Minutes from Nordic Liver Transplant Group (NLTG) and

Nordic Pediatric Liver Transplant Group (NPLTG) meetings at Hotel Thon Vika Atrium, Munkedamsveien 45, Oslo

NPLTG Meeting Monday 20th of October at 12.30 – 16.45 :

Participants:

Göteborg; Ulrika Samuelsen; Audur Gudjónsdóttir; William Benneth; Ulrika Skogsberg Dahlgren

Stockholm Gabriel Dumitrescu; Silvia Malenicka; Carl Jorns

Helsinki; Johanna Savikko; Arno Nordin, Aki Uutela

Oslo; Pål-Dag Line; Morten Hagness; Monika Olofsson Storrø; Jon Solheim; Ammar Khan; Katrine Engesæter; Embjørg Vollen; Anniken Bjørnstad Østensen;Tonje Martinsen

Copenhagen; Ulla Plagborg; Nicolai Schultz ;Kristian Kiim

Tartu; Andres Tein

Latvia; Ieva Pukite; Jānis Vilmanis

Scandiatransplant; Anne Boserup; Ilse Duus Weinreich

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1. Welcome and center-wise updates

Morten Hagness opened the meeting and welcomed participants from all Nordic pediatric liver transplant centers. Minutes from last meeting was accepted. Each unit briefly reported current pediatric activity and organizational setup for liver transplantation. Oslo performed 10 pediatric liver transplants up to 5 October, covering a broad spectrum of indications including PFIC2, Down syndrome with TAM, urea cycle defect, nephronophthisis with liver fibrosis, acute liver failure, PSC/AIH, BIAT and BIAT/HCCA, as well as AIH. One procedure was a living-donor transplant from the father of a child with PFIC2, using an ABO-incompatible segment II+III graft after plasmapheresis, while the remaining nine cases used deceased donors with both monosegmental and whole-liver grafts. The other centers reported their activity.

Gothenborg:

Stockholm:

Helsinki:

Copenhagen:

There was agreement to make a slide for each center for update also in the pediatric group from now on. William Bennet volunteered to provide a template for reporting prior to the next meeting

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2. Update from Scandiatransplant (Anne Boserup)

Anne Boserup presented recent developments in Scandiatransplant regarding liver allocation and registry reporting for pediatric patients.

There was a discussion whether to offer cDCD NRP splitable livers to pediatric resipients, to be further discussed, no conclusion.

Evidence and changes to split donor criteria was discussed, and the fact that we split several livers outside our criteria. Anne/ Ilse was asked to present Sctx numbers on more liberal criterias at the next meeting. It was suggested to look into outcome before and after the introduction of split liver criteria within Scandiatransplant.

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3. Metabolic indications for liver transplantation – Norwegian experience

Speaker: Anniken Bjørnstad Østensen

Anniken Østensen presented Norwegian pediatric liver transplant data from 1984–2024, showing a total of 212 transplants and a stable annual volume of about 10–11 procedures in recent years. Among 222 first transplants up to October 2025, 175 patients are alive, with biliary atresia remaining the most common indication while rare metabolic diseases increasingly contribute to the case mix. Metabolic indications include MSUD, propionic and methylmalonic acidemia, urea cycle defects, hyperoxaluria, NBAS and mitochondrial disorders, all characterized by toxic accumulation of amino acids, organic acids or ammonia. In a series of 16 children with these disorders, vascular and biliary complications, bowel perforation, need for VAC treatment and renal failure occurred but were generally manageable, with 13 survivors (81%) and three deaths mainly among patients with urea cycle defects or mitochondrial disease. Most surviving children now have normal or only moderately protein-restricted diets after transplantation, underscoring the potential of liver TX to stabilize metabolic control and improve quality of life.

There was rised a question on whether we should offer liver (as domino) from MSUD patients.

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4. New immunosuppressive protocol for pediatric liver transplantation in Oslo

Speaker: Embjørg Julianne Wollen

Embjørg Wollen outlined the revised Norwegian liver transplant immunosuppression protocol, which now uses one national script for adults and children, with a pediatric section under active refinement. The regimen is based on tacrolimus, MMF, prednisolone and Simulect, with methylprednisolone and basiliximab induction followed by structured tacrolimus targets and a tapering steroid schedule over the first post-transplant year. Prednisolone is discontinued after 12 months in standard-risk patients, whereas those with autoimmune liver disease remain on lifelong low-dose steroids, and tacrolimus trough levels are progressively lowered as graft stability is achieved. Wollen compared strategies from Gothenburg, Stockholm, Heidelberg, Tübingen and Brussels, illustrating that some centers favor early tacrolimus monotherapy while others maintain steroids for 6–12 months, which raises the question of Nordic harmonization. She also reviewed data from WISP-R and iWITH, where a subset of carefully selected children tolerated complete IS withdrawal, suggesting a future move toward more individualized, histology-guided weaning.

There was rised a question on whether we should offer liver (as domino) from MSUD patients.

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5. Experience from living donor liver transplantation for children in Oslo and Holocare as modality for planning of living donor procedures

Speaker: Pål-Dag Line

Pål – Dag presented the Norwegian experience with living donor liver transplantation in Oslo and Holocare as a modality for planning living donor procedure, with emphasis on the special needs for this option in small recipients (< 5-6 kg). He also outlined the experience with mono-segment (S3) transplantation in this context and the usefulness of using Holocare as a modality for planning living donor procedures and mono-segment in-situ splitting.

Exvivo meeting 17.00 –18.00

XVIVO presented XVIVO - 25 years of liver perfusion 'Actual experience & science' – Martin Kuizenga and Matt Walker
And there was a dinner at Stranden for the participants.

Nordic Liver Transplant Group (NLTG)

Meeting Minutes

Date: Monday, 21 October 2025
Time: 10:00–15:00
Location: Hotel Thon Vika Atrium, Munkedamsveien 45, Oslo, Norway

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Participants (22)

Göteborg; Ulrika Samuelsen; Audur Gudjónsdóttir; William Benneth; Ulrika Skogsberg Dahlgren, Andreas Schult

Stockholm Gabriel Dumitrescu; Silvia Malenicka; Carl Jorns; Gabriel Oniscu

Helsinki; Johanna Savikko; Arno Nordin, Aki Uutela

Oslo; Pål-Dag Line; Morten Hagness; Monika Olofsson Storrø; Jon Solheim; Ammar Khan; Katrine Engesæter; Marte Bliksøen; Lasse Grønningseter; Søren Pischke

Copenhagen; Ulla Plagborg; Nicolai Schultz ;Kristian Kiim

Tartu; Andres Tein

Latvia; Jānis Vilmanis

Scandiatransplant; Anne Boserup; Ilse Duus Weinreich

Morten Hagness opened the meeting and welcomed participants.

1. Minutes from NLTG Meeting in Tallinn, April 2025

Andres Tein briefly presented the minutes from the previous NLTG meeting held on 29 April 2025 at Nordic Hotel Forum in Tallinn. The group confirmed the record of discussions on center-wise activity reports, the 2024 NLTR annual report, and the establishment of the NLTR forms working group with representatives from all centers. The minutes also documented presentations on DILI and transplantation, the impact of night work on liver transplant outcomes, and the Scandiatransplant infectious disease guideline update. The Tallinn minutes were approved without further amendments and will serve as the formal reference for ongoing work on registry revision and multicentre studies.

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2. Center-wise Updates

Each Scandiatransplant liver transplant center and Riga presented activity data for 2025, including total transplant volumes, deceased versus living donor procedures, donor characteristics, waitlist status and early post-transplant outcomes.

Copenhagen

Copenhagen reported 44 liver transplants by October 2025, including 5 re-transplants and 6 pediatric liver transplants. Four DCD livers were utilized (3 transplants and 1 export). The pediatric activity comprised 3 whole-liver grafts (including 1 re-transplant) and 3 reduced grafts. The current waiting list includes 29 patients, of whom 6 are children; 4 patients were withdrawn and 2 died on the list. During the period Copenhagen imported 8 livers and exported 13, with a payback balance of 1 organ owed to Gothenburg and credits from Oslo and Helsinki for two grafts.

Stockholm

Stockholm reported 86 liver transplants in 2025, including 16 DCD procedures (20% of adult transplants) and 5 pediatric liver transplants. The current waiting list comprises 26 patients (13 blood group O, 11 A, 2 B), of whom 2 are pediatric; during 2025 there were 3 withdrawals (1 due to death, 2 no longer transplant candidates). Organizationally, Gabriel Oniscu has been appointed Chair of the Department of Transplantation Surgery, and a normothermic machine perfusion (NMP) program has been initiated. Liver transplantation for colorectal liver metastases (CRLM) has also been introduced as a new indication in the Swedish national guidelines.

Gothenburg

Gothenburg reported 79 liver transplants in 2025, based on 74 deceased donors (61 DBD and 13 DCD). Of the liver transplants, 63 used DBD donors (including one multivisceral transplantation) and 16 used DCD donors. The current waiting list comprises 32 patients, including 4 listed for multivisceral transplantation and 1 combined heart–liver procedure.

Oslo

Oslo reported 78 liver transplants by 17 October 2025, based on 100 deceased donors (92 DBD and 8 controlled DCD with NRP), plus 1 living donor liver transplant. Of these, 11 were pediatric liver transplants (8 DBD, 2 DCD and 1 living donor). The center also noted organizational strengthening with the recruitment of two new transplant coordinators during 2025.

Tartu

Tartu reported 33 potential organ donors in 2025, of whom 21 became actual donors, including 15 multi-organ donors. During the year, the center imported 2 livers (both as

payback) and exported 7 livers, including 1 urgent, 1 pediatric, 1 payback and 4 surplus grafts. Twelve liver transplants were performed, mainly for hepatocellular carcinoma (4 cases) and alcohol-related liver disease (5 cases). The current waiting list includes 8 patients, with HCC and alcohol-related cirrhosis as the predominant indications.

Latvia

Latvia reported 6 liver transplants, alongside 4 heart and 40 kidney transplants in 2025, with 8 liver recipients treated during the year. Nationwide, 48 donors were reported and 23 became actual donors, with almost every second retrieval being multi-organ. Current strategic focus is on pediatric liver transplantation, performed in collaboration with University Medical Center Hamburg-Eppendorf within a living-donor program. Latvia maintains active international cooperation via FOEDUS, sharing surplus organs (2 lungs, 4 kidneys, 4 livers and 1 heart), and is preparing for EFI laboratory accreditation and the start of surplus organ offers and gradual integration into the Scandiatransplant exchange system from 2026.

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3. Machine Perfusion: Implementation of HMP-COR-NMP Research in Oslo

Presenter: Marte Bliksøen, Oslo

Marte Bliksøen presented Oslo's research program on machine perfusion modalities, including hypothermic machine perfusion (HMP), controlled oxygenated rewarming (COR) and normothermic machine perfusion (NMP). The protocols aim to assess graft viability, reduce ischemia-reperfusion injury and expand the donor pool by reconditioning extended-criteria organs. Preliminary data on perfusion parameters, biochemical markers during perfusion and early post-transplant outcomes were shared.

Each center then gave brief updates on their current or planned machine perfusion activities:

- Stockholm has initiated a normothermic machine perfusion (NMP) program
- Gothenburg are actively utilizing HMP
- Helsinki and Tartu are evaluating platforms and research infrastructure
- Copenhagen are using HOPE (XVIVO) to be able to transplant at daytime. Perfusionists are running the machine.

4. Liver Transplantation for Cholangiocarcinoma: SURE-LT and TESLA Studies

Presenter: Pål-Dag Line, Oslo

Pål-Dag Line briefly presented the SURE-LT protocol, a transplant oncology concept developed in Oslo for patients with non-resectable perihilar cholangiocarcinoma (phCCA) beyond standard Mayo criteria. The approach combines an extended en-bloc resection, "Superior Upper Right Exenteration" (SURE) – removing liver, spleen, pancreas, duodenum and retrohepatic vena cava – followed by liver transplantation to achieve radical clearance of loco-regional disease.

Two compassionate-use cases have so far been treated with SURE-LT, both with advanced phCCA and no other curative options, and both remain cancer-free at 3–4 years post-transplant despite requiring lifelong insulin therapy. A controlled trial is planned to evaluate overall survival, disease-free survival and quality of life, and to identify biological markers that may define a subgroup with ≥50% 5-year survival.

The TESLA trial, a single-arm, exploratory study of liver transplantation for patients with locally advanced, non-resectable but liver-confined intrahepatic cholangiocarcinoma (iCCA) who have responded to at least 6 months of neoadjuvant therapy. Eligible patients must have histologically confirmed iCCA without vascular invasion, lymph node involvement or extrahepatic metastases and maintain disease control for at least 12 months from diagnosis before listing. TESLA (Transplantation for Early Stage Liver Cancers) studies, including TESLA-II for perihilar cholangiocarcinoma following Mayo protocol principles, were also discussed. Nordic centers compared their approaches to perihilar and intrahepatic cholangiocarcinoma candidates, with emphasis on balancing oncological outcomes and donor organ allocation ethics.

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5. Outcome of Extended Right Lobe Liver Transplantations in Nordic Countries

Presenter: Vera Nilsén

Vera Nilsén presented a multicenter retrospective analysis of extended right lobe deceased-donor liver transplants performed across Nordic centers. Data included graft size-to-recipient-weight ratio (GRWR), cold ischemia time, early allograft dysfunction, vascular and biliary complications, and patient and graft survival at 1 and 5 years. The presentation addressed technical challenges specific to large grafts, including venous outflow reconstruction and optimal placement in the abdominal cavity, as well as outcomes stratified by recipient Model for End-stage Liver Disease (MELD) score.

Preliminary findings suggest that extended right lobe grafts can achieve outcomes comparable to whole liver transplants when properly selected and managed, though higher rates of primary non-function and early vascular complications were observed.

6. Tracking of Anaesthesiological Complications for Liver Transplantation

Presenter: Lasse Grønningsæter, Oslo

Lasse Grønningsæter proposed a standardized registry framework for documenting perioperative anesthesiological complications during liver transplantation, including intraoperative hemodynamic instability, massive transfusion events, cardiac arrhythmias, ventilation challenges and metabolic derangements. The goal is to enable benchmarking across Nordic centers, identify risk factors for adverse anesthetic outcomes and support quality improvement initiatives.

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7. Predictors for Early Extubation After Liver Transplantation at Karolinska University Hospital

Presenter: Gabriel Dumitrescu, Stockholm

Gabriel Dumitrescu presented Karolinska's single-center experience identifying clinical and surgical predictors of successful early extubation (within 6 hours post-operatively) after liver transplantation. Variables analyzed included preoperative MELD score, intraoperative blood loss and transfusion requirements, cold ischemia time, donor characteristics and anesthetic protocols.

Early extubation was achieved in approximately 60% of cases and was associated with shorter intensive care unit length of stay, reduced pulmonary complications and lower overall costs. Key predictors of successful early extubation included MELD score <20, intraoperative blood loss <2 liters, absence of massive transfusion, and use of a standardized anesthetic protocol emphasizing minimal opioid use and goal-directed fluid management.

The findings informed a fast-track protocol now being piloted at Karolinska, with encouraging preliminary results.

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8. Update from Scandiatransplant: Payback, Balance, Liver Exchange and Urgent Call

Presenter: Anne Boserup & Ilse Duus Weinreich, Scandiatransplant

Anne Boserup reviewed Scandiatransplant liver allocation policies, highlighting that payback status is stable over time and presenting detailed information on rota(/spare)-liver offers. Regarding rota-livers acceptance rate (40%) and refusal cause was presented in details, with the most common refusal causes being ‘no matching recipient’ and ‘poor liver quality’.

8 cases have been waiting for payback >6 months. All centres follow the rules and all payback-attempts are supposed to be registered in the payback balance tab with the refusal cause.

Ilse Duus Weinreich presented that all transplant centers have started to share radiological DICOM image files through YASWA.

Ilse asked for permission to use anonymized liver waiting list data for her next semester on University for 'Advanced statistical analysis of time-to-event data (waiting list mortality)'. This was approved by all centers,

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9. Update from ELTR

Ilse Duus Weinreich provided an update on the new European Liver Transplant Registry (ELTR) platform for sharing data. It was a huge job but we had everything up and running against the ELTR test system August 2024. We are now waiting for ELTR

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10. Update on Revision of NLTR Forms and Variables

Presenter: Carl Jorns and Katrine Engesæter

Carl Jorns and Katrine Engesæter presented proposed revisions to the Nordic Liver Transplant Registry (NLTR) data forms and variable definitions. The NLTR forms working group, established at the Tallinn meeting, has been actively reviewing donor and recipient baseline characteristics, surgical details, machine perfusion parameters and standardized complication coding.

The working group includes representatives from all centers:

- Scandiatransplant: Anne and Ilse
- Oslo: Monika and Katrine
- Gothenburg: Andreas and Ulrika
- Stockholm: Malin and Carl
- Copenhagen: Ulla and Nicolai
- Helsinki: Arno, Fredrik, Leena and Essi
- Tartu: Maris

Feedback was solicited from all centers to ensure the revised forms capture clinically relevant information while minimizing reporting burden.

Key discussion points:

- Need to balance comprehensive data collection with practical feasibility
- Alignment with ELTR variables to reduce duplication

Action items:

- Have a face-to-face workshop in the working group
- The working group has the mandate to implement changes to the NLTR

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11. Other Ongoing Studies and Study Proposals

This session featured brief presentations of active and proposed multicenter studies.

a. Impact of Out-of-Hours Liver Transplantation on Patient Outcomes and Health Economics

Mathias Vidgren presented the study going out from Stockholm. This is a retrospective multicenter study examining whether transplants performed during nighttime or weekend hours are associated with different complication rates, graft survival or hospital costs compared to standard working hours. The study aims to inform staffing and resource allocation policies.

Preliminary data suggest no significant difference in major outcomes between out-of-hours and in-hours transplants when controlling for donor and recipient characteristics, though some centers reported longer operating times and higher resource utilization during nighttime procedures.

Action: Centers to contribute data on transplant timing, outcomes and costs for pooled analysis.

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b. Use of Donor CT Examination for Allocation of Liver Grafts

Presenter: William Bennet, Göteborg

c. Liver Transplantation in Polycystic Liver Disease

Presenter: William Bennet, on behalf of Per Lindnér Göteborg

The project aims to follow up patients who underwent organ transplantation in the Nordic countries between 2003–2024 and identify those who received a liver transplant due to polycystic liver disease. The objective is to map outcomes and assess whether

incidence and results have changed over time.

All centers approved that Scandiatransplant data can be extracted and used for the project.

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d. SALT – Study of Oxidized Albumin in Liver Transplantation

Presenters: Oslo and Stockholm teams; Lasse Grønningsæter

A collaborative biomarker study investigating oxidized albumin as a predictor of ischemia-reperfusion injury, early allograft dysfunction and long-term outcomes. Serial blood samples are collected peri- and post-operatively for laboratory analysis.

Pilot data from Oslo and Stockholm show promising correlations between oxidized albumin levels and clinical markers of graft injury.

Action: Expand recruitment and standardize sample collection protocols across participating centers.

The remainng studies and studyproposals were not presented due to restricted time.

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12. Next Meeting

Date & Location: Gothenburg 24/3