USZ Universitäts Spital Zürich

Annual Report

Transplantation Center
University Hospital Zurich

2022

1 The Transplantation Center in its 16th year of operation

Prof. Dr. med. Nicolas Müller, Head of the Transplantation Center

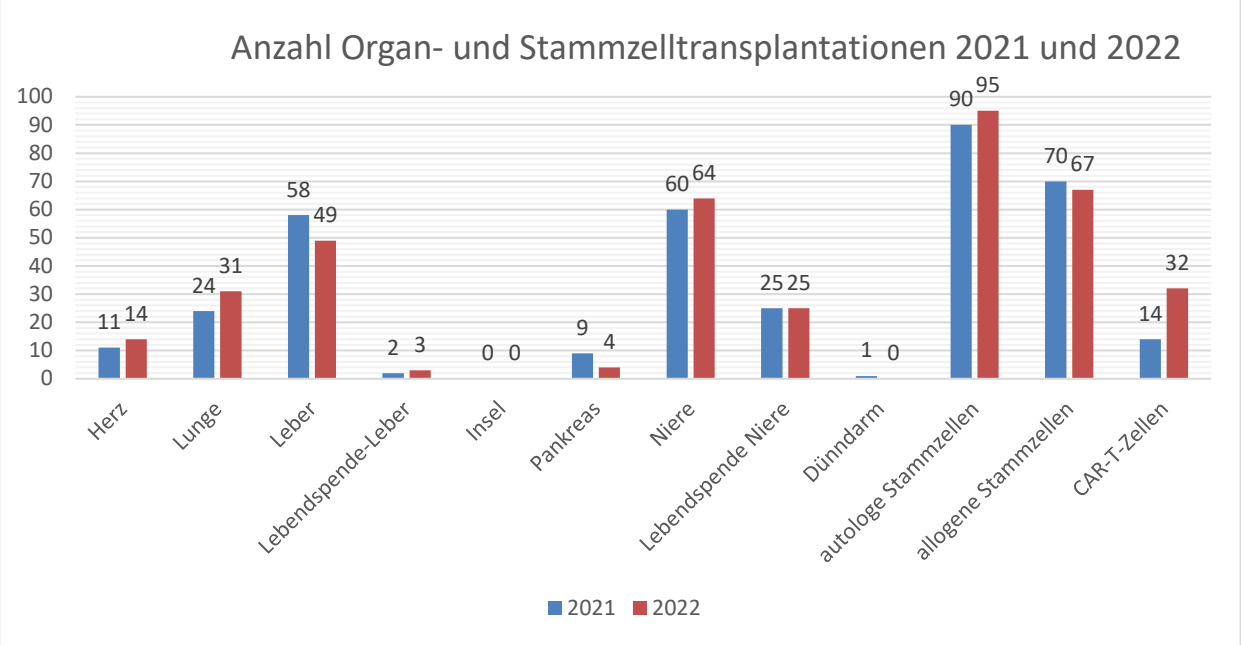

Figure 1: Number of transplants in 2022 compared against the numbers recorded in the previous year

Summary

In 2022, there were a total of **190** solid organ transplantations (2021: **190**); **26** patients died while on the waiting list for organ transplantations (2021: **34**). **67** allogeneic transplants, **95** autologous transplants, and **32** CAR-T cell therapies were performed in 2022.

Transplantation Center

2022 can be described as a year of transition between the pandemic and "normal operations". Transplantation activity remained stable at a high level. The innovative nature of transplantation medicine was also apparent in 2022. Some of the highlights were:

- The first simultaneous pancreas-kidney transplantation after DCD donation.
- The introduction of Next Generation Sequencing (NGS) technology for precise HLA typing.
- Two lung transplantations for COVID-19-induced pulmonary fibrosis.
- The first lung transplantation of an HIV-positive recipient in Switzerland, with excellent results.
- The first recipient of a liver that could survive and be assessed outside the body for three days celebrated one year since their surgery in good health.
- 1,000 liver transplantations were carried out at the University Hospital Zurich (USZ) between 1986 and 2022.
- An innovative new transport system for donor hearts was introduced, and progress has been made in preparing for DCD heart transplantation between the three centers.

Research and training

The Center was highly successful once again this year with 105 publications.
The 16th Annual Symposium of the Zurich Transplantation Center had two main areas of focus: Xenotransplantation and "Transplantation Research at USZ" once again met with great interest. Prof. Dr. med. Eckhard Wolf's keynote lecture was accompanied by an interesting and in-depth panel discussion – huge progress has been made in this area, too.
The consolidation of the Swiss Transplantation Cohort has entered the implementation phase. Unimedsuisse also decided on a new and innovative remuneration system throughout Switzerland, and this has been in force since 2023. This represents another building block for securing this research platform – which is also highly respected internationally – over the long term.

Objectives for 2023

- Creating our communication app for nephrology patients.
- Introducing the DCD heart transplant program.
- Migrating the STCS database and establishing this as an association geared toward securing the infrastructure over the long term.
- Re-assessing waiting list candidates for lung transplants according to the latest selection criteria in the 2021 ISHLT Guidelines.

2 Center-specific and integrative functions

2.1 Transplantation coordination

Stefanie Schiess, Head of Transplantation Coordination

In terms of transplantation coordination, the main focus in 2022 was on optimizing the overall processes. The foundations were laid back in 2021. This year the hospital management made the decision to change the working model that had been in place up to that point. After many years of on-call coordination, this was replaced by a three-shift system, leading to an overhaul of processes. The implemented measures are still subject to regular assessment and adjusted if necessary.
Once again, coronavirus had a major impact on both the team and patients this year. At the beginning of the year, the hospital management decided to reduce the number of employees working in the office and to increase the amount of working from home.
Patients remained very unsettled, and we saw a huge rise in the number of attempts to contact the Transplantation Coordination team.

Personnel development:

- On January 1, 2022, Mr. Darko Kalinic started working in Transplantation Coordination. He joins the Kidney Transplant team.
- On May 15, 2022, we followed the vote on presumed consent for organ donation with great interest: "In the future, those who do not want to donate organs and tissues after they die will have to explicitly say so. The new regulation will not come into force until 2025 at the earliest." The significance of this decision will therefore only become clear to us at a later stage.
- In June 2022, Ms. Samantha Gentile transferred from the Kidney Transplant team to the Living Kidney Donation team.
- It is with great regret that we have some tragic news to share from September 2022. Unfortunately, our long-standing and highly esteemed colleague, Ms. Therese Reh, passed away unexpectedly. The loss of Therese has left a huge void in our team. We miss her very much.
- In October 2022, Ms. Remy Suter joined us as Transplant Coordinator. Remy joins the Kidney Transplant team. She had already spent the previous months working as an intern in Transplantation Coordination.
- In December 2022, the Hospital Executive Board decided to increase the current ratio of full-time employees.
- Barbara Keller has decided to leave Transplantation Coordination. We wish her all the best in her new role.

Headcount as of December 2022:
A total of nine people are employed in Transplantation Coordination.

As a result, 750 FTEs were available at the end of 2022 to cover shift work.

A total of 186 Swiss donors and 233 foreign offers were coordinated in 2022. Most of these hours were worked at night and on weekends.

Number of transplantations:
In 2022, a total of 164 people throughout Switzerland donated their organs. This represented 21 fewer donors than in 2021. A total of 190 organs were transplanted at the University Hospital Zurich (USZ), which is exactly the same number as in the previous year.

A total of 179 evaluations were carried out by the transplant coordinators.

In total, 148 patients were placed on the national waiting list by the transplantation coordinators in 2022.

The number of living kidney donations was unchanged from the previous year.

In 2022, we were able to transplant 52 livers, three of which were living liver donations.

Patient care:

Stage 1 Living kidney donation	**39**
Stage 2 Living kidney donation	**29**

Stage 1 Living liver donation	**09**
Stage 2 Living liver donation	**05**

Events:
- Nephrology referring staff meeting
- Summer party
- Mulled wine meeting at Swisstransplant in Bern

Project work:
- STATKO (Swiss Transplant Coordination Working Group)
- OKT (Swisstransplant Core Operations team)
- STALOS (Swiss Transplant Working Group on Living Organ Donation)
- STS (Swiss Transplant Society)
- Quality Management

Presentations:
- ZINA (Higher Technical College for Intensive Care, Emergency Care, and Anesthesia Care)
- Waid Hospital Nephrology
- Triemli Nephrology
- Frauenfeld Cantonal Hospital, Intensive Care Unit
- Careum
- Various training sessions on USZ wards

Supervision of apprentices:
- Interview for various assignments

Ongoing professional development:
- Donation & Transplantation Institute Barcelona
- Advanced training in transplantation care
- Swiss Society of Intensive Care Medicine Interlaken Congress
- Lifeport
- USZ Autumn Symposium – Transplantation Center
- Grand Rounds
- Swisstransplant Autumn Symposium

2.2 Transplantation immunology laboratory

Dr. med. Ph. D. Jakob Nilsson, Senior Attending Physician, Transplantation Immunology and Zehra Gündüz, Senior Biomedical Analyst with qualifications from Higher Technical College (BMA), HLA Typing Laboratory

Analyses performed

In 2022, the Transplantation Immunology Laboratory once again provided the Transplantation Center of University Hospital Zurich (USZ) with Transplantation Immunology Laboratory analyses of the highest international standard. A total of 6,252 clinical samples came into the laboratory, on which 1,805 transplant-related HLA typings and 6,608 bead-based analyses of anti-HLA antibodies were carried out. The laboratory is available around the clock, ensuring the rapid HLA typing of organ donors and enabling the allocation of donated organs within the Swiss Organ Allocation System (SOAS). In 2022, we carried out HLA typing on 66 deceased organ donors. We also assisted with cross-matching a further 96 deceased organ donors. We supported the stem cell transplantation program by carrying out immunological transplant tests on 117 potential stem cell recipients and performed HLA typing on 207 potential donors.

Waiting list for organ transplants

The Transplantation Immunology Laboratory carries out immunological transplantation tests around the clock, ensuring that the waiting lists for an organ transplant remain up to date. On January 1, 2023, 348 patients at USZ were on the waiting list for a donor kidney, of which 108 were newly registered in 2022. In the same period, 89 patients received a new kidney at USZ (of which 25 were from living donors). With regard to lung transplants, we carried out 48 immunological transplant evaluations of potential candidates in 2022 and 31 patients received a new lung at USZ. On January 1, 2023, 31 patients were on the waiting list for a lung transplant. We also carried out the immunological characterization of 20 potential candidates for a heart transplant, 14 of which were transplanted at USZ in 2022. As of January 1, 2023, 24 patients were on the waiting list.

Notable changes in laboratory procedures

During 2022, several changes to our laboratory procedures were made. We introduced a Flow-cytometry based assay for complement-dependent crossmatch that replaced our standard microscopic CDC cross-match assay in 2022. This new cros-match method allows us to better track the quality and performance of the CDC crossmatch and should also reduce the rate of non-specific positive reactions. We also introduced an additional method to analyze the presence of anti-HLA antibodies. This second bead-based assay to detect a single antigen allows us to confirm suspected unspecific results in our standard assay, improving immunological risk assessment before and after transplantation.

Additional information

Two new BMAs (Mr. Ante Maric and Mr. Ersin Dincer) joined the team in 2022. The European Federation for Immunogenetics (EFI) also conducted an accreditation process for the laboratory. Our EFI laboratory accreditation was successfully renewed without the detection of any irregularities and with positive comments about the high standard of the laboratory. The laboratory continued to support the ongoing Swiss Transplant Cohort Study (STCS) in 2022 by processing 396 clinical samples of transplanted patients, as well as by retrieving and shipping aliquots from stored samples for STCS approved clinical trials.

2.3 Prizes

Prizes/awards received by the TPLZ or by the clinics in relation to organ transplantations:

Clinical trial award I 2022 of the Zurich Transplantation Center

- **Prof. Dr. med. Pierre-Alain Clavien** for his work on the transplantation of a human liver following three days of ex situ normothermic preservation.

Clinical trial award II 2022 of the Zurich Transplantation Center

- **Dr. med. Kerstin Hübel, Prof. Dr. med. Thomas Fehr** for his work, "Successful Induction of Specific Immunological Tolerance by Combined Kidney and Hematopoietic Stem Cell Transplantation in HLA-Identical Siblings".

Merit Award 2022 of the Zurich Transplantation Center

- **Dr. phil. Sonja Beckmann, Ms Marianne Ibe-Tarolli, Ms Andrea Pfister Koch** were awarded the "2022 Award of Merit of the Zurich Transplantation Center" for their services as clinical nurses for the care of liver transplant patients.

2.4 Participation on national and international committees

Olivier De Rougemont (- 2022)
Member of the Board: STAN, STALOS, STAPS
Member Comité Médical Swisstransplant
Scientific Committee: Swiss Transplant Cohort Study
Member MERH (Kompetenzzentrum Medizin – Ethik – Recht Helvetiae)

Philipp Dutkowski
President elect Swiss Transplant Society
President STAL
Member Scientific Commitee STS
Member STAPT
Member Comité medical

Andreas Flammer:
President-Elect of the Working Group Heart of Swisstransplant (STAH)
Past-President of the Swiss Society of Cardiology Working Group Heart Failure
HSM-"Begleitgruppe" VAD
Fellow of the European Society of Cardiology (FESC)
Fellow of the European Heart Failure Association (FHFA)
Member HFA Committee on Acute Heart Failure

Sven Hillinger
Scientific Committee: Swiss Transplant Cohort Study
Member Ethics-Committee of the University Hospital Zürich

Stephanie Klinzing
SGUM: Member Weiterbildungskommision POCUS
Swisstransplant: Member CNDO (Representative SGI)

György Lang
Member of the Thoracic Advisory Board, Eurotransplant Foundation
Member of the LAS Review Board, Eurotransplant Foundation
Präsident der Österreichischen Gesellschaft für Thoraxchirurgie
Präsident des ÖÄK Prüfungsausschusses für Facharztprüfung Thoraxchirurgie
Mitglied STALU Swisstransplant

Roger Lehmann
Past President of the Central European Diabetes Association (FID) 2013-2018
Board Member of the European Pancreas and Islet Transplant Association 2013-2019
Scientific Committee: Swiss Transplant Cohort Study

Nicolas Müller
Board member, Past president, Swiss Society of Infectious Diseases
Member, IVHSM Fachorgan
Chairman of Scientific Committee, Swiss Transplant Cohort Study
Member of Scientific Committee, Swiss Society of Transplantation
Editorial Board Xenotransplantation; Transplant Infectious Diseases, Transplantation

Thomas Müller
Member of the Swiss Transplant Kidney working group (STAN)
President of the Swiss Transplant working group for living organ donors (STALOS)
Member Scientific Committee (STCS, Swiss Transplant Cohort Study)
Member Swiss National Science Foundation evaluation body (SNF)
Member Ethics-Committee of the University Hospital Zurich
Co-Chair Declaration of Istanbul Custodian Group (DICG)
Co-Director Swiss Kidney Paired Donation Group (KPD)
Member 'Suko Lebendorganspende' SAMW
Board Member ISN Western Europe Regional Board
Member of the Comité Medical Swiss Transplant Society
Board Member Banff Pathology Group

Jakob Nilsson
Member of the Boards/Scientific Committees (STAN, Immunology working group)
Fellow Transplant Society
Fellow European Federation of Immunogenetics
Associate editor Frontiers in Immunology

Mirjam Nägeli
Board member and academic secretary SCOPE (Skin Care in Organ Transplant Patients Europe)
Member Scientific Committee Swiss Transplant Cohort Study (STCS)
Member ITSCC (International Transplant Skin Cancer Collaborative)

Urs Schanz
President Swiss Stem Blood Cell Transplantation (SBST)
Member Commission for allogenic Stem cell transplantation (KAT)
Member Board of directors, Blood donations SRK Schweiz
Member NAC (nuclear accident committee) of EBMT
Senior editor: Transfusion and Apheresis Science (2013-2015)
Editorial board member Transfusion and Apheresis Science

Stefanie Schiess
Swisstransplant: Mitglied einer CNDO-Arbeitsgruppe
Member Comité Medical Arbeitsgrupppe

Isabelle Schmitt-Opitz
Chair Mesothelioma Group ETOP
SAKK Thoracic Surgery Representative for the Lung Cancer Group
Editorial Board ATS
Head Thoracic Surgery Research Lab USZ
Cancer Research Center Zurich
iMig board member
SNF National and Research Council and Steering Committee IICT
Stiftungsrat Schulthessklinik
International Director AATS
ESTS President, member of Board of Directors, and Learning Affair Committee
Program Committee for ESTS, AATS, AATS ITSOS, ESMO, ISHLT, iMig, and ELCC

Carolin Steinack
Member of European Respiratory society (ERS)
Member of European Cystic Fibrosis Society (ECFS)

Markus Wilhelm:
President of the Comité Médical of Swisstransplantant
Past-President of the Working Group Heart of Swisstransplant (STAH)
Member of the Working Group for Procurement and Transportation of Swisstransplant (STAPT)
Member of the Board of Representatives of the Swiss Transplant Cohort Study (STCS)
Member of the Working Group Heart Failure of the Swiss Society for Cardiology
Member of the Mechanical Circulatory Support Counsil of the International Society for Heart and Lung Transplantation

Marco Zalunardo
SGAR: Member/President of Working Groups: Evaluation of Teaching Centers (2), Non-Anesthetist Analgosedation
SGAR: Committee: Visitation
SGAR: Committee: Education
SIWF: Executive Board Member
SIWF: Member of the Education Grant Jury

2.5 Professional development

Prof. Dr. med. Nicolas Müller, Member of the TNT Organizing Committee

The 16th Annual Symposium of the Zurich Transplantation Center was held on November 18, 2022. With a focus on xenotransplantation and research at the University Hospital Zurich (USZ), the symposium attracted great interest. The diversity of research approaches from a wide range of fields once again demonstrated the breadth and quality of the research carried out at USZ in the context of transplantation.

We were able to hold the TNT seminar in its usual format in 2022, but continued offer it in a hybrid format. Once again, the program focused on specific as well as overarching topics, and we were able to attract speakers from abroad in addition to USZ speakers. We would like to take this opportunity to thank our sponsors, without whom this event would not be able to take place in this context.

2.6 Swiss Transplant Cohort Study (STCS)

Prof. Dr. med. Nicolas Müller, President of the STCS Scientific Committee

As a cohort of national importance (together with the Swiss HIV Cohort), its foundations are set to be reorganized in the medium term, necessitating a transformation into a "Data Infrastructure and Services" organization, which will also lead to a reorganization of the STCS. This was given fresh impetus in 2022, with a key aspect being the new regulation of remuneration by transplantation centers.

With more than 5,300 active patients, 2,177 (1/3) of whom are in Zurich, the STCS has developed into an internationally recognized institution whose research results have generated significant interest. This is reflected in 118 publications and more than 2,000 citations (an average of 17 per publication).

The aim is to make even better use of this wealth of data and samples and to encourage everyone involved to submit projects.

3 Organ donation network

Donor Care Association (DCA)
The following information is taken from the Donor Care Association Annual Report 2022. Organ donation medicine comprises the specialist hospital-related processes relating to organ donation. DCA employees are affiliated with the University Hospital Zurich (USZ). In 2022, 47 organ donations were made in the DCA network – the same as in the previous year, which represents a consolidation of last year's high.

Organ donation processes were given a complete overhaul ten years ago, and this still relatively new system is now fully bearing fruit. Working closely with the treatment teams from associated network hospitals, the DCA staff supported potential organ donors and their relatives throughout the entire process in medically and psychologically challenging situations. As part of this close and strong collaboration, in 2021 the first DCD donation was also able to be carried out at the Children's Hospital Zurich, with the DCA playing a key role in redefining the DCD heart donation process. A total of 14 donors came from the network, with 33 from USZ.

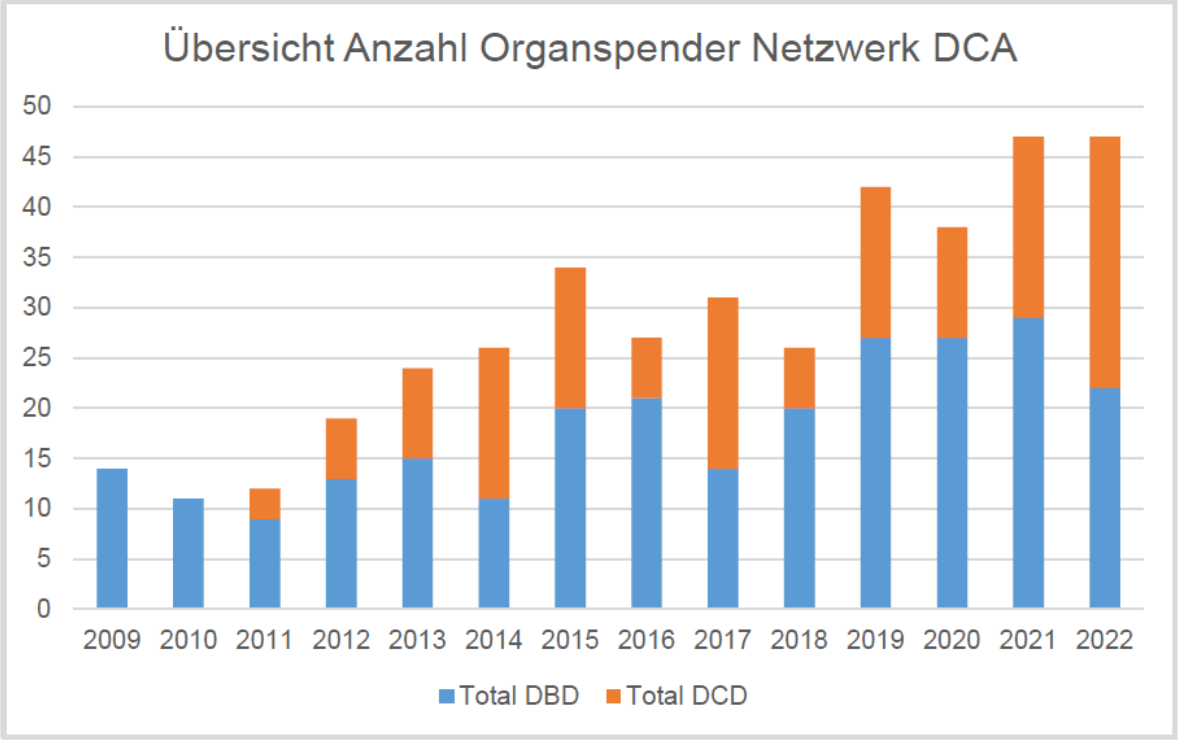

Figure 2: DCD and DBD donations in the DCA Network in 2022 (DCA Annual Report 2022)

4 General care of transplant recipients at the Transplantation Center

4.1 Anesthesiological aspects of transplantation

Dr. med. Rolf Schüpbach, Senior Consultant, Institute of Anesthesiology

The arrival of Prof. Dr. med. György Lang to Thoracic Surgery in summer 2022 has given fresh impetus to lung transplantation. Since then, we have seen a significant increase in the number of transplants carried out. Thanks to his extensive experience in the peculiarities of organ allocation within Europe, Zurich has been able to secure considerably more donor organs.

In addition to operating on extracorporeal circulation (ECMO), as in selected cases for lung transplantation to date, all patients are now administered intraoperatively to a veno-arterial ECMO in order to gently reperfuse the transplanted organs in the early phase of recirculation. The initial results are promising and reflect Prof. Dr. med. György Lang's experience and research findings in Vienna.

Together with the Children's Hospital Zurich (KISPI) and thanks to excellent preparation in various briefings organized by the Donor Care Association (DCA), multi-organ harvesting from a small child using the DCD procedure, i.e. discontinuation of treatment in the operating room and subsequent organ removal, was successfully carried out for the first time in Switzerland. The focus was not only on organizational issues, but also on an in-depth discussion of ethical aspects and how to deal with the emotional challenges.

Thanks to the DCA's hard work and meticulous preparation, with the involvement of all professional groups and specialists at the round table, the foundation was also laid for the success of Switzerland's first multi-organ harvesting, including a heart from a DCD donor. You can find out more about this in the 2023 Annual Report.

4.2 Nursing care at the Transplantation Center

Helen Ziegler, MScN, Advanced Practice Nurse, Department C

Nursing care in the East E III ward of the Transplantation Center

The East E III department has a capacity of 15 beds.
If patients receive the offer of an organ, they usually go to East E III and are thoroughly prepared for the upcoming operation within a few hours.
Following successful lung, liver, kidney, pancreas, or islet cell transplantation, patients in this department receive specialist care and support.
Being a nurse comes with a great deal of responsibilities. Among other things, nurses are responsible for providing structured patient education sessions, such as ensuring that immunosuppression is taken correctly and on time, as well as arranging patient discharge to a rehabilitation clinic or home.

APN care consultations

Three APN (Advanced Practice Nurses) offer consultations with patients and their relatives before and after a kidney, heart, or liver transplant. The aim is to optimally prepare patients and their relatives for living with the new organ, to strengthen their personal responsibility in dealing with the disease, and to promote individual self-management. The long-established transplantation care consultations take place on both an outpatient and inpatient basis.
Although they have been established for several years, post heart transplant care consultations are now included in this report for the first time.

Kidney transplantation care consultations

Maria Dammann, Advanced Practice Nurse

The care consultations focus on patients and their relatives before and after a kidney transplantation. The initial face-to-face contact takes place during the inpatient stay after the transplantation. In the following weeks and months of the outpatient follow-up check-ups at the University Hospital Zurich (USZ), consultations take place on the following topics: medication management, promoting healthy behavior with regard to nutrition and exercise, coping with the patient's new circumstances (assessing the need for support at home, questions about returning to work, dealing with social settings), as well as preventing infections and long-term complications. The content and scope of the consultations are adapted to patients' individual needs, with the ability to self-manage an overarching objective.

Since 2022, there have also been instances of pre-transplant care consultations to prepare patients for receiving kidney transplants. This initiative is set to be rolled out for more patients.

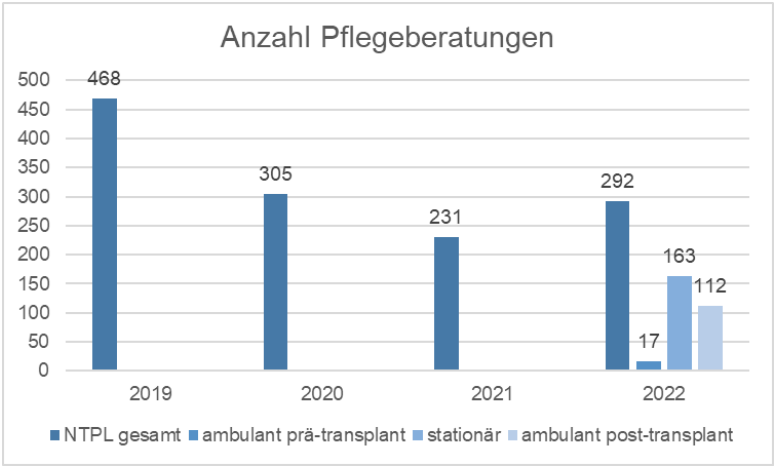

Figure 3: Number of care consultations

Information brochures
Patients receive three information brochures for educational purposes after receiving a kidney transplantation. This provides them with support in preparing for life with their new organ, offering structured education sessions during their inpatient stay and answering any questions they may have. All three brochures were updated and reprinted in 2020.

Collaboration at USZ
Due to changes made to the premises of the outpatient Department of Nephrology this year, the care provided by the Advanced Practice Nurses was reconfigured. Patient queries and concerns were mostly answered by telephone and e-mail during the first month after their transplant. In the following weeks, they were offered care consultations in the afternoon.

Wards
Changing the way inpatient education sessions are structured and delivered also provided the opportunity to both scrutinize and optimize patient collaboration and care. Above all, Advanced Practice Nurses are a resource for the care of patients and relatives with greater care and support needs. Dialog with the nurse expert on the ward and the nursing team plays a key role in maintaining a high level of care. The weekly interprofessional ward rounds allow for a collaborative exchange with patients.

Lugano Cantonal Hospital
The dialog between nurses at different hospitals is also used to hand over unresolved issues from previous consultations and to ensure continuity of care for patients.

Children's Hospital Zurich
As part of a jointly organized transition afternoon, three young adults moved from the pediatric unit to adult wards in November 2022. At the beginning, they were given a status review and will continue to be looked after by the Advanced Practice Nurse at different intervals based on their individual needs.

Liver transplantation care consultations
Andrea Pfister Koch, Advanced Practice Nurse

The liver transplantation care consultations offer patients and their relatives a consulting service before and after the transplantation. The content and scope of the consultations are adjusted to meet the individual needs of those affected. The issues covered in these sessions are as follows:

- Before the transplantation: Symptom management, waiting list procedures, health behavior (e.g. stopping smoking, abstinence from alcohol, nutrition and exercise), emotional processing of their disease situation, facilitation of peer discussions.
- After the transplantation: Use of medication, prevention of infections, self-monitoring, how to respond to organ rejection, sun protection, and health behavior.

Around two-thirds of all consultations take place during an inpatient stay. The majority of outpatient consultations are carried out over the phone or by e-mail. Pre-transplant consultations are much more in-depth now in terms of content, as they have incorporated more evaluations for patient inclusion on the waiting list since the pandemic.

In terms of numbers, APN consultations (Figure 4) continue to rise in comparison to previous years. Patients and relatives are taking advantage of the low-threshold offer to clarify questions and concerns or, if necessary, to be referred to internal specialists or external service providers.
In addition to the APN-only consultations, a total of 194 patients were seen on an interdisciplinary basis together with a senior attending physician on 38 OLT consultation afternoons. The APN-OLT consultation pathway is designed for patients who received transplants at least six months ago, have a fairly stable medical history, or benefit from the continuity of APNs for psychosocial reasons.

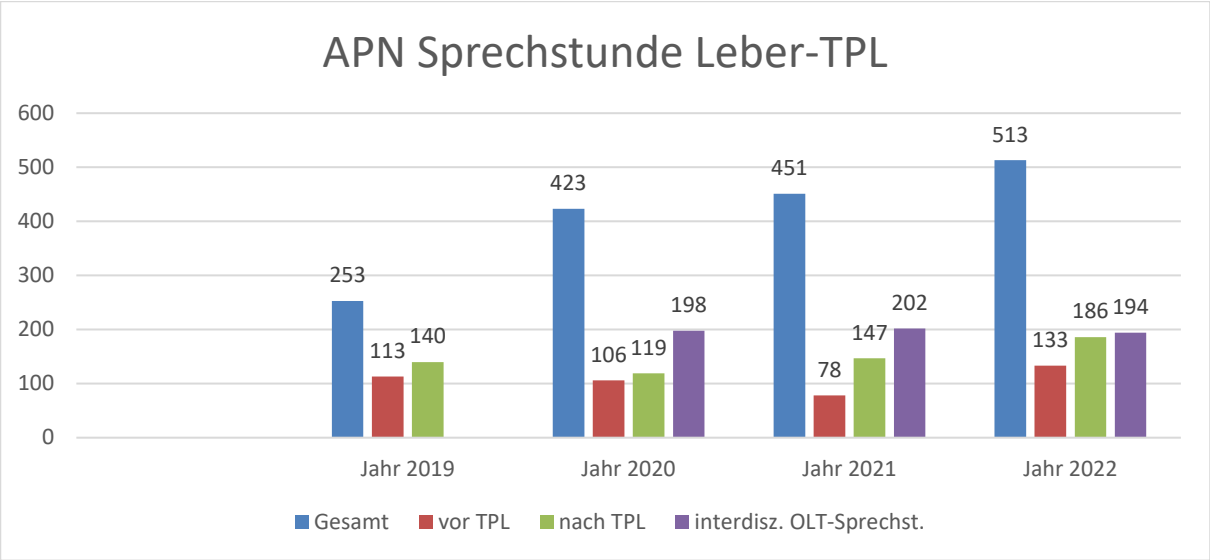

Figure 4: APN liver transplant consultation

Information brochures
In addition to the consultations, patients and relatives receive the brochures "Useful information for preparing for a liver transplantation" and "Useful information for life after a liver transplantation". The brochures are also used as the basis for the structured inpatient education sessions. Depending on requirements, picture topic cards can additionally or solely be used and handed out during consultations.

Collaboration
The collegial and interprofessional collaboration within and outside the University Hospital Zurich (USZ) was also able to be further consolidated and expanded in 2022.

USZ
Pre-transplant collaboration continued with Dr. med. Sonja Beckmann, Advanced Practice Nurse in Hepatology. She cares for patients with liver cirrhosis who, for various reasons, cannot receive transplants and require palliative care. The APN in Hepatology fills an important gap here.
The consultations as well as the structured inpatient education sessions during hospital stays following the transplantation are planned and carried out together with the nursing teams on the wards. The weekly interprofessional case discussions allow the treatment team – comprising the Nursing Service, APNs, Medical Service, Psychologist, Nutrition Counseling, and Physiotherapy – to quickly discuss the individual needs and coordinate the discharge plan in a timely fashion.

Rehabilitation
Since the pandemic, collaboration with rehabilitation centers has become more difficult due to long waiting times for admission. Only individual liver transplant patients can be admitted to the Clavadel/Davos Zurich Rehabilitation Clinic, although the nursing and medical specialists would still be generally available for liver transplant patients. This means additional work for discharge planning and consultation with aftercare clinics and external services.

Kantonsspital St. Gallen (KSSG):
Patients that receive medical care predominantly at KSSG are likewise provided with care consultations by Advanced Practice Nurses in Hepatology at KSSG. The working relationship allows for a smooth transition between the institutions. Unresolved issues from previous consultations can also be handed over to the Advanced Practice Nurse in the respective hospital.

Children's Hospital Zurich (KISPI):
At the end of March 2022, there was a dialog with Ms. Mantegazzi, Advanced Practice Nurse, with a view to working together on the transition of young adults with liver transplants from an early stage.

Heart transplantation care consultations (HTx)
Irene Stalder-Ochsner, Advanced Practice Nurse

The heart transplantation care consultations offer patients and their relatives a consulting service before and after the transplantation. The content and scope of personal consultations at the University Hospital Zurich (USZ) are adapted to the patient's individual needs and medical history.
In 2022, 194 consultations took place with 69 patients and their relatives.

Before heart transplantation
An initial consultation with the expert in the field, Mr. Matthias Hausdorf, or the APNs is organized as part of the inpatient transplant evaluations. This involves discussing the waiting list procedure, the heart transplantation procedure, the duration of the hospital stay, the recovery time, and any potential psychological and emotional challenges. At this stage, patients are also given the "Information on Heart Transplantation" brochure and, on request, the contact details of a heart transplant patient. Patients receive heart failure guidance to promote the self-management of heart failure and support positive health behavior such as stopping smoking, eating a healthy diet, exercising, and limiting alcohol consumption.
Depending on patient needs, further consultations are scheduled as part of the monthly outpatient consultations during the waiting period, which can be a challenging time both physically and mentally.

After heart transplantation
After the heart transplantation, patients and relatives learn about aspects of self-management through structured education sessions, such as hygiene measures, vital signs and symptom control, and medication management. These education sessions are held in an inpatient setting and are designed and delivered by nurses from the EAST D 1 and 2 Heart Transplantation Department.
At the same time, the patient will have at least one HTx care consultation in order to plan and support the transition to rehabilitation and the subsequent return home to day-to-day life, as well as to clarify any outstanding issues.
The main topics covered at this stage include the procedure and frequency of follow-up checks, the signs and symptoms of organ rejection or infections, and the timely contact with caregivers in the event of physical complaints or emotional struggles.
Further outpatient follow-up consultations are planned as needed and cover topics such as medication adherence, prevention of cardiovascular risk factors, sun protection, dental visits, return to work, and travel arrangements following heart transplantation.

Collaboration at the University Hospital Zurich (USZ):
The treatment team, comprising the Nursing Service, APNs, Medical Service, Psychologist, Nutrition Counseling, Physiotherapy, Social Services, and Transplant Coordination, is supplemented with additional specialists as required.

<u>Transition program from the Children's Hospital Zurich (KISPI)</u>
Since 2020, there has been an ongoing dialog with the APN in Heart Transplantation from the Children's Hospital Zurich (KISPI) as well as a transition program for young adults and their relatives to support the transition from care in the KISPI to a heart transplant consultation at USZ.
No young people were transferred to USZ consultations in 2022.

<u>Rehabilitation</u>
If necessary, the patient will receive a telephone handover or report back to the nursing staff at the Wald or Hochgebirgsklinik Davos rehabilitation clinics.

Presentation
Symposium on "SPITIN-SPITEX suture" Safe medication is a joint effort (September 14, 2022), presentation: Acquiring competence in medication after a liver transplantation, Andrea Pfister-Koch.

Distinction:
Award of Merit for TPLZ 2022: Andrea Pfister-Koch, Advanced Practice Nurse in Liver Transplantation.

4.3 Infectious disease control for transplant patients

Prof. Dr. med. Nicolas Müller, Senior Attending Physician, Department of Infectiology

From a total of 11,001 consultations, 2,426 had a transplant-specific background. This corresponds to approximately a quarter of all the infectiology consultations held at the University Hospital Zurich (USZ). Our four interdisciplinary visits go far beyond purely infectiological care: Optimal care for these patients with complex needs is ensured thanks to joint discussions from a surgical and specialist medical perspective, complemented by an infectiological and pharmacological perspective, and part of the visit is also accompanied by specialist nursing staff.

4.4 Follow-up care for organ transplant patients in the Department of Dermatology

Dr. med. Mirjam Nägeli, Department of Dermatology

Recipients of solid organs and bone marrow/stem cells are seen as part of specialized consultations for immunosuppressed patients at the Department of Dermatology.

The Immunosuppressed Clinic (ISS) moved from the "old" dermatology building at Gloriastrasse 31 to the NUK C wing on the campus of the University Hospital Zurich (USZ) in November 2021. The ISS is the only outpatient dermatology clinic that remains on the USZ campus and has not been moved to the Circle. In 2022, we recorded over 3,580 consultations with 2,185 patients (significant increase over the previous year).
The main focus is on the prevention, early detection, and treatment of non-melanoma skin cancer (squamous cell carcinomas), which involves the most common malignant tumor resulting from long-term immunosuppression. Existing tumors are detected and removed as part of the pre-transplant assessment. In addition, transplant patients are advised on the problematic nature of non-melanoma skin cancer and are taught prevention measures such as changing habits, clothing and the use of sunscreen, as well as how to detect symptoms at an early stage.

We offer inpatient extracorporeal photopheresis for patients with chronic lung rejection (bronchiolitis obliterans) after lung transplantation and chronic graft-versus-host disease after stem cell transplantation (in addition to dermatological patients with cutaneous Sézary T-cell lymphoma).

Information brochures
In addition to advice, new patients receive the "Suppressed immune defenses in the skin" brochure.

Studies
As part of a multi-center European study, we are monitoring how many of our patients are affected by skin cancer metastases and which factors present an increased risk. We thereby hope to identify patients with the greatest need at an early stage and support these in a targeted manner.

4.5 Special consultation in transplant psychiatry at the Department of Consultation-Liaison Psychiatry and Psychosomatic Medicine

KD Dr. med. Katja-Daniela Jordan, Department of Consultation-Liaison Psychiatry and Psychosomatic Medicine

All organ recipients are offered high-quality psychosocial assessment and care. This begins with the first evaluation and consultation and continues during the waiting period and after surgery during their hospital stay. Where possible, the same expert handles the respective patient's subsequent treatment. If necessary, relatives are also involved in the treatments. People undergo psychosocial assessments and receive counseling before living donations are carried out. We provide support on the wards as part of inpatient stays or as outpatient consultations. We also make extensive use of remote consultations. Team members also took part in visits and interdisciplinary case reviews in the departments and the waiting list colloquia. At our outpatient clinic, care can also be continued for a longer period of time.

This was achieved with a very modest personnel budget thanks to optimum collaboration with numerous specialists and clinics from the University Hospital Zurich (USZ) and involved external bodies, as well as involvement in the Department of Consultation and Emergency Psychiatry led by Assistant Professor Sebastian Euler. When caring for inpatients, we benefit from involving APNs in mental health.

Employees are highly committed to the area of education and training. Alongside the Department of Nephrology led by Prof. Dr. med. Thomas Müller and numerous dialysis centers in and around Zurich, all 422 first-year medicine, dentistry, and chiropractics students at the University of Zurich were able to complete communication training in a dialysis center for the first time. As a result, the students came into contact with patients on the waiting list for a kidney transplantation, which raised their awareness of psychosocial issues and links. As part of training for dialysis nurses in German-speaking Switzerland, the one-day course "Psychosocial Aspects for Patients with Chronic Kidney Diseases" was once again held at Waidspital Zurich for an insight into transplant-specific issues.

Medical student Michéle Krapf was able to present her master's thesis with the results of the joint study with the Department of Pulmonology on the quality of life and life satisfaction of lung transplant patients in the wake of the coronavirus pandemic at the Annual Symposium of the Zurich Transplantation Center in November.

5 Individual transplant programs

5.1.1 Allogeneic stem cell transplantation

Prof. Dr. med. Dr phil. Dominik Schneidawind, Department of Medical Oncology and Hematology

There were a total of 67 allogenic stem cell transplants in 2022, which is comparable to the previous year (2021 n = 69). The median age of patients across all entities was 55 years. Myeloid neoplasms remain the most common indication (n = 55). The number of transplants with unrelated donors totaled 37. 30 allogeneic stem cell transplants were carried out with related donors, of which 13 of the donors were haploidentical relatives (children, siblings, or parents). The vast majority of allogeneic stem cell transplants were carried out with G-CSF mobilized peripheral blood stem cells. In line with our cohort's age distribution, 76% of patients received reduced intensity conditioning. At 64, the evaluation and supply of transplants from healthy, voluntary donors for other centers in Switzerland and around the world significantly exceeded the previous year's number (2021 n = 44) and hit a record high.

5.1.2 Autologous stem cell transplantation

Prof. Dr. med. Dr phil. Dominik Schneidawind, Department of Medical Oncology and Hematology

There were a total of 95 autologous stem cell transplantations in 2022, a slight increase on the previous year (2021 n = 90). The median age of patients across all entities was 54 years. As expected, the most common indication among malignancies continues to be multiple myeloma (n = 52) followed by non-Hodgkin's lymphoma and germ cell tumors. Five multiple sclerosis patients received high-dose chemotherapy with autologous stem cell support following an interdisciplinary case conference between neurology and hematology in the aHSCT-in-MS registry study.

5.1.3 CAR T-cell therapy

Prof. Dr. med. Dr phil. Dominik Schneidawind, Department of Medical Oncology and Hematology

In the area of CAR T-cell therapy, the past year saw a significant increase in the number of treatments to 32 (2021 n = 13). This is due to both an extension of the approval for already available products and a new approval: Since 2022, a CAR T-cell therapy for multiple myeloma has also been available in the form of idecabtagene vicleucel. The distribution of the still limited production slots was successfully regulated at national level via the MM-CAR-T-Board of Swiss Blood Stem Cell Transplantation (SBST). This means that all commercial CAR-T cell products licensed in Switzerland are now available at the University Hospital Zurich (USZ). For 2023, the range of services in the area of lymphatic neoplasia will be expanded again.

5.1.4 Miscellaneous from the Center for Stem and Immune Cell Therapy

Cordula Walt, Quality Manager

Prof. Dr. med. Dominik Schneidawind succeeded Assistant Professor Urs Schanz as Program Director of the Center for Stem and Immune Cell Therapy in late 2022. In May 2022, Prof. Dr. med. Antonia Müller took over as Head of the Department of Blood Group Serology and Transfusion Medicine at the Vienna General Hospital (AKH Vienna) and the associated Chair at the University of Vienna. Dr. med. Gayathri Nair left the University Hospital Zurich (USZ) in July 2022 to take up the position of Medical Director of Swiss Blood Stem Cells, succeeding Dr. med. Grazia Nicoloso.

The new Stem Cell and GMP Laboratory was relocated and commissioned in spring 2022. The new clean room eliminates the need for long transport distances: Stem cell donations can now be processed in our laboratory at USZ and stored directly in nitrogen storage tanks in the adjacent room. In combination with the adjacent laboratory and warehouse, the new clean room offers significantly more work space compared to the previous solution. As a result, USZ has adapted to the rising number of cases and the increased demand in the area of cellular therapies.

Patients receiving stem cell transplantation or CAR-T cell therapy are looked after at our highly specialized stem cell and immune cell therapy ward. This department is designed to cater for special needs during this critical treatment phase. 16 rooms with an overpressure HEPA air filter system are available for infection prevention. This frees the indoor air from pathogens and environmental germs. Stem cell transplantation is a field of highly specialized medicine. As a result, we work as a multiprofessional team comprising the Medical Service, Specialist Nursing, Psychologists, Physiotherapy, Nutrition Counseling, Social Services, and Health Care Chaplaincy.

5.2 Lung transplantation

Assistant Professor Sven Hillinger, Thoracic Surgery / Dr. med. René Hage, PhD, Pulmonology/Prof. Dr. med. György Lang, Thoracic Surgery

A total of 31 patients underwent lung transplants at the University Hospital Zurich (USZ) in 2022. After the first two years of the pandemic with 24 transplantations in each case, transplantation activity further increased to 31. For the first time, an HIV-positive patient (without a detectable viral load) underwent a lung transplant in Zurich.

The following landmarks were achieved:
Compared to the last 5 years:

- highest number of lung transplants (n = 31)
- highest number of lungs implanted from DCD donors (n = 9)
- highest number of donations from abroad (n = 9)
- 100% intraoperative EMCO support

Various innovations were also introduced in the second half of the year, including total lung capacity (TLC)-based allocation for better size match, regular intraoperative use of ECMO, continuous bronchial sutures, insertion of Jackson Pratt drains for earlier mobilization, and tacrolimus-based immunosuppression. Last but not least, the now weekly interdisciplinary visits with colleagues from Infectious Diseases and Clinical Pharmacology contributed to a significant increase in the quality of perioperative care.

In spite of increased transplantation activity with more investigation and follow-up work, the percentage of medical staff employed in transplant pulmonology was regrettably not increased, but instead actually fell slightly.

The newly formed Lung Transplantation team also took the opportunity to critically examine the results of data published in the STCS. Plans for an international audit in collaboration with the Transplantation Center were discussed. This audit will take place in 2023.

Medical staff

The medical staff in the Department of Pulmonology include four part-time senior consultants who were responsible for transplantation and cystic fibrosis (Damm 80%, Roeder 80%, Hage 80%). Dr. Carlos Cardoso has left the Lung Transplantation team and moved to an external practice. We would like to thank him for his efforts. However, the decision has been made not to fill his 40% position on the Lung Transplantation team. Prof. Dr. med. Ilhan Inci has left USZ to work in a private clinic in Zurich. We are very grateful to him for his commitment to lung transplantation for more than a decade at USZ. Prof. Dr. med. György Lang, a very experienced lung transplant surgeon from Vienna (see below) has been recruited to navigate this transitional phase.

Collaboration with St. Gallen Cantonal Hospital (KSSG)

Close collaboration with the Department of Pulmonology at the Cantonal Hospital of St. Gallen (KSSG) began back in 2021. 25 patients were able to have their inpatient partial evaluations for lung transplantation (1 week) at the KSSG (Prof. Dr. med. Martin Brutsche, KSSG). Additional evaluations were then carried out at USZ (1 week inpatient stay). 17 patients from Eastern Switzerland who previously underwent transplantation at USZ are receiving outpatient lung transplant follow-up care at the KSSG (Senior Consultant, Dr. med. Anna-Lena Walter, KSSG). Once a year, patients attend a lung transplant follow-up check (annual check-up) at USZ. The lung transplant patients at the KSSG are co-supervised by USZ in a consultative capacity (Senior Consultant, Lung Transplantation team at USZ, 10% quota).

Collaboration between Lucerne Cantonal Hospital (LUKS) and Inselspital Bern

In 2022, preparations were made for a closer collaboration with Pulmonology at Lucerne Cantonal Hospital (LUKS) and Inselspital Bern in terms of lung transplantation follow-up care. Implementation will begin in 2023.

Collaboration with Barmelweid Rehabilitation Clinic
Thanks to the already established close working relationship with the director, Dr. med. Thomas Sigrist, for the care of our patients following pulmonary endarterectomy, we have succeeded in acquiring a committed ongoing partner for the early rehabilitation of lung transplant patients and thus shortening their inpatient stay with us in the future. The feedback from our shared patients is excellent.

Activities of the research group
- Collaboration on a prospective study on the vaccination response following COVID-19 vaccination in lung transplant recipients (COVERALL study) and on a multimodal remote home monitoring device for lung transplant recipients (COVIDA desk with wearable devices).
- Various master's and dissertation projects.
- Continuation of the prospective cryobiopsy study to diagnose rejection.

5.3 Liver transplantation

Prof. Dr. med. Philipp Dutkowski, Abdominal Surgery and Prof. Dr. med. Beat Müllhaupt, Gastroenterology

In 2022, 52 liver transplantations were performed in Zurich (in total, 142 liver transplantations were carried out in Switzerland), of which 26 were donations after circulatory death (DCD) and three were a living donor liver transplantation. All DCD livers have been routinely optimized in Zurich for 10 years by means of an ex vivo liver perfusion (Hypothermic Oxygenated Perfusion – HOPE). On April 28, 2022, the 1,000th liver transplantation was celebrated in Zurich.

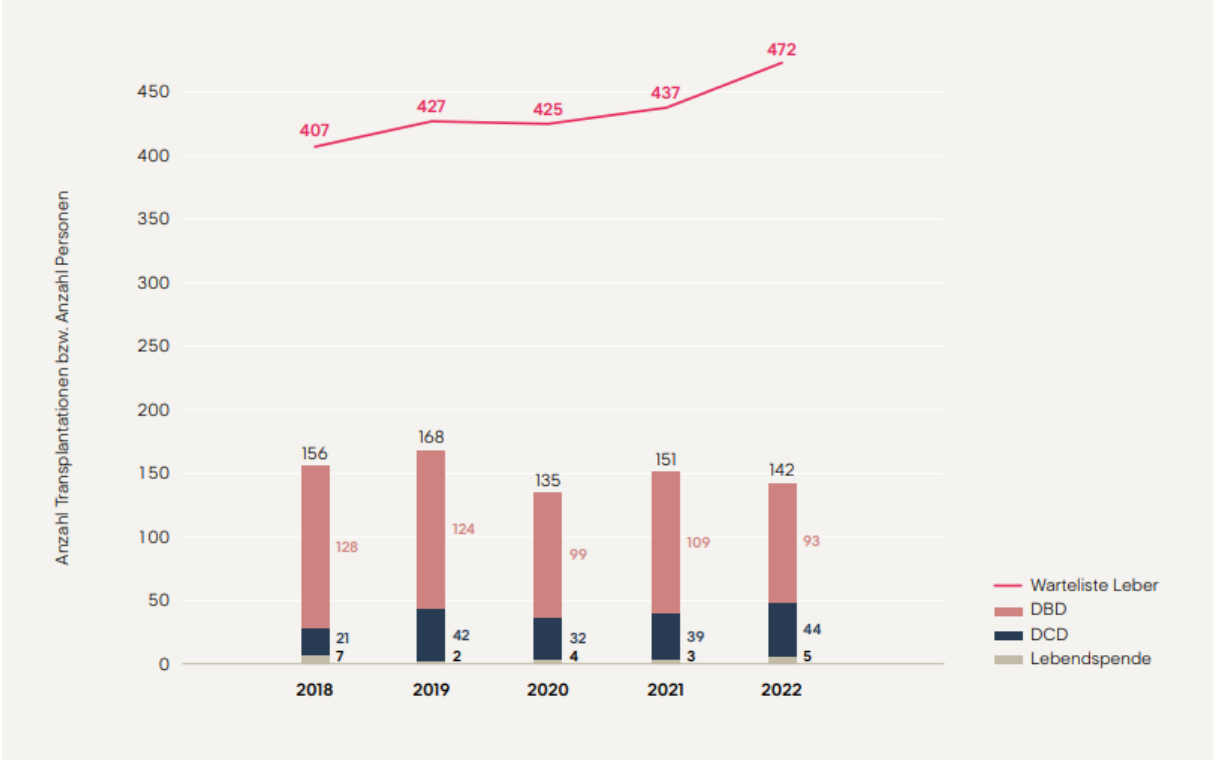

Figure 5: Number of liver transplants in Switzerland relative to the waiting list (Swisstransplant Annual Report 2022)

5.4 Kidney transplantation

Prof. Dr. med. Thomas Müller, Nephrology and Dr. med. Fabian Rössler, Visceral and Transplantation Surgery

In 2022, a total of 89 kidney transplants were performed at the University Hospital Zurich (USZ), including 25 living donor kidney transplants. As a result, we are able to maintain our high figures and are the largest kidney transplantation program in Switzerland.

Descriptive demographic data show a donor and recipient age of around 50 years. In terms of organ quality, the mean KDPI was 52% for the deceased kidneys, while the LDKDPI was expected to be lower at 25%. The immunological risk spectrum for cPRA ranged from 0 to 100%, with a mean and median of 0%. The mean PIRCHE score was 79 – this was 51 for living donor transplants and 88 for deceased donor transplants. The DGF rate was approx. 40% for deceased donor transplants and approx. 10% for living donor transplants. In kidneys with immediate function, CRR2 was 25% for deceased donor transplants and 26% for living donor transplants.

In 2022, we continued to focus on tracking the quality of our results, this time focusing on transplant follow-up and long-term survival. The vast majority of these papers have been prepared by PD Dr Thomas Schachtner's working group. The results were also presented for the first time in a hybrid patient symposium and made available to patients – and this was very well received. The focal points of quality monitoring and research are presented below.

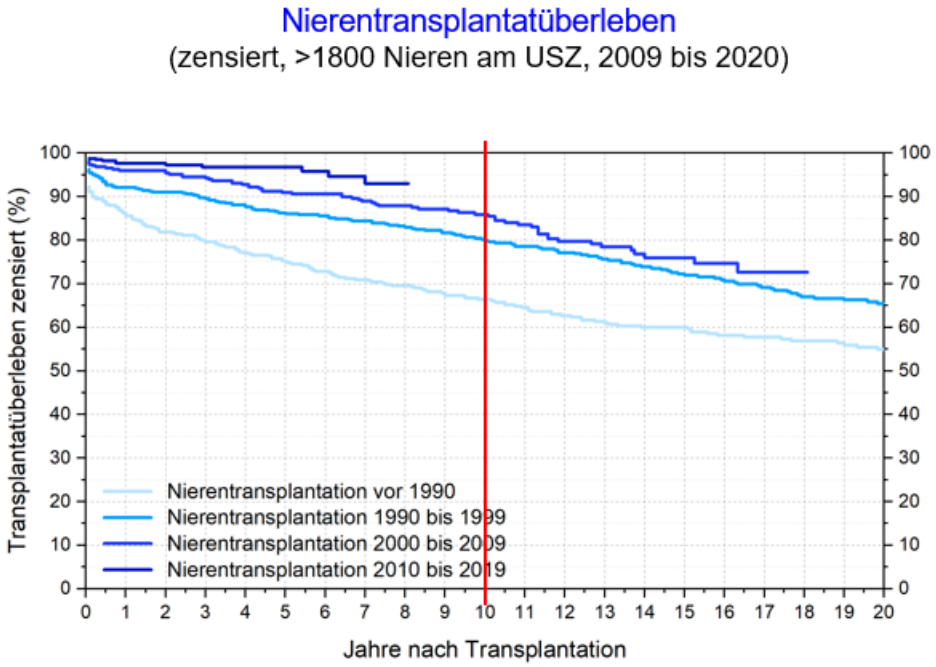

Figure 6: Kidney transplant survival

5.4.1 Long-term results

As shown in Figure 6, kidney transplant survival has progressively improved over the decades, with censored 10-year survival close to 90% and expected to be even higher for patients who received transplants between 2010 and 2019. This improvement is all the more remarkable as there has been a significant increase in recipient age, co-morbidities and, in particular, donor age.

Approximately 1,300 kidney transplants are currently underway and patients are regularly cared for in our Outpatient Care Unit. The distribution of the baseline immunosuppressive regimens is shown in Figure 7. You can see that immunosuppression predominantly applied to tacrolimus.

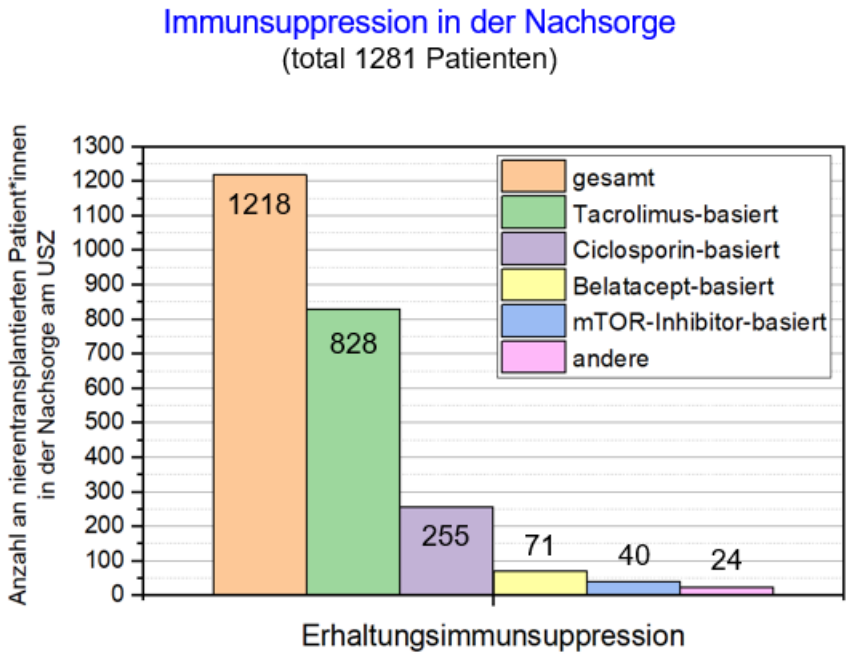

Figure 7: Immunosuppression in follow-up care

An analysis of transplant outcomes based on KDIGO stages (Figures 8 and 9) shows that two thirds of our patients demonstrate excellent renal function after one year and that two thirds of our patients have a potential transplant survival of more than 20 years. If no significant proteinuria occurs and renal function is stable, the transplant survival rate can be as high as 30 to 40 years. The primary reason for reduced post-transplant survival is the death of the patient with a functioning graft.

KDIGO-Stadien nach TPL nach 1 Jahr

GFR-Stadium (ml/min/1.73m²)				Albuminurie-Stadium A1: normal bis leicht erhöht; <30mg/Tag; <3mg/mmol Kreatinin	A2: moderat erhöht; 30-300 mg/Tag; 3-30 mg/mmol Kreatinin	A3: schwer erhöht; >300 mg/Tag; >300 mg/mmol Kreatinin
G1	normal bis hoch	≥90		5.0%	12.8%	0.6%
G2	leicht erniedrigt	60-90		12.0%	32.2%	1.7%
G3a	leicht bis moderat erniedrigt	45-60		6.5%	16.6%	1.3%
G3b	moderat bis schwer erniedrigt	30-45		2.2%	7.1%	1.1%
G4	schwer erniedrigt	15-30		0.2%	1.0%	0.2%
G5	Nierenversagen	<15				

Grün: geringes Risiko; gelb: mässiges Risiko; orange: hohes Risiko; rot: sehr hohes Risiko
(für terminale Niereninsuffizienz und kardiovaskuläre Komplikationen)

Figure 8: KDIGO stages one year post transplant

KDIGO-Stadien nach TPL nach 20 Jahren

GFR-Stadium (ml/min/1.73m²)				Albuminurie-Stadium A1: normal bis leicht erhöht; <30mg/Tag; <3mg/mmol Kreatinin	A2: moderat erhöht; 30-300 mg/Tag; 3-30 mg/mmol Kreatinin	A3: schwer erhöht; >300 mg/Tag; >300 mg/mmol Kreatinin
G1	normal bis hoch	≥90		0.3%	1.4%	1.0%
G2	leicht erniedrigt	60-90		5.2%	17.8%	6.6%
G3a	leicht bis moderat erniedrigt	45-60		4.2%	15.0%	8.4%
G3b	moderat bis schwer erniedrigt	30-45		3.5%	10.1%	10.8%
G4	schwer erniedrigt	15-30		1.0%	4.2%	8.4%
G5	Nierenversagen	<15		0	0.3%	1.4%

Grün: geringes Risiko; gelb: mässiges Risiko; orange: hohes Risiko; rot: sehr hohes Risiko
(für terminale Niereninsuffizienz und kardiovaskuläre Komplikationen)

Figure 9: KDIGO stages 20 years post transplant

One problem in the long term post-transplantation is the occurrence of tumors. Here, the evaluation shows that, as expected, the proportion of patients with tumors progressively increases depending on the time after transplantation and thus correlating with the cumulative burden of immunosuppression. Patients with transplant function for at least 20 years should expect a tumor to occur in one third of cases (Figure 10). Again, this rate is significantly higher in the case of skin tumors. In these patients, the tumor rate 20 years post-transplant is approx. 40% and is approx. 60% in patients 30 years post-transplant (Figure 11). What was very interesting in this evaluation was that even in our small group there was a significant link between thiazide diuretics and skin tumor rates.

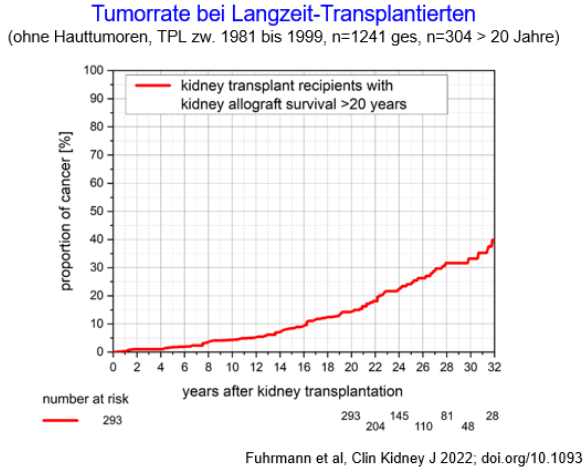

Figure 10: Tumor rate in long-term transplant recipients

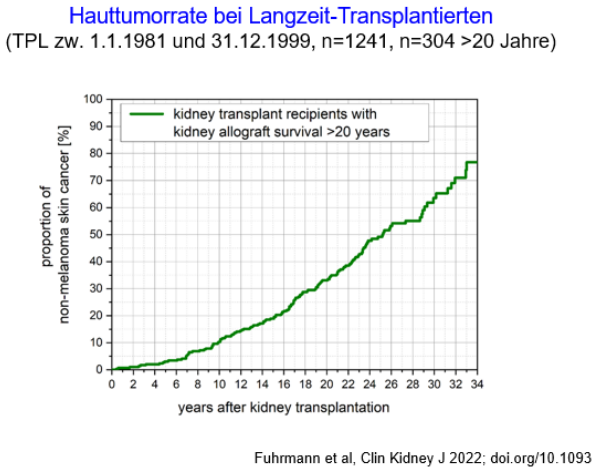

Figure 11: Skin tumor rate in long-term transplant recipient

5.4.2 Immunosuppression and viral infections

At the end of 2020, we revised and adjusted the risk classifications and immunosuppressive regimens. We have been offering the regimen shown in Figure 12 since 2021. The main changes consist of an initial lower tacrolimus level, a faster reduction in the prednisone dose, a new measurement of trough levels of mycophenolate mofetil and AUC values, a discontinuation of cyclosporine, an initial administration of ATG, and an overall greater individualization of therapy according to risk classification.

Schema der immunsuppressiven Therapie nach Nierentransplantation

		Visiten															
		Basis	W2a	W2b	W3a	W3b	W4	W5	W6	W8	W10	W12	M4	M5	M6	M8	M10	M12
		1.Kons																
Immunosuppressive Therapie																		
- Tacrolimus (Schema 1)	C0	BID **8-10**								QD		**6-8**						**5-7**
- Tacrolimus (Schema 2)	C0	BID **10-12**							**8-10**	QD		**6-8**						**5-7**
- Tacrolimus (Schema 3)	C0	BID **10-12**								QD		**8-10**						**6-8**
- Tacrolimus (Schema 4)	C0	BID **6-8**	Je nach Funktion individuell wechseln ins jeweilige Schema							QD								
- MMF	Dosis (mg)		**C0**									**C0**			**C0**			**AUC**
- MPS	Dosis (mg)																	
- Azathioprin	Dosis (mg/kg)	**1 mg/kg KG (bei Tripeltherapie), 2 mg/kg KG (bei Dualtherapie)**																
- Prednison	Dosis (mg/kg KG)	**0.5**	**0.25mg/kg KG**		**10mg**		**7.5mg**		**5mg**			**ab Monat 3: Absetzversuch 5 / 2.5 / 0 (Schema 1)**						

Figure 12: Regimen of immunosuppressive therapy after transplantation

Fortunately, there has been a surprisingly effective improvement in the area of viral infections, both in the incidence of CMV viramias (Figure 13) and in BK viramias (Figure 14), which benefit overall from a reduction in maintenance immunosuppression.

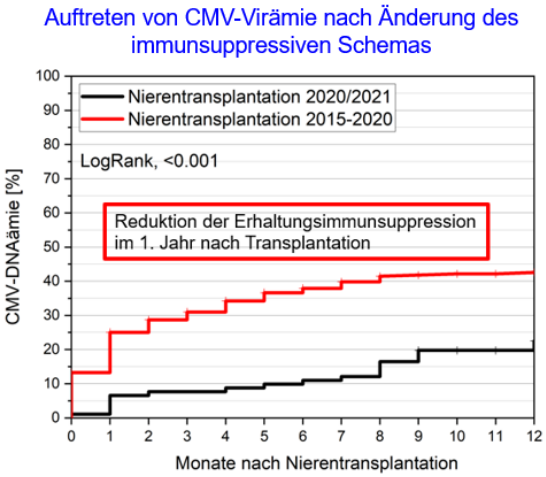

Figure 13: Incidence of CMV viramias after change of the immunosuppressive regimen

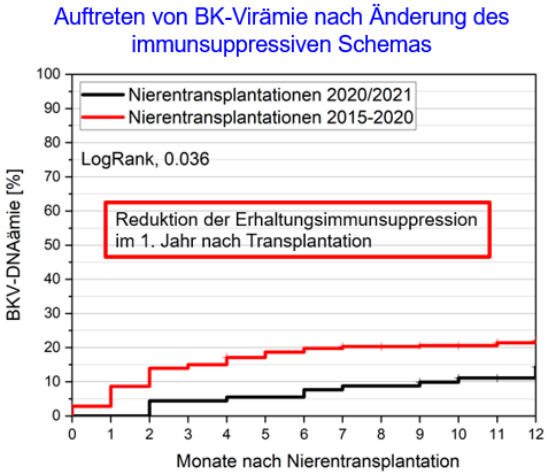

Figure 14: Incidence of BC viraemia after change in immunosuppressive regimen

These changes did not lead to an increased incidence of rejection reactions (Figure 15).

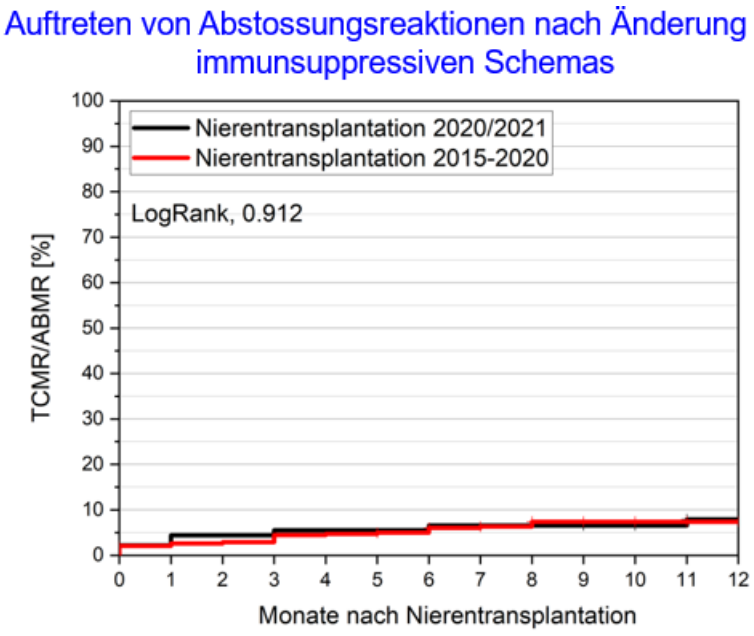

Figure 15: Incidence of rejection reactions after change in immunosuppressive regimen

5.4.3 MPA drug monitoring

In addition to measuring trough levels of mycophenolate mofetil, we have now also introduced AUC measurements. The first analyses show that the trough levels with the desired target range of 1.5 to 4 mg/l correlate well with the AUC levels, where we aim for a range of over 40 to 60 mg*h per liter. However, Figure 16 also shows that there are outliers in approx. 10 to 20% for which the combined measurement is certainly justified.

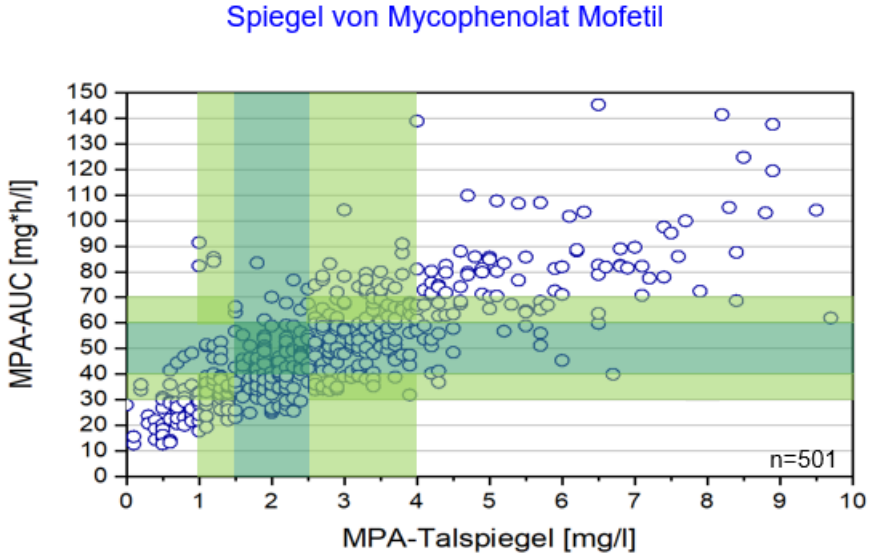

Figure 16: Levels of mycophenolate mofetil

As an interesting finding and a sign of potent inhibition of the immune response, the SARS-CoV-2 vaccination response correlated with MPA levels (Figure 17). This finding probably also justifies our strategy of initially reducing antiproliferative agents in the event of COVID-19 infection and the overall correlation between MPA and viral infections.

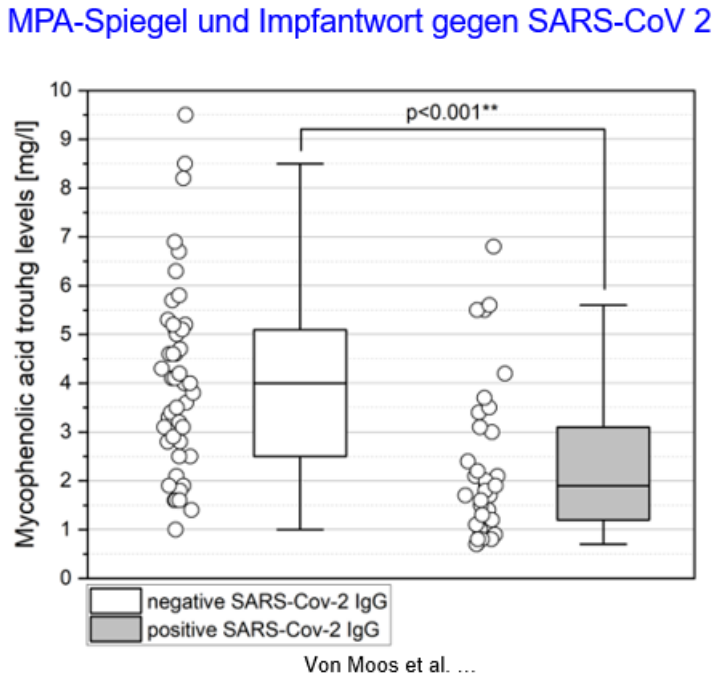

Figure 17: MPA levels and SARS-CoV-2 vaccination response

5.4.4 Immunological risk stratification

Classification of immunological risk is the basis for adjusting immunosuppression and avoiding over- or under-immunosuppression. The typing laboratory has made significant progress here by introducing the calculation of the PIRCHE score. Through collaborative work, we were able to show that the level of the PIRCHE score correlates with the probability of a rejection reaction in borderline histology (Figure 18) and is a valuable biomarker for the indication of whether or not a re-biopsy should be performed (Figure 19).

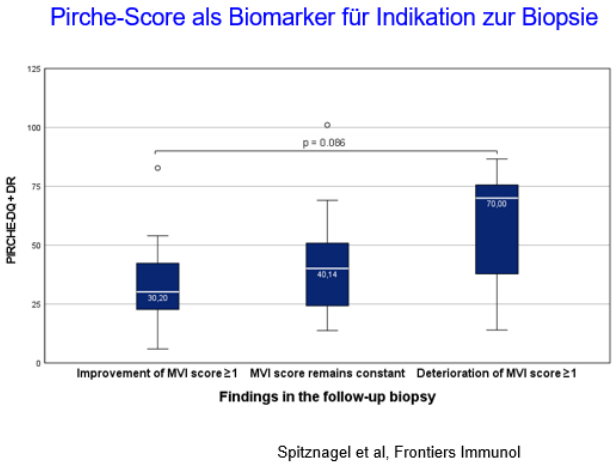

Figure 18: PIRCHE score as a biomarker for Biopsy indication

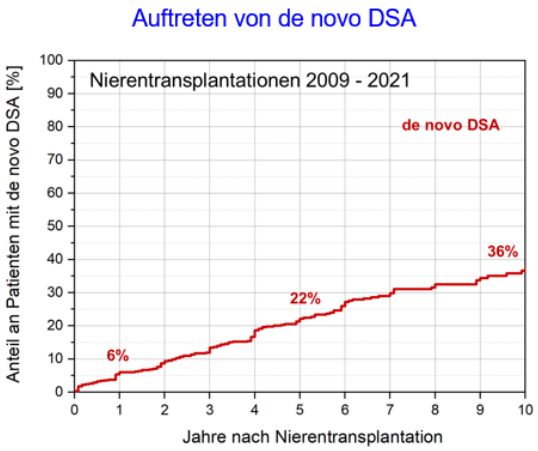

Figure 19: Incidence of de novo DSA

Regular monitoring of anti-HLA antibodies is essential for risk assessment and immunosuppressive therapy management as well as for the indication for a graft biopsy. The analysis in Figure 20 shows that the incidence of de novo DSA increases depending on the duration after transplantation, the percentage being comparable to the values described in literature. This also correlates with the incidence of chronic humoral rejection reactions, which are thought to be subject to delayed diagnosis after the onset of DSA (Figure 21).

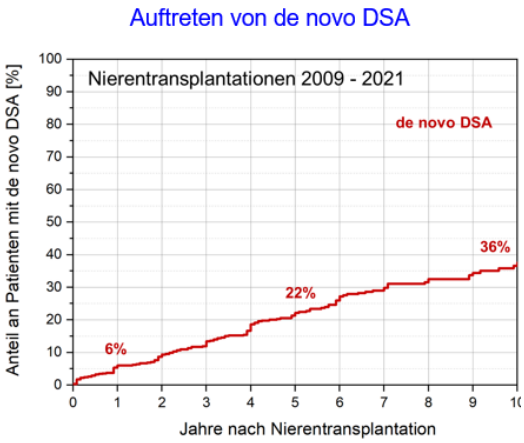

Figure 20: Incidence of de novo DSA

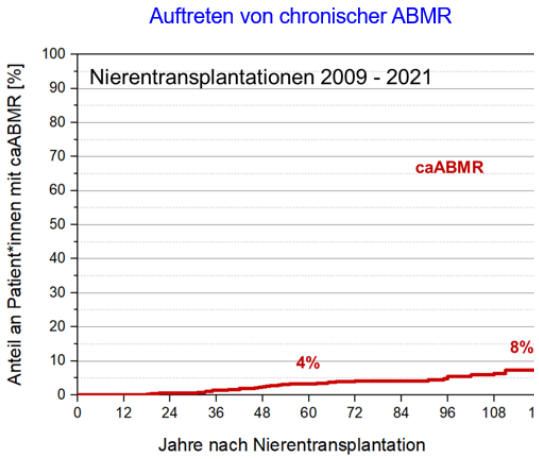

Figure 21: Incidence of chronic ABMR

5.4.5 Molecular microscope

Molecular diagnostics are an essential part of our program, which is carried out in close coordination with the Department of Nephropathology at the University Hospital Zurich, Dr. Gaspert, and Dr. Helmchen. However, there is still a lack of robust clinical data for the clinical added value of these diagnostics, which is why we have investigated the findings and therapeutic consequences from histology and transcriptome. Figure 22 summarizes the first findings in a poster and underlines the diagnostic value of the molecular microscope in cases of borderline histological findings for a rejection reaction.

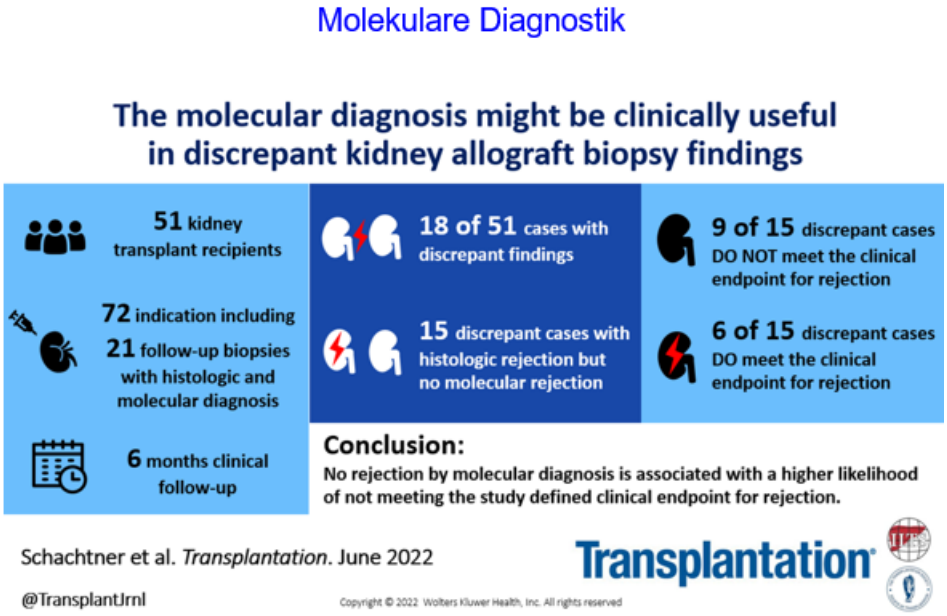

Figure 22: Molecular diagnostics

5.4.6 USZ follow-up care concept

Last but not least, we evaluated our outpatient care concept. This involves very close cooperation with referring physicians, which means that they generally see the transplanted patients every three months over the long term and the patient also has an annual check-up at USZ. The results show that this four-eyes principle enables high-quality follow-up care, and they also point to the high quality of our referring physicians (Figure 23).

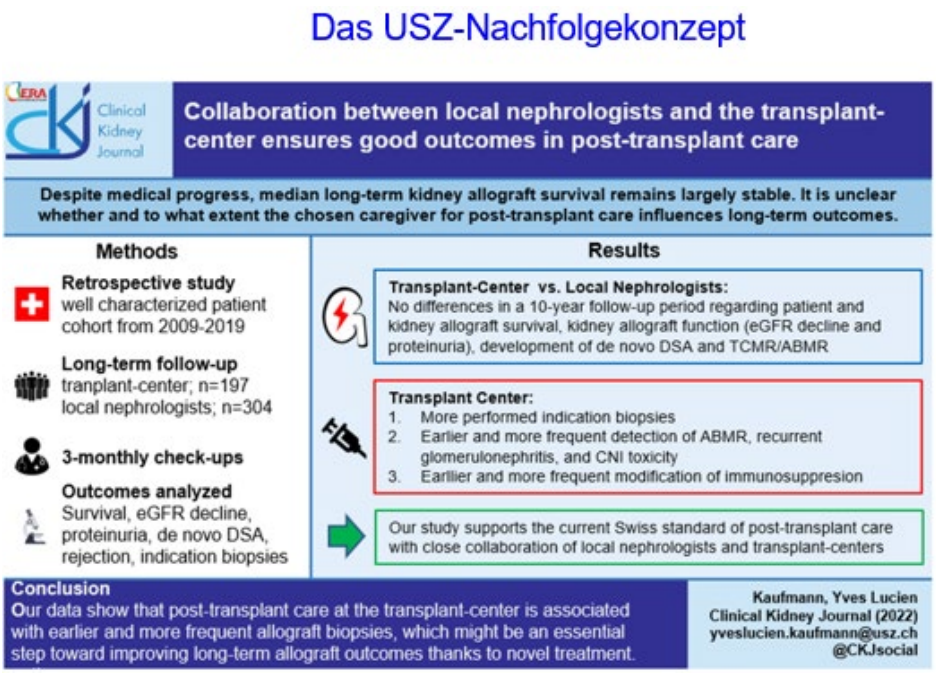

Figure 23: The USZ succession concept

Overall, we were able to retain the majority of our patients in 2022, despite damage to several rooms and the "outsourcing" of large sections of our outpatient clinic to the Circle. The points listed above – with the quality of transplant follow-up care a real highlight – are certainly a unique selling point of USZ compared to other transplantation centers, and we were able to showcase our expertise and results at a number of conferences as well as publish these. It is particularly encouraging to see that most of the clinically relevant research work was carried out by students under supervision or by our junior doctors primarily. We believe that this also contributes to the quality of professional development. The excellent collaboration with the Department of Nephropathology and the typing laboratory is also worth mentioning.

5.5 Pancreas transplantation

Dr. med. Fabian Rössler, Visceral and Transplantation Surgery

Four pancreatic transplants were carried out last year. All four were performed as simultaneous pancreas-kidney transplants in recipients with long-standing type 1 diabetes and chronic kidney disease. All were first-time transplants from DBD donors. This represents a slight decrease in the number of pancreatic transplants compared to recent years, but also reflects the overall decline in pancreatic transplants around the world. The results of these combined pancreas-kidney transplants were excellent, with all double organs transplanted in the past year functioning and no surgical graft loss. In addition, the rate of technical pancreatic graft loss has remained below 5% over the past 10 years, which is an excellent result by international standards. We can see the potential for an increase in the number of cases in the coming years in the increased transplantation of DCD and extended criteria pancreatic donors.

5.6 Islet cell transplantation

Prof. Dr. med. Roger Lehmann, Endocrinology and Diabetology

No islet cell transplantations were carried out in 2022. We signed the mutual agreement in collaboration with the Geneva University Hospital in 2023 and will be able to offer islet cell transplants again in 2023.

5.7 Heart transplantation

Prof. Dr. med. Markus Johannes Wilhelm, Senior Attending Physician, Department of Cardiac Surgery

2022 was still impacted by the COVID-19 pandemic. It was therefore all the more pleasing that we were able to increase the number of heart transplants this year to 14, which is a higher figure than in previous years. Perioperative mortality was 0%. The other morbidity parameters were also excellent. Of the 14 patients, four (29%) were assisted with an artificial heart prior to heart transplantation and one patient with an extracorporeal circulatory support system.

Under the baton of Swisstransplant, the "Organ Care System" (OCS) was established in 2022 together with the two other heart transplant centers in Bern and Lausanne (Figure 24). This allows donor organs to be transported outside the donor for a longer period of time. OCS was used for the first time during a transplantation in 2022.

Assist devices are becoming increasingly important due to the organ shortage. In 2022, a left ventricular assist device was implanted in five patients.

In 2022, 111 implantations of ECMO (ExtraCorporeal Membrane Oxygenation) and ECLS (ExtraCorporeal Life Support) were carried out and used for therapy for refractory acute pulmonary or cardiovascular failure (Figure 25). Approximately 75% of implants were carried out as ECLS in cardiogenic shock and 25% as ECMO in lung failure. With 42 ECMO/ECLS transport operations in 2022, the third-highest figure since the program was launched.

Figure 24: The Organ Care System™ (Transmedics, Inc., Andover, MA 01810, USA) for transporting donor hearts (https://www.fda.gov/medical-devices/recently-approved-devices/organ-care-system-ocs-heart-system-p180051)

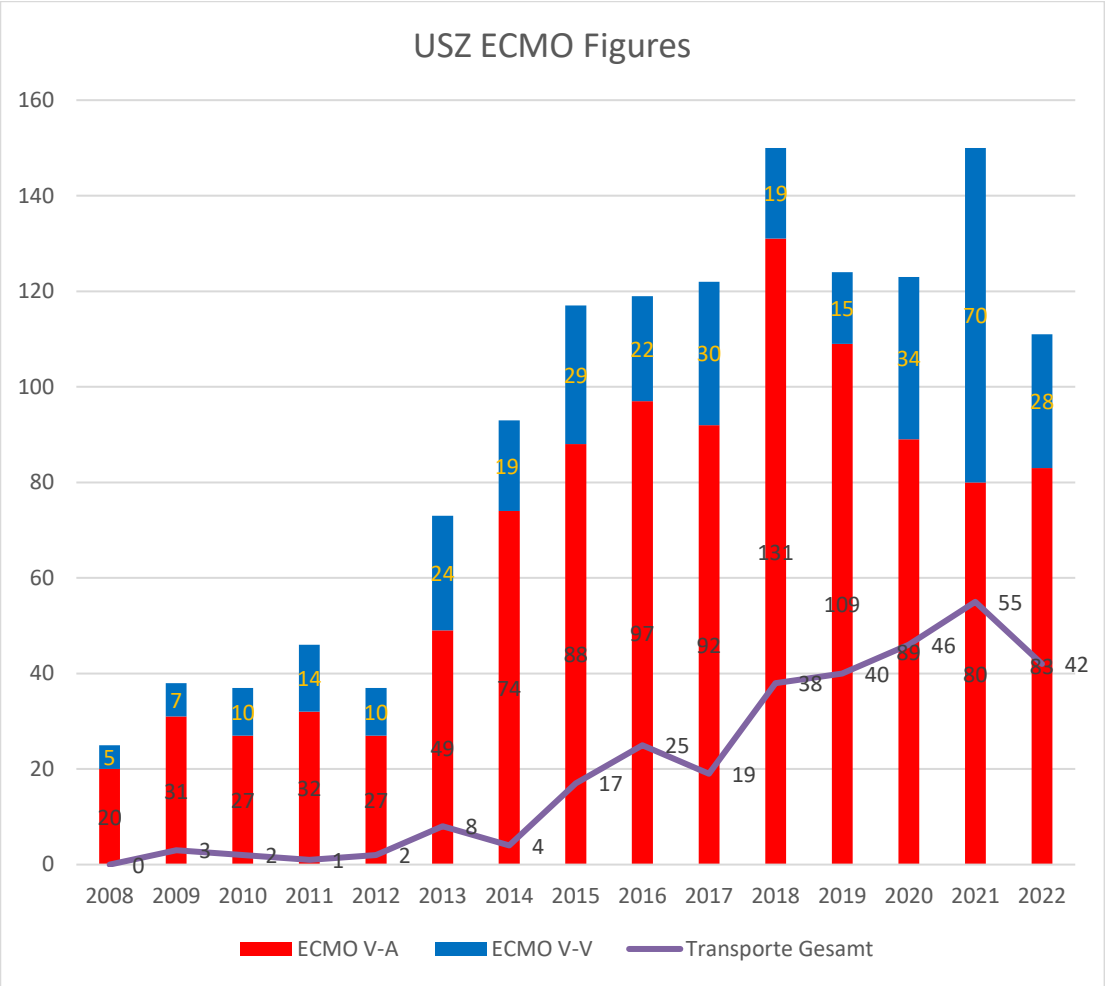

Figure 25: Number of ECLS/ECMO implantations since 2008

6 Annex

6.1 Staffing structure of the Transplantation Center 2022

	Board of Directors	**Board of Trustees**
Management	**Head** Prof. Dr. med. Nicolas Müller	**Chairman** Prof. Dr. med. Frank Ruschitzka
Heart	Prof. Dr. med. Andreas Flammer Prof. Dr. med. Markus Wilhelm	Prof. Dr. med. Frank Ruschitzka Prof. Dr. med. Omer Dzemali
Lungs	Dr. med. René Hage Prof. Dr. med. György Lang / Assistant Professor Sven Hillinger	Assistant Professor Macé Schuurmans Prof. Dr. med. Isabelle Schmitt-Opitz
Liver	Prof. Dr. med. Philipp Dutkowski vacant	Prof. Dr. med. Beat Müllhaupt Prof. Dr. med. Pierre-Alain Clavien
Kidney	Prof. Dr. med. Thomas Müller Dr. med. Fabian Rössler	Prof. Dr. med. Thomas Müller Prof. Dr. med. Pierre-Alain Clavien
Pancreas and islet cells	Prof. Dr. med. Roger Lehmann Dr. med. Fabian Rössler	Prof. Dr. med. Felix Beuschlein Prof. Dr. med. Pierre-Alain Clavien
Small intestinal and multivisceral transplantation	Prof. Dr. med. Philipp Dutkowski	Prof. Dr. med. Pierre-Alain Clavien
Stem cells	Prof. Dr. med. Dr. phil. Dominik Schneidawind	Prof. Dr. med. Markus Manz
Consultation services	Prof. Dr. med. Nicolas Müller, Infectiology Dr. med. Mirjam Nägeli, Dermatology KD Katja-Daniela Jordan, Psychiatry and Psychosomatics Consultation	Prof. Dr. med. Michael Weller
Anesthesiology	Prof. Dr. med. Marco Zalunardo	Prof. Dr. med. Donat Spahn
Transplantation immunology laboratory	Dr. med. Jakob Nilsson, Ph. D.	Prof. Dr. med. Onur Boyman
Care	Helen Ziegler	Stephan Schärer
Intensive care	Assistant Professor Stephanie Klinzing	Prof. Dr. med. Reto Schüpbach
Transplant coordination	Stefanie Schiess	
Transplantation ward E, EAST III	Dr. med. Kerstin Hübel	
Research	Ph. D. Lucia Bautista Borrego	
Quality Management	Ursula Schäfer	
Department Manager	Karl-Heinz Heidenreich	
DCA (seat without voting rights)	Assistant Professor Matthias Hilty / Dr. med. Anisa Hana	
Dean		Prof. Dr. med. Frank J. Rühli

International Advisory Board	
Heart	Prof. Dr. med. Mandeep R. Mehra, USA
Lungs	Prof. Dr. med. John Dark, UK
Liver	Prof. Dr. med. Daniel Cherqui, France
Kidney	Prof. Dr. med. Christophe Legendre, France
Pancreas and islet cells	Prof. Dr. med. Eelco de Koning, Netherlands
Stem cells	Prof. Dr. med. Ernst Holler, Germany
Anesthesiology and intensive care	Univ. Prof. Dr. med. Michael Hiesmayr, Austria

Referring physicians at the Transplantation Center		
St. Gallen	Cantonal Hospital	Dr. Dr. med. David Semela
Zurich	Clinic in the Park	Dr. med. Michael Möddel
Zurich	City dialysis	Dr. med. Cicvara / Dr. med. Küper / Prof. Dr. med. Nilufar Mohebbi
Baden	Baden Cantonal Hospital	Assistant Professor Harald Seeger
Chur	Chur Cantonal Hospital	Dr. med. Reto Venzin
Winterthur	Winterthur Cantonal Hospital	Dr. med. Thomas Kistler
Lachen	Lachen Hospital	Dr. med. Kneubühl / Dr. med. Schorn
Männedorf	Männedorf Hospital	Dr. med. Daniela Schiesser
Glarus	Glarus Nephrology	Dr. med. Georgalis
Muri	Muri Hospital	Dr. med. Rahel Pfammatter
Zug		Dr. med. Varga
Wetzikon	Wetzikon Hospital	Dr. med. Etter
	Seespital	Dr. med. Matheis
Davos		Dr. med. Christina Venzin
Uster		Dr. med. Alf Corsenca
Zurich	Waid Hospital	Dr. med. Ambühl / Dr. med. Johannes Trachsler
Locarno		Prof. Dr. med. Pietro Cippà
Bellinzona	Ospedale San Giovanni	Dr. med. Lorenzo Berwert
Lugano		Prof. Dr. med. Pietro Cippà
Hochfelden	Dialysis Practice	Dr. med. Christoph Wahl
Uznach	Hospital	Dr. med. Matthias Neusser
Chiasso	MedQualitas	Dr. med. Claudio Cereghetti
Urdorf		Dr. med. Jan Zaruba
Zollikerberg	Zollikerberg Hospital	Dr. med. Jörg Bleisch
Frauenfeld		Dr. med. Stefan Flury
Zurich	Practice	Dr. med. Michael Möddel
Zurich	Children's Hospital Zurich	Dr. med. Sparta
Aarau	KS Aarau	Prof. Dr. med. Stephan Segerer
Lucerne	Lucerne Cantonal Hospital	Dr. med. Odermatt
Schaffhausen	Schaffhausen Cantonal Hos-	Dr. med. Marco Miozzari

6.2 Transplantation activities 2012–2022

Organ	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Heart total	**11**	**10**	**16**	**14**	**10**	**17**	**16**	**11**	**11**	**11**	**14**
- Heart and kidney	0	1	1	0	0	0	0	0	0	0	0
Lung total	**33**	**28**	**32**	**31**	**23**	**14**	**19**	**17**	**24**	**24**	**31**
of which DCD	*2*	*5*	*5*	*5*	*3*	*2*	*3*	*4*	*5*	*7*	*9*
Liver total	**43**	**41**	**43**	**59**	**52**	**64**	**54**	**64**	**52**	**60**	**52**
- NBHD single-liver	39	27	28	44	34	37	37	61	49	58	49
of which DCD	*4*	*9*	*12*	*12*	*7*	*22*	*12*	*23*	*9*	*16*	*26*
- Living donor liver	4	2	2	2	7	5	4	1	3	2	3
- Liver and kidney	0	2	1	1	4	1	1	2	2	0	0
- Liver and small intestine	0	1	0	0	1	0	0	0	0	1	0
Kidney total	**84**	**87**	**84**	**96**	**88**	**104**	**100**	**91**	**97**	**85**	**89**
- NBHD single-kidney	47	47	44	62	48	54	58	60	76	60	64
of which DCD	*9*	*6*	*11*	*6*	*9*	*18*	*4*	*23*	*21*	*14*	*19*
- Living donor kidney	22	22	22	23	22	23	30	20	21	25	25
- Kidney and pancreas	10	11	5	3	4	4	5	8	8	7	4
- Kidney and islet cells	1	1	1	1	1	3	2	1	0	0	0
- Kidney and heart	0	1	0	0	0	1	0	0	0	0	0
- Kidney and liver	0	2	1	1	4	1	1	2	2	0	0
Pancreas total	**12**	**15**	**7**	**3**	**4**	**4**	**5**	**8**	**8**	**9**	**4**
- Pancreas only	2	3	2	0	0	0	0	0	0	1	0
- Pancreas and kidney	10	1	5	3	4	4	5	8	8	7	4
- Pancreas/small intestine	0	1	0	0	0	2	0	0	0	1	0
Islet cells total	**5**	**5**	**6**	**3**	**6**	**5**	**2**	**1**	**0**	**0**	**0**
- Islet cells only	4	4	5	2	4	2	0	0	0	0	0
- Islet cells and kidney	1	1	1	1	1	3	2	1	0	0	0
Small	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Stem cells total	**128**	**139**	**151**	**150**	**150**	**148**	**174**	**168**	**170**	**159**	**162**
- autologous	77	92	98	92	94	93	107	100	88	90	95
- allogeneic	51	47	53	58	56	55	67	68	82	70	67

Multi-organ donations at USZ	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Donors from USZ	12	18	17	24	14	23	17	33	26	36	33
- *of which DCD*	*6*	*9*	*12*	12	4	17	5	16	11	18	17
Donors from ZH network	7	6	9	10	13	8	9	10	12	11	14
Total donors USZ plus network	19	24	26	34	27	31	26	43	38	47	47

6.3 Outcome of organ transplantations

The results for all centers nationwide have been published since 2013. This is in accordance with the Transplantation Act and Ordinance. The "STCS Annual Report" is publicly available at the following link: **www.stcs.ch**

6.4 International Advisory Board (IAB) Meeting 2022

Prof. Dr. med. Nicolas Müller, Leiter Transplantationszentrum

Minutes Meeting International Advisory Board 2022:

Present: Strategic Board:
Frank Ruschitzka (FR) (Head), Beat Müllhaupt (BM), Roger Lehmann (RL), Pierre-Alain Clavien (PAC), Isabelle Schmitt-Opitz (IS), Dominik Schneidawind (DS), Thomas Müller (TM), Reto Schüpbach (RS), György Lang (GL), Macé Schuurmans (MS), Nicolas Müller (NM) *(Excused: Michael Weller, Frank Rühli, Felix Beuschlein, Markus Manz, Stephan Schärer, Onur Boyman, Donat Spahn)*

International Advisory Board:
Mandeep Mehra (via ZOOM), John Dark (in person), David Cherqui (via ZOOM), Chirstophe Legendre (in person), Ernst Holler (in person), Michael Hiesmayr (in person) *(Excused: Eelco de Koning)*

NM reports on the donor development (DCA report) and on the annual reporting of the Swiss Transplant Cohort Study, including crude survival curves. See attached handout.

Each program reports on its achievement and challenges.

The discussion focuses on the higher crude survival rates as compared between centers, for liver and lung recipients. A number of general points are raised:

- Center effect: What is the role of the center and peri- and posttransplant care? IA plans an audit of the lung transplant program with the help of JD, to assess this question.
- The new benchmarking report 2022, based on the same criteria as the one done in 2016 and 2017, clearly shows a closer alignment of the survival curves. Overall and in the specific subgroups. This result is in general reassuring, but raises questions:
    - Is it the result of an improved peri- and postransplant care?
    - Was the risk assessment pre-transplant influenced by the benchmarking 2016/2017? Risk aversion vs risk taking.
    - What is the composition of the waiting list in the respective centers?

The discussion centers on the following topics and actionable points:

- Death as an endpoint should be cross-checked by using publicly available statistics. Small mistakes/ omission have an over-proportional impact on outcome analysis. NM will raise this issue with STCS.
- The waiting lists are black boxes and need more scrutiny. The responsible person in the respective Swisstransplant organ working groups will raise this topic. Transparency must be enforced. Other countries can serve as models.
- The new benchmarking analysis has been sent to the involved programs, and feedback is awaited.

In a second part, the structural and personal issues with transplant coordination are discussed again. In the meantime, additional FTE have been approved by the hospital direction. Additional discussion on a new administrative and professional relocation of transplant coordination is currently ongoing.

6.5 Scientific publications 2022

Dermatology:

1. Ferrándiz-Pulido C, Leiter U, Harwood C, Proby CM, Guthoff M, Scheel CH, Westhoff TH, Bouwes Bavinck JN, Meyer T, Nägeli MC, Del Marmol V, Lebbé C, Geusau A.
Immune Checkpoint Inhibitors in Solid Organ Transplant Recipients With Advanced Skin Cancers-Emerging Strategies for Clinical Management.
Transplantation. 2023 Jan 5. DOI: 10.1097/TP.0000000000004459. Online ahead of print. PMID: 36706163.

Heart:

2. Radhoe SP, Jakus N, Veenis JF, Timmermans P, Pouleur AC, Rubís P, Van Craenenbroeck EM, Gaizauskas E, Barge-Caballero E, Paolillo S, Grundmann S, D'Amario D, Braun OÖ, Gkouziouta A, Planinc I, Macek JL, Meyns B, Droogne W, Wierzbicki K, Holcman K, Flammer AJ, Gasparovic H, Biocina B, Milicic D, Lund LH, Ruschitzka F, Brugts JJ, Cikes M.
Sex-related differences in left ventricular assist device utilization and outcomes: results from the PCHF-VAD registry.
ESC Heart Fail. 2022 Dec 22. DOI: 10.1002/ehf2.14261. Online ahead of print.
PMID: 36547014

3. Radhoe SP, Veenis JF, Jakus N, Timmermans P, Pouleur AC, Rubís P, Van Craenenbroeck EM, Gaizauskas E, Barge-Caballero E, Paolillo S, Grundmann S, D'Amario D, Braun OÖ, Gkouziouta A, Planinc I, Samardzic J, Meyns B, Droogne W, Wierzbicki K, Holcman K, Flammer AJ, Gasparovic H, Biocina B, Lund LH, Milicic D, Ruschitzka F, Cikes M, Brugts JJ.
How does age affect outcomes after left ventricular assist device implantation: results from thePCHF-VAD registry.
ESC Heart Fail. 2022 Dec 2. DOI: 10.1002/ehf2.14247. Online ahead of print.
PMID: 36460627.

4. Nägele MP, Flammer AJ.
Heart Failure After Right Ventricular Myocardial Infarction.
Curr Heart Fail Rep. 2022 Dec;19(6):375-385. DOI: 10.1007/s11897-022-00577-8. Epub 2022 Oct 5.
PMID: 36197627 Free PMC article. Review.

5. Gasparovic H, Jakus N, Brugts JJ, Pouleur AC, Timmermans P, Rubiś P, Gaizauskas E, Van Craenenbroeck EM, Barge-Caballero E, Grundmann S, Paolillo S, D'Amario D, Braun OÖ, Meyns B, Droogne W, Wierzbicki K, Holcman K, Planinc I, Lovric D, Flammer AJ, Petricevic M, Biocina B, Lund LH, Milicic D, Ruschitzka F, Cikes M.
Impact of progressive aortic regurgitation on outcomes after left ventricular assist device implantation.
Heart Vessels. 2022 Dec;37(12):1985-1994. DOI: 10.1007/s00380-022-02111-1. Epub 2022 Jun 23.
PMID: 35737119

6. Jakus N, Brugts JJ, Claggett B, Timmermans P, Pouleur AC, Rubiś P, Van Craenenbroeck EM, Gaizauskas E, Barge-Caballero E, Paolillo S, Grundmann S, D'Amario D, Braun OÖ, Gkouziouta A, Meyns B, Droogne W, Wierzbicki K, Holcman K, Planinc I, Skoric B, Flammer AJ, Gasparovic H, Biocina B, Lund LH, Milicic D, Ruschitzka F, Cikes M; PCHF-VAD registry.
Improved survival of left ventricular assist device carriers in Europe according to implantation eras: results from the PCHF-VAD registry.
Eur J Heart Fail. 2022 Jul;24(7):1305-1315. DOI: 10.1002/ejhf.2526. Epub 2022 May 24.
PMID: 35508920.

7. Auschra B, Wilhelm MJ, Husung C, Jenewein J, Flammer AJ, Jellestad L.
The use of serotonin reuptake inhibitors increases the risk of bleeding in patients with assist devices.
BMC Cardiovasc Disord. 2022 Mar 22;22(1):121. DOI: 10.1186/s12872-022-02557-1.
PMID: 35317724 Free PMC article.

8. Schmiady MO, Graf T, Ouda A, Aser R, Flammer AJ, Vogt PR, Wilhelm MJ.
An innovative cold storage system for donor heart transportation-lessons learned from the first experience in Switzerland.
J Thorac Dis. 2021 Dec;13(12):6790-6799. DOI: 10.21037/jtd-21-1175.
PMID: 35070363 Free PMC article.

9. Amstad T, Taeymans J, Englberger L, Mohacsi P, Steiner D, Wilhelm MJ, Hermann M.
Cardiac Rehabilitation in Patients With Ventricular Assist Device.
J Cardiopulm Rehabil Prev 2022;42(2):97-102.

10. Wilhelm MJ, Inderbitzin DT, Malorgio A, Aser R, Gülmez G, Aigner T, Vogt PR, Reser D.
Acute limb ischemia after femoro-femoral extracorporeal life support implantation: A comparison of surgical, percutaneous, or combined vascular access in 402 patients.
Artif Organs 2022;46:2284-2292.

11. Sahli SD, Kaserer A, Braun J, Halbe M, Dahlem Y, Spahn MA, Rössler J, Krüger B, Maisano F, Spahn DR, Wilhelm MJ.
Predictors associated with mortality of extracorporeal life support therapy for acute heart failure: single-center experience with 679 patients.
J Thorac Dis 2022;14:1960-1971.

Immunologie (HLA-Labor):

12. Bankova AK, Pasin C, Huang A, Cicin-Sain C, Epp S, Audige A, Mueller NJ, Nilsson J, Vilinovszki O, Nair G, Wolfensberger N.
Antibody response to a third SARS-CoV-2 vaccine dose in recipients of an allogeneic haematopoietic cell transplantation.
British Journal of Haematology. 2022 Nov 16.

13. Reimann AV, Nilsson J, Wuethrich RP, Mueller TF, Schachtner T.
Entering the Third Decade After Kidney Transplantation: Excellent Graft Function Refers to Superior Graft but Not Patient Survival.
Transplant International. 2022 Oct 31;35:10675.

14. Ehrsam J, Rössler F, Horisberger K, Hübel K, Nilsson J, de Rougemont O.
Kidney Retransplantation after Graft Failure: Variables Influencing Long-Term Survival.
Journal of Transplantation. 2022 Jun 22;2022.

15. Frischknecht L, Deng Y, Wehmeier C, de Rougemont O, Villard J, Ferrari-Lacraz S, Golshayan D, Gannagé M, Binet I, Wirthmueller U, Sidler D, Schachtner T, Schaub S, Nilsson J.
The impact of pre-transplant donor specific antibodies on the outcome of kidney transplantation–Data from the Swiss transplant cohort study.
Frontiers in immunology. 2022:5568.

16. Spitznagel T, Matter LS, Kaufmann YL, Nilsson J, von Moos S, Schachtner.
T. PIRCHE-II scores prove useful as a predictive biomarker among kidney transplant recipients with rejection: An analysis of indication and follow-up biopsies.
Frontiers in Immunology. 2022;13.

17. Lezoeva E, Nilsson J, Wüthrich R, Mueller TF, Schachtner T.
High PIRCHE Scores May Allow Risk Stratification of Borderline Rejection in Kidney Transplant Recipients.
Frontiers in immunology. 2022:587.

18. Fehr T, Hübel K, de Rougemont O, Abela I, Gaspert A, Güngör T, Hauri M, Helmchen B, Linsenmeier C, Müller T, Nilsson J, Riesterer O, Schandling JD, Schanz U, Cippa PE.
Successful Induction of Specific Immunological Tolerance by Combined Kidney and Hematopoietic Stem Cell Transplantation in HLA-Identical Siblings.
Frontiers in immunology. 2022;13.

Infectiology:

19. Dos Santos Q, Wareham NE, Mocroft A, Rasmussen A, Gustafsson F, Perch M, Sørensen SS, Manuel O, Müller NJ, Lundgren J, Reekie J.
Development and Validation of a Risk Score for Post-Transplant Lymphoproliferative Disorders among Solid Organ Transplant Recipients.
Cancers (Basel). 2022 Jul 4;14(13):3279. DOI: 10.3390/cancers14133279.

20. Bankova AK, Pasin C, Huang A, Cicin-Sain C, Epp S, Audige A, Mueller NJ, Nilsson J, Vilinovszki O, Nair G, Wolfensberger N, Hockl P, Schanz U, Trkola A, Kouyos R, Hasse B, Zinkernagel AS, Manz MG, Abela IA, Müller AMS.
Antibody response to a third SARS-CoV-2 vaccine dose in recipients of an allogeneic haematopoietic cell transplantation.
Br J Haematol. 2022 Nov 16. DOI: 10.1111/bjh.18562.

21. Sava M, Bättig V, Gerull S, Passweg JR, Khanna N, Garzoni C, Gerber B, Mueller NJ, Schanz U, Berger C, Chalandon Y, van Delden C, Neofytos D, Stampf S, Franzeck FC, Weisser M.
Swiss Transplant Cohort Study. Bloodstream infections in allogeneic haematopoietic cell recipients from the Swiss Transplant Cohort Study: trends of causative pathogens and resistance rates.
Bone Marrow Transplant. 2022 DOI: 10.1038/s41409-022-01851-y.

22. Hirzel C, Projer L, Atkinson A, Surial B, Mueller NJ, Manuel O, Mombelli M, van Delden C, Hirsch HH, Boggian K, Walti LN, Sidler D, Hadaya K, Dickenmann M, Müller TF, Binet I, Golshayan D, Huynh-Do U
Swiss Transplant Cohort Study (STCS). Infection Risk in the First Year After ABO-incompatible Kidney Transplantation: A Nationwide Prospective Cohort Study.
Transplantation. 2022;106(9):1875-1883. DOI: 10.1097/TP.0000000000004109.

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Swiss Transplant Cohort Study. Central nervous system infections in solid organ transplant recipients: Results from the Swiss Transplant Cohort Study.
J Infect. 2022;85(1):1-7. DOI: 10.1016/j.jinf.2022.05.019.

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Swiss Transplant Cohort Study. Surgical site infections after simultaneous pancreas kidney and pancreas transplantation in the Swiss Transplant Cohort Study.
J Hosp Infect. 2022;128:47-53. DOI: 10.1016/j.jhin.2022.07.009.

25. Chammartin F, Kusejko K, Pasin C, Trkola A, Briel M, Amico P, Stoekle MP, Eichenberger AL, Hasse B, Braun DL, Schuurmans MM, Müller TF, Tamm M, Mueller NJ, Rauch A, Koller MT, Günthard HF, Bucher HC, Speich B, Abela IA.
Swiss HIV Cohort Study. Determinants of antibody response to severe acute respiratory syndrome coronavirus 2 mRNA vaccines in people with HIV.
AIDS;36(10):1465-1468. DOI: 10.1097/QAD.0000000000003246.

26. Mejia-Chew C, Carver PL, Rutjanawech S, Camargo LFA, Fernandes R, Belga S, Daniels SA, Mueller NJ, Burkhard S, Theodoropoulos NM, Postma DF, van Duijn PJ, Fariñas MC, González-Rico C, Hand J, Lowe A, Bodro M, Vanino E, Cruz AF, Ramos A, Makek MJ, Mjahed RB, Manuel O, Kamar N, Calvo-Cano A, Carrasco LR, Muñoz P, Rodriguez S, Pérez-Recio S, Sabé N, Álvarez RR, Silva JT, Mularoni A, Vidal E, Alonso-Titos J, Del Rosal T, Classen AY, Goss CW, Agarwal M, López-Medrano F.
Risk factors for Nontuberculous Mycobacteria Infections in Solid Organ Transplant recipients: a multinational case-control study.
Clin Infect Dis. 2022:ciac608. DOI: 10.1093/cid/ciac608.

27. Pham TT, Andrey DO, Stampf S, Burkhard SH, Hirzel C, Tschopp J, Ullrich K, Strahm C, Schreiber PW, Boillat-Blanco N, Garzoni C, Khanna N, Manuel O, Mueller NJ, Suva D, van Delden C, Uçkay I, Neofytos D.
Swiss Transplant Cohort Study. Epidemiology and outcomes of bone and joint infections in solid organ transplant recipients.
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6.6 Transplantation Awards 2022

At the Autumn Symposium in November 2022, the Zurich Transplantation Center's prizes were awarded for the 12th time. The prizes were once again generously sponsored by Astellas Pharma and were presented by Dr. med. Mirjam Nägeli and Prof. Dr. med. Markus Wilhelm, both members of the Board of Directors' Awards Committee. Prizes were awarded for a laboratory testing study and a clinical trial as well as the award of merit.

Clinical trial award:

Prof. Dr. med. Pierre-Alain Clavien / Dr. med. Matteo Müller, Senior Consultant
"Transplantation of a human liver following 3 days of ex situ normothermic preservation"

Figure 26: Award to Senior Consultant, Dr. med. Matteo Müller

Laboratory testing study award:
Dr. med. Kerstin Hübel, Prof. Dr. med. Thomas Fehr
“ “Successful Induction of Specific Immunological Tolerance by Combined Kidney and Hematopoietic Stem Cell Transplantation in HLA-Identical Siblings”

Figure 27: Award to Dr. med. Kerstin Hübel (and Prof. Dr. med. Thomas Fehr)

Award of Merit:
Dr. phil. Sonja Beckmann, Ms. Marianne Ibe-Tarolli, Ms. Andrea Pfister Koch
"For your services as clinical nurses for the care of liver transplant patients"

Figure 28: Award to Dr. phil. Sonja Beckmann, Ms. Marianne Ibe-Tarolli, Ms. Andrea Pfister Koch

6.7 Professional development program 2022

16th Annual Symposium of the Zurich Transplantation Center 2022

USZ Universitäts Spital Zürich

Universität Zürich[UZH]

16. Annual Symposium of the University Hospital Zurich Transplant Center

Xenotransplantation – the new hope?

&

Transplantation Research at the USZ

Symposium for referring physicians and employees

Friday the 18th of November 2022, 13:00-17:00

Great Lecture Hall East, University Hospital Zurich

13.30	**Welcome and opening by the Medical Director of the USZ** Malcolm Kohler, Prof. Dr. med., USZ
13.40	**Opening remarks** Nicolas Müller, Prof. Dr. med., USZ
13.45	**Annual report** Nicolas Müller, Prof. Dr. med., USZ
	Xenotransplantation – the new hope? Chair: Thomas Müller, Prof. Dr. med., USZ
14.10	**Xenotransplantation - the new frontier** Eckhard Wolf, Prof. Dr. med. vet., Molecular Animal Breeding and Biotechnology, Gene Center, LMU Munich
14.40	**Panel discussion** Representatives of the individual organ programs at USZ
15.15	**Coffee break**
15.45	**Excellence Award Zurich Transplantation Center** Markus Wilhelm, Prof. Dr. med., USZ
	Transplantation Research at the USZ Chair: Nicolas Müller, Prof. Dr. med. and Markus Wilhelm, Prof. Dr. med., USZ
15.55	**The psychosocial wellbeing study of lung transplant survivors during the corona pandemic: surprising results** Michèle Krapf, cand. med. and Katja-Daniela Jordan, KD Dr. med., USZ
16.05	**Impact of COVID-19 prevention measures on viral infection rate in lung transplant recipients** Isabelle Baumann, med. pract., USZ
16.15	**The eye – a window to the heart?** Valentina Rossi, Dr. med., USZ
16.25	**The impact of pre-transplant donor specific antibodies in kidney transplantation** Lukas Frischknecht, Dr. med. Dr. sc., USZ
16.35	**TPLZ Scientific Award** **First worldwide transplantation of a human liver following long-term ex-situ normothermic preservation** Pierre-Alain Clavien, Prof. Dr. med. and Matteo Müller, Dr. med., USZ
16.45	**TPLZ Scientific Award** **Swisstolerance** Kerstin Hübel, Dr. med., USZ
16.55	**Closing remarks** Thomas Müller, Prof. Dr. med., USZ
17.00	**Apéro**

When
Friday, 18.11.2022
13:30 -17:00

Sign up for on-site or online
https://www.usz.ch/veranstaltung/16-annual-symposium-of-the-transplant-center/

Location
University Hospital of Zurich
Great Lecture Hall East
Gloriastrasse 29 / B10
8091 Zürich

Organization and Contact
Transplantationszentrum USZ
Rämistrasse 100
8091 Zürich
transplantationszentrum@usz.ch
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Mandatory masks and hand hygiene
For courses, congresses and lectures in the USZ, masks and hand hygiene are mandatory.
The certificate requirement for visitors does not apply.

Many thanks to our sponsors

Monthly seminar: "Hot topics in transplantation" (TNT) 2022

Programm

Datum	Titel	Referent	Host
28.02.2022	Was kann mit den neusten Glukosesensor-gesteuerten Insulinpumpen erreicht werden?	**Prof. Dr. med. Roger Lehmann** Leitender Arzt und Stv. Klinikdirektor Klinik für Endokrinologie, Diabetologie und Klinische Ernährung Universitätsspital Zürich	Prof. Dr. med. Nicolas Müller
28.03.2022	New options in maintenance immunosuppressive therapy	**Stefanie Schiess** Leiterin Transplantationskoordination Universitätsspital Zürich **Ursula Schäfer** Qualitätsmanagerin Transplantationszentrum Universitätsspital Zürich	Prof. Dr. med. Nicolas Müller
30.05.2022	Langzeitüberleben nach Nierentransplantation	**PD Dr. med. Thomas Schachtner** Oberarzt in der Klinik für Nephrologie Universitätsspital Zürich	Prof. Dr. med. Thomas Müller
11.07.2022	Safe living nach Transplantation: Ernährung	**Christina Gassmann** Stellvertretende Leiterin Ernährungsberatung/-therapie Universitätsspital Zürich **Claudia Vogt** Ernährungsberaterin/-therapeutin Universitätsspital Zürich **Prof. Dr. med. Nicolas Müller** Leitender Arzt Klinik für Infektionskrankheiten und Spitalhygiene Leiter des Transplantationszentrums Universitätsspital Zürich	Prof. Dr. med. Nicolas Müller
28.08.2022	Vorstellung der Swiss Transplant Cohort Study (STCS)	**Prof. Dr. med. Nicolas Müller** Head of the Scientific Committee Swiss Transplant Cohort Study Universitätsspital Zürich **Dr. sc. Lisbeth Langhammer** Scientific Project Officer Swiss Transplant Cohort Study Universitätsspital Zürich	Prof. Dr. med. Nicolas Müller
31.10.2022	Begegnung zwischen Spender- und Empfängerfamilien Rechtliche und ethische Aspekte	**Prof. Dr. med. Tanja Krones** Leitende Ärztin Klinische Ethik Geschäftsführerin Klinisches Ethikkomitee Universitätsspital Zürich Universität Zürich **PD Dr. med. Franz Immer** Facharzt für Herzchirurgie FMH Direktor von Swisstransplant Swisstransplant	Prof. Dr. med Nicolas Müller

05.12.2022	Perioperative use of ECMO in Lung Transplantation	**Prof. Dr. Konrad Hoetzenecker** Leiter der Universitätsklinik für Thoraxchirurgie Leiter des Lungentransplantationsprogramms Medizinische Universität Wien	PD Dr. med. Sven Hillinger

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