“Reviving the Forgotten Organ:

A Global Journey to Advance Gut

Function Assessment in Critical Illness’’

VARSHA ASRANI

Travel : JAN-MARCH 2025

Submitted : APRIL 2025

My current role is of an Advanced Clinician: Critical Care Dietitian in the area of intensive care and surgery at Auckland City Hospital, which has been a contributing factor to various elements of this project and thesis. My area of expertise is in intensive care and surgical nutrition demands complex clinical care as part of a multi-disciplinary team; a crucial part of this is 'nutrition' which positively influences clinical outcomes in critical illness. Nutrition intervention, also known as Medical Nutrition Therapy (MNT), is reinforced primarily by evidence-based practice, which originates from high-quality academic research. In critical care units, guidelines form an important part of delivering intervention (including nutrition) which is derived from evidence-based research. In my clinical leadership role, I strongly advocate the importance of evidence-based care which is fundamental to clinical practice. Having worked with the Department of Surgery for the past 5 years, I have acquired skills to manage and facilitate projects, and coordinate a group of research assistants and students. This experience has enabled me to execute my research skills and knowledge that has encouraged my determination towards a doctoral degree. It has fostered my passion over the years to grow academically and professionally to meet the changing needs and expectations of the dietetic profession within the health care system in NZ and globally. I believe these skills will help me pursue my PhD degree involving systematic literature review, scientific methodology and research design, statistical analysis, academic writing and presentation. As part of my supervision, mentoring and teaching roles, I have not only explored the area of my research further but enabled other students and younger medical/dietetics/nursing graduates to give it its due importance. In my day-to-day practice my experience with prescribing nutrition to patients alerted me that the gut was an organ that was heavily neglected in intensive care. A favourable approach to organs that maintain life was the key focus of ICU clinicians, admist of which the gut was a

‘forgotten organ’. One could not attain adequacy of nutrition with a non-functioning gut. This was experience with nearly every patient at some point in an ICU admission. This PhD project evolved with an intention to addresses this urgent need to find a better answer to assess gut dysfunction (GDF) in intensive care patients who are often not able to report their symptoms more often (being intubated and sedated) which compromises clinical assessment at the bedside. The project was the first step to provide a basis for developing and testing a new approach to the assessment of GDF suitable for inclusion in the current tools for assessing end-organ dysfunction and failure by assisting incorporating into an organ severity score This is a key defined goal of this research group. Besides, the project would also unfold the significance of this research on its relevance to the key role that the gut plays in critical illness. Although briefly acknowledged is the gut plays a key role in the clinical course of these patients on a routine basis, and as such is responsible for a major health and economic burden which has been underestimated. The accurate prediction, early diagnosis, and responsive monitoring of GDF was becoming a priority to any other vital organ. The lack of an available and reliable tool or method to do this contributes to suboptimal clinical care of the patient with GDF and suboptimal research because of the inability to accurately risk stratify and allocate patients for clinical trials is crucial and imperative to investigate interventions to prevent and treat GDF. The project was a challenging piece of work to make a telling contribution towards a more reliable and accurate method to measure GDF, assist with interventions in intensive care, support important clinician decision-making and most importantly hopefully improve clinical outcomes. Throughout my experience, I believe that clinical practice without research is following a path with no vision. My intention is to pursue a career as an academic clinical dietitian / lead research dietitian within the area of intensive care and surgery. My vision is to merge the area of intensive care and dietetics and develop a stream of an ICU-nutrition research base in NZ which hasn’t been developed yet. My PhD

is the necessary foundation to ultimately establish my own research unit and connect with international research groups. It will strengthen my ability to provide leadership in clinical and translational research. I believe my research and clinical practice closely co-relate, and there is huge potential to have an impact on clinical practice, which can reduce unnecessary costs, lower the burden on the health-care authorities and achieve positive patient outcomes especially in critical-illness. I am excited and optimistic about this opportunity of exploring this interesting area of research wherein the gut should be considered an important organ in its own right, contributing significantly to systemic inflammation and multi-organ dysfunction in patients with acute and critical illness. As such, the gut needs to be given a 'seat at the table', to be assessed and scored along with other organ systems in the evaluation of patients with acute and

critical illness.

Contents

1. EXECUTIVE SUMMARY

This Fellowship enabled a deep, practice-informed exploration into the global assessment and management of gastrointestinal dysfunction (GID) in critically ill patients—a neglected but clinically significant domain. Across visits to leading centres in Switzerland, the United Kingdom, and India, I engaged with international experts, observed clinical models, and initiated collaborative research focused on innovative gut monitoring strategies. These include intraluminal pressure measurement, body surface gastric mapping, and gut-specific biomarkers—technologies that hold promise for earlier, more accurate detection of GID in intensive care. At Lucerne Kantonsspital, discussions with Professor Annika Reintam Blaser strengthened collaboration on the AGI and GIDS scoring systems, culminating in my contributions to the international GUT-PHOS and COSMOGI studies, and a forthcoming GUT-FIRST multicentre trial. At Salford Royal Intestinal Failure Unit, I observed a high-functioning, multidisciplinary approach to intestinal failure, which informed my understanding of long-term nutrition therapy and transition from acute gut injury to rehabilitation. In India, my time at Apollo Hospitals with Dr Daphnee Lovesay offered insights into the challenges and opportunities for advancing GI care in resource-limited settings, where interest in structured gut function assessment is rising. This Fellowship catalysed ongoing research leadership in my PhD project, The GIFT Study, and elevated the profile of New Zealand-led translational research in this area. It also sparked new educational partnerships and positioned me to lead the development of internationally aligned, context-sensitive models of gastrointestinal monitoring and nutritional care in critical illness. Collaborative projects initiated during this Fellowship following my visit included the GUT-PHOS study, COSMOGI, and an international review of GID assessment which have already paved the way towards the importance of gut assessment for my forthcoming postdoctoral research. This experience

significantly contributed to the development of my study (The GIFT study: Gastrointestinal dysfunction In critical illness), a multi-phase programme I now lead, which integrates physiological, clinical, and technological innovations to characterise GID in ICU patients. This Fellowship has had a profound impact on my research trajectory and clinical role as an advanced critical care dietitian. It has led to new collaborations, enhanced visibility of New Zealand-led translational research in GID, and will continue to inform ICU protocols and nutrition practices in our health system.

2. INTRODUCTION

The gastrointestinal (GI) tract plays a pivotal role in the homeostasis and recovery of critically ill patients, yet it remains the only major organ system not routinely scored in ICU organ failure assessments. Despite increasing recognition of GID, challenges remain in its diagnosis, monitoring, and treatment. This Fellowship aimed to explore innovative strategies for assessing GI function and dysfunction, understand international approaches to GID management, and translate key findings to the New Zealand ICU context. My doctoral research has been focused on gastrointestinal dysfunction in critical illness, particularly in relation to enteral nutrition-based intraluminal pressure , gut-biomarkers, and physiological monitoring. This Fellowship provided a timely opportunity to extend my academic inquiry into applied clinical settings abroad, identify future collaborators, and explore translational pathways for advanced gut monitoring techniques in critically ill populations.

The Fellowship addressed the following key questions:

- How is gastrointestinal dysfunction identified and monitored internationally?
- What are the emerging methods of GI function assessment in ICU and intestinal failure settings?
- What collaborative models and protocols exist for translating physiological gut data into clinical practice?

3. KEY LEARNINGS

3.1 VISIT TO LUCERNE HOSPITAL (KANTONSSPITAL), LUCERNE, SWITZERLAND – PROF. ANNIKA REINTAM BLASER

During my visit to Lucerne, I spent my time with Professor Annika Reintam Blaser, an intensivist and a globally recognised leader in gastrointestinal dysfunction research. In addition to IUC rounds, case discussion, teaching, coffee catch-ups and lunch, our discussions centred around GID classification, its omission from organ failure scoring systems, and the importance of structured GI assessment tools described below:

- Bar colour coding for signs and symptoms
- Trend vs actual monitors
- Abdomen – distended/ bowel sounds/ Bristol tool chart/intra-abdominal pressure
- Nutrition – Enteral, Parenteral and fluids
- Biochemistry – liver enzymes, ammonia, glucose
- Macro/micro nutrients
- Glucose and inuslinr egimes
- Refeeding Panel – Po4/ K and Mg
- Overfeeding – Urea/ VO2/ Blood urea nitrogen
- Propofol and oral calories not included

Promote feed used includes fibre and high in protein

For surgical patients – Peptide based feeds are used

Parentral Nutrition includes omega -3

Indirect calorimetry is used vai QNRG

Prof. Blaser shared insights into the development of the Grading systems she attempted in 2012 (AGI) and 2021 (GIDS) and challenges in its implementation across ICUs globally. She introduced me to her programming systems and how GID was assessed in her patients clinically including the signs and symptoms that adds up to the AGI score.

This meeting strengthened our collaborative ties and led to multiple joint projects including the following.

GUT-PHOS study

Link: Ongoing Projects - Endorsed - ESICM

- Aim 1: To validate the Gastrointestinal Dysfunction Score in predicting mortality and duration of ICU dependency and duration of parenteral nutrition dependency among consecutive adult patients admitted to participating ICUs worldwide.
- Aim 2: To identify the prevalence, management practices, and outcomes of Pi abnormalities during the first week of ICU admission in consecutive adult patients admitted to ICUs worldwide.

This study has now been completed and I had the opportunity to be a steering committee member on the study group and our ICU (DCCM) was a participating site as part of the validation study.

The study will be published in 2025.

A sub-study article was published as below involving me as a contributer

Reintam Blaser, A., Cotoia, A., Berger, M.M. *et al.* How to define parenteral nutrition. *Crit Care* **28**, 372 (2024). https://doi.org/10.1186/s13054-024-05153-1

Acknowledgements

We thank all collaborators in all study sites.
the GUTPHOS study sites and investigators: Gelderse Vallei Hospital, Ede, The Netherlands: Yvonnen Swaen-Dekkers; Tartu University Hospital, Tartu, Estonia: Anna-Liisa Voomets; Karolinska University Hospital Huddinge, Stockholm, Sweden: Rebecca Lindström; Karolinska University Hospital Solna, Solna, Sweden: Jonas Blixt; Luzerner Kantonsspital, Luzern, Switzerland: Benjamin Hess; CHUV, Centre hospitalier universitaire vaudois, Lausanne, Switzerland: Olivier Pantet; King Abdullah International Medical Research Center, Riyadh, Saudi Arabia: Yasir Alzoubi; UZ Leuven, Leuven, Belgium: Liese Mebis; Charité—Universitätsmedizin Berlin, Corporate Member of Freie Universität Berlin and Humboldt Universität zu Berlin, Department of Anaesthesiology and Intensive Care Medicine (CCM/CVK), Berlin, Germany: Linus O. Warner; Klinikum rechts der Isar Technische Universität München, Munich, Germany: Kristina Fuest; Azienda Ospedaliero Universitaria "Policlinico Riuniti", Foggia, Italy: Francesco Cardinale; Beijing Hospital, Beijing, China: Zhigang Chang; University Hospitals of North Midlands, North Midlands, UK: Ramprasad Matsa; H.I.G.A. San Martin de La Plata, Buenos Aires, Argentina: Cecilia Loudet; General Hospital of Atikki, KAT, Athens, Greece: Maria Theodorakopoulou; USL Romagna: Azienda USL della Romagna, Cesena, Italy: Giuliano Bolondi; Královské Vinohrady University Hospital, Prague, Czech Republic: František Duška; Hospital Clínic de Barcelona, Barcelona, Spain: Juan Carlos Lopez-Delgado; Auckland City Hospital, Auckland, New Zealand: Varsha Asrani; Univerity Cinical Center Niš, Niš, Serbia: Natalija Vukovic; North Estonia Medical Centre, Tallinn, Estonia: Oskar Appelberg; The Methodist Hospital Research Institute, Houston, USA: Raul Sanchez Leon; CHU de Besançon, Besançon, France: Guillaume Besch; Universität Leipzig, Leipzig, Germany: Sirak Petros; Södersjukhuset AB, Stockholm, Sweden: Rebecka Rubenson Wahlin; West China Hospital, Chengdu, China: Qin Wu; University Clinical Centre of Serbia, Belgrade, Serbia: Jovana Stanisavljevic; The First Hospital of Jilin University, Jilin, China: Zhang Dong

COSMOGI

Link : COSMOGI – An ESICM endorsed modified Delphi process.

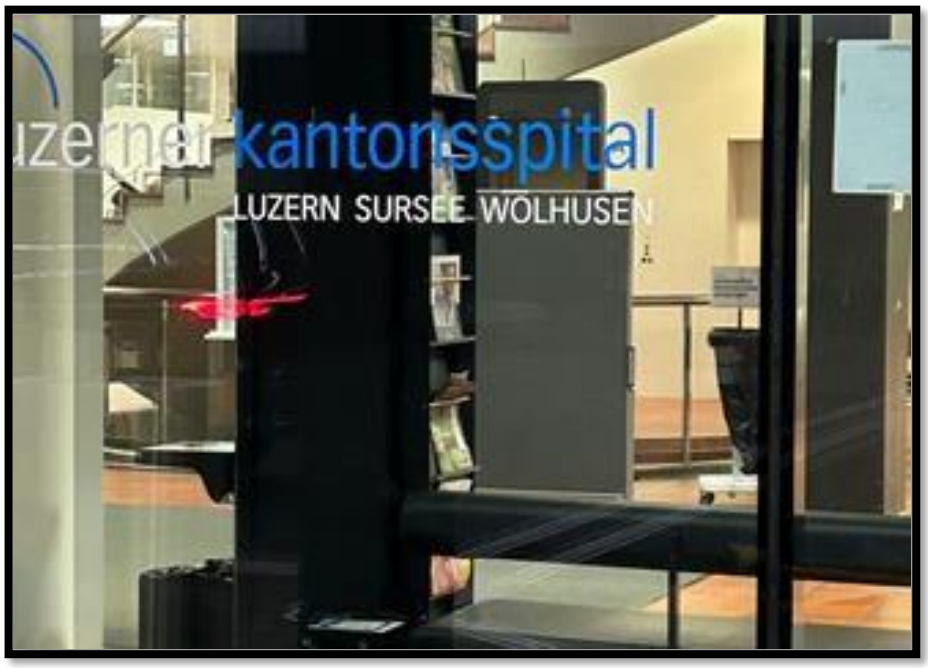
The purpose of this study was to reach consensus on: (1) the core outcome measures that should be reported daily in trials assessing gastrointestinal function or nutrition in critically ill patients. (2) the definitions of these outcomes.

This study was published and was delighted to be part of the authorship and steering committee members.

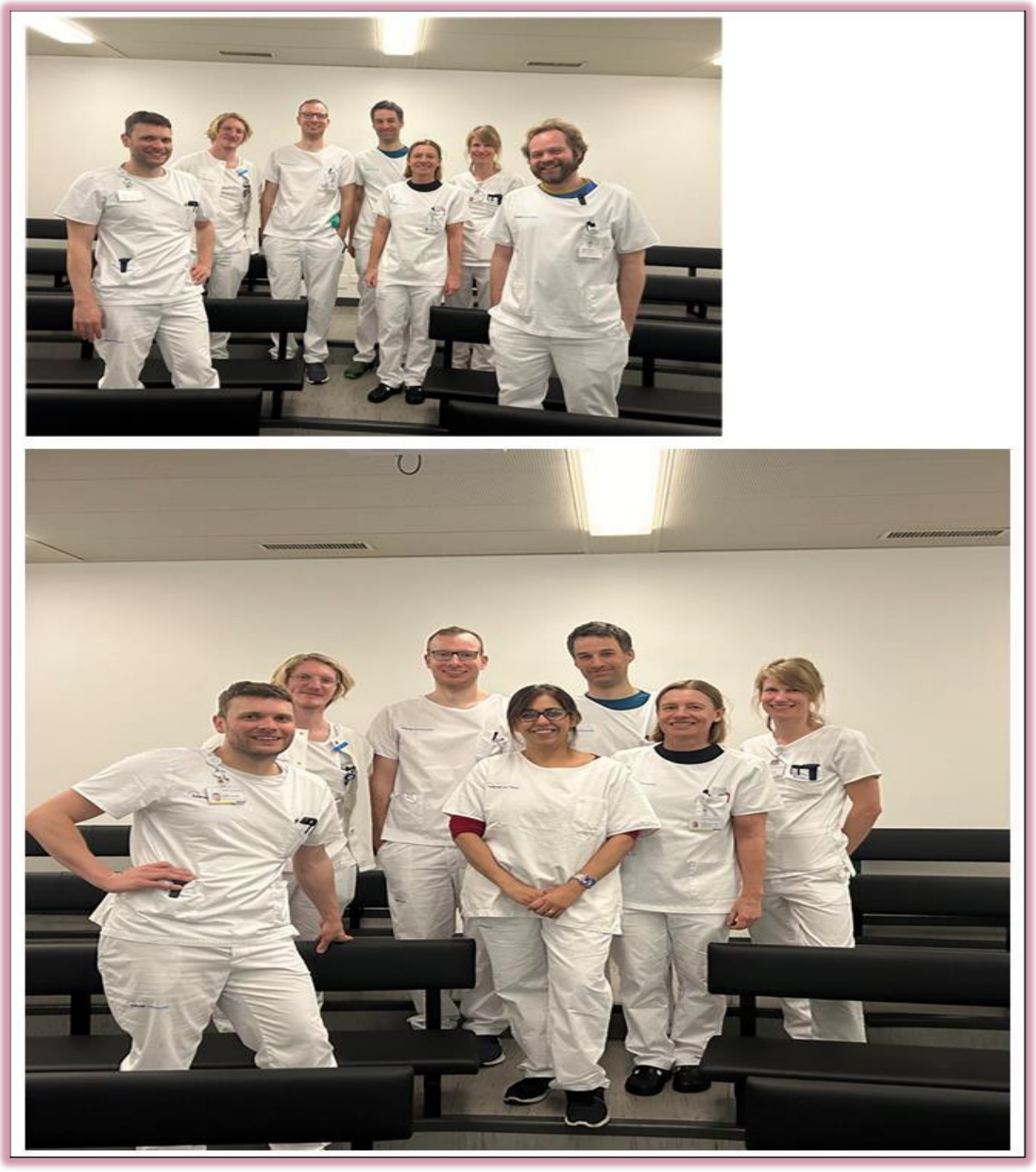
*Bachmann, K.F., Jenkins, B., **Asrani, V.** et al. Core outcome set of daily monitoring of gastrointestinal function in adult critically ill patients: a modified Delphi consensus process (COSMOGI). Crit Care 28, 420 (2024). https://doi.org/10.1186/s13054-024-05192-8.*

These collaborations laid the groundwork for the my first proposed multicentre GUT-FIRST grant application currently under development applied to the ESICM and ESPEN grants to allow for 2 key objectives, aiming to implement non-invasive monitoring tools and optimise enteral nutrition strategies in high-risk ICU cohorts.

In addition, we published a review paper very recently that was published as seen in the link below. *Bachmann, K. F., **Asrani, V. M**., & Reintam Blaser, A. (2025). Assessing gastrointestinal system dysfunction in intensive care. Current opinion in critical care, 31(2), 172–178. https://doi.org/10.1097/MCC.0000000000001248. Assessing gastrointestinal system dysfunction in intensive care - PubMed (nih.gov)*



Entrance to Lucerne Hospital Kantonsspital



At Kantonhospital in Lucerne Switzerland with Dr Annika Rintam Blaser and her ICU team.

In addition, one of my students recent thesis was on Evaluating the Feasibility of the Gastrointestinal Dysfunction Score (GIDS) in a New Zealand Intensive Care Unit: A Comparison of Objective and Subjective Assessment Methods. Prof Reintam Blaser kindly agreed to contribute to assessment of this work and made some suggestions which would be useful before we publish it in 2025, wherein she will contribute as an author.

Abstract

Background: Gastrointestinal dysfunction (GD) is a frequent clinical challenge among critically ill patients, associated with adverse outcomes, such as longer Intensive Care Unit (ICU) stays and increased mortality. However, most methods to assess GD are subjective. Standardised, objective tools like the Gastrointestinal Dysfunction Score (GIDS) are needed to improve gastrointestinal assessment in the ICU.

Objective: To compare intensivists' subjective GD assessments with nurses' and the researchers' objective GIDS assessments, evaluate GIDS consistency between nurses and the researcher, and assess GIDS feasibility and acceptability among ICU nurses.

Method: This pilot prospective study was conducted in a single ICU. It involved 30 patients, 20 ICU nurses, and nine intensivists over a two-week period. Data collection involved GIDS assessments by the investigating researcher and nurses, subjective gut function ratings by intensivists using a 5-point Likert scale, and a 4-question feasibility survey completed by nurses. Data were analysed using SPSS for quantitative statistics and NVivo for thematic analysis of qualitative survey responses.

Results: Agreement between nurses' and researchers' GIDS scores was fair to substantial (κ=0.714, p=<0.001), but both showed discrepancies when compared to intensivists' subjective ratings of GD. Nurses indicated that the GIDS tool was easy to use and feasible but lacked awareness and

understanding about the tool and GI assessment. Nurses identified time constraints, workflow integration, and education and training needs as potential implementation barriers. The qualitative analysis highlighted further concerns about increased workloads and the tool's limited applicability to diverse patient conditions.

Conclusion: This pilot study supports the potential use of the GIDS as a standardised tool for objective GD assessment in the ICU. While further validation is required before formal tool adoption, the GIDS shows promise in addressing inconsistencies in current GD assessment practices. Although not without its limitations, the GIDS represents a step, alongside other noninvasive methods, to improving overall gut assessment in the future. Successful implementation will require targeted education to overcome adoption challenges. The findings from this study provide a foundation for further large-scale studies needed to improve GD assessment in critical care settings.

3.2 VISIT TO SALFORD INTESTINAL FAILURE UNIT, UK – DR. SIMON LAL AND TEAM (KIRSTINE FARRER, CATH CAWLEY, SIMON HARRIS AND EMMA BEXALL)

I visited the Salford Intestinal Failure Unit (IFU), one of Europe's leading centres for intestinal rehabilitation and long-term parenteral nutrition. Under the mentorship of Dr. Simon Lal and his multidisciplinary team, I observed clinical rounds, multidisciplinary meetings, intestinal failure assessment, MDT meetings and patient consults spanning complex intestinal failure, sepsis, and transplant cases.

Population and Scope: This service covers adults with Type 2 or Type 3 IF, including those requiring Home Parenteral Nutrition (HPN), prolonged parenteral nutrition, specialised surgery, or

consideration for intestinal transplant or autologous GI reconstruction. It applies to patients resident in England or under NHS England's commissioning responsibility.

Demand Estimates:

Annually, ~600–700 patients are expected to access Type 2 IF services, with 350–500 requiring surgery. HPN prevalence is about 50 per million and is projected to grow to 80 per million (~4000 patients/year) within 5 years due to rising Type 2 IF cases, especially post-surgical.

Service Aims and Outcomes:

The aim is to manage IF safely and effectively, improve quality of life, and reduce mortality. Outcome measures include post-op and inpatient mortality, refistulation rates, HPN survival (1 and 5 years), and catheter infection rates.

Care Standards and Guidelines:

Providers must adhere to national and international standards (e.g., ASGBI guidelines), work with accredited homecare providers under the HPN framework, ensure training for patients and carers, and support multidisciplinary collaboration.

Service Structure and Models:

- Type 1 IF: Short-term, managed by local services.
- Type 2 IF: Medium-term, often post-surgical and metabolically unstable, requiring prolonged PN; managed by NHS England via Integrated IF Centres.
- Type 3 IF: Chronic, metabolically stable but requiring long-term PN; managed through Home PN Centres or Integrated Centres.

Care Components Include:

- Inpatient and outpatient management
- Specialised surgery
- HPN provision and monitoring
- Long-term follow-up for transplant or reconstruction candidates
- Referral assessments and care coordination

Referral and Discharge Pathways:

- Referrals accepted from secondary care, especially for patients on PN >28 days.
- Care plans and transfers must be completed within 14 working days.
- Patients may be remotely discharged if clinically stable and with appropriate support.
- Transition planning is required for patients aged 16–18 or moving from paediatric to adult services.

Clinical Networks and Collaboration:

Integrated IF Centres lead networks with Home PN Centres and local hospitals, ensuring standardised care, regular multidisciplinary meetings, seamless transitions, and data sharing.

Networks are encouraged to operate nationally to unify practice.

Exclusions:

Short-term IF (<28 days), unrelated operations, and patients outside England are excluded from this service.

Key takeaways from this visit included:

- The integration of nutrition, surgical, and gastroenterological care in a coordinated, patientcentred model.
- Strategies for transitioning ICU patients from acute gut injury to rehabilitation, including parenteral and enteral nutrition transitions.
- Practical approaches to measuring tolerance, motility, and absorption in patients with compromised GI function.
- This visit provided valuable exposure to advanced intestinal failure care pathways and further reinforced the need for multidisciplinary input in managing GID.
- Learnings from Salford have directly influenced my approach towards GID assessment and nutrition assessment.

In addition, spending time with psychologists, pharmacists, nurse specialists, specialist dietitians, gastroenterologists and surgeons confirm the importance of multidisciplinary care not just in ICU but also other specialist areas in improving patient outcomes. The key features as part of the leaning were that imply in clinical practice and research were:

- Team structure – a team approach to improve patient outcomes
- Nutrition monitoring is of utmost importance as it confirms if intervention strategies are working.
- Anatomical discussions guide better assessment and hence treatment plans
- Routine psychology for any patient care is an important step to address mental well-being while recovering

Key novel aspects such as bioimpedance in measuring muscle mass, use of GLP for intestinal failure, focus on quality of life, keeping patients out of hospital and avoiding catastrophic infections such as sepsis.

The Salford Royal Intestinal Failure and ICU visit in Manchester, United Kingdom

3.3 VISIT AND COLLABORATION WITH APOLLO HOSPITALS, INDIA - TO VISIT DAPHNEE LOVESAY.

During my Fellowship, I had the opportunity to visit **Apollo Hospitals**, one of India's foremost private tertiary care centres, to explore practices on the assessment and management of GID in critically ill patients. This experience offered a valuable comparative perspective on the challenges and innovations present in low- and middle-income healthcare settings, wherein the dietitian is often guided and directed by the treating team. While there was clear clinical recognition of the importance of gastrointestinal function in critical care, the approach to assessment was often limited by inconsistent use of validated tools such as the AGI grading system in research settings constrained by variable access to advanced diagnostics like gastric emptying studies or motility testing. Predominantly specialist GI services use invasive objective methods which are for diagnostic purposes and not merely assessment focused. Despite these limitations, I observed a strong commitment to multidisciplinary care and a growing appetite for research and evidencebased protocol development, particularly in metabolism, nutrition and gut function. The visit highlighted opportunities for international collaboration, particularly in the development of scalable, resource-appropriate tools for identifying and managing GID in ICU settings.

I met with senior intensivists, gastroenterologists, and clinical nutrition teams at Apollo, many of whom expressed a shared concern about the under-recognition of GID and the lack of contextappropriate diagnostic and monitoring strategies in Indian ICUs. While some centres had access to imaging and functional tests like gastric residual volume measurement or intermittent endoscopy, these were often used in isolation rather than as part of a structured framework. Notably,

there was no consistent use of international scoring systems such as AGI or GIDS, and most clinical decisionmaking was based on indirect signs of feed intolerance, such as vomiting or abdominal distension, mainly subjective assessment which is not different to many other ICUs. The potential to adapt to change is tremendous with more funding streams being available in India.

From a nutrition perspective, the role of the critical care dietitian was emerging but remained variable in scope. Where present, the dietitians were highly skilled and deeply committed to patient care, but often worked without standardised enteral feeding protocols, particularly for patients with suspected GI dysfunction. Discussions highlighted the need for more structured interdisciplinary training, greater integration of GI function monitoring into routine ICU workflows, and enhanced research collaborations to build local evidence.

This visit reinforced several core themes of my Fellowship: the global need to develop pragmatic, validated tools for GI assessment in critical illness; the vital role of clinician education and multidisciplinary engagement; and the challenges faced in translating research into routine care in resource-limited settings. It also deepened my appreciation for the adaptability and innovation displayed by clinicians working in high-pressure, high-volume environments, and underscored the importance of contextualising international guidelines for local relevance. I left Apollo with strong professional connections, a deeper understanding of system-level barriers, and a shared enthusiasm to explore collaborative opportunities in areas such as bedside gut monitoring, nutrition support optimisation, and scoring tool adaptation.

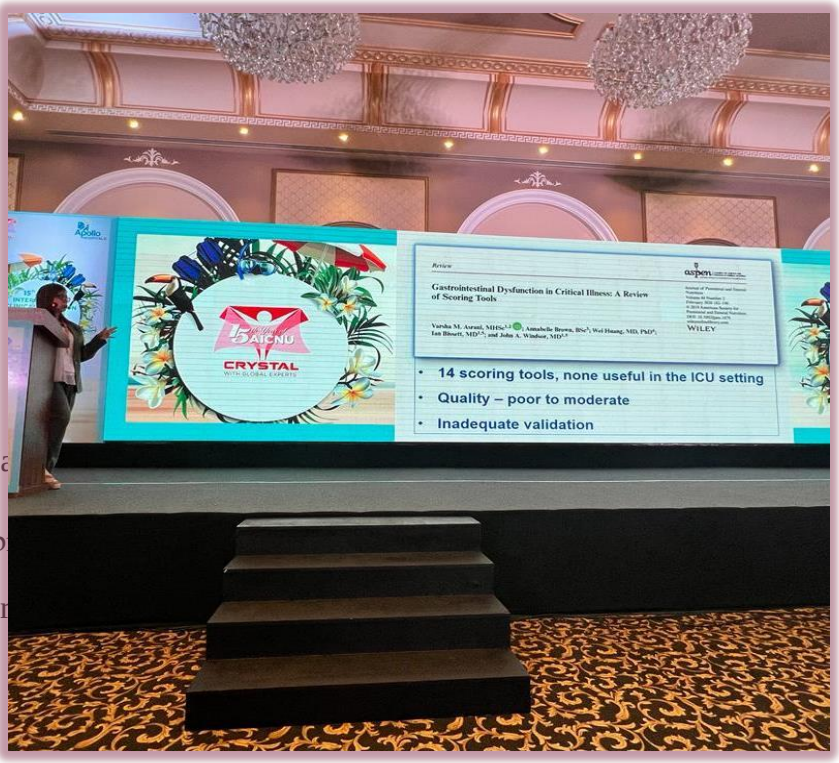
Emerging Collaborations from the Visit

Several meaningful collaborations have emerged from my visit to Apollo Hospitals, further extending the reach and impact of my work in gastrointestinal dysfunction and critical care nutrition.

I was invited to present my current research on gut function assessment to the clinical and academic teams, which sparked productive discussions and laid the groundwork for ongoing collaborative research projects. Notably, Dr Daphnee Lovesay—Secretary of the Indian Society for Parenteral and Enteral Nutrition (ISPEN)—expressed keen interest in this area and has suggested future opportunities to present at upcoming national conferences. These platforms would allow for broader dissemination and knowledge exchange with the wider Indian critical care and nutrition community.
In addition, I was approached by the Nutri-Health Foundation, a non-profit organisation dedicated to advancing clinical nutrition education among healthcare professionals, particularly dietitians.
Recognising my role as a certified trainer with the European Society for Clinical Nutrition and Metabolism (ESPEN), they proposed a formal collaboration for me to serve as a Course Director for a suite of educational modules. These would focus on gut dysfunction, metabolism, and evidence-based critical care nutrition, with the aim of enhancing global clinical knowledge in this space.
A formal proposal for this curriculum—including both online and in-person workshops—has been submitted to ESPEN and the Indian Association of Parenteral and Enteral Nutrition (IAPEN). The proposed programme is scheduled to begin in 2025 and includes plans to deliver face-to-face study days across at least three Indian cities, providing much-needed in-country training and mentoring for early-career dietitians and clinicians.

These initiatives reflect the lasting value of international engagement and underscore the global relevance of research into gastrointestinal dysfunction in critical illness. The collaborations formed during this visit offer a strong platform for sustained exchange of knowledge, capacity-building, and joint academic progress.

Visit to the Apollo Hospitals in Indi a: Varsha Asrani with Daphnee Lovesay and her team. During the visit the Apollo Hospitals were celebrating their ‘crystal’ anniversary and held an event at which I was asked to join in and meet the wider team and guests and also present my research work t o the Apollo Hospital team on-site.



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4. CONCLUSIONS

This Winston Churchill Fellowship has been a pivotal experience in advancing my understanding of gastrointestinal dysfunction (GID) in critical illness and in shaping the future direction of translational research and clinical practice in this area. Through immersive visits to centres of excellence in the United Kingdom, Switzerland, and India, I was able to gain a comprehensive perspective on international models of GID assessment and management across high-resource and resource-limited settings. The Fellowship reaffirmed the critical, yet under-recognised, role of the gut in ICU outcomes and highlighted the global need for validated, pragmatic tools that enable early diagnosis, consistent monitoring, and tailored interventions. My interactions with world-leading clinicians and researchers have catalysed several international collaborations and academic outputs, and directly informed the development of The GIFT Study, a multi-phase programme now underway in New Zealand. This experience has also strengthened my position as a leader in critical care nutrition research, enabling me to bridge clinical dietetic practice with innovation in gastrointestinal monitoring technologies and scoring systems.

5. RECCOMENDATIONS

1. Formal Integration of GI Assessment in ICU Scoring Systems - International critical care frameworks should adopt validated tools such as the AGI and GIDS to systematically assess gastrointestinal dysfunction alongside other organ systems. Advocacy at guideline and policy levels is needed to ensure the gut is no longer overlooked.
2. Adoption of Objective, Non-Invasive Monitoring Tools - Emerging techniques such as intraluminal pressure monitoring and body surface gastric mapping should be validated and implemented in clinical settings to support earlier detection and individualised nutrition strategies.
3. Strengthen Multidisciplinary Care Models - The integration of dietitians, psychologists, pharmacists, and surgical/gastroenterology specialists—as observed at Salford and Lucerne—should be considered a best-practice model for managing complex GID and intestinal failure cases.
4. Capacity Building and Education - There is an urgent need for interdisciplinary education in gastrointestinal monitoring and nutrition in critical care, especially in low- and middle-income countries. Initiatives like the proposed ESPEN-IAPEN educational modules should be supported and scaled.
5. Investment in Translational Research and Collaboration - Funding bodies and institutions should prioritise translational studies that connect emerging diagnostics to real-world patient outcomes. Continued collaboration across countries and disciplines will be essential for scalable innovation.

6. Local Adaptation of Global Guidelines - Guidelines for GID assessment must be contextualised to reflect resource variability. Institutions in countries like India would benefit from streamlined, low-cost diagnostic pathways co-designed with international partners.
7. New Zealand Leadership in ICU-Gut Research - With growing momentum, New Zealand should establish itself as a regional hub for gastrointestinal dysfunction research and clinical innovation. Establishing a national research group focused on ICU nutrition and gut function is timely and necessary.

PROJECTS AND PRESENTATIONS ARISING FROM THE FELLOWSHIP

Post graduate Dietitian Research Projects Supervision

To be Completed 2025-2026/2027

• Navigating Gut Rhythm (2025-2026) s: Gastric Patterns in Critically Ill Patients Before and After Prokinetics (Shannae Lovell – University of Auckland)

Completed 2024-2025

- Evaluating the Feasibility of the Gastrointestinal Dysfunction Score (GIDS) in a New Zealand Intensive Care Unit: A Comparison of Objective and Subjective Assessment Methods (Jamie Schwarz - University of Auckland) (2024-2025)
- A Pilot Study for Optimising Enteral Feeding Using Novel Strategies Towards Gut function Assessment (Hannah LeGrange – University of Auckland) (2024-2025)

Academic Leadership and Dissemination

- Ongoing single-centre and multicentre trials (GIFT study, SMARTTUBE study, COSMOGI, GUTPHOS GUT-FIRST**)**
- National education (Massey University, ICU nutrition study days)
- Policy and guideline development (AuSPEN, ESPEN)
- Future grant proposals and PhD student supervision.
- Presentation at AuSPEN, ESPEN, ESICM conferences (2023–2025)
- ICU webinars and teaching sessions
- Student lectures and thesis projects
- Publications in Current Opinion in Critical Care and Critical Care
- Presentations and collaboration at Apollo Hospitals and Nutri-Health Foundation, India

Stakeholders Interest

- ICU teams and intensivists globally
- Clinical dietitians
- Medical educators and policy developers
- Global health systems seeking scalable GID diagnostics/ Industry sponsors
- Health Ministries & ICU Units: Integrate gut scoring (e.g., GIDS) into organ dysfunction protocols
- Funding Bodies (NZ HRC, MBIE, ESICM): Support translational GID research
- Education Providers: Include GID in critical care curricula
- International Societies (ESPEN, AuSPEN): Promote training in gut function assessment
- ICU Directors & Clinical Networks: Adopt non-invasive monitoring and structured interdisciplinary models

This Fellowship has elevated the role of dietetics and ICU research in New Zealand, contributing to academic leadership, curriculum development, and healthcare innovation. It strengthens the Commonwealth's research influence through collaboration with international societies ESICM, ESPEN, and Indian institutions, whilst holding NZ in a stronger position amongst other countries and ongoing research.

6. REFLECTIONS

Bringing the learnings from my Fellowship back to NZ has been inspiring but also highlighted some real-world challenges. Below I highlight these challenges and how I have been involved in addressing these moving forward and the potential opportunities come my way since this fellowship.

One of the biggest barriers is awareness and engagement. While there is increasing recognition that the gut plays a critical role in critical illness, structured tools such as AGI and GIDS are still not widely used, because of subjectivity and lack of validation. In busy ICUs, with so many competing demands, it can be difficult to introduce something new unless it clearly fits into existing workflows. To address this I am collaborating with the researchers who developed this score in being a part of the validation process (GUT-PHOS study completed, NZ part of the study amongst rest of the other European ICUs) but also taking the lead in testing out nutritional delivery and outcomes by using this tool from the dataset obtained across 28 ICUs globally (GUT-FIRST study led by Varsha Asrani). In India we have collaborated ESPEN (using the life-long-learning) educational platform with the Nutri-Health foundation an educational platform to educate resaerchers and health professionals on nutrition in ICU and other areas which will be held a hybrid events across the year. I am a current LLL-ESPEN trainer and will be the scientific advisor on the NHF board to support these activities while facilitate the sessions on-site and virtually as planned (Upcoming in December 2025).

Another challenge has been resourcing and technology. Tools like intraluminal pressure monitoring or body-surface gastric mapping require investment, training and time. Securing funding and making space for these in routine practice is not straightforward. Similarly, while international centres often have access to large teams and advanced diagnostics, adapting these approaches for smaller or resource-limited ICUs needs a more pragmatic approach.

This has been one of the key aspects I have been working on for years and we are closer to the goal by refining and delivering a more sophisticated approach although pilot studies will need to continue until such a device is ready for use in the clinical setting. Irrespective there is a higher demand for objective devices in the ICU particularly that are non-invasive and have little impact on the patient in relation to discomfort.

Finally, education and behaviour change remain central. For any of these methods to be taken up meaningfully, ICU doctors, nurses, dietitians and wider teams need consistent training and opportunities to see their value at the bedside. Without that, even the best-designed tool risks sitting unused.

This is another aspect that has been central to my role. My current role involved improving teaching on the gut and nutrition in the ICU for nurses and doctors and also developing a curriculum for advanced critical care nursing courses that can support nurses who are upskilling in intensive care.

Besides, leading the nutrition research portfolio has been an evolving process for me which ahs never been the case in Te Toka Tumai. I receive the support of the ICU research lead and the clinicians to run projects and studies that raise the profile of the profession ut more so for NZ within the world map, which is an ongoing process. As I wrote this, I have delivered presentations on the ICU Research portfolio projects to our research leadership team on 8/10/2025 that enhances leadership and recognition within the ICU space.

Besides recently been asked to be a part of the ESICM board as a facilitator and leader towards educational events, research and congress meetings which is a pleasure. The ESICM will be interviewing me on gut dysfunction in critical illness as par to of this process.

These reflections remind me that it is not enough to generate new knowledge, but it has to be translated into practice in a way that is realistic, supported, and accessible. That is where my focus will be moving forward.

8. KNOWLEDGE DISSEMINATION

The groups who would benefit most from these learnings include:

- **ICU clinicians** – intensivists, nurses, dietitians, pharmacists to bring more consistent gut assessment and nutrition support to patient care.
- **ICU and hospital leaders, and policy makers** to drive adoption of gut scoring and monitoring into everyday quality measures.
- **Professional bodies and educators** ESPEN, AuSPEN, ESICM and universities to weave gut function assessment and nutrition into critical care training.
- **Research networks and funders** to back translational studies that show how early gut dysfunction detection improves outcomes.
- **Global colleagues working in low-resource settings** to adapt and scale practical, cost-conscious approaches to gut monitoring and nutrition.

9. APPENDICES

Travel Diary: Winston Churchill Fellowship 2024

Varsha Asrani Travel Period: January 20 – March 7, 2024

Week 1: Manchester, United Kingdom

Dates: January 20–28, 2024

Primary Activity: Visit to the Salford Royal Hospital

Purpose: Observational and collaborative visit to the Intestinal Failure Unit (IFU) and ICU

Upon arrival in Manchester on January 20, I was warmly welcomed and transferred to my accommodation. Over the week, I engaged closely with Dr. Simon Lal and his multidisciplinary team at the Salford Royal Hospital. I observed clinical rounds, multidisciplinary team (MDT) meetings, and complex intestinal failure consultations. I gained insights into their integrated care model, long-term parenteral nutrition strategies, surgical interventions, and rehabilitation approaches. This visit provided an invaluable understanding of transitioning patients from acute gut dysfunction to long-term management and reinforced the importance of nutrition monitoring, psychological support, and multidisciplinary care in complex gastrointestinal cases.

Week 2–3: Lucerne, Switzerland

Dates: February 4–13, 2024

Primary Activity: Visit to Kantonsspital Lucerne and roundtable scientific meetings

Purpose: Collaborative exchange with Prof. Annika Reintam Blaser on GID assessment and ongoing studies

Following my flight to Zurich and transfer to Lucerne, I spent several days with Professor Annika Reintam Blaser, a world leader in gastrointestinal dysfunction (GID) research. I joined ICU rounds, participated in case discussions, and explored GID scoring frameworks including AGI and GIDS.

We reviewed the challenges in implementing GI scoring systems globally and discussed the application of structured GI assessment tools. The visit strengthened ongoing collaborations, including the GUT-PHOS study and the COSMOGI consensus project. I also presented my own research initiatives, which led to planning of future multicentre trials such as the GUT-FIRST project. Participation in a roundtable scientific meeting during this time further broadened my academic engagement.

Week 4–5: Mumbai, India

Dates: February 27 – March 5, 2024

Primary Activity: Visit to Apollo Hospitals and collaboration with Indian critical care experts

Purpose: Explore gastrointestinal dysfunction management in resource-limited settings and foster regional collaborations

My final leg took me to Mumbai, India, where I visited Apollo Hospitals and met with senior intensivists, gastroenterologists, and the clinical nutrition team, including Dr. Daphnee Lovesay. I observed how GID is managed in a high-volume, resource-constrained environment and noted the challenges in implementing structured GI assessment tools like AGI and GIDS due to limited access to advanced diagnostics. Despite these constraints, the dedication to multidisciplinary care and enthusiasm for evidence-based practice were evident.

I was invited to present my research on gut function assessment, which initiated promising conversations around future collaboration, including invitations to speak at national conferences and to co-develop an educational curriculum for clinical nutrition professionals in India. As a certified ESPEN trainer, I was also approached by the Nutri-Health Foundation to lead workshops on gut dysfunction and critical care nutrition, with plans to roll these out in 2025 across multiple Indian cities.

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