increase in number as they detect cancer cells,” says Stephan Mielke, Head of Department and Professor, and continues:

“This results in a proliferation of cells in the body, which also leads to severe side effects. It can be a very tough

treatment that often requires patients to receive intensive care during the acute phase, due to the drug's effectiveness.”

Karolinska's first CAR-T treatment was conducted in 2019 in a clinical trial, and to date, about fifty cancer patients have undergone the treatment at CAST. In March 2023, the first patient with mantle cell lymphoma was treated, and in November 2023, the first patient in the Nordics received CAR-T cell treatment for a solid tumor at CAST.

The outcomes of the treatment usually become apparent quickly. At follow-up visits four weeks after discharge, the cancer has often disappeared or significantly reduced. Mielke emphasizes that CAR-T treatment is still a new method and that today there is very little known about how patients will respond in the future.

■ ANNA SOMELL AND STEPHAN MIELKE. PHOTO: JOAKIM LINDBERG



## ATMP-center established at Karolinska

Cell and gene therapy has the potential to treat and cure diseases in ways that were not possible with traditional drugs and treatments. These types of treatments are often regulated under the designation 'Advanced Therapy Medicinal Products' (ATMP). The Karolinska Institute and Karolinska University Hospital are enhancing their focus on advanced cell, gene, and tissue therapies by establishing the Karolinska ATMP-center, with activities primarily in Huddinge but also in Solna. The Karolinska ATMP-center coordinates research and innovation, production, and clinical treatment.

"Even today, we see examples of how CAR-T cell therapy dramatically improves survival for patients affected by certain types of cancer. Advances in ATMP will change the way healthcare is conducted. We must accelerate the pace of introducing new treatments, to cure more people but also to ensure efficient use of society's resources, says Björn Zoëga, CEO of Karolinska University Hospital."

## Precision diagnostics play a crucial role in precision medicine

Precision medicine entails tailoring diagnosis, treatment, and follow-up according to the individual conditions of the patient. Thanks to rapid technological advancements, the possibilities to personalize both diagnosis and treatment have dramatically improved, signifying the beginning of a paradigm shift.

Diagnostics are becoming increasingly important as the analyses and findings are crucial for selecting or discarding treatments. New large-scale methods generate vast amounts of data, providing unprecedented precision in investigations. Developments in AI are vital for maximizing the benefits of the generated data, particularly in imaging diagnostics.

A prerequisite for shortening the time between research and implementation in everyday healthcare is seamless collaboration between academia, research, and healthcare. The ambition is to establish an innovation environment in BioClinicum where several diagnostic methods can interact with research and proximity to the healthcare environment. Work has begun in 2023 to integrate clinical genomics within Medical Diagnostics Karolinska's organization as a first step.

"Clinical whole-genome sequencing has had a tremendous impact, especially in the field of rare diseases where new groups of patients can receive a correct diagnosis and treatment in ways that were not previously possible. With the integration of clinical genomics into the hospital environment, an important step is taken towards creating the new interdisciplinary approaches that are a prerequisite for precision medicine, and to enable dissemination to more areas", says Anna Wedell, Director of Precision Medicine Center Karolinska.



■ ANNA WEDELL.  
PHOTO: STEFAN ZIMMERMAN

## Karolinska offers precision medical diagnostics for patients with prostate cancer

The clinical pathology and cancer diagnostics at Karolinska University Hospital are the first in Sweden to analyze mutations in cell-free DNA in patients with metastatic castration-resistant prostate cancer. The analysis means that more patients can access treatment for their prostate cancer.

Since May 2022, men with metastatic castration-resistant prostate cancer have been treatable with a drug that is a PARP inhibitor, but this requires that the cancer cells have a mutation in one of the genes BRCA1 or BRCA2.

The clinical pathology and cancer diagnostics at Karolinska University Hospital are the first in Sweden with a self-developed precision medicine analysis that can identify these mutations in the genes BRCA1 and BRCA2 through sequencing of circulating DNA from dying tumor cells. The new analysis is unique in that it provides a current snapshot of the mutations.

"The clinical implementation of this analysis within the framework of precision medicine means that more patients can gain access to suitable treatment for their disease. The test has been optimized to detect changes in very low levels of DNA, which has previously been a challenge for this patient group", says Mikael Björnstedt, Head of Clinical Pathology and Cancer Diagnostics.

These patients have advanced disease progression, often in later stages, and therefore a rapid and accurate analysis is of utmost importance.

"After the introduction, the response times were uncontrolled, so during the autumn of 2023, we worked on quality assuring the method and workflow to maintain adequate response times so that patients can get answers quickly. The method is under constant optimization and further development to enable shorter response times."

## Karolinska@Home

A concerted effort around hospital care at home was initiated in 2023. Several existing and new initiatives have been combined under a hospital-wide umbrella with the aim of radically increasing accessibility (without increasing resources). Some patients who would normally be hospitalized will instead be cared for in their own homes. This contributes to patients being more involved in their own care, the hospital freeing up beds, and therefore being able to treat more patients. As several healthcare providers are typically involved in a patient's care, the project's perspective is regional and includes other hospitals as well as primary care. The transition to providing more care at home is complex but necessary to ensure healthcare as the population pyramid changes and more elderly need to be cared for by a smaller working-age population.

## Karolinska monitors chronically ill patients at home in new digital initiative

A major initiative in digital home monitoring began in 2023. Karolinska University Hospital is coordinating several pilot projects in the region where about a hundred patients with conditions such as heart failure, atrial fibrillation, COPD, or heart valve infection are monitored digitally in their homes.

"We want to be able to detect small deteriorations early and implement measures that help keep the patients' condition stable. This reduces the risk of them worsening and needing hospitalization," says Frieder Braunschweig, Senior Consultant and initiator of the project.

Patients selected to participate in the digital pilot projects have been discharged from inpatient care, but have conditions that carry a risk of deterioration and the need for readmission. Home monitoring allows for close follow-up of these patients.

■ VICTORIA ON TOP OF SWEDEN'S HIGHEST MOUNTAIN ONE YEAR AFTER SURGERY. PHOTO: ISAC PRINTZ

### PATIENT STORY

## Victoria's battle against cancer

Victoria Thomasfolk has always led an active life. But in 2019, an X-ray revealed a large tumor in her right breast. She underwent surgery and the breast was removed, and she was treated with chemotherapy, radiation, and hormonal treatment.

By 2022, life had started to return to normal when Victoria's aunt passed away from stomach cancer. Her aunt, who had previously suffered from breast cancer, carried a hereditary genetic mutation. Upon discovering she carried the same gene, Victoria decided to have her entire stomach removed.

*"I've had the world's best cancer team"*

But here cancer journey didn't end there. Due to an increased risk of cancer in her left breast, she chose to have it removed as well as soon as she was deemed sufficiently recovered from the gastrectomy. Despite all the trials, she looks back on the past years with gratitude.

"I have had the world's best cancer team. Everyone has been clear, present, and consistently followed the plan we had. Not even during the pandemic, I had to wait for treatment. For me, it has been top-notch from start to finish. There is so much expertise in cancer care at Karolinska, and everyone has really contributed in different ways."

# AI at Karolinska

The rapid emergence of Artificial Intelligence, AI, represents both opportunities and challenges for healthcare. To ensure responsible use, Karolinska actively participates in development in collaboration with academia and industry. Here are five examples of how AI is used at Karolinska.

## 1 AI to detect lung cancer

Thoracic radiologist Vitali Grozman uses AI for the investigation of lung tumors. The idea is to increase the accuracy of diagnosis, optimize the use of the hospital's resources, and contribute to more equitable care. Lung cancer is the deadliest cancer globally, but it's treatable if detected early.

## 2 AI in radiation therapy for cancer

Oncology nurse Carina Holmberg evaluates AI support in radiation therapy along with physicians and physicists. The purpose is to define a patient's treatment area more quickly, whereas much of the tumor as possible is targeted while sparing surrounding organs.

## 3 AI for early signs of dementia

Speech therapist Fredrik Sand Aronsson investigates how speech and language can be analyzed with AI to assess cognitive decline, for instance, in dementia. An app for home training has been developed to see if home monitoring can help identify deterioration and the need for follow-up or other healthcare interventions.

## 4 AI to detect atrial fibrillation

Cardiologist Emma Svennberg is developing AI to identify individuals with atrial fibrillation, one of the main risk factors for stroke. During screening, a simpler ECG can be used, a technique available in many smartwatches.

## 5 AI for precision diagnostics in MS

Neuroradiologist Tobias Granberg uses AI for diagnosing multiple sclerosis, MS. Small changes over time can be difficult to detect with the naked eye, and there are about 20 treatments that suit different patients differently. AI support facilitates the choice of the right treatment at the right time.

## 6 AI to detect violence against children

Catharina Ahlsten and Helena Agenäs from the Child Protection Team at Karolinska University Hospital are creating avatars to train healthcare staff. These avatars are designed to improve the staff's skills in conversing with children, helping to identify those who may be suffering from violence and related health issues.

## Seminars and courses to increase knowledge about AI

- To contribute to increased knowledge about Artificial Intelligence (AI), Karolinska's employees were offered a basic AI course by the American top hospital Mayo Clinic. About 180 Karolinska employees participated.
- Just over 200 people from various parts of the world participated in Karolinska's seminar *Implementing AI in healthcare – learnings and reflections*, where healthcare, academia, and industry discussed concrete experiences of implementing AI in healthcare.



## Education

Education is a top priority at Karolinska University Hospital, which provided clinical training across 39 educational programs in 2023. Several initiatives were undertaken throughout the year, including advancements in medical pedagogy, supervisor training for clinical mentoring, preparations for the new 6-year medical school curriculum, and a project to scale clinical training. The hospital also focused on collaboration agreements for clinical training environments, particularly in simulation, and reviewed the use of educational funds for clinical training. Additionally, the conditions for training at the Clinical Training Center and the CPR Training Center were improved. Significant developments were made in the structure and framework of the intern training program.

**38,248** student weeks at the hospital in 2023.

**> 700** employees in Region received Good Clinical Practice certificates.

**47** additional research nurses got their degree at Karolinska during 2023.

### Nordic center for training and development in robot-assisted surgery

The Preclinical Laboratory in Huddinge is a research and educational facility for, among other things, surgical training, and support for preclinical and translational research studies. The facility has the capacity for six simultaneous operations and is equipped in the same way as the hospital's other operating rooms.

"These robots are used in surgery at Karolinska today, including for gastro-surgery and procedures in gynecology and urology. With a permanent training facility here at Karolinska, we are given time and opportunity to develop and further enhance our skills in the use of robot-assisted surgery," explains Moustapha Hassan, Head of Department.

### VR training for handling threatening and violent situations

At the Clinical Training Center, the hospital's emergency services are offered Virtual Reality training in handling situations involving threats and violence. At Karolinska, the training is relatively newly initiated and has initially been offered and conducted within the hospital's Emergency and Intensive Care Departments, as well as Pediatrics. The purpose of the initiative is to increase competence in conflict management and the management of patients and relatives with challenging behaviors, as well as to reduce the risk of threatening and violent situations.



## A hospital for all of Sweden

Karolinska's ambition is to be a hospital for all of Sweden, and throughout the year, Karolinska has received 20 235 patients from other regions. In the spring of 2023, Karolinska assisted Västmanland with many colonoscopies conducted over several Saturdays. When Gävleborg faced a shortage of oncologists before the summer, Karolinska took over several patients for oncological treatment.

Region Stockholm has renewed its cooperation agreement with Region Gotland, allowing Karolinska to continue providing highly specialized care and education to the region's residents. A partnership has been formed with Norrland's University Hospital in the field of neurophysiology, where Karolinska leads their specialist training and supervises resident physicians.

To reduce administration and further increase collaboration, a dialogue has been initiated with some of our partner regions, to simplify payments in outpatient care. In 2023, Region Jämtland Härjedalen became the first in Sweden to send electronic referrals to the Cancer Theme at Karolinska, with more expected to follow in 2024.

### LEARN MORE!

To find out more about Karolinska University Hospital, visit [karolinskahospital.com](https://karolinskahospital.com) or scan the QR-code.



## Intestinal rehabilitation for children, a new national assignment for Karolinska University Hospital

Intestinal failure in children is an area where medical development has progressed rapidly – from very high to low mortality. Intestinal failure refers to a condition where the intestine’s absorption capacity is so low that additional nutrients, fluids, and salts need to be supplemented through the blood. The intestine in these children may be too short or too diseased in other ways to absorb sufficient nutrients from the food for growth and physical development.

“Then we need to provide the child with nutrition and/or fluids through a permanent entry into the bloodstream, known as parenteral nutrition, PN,” says Henrik Arnell, Senior Consultant and Head of Pediatric Gastroenterology, Hepatology, and Nutrition at Astrid Lindgren’s Children’s Hospital.

The group of young patients, from newborns to 18 years, with chronic intestinal failure is relatively small (about 80 children in Sweden), but they often have very long-term and significant healthcare and care needs.

“3–4 patients per 100,000 children and adolescents are treated for chronic intestinal failure. They receive parenteral nutrition at home, and with the right treatment,

most of them can eventually be weaned off it in the long term. But a few of them are so severely ill and suffer from such complications that they may need to undergo extensive transplantation of the abdominal organs.”

Just two decades ago, intestinal failure in children was associated with high mortality – that is no longer the case.

“Modern care includes well-coordinated multidisciplinary teamwork with the child and guardians at the center. It’s about teaching the parents to take care of their children through a good team of nurses, dietitians, social workers, psychologists, and doctors, who support them on this journey”, says Henrik Arnell.

The most common cause of chronic intestinal failure in children is short bowel syndrome, and the prognosis is particularly good nowadays.

“Most are free from their parenteral nutrition already during the first or second year of life. Then there are children with chronic intestinal failure who need continued PN treatment, but they usually avoid the previously feared complications.”

### PATIENT STORY

## “I’ve really received a lot of support and help”

Sirra Gustafsson has the rare disease systemic sclerosis. Thickened skin, sore fingers, and impaired breathing are some of the symptoms.

“It’s a tough diagnosis, but it helps to focus on one day at a time,” she says.

The symptoms crept in during the spring of 2014. Sirra experienced body pain at night and had difficulty sleeping. Tests at the healthcare center showed nothing abnormal. Finally, a doctor referred her to a rheumatologist. A week later, she was diagnosed with systemic sclerosis.”

It’s a rare autoimmune disease where the immune system attacks the body’s own tissues and organs. Sirra Gustafsson’s skin is thick and tight, and blood flow to her fingers is poor, causing swelling and sore fingertips. She also has pigmentation changes on her face and body. By her side is her daughter Aminata, who paused her studies in the US to support her mother.

Sirra is on blood-thinning medicine, painkillers to slow the disease and provide pain relief, as well as pills to counteract side effects. To name a few of the drugs.



■ SIRRA GUSTAFSSON AND AMINATA CAMARA.  
PHOTO: JOAKIM LINDBERG

She has been referred to Karolinska University Hospital within the framework of national highly specialized care regarding stem cell transplants for systemic sclerosis. This includes patients with a prognosis that is considered severe due to internal organ involvement and/or rapid and widespread skin progression.

A stem cell transplant is mainly relevant at the beginning of the disease’s progression and can cause severe and serious side effects. Other treatment options include changing or adding other medication that suppresses the immune system.

“I feel grateful. I’ve really received a lot of support and help along the way.”



■ PHOTO: DANISH SAROEE



## Karolinska – a global provider

As the university hospital of the Stockholm Region, Karolinska University Hospital plays a vital global role in creating international collaboration opportunities within highly specialized healthcare. Karolinska aims to assist patients from other parts of the world with care that their home countries cannot offer, and efforts are underway to establish clear and straightforward routines and processes for receiving an increasing number of international patients.

As a member of the EUHA alliance and ERN networks, Karolinska engages in extensive dialogue, exchanges, and collaborations with other healthcare actors in Europe. Finding new ways of working for nursing staff is an important part in meeting the challenges of future healthcare. Karolinska has a cooperation agreement with Tampere University Hospital in Finland, with whom we have had such an exchange regarding nursing.

Knowledge exchange occurs with many international hospitals and organizations – in addition to all the international research and innovation collaborations driven by the hospital's various departments. For instance, a

Memorandum of Understanding has been signed with Pertamina Bina Medika Hospital in Jakarta, aiming to develop cancer care in Indonesia through expertise exchange. In 2023, Karolinska and the German university hospital Charité entered into a cooperation agreement. The collaboration is strategic and includes digitalization and clinical studies, and another ongoing cooperation is with two hospitals in Ukraine.

Karolinska has welcomed 30 major international visits during the year. The purpose of these visits varies, but all are driven by curiosity to understand how one of the world's top ten hospitals has evolved in recent years. Questions about how Karolinska managed challenges such as the pandemic and increased demand for healthcare have been on the agenda, as well as questions about leadership, organization, and digitalization of decision support.

### **Karolinska's departments that receive a significant number of patients from other countries include:**

- ITC – Intensive Care Transport
- Heart, Vascular, Neuro – Ablations
- Cardiac Surgery – Pacemakers
- Stem Cell Transplantations
- Fetal Medicine
- Trauma Center
- Pediatric Oncology
- Women's Healthcare – Birth Injuries, PGT
- ECMO
- Neurosurgery – DBS, Gamma Knife

## Some of Karolinska University Hospital's Partners



## Karolinska part of Harvard Business School's curriculum

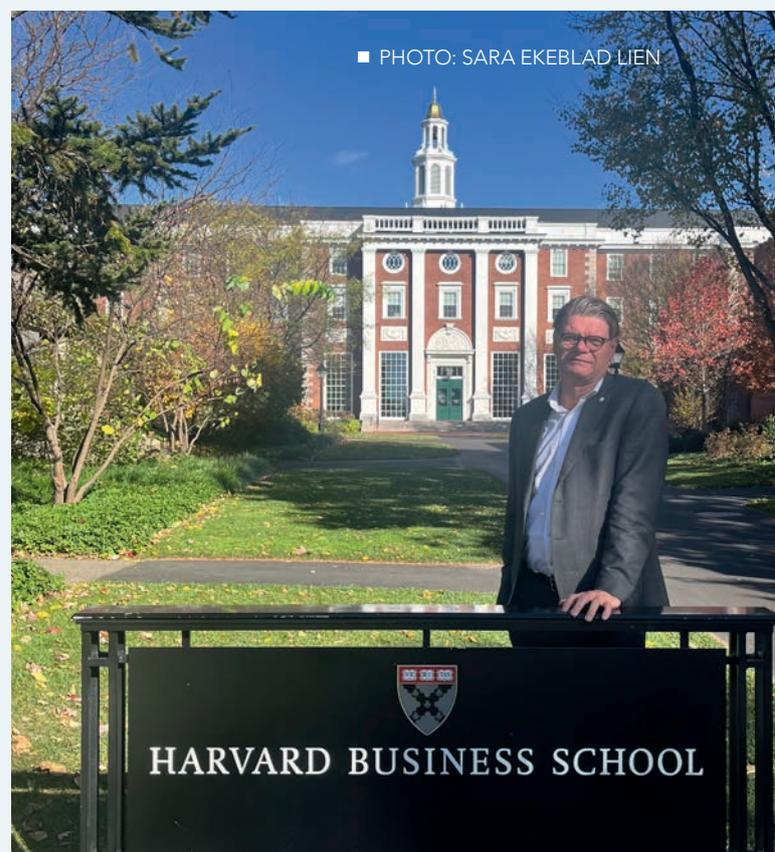
Harvard Business School in Boston has conducted a case study on Karolinska University Hospital, which will be used in teaching students and executives.

The case study encompasses the hospital's operations in both Huddinge and Solna. It originates from the 2008 decision to build a new hospital in Solna and to implement a thematic organization. This thematic organization means that operations are organized based on the patient's journey in healthcare rather than clinic structure. The case study describes the operational issues that existed, as well as the criticism from both staff and media regarding the new organization and the new hospital building in Solna.

"An important aspect of the HBS case is the analysis of how we since 2019 have used our strategy to implement rapid change. The strategy has to be simple enough that everyone can relate to it but also specific enough that it actually has relevance", says Björn Zoëga, CEO at Karolinska.

"The healthcare sector is undergoing a pervasive transformation and development. The transformation at the Karolinska University Hospital is particularly remarkable because it has involved the entire hospital, which engendered significant challenges. By overcoming these challenges, the hospital was able to achieve greater production levels, and thus greater access, while delivering the same or better quality of care. The Karolinska's experience with this trans-

formation offers many lessons on how to implement organizational change. Our students will benefit from sharing in these learnings", says Susanna Gallani, the Tai Family Associate Professor of Business Administration at Harvard Business School.



## Helping Latvia initiate liver transplantation programs

During two weeks in October 2023, a multidisciplinary team of specialists from a university hospital in Riga visited Karolinska's liver transplantation team. The aim was to gather valuable insights and experiences for the relaunch of their own liver transplantation program in 2024.



“Liver transplantation is a multidisciplinary procedure that requires a large team from several departments, making cross-sectional collaboration important for us. That’s something we aimed to emphasize and highlight during these two weeks,” says Carl Jorns, transplant surgeon and responsible for liver transplants at Karolinska in Huddinge.

The training began with an online course and supplementary workshops in Riga before they arrived at Karolinska. In addition to a transplant surgeon, two anesthesiologists were also sent from Riga.

“Anesthesia during a liver transplant is one of the most complex anesthesia we perform, so there’s a lot to learn. The most valuable training experience we can offer them is to participate and learn during an actual transplant,” says Gabriel Dumitrescu, responsible for anesthesia for transplants.

■ CARL JORNS AND GABRIEL DUMITRESCU.  
PHOTO: FREDRIC MÖLLER EKLUND

## Strengthening collaboration with Charité

Karolinska University Hospital, Karolinska Institute, and the Charité University Hospital in Berlin have signed a Memorandum of Understanding (MoU) with the aim of strengthening collaboration in healthcare, research, and education.

Karolinska University Hospital already has a close partnership with Charité, which is one of Europe’s leading hospitals, within the framework of the European University Hospitals Alliance (EUHA). With the MoU signed in Berlin on October 17, this collaboration will be further deepened. Among the areas where the two university hospitals are collaborating are nursing, precision medicine, and the organization of future healthcare, such as home care.

“Karolinska University Hospital and Charité have a long tradition of collaboration. Now, we are deepening our collaboration with Karolinska Institute as well. For me, it’s important that this collaboration now leads to real progress,” says Heyo Kroemer, Director of Charité – Universitätsmedizin Berlin.

“The collaboration within EUHA has made it possible to influence the healthcare system throughout Europe and thereby improve care for patients and drive the change that the healthcare sector must undergo. Now, we are creating the conditions to continue this work at an increased pace,” says Björn Zoëga, CEO at Karolinska University Hospital.



■ JOACHIM SPRANGER, DEAN CHARITÉ – UNIVERSITÄTSMEDIZIN BERLIN, ANNIKA ÖSTMAN WERNERSON, PRESIDENT KAROLINSKA INSTITUTET, HEYO KROEMER, CEO CHARITÉ – UNIVERSITÄTSMEDIZIN BERLIN AND BJÖRN ZOËGA, CEO KAROLINSKA UNIVERSITY HOSPITAL.  
PHOTO: KAROLINSKA



## Medical Educational Conference – MedEd on the edge

In October 2023, Karolinska University Hospital, together with Karolinska Institute, hosted an innovative medical educational conference, Med Ed on the Edge. The conference featured internationally renowned

participants from several continents in an interactive and dynamic interface, aiming to create a broad innovative dialogue within medical education at both undergraduate and specialist levels.

## Karolinska University Hospital takes over presidency of EUHA

The European University Hospital Alliance (EUHA), consisting of ten leading university hospitals in Europe, focuses on high-quality healthcare through research and education, better health outcomes, and sustainable European healthcare systems. The presidency alternates, and in November 2023, Karolinska took over from Charité - Universitätsmedizin in Berlin.

“I want to thank Charité for an excellent presidency, particularly in terms of strengthening cooperation between EUHA and the EU. We, the ten leading university hospitals, should become even more distinct as the union’s partner in driving improved health and

stronger healthcare for all residents within the EU,” said Björn Zoëga, CEO at Karolinska University Hospital and Chairman of EUHA.

The work within EUHA is conducted through various networks and working groups. Covered areas include gene and cell therapy in cancer, nursing, digital health, and research. During its presidency, Karolinska will place extra emphasis on competence supply and efficiency.

## European University Hospital Alliance (EUHA)

University hospitals in Europe hold a special place in healthcare systems with responsibilities in care, research, and education, and therefore face common challenges. The European alliance EUHA, which includes Karolinska, encompasses a total of 220,000 healthcare employees. The aim is to improve the quality of care by sharing experiences and processes and creating a common platform to influence decision-makers, industry, and other stakeholders.





■ PHOTOS: NNEKA MAGNUSSON A&U

## Cooperation agreement signed with two hospitals in Ukraine

Karolinska University Hospital is the Swedish hospital that has received the most sick and injured patients from Ukraine, totaling 70 individuals. The assistance so far has included patients with war injuries, patients with cancer, and children. The first two patients arrived at Karolinska in Huddinge on March 29, 2022, just over a month after Ukraine was attacked by Russia.

“The needs of the Ukrainian patients must guide us, and their needs may change over time. The agreements provide frameworks for building closer relationships between the hospitals, allowing us to learn from each other and improve healthcare in both Ukraine and Sweden. A closer collaboration also means that our Ukrainian sister hospitals gain access to Karolinska’s network in Europe and the rest of the world,” says Björn Zoëga, CEO at Karolinska University Hospital.

To enhance exchange and support healthcare in Ukraine, Karolinska University Hospital has signed Memorandums of Understanding with Kryvyi Rih City Clinical Hospital in Kryvyi and Ohmatdyt National Specialized Children’s Hospital in Kyiv.

In the two agreements signed on December 1, 2023, trauma care, otolaryngology (ear, nose, and throat care), and pediatric care are identified as areas for deepened collaboration. Special focus will be placed on governance and management, nursing, implementation of new technology and European standards, joint research projects, internship opportunities, and cooperation between trauma centers. The agreements are broadly formulated to allow adjustments.

Kryvyi Rih City Clinical Hospital in the city of Kryvyi Rih in central Ukraine has 860 beds. The hospital offers emergency care, routine care, and highly specialized care in 34 medical specialties. Ohmatdyt National Specialized Children’s Hospital in Kyiv is Ukraine’s leading and largest children’s hospital. With approximately 720 beds, the hospital annually treats 20,000 patients and performs around 10,000 surgeries.

### Nurses from Karolinska to improve intensive care in Europe

The shortage of specialist nurses is a challenge in both Sweden and Europe, particularly in intensive care. Therefore, nurses from Karolinska University Hospital are participating in a three-year European collaboration, EUCARE, along with other hospitals in the EUHA. The project aims to increase participants’ knowledge in crisis and disaster preparedness and strengthen the exchange of experiences between intensive care units. The project commenced on December 12, 2023, in conjunction with the EUHA nurses’ network conference at Karolinska.

### A platform for health data is being developed

There is an ongoing collaboration within Europe, involving all member states, to establish ways to share health data, including both primary and secondary data, as part of the European Health Data Space (EHDS). The e-Health Authority is spearheading this initiative from Sweden, with Karolinska University Hospital actively participating. Karolinska’s involvement is pivotal in influencing the development and future regulations of EHDS. Moreover, the hospital is contributing its expertise in the field, playing a significant role in shaping this pan-European health data platform.

# Wellness Center takes a comprehensive approach to staff wellbeing

Karolinska makes proactive and systematic efforts to promote employees' health and reduce work-related ill health. The vision is for Karolinska to be a workplace where staff thrives, develops, and wants to remain. In the long term, the hospital aims to become one of the world's healthiest workplaces within healthcare.

“Our staff is the hospital's most important resource, and by prioritizing their health and work environment, we strengthen well-being while also benefiting our patients,” says Magnus Flodberg, Manager of the Wellness Center.

At the Wellness Center, work environment specialists, rehabilitation specialists, ergonomists, and health educators work together to promote a proactive systematic work environment effort. The Wellness Center particularly focuses on the organizational and social work environment as well as promoting mental health among all Karolinska employees.

The Health Inspirator Network includes about 300 employees this year, an important role that acts locally within the different units along with responsible managers. The year has also resulted in the training of 134 ergo coaches to strengthen ergonomic work at the hospital. All collaboration groups under the Wellness Center's auspices have also conducted training within the framework of collaboration together with the main safety representatives.

In 2024, further efforts will be made for health-promoting work with a focus on stress resilience and recovery.

To tailor the efforts, ongoing monitoring of sick leave and other health-related data, as well as results from the mapping of the organizational and social work environment, are carried out together with operations and safety representatives.

“The Wellness Center both drives and supports initiatives, largely based on the follow-up of data. Many times, it's the local units that carry out an action, where we assist with planning and choice of intervention. Other times we run activities that are broader and more powerful. The basic training in stress is an example – it has been developed for all 16,000 employees and is available online, and soon there will also be a digital basic training about health,” says Magnus Flodberg.

Data from 2023 shows that long-term sick leave (over 15 days of absence) at Karolinska has decreased compared to 2019, before the pandemic. However, short-term absence, up to 14 days, has increased during the same period. Therefore, more measures will be implemented around short-term sick leave, both through training and other interventions, and here all Wellness Center teams participate in the strategic work.

“By working systematically for the organization and at the group and individual level, we can continually direct efforts to capture trends and promote what contributes to health. With all the efforts, we will have 16,000 people at Karolinska who have knowledge of how to work healthily. That's significant,” says Magnus Flodberg.



■ ERGO COACHES IN TRAINING. PHOTO: NNEKA MAGNUSSON AMU



## Better processes improve care delivery

Karolinska University Hospital is continually focusing on collaboration and finding improvements, allowing for better utilization of resources to ensure timely patient care. Numerous examples of improved methods, collaborations, and efficiencies across the hospital illustrate this commitment.

“The economic challenges we face make it even more crucial to keep improving and re-evaluating our practices. The patient’s needs remain constant, regardless

of economic downturns. There are so many great ideas for improvements within our operations, and we support these to ensure implementation. This is vital not just for our patients, but for all of us working here,” states Caroline Hällsjö Sander, Senior Consultant and Production Director at Karolinska University Hospital.

### “We manage four thyroid surgeries instead of three”

Karolinska University Hospital is the sole performer of endocrine surgery in the Stockholm Region. The activity performs about 1,500 endocrine surgeries annually, and most of these are thyroid surgeries.

“Normally, comparable hospitals that perform endocrine surgeries manage two to three standard operations per day and operating room. But with careful planning and collaboration, Karolinska now performs four standard operations per day and operating room,” says Fredrik Karlsson, Head of Endocrine-Sarcoma Surgery at Karolinska University Hospital. He adds:

“There’s always a certain amount of uncertainty in surgery and anesthesia times, but the experience since starting late last spring is that more than 90 percent of these operating rooms manage four patients.”

“Performing four cases in an operating room corresponds to a 33 percent increase in productivity, as the operating times are the same. Rebecka Lindvall, surgical nurse, and operation planner, explains how they have succeeded in this:

“Briefly summarized, we have focused on early surgery starts and ensuring that the surgeon is present when the patient is anesthetized, to ensure an efficient workflow,” she says, emphasizing that the right attitude among all staff is crucial. The whole operating team knows what needs to be done during the day and can manage and adapt accordingly.”

“This new way of working has meant that the queue\* for thyroid surgery will soon be gone. In that case, we will likely be the only hospital in Sweden without a queue for this type of surgery, and we will therefore also accept patients from other regions,” says Karlsson.

Recently, the unit was also awarded a National Highly Specialized Care commission, focusing on advanced adrenal tumors and neuroendocrine tumors.

\* ‘Queue’ refers to patients who have waited longer than the 90-day national waiting time guarantee.

## More hip and knee surgeries through closer preoperative collaboration

By mid-2023, Karolinska had nearly 500 patients who had been waiting for a knee or hip prosthesis for half a year, and something needed to be done. The solution was to try to manage three instead of two knee or hip prosthesis operations per operating room and day.

Asle Hesla, Senior Consultant and Head of Reconstructive orthopedics, highlights closer preoperative collaboration with PMI as an important key to success. Every week, they have preoperative meetings together and make a careful surgery plan for the coming week.

“At the surgery planning meeting that takes place the week before the surgery, staff from PMI sit together with the operators to plan the best use of competencies. We are completely dependent on PMI also being on board, we know they are short-staffed but despite this, they really make an effort.”



■ ASLE HESLA. PHOTO: JOSEFINE FRANKING

*In reconstructive orthopedics, several workflow improvements mean that three surgeries per operating room can be managed instead of two.*

## This is how reconstructive orthopedics have improved their working methods:

### ✓ Early morning start

Everyone involved makes an effort to ensure the patient is optimally prepared, has i.v.s set up in the department, and that the patient is in the operating room as early as possible in the morning.

### ✓ Extended operating time

Extended operating time in the elective operating room provides the opportunity to go over in one of three operating rooms. Since this eliminates the strict need to be finished exactly at 4:30pm, they can plan an extra patient who runs the risk of being more time-consuming.

### ✓ Reduced changeover times

PMI makes extra efforts to shorten the changeover times when everyone knows that they need to manage three surgeries that day.

### ✓ Increased competence on the first surgery of the day

During the planning meeting the week before, it is ensured that the first surgery in each operating room each day is performed by the most experienced team, to avoid early delays.

### ✓ No complicating circumstances on first patient of the day

The first surgery per operating room is expected to go quickly. Patients with circumstances that mean they need more time in the preoperative room are never planned as the first patient of the day.

### ✓ Same team and type of operation all day

Ideally, having the same team configuration in each operating room all day. According to Hesla, this allows improved teamwork and efficiency. Likewise, it's faster if the same type of operation is done in a room all day, for example, only three right knees a certain day, the next day three hip operations.

### ✓ The same anesthesiologist

During surgery planning, they also try to ensure that the same anesthesiologist who sits in on the planning meeting is in the operating room the week after. They are already familiar with the patient and therefore don't need to read up on the patient's medical history and can also more easily anticipate any potential problems that may arise before or during the surgery.

## **“We overbook the operating room with a standby patient”**

At Medical unit Pelvic cancer, Section for Gynecological Cancer Surgery, waiting times for cancer surgery became excessively long during the summer of 2023, and there was a need to act. The solution became planned overbookings.

“Since the summer, we’ve had close cooperation with the gynecological surgeons and the Head of the Gynecological Cancer Surgery section around the concept of overbookings. We schedule an extra surgery defined as a standby patient. Simply an overbooking of the operating rooms,” says Ann-Charlotte Lindström, Head of Abdominal Surgery, PMI Solna.

“We live in an uncertain world in the surgical department. Sometimes certain surgeries go faster than planned, and then you can slot standby patients into these unpredictable gaps. All involved, including the patients, are aware that this surgery will only be carried out if there’s enough time.”

The question of becoming a standby patient is posed by the surgeon, and almost all patients who have been offered this chance have accepted. Those who are not operated that day retain their place in the regular surgery queue – but almost all standby operations have actually been carried out.

“If we have the operating room until 4 pm, we can squeeze in three operations instead of two. If we have it until 7 pm, we can operate on four patients instead of three. It offers a significant gain. Ann-Charlotte Lindström emphasizes that collaboration is the key to success.”

“It’s thanks to the incredibly good cooperation between Function and Theme. That’s what we need to do going forward, the key is collaboration – otherwise, it won’t work.”

*Standby patients are an effective way to shorten the surgery queue. Additionally, both patients and staff are satisfied.*

## **Improved pediatric surgery workflow**

Pediatric surgery is a dynamic activity where many different specialties coexist on an operating floor and it includes both acute and elective patients. With a joint startup meeting and a surgeon in the operating room all day, Pediatric surgery managed to shorten waiting times for its young patients.

“The key for the team and the workflow is good communication, and here we’ve noticed a bit of miscommunication between the surgeon – the operator – and the rest of the team,” says otolaryngologist Malin Wendt, Chief of Surgery and responsible for coordination of all pediatric surgery patient flows.

She is part of the working group ‘Improved flow in pediatric surgery’ which looks at how to improve the workflow and strengthen teamwork in the room.

“The key is for everyone to attend the morning startup meeting and for the operator to spend as much of the day as possible in the operating room,” says Wendt.

The efforts have resulted in a clear trend towards shorter ‘waiting for the operator’ time, a term that Malin Wendt thinks is somewhat misleading as it makes it sound like the surgeons alone are responsible when it’s rather an indicator of how well the entire team in the room is interacting. In pediatric surgery, there is now a chart, ‘Kickoff,’ with clear checkpoints for the day.

“The idea is for the entire team – anesthesiologists, operators, nurses, assistant nurses – to meet in the room at 07:35. We introduce ourselves and share specific information about the day’s surgeries. This could involve equipment, how to position the patient, who will be responsible for calling down the patient during the day. Important information comes out right away,” says Marie Andersson, Operating Nurse.

‘Operator in the room’ is about trying to use a very precious resource in the best way possible, emphasizes anesthesiologist Pontus Wedell.

“Our goal is to have all categories in place for a larger part of the time so that we don’t have to look for each other. It can be a matter of minutes gained around each surgery. But when you add it all up, you suddenly have hours,” says Pontus Wedell.

“We see that when it works, it really makes a difference, both by being able to help more children and by creating a better work environment,” says Malin Wendt.



# Sustainability – for people, resources, and climate

Karolinska has long been actively working with environmental and sustainability issues. As early as 2005, the hospital was certified according to the environmental management standard ISO 14001. There are 500 environmental and sustainability informants appointed within the organization to support the hospital's operations locally.

The sustainability efforts are conducted within four main areas: social sustainability, sustainable work environment, environmental sustainability, and economic sustainability.

For the years 2023–2027, there is a governing program with sustainability goals for the hospital. The different units strive to reduce environmental and climate impact on an ongoing basis, and the hospital strives for continuous improvements.

## Nine examples of Karolinska's sustainability efforts



### INCREASED USE OF BIO-BASED MATERIAL

The use of bio-based aprons has increased from 18% in 2022 to 33% in 2023 and the use of bio-based needle containers increased from 1% in 2022 to 12% in 2023.



### REDUCTION OF CMR PRODUCTS

We have reduced the number of CMR products (carcinogenic, mutagenic or reproductive toxic products) by 18% since 2020; from 283 products to 233. We have also reduced employees' exposure to these.



### CIRCULAR APRONS REDUCE CO<sub>2</sub> EMISSIONS

Disposable plastic aprons are recycled and used to produce new ones. At Karolinska, 100,000 such 'circular aprons' have been used in 2023, generating 66% lower CO<sub>2</sub> emissions and thereby reducing CO<sub>2</sub> emissions by 15.3 tons.



### OWN ENERGY SUPPLY

Thanks to boreholes and its own energy center in Solna, the hospital has 52% lower CO<sub>2</sub> emissions than if the equivalent amount of energy had been purchased.



### EFFORTS AGAINST FOOD WASTE

Food waste has decreased from 21% in 2021 to 12% in 2023. The reduction is due to both good efforts from our staff and the supplier's employees as well as fixed menus.



### FEWER ENVIRONMENTALLY HARMFUL MEDICINES

The use of 4 out of 5 environmentally harmful medicines (diclofenac, escitalopram, citalopram, and felodipine) have significantly decreased since 2022.



### WORKING AGAINST ANTIBIOTIC RESISTANCE

Karolinska has its own STRAMA group (collaboration against antibiotic resistance), working to reduce the incidence of health-care-related infections and decrease antibiotic resistance.



### LIVE UPDATES OF SUSTAINABILITY WORK

During the year, we have visualized sustainability statistics to facilitate for the operations to follow up on their sustainability work. In total, this is displayed in nine dashboards, which have received nearly 2,400 hits.



### INSPIRING COLLEAGUES GLOBALLY

Interest is growing to visit Karolinska to learn about our sustainability work. During the year, visitors from Taiwan and Germany, among others, have visited to learn more about how we work with sustainability issues.



PHOTO: LIZA SIMONSSON

## Patient-reported outcome measures

Karolinska University Hospital systematically strives to increase patient participation in healthcare. Patient-reported outcome measures (PROMs) play a central role and are a way to utilize the patient's experience of results and function after treatment or surgery. These questionnaires are used in most departments and is available both in paper form and as digital questionnaires. The results

provide expanded knowledge about how treatments make a difference for the patient, how it changes over time, and in comparison, with other healthcare providers. This is used in the hospital's improvement efforts and contributes to raising the quality of care, treatment, and patient interaction.

### A selection of PROM results at Karolinska



Were symptom-free after tonsillectomy in 2023 (PROM six months afterwards)

Proportion of patients with DAS28 <2.6 One year after RA diagnosis (target >55%)

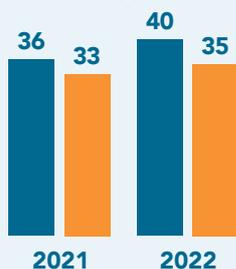


Karolinska Sweden



Were satisfied with pain relief at home 30 days after tonsillectomy (PROM 30 days afterwards)

Proportion with VAS pain <20 (Target >50%) one year after RA diagnosis



2021 2022

### PROM regarding health-related quality of life in patients with malignant brain tumor

| Question (EORTC QLQ BN20)                 | Share 4 (Very much) |
|---|---------------------|
| Uncertain about future                    | 37%                 |
| Outlook on future worsen                  | 22%                 |
| Daytime drowsiness                        | 21%                 |
| Setbacks in your condition                | 16%                 |
| Headache                                  | 13%                 |
| One-sided weakness                        | 12%                 |
| Trouble finding right words               | 12%                 |
| Hair loss                                 | 10%                 |
| Difficulty reading due to vision          | 9%                  |
| Concerned about disruption of family life | 7%                  |

## Urology: Provides guidelines for the patient's individual treatment plan

PROMs are also used in prostate cancer care. At the Urology Department, patients are encouraged to fill in validated questionnaires, both at the time of diagnosis and after treatment. The analyses are used to create a unique detailed treatment plan for each patient.

“There is a clear relationship between how aggressively the tumor and surrounding tissue are treated, and the degree of side effects. The severity of cancer and the risk of death must be weighed against risks such as permanent urinary incontinence,” says Per Henrik Vincent, Research Coordinator.

The contact nurses, who have a more concrete role in the follow-up of the patient-reported outcome measures (PROMs), review all patients planned for robot-assisted minimally invasive prostatectomy.

The questionnaire is followed by a video call to assess the need for treatment. The patient is also scheduled for a follow-up rehabilitation conversation about 2–3 months after the operation and has filled in the PROMs again.

### Number of PROMS per medical area

By December 2023, 230 standardized PROM tools were used at Karolinska as follows

|                           |    |
|---------------------------|----|
| Cardiology                | 7  |
| Cardiac Surgery           | 4  |
| Endocrinology             | 35 |
| Gastroenterology          | 10 |
| Neurology                 | 10 |
| Neurosurgery              | 10 |
| Obstetrics and Gynecology | 5  |
| Oncology                  | 25 |
| Orthopedics               | 10 |
| Pediatrics                | 25 |
| Pulmonary Medicine        | 15 |
| Urology                   | 9  |
| Other                     | 65 |

## What do our patients think?

The hospital has automated the dispatch of Patient Experience Measures (PREMs) following visits to clinics, day care, or inpatient care. Patients can easily access and respond to the survey via 1177 on their computers or mobile devices, providing feedback on aspects like interaction, information, and involvement.



■ THE HIV CLINIC IN HUDDINGE. PHOTO: KAROLINSKA

## HIV Clinic: Identifying patient-specific dissatisfaction

At the HIV Clinic in Huddinge, significant progress has been made with PROMs. Here, the health questionnaire is offered to all patients one to two times a year. The results are continuously evaluated, followed up with the patient during return visits, and have a direct impact on future care and treatment.

“By identifying individual-specific low results in areas such as participation in care/treatment, decreased physical/mental health, or side effects of medication, we can target our efforts at both the individual and group level to achieve better results,” says Jan Vesterbacka, clinically active physician, and medically responsible for HIV care. He adds:

“The long-term PROMs efforts with this patient group have contributed to high-quality care that holds up very well both from a national and international perspective.”

Free-text responses are a vital source for departmental improvement efforts. In 2023, the hospital received 108,831 responses (as of December 12), with 94% rating Karolinska as “good” or “very good.”



■ PHOTO: JOSEFINE FRANKING

## World-class care for children

Astrid Lindgren's Children's Hospital at Karolinska receives seriously ill children from all over the country, providing care for children with chronic diseases, congenital malformations, various acute conditions, and for premature babies. The hospital conducts specialized and highly specialized care and has a national healthcare assignment for certain advanced pediatric and adolescent sur-

geries. The hospital receives about 180,000 patient visits per year, including 55,000 emergency visits, and conduct extensive clinical research, development, and teaching with broad international collaboration. Care is provided at several of Karolinska University Hospital's sites, including Solna, Huddinge, and Danderyd Hospital.

### Play therapy at the Pedagogical Resource Center

The Pedagogical Resource Center offers activities in Huddinge and Solna, continuing to serve many patients throughout the year.

The open play therapy services, welcoming children and guardians for play and activities, recorded 12,065 visitors.

Over 250 loans of play and activity materials were made weekly to children in Karolinska's inpatient departments.

Play therapy also receives referrals for children with anxiety related to various treatment procedures. About 300 referrals were handled, and in most cases,

preparatory work enabled children to cope with their impending procedures. Astrid Lindgren's Children's Hospital thereby fulfilled the child's right to receive adapted and understandable information.

The PRC's children's library loaned out 3,316 books and audiobooks in 21 different languages, including 2,490 from the book cart.

Around 675 music therapy patient visits were conducted during the year.

## First in Sweden with a team for children with conditions in the airways and gastrointestinal tract

Children with complex and concurrent conditions in the airways and gastrointestinal tract are often seriously ill. For example, they may lack a part of the esophagus or have constrictions that make it difficult to breathe or impossible to ingest food orally. These children often undergo many demanding examinations and treatments. It can take a long time to receive a diagnosis, hospital stays can be lengthy, and patients and parents are shuffled between various clinics and departments.

*“Diagnosis after a week instead of five months”*

Karolinska University Hospital has brought together various departments, including Pediatric Surgery, Pediatric ENT, Pediatric Pulmonology, and Pediatric Gastroenterology, in a new approach to care for these patients. This cluster of expertise is now

officially the Karolinska Pediatric Aerodigestive Team (KPAT), the first of its kind in Sweden.

“Through our collaboration, we can better coordinate the patient’s journey through the healthcare system and reduce the number of examination and treatment occasions. We can perform multiple examinations under the same anesthesia and minimize the times the child needs to be sedated, which leads to a lower risk of complications,” say the initiators of the formalization of KPAT, Pediatric ENT Surgeon Malin Wendt and Pediatric Surgeon Jan Svensson.

With this new approach, the pediatric aerodigestive team can quickly establish the correct diagnosis and treatment possibilities. Data from international centers that have established Pediatric Aerodigestive Team show the possibility of reducing the time from investigation start to diagnosis from five months to just a week.

## New follow-up clinic for children inaugurated

In November 2023, the Pediatric Infection Clinic and the Pediatric Emergency Department’s new follow-up clinic moved into shared premises at Karolinska in Solna. The opening was celebrated with a ribbon-cutting by Malin Ryd Rinder, Senior Consultant, and Head of Pediatric emergency care.

“Of the emergency department’s patients, 8–10 percent of return within the next few days, some planned and others unplanned. We have long wanted to have a follow-up clinic to be able to have quick follow-ups of various acute conditions that don’t need the more highly

specialized care or inpatient care. This results in care at the right level and more efficient patientflows,” says Malin Ryd Rinder, and continues:

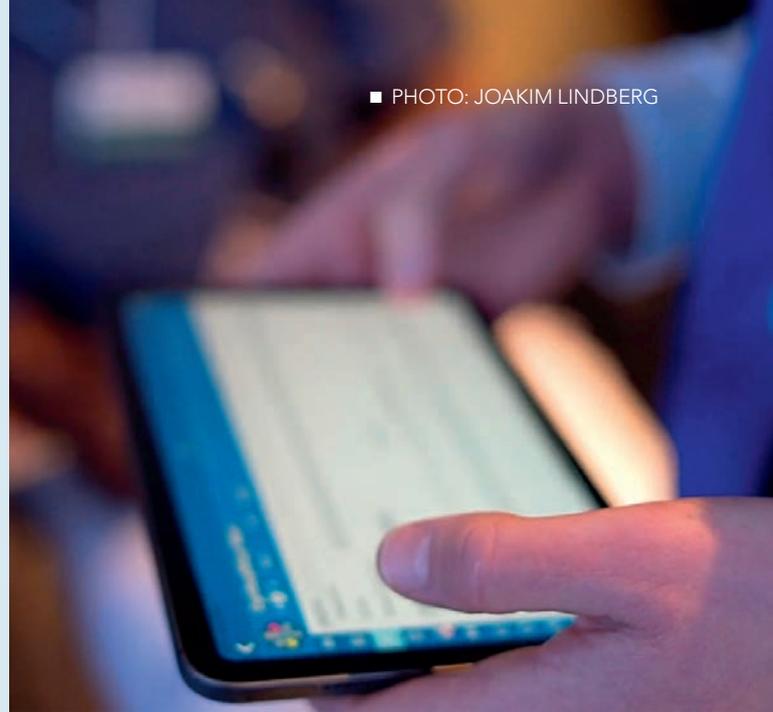
“Every day, we have the possibility for planned procedures under nitrous oxide, which means that the patient can come better prepared, and it avoids taking resources from the emergency patientflow. It is also a very appreciated opportunity for specialist training, where resident and specialist doctors can have parallel clinics and in calm conditions perform subacute procedures under supervision.”



## Karolinska first in the region with emergency app

The emergency app is an innovative solution for emergency departments – on a tablet. The tablet is slightly larger than a mobile phone but much smaller than a standard tablet and easily fits in the pocket of healthcare staff. By using the emergency app, staff can easily view the emergency log, get an overview of the emergency room's patient flow logistics, and access all important patient information.

One of the main advantages of the emergency app is that it eliminates the need to run to stationary computers to look up patient information, which can be stressful for the staff and cause anxiety for the patient. Instead, staff have access to all necessary information directly on the tablet.



*“It’s an innovative solution for emergency departments, designed to facilitate the work and reduce stress for both staff and patients,”*

says Derya Cömert Rostami, Project Manager for the emergency app.



### LEARN MORE!

#### “Bolibompa Dragon in the Pediatric ER”

The pediatric emergency department at Astrid Lindgren Children’s Hospital is featured in the SVT series “Draken följer med” (The Dragon Comes Along), to help children feel at ease in new and intimidating places like hospitals. Scan the QR code to watch the Bolibompa Dragon’s comforting visit to the ER.



## Pediatrician Petter Brodin awarded

Petter Brodin, a pediatrician at Astrid Lindgren's Children's Hospital, was honored with the Oscar Medin Prize 2023 for outstanding research contributions in Pediatrics.

Particularly highlighted is his scientific article: "The Immunology of Multisystem Inflammatory Syndrome in Children with COVID-19" published in the journal *Cell* in 2020. Petter Brodin has conducted research on how children's immune systems develop and are affected by various factors such as environment, vaccines, and infections. During the COVID-19 pandemic, he focused on hyperinflammation in children who contracted COVID-19.

"It is very honorable to receive this prize from the Swedish Medical Society! Receiving this encouragement in the form of the Oscar Medin Prize from my colleagues in the Medical Society gives me energy to continue fighting for new discoveries and hopefully better care in the future," says Petter Brodin.



■ PETTER BRODIN.  
PHOTO: JOSEFINE FRANKING

## Sterile technology and logistics received international honorary mention

At this year's World Hospital Congress in Lisbon, Sterile Technology and Logistics at Karolinska received an honorary mention from the International Hospital Federation (IHF) in the category Executive Excellence Award for Leadership and Management for their efforts in driving change and improvement within the hospital.



■ PHOTO: ANNELI GEORGSSON

# AWARDS 2023

## FEBRUARY

**Mehrnoush Khoshnevis** is named Chief Resident at the world's largest training congress for resident physicians, the International Conference for Residency Education.

**Tommy Andersson** receives the ISC Paul Dudley White International Scholar Award.

**David Olsson** receives the "Prussiluskanpriset" from the resident physicians at Astrid Lindgren's children's hospital.

**Sintia Kolbjer** is awarded 200,000 SEK by the Epilepsy Foundation for a study on severe epilepsy in children.

**Richard Åhlberg** wins the internal award for Best Supervisor for Intern Doctors in Solna 2022.

## MARCH

**Petter Brodin** receives the newly established Olle Söder Award for evidence-based knowledge dissemination about COVID-19 in public media.

**Maria Helde Frankling** receives a research grant of 100,000 SEK for postdoctoral work in oncology.

**Susanna Einarsson Berg** and Jeffrey Yachnin receive an award from the Network Against Gynecological Cancer.

**Ylva Orrevall** is named Dietitian of the Year at the Dietitians' National Association's annual meeting.

## APRIL

**Ann-Cathrin Leviné Ericson** is awarded the Tech, CPR & Samaritan Award at the 112 Awards Ceremony during the European 112 Congress organized by the European Emergency Number Association.

## MAY

**Cathrin Hällström** and **Ingemar Hällström** receive the "Teacher of the Year" award from the resident physicians at the PMI function Karolinska Huddinge.

**Tore Evang** is named Leader of the Year at the Future Gala.

**Cecilia Kindstrand Gnarpe**, **Simon Olsson Boström**, **Saha Cehic** and **Karin Thourot Nouchi** are named Contact Nurses of the Year by RCC Stockholm-Gotland.

## JUNE

**Jenny Fredriksson Heikkilää** and the Reuse Portal application are awarded the 2023 Environmental Prize by the Stockholm Region.

## Karolina Award 2023

Exemplary Contribution to Creating World-Leading Competence - **Eva Nilsson**

Exemplary Contribution to Creating World-Leading Competence - **Bijan Darvish**

Exemplary Contribution to Increasing Capacity and Improving Accessibility for Our Patients - **GAVA Huddinge**

Exemplary Leadership - **Maria Thambert**

Exemplary Contribution to Achieving the Best Quality and Patient Safety - **Pain Unit Children**

Exemplary Research Effort for Patient Benefit - **Kristina Gemzell Danielsson**

Exemplary Staff Contribution Cancer - **Crina Lukacs**

Exemplary Staff Contribution Astrid Lindgren's Children's Hospital - **Vendela Hagås**

Exemplary Staff Contribution Children Perioperative Medicine, Intensive Care and Transport - **Jan Johansson**

Exemplary Staff Contribution Acute and Reparative Medicine - **Meta Uddnäs**

Exemplary Staff Contribution Acute and Reparative Medicine - **Anna Lundberg**

Exemplary Staff Contribution Heart, Vascular and Neuro - **Anita Karlsson**

Exemplary Staff Contribution Women's Health & Allied Health Professionals - **Sofia Broman**

Exemplary Staff Contribution Inflammation and Ageing - **Setarah Najafi**

Exemplary Staff Contribution Medical Diagnostics Karolinska - **Mimi Sanusi Harikainen**

Exemplary Staff Contribution Perioperative Medicine and Intensive Care - **Alireza Mortezaei**

Exemplary Staff Contribution Central Administration & IT - **Christer Lövgren**

## JULY

**Carolin Ahlinder** is elected as the only Swede to the board of the European Association of Percutaneous Cardiovascular Interventions.

**Stavroula Anastasopoulou** is awarded the Rolf Zetterström Prize for the best dissertation in pediatrics 2022.

## AUGUST

**Vascular surgery** and **thoracic surgery** in Solna are awarded the annual nursing scholarship in surgery.

**Karin Pettersson** receives the Berndt Kjessler Prize - an annual award for teaching and development within obstetrics and gynecology.

**Charlotte Höög** is awarded by the Swedish Medical Society for her sustainability efforts at GI Endoscopy.

## SEPTEMBER

**Petter Brodinis** awarded the Oscar Medin Prize 2023 for outstanding research contributions in pediatrics.

**Arne Wikström** receives the Ellis and Ivar Janzon's Prize 2023 from the Swedish Medical Society.

**Bahira Shahimis** awarded by the Swedish Medical Society for the best scientific project application.

**Olof Stepahnsson's** research team is awarded the Swedish Medical Society's Alvarenga Prize 2023.

**Anna Wedell** is awarded the gold medal 2023 by the Royal Swedish Academy of Engineering Sciences (IVA) for her contributions in precision medicine.

**Per Nydert** is named Pharmacist of the Year by the Swedish Pharmacists.

## OCTOBER

**Jakob Pansell** receives the Innovation of the Year award from the Stockholm Region Innovation Fund.

**Anton Razuvaiev**, MD, specialist in vascular surgery, is awarded the annual scholarship from the Maria Röhl Memorial Foundation for his work aiding the war-affected vascular surgery care in Ukraine.

**Anna Martling**, professor and senior consultant, has been named an honorary fellow of the American College of Surgeons (ACS).

## NOVEMBER

**Sterile technology and logistics** received an honorable mention from the International Hospital Federation (IHF) in the Executive Excellence Award for Leadership and Management category for their efforts to drive change and improvement.

**Bahira Shahim**, Cardiology Resident at ME Cardiology, receives a Starting Grant, a support for young researchers in medicine, from the Swedish Society for Medical Research.

**Nneka Magnusson Amu**, journalist and editor, has been awarded a scholarship from the Journalists' Association for professional development through a visit to Mount Sinai Hospital in New York.

## DECEMBER

**The National Center for Childhood Obesity** in Liljeholmen becomes the first Swedish clinic for children accredited by the EASO, European Association for the Study of Obesity.

**Petter Svenberg**, Senior Consultant, is awarded the annual mentorship prize by the resident doctors in Pediatric Oncology and Hematology.

■ A FEW WINNERS ON STAGE. PHOTO: JANN LIPKA





PHOTO: JENS DAHLBORG

## Change that moves us forward

“Best at the most difficult.” This statement encapsulates Karolinska University Hospital’s overarching strategic direction. It encompasses not only today’s highly specialized care, where Karolinska is sometimes the sole provider in the country, but also the management of complex and challenging large acute patientflows. More importantly, it represents the development of the healthcare of the future. The structural efficiency improving changes conducted in 2023 positions Karolinska well to continue developing the hospital to deliver the healthcare of the future – to cure and relieve tomorrow what no one can cure or relieve today.

Healthcare faces extensive changes. Demographic developments necessitate alterations in working methods to accommodate more patients. The ongoing medical and technological advancements open up possibilities that are yet to be fully realized. Karolinska aims to continue leading this development and be the smartest hospital. Key focus areas in the coming years include precision medicine, which is starting to benefit larger patient groups, and advanced cell and gene therapy, revolutionizing the treatment of certain cancers. Also, distance monitoring, as part of Karolinska@Home, promises to make healthcare location-independent, offering efficiency, equitable access to care, and patient benefits. Furthermore, the rapid development of artificial intelligence opens

uncharted possibilities. In all these areas and more, Karolinska is committed to creating the best conditions for development and benefit to both patients and society.

As important as the exciting forefront developments are the continual improvements in processes, quality, and efficiency made daily by all staff at our large hospital. The relentless improvement efforts, driven by dedicated staff’s desire to improve and develop, is what creates real and lasting change. This is something we will continue to promote and facilitate.

To drive development and care for our patients, we need to make sure staff can enjoy their work and have opportunities for responsibility, development, and job satisfaction. This is one of our primary focus areas. 2024 promises to be an exciting year for Karolinska. The entire hospital will continue to do this Together.

*“Karolinska will continue to lead development and be the smartest hospital”*

Björn Zoëga,  
CEO  
Karolinska University Hospital

# Innovation for life

## – a film series about cutting-edge research

Over the years, Karolinska University Hospital, together with Karolinska Institute, has contributed to better health for millions of people. In four episodes, you will meet some of our researchers who talk about their work at the forefront of research in the film series Innovation power at Karolinska University Hospital.

Kerstin Hagenfeldt and Kristina Gemzell Danielsson have contributed to women's health worldwide through the development of, among other things, the copper IUD, the abortion pill, and international guidelines for contraceptives at WHO.

Nanna Svartz and Johan Askling have contributed to improved survival in patients with rheumatic disease.

Sven-Ivar Seldinger's discovery made it possible to insert instruments into the vascular system, which has revolutionized healthcare in a variety of areas. Now, Staffan Holmin is working on an inverted Seldinger technique.

Tore Curstedt and Ulrika Ådén have contributed to Sweden being a world leader in neonatal care. Curstedt, together with his colleague Bengt Robertsson, made a revolutionary breakthrough with surfactant treatment. Ådén's research has focused on how nursing can promote a healthy development of the child's brain, in the short and long term.



**LEARN MORE!**

Scan the QR code to watch the films.





GRAPHIC DESIGN AND PRODUCTION: LUXLUCID, STOCKHOLM, 2024

PHOTO BACK PAGE: JOAKIM LINDBERG. FRONT PAGE: FREDRIC MÖLLER EKLUND