Annual report 2024

Karolinska Institutet | KAROLINSKA UNIVERSITY HOSPITAL

Karolinska Comprehensive Cancer Center

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Annual report Karolinska CCC 2024
A future-oriented collaboration

2024 concludes our 5-year stepping stone into the future of healthcare, research and education as Sweden's first Comprehensive Cancer Centre. In 2024, we can see how several of our activities have helped equip us even more for the ongoing paradigm shift that cancer care is undergoing.

It is becoming increasingly clear how our capabilities in precision health are contributing to gentler and effective care, whether it is medical treatment in the form of medicinal products, radiation, surgery or nursing.

Together with Medical Diagnostics Karolinska and Karolinska Institutet, we have created new centres for translational research through, among other things, the formation of Karolinska's ATMP Centre and Theranostics Trial Centre as the latest additions on top of Precision Medicine Centre Karolinska. We have helped to develop the latest robotic technology for advanced surgery to a world-leading level, including being the first in Europe in 2024 to introduce the single port technology.

We have actively expanded our national and international networks, reinvesting in future advancements. More stakeholders are joining us in our shared commitment to progress, while we also enhance coordination and alignment of methodologies and infrastructure. This is achieved both through traditional academic networks and active participation in multiple EU projects. As a result, the Comprehensive Cancer Center Projects Unit has been established to manage the increasing number of initiatives.

Renewed Accreditation and Future Development

In 2024, the process of renewed accreditation began, deepening our collaboration with an increasing number of departments within the hospital and Karolinska Institutet.

The collaboration with paediatric cancer activities is particularly exciting as it can serve as a model of how future cancer classification, also in adults, may evolve towards smaller tumour groups with narrow and strict definitions combined with targeted treatment strategies.

We have achieved significant progress in 2024 and look forward to continuing our contribution to the advancement of cancer care both regionally and nationally. The new regional governance principles within our university healthcare region pave the way for stronger collaboration. With great confidence and humility, I extend my heartfelt thanks to everyone who has contributed and warmly welcome all who wish to join us in future partnerships.

Patrik Rossi
Managing Director,
Theme Cancer. Chairman,
Board of Directors,
Karolinska CCC.

Contents

Vision

Reduce cancer incidence, mortality and suffering through preventive measures, world-classcare and cutting-edge research with patients of all ages and their loved ones.

Mission

Karolinska CCC provides world-class cancer care with a focus on the patient and their loved ones. Groundbreaking research is fully integrated in our care and is used from prevention through understanding disease mechanisms to early detection, treatment, follow-up, and rehabilitation.

Karolinska CCC improves the quality of life for cancer patients and their loved ones through ongoing collaborations with relevant civil society stakeholders and skills development for healthcare professionals.

Karolinska CCC offers the most advanced and effective treatments at individual level. Parallel to this, we pursue research opportunities to find new and innovative ways to prevent, diagnose, and treat cancer to achieve the best possible health and quality of life.

Karolinska CCC is an international knowledge bank and a centre for education in and the exchange of best practices in cancer treatment, nursing, rehabilitation, and the associated health outcomes.

Karolinska CCC is a role model for other hospitals and institutions worldwide in terms of delivering high-quality healthcare and pursuing groundbreaking research within the field of cancer. Together with the perspective of representatives of patients and their loved ones.

Karolinska CCC pursues the development of world-class translational research to generate new knowledge and methods with an integrated work practice involving healthcare, academia, and industry.

Inside Karolinska CCC

Karolinska CCC brings together excellence in highly specialised cancer care and cancer research. The centre is a joint initiative of Karolinska University Hospital and Karolinska Institutet. Karolinska CCC was the first in Sweden to be accredited by the Organisation of European Cancer Institute (OECI). Being accredited means that care, research and education meet high quality standards of care, research and education.

Karolinska CCC Strategy 2024–2030

In order for everyone to work together, a common direction that identifies priority focus areas has been developed and is valid for all ages. The strategy has been developed together with the Board of Directors of Karolinska CCC – in the work, several partners have had the opportunity to input; Cancer Research KI, Sci-Life Lab, representatives of preclinical, translational and clinical research, managers and employees within the hospital, as well as representatives of patients and their loved ones.

Strategic areas

1. Each person's unique circumstances and context form the basis for personalized prevention, diagnostics, therapy, healthcare, self-care, and rehabilitation.
2. Together with patients and their loved ones, we develop future prevention, diagnostics, therapy, care, self-care, and rehabilitation with a focus on improving health and quality of life.
3. We fully integrate research with healthcare while also allowing healthcare to serve as an important basis for research.
4. We build networks for multidisciplinary collaborations nationally and internationally to be leaders within prevention, cancer diagnostics, healthcare, research, and education.
5. Our organization maintains an optimal mix of competencies tailored to patient needs by ensuring continuous education and knowledge development.

Board of Directors (BoD) – The Year in Review

In 2024, the Board of Directors has two new representatives, Carl-Johan Sundberg, Dean North, Karolinska Institutet, and Elias Arnér, who is the new Chairperson of Cancer Research KI (CRKI).

The BoD assembled once a month during 2024 and again the work has focused on the continued development of collaborations with national and international organisations and networks, as well as active participation in conferences and meetings within cancer care, research and education. Important activities during the year have been:

- Planning and implementation of the re-accreditation within the framework of the OECI accreditation program.
- Prioritisation of activities within the Karolinska CCC strategy.
- Digital meeting with the Scientific Advisory Board in February.
- Needs analysis for data management through Task Force I3 i.e. Interoperability within IT and Informatics and the VDC project (virtual data centre).
- Two seminars at the Almedalen Week in Visby.
- Establishment of a patient network for Karolinska CCC.

Board of Directors (BoD)

Patrik Rossi
Theme Manager Theme Cancer Karolinska University Hospital, Chairperson Board of Directors Karolinska CCC.

Jonas Bergh
Professor of Oncology, Karolinska Institutet. Head of Department, Theme Cancer Karolinska University Hospital.

Carl Johan Sundberg
Professor of Molecular and Applied Work Physiology at the Institute of Physiology and Pharmacology and Dean of Karolinska Institutet Nord.

Pernilla Grillner
Head of Operations at Highly Specialized Paediatric Medicine 1 (including Paediatric Oncology and Paediatric Haematology) at Astrid Lindgren Children's Hospital. Researcher, Karolinska Institutet.

Stephan Mielke
Professor of Haematology and Cell Therapy, Karolinska Institutet. Head of Operations, CAST. Head of R&D, Theme Cancer, Karolinska University Hospital.

Anita Wanngren
Representative of patients and their loved ones.

Mathias Axelsson
Divisional Manager, Medical, Diagnostics Karolinska, Karolinska University Hospital.

Yvonne Wengström
Professor of Nursing, Karolinska Institutet. Nursing Officer, Theme Cancer, Karolinska University Hospital.

Janne Lehtiö
Professor of Proteomics, Karolinska Institutet. Director of R&D, SciLifeLab.

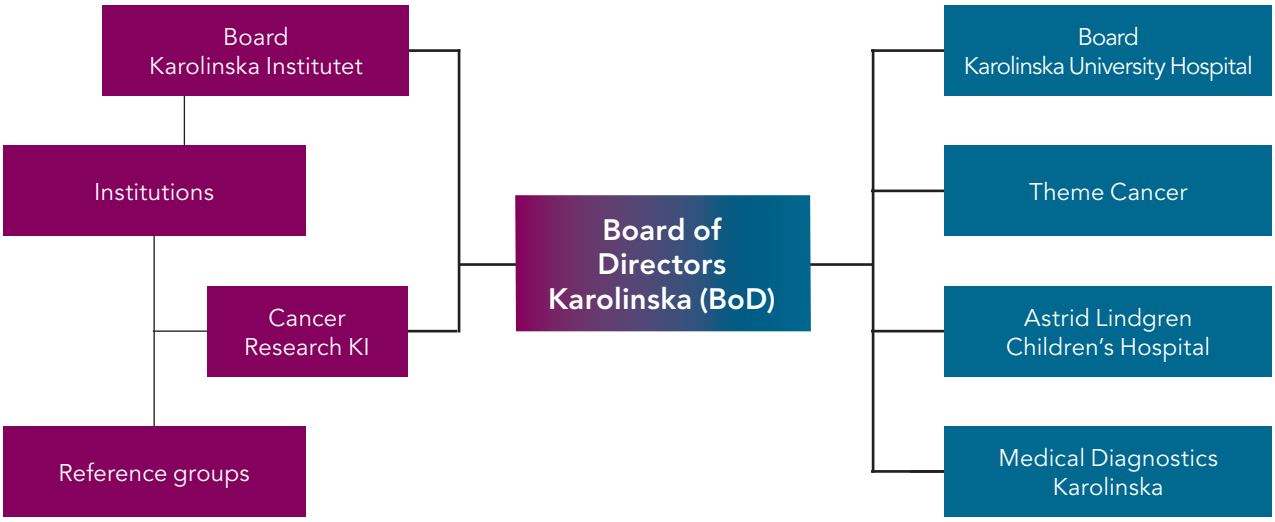
Elias Arnér
Professor of Biochemistry. Chairperson, Cancer Research KI (CRKI), Karolinska Institutet.

Päivi Östling
Scientific Director Precision Medicine SciLifeLab, Senior Scientist, Karolinska Institutet.

Eva Jolly
Operations Manager, Karolinska CCC, Karolinska University Hospital.

Ann-Britt Johansson
Coordinator, Karolinska CCC, Karolinska University Hospital.

Figure 1: Organisation Karolinska CCC



Scientific Advisory Board (SAB)

The SAB has contributed to several important reports over the years, and this year we prioritized a digital meeting with the SAB. The program included a review of the most recent reports, with presentations and discussions on clinical research and radiation therapy, as well as topics in both basic and clinical research. SAB Chairman Erlend Smeland, together with the other members, then presented a new report with their perspectives on the continued development of Karolinska CCC.

Members of the SAB for Karolinska CCC:

- Alison Richardson, University of Southampton and University Hospital Southampton.
- Cornelis van de Velde, Leiden University Medical Centre.
- Erlend B. Smeland, Oslo University Hospital and University of Oslo (chair).
- Josep Tabernero, Vall d´Hebron Institute of Oncology and Medical Oncology Department.
- Julian Downward, Francis Crick Institute in London.
- Laura Esserman, University of California, San Francisco (UCSF) Carol Franc Buck Breast Care Centre.
- Nancy Berliner, Brigham and Women's Hospital and Harvard Medical School.
- Rupert Handgretinger, Tübingen University Hospital and University of Tübingen.

Annual report

Re-accreditation

The year has been characterized by intensive re-accreditation work within the framework of the OECI accreditation programme. Initially, a comprehensive self-assessment was made against qualitative and quantitative standards, which took us six months to complete. Following the approval of the self-assessment, a two-day on-site visit was carried out by an international team of experts appointed by the OECI. We are now awaiting a report from the experts, which will form the basis of a new action plan that we will develop for the next five years. We have high hopes for a re-accreditation in spring 2025.

Comprehensive Cancer Centre Project Unit

Karolinska CCC has successfully increased its involvement and is now participating in several EU-funded projects under the Cancer Mission and the EU Cancer Plan. Due to the increased level of engagement, a new organisational unit will be established under Theme Cancer 2025, in order to best harness and pool the expertise and resources associated with various EU-funded projects. The new unit has been named the Comprehensive Cancer Centre Project Unit.

EU-funded projects

Karolinska CCC is actively involved in both ongoing and upcoming initiatives aimed at building infrastructure for care, research, and education in cancer across EU member states. In November, we hosted the launch of the EU-funded project "European Network on Comprehensive Cancer Centers (EUnetCCC)." The goal is to establish a network to improve equitable access to cancer care, research, and education throughout Europe. This is a four-year project in which we will develop, test, coordinate, and implement network activities among comprehensive cancer centers. This initiative marks a significant step in our efforts to drive medical advancements and promote international collaboration.

The EUnetCCC kick-off brought together 135 participants who took part in insightful lectures and engaging discussions.

ECHoS – Establishing of Cancer Mission Hubs: Networks and Synergies. Aiming to create cancer mission hubs for cross-sectoral collaboration within the field of cancer starting in 2023, to be completed in 2026.

ATMP4EU – Drive European Activities for Advanced Therapy Medicinal Product, Development and Implemetation. Aiming to identify barriers to clinical application of ATMP, starting in January 2024, to be completed in 2027.

EUnetCCC – European Network on Comprehensive Cancer Centres. Aiming to implement a network of CCCs in Europe, starting in October 2024, to be completed in 2028.

JANE 2 – Joint Action Networks of Expertise. Aiming to implement a network of experts, starting November 2024, to be completed in 2028.

eCAN+ – eHealth for Cancer Prevention and Care. Aiming to strengthen digital capabilities including e-health, telemedicine, remote monitoring systems, access to health data and health data exchange services at cancer centres across the EU. 3 years starting July 2025.

In addition, two projects for which the application process started during the year are Personalised Cancer Medicine (PCM) and Paediatric Palliative Care (PPC).

Two seminars in Almedalen

Karolinska CCC participated with several staff members on the stages of the annual Almedalen Week, in Visby, Gotland, where we had two seminars on the Folkhälsodalen stage. The aim of both seminars was to raise awareness and influence the opportunities that precision medicine offers for cancer care and the resources needed to fully implement precision medicine in both healthcare and research. Both seminars are recorded and the links are available here:

Precision medicine – an expense or an investment?

Precision medicine for all – from diagnostics to treatment

The QR codes link to Swedish websites.

Panel discussions at Almedalen, featuring a diverse range of perspectives.

Karolinska CCC Day 2024 focused on cancer prevention

A large number of cancer research experts from Karolinska Institutet and Karolinska University Hospital attended the Karolinska CCC Day 2024, which focused on cancer prevention and the role of research within healthcare. Patrik Rossi emphasized the importance of patient involvement, and Anita Wanngren presented a new patient network for better quality of care through dialogue and improvement suggestions. Eva Jolly highlighted the EU Cancer Plan and the Cancer Mission, which focuses on prevention and research to improve the lives of three million people by 2030. Professor Joakim Dillner pointed out that many cancers are preventable, citing HPV vaccination and screening as examples. Professor Yvonne Wengström and Cecilia Haddad Ringborg showed that physical activity reduces the risk of cancer, improves treatment outcomes and should be prescribed as part of healthcare. Professor Gunilla Karlsson Hedestam described how immunotherapy and tailored vaccines can strengthen the immune response against cancer. The day showed that prevention, patient involvement and new treatment methods are crucial in the fight against cancer.

The audience was invited to ask questions to the speakers, fostering an engaging and interactive dialogue.

Patient involvement at the core of Karolinska CCC's development

Since 2023, Karolinska CCC has integrated patient involvement at the highest management level by including a patient representative in the steering group, Board of Directors (BoD). This initiative is part of our efforts to strengthen the role of patients and loved ones as active partners in the development of our comprehensive cancer centre.

An important part of this work is the establishment of a patient network, which creates a forum for the exchange of experience and collaboration between patient representatives from different organisational areas within Theme Cancer, Paediatric Oncology and Paediatric Haematology, Neurocentrum and Cancer Research KI. The network meets twice a semester and works on priority issues in close dialogue with the steering group.

The patient network brings valuable perspectives to the healthcare chain, from prevention and understanding disease mechanisms to treatment, follow-up and rehabilitation. The network also has an important role in stimulating patients' participation in research, clinical studies and in the development of innovative treatments and medicines. By focusing on overall issues rather than individual patient cases, the network helps to create more person-centred and equitable care.

> "Being able to highlight the importance of physical activity during cancer treatment together with Professor Yvonne Wengström and discuss tangible solutions within the network has been incredibly inspiring – this is something that really makes a difference for patients." says Barbro Sjölander, member of the patient network.

To ensure close cooperation and avoid parallel processes, the Patient Network works in harmony with the Strategic Council of Karolinska University Hospital. Examples of common focus areas are the recruitment of more patient representatives and the mapping of skills development needs to further strengthen patient engagement.

The Patient Network plays a crucial role in ensuring that the patient voice permeates all aspects of Karolinska CCC's work, thereby contributing to our overall goal: to continuously improve the quality of cancer care for all patients.

> "I really appreciate our joint commitment to improving quality for patients and how we have been able to develop together based on the OECI standards for patient involvement. I am referring to the continuity survey we did which really reflects the patients' perspective." says Anita Wanngren, Chairperson of the Patient Network.

Efforts for change supported by the national cancer care investment

Wise clinical choices in cancer care

The KKV-project aims to reduce interventions within healthcare that have no medical value – such as tests, examinations and treatments that do not contribute to the best interests of patients. By challenging established practices and reducing interventions without clear medical benefits, resources are freed up to focus on what really makes a difference. This requires a long-term transition with patience and a continued focus on patient needs.

The project started in May 2024 with a multi-disciplinary working group from diagnostics, radiology, cancer care and paediatric cancer care. Training material was developed over the summer and launched in August to first-line oncology managers. Areas for improvement were then identified, and in the autumn the project team visited the sections to support implementation.

Palliative care consultant team improves care

The consultant team, consisting of Helena Ullgren and Maria Helde Frankling, is staffing a full-time position to support staff with expertise within palliative care. The consultant team is available by telephone to those caring for patients with palliative care needs, regardless of where the patient is being cared for.

> "We have also had a lot of communication with the emergency flow. It feels like we are really making a difference there. We also meet regularly with home care services to strengthen cooperation with them and other partners outside cancer care who also work with these issues," says Helena Ullgren.

Working with quality indicators has improved the monitoring of care and created a more data-driven care process. By analysing patient data, the team can optimise palliative care, but there is still work to be done on a full implementation.

The close relationship between KI and the hospital is essential for the work of KCCC.

Research and Education

Cancer Research KI (CRKI)

For CRKI, 2024 was a year full of exciting events, with several new networking initiatives and collaborative projects, as well as many strong achievements across CRKI's many areas of activity. Here is a summary of some of CRKI's highlights during the year.

PI-retreat – CRKI hosted its first PI retreat with the aim of fostering stronger collaboration between KI research team leaders and catalysing new networking opportunities.

Online Workshop – In collaboration with the Regional Cancer Center (RCC) Stockholm-Gotland, a digital workshop was conducted for patient organizations. This event is held regularly with the goal of promoting interaction and communication among different patient organizations, researchers, and the public. The theme for this year was lung cancer, highlighting a regional screening project and innovative methods for early lung cancer diagnosis.

Mayo Clinic – In 2024, CRKI continued its fruitful collaboration with Mayo Clinic in the USA. To deepen this cooperation, a new initiative was initiated during the year. In May, a delegation of 12 CRKI members traveled to Santa Fe, New Mexico, for detailed discussions with a counterpart delegation from Mayo. The primary focus was on exploring opportunities for joint cancer research ventures – a project that is ongoing, with a larger research grant call scheduled for 2025.

As part of the ongoing collaboration, three KI researchers were awarded grants for cooperation with Mayo Clinic during the year: Theodoros Foukakis, Nils-Göran Larsson, and Urban Lendahl. These projects, along with previously awarded initiatives, were presented at the fifth joint cancer research symposium between Mayo Clinic and Karolinska Institutet, which took place in June 2024.

A visit to the Mayo Clinic in Santa Fe, New Mexico, was made to strengthen and broaden our partnerships.

In October, a large group of cancer researchers from both KI and Mayo Clinic reunited, this time in Stockholm, for a scientific conference that marked 30 years of enduring collaboration.

National Institute of Oncology (NIO) – CRKI has a collaborative agreement with NIO and in June, CRKI, along with a team from ME Radiology at the hospital and NIO, hosted a workshop in Budapest focusing on radiotherapy. The guest speakers were Alexander Valdman, Åsa Carlsson Tedgren, and Daniel Alm.

The second joint CRKI-NIO workshop on radiation therapy is set to take place at the hospital in May 2025. NIO will also be involved in a research training course on precision cancer medicine, organized in partnership with CRKI in Stockholm in March 2025.

Around 80 research group leaders attended the PI retreat, which took place over two days.

Mark Levengood moderated "En dag för cancerforskningen".

CRKI Retreat 2024 – The 21st CRKI retreat took place at Djurönäset in September 2024. This annual two-day event attracted over 260 participants and offered excellent networking opportunities, inspiring presentations from both junior and senior researchers, as well as a series of parallel sessions focused on the patient perspective. The program also featured exciting lectures from invited speakers: Professor Clare Isacke from the Institute of Cancer Research in London, Professor Caroline Verbeke from the University of Oslo, and Dr. Raza Ali from the University of Cambridge.

Cancer Core Europe (CCE) – In October, CRKI participated in organizing the annual Cancer Core Europe (CCE) summer school on translational cancer research in Portugal. The summer school is a unique program where PhD students, postdocs, and clinical researchers from around the world come together for a week of groundbreaking lectures and workshops. The program covers the latest advances in cancer research, with a particular focus on precision medicine.

The first cohort of CCE's TRYTRAC program (Training Program for Young Leaders in Translational Cancer Research) has been completed, and a new group has begun their training. A new pillar within CCE, focusing on early detection and cancer prevention, has been established. Within CCE's clinical trial "Basket of Baskets," 180 patients have begun treatment. More updates on CCE are provided below:

Cancer Core Europe

Knowledge-Sharing Events – On November 4–5, CRKI, in collaboration with Dragonfly Therapeutics, organized two exclusive film screenings featuring documentaries about Nobel Laureates Phil Sharp and Jim Allison. Each screening attracted around 200 attendees, who also had the opportunity to discuss the films with director Bill Hayne. Following the screenings, a networking event was held for all participants.

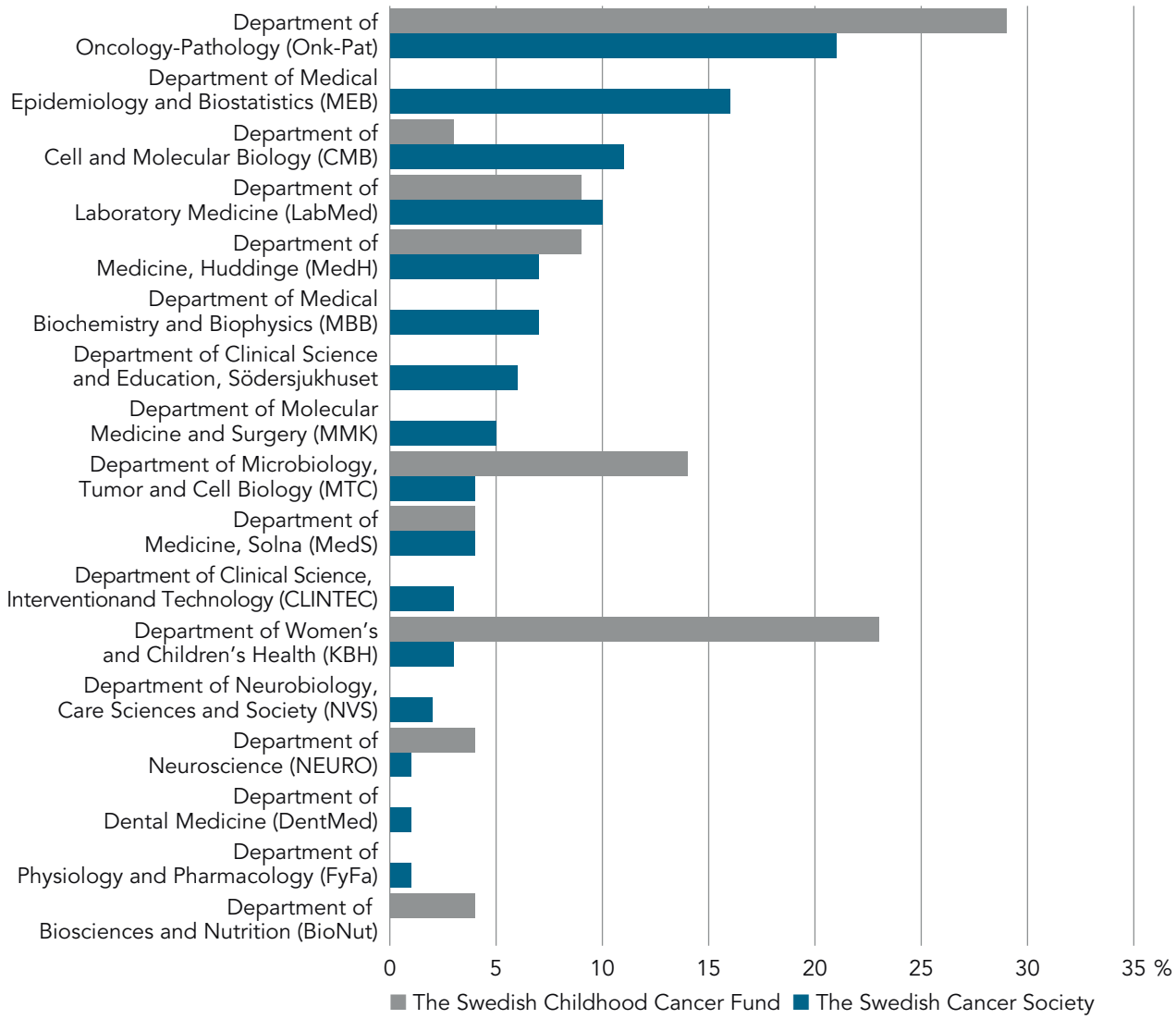
In the same week, a public knowledge-sharing event, "En dag för cancerforskningen", took place. The event, hosted by Mark Levengood, offered popular science presentations on palliative cancer care and the latest advances in cancer therapy. The event was streamed online, gathering approximately 1,000 registered participants. The webinar is also available for later viewing on our website.

Blue Sky Grants – CRKI launched the Blue Sky Grants to support innovative and entirely new ideas in cancer research. The call for proposals received 72 strong applications, which were reviewed by nine independent experts for ranking. The top 10 most outstanding applications were awarded funding.

Promoting Industry Collaborations – As partnerships with the pharmaceutical industry play a crucial role in the advancement of cancer research, CRKI hosted three seminars in 2024 focusing on industry-academia collaborations. The seminars addressed key topics such as why and how to collaborate with industry, intellectual property, and biomarker-driven precision medicine, with the latter seminar held in partnership with the industry association LIF.

During the year, CRKI also launched a new webpage aimed at researchers looking to initiate new collaborations with industry. The page includes links to resources both within and outside KI to support industrial partnerships.

Figure 2: Distribution of research grants from the Swedish Cancer Society and The Swedish Childhood Cancer Fund to Karolinska Institutet, 2024.



In addition, CRKI hosted a webinar in collaboration with the KI Compliance & Data Office to guide researchers through ethical and legal challenges. For more details on all activities and research conducted within CRKI, visit ki.se/en/cancer-research-ki.

Funding for cancer research

In 2024, 302 cancer researchers at KI, including those with clinical affiliation at KCCC, were awarded SEK 1.6 billion in various grants.

The Swedish Cancer Society awarded SEK 885 million to cancer research in Sweden. Of these grants, 41% went to researchers at KI/KCCC. In total, the Swedish Cancer Society awarded SEK 362 million to 86 researchers from 16 different KI institutes.

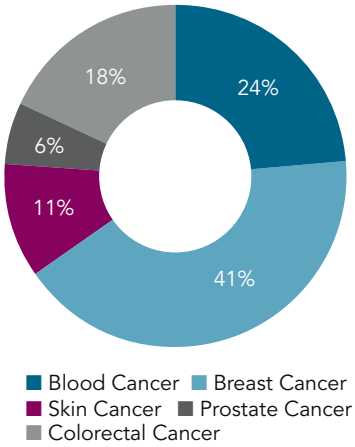
The Institute that received the most grants was the Institute of Oncology-Pathology, which received SEK 78 million (see Figure 3).

The Swedish Cancer Society's extra investment in clinical treatment studies awarded SEK 167 million to 16 researchers from across the country. 50% in total, i.e. SEK 84 million of that investment, was distributed among 8 clinical researchers at KI/Karolinska CCC. The largest share of the funding, 41%, was allocated to breast cancer research, which received 35 million for 1 study at the Institute of Oncology-Pathology and 2 studies at the Institute of Medical Epidemiology-Biostatistics (see Figure 3).

This year, the Swedish Childhood Cancer Fund distributed SEK 116 million to cancer research in Sweden. 48% of these grants, SEK 56 million, were awarded to 22 of KI/KCCC's cancer researchers from 9 of KI's institutes. 5 researchers from the Institute of Women's and Children's Health and 7 researchers from the Institute of Oncology-Pathology shared 52% of the grants awarded to KI/KCCC by the Swedish Childhood Cancer Fund, distributed as SEK 13 and 16 million.

The Swedish Research Council also allocated a large proportion of its Medicine and Health grants to cancer research. They awarded SEK 111 million to 16 cancer researchers.

Figure 3: Awarded grants clinical treatment studies.



Cancer type	Cancer Foundation grants for clinical treatment studies
Blood cancer	20,000,000
Breast cancer	35,000,000
Skin cancer	9,000,000
Prostate cancer	5,000,000
Colon cancer	15,000,000
Total	**84,000,000**

Professors previously appointed, Ola Nilsson and Anna Smed Sörensen, along with newly appointed Anna Nilsson, during the installation ceremony on October 3, 2024.

Education in oncology

Figure 4: Specialist Training Course in Oncology: Modern Oncology Treatment.

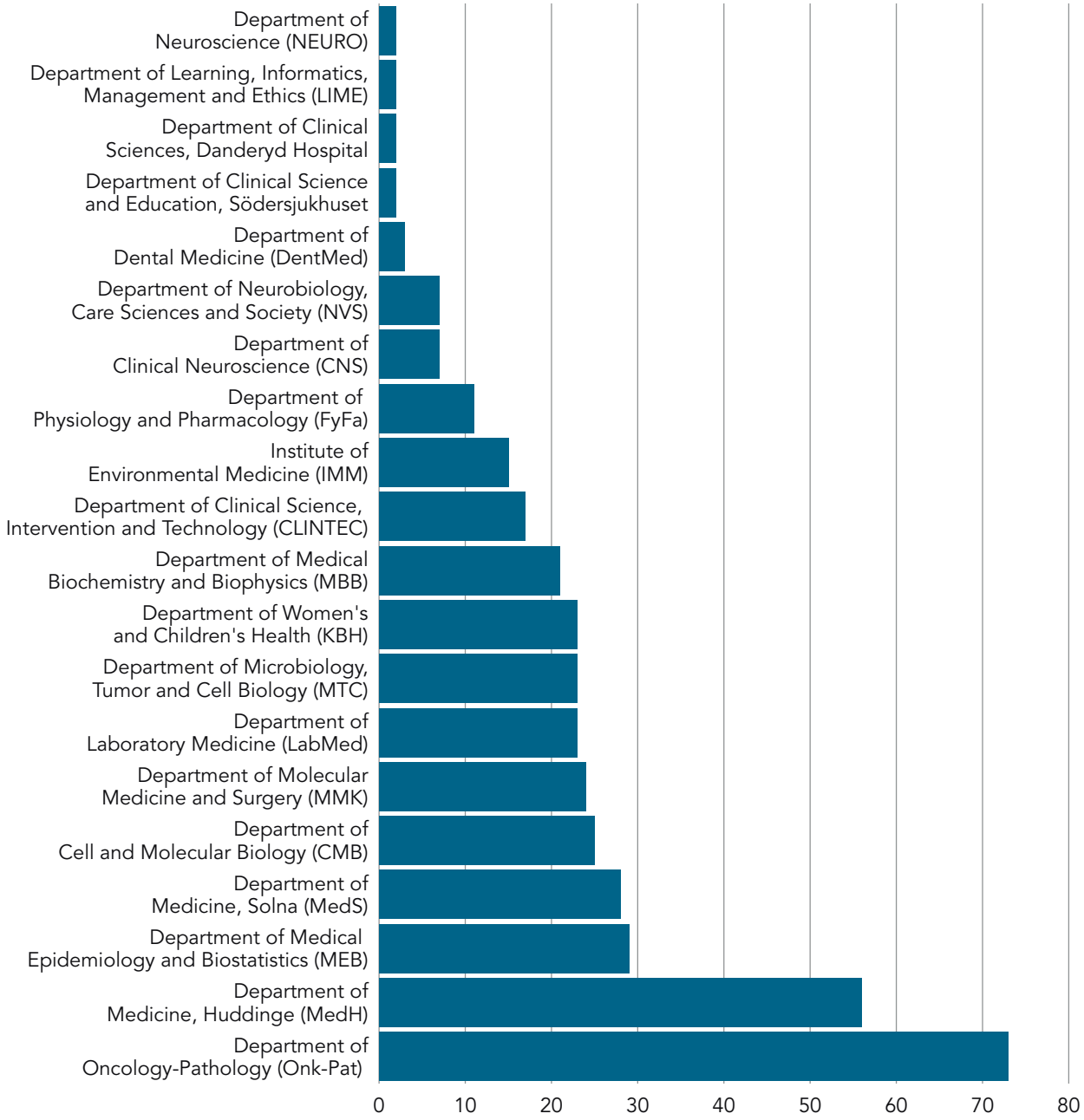
Courses for Specialist Training and Already Graduated Doctor	Number of students 2024
Modern Oncology Treatment (2 full days)	25

Figure 5: Education in oncology at KI for doctors and specialist nurses.

Course in Oncology in the Medical Programme	Number of students 2024
Clinical Medicine - Specialisation Surgery compulsory course (Oncology 1.5/27 credits)	125
Optional courses:	
Advanced Nursing - Palliative Medicine and Oncology (7.5 credits)	28
Advanced course in multidisciplinary cancer treatment (7.5 credits)	21
Tumors of the female genitalia and breast: investigation, diagnosis and treatment (7.5 credits)	0

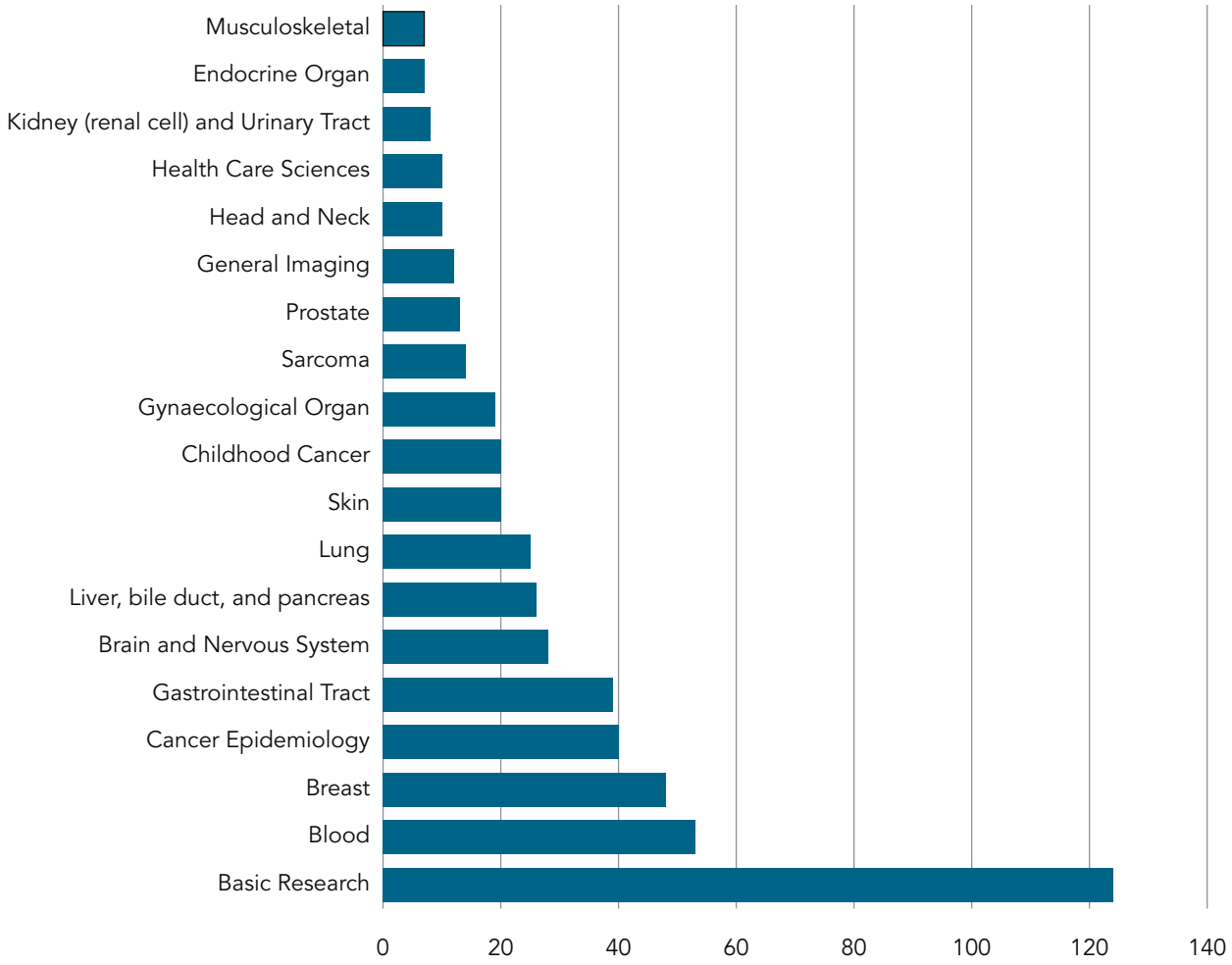
Course in Oncology in the Specialist Nursing Programme	Number of students 2024
Cancer diseases and nursing in the treatment of cancer diseases Module 1 and 2 (15 credits)	30
Profession, patient safety and methods for developing nursing in the field of cancer (7.5 credits)	22
Cancer prevention and health education (7.5 credits)	26
Degree Project in Nursing - Oncological Care (15 credits)	25
Optional and freestanding courses:	
Palliative care (7.5 credits)	7
The contact nurse in care (7.5 credits)	39

Figure 6: Research group leaders sorted by home department, 2024.



More than 390 cancer research leaders have been identified at KI, and their research and details are listed in the Cancer Research KI database. The key areas of cancer research at KI include preclinical research, blood cancer, brain and nervous system cancers, cancer epidemiology, and breast cancer. The Department of Oncology and Pathology has the largest number of group leaders in cancer research at KI. The gender breakdown of principal investigators (PIs) is 34% women and 66% men.

Figure 7: Number of principal investigators within the cancer area per KI department.



New Professors and Associate Professors in Cancer Research at Karolinska Institutet 2024

Professors

Olof Akre
Jan Ellenberg
Weng-Onn Lui
Anna Nilsson
Hong Qian
Linda Björkhem-Bergman
Lisa Westerberg

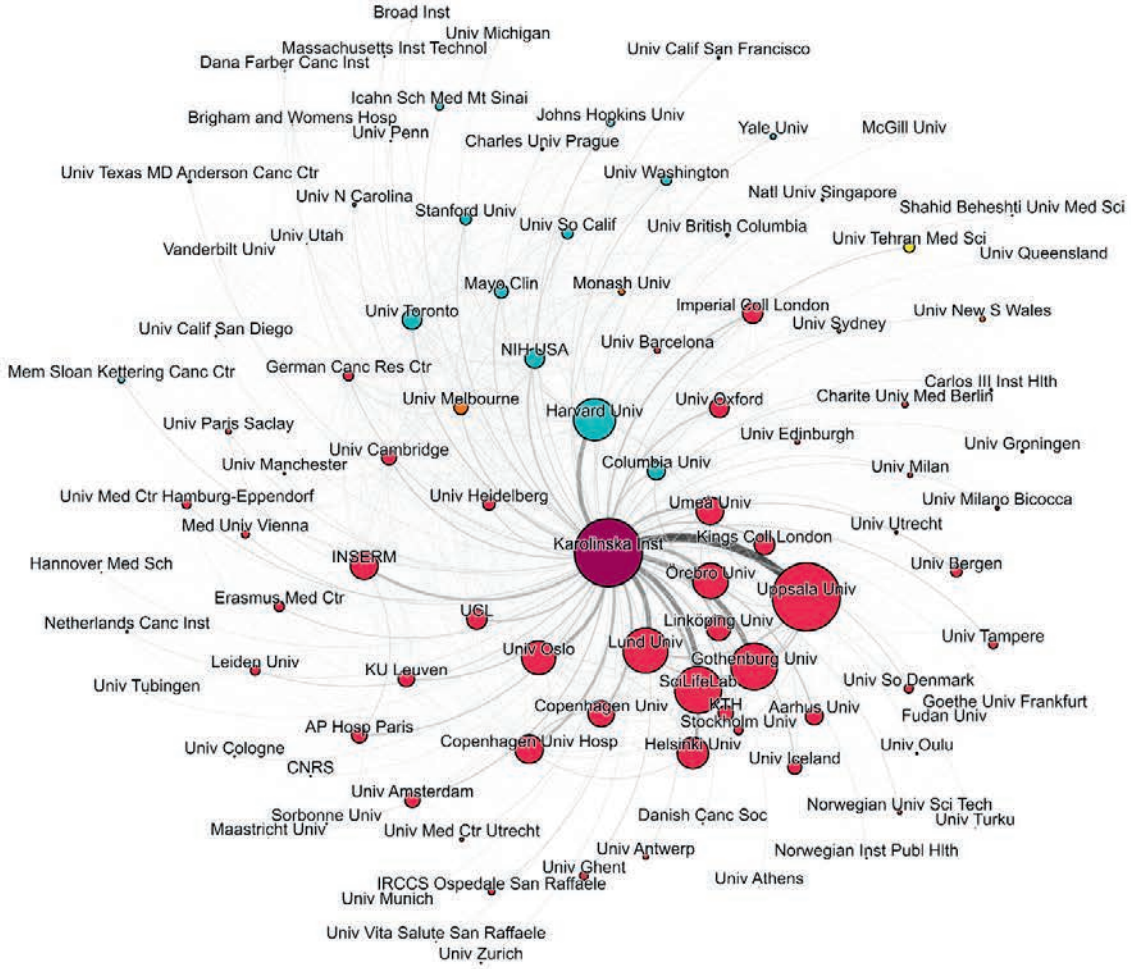
Adjunct professors

Jana de Boniface
Mats Lindblad

Associate Professors

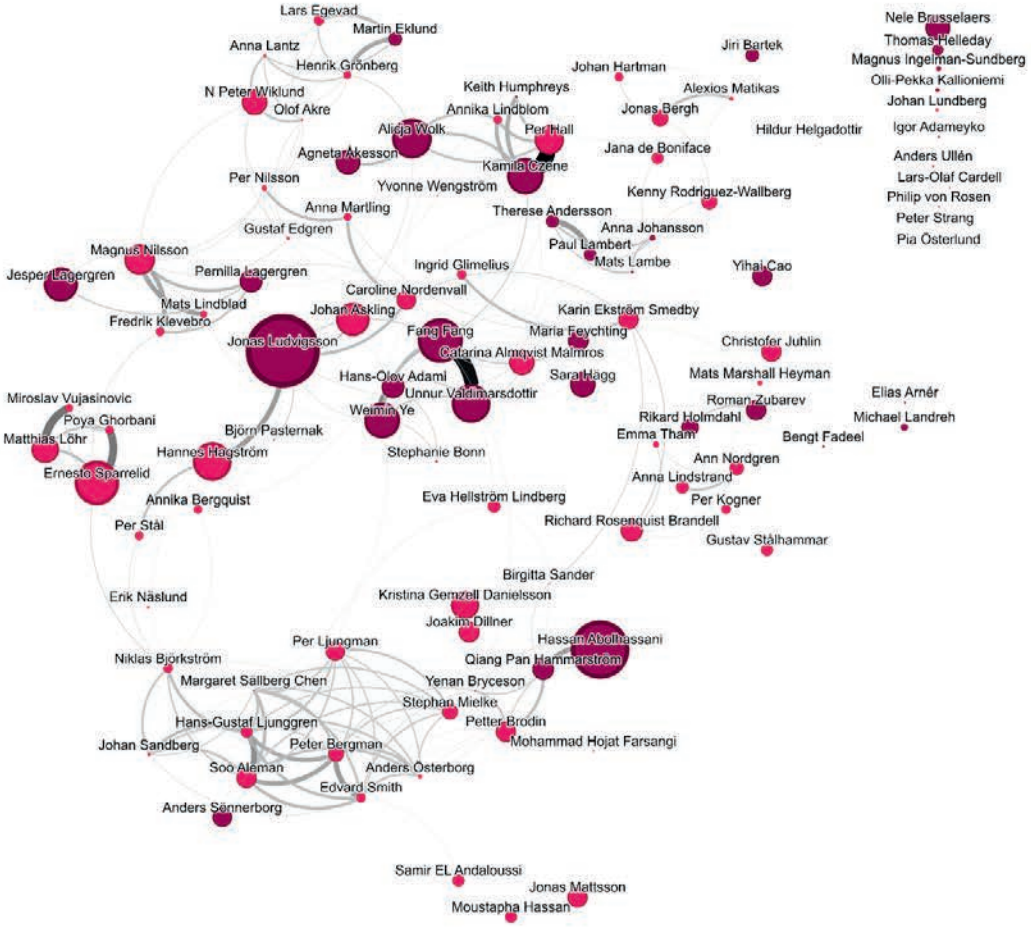
Cecilia Bartholdson
Stina Wickström
Ann-Sofie Backman
Rozbeh Jafari
Deborah Saraste
Christina Carlander
Ying Zhao
Markus Aly
Anthony Matthews
Annica K.B. Gad
Jennie Engstrand
Christina Villard
Eva Onjukka
Robert Månsson
Karin Larsson
Lisa Örtqvist
Poya Ghorbani
Anna Kistner
Balazs Acs
Anders Mutvei
Joakim Dahlin
Åsa Edsander-Nord
Brinton Seashore-Ludlow
Anda Gligas

Figure 8: Tema Cancer and Cancer Research KI copublication organisations 2022–2024. 101 organisations have been included (organisations with at least 58 publications). Edges are shown between organisations with at least 14 co-publications. For visibility, the node of Karolinska Institutet has been reduced to the size of the copublication organization with the largest amount of publications.



Europe
North America
Oceania
Asia

Figure 9: Tema Cancer and Cancer Research KI Author network Authors with at least 20 publications, 2022-2024. 102 authors have been included (authors with at least 20 publications). Connections between authors need at least 1 publication to be shown.



- Region Stockholm only
- Karolinska Institutet only
- Both Karolinska Institutet och Region Stockholm

Network contains no authors only affiliated to SLL.

Medical Unit Center for Clinical Cancer Studies (CKC)

CKC is a medical unit within the Cancer Theme that plans and conducts clinical studies for cancer patients. Acting Head of Operations: **Kristina Sonnevi**.

In 2024, we had an intense and successful year within clinical studies. We have included more patients than ever in our early clinical studies (First in Human and Phase I studies) and we are Sweden's largest Phase I organisation within cancer.

Our medical expertise has been strengthened by the recruitment of two new medical directors with specialist expertise in haematology and oncology. To improve the patient experience and streamline our processes, we have introduced the possibility to sign informed consents electronically via Alltid öppet.

We have also worked actively to ensure that patient inclusion can be monitored in real time via a Visual Analytics Platform, Tableau and have strengthened cooperation with all activities within Theme Cancer. This has involved regular reconciliations and follow-ups regarding finances, inclusion rates and planned studies.

The Clinical Trials Office (CTO) has successfully managed the transfer of all academic clinical studies within Theme Cancer to the EU-wide web portal and database, Clinical Trial Information System (CTIS). The CTO coordinates and runs all academic studies with cancer medicines in Stockholm which are newly registered in CTIS in 2024.

Furthermore, Research Electronic Data capture – REDCap has been introduced at Karolinska, a data collection tool for clinical research studies. This means that academic studies can now use the eCRF (electronic Case Report Form) system to document patient data, treatments and research results in a structured and secure way.

Finally, CKC, in collaboration with the other cancer study units within NASTRO and in cooperation with LIF and ASCRO, has developed a Code of Conduct to streamline the work with clinical studies. The aim is to increase patient inclusion and reduce the administrative burden.

From left: Caroline Brav, Johanna Vernersson, and Maria Creignou, Center for Clinical Cancer Studies, who are excited about the new trials.

Figure 10: Number of inclusions between 2022–2024. The number of new patients enrolled in studies during the year decreased slightly compared to 2023.

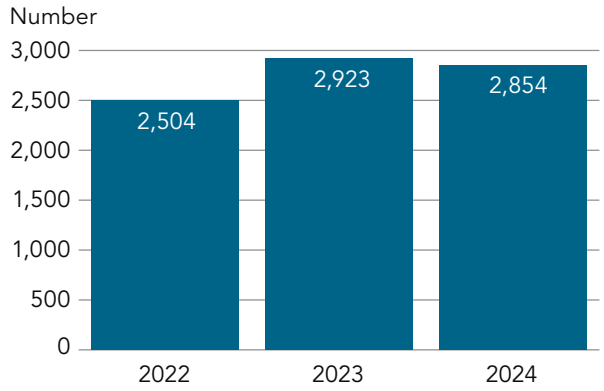


Figure 11: Proportion of new cancer patients included in studies, 2022–2024.

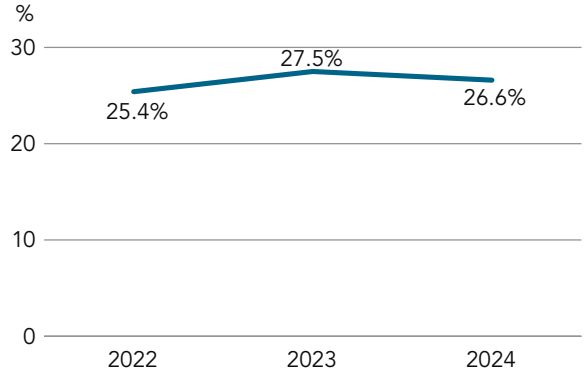
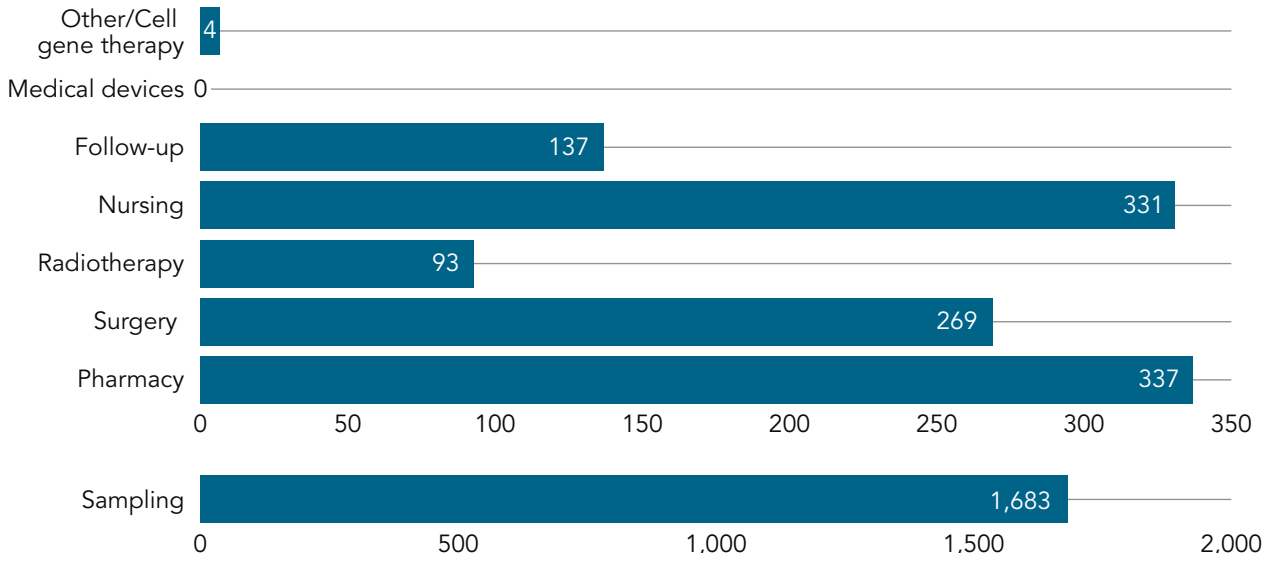


Figure 12: Trials open for inclusion per 31 December 2024.

	Total Cancer Theme	Breast, endocrine tumours and sarcoma	Pelvic cancer	CAST	Phase 1 unit	Hema-tology	Head & neck, lung, skin	Radio-therapy	Upper abdo-men
Studies started in 2024 (2023: 58 st)	**57**	8	12	2	4	5	12	2	12
Ongoing trials per 31 December 2024	**411**	49	78	23	28	85	60	8	80
Number of studies open for inclusion	**179**	15	38	10	15	22	31	6	42
Academic studies (%)	**70%**	87%	74%	50%	13%	64%	74%	100%	83%

Figure 13: Number of patients included in studies, 2024.



Paediatric cancer research

Clinical research within paediatric oncology and paediatric haematology is conducted at Karolinska Solna and Karolinska Huddinge as well as at several departments at KI. In 2024, collaboration has strengthened between the different units and a strong contributor to this is the creation of a clinical study unit that now exists within the framework of the Centre for Clinical Child Studies (CKB) at Astrid Lindgren Children's Hospital. The CKB provides support in the start-up process of both clinical studies and academic studies.

Within academic research, international collaborations are becoming increasingly important and KI has a strong profile in this area. For example, a major European treatment protocol for children with leukaemia, ALLTogether, is led by researchers at KI, following a long tradition of Nordic collaboration. In preclinical research, we also aim to create international collaborations to accelerate knowledge that leads to better care for our patients. A good example is the Nordic NordFertil study, which looks at how current treatment affects boys' future fertility and how best to preserve fertility.

Figure 14: Studies open for inclusion for children as of December 31, 2024.

Number per diagnostic area in 2024 (children)	Total CKB HOPE	Hema-tology	Leukemia, Lymphoma, Histiocytosis	Solid tumours	CNS	Diagnosis Overall
Studies started in 2024	**12**	1	4	1	5	1
Ongoing studies Dec 2024	**41**	4	16	4	8	9
of which open for inclusion	**38**	4	16	4	6	8

Figure 15: Number of children and ongoing studies per study phase.

Number of academic and industry-sponsored studies for children.	Total CKB HOPE	Phase I/II	Phase III	Phase IV
Clinical trials started in 2024	**7**	3	4	0
Ongoing clinical trials Dec 2024	**25**	9	13	3

Figure 16: Number of academic and industry-sponsored studies for children.

Number per study type	Academic studies	Industry sponsored studies	Total CKB HOPE
Ongoing studies, open for inclusion	**23**	4	—
Ongoing studies, closed for inclusion	**4**	2	—
Total number	**27**	6	33

Healthcare production and availability

Karolinska CCC's healthcare is gathered within the business structure under several different medical units (ME) and nursing areas (OO) at the hospital, both in Solna and Huddinge. Theme Cancer is the largest area, Paediatric Oncology and Paediatric Haematology within Astrid Lindgren's Children's Hospital, Neurocentre (Patient Flow Brain Tumours) within Theme Heart Vascular Neuro. Medical Diagnostics Karolinska (MDK) performs all diagnostics within the framework of radiology, pathology and nuclear medicine. All surgical care takes place within Perioperative Medicine and Intensive Care (PMI), which is outside Karolinska CCC in business structure. We investigate, treat and care for patients with any form of malignant tumour disease. Patients with benign conditions within e.g. urology, endocrinology, coagulation, inflammatory bowel disease (IBD) and intestinal failure are also included in the mission. Some of the diagnoses we are responsible for take place within the framework of national highly specialised care, so-called NHV assignments, which are assigned by the National Board of Health and Welfare, please see www.karolinska.se/vard/for-vardgivare/nationell-hogspecialiserad-vard-nhv

Standardised care processes

Data-driven business development enables automatic transfer of lead times and internal monitoring of standardised care processes (SVF) in real time. SVF is a national work practice to reduce unnecessary waiting and uncertainty for patients. Theme Cancer reports 30 different care processes to the Regional Cancer Centre (RCC). SVF describes the investigations and initial treatments to be carried out for a given cancer diagnosis, as well as the lead time limits to be aimed for from well-founded suspicion to the start of initial treatment for different diagnoses and treatments (see Figure 17).

The overall performance for all diagnoses has improved year on year, as has the proportion of patients included for evaluation. During the year, lead times for each diagnosis have varied somewhat, but one diagnosis that stands out for its great efforts and significant improvements is lung cancer. Over the last six months, the proportion of patients receiving care with the specified time has increased significantly.

Official statistics can be found at cancercentrum.se/samverkan/

Relative Five-Year Survival

Certain types of cancer, such as prostate, skin, and breast cancer, continue to have high survival rates, while pancreatic, lung, and liver/bile duct cancers remain significantly lower despite some improvement. This underscores the importance of early detection, effective treatments, and ongoing research. The results highlight progress in cancer care but also emphasize the need for further efforts to reduce disparities in survival between different diagnoses (see Figure 18).

Figure 17: The proportion of patients undergoing SVF within the specified timeframe, 2024.

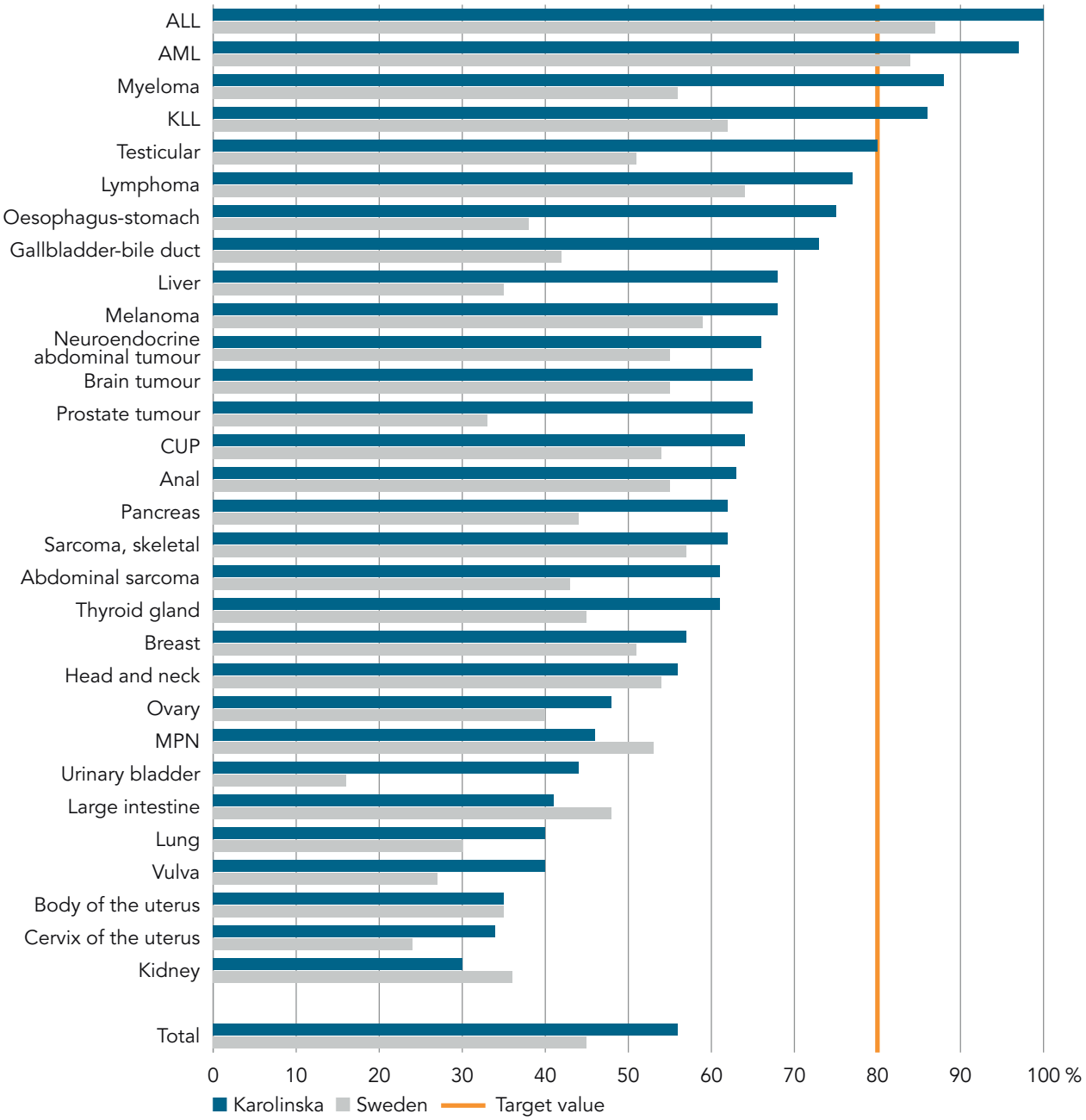
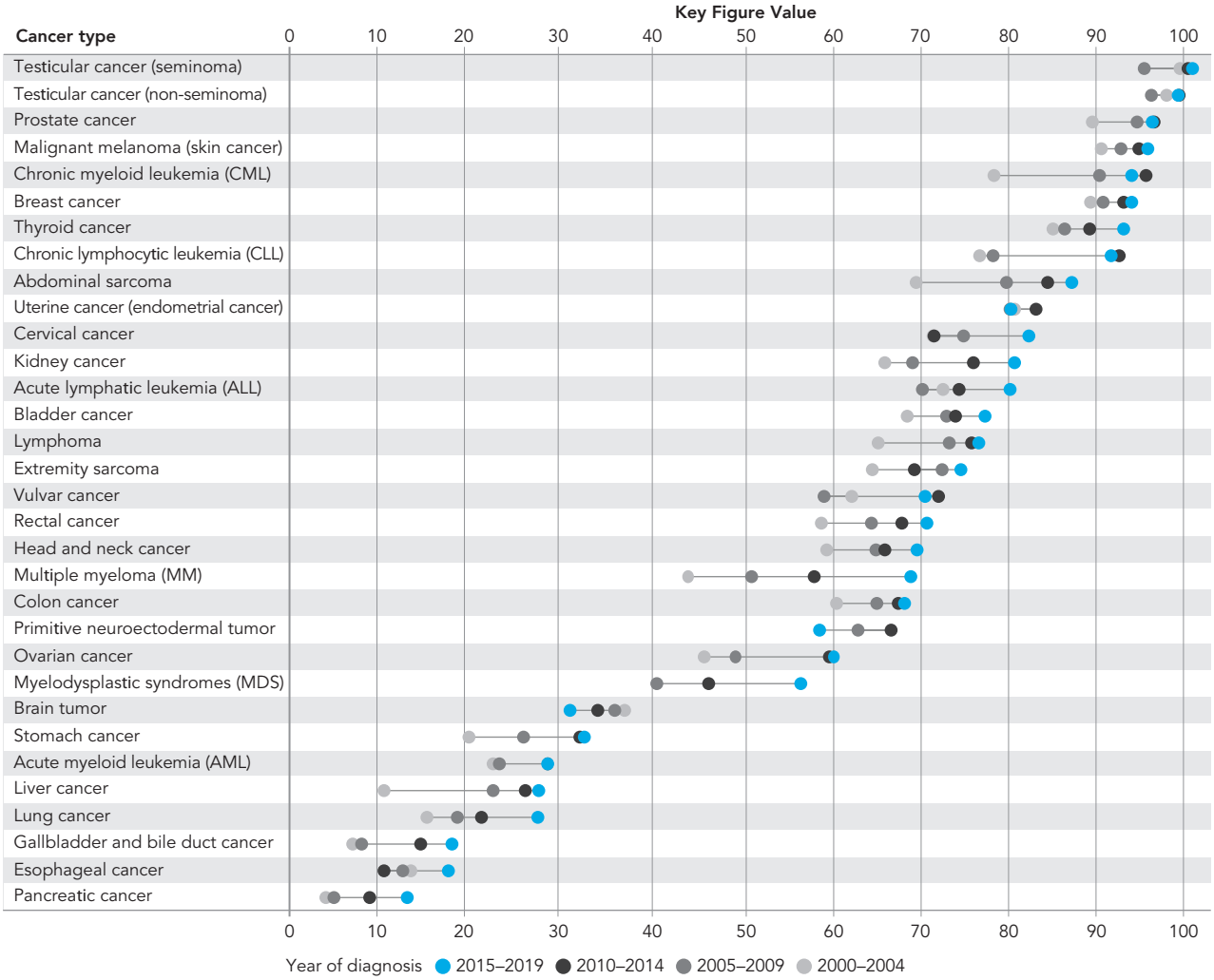


Figure 18: Relative 5-year survival rate (percent) for patients diagnosed in the Stockholm-Gotland healthcare region.



Medical Diagnostics Karolinska – MDK

In 2024, the medical unit Clinical Pathology and Cancer Diagnostics, the medical unit Radiology and the Theranostics Trial Centre (TTC) within the medical unit Medical Radiation Physics and Nuclear Medicine have made great progress in the work on cancer diagnostics and treatment. Divisional Manager responsible for MDK is **Mathias Axelsson**.

By investing in digitalisation, interdisciplinary collaboration and cutting-edge research, we have strengthened our capacity to meet future needs within precision medicine. The aim is to continue this work in 2025, with a focus on strengthening our role as a leading partner within cancer diagnostics and research. By continuing to invest in innovation, collaboration and patient-centred solutions, we are ready to meet the challenges of the future and contribute to better diagnostics for all cancer patients.

Medical Unit Clinical Pathology and cancer diagnostics

ME Clinical Pathology and Cancer Diagnostics, is organised under MDK, Head of Operations **Mikael Björnstedt**.

In 2024, the medical unit Clinical Pathology and Cancer Diagnostics has completed a transition to digital pathology, which has revolutionised the workflow. This transformation has created a more efficient working environment and improved collaboration both internally and externally, in particular through easier participation in multi-disciplinary conferences. Digital pathology also enables new investments in AI and machine learning, where we are now equipped to continue running our own development projects and contribute to scientific progress.

One of the great strengths of our digital initiative is its potential to shorten response times and improve the quality of cancer diagnostics. By optimizing our processes and working with standardised digital tools, we can analyse complex cases faster and more efficiently, which is crucial for patients. For example, the implementation has enabled real-time collaboration across sites, resulting in faster and more accurate diagnosis and treatment.

Molecular diagnostics and the fight against cervical cancer – A significant focus of pathology activities in 2024 has been on molecular diagnostics. By restructuring the molecular diagnostics organisation, we have created a faster, more cost-effective and quality-assured process. Within our Centre for Cervical Cancer Elimination, we are driving a major national project to eradicate HPV and cervical cancer in Sweden. Thanks to this investment, we have been able to contribute to faster screening and follow-up, which is crucial to prevent and eradicate this type of cancer.

Enablers for precision medicine – Research support within molecular diagnostics has also expanded. The Research Support and Implementation unit has strengthened its capacity to provide advanced molecular analyses, biological samples and data for clinical studies. This enables Karolinska to be a leading partner in national projects within precision medicine. Through the renowned Translational Analyses in Molecular Medicine (TAMM) facility, we have continued to offer high-quality molecular analyses, for example within epigenomics and cell-free DNA, opening up new possibilities for cancer diagnostics and treatment.

Medical Unit Radiology

ME Radiology is organised under MDK, Head of Operations **Peter Ehrstedt**.

The need for radiological diagnostics has continued to increase in 2024, not least within the field of cancer. To meet this need, medical unit Radiology has prioritised streamlining workflows, developing digital solutions and optimising resources. The results are clear: Waiting lists for the MRI section have been completely eliminated and the response time for CT scans has been reduced. These successes have been achieved through interprofessional collaboration and strategic investment in skills development.

The interventional section has also made significant progress, in particular through a new work practice for adrenal vein catheterisation that reduced examination time by 1.5 hours, despite an increased referral flow.

Research from bench to bedside is an important part of KCCC.

Research within Radiology has also been very active. The Abdominal section published 20 scientific articles and gave 80 lectures, while the volume of reviews increased by 9% compared to the previous year. This demonstrates a strong link between research and clinical activities, where new insights are rapidly implemented to improve care.

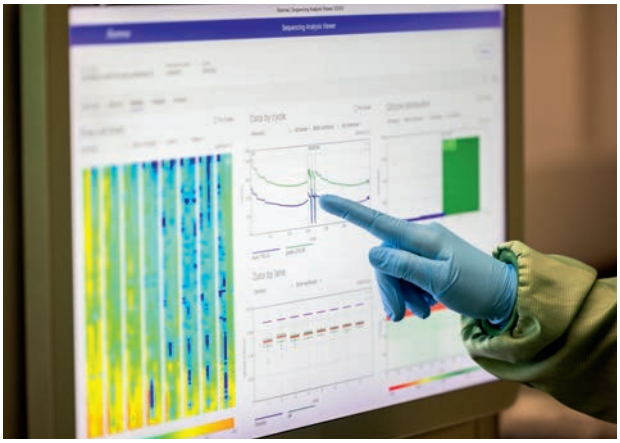
Medical Unit Nuclear Medicine and Hospital Physics
ME Nuclear Medicine and Hospital Physics, is organised under MDK, Head of Operations **Erik Samén**.

Physics Innovation in nuclear medicine and radiation therapy – The newly formed medical unit Nuclear Medicine and Hospital Physics (which is a merger of the former medical unit Medical Radiation Physics and Nuclear Medicine and medical unit Radiation Pharmacy) has been a driving force within cancer diagnostics and treatment during 2024. During the year, in collaboration with industry, we contributed to the development of new methods for dose plan optimisation. This technology, planned for implementation in 2025, is an advance in cancer care and will provide patients with gentler radiation therapy.

At the same time, several exciting development projects are underway within brachytherapy, where we are working on 3D printed applicators for the treatment of superficial tumours. These innovations make treatment more precise and tailored to the patient's needs, which is an important step towards more personalised care.

Theranostics Trial Centre (TTC) - TTC, a newly created section within the unit, has continued to strengthen its role in clinical studies. With the support of the new innovation environment Theranostics Trial Alliance (TTA) Sweden, TTC has initiated several projects, including radionuclide therapy with in-house manufactured radiopharmaceuticals. This work is crucial to drive the development of precision medicine and new treatment methods that can improve the quality of life for cancer patients.

Training and collaboration as pillars for the future – During the year, a national course for oncological PET was organised, with participants from all over Sweden. This initiative strengthens expertise in cancer diagnostics and contributes to a higher standard of care nationally. A new agreement with Stockholm University has also ensured that a large part of the medical physics training continues to take place at Karolinska. Around twelve new students are trained each year, ensuring a sustainable supply of expertise within a critical discipline for cancer diagnostics and treatment.



Precision Medicine Forum Cancer (PM Forum Cancer)

Precision Medicine Forum Cancer (PM Forum Cancer) is a collaborative forum within Precision Medicine Centre Karolinska (PMCK) where **Kristina Sonnevi** is in charge togheter with key people from different parts of the hospital, KI and SciLifeLab collaborate on issues related to the implementation of precision medicine within cancer care. In the group, we have representatives from KI, paediatrics, oncology, haematology, clinical genetics, pathology, SciLifeLab, Medical Diagnostics Karolinska, etc.
In 2024, we have continued to work within the PM Forum Cancer to define new patient flows where the implementation of precision medicine diagnostics should be introduced at Karolinska. Through analysis of needs, patient benefits and evidence, a basis for decision-making has been created and then discussed at the operational level before deciding on implementation at the Theme/Divisional Manager level. In 2024, decisions have been taken on the implementation of whole genome sequencing for paediatric cancer, whole genome sequencing for sarcoma patients and wide panel sequencing for endometrial cancer patients. Work is now underway to ensure that all parts are in place within both MDK and Theme Cancer for these flows, and at present whole genome sequencing within paediatric cancer is the flow that is fully implemented in 2024. In addition, the forum has also worked on training in precision medicine, planning for new pilot projects that are close to clinical implementation and collaborations with SciLifeLab within proteomics and upcoming modalities.

Anna Nilsson is a professor at the Department of Women's and Children's Health and works clinically as a senior consultant at Astrid Lindgren Children's Hospital.

Paediatric cancer

Paediatric Oncology and Paediatric Haematology are organised at Astrid Lindgren Children's Hospital, under Highly Specialised Paediatric Medicine 1, Director **Pernilla Grillner** and Nursing Area Highly Specialised Paediatric Medicine 1 and Paediatric Surgery, Head of Operations **Annika McCarthy**.

In 2024, Paediatric Oncology and Paediatric Haematology have participated in the re-accreditation process of Karolinska CCC. It has strengthened engagement and collaboration for the benefit of our patients. In 2024, we have also developed our joint management forum for the activities located in Huddinge and Solna.

In 2024, the focus has been on, among other things: Implementation of the three national care programs available within paediatric cancer care; long-term follow-up after paediatric cancer, palliative care of children and rehabilitation after paediatric cancer. Implementation of precision diagnostics (whole genome sequencing) for all children with newly diagnosed cancer and development of work practices with e.g. the Molecular Tumour Board. We also run a project for national coordination of expertise. Continued development of transitions of care supported by the contact nurse, transition nurse roles. Development of pharmacist roles from care and patient-oriented medicine management to comprehensive analysis of medicine use and costs – work that will continue in 2025. Research, development and training (FOUU) activities with searchable FOUU weeks and a "FOUU festival" on the research process and implementation of research results. Branch residency training within paediatric haematology, oncology and coagulation has also undergone SPUR review with very good opinion.

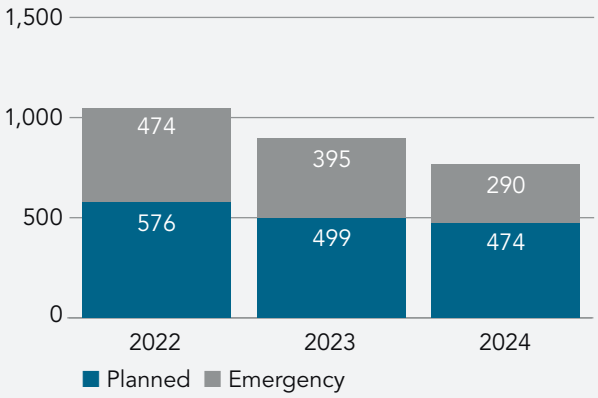
We have also continued our international scouting with another team visit to The Hospital for Sick Children (SickKids) in Toronto and this year the paediatric coagulation, paediatric medicine and play therapy teams have visited the hospital. SickKids is ranked as one of the world's best children's hospitals. The teams are inspired to develop new work practices, and equally valuable is the confirmation that our activities maintain a high quality.

The government's investment in paediatric cancer care continues to have a major impact on investments in development work and major projects. Some teams have participated in the Regional Cancer Centre (RCC) training "Practical improvement work in teams – a development programme in leading change and development".

Integration of genetics and MRD to define low risk patients with B-cell precursor acute lymphoblastic leukaemia with intermediate MRD levels at the end of induction. Leukemia, doi.org/10.1038/s41375-024-02329-0

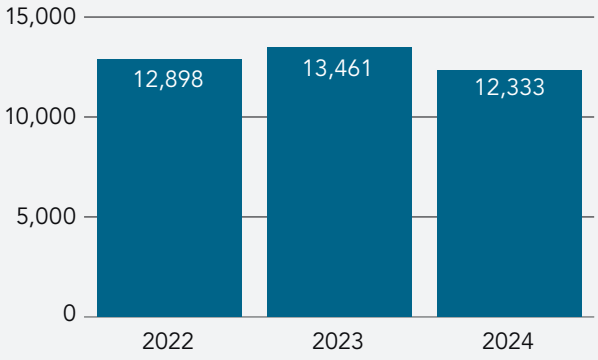
Decreased spermatogonial numbers in boys with severe haematological diseases. British journal of haematology, doi.org/10.1111/bjh.19572

Figure 19: Number of inpatient visits in pediatric oncology and pediatric hematology, 2022–2024.



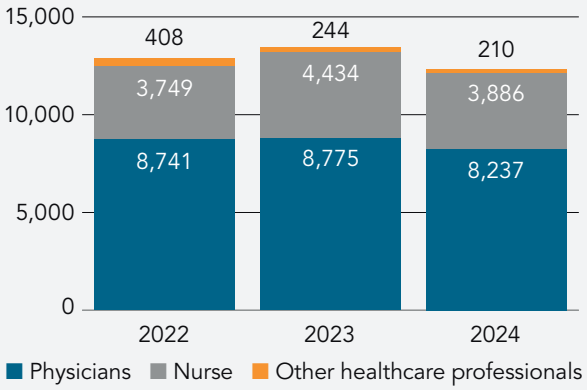
Inpatient care	2022	2023	2024
Number of inpatient care episodes	1,050	894	764
Proportion of emergency inpatient care episodes	45%	44%	38%
Available inpatient beds	13.3	12.4	—

Figure 20: Number of outpatient contacts in pediatric oncology and pediatric hematology, 2022–2024.



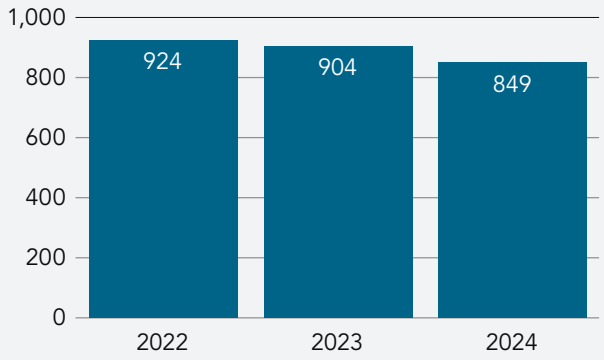
Outpatient care	2022	2023	2024
Proportion of indirect	24%	26%	29%
Number of unique patients	2,447	2,509	2,434
Number of unique patients, first visits to doctor	324	256	249

Figure 21: Number of outpatient contacts distributed by staff category, 2022–2024.



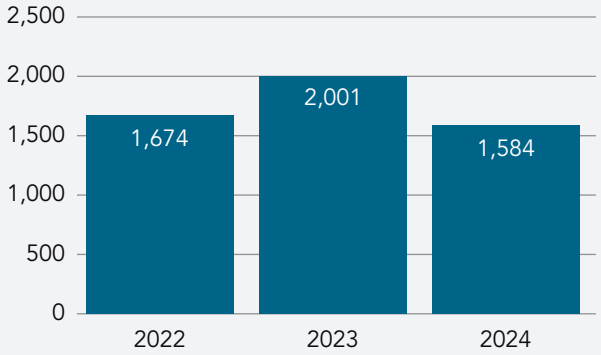
Outpatient care by staff category	2022	2023	2024
Physicians	8,741	8,775	8,237
Nurse	3,749	4,434	3,886
Other staff	408	244	210

Figure 22: Number of surgical interventions in pediatric oncology and pediatric hematology, 2022–2024.



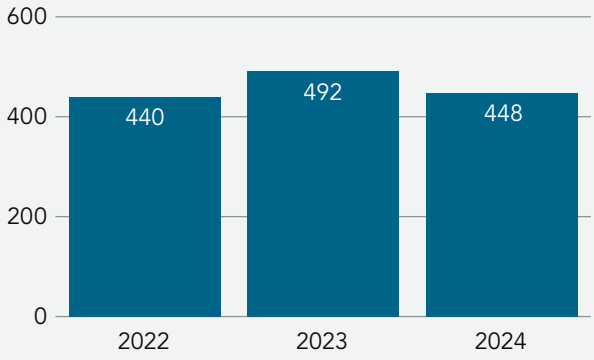
Surgery	2022	2023	2024
Day surgery procedures	506	434	464

Figure 23: Chemotherapeutic treatment for children (cytostatics), 2022–2024.



Treatment	2022	2023	2024
Number of unique patients	148	142	134

Figure 24: National and international pediatric patients, 2022–2024.



National and international patients	2022	2023	2024
International	51	40	31
National	390	452	417
Number of outpatient contacts	1,520	1,701	1,507
Number of inpatient episodes	165	111	114

Medical unit Breast, Endocrine Tumours and Sarcoma (BES)

ME BES is organised under Theme Cancer, acting Head of Operations **Fredrik Karlsson**.

Within the organisation patients with tumours of the breast, endocrine organs and sarcomas are examined and treated. We work in a multidisciplinary way and we have four sections.

Breast Surgery Section

The surgical treatment of breast cancer is in an era of de-escalation. The section has now fully implemented Targeted Axillary Dissection (TAD), which means that patients with limited axillary metastasis and good response to neoadjuvant systemic therapy can undergo more limited surgery. This reduces the risk of arm lymphoedema, a troublesome condition that reduces the quality of life for some breast cancer patients.

To increase the share of breast-conserving surgery, we have further developed surgical expertise within advanced breast-conserving oncoplastic surgery, including perforator flap and rotation flap surgeries. For the fifth consecutive year, we organised "Lump Day" in October, where 56 patients with lumps in breasts and armpits, without referral, received a breast examination and plans of further investigation.

We have enrolled patients in the AXSANA study, which investigates quality of life after different types of axillary surgery, and the PREP study (see Hereditary cancer). In 2025, inclusion in two additional clinical breast surgery studies is planned.

Our work on lead time reduction has been intense, with the goal of 80% of patients receiving their treatment on time. In 2023, only 38% achieved this target at the start of treatment with surgery, but by 2024 the figure has improved to 58%. Our target for 2025 is to reach 80%.

A specialist competence (SK) course in breast surgery was held, and four breast surgeons have been trained in team-based learning (TBL), a science of learning used at Karolinska Institutet. We have had an oncoplastic fellow from Sundsvall Hospital for further training in oncoplastic surgery and we participated in multidisciplinary working groups on benign breast changes (B3), idiopathic granulomatous mastitis and phyllodes tumours.

During the year, we held six breast cancer flow management group meetings, with participation from patient representatives and multidisciplinary collaboration partners. International visits have been conducted by the Oslo Breast Centre in May, and a three-day visit from the Tallinn Breast Centre is planned for January 2025. We plan to apply for EUSOMA accreditation in 2025.

Section for Hereditary Cancer

In 2024, the Section for Hereditary Cancer (HC) has been working intensively towards closer collaboration with the different cancer sections within the hospital. There is an increasing need for rapid predictive evaluation of treatment for suspected hereditary cancer. A genetic counselling information and rapid gene panel testing within three weeks has been implemented for breast cancer and in 2024 also for colorectal cancer.

Through a project via the RCC, we have nationally trained contact nurses to increase knowledge of hereditary cancer and genetic counselling before mainstream testing upon cancer diagnosis. Karolinska participates actively in MDT ERN-GENTURIS, a European reference network for rare tumour risk syndromes.

We conduct translational research for the early detection and prevention of breast and ovarian cancer. The PREP study, coordinated by Angelique Rådestad, is collecting breast tissue from healthy controls, risk-reducing mastectomy (BRCA) patients and progressed breast cancer. Similar tissue collection is ongoing for ovarian cancer.

Research on new prevention methods, including risk reduction measures for BRCA mutation, is conducted. We participate in the TUBA-WISP II study, which choose between a two-stage risk-reducing surgery (initially fallopian tubes, then ovaries) or standard surgery. The study examines quality of life and oncological safety.

We also started PhD projects within hereditary gastric cancer and BRCA mutation, wich foscus on personalized surveillance programs and quality of life after risk-reducing surgeries.

Residents in oncology carry out a 1–2 week rotation at ÄC in collaboration with clinical genetics. Basic training is conducted on an ongoing basis via VFU gynaecology. Patient involvement is a central part of the activities, with two representatives in the management team of ÄC, one of whom also sits on the steering committee of Karolinska CCC.

Publication: Natural Killer Cell Dysfunction in Premenopausal BRCA1 Mutation Carriers: A Potential Mechanism for Ovarian Carcinogenesis. Cancers, doi.org/10.3390/cancers16061186

Publication: Sexual function following risk-reducing salpingo-oophorectomy: a prospective cohort study. Sexual medicine, doi.org/10.1093/sexmed/qfae078

Publication: Investigation of Genetic Alterations Associated With Interval Breast Cancer. JAMA oncology, doi.org/10.1001/jamaoncol.2023.6287

Section for Endocrine and Sarcoma Surgery

The Section for Endocrine Surgery is the sole provider within Region Stockholm and also evaluates and treats patients from other regions and abroad. Since April 2023, together with units in Skåne, Gothenburg, and Uppsala, we have been assigned to provide National Highly Specialized Care (NHV) for advanced neuroendocrine tumors (NET) and advanced adrenal tumors. This means that patients with advanced NET, pancreatic NET, and inoperable rectal NET are referred to us, as well as patients with adrenal tumors larger than six centimeters or showing signs of malignancy. Within NHV, national multidisciplinary conferences are held to discuss these complex conditions.

We are also one of three national centers for surgery for sarcomas in the abdomen and retroperitoneum and participate in treatment programs for all diagnosis groups within the unit. Over the past year, we have improved accessibility and are now queue-free, with the ability to offer surgery within the healthcare guarantee.

In addition to clinical work, we are engaged in research and education and participate in the multicenter study START-NET, which investigates the treatment of progressive NET. The study explores whether individualized PRRT therapy with adjusted dosing improves progression-free survival compared to the current standard treatment. Another project focuses on antibody-mediated molecular radiotherapy, where Lutetium is linked to an antibody targeting CD44v6, now in the first phase of a "first-in-human" study.

Several of the section's physicians lead independent research projects on endocrine tumors, including studies on the treatment of hyperparathyroidism, cognitive effects after thyroid cancer, and translational studies aimed at improving prognosis assessment and tailoring treatment and follow-up for patients with thyroid cancer.

Section for Breast, Endocrine Tumors, and Sarcoma Oncology

Throughout 2024, we have maintained our focus on improving patient care while actively participating in education, clinical trials, and research projects. We have updated our patient-centered protocols and strengthened collaboration with patient representatives, including the addition of a patient representative to the leadership group, which is managed jointly with the Section for Endocrine and Sarcoma Surgery.

Ongoing efforts to transition chemotherapy treatments from inpatient to outpatient care, currently led by David Goldstein, are progressing. During the year, the Breast Center has hosted two delegation visits from Norway and Cyprus, in collaboration with the Breast Surgery Section and Care Area 2.

The ARIADNE study, an international multicenter trial investigating biology-driven de-escalation of neoadjuvant therapy for HER2-positive breast cancer, has continued to enroll patients and has attracted significant international interest. We are the sponsor of the study, which is led by Theodoros Foukakis and Alexios Matikas.

At ESMO Breast 2024 and ESMO 2024, data from three studies were presented: the phase III PANTHER study and the phase II PREDIX HER2 and PREDIX Luminal B studies. Long-term follow-up shows that dose-intense chemotherapy after surgery reduces the risk of recurrence and improves survival for patients with high-risk breast cancer. These findings were presented at ESMO Breast and published in the Journal of Clinical Oncology.

Publication: Longitudinal molecular profiling elucidates immunometabolism dynamics in breast cancer. Nature communications, doi.org/10.1038/s41467-024-47932-y

Publication: Benefit from dose-dense adjuvant chemotherapy for breast cancer: subgroup analyses from the randomised phase 3 PANTHER trial. The Lancet regional health. Europe, doi.org/10.1016/j.lanepe.2024.101162

Figure 25: Proportion of patients starting surgical treatment within target, 2020–2024.

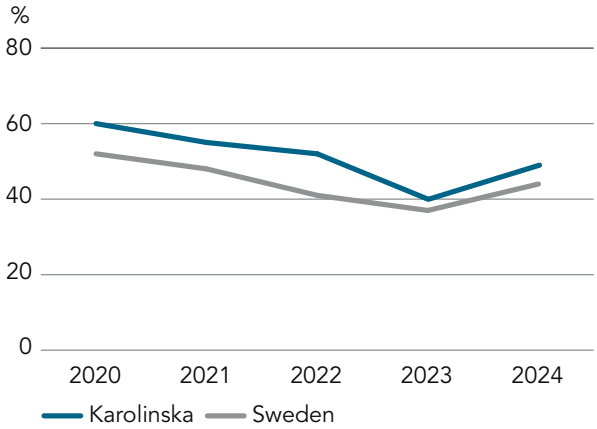
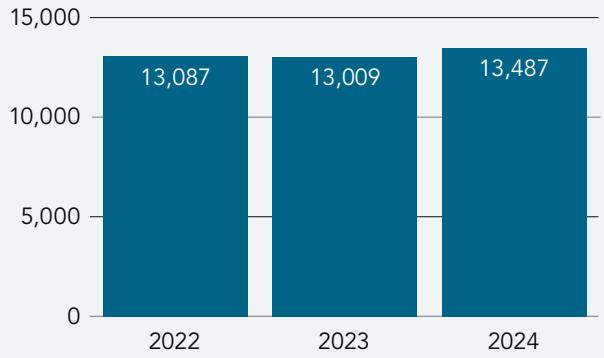
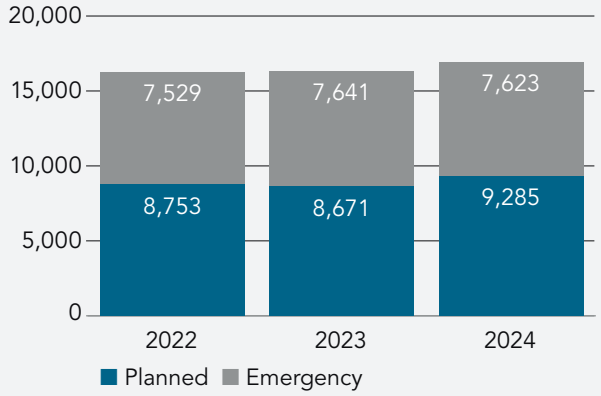


Figure 26: Number of surgical interventions, 2022–2024.



Surgery	2022	2023	2024
Of which, day surgery procedures	3,983	4,202	4,418
Proportion of day surgery procedures	30.4%	32.3%	32.8%
Of which, robot-assisted procedures	1,249	1,396	1,537

Figure 27: Number of planned and emergency hospital admissions, 2022–2024.



Inpatient Care	2022	2023	2024
Number of inpatient care episodes	16,282	16,312	16,908
Proportion of emergency inpatient care	46%	47%	45%
Number of hospitals beds	205	204	196

Medical unit Pelvic Cancer

ME Pelvic Cancer is organised under Theme Cancer, Head of Operations **Stefan Carlens**.

There are three major cancer streams within the organisations: colorectal, gynaecological and urological. We also manage benign conditions such as surgery for IBD and intestinal failure, and benign urologic surgery, including kidney stone treatment and reconstructive surgery. This summary focuses on cancer.

All parts of the medical unit Pelvic Cancer are involved in the basic training of medical students. With the new 6-year medical programme, we have redesigned courses and examinations to meet new requirements.

Colorectal cancer section

The Section strives to be a world leader in clinical and research activities. Structural changes have been implemented and we have been designated as an NHV provider for advanced pelvic surgery, increasing the proportion of patients requiring surgery from other regions with advanced or recurrent cancer.

As part of our focus on early cancer treatment, we are responsible for advanced endoscopy and minimally invasive tumour removal. The aim is to reduce the need for extensive surgery. Our Watch-and-Wait clinic, the largest in Sweden, offers organ-preserving treatment for rectal cancer. In collaboration with medical unit Radiation therapy, the introduction of contact radiation therapy is planned for Q1 2025. To ensure equal assessment of rectal cancer patients, a central regional multidisciplinary conference (MDC) was established in 2024.

Together with Perioperative Medicine and Intensive Care (PMI) and medical unit Ageing, we have started the hospital's first high-risk clinic, which is now implemented throughout the medical unit Pelvic Cancer. The aim is to optimise frail patients for surgery and identify those who do not benefit from surgery.

The section and its research team have driven the development of precision medicine within colorectal cancer. The ALASCCA study, the largest academic biomarker-driven RCT within the field, is investigating adjuvant aspirin treatment for patients with colorectal cancer and Pik3CA mutation. Results will be presented at ASCO GI in January 2025. In parallel, pilot projects for broad genetic testing and ctDNA analysis have been conducted and are being implemented regionally.

Gynaecological cancer

NHV Advanced Pelvic Surgery started on July 1 and is the section's third NHV mission. Cooperation within the national MDK has worked well. During the year, Karolinska has led the NHV vulvar cancer and organised a national quality registry meeting, where we noted a significantly better 5-year survival for vulvar and ovarian cancer compared to other regions.

Improvement work has continued, including outpatient surgery for robotic hysterectomy for endometrial cancer, releasing inpatient resources. Investment in single-port robot for minimally invasive surgery has enabled operations through one incision instead of five, improving patient recovery.

We have expanded our work within the field of rare gynaecological cancers and we participate in the EURACAN network. The national MDK for trophoblastic tumours now also includes other rare gynaecological tumours. We plan to develop cooperation in clinical and translational research.

During the year, we hosted two international conferences: EOTTD in May and NSGO in November, focusing on precision medicine within gynaecological cancer and new molecular assays.

Urological cancer

ME Pelvic Cancer conducts urologic cancer surgery at both sites. Solna focuses on bladder, prostate and reconstructive surgery, while Huddinge handles kidney, urothelial and testicular cancer.

In 2024, urology in Solna has evolved, and waiting lists for bladder and prostate cancer have been virtually eliminated through extra surgical capacity. The ERAS programme for post-operative recovery will be implemented in 2025 for all urological patient flows.

The new single-port robot is being used successfully, especially within kidney cancer surgery, reducing surgical trauma and shortening care periods. For advanced prostate cancer and radiation complications, an NHV mission is planned. Within Symphony, an EU project, we are developing structured healthcare data to reduce duplication of documentation and facilitate research.

We have started using Optilume for urethral strictures and are providing clinical training. Students are supervised by our junior doctors, who were again appointed best teachers.

In Huddinge, we have increased patient volumes, both within elective and emergency surgery, and eliminated waiting lists within the cancer flows. We have NHV missions for advanced testicular cancer surgery and are developing centralised care for cancers of the renal pelvis.

Research has been extensive with 15 open studies within radiation therapy, medical treatment and sampling. A new role where nurses pre-screen patients has shown good results and will be fully implemented in 2025.

Patient involvement has strengthened through regular meetings with patient representatives. We continue to work for high quality care, education and research.

Publication: Total neoadjuvant treatment using short-course radiotherapy and four CAPOX cycles in locally advanced rectal cancer with high-risk criteria for recurrence: a Swedish nationwide cohort study (LARCT-US). EClinicalMedicine, doi.org/10.1016/j.eclinm.2024.102771

Publication: Atezolizumab plus bevacizumab and chemotherapy for metastatic, persistent, or recurrent cervical cancer (BEATcc): a randomised, open-label, phase 3 trial. Lancet (London, England), doi.org/10.1016/S0140-6736(23)02405-4

Publication: Whole-brain spatial transcriptional analysis at cellular resolution. Science (New York, N.Y.), doi.org/10.1126/science.adn9947

Publication: Molecular Subtypes Are Associated With Clinical Benefit in Cisplatin-Treated Metastatic Urothelial Cancer Patients. JCO precision oncology, doi.org/10.1200/PO.24.00209

Medical unit Cell Therapy and Allogeneic Stem Cell Transplantation

ME CAST is organised under Theme Cancer, Head of Operations **Stephan Mielke**.

Allogeneic stem cell transplantation and advances within cell and gene therapy – Allogeneic stem cell transplantation is used to treat both children and adults with different types of blood cancer, such as acute and chronic leukaemia, lymphoma, myelodysplastic syndrome and myeloproliferative disorders. In addition, patients, especially children, with immunodeficiency diseases, anaemias and inborn errors of metabolism can be cured by this treatment method. Patients come from all over Sweden to undergo transplantation, and we also treat patients with multiple sclerosis (MS).

Soon it will be 50 years since the first allogeneic stem cell transplant was performed at Karolinska in 1975. Today, CAST is a comprehensive platform for cell and gene therapy. During the year, we conducted 130 treatments for both children and adults, reflecting an increased demand and growing complexity of care.

Progress within medicines management and collaboration – The introduction of pharmacists via OO1 has significantly improved the management of medicines, thereby increasing patient safety. Together with our collaboration partners Clinical Immunology and Transfusion Medicine (KITM) and Paediatric Haematology, we maintain the high standards established by the international JACIE certification. The JACIE area is also the clinical part of the newly established Karolinska ATMP centre.

In 2024, our own first virus-specific T cells were produced in the stem cell laboratory. The CAR-T cell programme continues to expand, and we have already completed more than 70 treatments with CAR-T cells and other genetically modified immune cells within CAST.

Innovations within treatment and research – In 2024, several patients with solid tumours were treated with CLD6-CAR-T cells and an mRNA vaccine. Five years after Karolinska's first CAR-T patient was treated with liso-cel in the TRANSFORM study, the same therapy was introduced as standard treatment for patients with r/r DLBCL.

Some of the conditioning for CAR-T cell therapy and stem cell transplantation has already been moved to our new out/patient facilities, and the aim is to reintroduce home care for our patients.

Future and research within cell and gene therapy – CAST and its research unit USVE are actively engaged in cell and gene therapy research. Our translational projects include: Microvesicles, Neurotoxicity, Gene therapy for sickle cell disease, Hospital-based production of ATMPs, Therapeutic NK cells, Microbiome and Vaccination and infections in immunosuppressed patients

Our future goal is to translate research into patient benefits faster and more efficiently. As part of this work, a Collaborative Research and Development Agreement (CRADA) has been signed between USVE CAST (K/KI) and Kite/Gilead.

Publication: Antibody-displaying extracellular vesicles for targeted cancer therapy. Nature biomedical engineering, doi.org/10.1038/s41551-024-01214-6

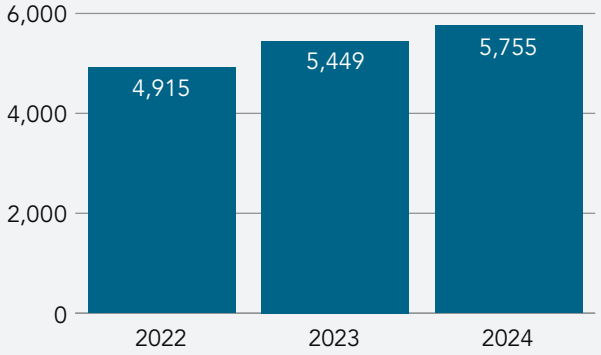
Publication: Improved outcome of COVID-19 over time in patients treated with CAR T-cell therapy: Update of the European COVID-19 multicenter study on behalf of the European Society for Blood and Marrow Transplantation (EBMT) Infectious Diseases Working Party (IDWP) and the European Hematology Association (EHA) Lymphoma Group. Leukemia, doi.org/10.1038/s41375-024-02336-1

Publication: Author Correction: Lisocabtagene maraleucel in follicular lymphoma: the phase 2 TRANSCEND FL study. Nature medicine, doi.org/10.1038/s41591-024-03175-4

Publication: Harnessing upregulated E-selectin while enhancing SDF-1α sensing redirects infused NK cells to the AML-perturbed bone marrow. Leukemia, doi.org/10.1038/s41375-023-02126-1

Karolinska ATMP Centre in focus

Figure 28: Number of unique national and international patients, 2022–2024.



National and international patients	2022	2023	2024
International	397	483	484
National	4,519	4,970	5,276
Multidisciplinary conferences	3,121	3,741	4,243
New visits, physicians	947	1,066	924

Medical unit Haematology

ME Haematology is organised under Theme Cancer, Head of Operations **Maria Magnusson**.

In all sections, we are forward-looking and developing our initiatives to integrate care, research and education, with the aim of achieving the highest quality, patient involvement and long-term sustainable staffing.

Precision medicine, new therapies and improved nursing are leading to increased survival rates and our patients increasingly need multi-year maintenance treatment and follow-up. This positive development has, however, led to a high burden on healthcare and during the year we have therefore worked on measures to improve the working environment, staff recruitment and new work practices. Several Close Care projects for highly specialised care at home have been launched. These include patient education to enable patients to manage more of their own treatment. Skill-sharing with nurse-led clinics is important for strengthening follow-up. We are also investing in the next generation of colleagues and we receive good ratings for our team-based learning from medical students and the highest ranking from interns. We are accelerating research by increasing the number of clinical studies that actively include patients. Over 90 scientific papers have been published from ME Haematology this year.

Section for Bone Marrow Failure and Leukaemia and Myeloma

Innovative home chemotherapy using CADD-Solis pumps has radically reduced the need for hospital visits for our patients. Patients indicate in evaluation surveys that this is "a big step forward" with more control over their treatment and daily life.

We have introduced patient-controlled sedation (PCS) with propofol to relieve anxiety and pain during bone marrow sampling, which has contributed to greater safety and a gentler procedure.

Publication: Patient-Specific Measurable Residual Disease Markers Predict Outcome in Patients With Myelodysplastic Syndrome and Related Diseases After Hematopoietic Stem-Cell Transplantation. Journal of clinical oncology, doi.org/10.1200/JCO.23.01159

Publication: Natural killer cell biology and therapy in multiple myeloma: challenges and opportunities. Experimental hematology & oncology, doi.org/10.1186/s40164-024-00578-4

Publication: Identification and surveillance of rare elapse-initiating stem cells during complete remission after transplantation, Blood. doi.org/10.1182/blood.2024025371

Section for Lymphoma

The BioLymph precision medicine study, which will lead to more personalised therapy in the future, included patient number 500 during the year. For improved diagnostics and research sampling, an important close collaboration with a new X-ray unit, the Biopsy Intervention Centre (BIC), has been initiated for multimodal sampling. In terms of treatment, this year we have increased availability of CAR-T and bispecific antibodies both in and out of studies for patients with multiple lines of therapy, and several new studies have been initiated for the treatment of chronic lymphocytic leukaemia.

Publication: Ibrutinib combined with immunochemotherapy with or without autologous stem-cell transplantation versus immunochemotherapy and autologous stem-cell transplantation in previously untreated patients with mantle cell lymphoma (TRIANGLE): a three-arm, randomised, open-label, phase 3 superiority trial of the European Mantle Cell Lymphoma Network. Lancet (London, England), doi.org/10.1016/S0140-6736(24)00184-3

Publication: Zanubrutinib Versus Bendamustine and Rituximab in Patients With Treatment-Naïve Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma: Median 5-Year Follow-Up of SEQUOIA. Journal of clinical oncology, doi.org/10.1200/JCO-24-02265

Section for Coagulation

We have been awarded NHV contracts within the field of coagulation diseases including congenital bleeding disorders, acquired haemophilia and von Willebrand disease. To this end, investments have been made in multidisciplinary conferences, applied precision medicine and strengthening the haemophilia registry.

Publication: Tocilizumab reduces hypercoagulation in COVID-19 – Perspectives from the coagulation and immunomodulation Covid assessment (Coag-ImmCovA) clinical trial. Thrombosis research, doi.org/10.1016/j.thromres.2024.109135

Publication: Out-of-hospital cardiac arrest associated with venous thromboembolism-a Swedish population-based cohort study. Journal of thrombosis and haemostasis, doi.org/10.1016/j.jtha.2024.11.021

Publication: Global Hemostatic Methods to Tailor Treatment With Bypassing Agents in Hemophilia A With Inhibitors- A Single-Center, Pilot Study. Clinical and applied thrombosis/hemostasis, doi.org/10.1177/10760296241260053

Brain tumour patient flow

The patient flow is organised under Theme Heart, Vascular and Neuro, medical unit Neurology, Head of Operations **Albert Hietala**.

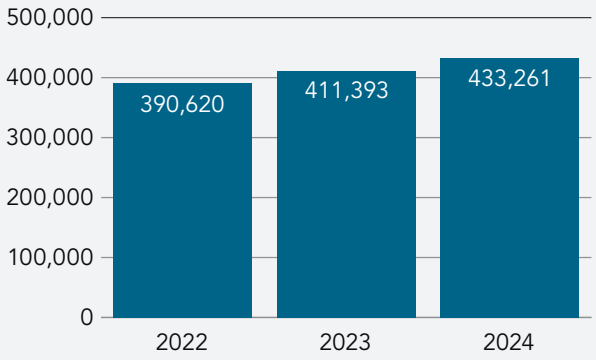
The Patient Flow (PF) investigates and treats adult patients from across the region with primary brain and spinal cord tumours. The most common diagnosis is malignant glioma. The flow is multidisciplinary, with staff from different medical units coming together around the patient. We are the sole provider of brain tumour care in the region. We handle emergency and planned neurosurgical operations and provide other neuro-oncological treatment. We have access to advanced methods such as Gamma Knife, an advanced method of radiation surgery that treats brain diseases without making any incisions and is used to focus high-dose radiation on small, defined areas of the brain. LITT (laser ablation) is another minimally invasive method where lasers are used to destroy tumours or other damaged tissues with heat.

The multi-professional work practice and management structure can be a challenge. During the year, the flow has therefore focused on further consolidating the team to create a complete brain tumour centre. Many of the group's members from different professions have participated in the European Brain Tumour Conference EANO in Glasgow. Insights and inspiration from the conference were later discussed at the joint planning day to embody and structure proposals.

The flow has short lead times as standard. The majority of the diseases managed are very serious, so interventions must be rapid. We have a continuous review of our lead times. This year we have started new projects with both the radiation therapy unit and the pathology lab. The aim is to see if we can standardise and simplify our work with simple interventions and thus speed up individual patient lead times.

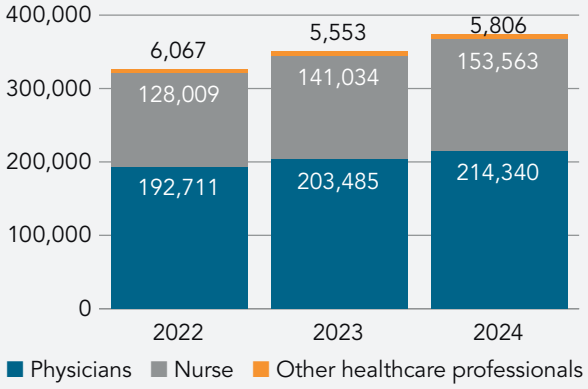
The flow is acting as the lead investigator, conducting a multicentre clinical study investigating the relevance of adding antiviral therapy targeting cytomegalovirus (CMV) to standard treatment. We also actively participate in other research conducted in the Nordic countries.

Figure 29: Number of direct and indirect healthcare contacts, 2022–2024.



Outpatient Care	2022	2023	2024
Proportion of indirect contacts	32%	32%	35%
Number of unique patients	66,405	69,414	71,511
Number of new patient visits to doctors	19,799	20,789	20,418
Number of unique patients with a tumor diagnosis and a new visit to doctors	9,961	10,814	10,885

Figure 30: Outpatient contacts per staff category (excluding ME Radiotherapy), 2022–2024.



Outpatient contacts per staff category	2022	2023	2024
Physicians	192,711	203,485	214,340
Nurses	128,009	141,034	153,563
Other staff	6,067	5,553	5,806

We have a continuous training mission at both basic and specialist levels. Our unique position as the sole provider of the care means that we are dependent on good cooperation with other stakeholders, which is why we always want to promote good training and an open environment

Medical unit Head, Neck, Lung and Skin Cancer

ME Head, Neck, Lung and Skin Cancer is organised under Theme Cancer, Head of Operations **Signe Friesland**. The unit has a specialist responsibility for oncology. Oncology specialists have section managers as first-line managers in the section where they primarily work. Residents are employed under a Residency Manager. Furthermore, the unit is responsible for the lung surgery performed at the hospital.

Oncology Residency

Medical unit HHLH is responsible for the more than 30 resident positions within oncology. Residents are highly active in research, with all of them becoming involved in various research projects through their residency projects. More than half are registered PhD students, many of whom have already defended their thesis or are half way there. We run scheduled trainings for all resident physicians in the region and in 2024 several trainings were conducted. The MEGA-Journal Club took place on May 24th where about 20 very relevant articles within oncology were presented and discussed. We also provided training in areas such as sustainability in healthcare, statistics, CNS tumours, radiation therapy, cardio-oncology and evidence-based medicine. In September, a large number of residents participated in the KI Cancer Retreat at Djurönäset. POST-ESMO was conducted on October 25 as a scheduled training day.

CT-guided biopsy for cell sampling of a lung tumor.

In October, we held a national postgraduate training on modern oncology treatment that was well attended by resident physicians at the end of their residency as well as specialists from Stockholm and other regions. On September 6, all oncology residents completed the Swedish Oncology Association's (SOF) progression test, which we had as a scheduled educational activity. Four of our residents also went to ESMO in Barcelona and sat the ESMO exam, which they all passed.

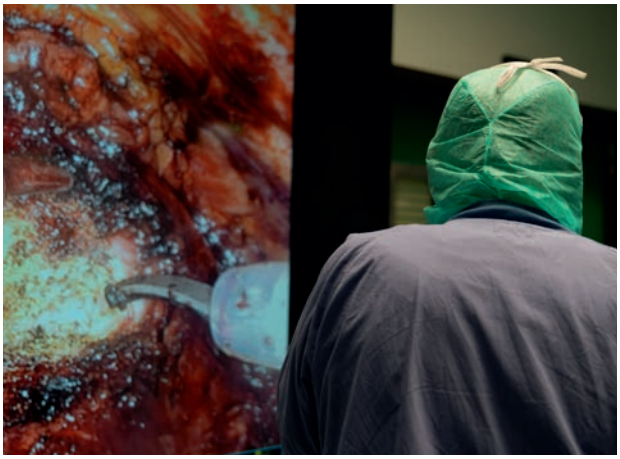
Section for Lung Cancer

2024 has been a year of significant progress for our lung cancer activities, with an increasing number of patients being evaluated, new biopsy techniques and a dedicated fast track for evaluation. We are conducting intensive clinical and translational research in collaboration with KI on prognostic and predictive biomarkers for survival and treatment effects. A large biobank project is underway, PreDDLung, with the collection of tumour material and blood samples, and during the year we received welcome support from SciLifeLab in Stockholm. Within this project, lung cancer is the first at NKS with electronic signatures for patient inclusion. We have 33 open and 12 initiated treatment studies during the year and several planned, these include new treatments with targeted therapies, immunotherapy as well as radiation therapy in combination with medicines. A study on lung cancer screening in Region Stockholm is ongoing as well as studies on quality of life and frailty associated with oncology treatments. Patient representatives are involved in clinical study planning and regular meetings. Our research, development and training (FOUU) team holds frequent research and training days and we support individual staff members to attend training courses and scientific conferences.

Publication: Trends in lung cancer survival in the Nordic countries 1990–2016: The NORDCAN survival studies. Lung cancer, doi.org/10.1016/j.lungcan.2024.107826

Publication: Treatment of metastatic ALK-positive non-small cell lung cancer: real-world outcomes in a single center study.Translational lung cancer research, doi.org/10.21037/tlcr-24-396

Publication: Fertility and reproductive concerns related to the new generation of cancer drugs and the clinical implication for young individuals undergoing treatments for solid tumors. European journal of cancer, doi.org/10.1016/j.ejca.2024.114010



Head and neck cancer

The number of robotic operations with our new single-port robot has increased. At the outpatient clinic, we continue to work on making our patients feel included in their treatment and over the next year we will improve the written information inside and outside ”Min vårdplan” (My care plan). We remain active in research to optimise treatment and improve quality of life. Studies are available on circulating HPV-DNA in oropharyngeal cancer, diagnostics of HPV-DNA in fine needle aspiration in cervical resistance, sentinel lymph nodes for the tumours, factors affecting survival, treatment side effects and quality of life within laryngeal, epipharyngeal, lip and salivary gland cancers, as well as experimental studies at the Bioclinium research laboratory. A Nordic collaboration on oropharyngeal cancer has started.

Publication: “High-risk” tumors of the lip treated with external beam radiotherapy and high-dose-rate brachytherapy: Long-term outcome. Head & neck, doi.org/10.1002/hed.27936

Publication: A multicentric randomized controlled phase III trial of adaptive and 18F-FDG-PET-guided dose-redistribution in locally advanced head and neck squamous cell carcinoma (ARTFORCE). Radiotherapy and oncology journal, doi.org/10.1016/j.radonc.2024.110281

Publication: Human papillomavirus (HPV) load is higher in HPVDNA/p16 positive than in HPVDNA positive/p16 negative oropharyngeal squamous cell carcinoma but does not differ significantly between various subsites or correlate to survival. Oral oncology, doi.org/10.1016/j.oraloncology.2024.106749

Skin cancer

A project on remote consultation through digital decision support for tumour wounds has led to the reopening of the Tumour Wound Clinic. A teledermatoscopy project has been widely implemented. Development of Quality of Life (QoL) questionnaires for melanoma patients is ongoing. Research projects aim to improve diagnostics, survival, knowledge of immune side effects and treatment efficacy for melanoma. We have shown that the trend of a steep rise in incidence of melanoma in Sweden starts to reduce in younger adults, but is rising in older adults. Other work has led to increased awareness of fertility and reproduction in our patients in the era of new oncology treatments.

We would also like to draw attention to Hildur Helgadottir, who together with colleagues has received a large grant from the Sjöberg Foundation, to introduce/make available/optimise both neo-adjuvant melanoma treatment and cell therapy for melanoma in Sweden. sjobergstiftelsen.se/malignt-mellanom/

Hildur Helgadottir, Associate Professor Department of Oncology-Pathology and Senior Consultant Cancer Theme

Publication: Melanoma Incidence and Mortality Trends Among Patients Aged 59 Years or Younger in Sweden. JAMA dermatology, doi.org/10.1001/jamadermatol.2024.3514

Publication: Impact of personalized response-directed surgery and adjuvant therapy on survival after neoadjuvant immunotherapy in stage III melanoma: Comparison of 3-year data from PRADO and Op CIN-neo. European journal of cancer, doi.org/10.1016/j.ejca.2024.115141

Publication: Loss in life expectancy in patients with stage II–III cutaneous melanoma in Sweden: A population-based cohort study. Journal of the American Academy of Dermatology, doi.org/10.1016/j.jaad.2023.12.053

Medical unit Upper Abdomen

ME Upper Abdomen is organised under Theme Cancer, Head of Operations **Ernesto Sparrelid**.

The unit is responsible for the investigation, care and treatment of patients with malignant and highly specialised benign diseases of the oesophagus, stomach, liver, biliary tract and pancreas.

In 2024, we have successfully delivered cancer care with short waiting times within all patient flows. At the same time, we have had the capacity to receive many patients from other regions of the country for cancer surgery and other cancer treatment, especially when waiting times there were too long.

Among the clinical achievements of the year, we can highlight in particular the renewed and structured implementation of the Mayo protocol for liver transplantation in perihilar bile duct cancer. This has been made possible through close collaboration between several sections of medical unit Upper Abdomen and medical unit Transplantation. In addition, a greater proportion of patients treated in the organisation have been able to receive targeted treatment, as a result of both improved diagnostics and research advances.

The minimally invasive, robot-assisted surgery initiative has continued to develop. For example, in liver and pancreatic surgery, over 40% of operations are now performed using this technique. For these patients, we have seen positive effects in terms of shorter care periods, minimal use of intermediate care and spinal anaesthesia, and limited referral to rehabilitation clinics in the region.

Research and education

Research and education have continued to be a priority for medical unit Upper Abdomen, and several important advances have been made during the year. In 2024, we have enrolled more patients in clinical studies and started more studies than ever before.

Several staff members have also achieved academic qualifications. Hannes Hagström has been appointed Adjunct Professor of Gastroenterology, while Jennie Engstrand and Poya Ghorbani have been appointed Senior Lecturers of Surgery. Furthermore, our gastroenterology residents, Sophie Walton Bernstedt and Soran Rabin Bozorg, defended their PhD thesis during the year. In addition, Magnus Nilsson has been appointed as the new R&D Manager at Theme Cancer.

During the year, the medical unit Upper Abdomen also hosted several major scientific meetings. Among these, we can particularly highlight the Collaboration in Science at Campus Flemingsberg and a world congress on primary sclerosing cholangitis, led by Annika Bergquist.

Publication: Inebilizumab for Treatment of IgG4-Related Disease. The New England journal of medicine, doi.org/10.1056/NEJMoa2409712

Publication: Neoadjuvant FOLFIRINOX versus upfront surgery for resectable pancreatic head cancer (NORPACT-1): a multicentre, randomised, phase 2 trial. The lancet. Gastroenterology & hepatology, doi.org/10.1016/S2468-1253(23)00405-3

Publication: Cause of death by fibrosis stage in 959 patients with biopsy-proven NAFLD. Gut, doi.org/10.1136/gutjnl-2023-331331

Publication: Antireflux Surgery Versus Antireflux Medication and Risk of Esophageal Adenocarcinoma in Patients With Barrett's Esophagus. Gastroenterology, doi.org/10.1053/j.gastro.2023.08.050

Person-centred care at Cancer Theme.

Nursing area 1

OO1 is responsible for patient care in close collaboration with ME Pelvic Cancer, ME Upper Abdomen, and ME CAST in Huddinge. Head of Operations: **Camilla Hultberg**.

Outpatient Clinic – In 2024, our Cell Therapy and Allogeneic Stem Cell Transplantation (CAST) unit opened a completely new outpatient clinic with an integrated day care facility. Significant efforts have been made to enhance patient care in the outpatient setting and to provide treatments on a non-hospitalized, outpatient basis.

Integration of Pharmacists into Clinical Operations – To efficiently manage the large volumes of medications across all OO1 units, particularly within CAST, pharmacists have been integrated into clinical operations this year. While still under development, this initiative has demonstrated significant benefits for patients and is an important step in further enhancing cancer care services.

Outpatient Clinic for Esophageal and Gastric Cancer – Patients visiting our clinic have often sought medical attention through their primary care provider. The standard procedure is for a referral to be sent to our clinic on the same day that a gastroscopy is performed, in cases where findings suggest a potential cancer diagnosis. Despite the absence of a histological biopsy result, a standardized care pathway (SVF) is initiated to minimize unnecessary waiting times.

Once we receive the referral, it is reviewed by a physician, and a plan is developed for further evaluation. This typically includes an initial outpatient visit, radiological examinations, additional gastroscopy if needed, and discussion at a multidisciplinary conference (MDK). Once the diagnostic process is complete, the patient is scheduled for a follow-up visit to determine the treatment plan and further management.

A dedicated team of specialized nurses, physicians, and dietitians follows a standardized initial assessment template. In addition to collecting social history and information on tobacco and alcohol use, the assessment evaluates nutritional difficulties. A specific tool is used to assess swallowing function. The patient's functional status is evaluated using the Eastern Cooperative Oncology Group (ECOG) Performance Status, the World Health Organization (WHO) functional scale, and the Clinical Frailty

Scale (CFS) to better understand the patient's overall vulnerability.

To date, over 100 patients have been assessed using this template, providing valuable decision-making support for multidisciplinary conferences.

Nursing area 2

OO2 is responsible for nursing care in close collaboration with medical unit Pelvic Cancer and medical unit Breast, Endocrine Tumours and Sarcoma in Solna, Head of Operations Anna Wiberg.

In conclusion, 2024 has been a year of progress, where our efforts have and will strengthen the quality of cancer care and set the stage for future developments. The focus has been on improving patient health through prevention, research, wise clinical choices through interprofessional collaboration and implementation of evidence-based practices.

New expertise in surgical nursing – Four specialist nurses are training to become advanced specialist nurses within surgical nursing and they will graduate in 2025. This specialist knowledge is expected to contribute to improved pre- and post-operative care and patient education, as well as shorter care periods and higher patient satisfaction.

Healthy lifestyles and prevention in cancer – A major project has been launched to support and promote healthy lifestyles in people diagnosed with cancer. In this work, patient organisations will play a major role in developing future care support within this area.

Research Sensi EX – Sensi EX is a randomized pilot study evaluating whether sensory vibration training can relieve chemotherapy-induced peripheral neuropathy. Analysis is now underway, with results expected in early 2025. Several intervention studies within the field of exercise as medicine are ongoing, including testing distance-based training in the home.

Wise clinical choices-minimising low-value care in cancer care – Identifying low-value care for our patients, i.e. care that benefits the patient, as well as resource-efficient and high-quality care is a focus area. The aim is to ensure individual care outcomes. Through staff training, patient involvement and optimisation of existing processes, together with the patient, we can minimise low-value care.

Patient engagement within more areas – In various contexts, patient and cancer care have worked together. This includes work on wise clinical choices and, in 2025, on healthy lifestyles and prevention in cancer. This work has and will strengthen our understanding of patients' needs and improve the quality of our efforts.

New work practice for symptom control in gastrointestinal cancer – Symptom checks during chemotherapy should be performed by the nurse on the medical treatment ward rather than by the contact nurse. The aim is to improve continuity, accessibility and patient security.

Prostate Team Conference – New work practices have been introduced to ensure that patients receive their follow-up in a timely manner and that the follow-up is more individualised. The results show that patients now receive their follow-up in time and to a greater extent more tailored to their needs.

Recruitment and training within nursing – Continued efforts to recruit more services as assistant university nurse positions to strengthen the quality of care closest to the patient. Similarly, motivate existing staff and increase the number of staff training to become specialist nurses.

Nursing area 3

OO3 is responsible for nursing care in close collaboration with medical unit Haematology and medical unit Head, Neck, Lung and Skin Cancer and has activities in both Solna and Huddinge, Head of Operations **Karolina Fridblom**.

Increased focus on patient participation – In 2024, activities have focused on improving patient safety by enabling patients to participate in their care. We regularly conduct digital patient surveys in all units. Out of 10,000 respondents, 85% feel involved in decisions about their care and treatment. The results of the surveys are used in the daily work to implement improvements that create value for patients. We will develop the questionnaires further in the future to create an even deeper understanding of patients' experience of participation. Our aim is to increase the proportion of patients who feel involved in decisions.

Home treatment within Haematology – Within Haematology, we have increased the proportion of patients with home treatment during the year. Home treatment means treatment with subcutaneous injections of cytotoxic medicines or antibody treatment carried out by the patient at home following instructions from the contact nurse. The aim is to create a better quality of life where patients can spend more time at home and less travel and time in hospital, with fewer side effects are reported, resulting in more satisfied patients. Furthermore, this creates room for more beds for patients who need both inpatient and outpatient treatment.

Opening of the Tumour Wound Clinic – In the autumn of 2024, we started up a tumour wound clinic. The target population is patients with complicated hard-to-heal tumour wounds and/or difficult-to-manage skin side effects of oncological treatment. The clinic receives patients from all over Theme Cancer. Since the start, around 60 treatments have been carried out. To enhance expertise and develop collaboration, an internal network will be launched in 2025.

Tumour disease of the head and neck region – A large proportion of our patients with tumour disease of the head and neck region and where the airways are affected, are treated with tracheostomy. The nursing of patients with tracheostomies is complex and requires in-depth knowledge of the anatomy in order to treat and care for the patients adequately and safely. Cooperation between inpatient and outpatient care is a prerequisite for quality care. Tracheostomised patients are also present in other patient flows within the hospital and we have initiated and started a project to create a tracheostomy team at Karolinska. The idea is that the team will work in the hospital as a whole and provide support with expertise and training efforts to units caring for patients with tracheostomies.

Supervision of students – We deal with many students throughout the year, both in outpatient and inpatient settings. The percentage of supervisors with supervisor training is 40%. To meet the need, we will invest in increasing the expertise of staff who supervise students and increase the proportion of staff with supervisor training in the coming years. The aim is for all supervisors to complete the e-learning VIL (Introduction to Supervision in Practice Integrated Learning) in 2025. Within two years, all units should have at least 50% of staff trained as supervisors.

Publication: Adaptation and feasibility of the Swedish Promoting Resilience in Stress Management intervention targeting adolescents and young adults newly diagnosed with cancer. Journal of psychosocial oncology, doi.org/10.1080/07347332.2024.2419663

Publication: Aspects of occupational safety: a survey among European cancer nurses. European journal of oncology nursing, doi.org/10.1016/j.ejon.2024.102595

Medical Treatment Department (MBA)

ME MBA is organised under Theme Cancer, Head of Operations **Susanne Wallberg**.

The work to improve patient care has continued in 2024 and the major change was the opening of a treatment unit at Norrtälje hospital with our own staff and in collaboration with Norrtälje hospital. This is part of the effort to bring cancer treatment closer to patients' homes. The opportunity was also offered to patients who have a summer residence in the Norrtälje area. The pilot activities were highly appreciated by patients and received mass media attention. The evaluation shows that patients felt confident in receiving their treatment outside the regular hospital and they found that the time saved was invaluable. In 2025, work will continue to try to establish a permanent treatment unit in Norrtälje. Huddinge opened a larger MBA unit in January with 10 additional beds with the aim of reducing patients' travel time to their cancer treatments.

Digital tools have been developed during the year, with nurses sending symptom checks to patients before their treatments to assess potential side effects digitally. The aim is to reduce medicine disposal and allow patients to monitor their own progress in terms of side effects and symptoms. In the coming years, more patient groups will report symptoms digitally.

Staff have been trained in conversational methods to strengthen and develop their professional conversational skills. The aim of the training is to increase the understanding of the conversational process, provide insights into the dynamics of conversation, develop skills to support and manage patients on life and ethical aspects, and practice dealing with distressed patients and loved ones. The training has been conducted together with the staff of medical unit Radiation Therapy.

Figure 31: Proportion of patients starting medical treatment within target, 2020–2024.

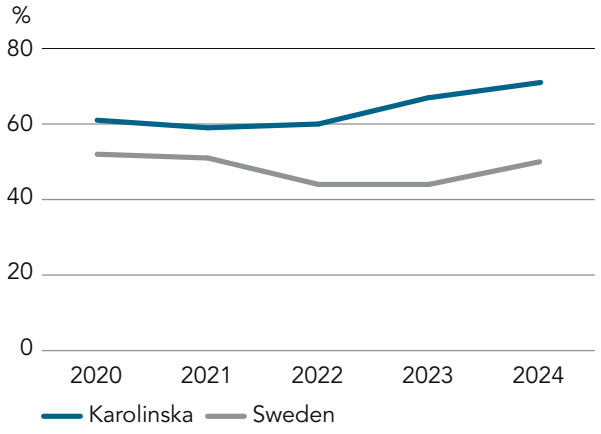


Figure 32: Number of new initiations of immune checkpoint inhibitors, 2021–2024.

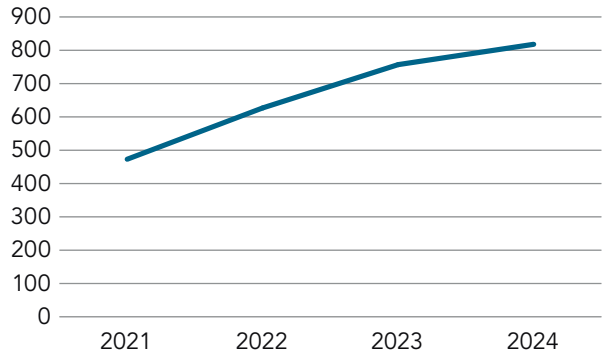
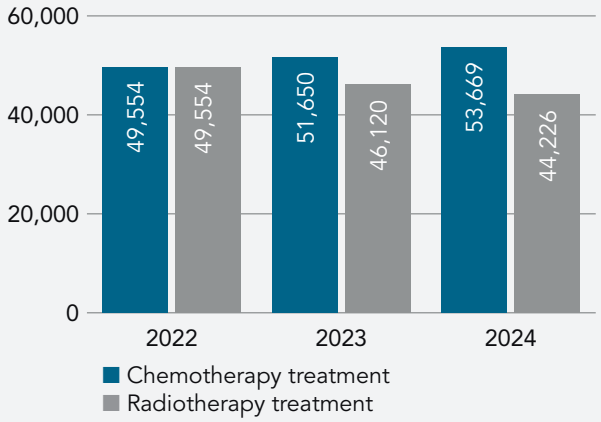


Figure 33: Number of treatments, 2022–2024.



Treatment	2022	2023	2024
Chemotherapy treatment			
Number of unique patients	6,331	6,627	6,839
Radiotherapy treatment			
Number of unique patients	3,953	4,026	3,886

From basic research to clinical implementation is the goal of Karolinska CCC.

Medical unit Radiotherapy

ME Radiotherapy is organised under Theme Cancer, Head of Operations **Mattias Hedman**.

The unit treats all forms of cancer and is responsible for radiation preparation, external radiation therapy and brachytherapy. We also prepare patients for proton beam therapy in Uppsala and we staff that clinic together with other university hospitals in Sweden.

During the year, we have invested heavily in expertise provision by recruiting doctors, nurses and radiology nurses. The aim is to strengthen the unit for the future, shorten lead times to radiation therapy and ensure radiation therapy expertise in several parts of the healthcare chain for the patient.

In the Outpatient Radiation Therapy unit, we have introduced a new concept for clinical training – a clinical treatment room with clear supervision of students. In addition, a national collaboration project during the year has led to the launch of continued training for nurses and radiation nurses within radiation therapy in September 2025. The training includes topographical anatomy and Image-Guided Radiation Therapy (IGRT).

In 2024, we have been working on implementing a new treatment method aimed at curation – contact brachytherapy – for patients with rectal cancer. In paediatric radiation therapy, we have established a structure for the provision of expertise for all professional categories and initiated work to reduce the need for anaesthesia during radiation therapy.

To meet the needs of Stereotactic Body Radiation Therapy (SBRT) – an advanced method to treat small, well-defined tumours with high precision – we are exploring the benefits of magnetic resonance imaging (MRI). This technology allows for moving image series over time and is often used to visualise organ and tissue movements in real time.

To better estimate respiratory-related tumour movement, we have started the RealMove (lung) study in 2024. AI is playing an increasing role within radiation therapy, and a PhD project has been launched with a focus on quality assurance of AI-based software and the design of safe work practices.

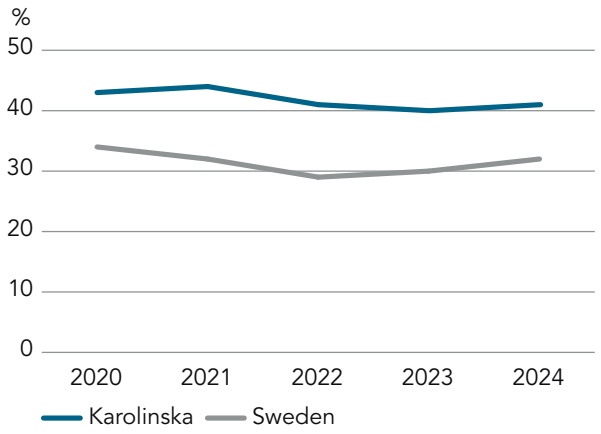
Finally, we have used a unique local quality registry for head and neck cancer radiation therapy to evaluate the clinical impact of previous methodological changes.

Publication: Surgical outcomes following total neoadjuvant therapy in rectal cancer with short-course radiotherapy using protons or photons: initial safety data from the PROREСT randomized trial. The British journal of surgery, *doi.org/10.1093/bjs/znae241*

Publication: Clinical implementation of a commercial synthetic computed tomography solution for radiotherapy treatment of glioblastoma. Phys Imaging Radiat Oncol. *doi.org/10.1016/j.phro.2024.100589*

Publication: "High-risk" tumors of the lip treated with external beam radiotherapy and high-dose-rate brachytherapy: Long-term outcome. Head & neck, doi.org/10.1002/hed.27936

Figure 34: Proportion of patients starting radiotherapy within target, 2020–2024.



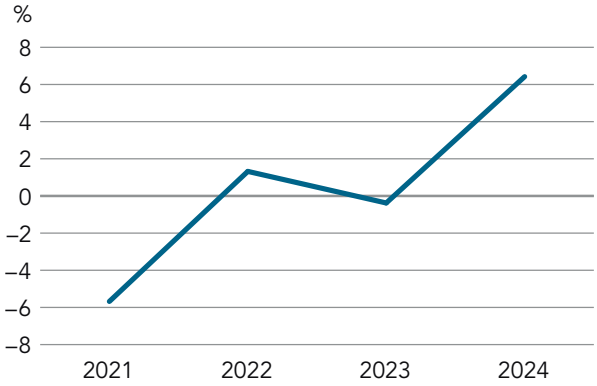
Mapping of the organisational and social work environment

In the annual mapping of organisational and social work environment (KOSA) for 2024, Theme Cancer shows a continued positive development compared to the previous year. The purpose of the mapping is to evaluate the working environment and employee satisfaction and to identify both strengths and areas for improvement.

This year's results show that Theme Cancer excels by achieving the highest ranking in Employee Net Promoter Score (eNPS) among all organisations within the hospital. This measure is internationally established and is used to assess how likely employees are to recommend their employer to others. The indicator is based on the answers to the question: "How likely is it that you would recommend Karolinska University Hospital as an employer to a friend or colleague?" In KOSA 2024, 71% of Theme Cancer employees are classified as ambassadors or neutral, while 29% are rated as critics. This result underlines the organisation's ability to create a work environment that supports both engagement and well-being.

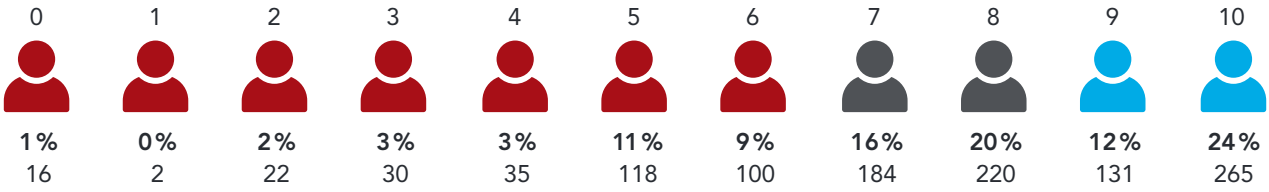
In conclusion, the results of the mapping confirm that Theme Cancer continues to perform well in promoting a positive and inspiring work environment. This success not only helps to strengthen employee well-being and motivation, but also positions Karolinska University Hospital as an attractive employer.

Figure 35: eNPS – Employee not promoter score. The value is calculated by the ratio between the proportion of promoters and the proportion of detractors.



The Cancer theme has 68 percent who are promoters or neutral, and 32 percent who are detractors, according to the eNPS scale.

Figure 36: Response distribution of eNPS for employees within the Cancer theme, where 0 corresponds to detractors and 10 corresponds to promoters.



Some awards during the year

KI Professor **Carl Johan Sundberg** is awarded the newly established Forum for Science Communication (FFF) Hall of Fame 2024 prize for his work in making research accessible and developing research communication.

Annika Sjövall, Karolinska University Hospital, was one of three recipients of the Eldsjälspriset (the "Driving Force Prize") awarded by the Network against Gynaecological Cancer for special efforts made by outstanding driving forces within cancer care.

KI Professor **Thomas Helleday** was awarded the Stora Jahre Prize 2024, for his discoveries of mechanisms of cancer development in humans, which have been implemented in the follow-up and treatment of patients.

The Landstinget Fond for healthcare development at Karolinska University Hospital granted the main applicant **Ewa Alderwi**, Karolinska University Hospital, for the project filmed information material for home treatment.

Jonas Bergh, KI Professor of Oncology, was awarded the Grand Silver Medal 2024 for his world-leading and unique contributions in cancer research at Karolinska Institutet. The medal has been awarded since 2010 to people who have made great contributions to KI.

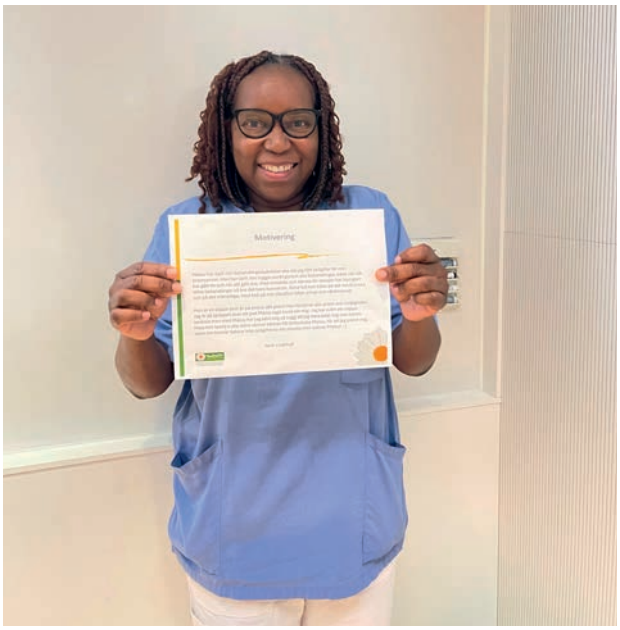
The 2024 Cancer Networker of the Year was awarded to **Eva Jolly**, Operational Manager of Karolinska CCC. The Network Against Cancer established the honorary Cancer Networkers of the Year award on World Cancer Day 2015. The honorary award is given to a person or organisation that, through its commitment, supports the Network against Cancer's goal of strengthening patient influence and opportunities for optimal care. Cancer care June 3, 2024

The 2024 Process Leader of the Year was awarded to **Svetlana Bajalica Lagercrantz** Professor of Hereditary Cancer. Regional Cancer Centre (RCC) and is recognized for her drive and commitment to the work she initiated and leads, a project on the Centre for Personalised Cancer Prevention where the goal is to increase knowledge about genetics and improve the care of patients at high risk of cancer.

Pernilla Lagergren, Professor of Surgical Care Science, was awarded the 2024 Research Prize from National Association of Nurses in Surgical Care. A research award that aims to highlight improving the care of the surgical patient and/or professional development of the surgical nurse.

Daisy Award

Every year, the Daisy Award ceremony is held at Theme Cancer, where patients can nominate their nurse for the prize for great nursing. Also this year, the prize was awarded to a nurse at medical unit MBA: **Malou Nilsson**.



Malou Nilsson was nominated by her patient for good nursing care.

The patient's motivation was:

– Malou has been my treatment nurse when I received chemotherapy for my breast cancer. She has been my safe point through all treatments, both when something went wrong and when something went right. With care and attention to detail, she has made my treatments as good as they could be. Always in full control of both the medical and human aspects, with control of my situation both privately and in terms of care. She is a rock who is in just the right place! She deserves every award and opportunity. I am grateful to Malou for taking care of me. I find it hard to let go of control but with Malou I have felt so safe that I just leaned on her. All my family and friends know about the amazing Malou because I've been raving about her! I don't miss my chemo in the least but I miss Malou!

Quality accounts Theme Cancer

Patient satisfaction

The aim of the survey is to obtain more information about the patients' experience of the healthcare, including approach from healthcare staff, participation in decisions to the desired extent and whether the information provided has been sufficient. The results of the patient satisfaction survey show a positive trend, with targets in all areas being reached. The high score is particularly noticeable in the 'Information' category, where patients express very high satisfaction. The areas "Approach" and "Participation" are also consistently above the target levels, indicating a well-functioning care relationship and communication. Further work will focus on ensuring that the good results are maintained and on working with the free text responses to identify potential areas for improvement.

Area	2022	2023	2024	Target
Interaction	87%	88%	88%	87%
Participation	86%	87%	87%	85%
Information	95%	95%	95%	90%
Number of respondents	18,628	27,788	24,857	—

Min vårdplan (My Care Plan)

Min vårdplan is a tool that enables patient participation and empowerment throughout the care process. The aim is that all patients diagnosed with cancer will be offered a Min vårdplan. We are seeing an increase in the number of patients in Theme Cancer receiving a Min vårdplan.

Workshops and training efforts for all contact nurses have been carried out in 2024, and further work is planned for 2025 to ensure that we provide individualised support to patients throughout the whole care process.

PROM (Patient reported outcome measures)

We mainly use two different forms for patient-reported outcome measures.

The **symptom control** form is used during periods when patients are receiving intravenous oncology treatment to assess potential side effects. Two days before the next treatment, the patient completes the form via the Alltid Öppet (Always Open) app. The nurse then assesses the reported responses in combination with the relevant lab results before ordering the next course of treatment. If the results and lab values indicate that the patient is tolerating the treatment, the patient is notified and the treatment is implemented as planned. Other measures are taken if there are many side effects or deteriorating lab values.

In 2025, development work is planned to integrate this symptom-based information with data from the Cytodos system. The aim is to enable analysis at an aggregated level, which may provide new insights into the relationships between treatment and symptoms. This would create better conditions to further individualise and optimise treatment for each patient.

The Health Assessment is a self-assessment questionnaire covering common areas of concern for cancer patients before, during and after treatment. Patients rate their symptoms on a scale from "no problems" to "very troublesome problems". The form is used to support the mapping, needs assessment and discussion of the patient's needs after treatment has ended.

To date, over 8,000 health assessments have been sent out, and the responses form the basis of the rehabilitation assessment carried out by the contact nurse together with the patient. This allows for an individualised rehabilitation plan based on the patient's current situation and needs.

In 2025, the development of the health assessment will continue. The aim is to be able to analyse diagnosis-specific responses and link the results to different events during the patient's care process. This allows for a better understanding of the links between the patient's symptoms, care interventions and treatment effects, which can contribute to improved care and rehabilitation.

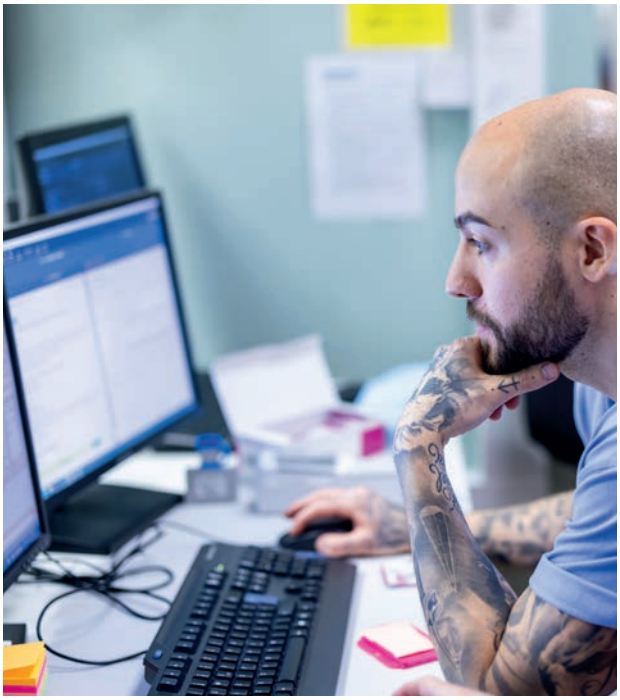
Nursing – Nutrition, pressure ulcers, falls and pain

Assessing patients' risk of malnutrition, pressure ulcers and falls is an important step in working with patient safety.

Nutrition

The purpose of the follow-up is to ensure early detection of malnutrition risk. The number of patients assessed as being at risk of malnutrition has remained at the same level in recent years, although we have not reached the target level. Malnutrition is a risk factor for about half of the patients receiving care at Theme Cancer and we reach the target levels for prescribed measures.

Area	2022	2023	2024	Target
Complete nutritional assessment	74%	78%	78%	80%
Proportion of patients with risk factors	51%	51%	49%	—
Proportion of high-risk patients with prescribed interventions	77%	77%	75%	> 70%
Number of patients	9,367	13,688	13,542	—



Pressure ulcers

The aim of the monitoring is to prevent and reduce the incidence of pressure ulcers. The results for pressure ulcer prevention are generally positive, with particularly good results for risk assessment and the incidence of acquired pressure ulcers. To further improve quality, focus will be placed on ensuring that more at-risk patients are prescribed individualised interventions, which can help to further reduce the incidence of pressure ulcers.

Area	2022	2023	2024	Target
Proportion of patients assessed for pressure ulcers upon admission	82%	88%	91%	80%
Proportion of patients with acquired pressure ulcers, category 2–4	0.50%	0.60%	0.50%	< 3%
Proportion of high-risk patients with prescribed interventions	66%	65%	68%	60%
Number of patients	9,438	13,956	14,693	—

Falls

The purpose of monitoring is to identify patients at risk of falling during their care period at an early stage and to take preventive measures. The measurement shows that the number of risk assessments has increased compared to the previous year, and that the number of patients with an identified risk of falling who are prescribed preventive measures has decreased compared to the previous year, but remains above the target level. Further work will focus on strengthening follow-up and training on fall prevention measures.

Area	2022	2023	2024	Target
Percentage of patients assessed at risk of falling upon admission.	82%	88%	90%	70%
Percentage of patients at risk of falling with fall prevention measures prescribed within 24h	69%	69%	67%	65%
Number of respondents	9,367	13,688	14,393	—

Pain assessment

Twice a year, medical record reviews are carried out in all organisations to evaluate the pain management of patients. The aim of the review is to assess how many patients have reported pain, how many have had their pain assessed using a pain assessment tool and what treatment they have received.

The results of the latest medical record review show that 66% of patients reported pain during care. Pain intensity, assessed by VAS or NRS, was documented in 54% of cases. 93% of patients with pain received pharmacological treatment. This review highlights that there is a need for improvement in the documentation of pain intensity linked to actions taken to alleviate pain conditions.

Healthcare-related infections and hygiene

Healthcare-related infections (VRI) – The follow-up of healthcare-related infections (VRIs) shows that outcomes are high, which can be partly explained by the patient population and the complexity of care. Many of these patients are susceptible to infection due to immune deficiencies, extensive surgery and other risk factors associated with their treatments.

However, a comprehensive medical record review in 2024 has identified a clear pattern of misrecordings, such as community-acquired infections. This points to a systematic lack of documentation, which may give a misleading picture of the infection situation. Efforts on proper documentation have been taken, medical record reviews will continue in 2025.

Basic hygiene and dress code – This measurement is an observational study conducted monthly within all units.

The work on basic hygiene and dress codes has resulted in both improved results and stable compliance with the guidelines. The increased number of observations shows that these issues are a high priority within the organisations. The remaining challenge is to further strengthen compliance to hand disinfection procedures and ensure the correct use of protective clothing.

Area	2022	2023	2024	Target
Disinfection before and after, gloves and protective clothing were used correctly	73%	75%	78%	Improved results
Suit, ring, nails, and hair were used correctly	92%	92%	92%	Improved results
Number of observations	2,260	2,875	3,467	—

Patient safety work

As part of the National Board of Health and Welfare's national action plan for patient safety, Karolinska has developed its own action plan, developed by a hospital-wide working group within the quality and patient safety network. A key part of this action plan is a self-assessment tool for Head of Operations, aimed at strengthening and structuring patient safety work.

The action plan and the self-assessment tool support the daily work on patient safety and aim to:

- Raise awareness of patient safety issues
- Increase knowledge of what patient safety means
- Make patient safety work visible and up to date

The tool, designed as an Excel file, allows organisations to assess their level of maturity within different aspects of patient safety. Activities are classified as green, yellow or red depending on the progress made. All activities are practically formulated to be easily implemented in daily activities.

In 2024, Theme Cancer identified 4–8 priority activities per organisation, selected by the respective Head of Operation. The work was followed up by a patient safety dialogue with the hospital's Chief Medical Officer, where the activities and their results were evaluated.

The next self-assessment will be conducted in the first quarter of 2025. This recurring process ensures that patient safety work is continuously developed and remains a central part of the organisation's quality work.

Sustainability

The Karolinska University Hospital has a joint Sustainability Programme for 2023 with goals in three areas: financial sustainability, social sustainability including work environment and environmental sustainability.

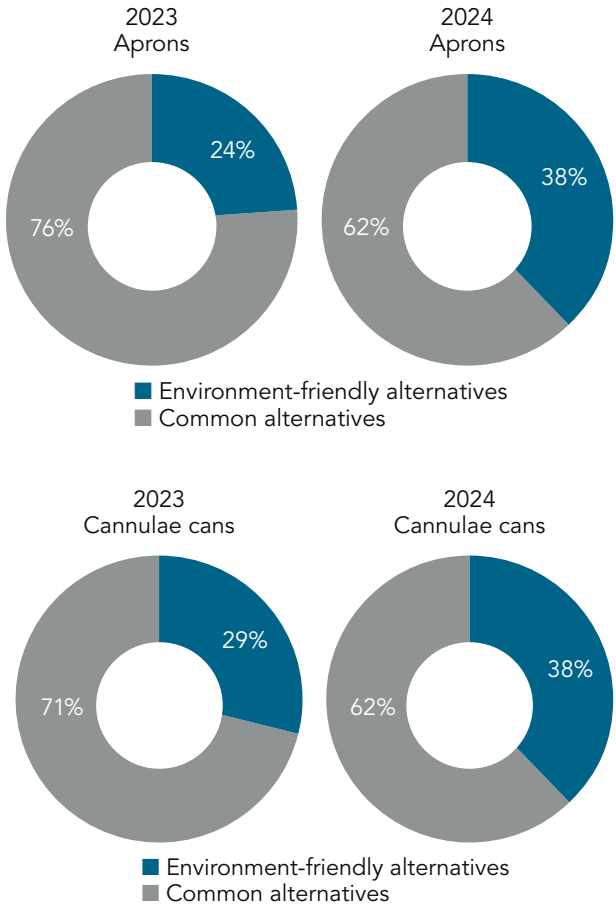
The organisations choose activities to contribute to the targets based on their activities and how to make the most impact. In 2024, the organisations within Theme Cancer worked on 38 sustainability activities linked to the sustainability programme.

All organisations worked on two activities each to contribute to the hospital's joint sustainability goals. Actions in 2024 included reducing medicine disposal, raising awareness on social sustainability, promoting preventative care, improving medicine management and material selection. The work is followed up on a quarterly basis.

There are about 80 environmental information officers within Theme Cancer who are active in local environmental work.

Future challenges for organisations within the climate area include the upcoming climate action plan from Region Stockholm with the goal of becoming climate neutral by 2035. To help us prioritise what we need to do, we need to conduct environmental reviews in tableau. It allows us to track, among other things, the disposal of medicines, material consumption and travel.

Figure 37: Increased consumption of environmentally friendly material choices.



Preparation of the patient for an sample collection.

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