

Forschungsaktivitäten 2024 – Research Report 2024

**Departement für Intensivmedizin und Neonatologie
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Preface

Dear Colleagues,

We are pleased to present the 2024 research highlights from the Pediatric and Neonatal Intensive Care Research Group (PINNACLE) at the University Children's Hospital Zurich and Children's Research Center.

Research is the key to advancing high-quality healthcare. We actively support and engage in national and international cutting-edge research, collaborating with partners nationally and worldwide. 2024 was marked by an exciting start - recognizing the important role of high-quality intensive care research, the University of Zurich established the first Professorship for Pediatric Intensive Care Medicine. 2024 was concluded with an even more exciting event – the long awaited relocation to the brand new hospital and research building in Lengg. As the research and clinical teams have settled in, we look forward to the new opportunities created by the new environment and capacity, coupled with the spirit for collaboration and exchange.

Despite the challenges of preparing for and relocating to the new facilities, the PINNACLE research team demonstrated its productivity and scientific impact in 2024. More than 40 presentations and posters were presented at both national and international congresses and over 85 publications were published, more than half of which appeared in top-tier journals within their respective fields. A particular highlight was the publication of a twin study in JAMA on new pediatric sepsis criteria led by our group. This study analyzed data from over 3.5 million patients across four continents, making it the largest pediatric data-driven study to date. The publication became JAMA's most-read article of 2024 ([link](#)). Another major achievement was an invitation from The Lancet to lead a Lancet Series on pediatric sepsis. Published in September 2024 ([link](#)), the series includes four papers by internationally renowned authors, an editorial, and two Lancet Profiles.

The breadth of our publications underscores our increasingly interdisciplinary research approach, and how research is embedded at the bedside to enhance the quality of care provided to our critically ill patients and their families. Notably, the involvement of young researchers is a priority for our team to enhance the capacity and capability in the field. Importantly, we are proud to see increasingly proactive patient and public involvement and engagement (PPIE) being developed across all stages of research which we want to push ahead in coming years.

To this end, in 2024 more than 300 patients were recruited from our team in several ongoing randomized clinical trials (RCT) and research projects. These projects span from biomarker discovery and investigations into rare diseases using multi-omics through pragmatic trials, and from artificial intelligence into music therapy and family engagement. PINNACLE investigators are leading several competitive national grants including 2 SNF (BOND RCT, Swiss Pediatric Sepsis Precision Medicine) and the SPHN/PHRT National Data Stream SwisspedHealth. Rebeca Mozun led the first fully digital clinical trial (CoCO2) which recruited 59 ventilated patients within nine months, marking PINNACLE's first study of its kind. Several national and international observational studies are ongoing on sepsis, infections, and inflammation in critically ill children (ADONIS: SPHN Demonstrator Project, led by CHUV; RAPIDS: PHRT Project, led by Kispi-ETH; APET: led by the Pediatric Critical Care Research Group, University of Queensland; DIAMONDS: Horizon 2020, led by Imperial College London).

PINNACLE is dedicated to supporting clinical research in resource-limited settings. The team is spearheading ANDES CHILD, a pilot RCT on resuscitation of children with sepsis in Latin America. Furthermore, we are actively involved in neonatal randomized trials and observational studies in Uganda (Mbale, Kampala), aiming to improve long-term outcomes for high-risk newborns in low- and middle-income settings.

We would like to thank all the members of the PINNACLE team, the staff of the Department of Intensive Care and Neonatology, the Children's Research Centre at the University Children's Hospital Zurich and our partners for their work and support.

We are particularly indebted to the families for their willingness to participate in research projects during challenging and stressful times and for their invaluable contribution to improving outcomes for children in the future.

Yours

C. Hagmann *Luregn Schlapbach*

Cornelia Hagmann and Luregn Schlapbach



Picture from the World Sepsis Day on 13 September 2024 organized by the Swiss Sepsis Program in Kispi. The PINNACLE team was actively involved, distributing flyers and sweets around the hospital to help raise awareness about sepsis.

ORIGINAL ARTICLES

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47. Wachsmuth, L., Bieli, C., Grethen, P., Moehrlen, T., Moehrlen, U., Bernet, V., **Hagmann, C.**, Spina Bifida Study Group Zurich, and Grass, B., *Sleep-disordered breathing on respiratory polygraphy in neonates with spina bifida*. Pediatr Pulmonol, 2024. **59**(11): p. 2829-2838.

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ACCEPTED PUBLICATIONS

1. Asperen, R.M.W., Hines, M.R., **Schlapbach, L.J.**, and Agulnik, A., *Tailoring organ dysfunction criteria for critically ill children with cancer*. Lancet Child Adolesc Health, 2025. **9**(4): p. 217-219.
2. Bottari, G., Buccione, E., Bayrakci, B., Briassoulis, G., Carter, M.J., Demirkol, D., Ilia, S., Morin, L., Reiter, K., Santiago, M.J., **Schlapbach, L.J.**, Slocker-Barrio, M., Tissieres, P., Zaoral, T., Bianzina, S., and Deep, A., *Extracorporeal Blood Purification in European Pediatric Intensive Care Units: A Consensus Statement*. JAMA Netw Open, 2025. **8**(2): p. e2457657.
3. Fenton, T.R., Alshaikh, B., Kusuda, S., Helenius, K., Modi, N., Norman, M., Lui, K., Lehtonen, L., Battin, M., Klinger, G., Vento, M., Lastrucci, V., Gagliardi, L., Adams, M., Marba, S.T.M., Isayama, T., Hakansson, S., Bassler, D., Shah, P.S., and the International Network for Evaluation of Outcomes (iNEo) of Neonates Investigators (...**Cornelia Hagmann**,...), *Birth weight and head circumference for 22-29 weeks gestation neonates from an international cohort*. Arch Dis Child Fetal Neonatal Ed, 2025. DOI: 10.1136/archdischild-2024-327845.
4. Flauzino de Oliveira, C., Evans, I., Argent, A.C., Lodha, R., Menon, K., and Society of Critical Care Medicine Pediatric Sepsis Definitions Taskforce (...**Luregn Schlapbach**,...), *The 2024 Phoenix Sepsis Score Criteria: Part 2, What About Using Interventions in the Criteria?* Pediatr Crit Care Med, 2025. **26**(2): p. e252-e255.

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6. Gilholm, P., Lister, P., Irwin, A., Harley, A., Raman, S., **Schlapbach, L.J.**, and Gibbons, K.S., *Comparison of Random Forest and Stepwise Regression for Variable Selection Using Low Prevalence Predictors: A case Study in Paediatric Sepsis*. *Matern Child Health J*, 2025. DOI: 10.1007/s10995-025-04038-1.
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8. Hall, M.W., Lodha, R., Kissoon, N., Randolph, A.G., and Society of Critical Care Medicine Pediatric Sepsis Definition Taskforce (...**Luregn Schlapbach**,...), *The 2024 Phoenix Sepsis Score Criteria: Part 3, What About Using Stages of Sepsis in the Criteria?* *Pediatr Crit Care Med*, 2025. **26**(2): p. e256-e261.
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17. Viz-Lasheras, S., Gomez-Carballa, A., Bello, X., Rivero-Calle, I., Dacosta, A.I., Kaforou, M., Habgood-Coote, D., Cunnington, A.J., Emonts, M., Herberg, J.A., Wright, V.J., Carrol, E.D., Paulus, S.C., Zenz, W., Kohlfurst, D.S., Schweintzger, N., Van der Flier, M., de Groot, R., **Schlapbach, L.J.**, Agyeman, P., Pollard, A.J., Fink, C., Kuijpers, T.T., Anderson, S., Von Both, U., Pokorn, M., Zavadska, D., Tsolia, M., Moll, H.A., Vermont, C., Levin, M., Martinon-Torres, F., Salas, A., EUCLIDS, PERFORM, and DIAMONDS consortia, *A diagnostic host-specific transcriptome response for *Mycoplasma pneumoniae* pneumonia to guide pediatric patient treatment*. *Nat Commun*, 2025. **16**(1): p. 673.

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22. **Kennedy, U. K.**, Moulin, J., Bühner, L., Lim Fang Nian, J., Halter, L., Böhni, L., Güzelgün, M., Menon, K., Lee, J.H., **Schlapbach, L.J.**, Held, U. *Sex Differences in Pediatric Sepsis Mortality: A Systematic Review and Meta-Analysis*. *Critical Care Explorations* 7(4):p e1226, April 2025. | DOI: 10.1097/CCE.0000000000001226
23. Lopera-Múnera, N., Ortiz, J., Casson, N., Iramain, R., Pavlicich, V., Jaramillo-Bustamante, J. C., de Oliveira, C. F., **Mozun, R.**, **Schlapbach, L. J.***, Jabornisky, R.* (*equally contributed). *Adrenaline for the early resuscitation of children with sepsis - a randomized controlled pilot study (ANDES CHILD): study protocol and analysis plan*. *Intensive Care Med.* – *Paediatr. Neonatal* 3, 8 (2025). DOI: 10.1007/s44253-025-00066-5
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LETTERS

1. Raman, S., Gibbons, K., LeMarsney, R., and **Schlapbach, L.J.**, *The authors reply*. *Pediatr Crit Care Med*, 2024. **25**(9): p. e398-e399.
2. Watson, R.S., **Schlapbach, L.J.**, Sorce, L.R., and Society of Critical Care Medicine Pediatric Sepsis Definitions Taskforce, *Pediatric Phoenix Sepsis Score Validation Challenges in Low-Resource Settings and in the Emergency Department-Reply*. *JAMA*, 2024. **331**(24): p. 2135-2136.

REVIEWS

1. Brossier, D.W., Goyer, I., Verbruggen, S., Jotterand Chaparro, C., Rooze, S., Marino, L.V., **Schlapbach, L.J.**, Tume, L.N., Valla, F.V., and European Society of Paediatric and Neonatal Intensive Care IV-MFT group, *Intravenous maintenance fluid therapy in acutely and critically ill children: state of the evidence*. *Lancet Child Adolesc Health*, 2024. **8**(3): p. 236-244.
2. Carter, M.J., Carrol, E.D., Ranjit, S., Mozun, R., Kisson, N., Watson, R.S., and **Schlapbach, L.J.**, *Susceptibility to childhood sepsis, contemporary management, and future directions*. *Lancet Child Adolesc Health*, 2024. **8**(9): p. 682-694.
3. Cree, M.L., Abdul-Aziz, M.H., **Schlapbach, L.J.**, Roberts, J.A., and Parker, S.L., *The impact of extracorporeal support on antimicrobial pharmacokinetics in critically ill neonatal and paediatric patients: A systematic review*. *Int J Antimicrob Agents*, 2024. **64**(4): p. 107311.
4. de Souza, D.C., Paul, R., **Mozun, R.**, Sankar, J., Jabornisky, R., Lim, E., Harley, A., Al Amri, S., Aljuaid, M., Qian, S., **Schlapbach, L.J.**, Argent, A., and Kisson, N., *Quality improvement programmes in paediatric sepsis from a global perspective*. *Lancet Child Adolesc Health*, 2024. **8**(9): p. 695-706.
5. Kennedy, U., Moulin, J., **Schlapbach, L.J.**, Menon, K., Lee, J.H., and Held, U., *Sex differences in pediatric sepsis-a systematic review protocol*. *Syst Rev*, 2024. **13**(1): p. 214.
6. Loucaides, E.M., Yan, G., Elliott, J., Duckworth, E., MacLeod, R., Katongole, F., Okot, W., Senyonga, R., **Hagmann, C.F.**, Cowan, F.M., Opondo, C., and Tann, C.J., *Neonatal intracranial pathologies on ultrasound imaging in sub-Saharan Africa: a systematic review and meta-analysis*. *Pediatr Res*, 2024. DOI: 10.1038/s41390-024-03650-1.
7. Sanchez-Pinto, L.N., Del Pilar Arias Lopez, M., Scott, H., Gibbons, K., Moor, M., Watson, R.S., Wiens, M.O., **Schlapbach, L.J.**, and Bennett, T.D., *Digital solutions in paediatric sepsis: current state, challenges, and opportunities to improve care around the world*. *Lancet Digit Health*, 2024. **6**(9): p. e651-e661.

8. Watson, R.S., Carrol, E.D., Carter, M.J., Kissoon, N., Ranjit, S., and **Schlapbach, L.J.**, *The burden and contemporary epidemiology of sepsis in children*. *Lancet Child Adolesc Health*, 2024. **8**(9): p. 670-681.

INVITED EDITORIALS

1. **Luethi, N., Schlapbach, L.J., and Baumann, P.**, *The Quest for Evidence on Time to Antibiotics in Children With Sepsis-Finding the Sweet Spot*. *JAMA Netw Open*, 2024. **7**(6): p. e2413926.
2. **Luethi, N., Schlapbach, L.J., and Baumann, P.**, *Könnte dies eine Sepsis sein?* *PraxisMag*, #5 Okt 2024, p48-53.
3. **Mozun, R. and Schlapbach, L.J.**, *A Critique of the "Conservative Versus Liberal Oxygenation Targets in Critically Ill Children" Multicenter, Randomized Clinical Trial Published in the Lancet 2024-More on "Less Is More?"*. *Pediatr Crit Care Med*, 2024. **25**(7): p. e338-e342.

INVITED KEYNOTE PRESENTATIONS

P. Baumann

How to implement an antimicrobial stewardship program in your unit

The European Society of Paediatric and Neonatal Intensive Care (ESPNIC) Congress, Rome, Italy, June 2024

J. Burren

Blood Gas analysis made easy – from Henderson –Hasselbalch to Stewart and back

Pediatric Emergency Medicine (PEMS) Congress, Lugano, Switzerland, September 2024

How Do I Approach a PARDS Patient? - My Reflections on the PALICC-2 Guidelines

How do I wean

Hamilton Pediatric Ventilation Expert Workshop, Valbella, Switzerland, November 2024

D. Chopard

Data-Driven Phenotype Analysis: A Pipeline for Structured Extraction of Clinical Information

Meets Data Science Symposium, Zurich, Switzerland, September 2024

M. De Gaudenzi

ABC-PRO: Impact on the introduction of structured risk assessment and anticipation handover tool on cardiac arrest in PICU

The European Society of Paediatric and Neonatal Intensive Care (ESPNIC) Congress, Rome, Italy, June 2024

L. Flückiger

APD Profile in der Praxis

Master study program for nutrition and dietetics, Zurich, Switzerland, November 2024

Ernährungstherapie in der Intensivmedizin

Gesellschaft für klinische Ernährung Schweiz (GESKES), December 2024

C. Hagmann

Music interventions in the NICU

7th International Family Integrated Care Conference 2024, Glasgow, UK, October 2024

N. Lüthi

Prioritising sepsis in Europe's public health agenda: best practices, needs, shortcomings and opportunities (Panel Discussion)

7th Annual Meeting of the European Sepsis Alliance (ESA), Brussels, Belgium, March 2024

Das nationale Sepsis-Programm

Interprofessionelles Intensivmedizinisches Netzwerk Aargau (IINA) Symposium Kantonsspital Aarau, Switzerland, April 2024

L. Schlapbach

Phoenix Criteria for Sepsis in Children

Critical Care Congress: Society of Critical Care Medicine (SCCM), Phoenix, US, January 2024

ESPNIC Research School

ESPNIC, Lausanne, February 2024

Lebensbedrohliche Zustände bei Kindern

Pediatric session, University Hospital Zurich, Zurich, Switzerland, March 2024

Host gene expression signatures in children evaluated for sepsis

Phoenix sepsis criteria: small or big step forward?

Update on Paediatric Critical Care Trials

7th Annual Meeting of the European Sepsis Alliance (ESA), Brussels, Belgium, March 2024

Basic Life Support

4th year medical students, University of Zurich (UZH), Zurich, Switzerland, May 2024

Putting the Phoenix Sepsis Criteria into Context

XX Forum International de Sepse (Brazil), virtual, June 2024

The new Phoenix criteria for sepsis in children

The not so holy grail of fluids – Why we should not drown the child with sepsis

Finding the sweet spot 2: When and how to use ECMO in pediatric septic shock

Behind the scenes – reimagining the approach to dysregulated host response

New pediatric sepsis definition and research priorities for SSC

The European Society of Paediatric and Neonatal Intensive Care (ESPNIC) Congress, Rome, Italy, June 2024

Organ failure

Pediatric Sepsis

15th Indonesian PICU NICU Update, virtual, July 2024

Fluids - time to save water (or chloride)?

Swiss pediatric fellows' lecture series, virtual, July 2024

Sepsis bei Kindern

Kantonsspital Baden, Baden, Switzerland, September 2024

Streptococcal toxic shock syndrome – defining boundaries (with Janet Kelly)

Schweizerische Gesellschaft für Intensivmedizin (SGI), St. Gallen, Switzerland, September 2024

Rethinking critical illness in children

DIAMONDS consortium meeting, Annecy, France, October 2024

Pediatric Intensive Care – the journey from pragmatism to precision medicine

Research Center Children's Hospital Zurich 2024 Symposium, Zurich, Switzerland, November 2024

Sepsis in Children 2024

Universitäts-Kinderspital beider Basel (UKBB), Basel, Switzerland, November 2024

Sepsis Update 2025

From Bits to Breakthroughs, 2nd National Symposium on Data-Driven Approaches in Sepsis and Infectiology, ETH, Bern, Switzerland, November 2024

Phoenix Sepsis Criteria

Pedicriticon, Indian Academy of Pediatrics, Chennai, India, December 2024

Phoenix Sepsis Criteria

Gene expression biomarkers

Long-term outcomes after sepsis in children

Quality improvement in sepsis

Enrolling children in adult ICU trials

Precision medicine for all

Sepsis today and tomorrow: International symposium on intensive care & emergency medicine (ISICEM), Rome, Italy, December 2024

POSTER PRESENTATIONS

Fenner A., Huber M., Gotta V., Schlapbach L., Baumann P.

Antibiotic exposure of critically ill children on a tertiary care pediatric intensive care unit in Switzerland

The European Society of Paediatric and Neonatal Intensive Care (ESPNIC) Congress, Rome, Italy, June 2024

Muff R., Gotta V., Schlapbach L., Baumann P.

Course of Serum Sodium during Vasopressin Infusion in Critically Ill Children

German Society for Neonatology and Paediatric Intensive Care, Munich, Germany, April 2024

Chopard D., Laguna S., Chin-Cheong K., Dietz A., Badura A., Wellmann S., Vogt J.E.

Automatic Classification of General Movements in Newborns

Machine Learning for Health (ML4H) Symposium, Vancouver, Canada, December 2024

Sutter T.M., Meng Y., Agostini A., **Chopard D.**, Fortin N., Vogt J.E., Shahbaba B., Mandt S.

Unity by Diversity: Improved Representation Learning for Multimodal VAEs

Advances in Neural Information Processing Systems (NeurIPS), Vancouver, Canada, December 2024

Agostini A., **Chopard D.**, Meng Y., Fortin N., Shahbaba B., Mandt S., Sutter T.M., Vogt J.E.

Weakly-Supervised Multimodal Learning on MIMIC-CXR.

Machine Learning for Health (ML4H) Symposium, Vancouver, Canada, December 2024

Chopard D., Lawless D., Zanotelli V.R.T., ..., **Schlapbach L.J.,** Vogt J.E., Baumgartner M.R., Fellay J., Froese D.S., for the SwissPedHealth consortium.

The Lighthouse Project's Retrospective Study: Multi-Omics Mechanistic Insights for Rare Diseases.

SPHN/PHRT Data for Health Symposium, Bern, Switzerland, October 2024

Zotter K., ..., **Chopard D.,** ..., Vogt J.E., **Schlapbach L.J.,** Fellay J., Baumgartner M.R., Froese D.S., for the SwissPedHealth consortium

The Lighthouse Project's Prospective Study: Multi-Omics Diagnostic Workflow for Rare Diseases.

SPHN/PHRT Data for Health Symposium, Bern, Switzerland, October 2024

Burger M, Sergeev F, Londschien M, **Chopard D,** Yèche H, ..., Faltys M, Kuznetsova R, Rättsch G.

Towards Large-scale Clinical Multi-variate Time-series Datasets

In NeurIPS Workshop on Time Series in the Age of Large Models, Vancouver, Canada, December 2024

AWARDS

Burger M., Sergeev F., Londschien M., **Chopard D.,** Yèche H., ..., Faltys M., Kuznetsova R., Rättsch G.

Towards Foundation Models for Critical Care Time Series

NeurIPS Workshop on Advancements in Medical Foundation Models: Explainability, Robustness, Security, and Beyond (Oral, best paper award), Vancouver, Canada, December 2024

MEDIA ACTIVITIES AND PODCASTS (LINKS)

L. Schlapbach

- Sepsis in Children: Improved Diagnosis Thanks to New Global Criteria ([Sepsis in Children | UZH](#)), January 2024
- SCCM Pod-522 PCCM: Early Adrenaline Infusion Versus Standard Fluid Resuscitation in Children With Septic Shock (<https://www.podbean.com/ep/pb-3whe6-17862e6>), March 2024
- New Phoenix Pediatric Sepsis Criteria. OPENPediatrics, May 2024 (https://soundcloud.com/openpediatrics/new-phoenix-pediatric-sepsis-criteria?utm_source=clipboard&utm_medium=text&utm_campaign=social_sharing)
- Nelson Sánchez-Pinto and Luregn Schlapbach on paediatric sepsis, Lancet in conversation with (<https://podcasts.apple.com/us/podcast/nelson-s%C3%A1nchez-pinto-and-luregn-schlapbach-on/id1516464416?i=1000669363672>)

- "We need to intensify research into sepsis and coordinate it better", UZH Sept 2024 (<https://www.news.uzh.ch/en/articles/news/2024/sepsis-schlapbach.html>)
- The Lancet Child Adolescent Health, *Making sense of paediatric sepsis*. Lancet Child Adolesc Health, 2024. 8(9): p. 611.
- Burki, T., *Luregn Schlapbach: advocating for children with sepsis*. Lancet Child Adolesc Health, 2024. 8(9): p. 621.
- Tückisch ist, dass die Symptome einer Sepsis so vielfältig sind», Medinside september 2024 (<https://www.medinside.ch/%C2%ABtueckisch-ist,-dass-die-symptome-einer-sepsis-so-vielfaeltig-sind%C2%BB-20240913>)

NEW AND ACTIVE GRANTS AS CHIEF INVESTIGATOR 2024

Grant	Project	Investigator	Budget
Academy of Medical Sciences Networking Grant Scheme (NGR1\1903)	Better Data for Child Health: The Development of a Global Collaboration of Pediatric Critical Care Research Networks	L. Schlapbach (co-investigator)	£22'020
Baxter	Implementation of NUMETA parenteral nutrition on meeting nutritional demands, critical incidents, and ICU length of stay in critically ill children	L. Flückiger	US\$ 20'000
COALAR	Improving the lives of Latin American children with sepsis through clinical trial capacity building	L. Schlapbach	AUD 22'237
Gaydoul Foundation	BOND-Creative Music Therapy in Newborn Infants with Congenital Heart Disease	C. Hagmann	CHF 300'000
HORIZON2020	DIAMONDS: Diagnosis and Management of Febrile Illness using RNA Personalized Molecular Signature Diagnosis	L. Schlapbach (co-investigator)	CHF 200'000 (for Kispi)
NHMRC	Resuscitation in Pediatric Septic Shock using Mega-Dose Vitamin C and Hydrocortisone - A Randomized Controlled Multicenter Trial (RESPOND study APP 2014937)	L. Schlapbach (co-investigator)	AUD 1'305'172
NIH	Novel Pediatric Sepsis Criteria and Clinical Decision Support Tools	L. Schlapbach	US\$ 48'235
Nomis Foundation	Artificial Intelligence in the PICU	L. Schlapbach	CHF 496'500

PHRT	PHRT-273: Rapid Personalized Diagnosis of Sepsis in Children (RAPIDS)	L. Schlapbach (co-investigator)	CHF 2'000'000
Research Grant Children's Research Center Zurich	CoCo2 trial	R. Mozun	CHF 60'000
SANA Foundation	Artificial Intelligence in the PICU	L. Schlapbach	CHF 150'000
SNF	BOND-Creative Music Therapy in Newborn Infants with Congenital Heart Disease	C. Hagmann	CHF 900'000
SNF	Derivation of pediatric sepsis phenotypes using machine learning applied to clinical, functional and genomic data from the swiss pediatric sepsis study	L. Schlapbach	CHF 930'302
SPHN	ADONIS	L. Schlapbach (co-investigator)	CHF 487'450
SPHN/PHRT	NDS-2021-911 "Pediatric Personalized Research Network Switzerland (SwissPedHealth) – a Joint Pediatric National Data Stream"	L. Schlapbach	CHF 5'000'000
Starship Foundation	Follow-up of the NITRIC cohort	L. Schlapbach	NZD 100'000
Stiftung Naturwiss./techn. Forschung	Artificial Intelligence in the PICU	L. Schlapbach	CHF 150'000
UZH Global Funding Scheme	Digital Trial Platform for Precision Medicine in Critically Ill Children	L. Schlapbach	CHF 60'000
Vontobel	BOND-Creative Music Therapy in Newborn Infants with Congenital Heart Disease	C. Hagmann	CHF 145'620

ACADEMIC PROMOTIONS

Name	Title	University
Schlapbach Luregn	Extraordinary Professor ad personam for Pediatric Intensive Care Medicine	Faculty of Medicine, UZH

MEDICAL DOCTORAL THESIS AND MASTER THESIS (completed 2024)

Name	Project Title	Supervision	University
Bader Valerie	Quality assessment of fluid-and electrolyte management in cooled neonates with hypoxic ischaemic encephalopathy at the University Children's Hospital	Cornelia Hagmann	Faculty of Medicine, UZH
Fenner Anica	Antibiotikaexposition von kritisch kranken Kindern auf der Intensivstation	Baumann Philipp Schlapbach Luregn	Faculty of Medicine, UZH
Muff Rafael	Hyponatriämie während Vasopressintherapie bei kritisch kranken Kindern	Baumann Philipp Schlapbach Luregn	Faculty of Medicine, UZH
Rüdisüli Katharina	Spannungsfelder in der Pflege von Kindern mit kritisch chronischen Erkrankungen	Anna-Barbara Schöler	Institut für Pflege, Department Gesundheit, ZHAW
Scheidegger Raphael	Evaluation Lactatwerte nach Hirntumorexstirpation	Brotschi Barbara	Faculty of Medicine, UZH
Tomar Rodi	Erhebung der Lebensumstände bei jungen Erwachsenen, deren Mütter während Schwangerschaft und Geburt Drogen konsumiert haben	Urs Zimmermann Cornelia Hagmann	Faculty of Medicine, UZH

CLINICAL STUDIES AND RESEARCH PROJECTS

Randomized Clinical Trials (recruitment concluded in 2024)

CoCO2: Comparison of carbon dioxide control during pressure controlled (PC) versus pressure regulated volume control (PRVC) ventilation in children (CoCO2): a digital, randomized controlled trial

National, monocenter, Investigator Initiated Trial Kispi (head of the study). Category A, Other clinical trials (ClinO chapter 4). Funding: Children's Research Center (CRC, Kispi)
Recruitment period in Kispi: from January to September 2024
Patient recruited in Kispi: 59

PREPICARE: Assessment of an Innovative Air Mattress on Critically Ill Infants

National, monocenter, Principal Investigator Kispi (partner of the study). Clinical trials with medical devices according to ClinO-MD.
Recruitment period in Kispi: from May to September 2024
Patient recruited in Kispi: 25

Research Projects (concluded in 2024)

Vyair: Observational study of the safety and performance of bellavista ventilator and the iFlow sensor during routine use in the neonatal, pediatric, and adult intensive care unit.

International, multicenter, Principal Investigator Kispi (partner of the study). Prospective post market observational study. HRO Chapter 3.
Data collection period in Kispi: 06.2023 – 05.2024
Patient recruited in Kispi: TOT 150

PICSS-PF: Post Intensive Care Syndrome in Swiss Pediatric survivors and their Families [PICSS-PF]: A Multi-center Longitudinal Observational Study.

National, multicenter, Principal Investigator Kispi (partner of the study). Prospective, longitudinal observational study. HRO Chapter 2.
Recruitment period in Kispi: 08.2023 – 06.2024
Patient recruited in Kispi: TOT 62

Randomized Clinical Trials (ongoing December 2024)

BOND: Creative Music Therapy in Newborns with Congenital Heart Disease: A Randomized Clinical Trial – BOND Study.

National, monocenter, Investigator Initiated Trial Kispi (head of the study). Category A, Other clinical trials (ClinO chapter 4). Funding: SNF
Recruitment period in Kispi: 11.2022 – 07.2025 (planned)
Planned patient recruitment: TOT 164

Research Projects (ongoing December 2024)

SWISSPEDHEALTH: Swiss Personalized Pediatric National Data Stream

National, multicenter, Principal Investigator Kispi (partner of the study). One of four SPHN NDS projects selected. Aims to build a harmonized datastream for children across the 5 university hospitals. Combines retrospective and prospective projects.

MOMIC: Pediatric Personalized Research Network Switzerland (SwissPedHealth): Development of a multi-omics work-flow to discover rare diseases in children with extreme phenotypes.

National, multicenter, Investigator Initiated research project Kispi (head of the study). HRO Chapter 2.

Recruitment period in Kispi: 09.2022 – 09.2025

Planned patient recruitment: TOT 150 patients and 350 relatives

ADONIS: Accelerating detection of neonatal sepsis (ADONIS): A machine learning-based approach.

National, multicenter, Principal Investigator Kispi (partner of the study). Retrospective, cohort study with routine clinical patient data. HRO Chapter 3.

MELODY: Machine learning in the Paediatric Intensive Care Unit: Development of Risk Prediction Models

International, multicenter, Principal Investigator Kispi (partner of the study). Retrospective, cohort study with routine clinical patient data. HRO Chapter 3.

RAPIDS: Rapid Pediatric Infectious Disease and Sepsis Assessment. Discovery and validation of novel biomarkers using transcriptomics, proteomics, and metabolomics in cohorts of children evaluated for sepsis (RAPIDS, RESPOND) and undergoing cardiopulmonary bypass surgery (NITRIC). In addition, the aim is to improve understanding of the biology of critical illness and sepsis, and to identify novel phenotypes relevant for future precision medicine approaches.

Kispi is responsible together with ETH to perform additional omics in these cohorts and perform analyses of the datasets, including over 2,000 patients recruited internationally.

ProVENT PED: PRactice of VENTilation in Critically Ill PEDIatric Patients (PRoVENT–PED) – an international multicenter observational study

National, multicenter, Principal Investigator Kispi (partner of the study). HRO Chapter 3. Data collection during two predefined periods of 4 weeks each year for 10 years in total.

APET: Pharmacokinetic modelling for Antimicrobials in Paediatric Patients on Extracorporeal Therapies

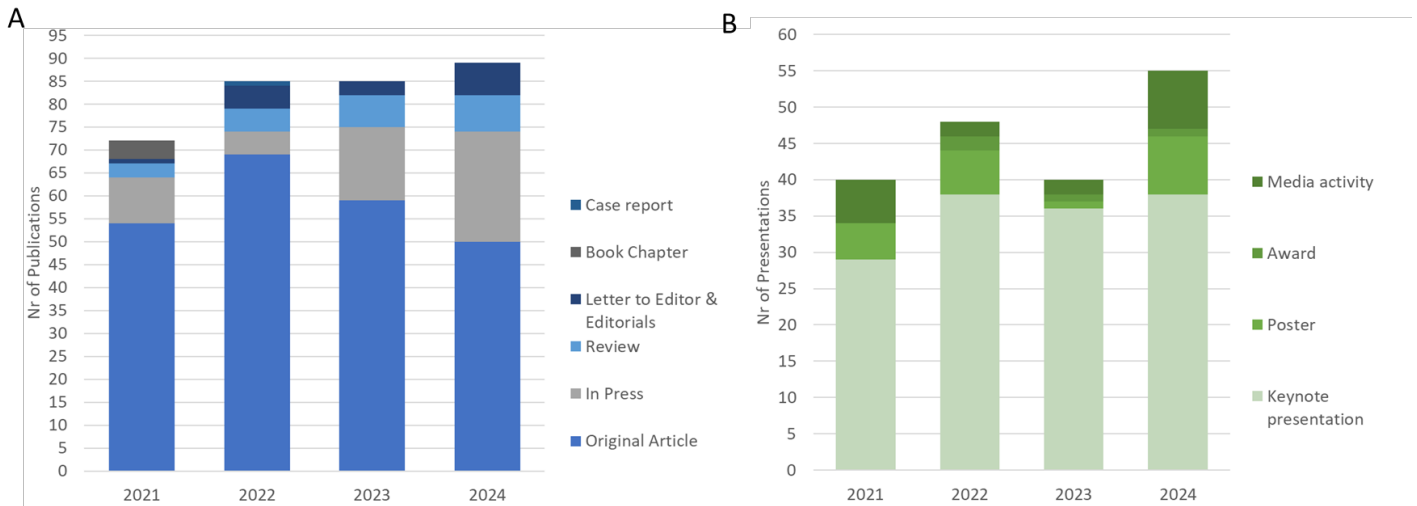
International, multicenter, Principal Investigator Kispi (partner of the study). HRO Chapter 2.

Recruitment period in Kispi: October 2024 – December 2025

Planned patient recruitment: TOT 20

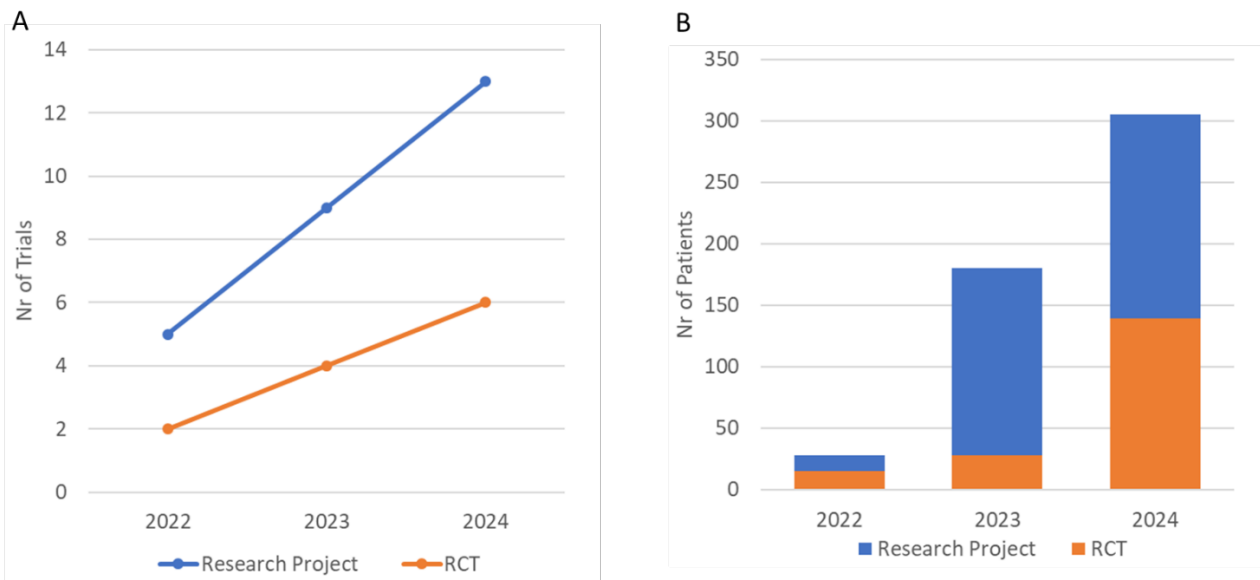
SUMMARY RESEARCH ACTIVITIES

Publications and Presentations 2021 – 2024



A) Numbers of published articles by the PINNACLE research group from 2021 to 2024. B) Numbers of published articles by the PINNACLE research group from 2021 to 2024.

Clinical trials and patient recruitments 2022 – 2024



A) Number of randomized clinical trials (RCTs) and research projects conducted by the PINNACLE research group from 2022 to 2024. B) Number of patients recruited in randomized clinical trials (RCTs) and research projects in the years 2022 - 2024.