



WHAT DO WE KNOW ABOUT NUTRITION AND LIFESTYLE TO SUPPORT PEOPLE LIVING WITH CIRRHOSIS

Developed in partnership with:



The Canadian **Donation and
Transplantation** Research Program
Programme de recherche en
don et transplantation du Canada



**CIHR
IRSC**

Canadian Institutes of
Health Research
Instituts de recherche
en santé du Canada

BACKGROUND INFORMATION

Liver disease is a significant public health issue that affects one in four individuals in Canada, which is approximately 10 million individuals (1). Chronic liver disease has many causes, including obesity, alcohol abuse, viral infections, and autoimmune disorders (1).

Cirrhosis is advanced liver scarring that is categorized as compensated and decompensated; **decompensated cirrhosis** is a severe form of cirrhosis that leads to the appearance of complications, such as malnutrition and sarcopenia (2,3).



Sarcopenia is the progressive loss of muscle mass and function and physical ability; this occurs because the liver is no longer able to break down nutrients and begins to break down muscle for energy (5-7). This can cause problems with motility, frailty, falls and fractures, and loss of independence (5-7). Individuals with physical disabilities may also experience challenges with their mental health; this could lead to feelings of depression and anxiety due to feelings of low self-esteem and frustration as they increasingly rely on others for their daily life (8).

Managing daily health needs such as nutrition and physical activity can become increasingly more difficult for people living with cirrhosis. As a result, patients, caregivers, and healthcare providers require personalized strategies to support patients' health and quality of life.

This document summarizes insights from a two-day event that brought together researchers, healthcare providers, and patient, family and donor (PFD) partners to explore how nutrition and lifestyle can better support individuals living with cirrhosis.

EVENT SUMMARY AND OBJECTIVES

EVENT SUMMARY

Drs. Chantal Bémour and Isabelle Doré, with the support of the Canadian Donation and Transplantation Research Program and the Canadian Institutes of Health Research, hosted the two-day event **"What do we know about nutrition and lifestyle to support people living with cirrhosis, a conversation between healthcare providers and people with lived experience"** on October 30 and 31, 2025.

The event provided researchers and PFD partners to share their research and perspectives regarding the role of nutrition and lifestyle to support people living with cirrhosis.

EVENT OBJECTIVES



Explore strategies to address nutrition and sarcopenia, which can affect physical activity, mental health, and quality of life, specifically within the context of cirrhosis.



Identify next steps for engaging and supporting individuals with cirrhosis to enhance health.

The meeting Agenda can be found in Appendix 1.



MAIN RESEARCH FINDINGS

PREHABILITATION BEFORE LIVER TRANSPLANTATION

Prehabilitation is a proactive strategy that helps patients prepare for a treatment, such as a transplant, which aims to improve their physical and mental health, as well as nutrition. The goal is to maximize physical function before transplantation. **The benefits of prehabilitation include improved quality of life, exercise capacity, and nutrition post-transplant.**

Future research should move beyond showing whether prehabilitation works to understanding how to personalize, scale, and sustain equitable prehabilitation interventions for individuals experiencing liver disease for both adult and paediatric populations.

Key considerations of prehabilitation for adult liver transplant recipients

Prehabilitation needs to be individualized to the patient, as a one-size-fits all model is ineffective. Prehabilitation strategies should be tailored to each patient and designed to support habits that are sustainable over the long-term. There are considerations for adequate prehabilitation, such as patient empowerment, food security, and the need for a holistic approach.

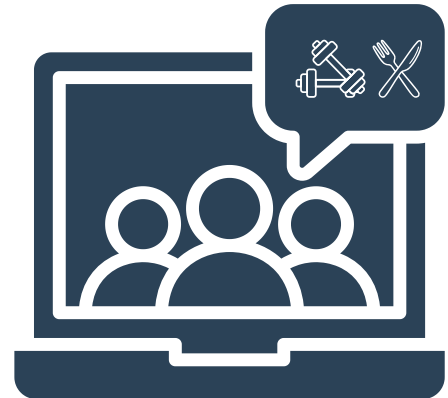
Individuals living with cirrhosis experience an accelerated starvation state, meaning that their bodies break down muscle more quickly, so it is important to implement prehabilitation strategies that address these nutritional needs. Improving nutrition can also reduce "brain fog," improve quality of life, increase muscle mass, and reduce hospitalizations.

MAIN RESEARCH FINDINGS

IMPLEMENTING **DIGITAL TOOLS** AND **TECHNOLOGY** DURING PREHABILITATION

Technology and other digital tools are available to support patients through their prehabilitation journey. One example is **OPAL**, which is an online prehabilitation program co-designed with PFD partners, that recruited participants across Canada.

This program has led to improved nutrition, and accessibility of participants. There are hopes to implement more programs like this across Canada and other diverse populations.



WELLNESS ACCROSS THE TRANSPLANT JOURNEY

Wellness should be addressed holistically throughout the transplant process, from pre-transplant to post-transplant. These interventions can include integrated prehabilitation into care, patient empowerment and education, building community and support networks to sustain long-term health.



MAIN RESEARCH FINDINGS

KEY CONSIDERATIONS OF PREHAB FOR PAEDIATRIC LIVER TRANSPLANT RECIPIENTS

Children with end-stage liver disease experience high rates of sarcopenia before and after transplantation; **in some cases, sarcopenia persists up to 10 years post-transplant**. This can lead to early fatigue, malnutrition, and changes in skeletal muscle biology such as reduced muscle mass and strength.

Children are not just mini adults, they require distinct approaches to address nutrition and lifestyle when living with cirrhosis.

To address the unique needs of paediatric patients, resistance exercise combined with adequate protein and energy intake after transplant is recommended to increase skeletal muscle mass, improve physical performance, and reduce visceral fat (this is the fat that lines the internal organs).

These programs, virtual or in-person, should be specifically designed for children and ensure that there are considerations for the parents and caregiver's perspective. It was noted that a key challenge for children is food insecurity. 30% of the Canadian population is facing food insecurity, and food insecurity in children is strongly related to low quality of diets. This impacts the rehabilitation efforts post-transplantation.



PRACTICAL STRATEGIES TO ADDRESS NUTRITION AND LIFESTYLE FOR PEOPLE LIVING WITH CIRRHOSIS

Lifestyle

- ✓ Believe in yourself! You have the strength to exercise a bit more!
- ✓ Build habits gradually - small changes compound over time.
- ✓ Ask your healthcare team for what resources are available near you.
- ✓ Maintain regular sleep patterns (7–9 hours/night).
- ✓ Manage stress with mindfulness, breathing exercises, or social support.
- ✓ Limit alcohol intake, total abstinence in those with liver fibrosis.

Nutrition

- ✓ Aim for balanced, sustainable habits rather than restrictive diets.
- ✓ Aim to eat adequate calories and proteins in the day.
- ✓ Reduce added sugars and refined carbohydrates to lower liver fat.
- ✓ Choose water or unsweetened beverages instead of sugary drinks.
- ✓ Coffee is good for the liver, and guidelines recommend 3 black coffees per day!
- ✓ Prioritize a diet rich in vegetables, whole grains, legumes, lean proteins, and healthy fats.
- ✓ Don't hesitate to "upgrade" your oral nutritional supplement! Have it cold, blended with ice, adding protein powder, yogurt or fruits to make it a wonderful smoothie!
- ✓ Eating later in the evening has been shown to increase muscle mass by up to 2kg over the year.

Exercise

- ✓ Target 150 minutes/week of moderate aerobic activity (e.g., brisk walking, cycling).
- ✓ Add 2 days/week of resistance training to improve muscle mass and metabolism.
- ✓ Short daily activity bursts (10–15 minutes) help reduce liver fat and improve insulin sensitivity.

RESOURCES



CIRRHOSISCARE.CA

User-friendly resources that cover key concepts including nutrition, exercise, and liver diseases.

[ACCESS THE WEBSITE](#)



LIVER CANADA

Provides accessible information on liver diseases, lifestyle recommendations, and patient education tools. Their infographics and patient handouts are excellent for clinical counselling.

[ACCESS THE WEBSITE](#)



DIABETES.CA

Offers evidence-based tips and resources to manage diabetes.

[ACCESS THE WEBSITE](#)



OBESITY CANADA

Offers evidence-based obesity management guidelines, webinars, and patient education material.

[ACCESS THE WEBSITE](#)



AMERICAN LIVER FOUNDATION

Contains liver focused educational tips; includes tips for back to school lunches for children with liver disease.

[ACCESS THE WEBSITE](#)



PEN NUTRITION SYSTEM

Practice-based Evidence in Nutrition (PEN) system developed by Dietitians of Canada. It provides nutrition practitioners with ready access to timely, current and authoritative guidance on food and nutrition.

[ACCESS THE WEBSITE](#)



RESOURCES

CAN-RESTORE



Network dedicated to achieving optimal well-being in transplant patients through exercise and rehabilitation.

[ACCESS THE WEBSITE](#)

OPAL STUDY



The OPAL study recruited eligible liver transplant candidates across Canada. Access the website for information on the study and the research team.

[ACCESS THE WEBSITE](#)

FATTY LIVER CANADA



Canadian advocacy and patient-support organization focused on MASLD awareness. Useful for community outreach and patient engagement in research.

[ACCESS THE WEBSITE](#)

ABOUT KIDS HEALTH



Health education website for children, youth and caregivers.

[ACCESS THE WEBSITE](#)

WELLNESSTOLBOX.CA/CIRRHOSIS



User-friendly resources that cover key concepts including nutrition, exercise, and liver diseases.

[ACCESS THE WEBSITE](#)



MEETING AGENDA

October 30, 2025

Time	Presentation	Speaker/Moderator
1:00 – 1:07	Introduction and land acknowledgement	Chantal Bémeur
1:07 – 1:25	Nutrition and Exercise interventions in pediatric liver transplant recipients at risk for sarcopenia	Diana Mager
1:25 – 1:40	Nutrition in cirrhosis	Puneeta Tandon
11:40 – 1:50	Discussion	Moderator: Sandra Holdsworth
1:50 – 2:00	Break	
2:00 – 2:15	Against the odds: Life with Cirrhosis	Amanda Kuhn
2:15 – 2:30	Integrating multimodal prehabilitation in the care of liver transplant candidates - lessons from the McGill experience.	Amine Benmassaoud
2:30 – 2:40	CAN-RESTORE - resources for patients and professionals focused on rehabilitation in the context of solid organ transplantation	Tania Janaudis Ferreira
2:40 – 2:50	Discussion	Moderator: Chantal Bémeur
2:50 – 3:00	Conclusion	Chantal Bémeur

MEETING AGENDA

October 31, 2025

Time	Presentation	Speaker/Moderator
10:30-10:40	Introduction and land acknowledgement	Isabelle Doré
10:40 – 11:00	Nutrition and Metabolism: Integrating Holistic Care in MASLD	Giada Sebastiani
11:00 – 11:15	Wellness in Transplant Patients	Nicole Culos-Reed
11:15 – 11:25	Discussion	Moderator: Sandra Holdsworth
11:25 – 11:40	Break	
11:40 – 11:55	Thrive Anyway: How I do life while living with liver disease	Shelby Gielen
11:55 – 12:10	Filling the tank – Nutritional prehabilitation before liver transplantation	Christofer Cruz
12:10 – 12:20	Discussion	Moderator: Isabelle Doré
12:20 – 12:30	Conclusion	Chantal Bémeur

MEET THE SPEAKERS!

Dr. Chantal Bémour

Chantal Bémour is a nutrition specialist focused on liver disease and related complications, and a Full Professor at the Nutrition Department of the Faculty of medicine of Université de Montréal. Trained as a dietitian/nutritionist, she completed graduate studies and postdoctoral fellowships in nutrition, specializing in hepatic encephalopathy. Her research includes both clinical and fundamental science in collaboration with the CHUM Department of Hepatology and Gastroenterology. Dr. Bémour contributed to international guidelines on nutrition and liver disease and helped develop an evidence-based nutrition education guide for people with chronic liver disease and their caregivers.



Dr. Isabelle Doré

Isabelle Doré is an epidemiologist, Associate Professor at the School of Kinesiology and Physical Activity Sciences and the School of Public Health at Université de Montréal and researcher at the Centre de recherche du Centre hospitalier de l'Université de Montréal and the Institut du cancer de Montréal. Her research focuses on physical activity as a strategy to promote wellbeing across diverse populations, including youth transitioning to adulthood, people affected by cancer, immunosuppressed individuals, and caregivers.



Dr. Amine Benmassaoud

Amine Benmassaoud completed his medical degree and Gastroenterology training at McGill University, followed by an advanced Hepatology fellowship at the Sheila Sherlock Liver Centre in London (UK), focusing on portal hypertension. He also earned a Master's in Experimental Medicine at McGill, where his research focused on prehabilitation in patients awaiting liver transplantation. As an early-career clinician-investigator at the McGill University Health Centre, supported by an FRQS Junior 1 award, his program aims to improve the diagnosis and management of portal hypertension using innovative diagnostic tools and treatment strategies, with a particular focus on addressing sarcopenia.



MEET THE SPEAKERS!

Christopher Cruz

Christopher Cruz is a registered dietitian and PhD candidate at the University of Alberta. He began his career supporting patients in managing chronic conditions through nutrition and lifestyle changes. His current research focuses on leveraging digital technologies to develop innovative, accessible nutrition solutions for chronic disease management. Christopher is leading a large, multi-centre prehabilitation trial across Canada for patients with cirrhosis awaiting liver transplantation. His work aims to improve patient outcomes and quality of life by integrating evidence-based nutrition strategies with digital health tools.



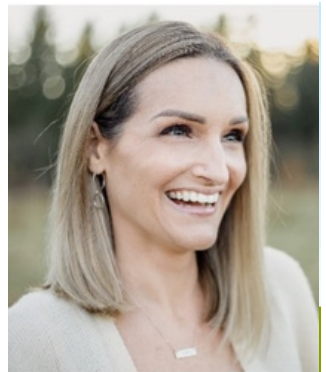
Dr. Nicole Culos-Reed

Dr. Nicole Culos-Reed is a Professor, Associate Dean Research, and Research Excellence Chair in the Faculty of Kinesiology at the University of Calgary. As a health behaviour change researcher, she develops, implements, and evaluates exercise interventions to enhance well-being and quality of life across diverse populations. Her work in transplantation includes the Transplant Wellness Program, a transdisciplinary initiative that develops prehabilitation and wellness resources for individuals undergoing liver, kidney, and lung transplantation. Her research aims to support patients across the transplant journey through accessible, evidence-based physical activity interventions.



Shelby Gielen

Shelby Gielen is a two-time liver transplant recipient with over 30 years of lived experience in the healthcare system and is currently awaiting a third transplant. She serves nationally as a patient and family donor (PFD) partner with the Organ Donation and Transplant Research Foundation and the Canadian Donation and Transplantation Research Program. Shelby is passionate about integrating lived experience into research to improve patient-centered care. She advocates for stronger collaboration between patients and researchers to ensure that healthcare innovations reflect the real needs and priorities of the transplant community.



MEET THE SPEAKERS!

Sandra Holdsworth

Sandra Holdsworth transitioned from a 30-year banking career to becoming a leading voice in transplant care after receiving a liver transplant in 1997 due to a rare liver disease (PSC) and Crohn's disease. She now lives with a permanent ostomy and kidney failure requiring home hemodialysis, offering unique insight into long-term transplant outcomes. As Patient Partner Co-Lead with the Canadian Donation and Transplantation Research Program, Sandra advocates for holistic care that integrates physical, mental, and emotional health. She is dedicated to mentoring patients and promoting organ donation awareness across Canada.



Dr. Tania Janaudis-Ferreira

Dr. Tania Janaudis-Ferreira is an Associate Professor in the School of Physical and Occupational Therapy at McGill University and a Scientist at the Research Institute of the McGill University Health Centre. Her research focuses on improving rehabilitation care and outcomes for individuals with chronic conditions, including COPD, long COVID, and solid organ transplant recipients. Through her work, she aims to enhance functional recovery and quality of life by developing and evaluating innovative rehabilitation strategies. Her program emphasizes patient-centered approaches and the integration of rehabilitation into standard care pathways.



Amanda Kuhn

Amanda Kuhn was diagnosed at age 12 with primary sclerosing cholangitis, autoimmune hepatitis, and ulcerative colitis, and lived with cirrhosis for 18 years. In 2023, she received a liver transplant at Vancouver General Hospital. Amanda now serves as the Provincial Director for British Columbia with the Canadian Transplant Association and works professionally as a silviculture forester. She leads an active lifestyle and represented Team Canada at the World Transplant Games in Dresden, Germany, where she medaled in cycling. Amanda is passionate about nutrition, fitness, and sharing her story to inspire and support others in the transplant community.



MEET THE SPEAKERS!

Dr. Diana Mager

Dr. Diana Mager, PhD, MSc, RD, is a Professor of Clinical Nutrition at the University of Alberta, with appointments in the Departments of Pediatrics and Agricultural, Food and Nutritional Sciences. A pediatric nutrition support dietitian by training, her research focuses on developing diet and exercise interventions to address frailty and sarcopenia. Her work spans adults with chronic kidney disease and children with liver and gastrointestinal diseases, both before and after transplantation. Dr. Mager's research aims to improve clinical outcomes and quality of life through targeted, evidence-based nutrition and physical activity strategies.



Dr. Giada Sebastiani

Giada Sebastiani, MD, FAASLD, is a Clinician Scientist and Full Professor of Medicine at the McGill University Health Centre. Her research focuses on non-invasive diagnostics and personalized screening strategies for metabolic dysfunction-associated steatotic liver disease (MASLD). She has a particular interest in improving early detection and care for high-risk populations, including individuals living with HIV, inflammatory bowel disease, and type 2 diabetes. Through her work, Dr. Sebastiani aims to advance precision medicine approaches that enhance disease management and reduce long-term complications.



Dr. Puneeta Tandon

Dr. Puneeta Tandon is a Professor of Medicine at the University of Alberta, Director of the Cirrhosis Care Clinic, and a Transplant Hepatologist with advanced training from Yale University and the Hospital Clinic in Barcelona. Her research focuses on improving care for patients with cirrhosis through quality improvement, frailty assessment, exercise, nutrition, and digital health solutions. She is dedicated to promoting patient education and engagement, with a goal of delivering holistic, interdisciplinary, and evidence-based care that supports both physical and mental well-being across chronic disease populations.



REFERENCES

1. Canadian Liver Foundation. Liver.ca [Internet]. 2025 [cited 2026 Feb 19]. New survey shows most Canadians overlook their liver health, yet 1 in 4 is affected by liver disease. Available from: <https://liver.ca/new-survey-shows-most-canadians-overlook-their-liver-health/>
2. Buchard B, Boirie Y, Cassagnes L, Lamblin G, Coilly A, Abergel A. Assessment of Malnutrition, Sarcopenia and Frailty in Patients with Cirrhosis: Which Tools Should We Use in Clinical Practice? *Nutrients*. 2020 Jan 8;12(1). doi:10.3390/nu12010186
3. Jensen GL, Cederholm T, Correia MITD, Gonzalez MC, Fukushima R, Higashiguchi T, et al. GLIM Criteria for the Diagnosis of Malnutrition: A Consensus Report From the Global Clinical Nutrition Community. *J Parenter Enter Nutr*. 2019 Jan;43(1):32–40. doi:10.1002/jpen.1440 PubMed PMID: 30175461.
4. Traub J, Reiss L, Aliwa B, Stadlbauer V. Malnutrition in Patients with Liver Cirrhosis. *Nutrients*. 2021 Feb 7;13(2):540. doi:10.3390/nu13020540 PubMed PMID: 33562292; PubMed Central PMCID: PMC7915767.
5. Montano-Loza AJ, Meza-Junco J, Prado CMM, Lieffers JR, Baracos VE, Bain VG, et al. Muscle wasting is associated with mortality in patients with cirrhosis. *Clin Gastroenterol Hepatol Off Clin Pract J Am Gastroenterol Assoc*. 2012 Feb;10(2):166–73, 173.e1. doi:10.1016/j.cgh.2011.08.028 PubMed PMID: 21893129.
6. Tandon P, Ney M, Irwin I, Ma MM, Gramlich L, Bain VG, et al. Severe muscle depletion in patients on the liver transplant wait list: its prevalence and independent prognostic value. *Liver Transplant Off Publ Am Assoc Study Liver Dis Int Liver Transplant Soc*. 2012 Oct;18(10):1209–16. doi:10.1002/lt.23495 PubMed PMID: 22740290.
7. Pichard C, Kyle UG, Morabia A, Perrier A, Vermeulen B, Unger P. Nutritional assessment: lean body mass depletion at hospital admission is associated with an increased length of stay. *Am J Clin Nutr*. 2004 Apr;79(4):613–8. doi:10.1093/ajcn/79.4.613 PubMed PMID: 15051605.
8. Allen SL, Quinlan JJ, Dhaliwal A, Armstrong MJ, Elsharkawy AM, Greig CA, et al. Sarcopenia in chronic liver disease: mechanisms and countermeasures. *Am J Physiol Gastrointest Liver Physiol*. 2021 Mar 1;320(3):G241–57. doi:10.1152/ajpgi.00373.2020 PubMed PMID: 33236953; PubMed Central PMCID: PMC8609568.

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ACKNOWLEDGEMENTS

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This fast fact was developed and formatted by Marie-Claire Kapesa, reviewed and edited by Dr. Chantal Bémour and Manuel Escoto, Shelby Gielen, Amanda Kuhn, and Sandra Holdsworth.

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