# A multicenter study on the resting energy expenditure of cancer patients – METHEHO Group

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## Description of the initiative

Cancer cachexia syndrome is associated with profound metabolic disturbances, significantly impacting patient outcomes (Fearon, 2011). Between 47-51% of cancer patients are hypermetabolic (HM) (Cao, 2010; Jouinot, 2017). HM patients are unable to increase their nutritional intake sufficiently to match elevated energy demands (Bosaeus, 2001). This imbalance is a risk factor for malnutrition, and contributes to increased morbidity and mortality. Moreover HM is a recognized factor of resistance to immunotherapy (Boudou-Rouquette, 2021). However clinicians still largely rely on predictive equations to estimate energy, with possible underestimations up to -40% or overestimations up to +30% (Bendavid, 2020). In cancer patients ESPEN recommends 25 to 30 kcal/kg/day (Muscaritoli et al., 2021) whereas SFNCM recommends 30 to 35 kcal/kg/day (Senesse, 2012). Indirect calorimetry, the gold standard for measuring resting energy expenditure (REE), offers a precise method for assessing a patient's actual energy needs, but it's not well implemented in daily practice in cancer patients. Tailoring nutritional support based on these individualized measurements could significantly improve nutritional outcomes, reduce the risks of underfeeding or overfeeding, and potentially enhance treatment tolerance and overall prognosis in hypermetabolic patients.
Objectives : Precisely identify patients prone to hypermetabolism, normo and hypometabolism, according to type of tumor and treatment. Refine nutritional recommendations, aligning them with the actual needs of patients. Better characterize the metabolic needs (REE) in order optimize nutritional management and prognosis.

## Planned activities & deliverables

This is a multicenter observational study conducted in France, involving 7 specialized cancer centers. Collection data in oncology units will include: REE by indirect calorimetry performed as part of standard care, oncological, treatment, nutritional and anthropometric data. All information will be centralized in a secure server, via an evolving REDCap e-CRF. Study duration: first analysis after 24 months, the minimum projection is 300 patients (approximately 30 indirect calorimetry measurements per week across all centers).
Scientific publication and presentation of posters at international oncology/nutrition conferences in 24 months.
Moreover, this is a registry we aim to enrich over several years, providing opportunities for additional future publications.

## Resources & enablers

Initial Development : founded by the METHEHO (Métabolisme et Thérapies de l'Hôte) group : Creation of the REDCap e-CRF (already created), drafting of inter-institutional agreements (in progress).

MNI Grant 2025 funding €40,000 :
- CRC Resources: €30,000 to cover data collection and entry by Clinical Research Coordinators (CRCs) in each center.
- Interim analysis at 6 and 12 months by the coordinating team (number of patients, missing data, preliminary statistics): €3,000
- Statistical Analysis: €7,000 for statistician services and related infrastructure.

Publication and promotion costs (writing, submission, and conference presentations): founded by METHEHO group.

This project is financially, scientifically supported and driven by the METHEHO group. Seven enrolling centers spread across France are willing to participate. The referring physicians from the various centers have participated in the study design (multicenter meetings) and in creating the eCRF (data collection). The criteria to be collected have been defined. The e-CRF (electronic Case Report Form) is completed. The administrative aspects (ethical and research framework) are in progress.

## Results/outcomes & expected impact

This national multicenter project, led by the METHEHO group, addresses a central issue: the variability of REE in cancer patients and its potential impact on prognosis and nutritional management. This study will help improve nutritional management in clinical practice by enabling clinicians to identify patients who may be hypermetabolic, normo and hypometabolic (due to patient-related factors, cancer type, or treatment). In doing so, clinicians can better tailor the patients' energy targets according to these parameters, even in the absence of indirect calorimetry measures. This study could incorporate a stratified approach to energy needs into the guidelines, in order to provide more tailored guidance based on the patient's profile, tumor type, and treatment, to reduce the risk of malnutrition and enhance patients outcomes. We hope this study will also help normalize the use of indirect calorimetry in oncology, which is currently underused in this population.
To our knowledge, there is no national cohort of this kind, and this project is clearly innovative. This project could lead to an adjustment of official recommendations on energy needs oncology patients.
The recommendations from this project can be used for patients with similar characteristics, including those in other countries.

☐ **Please tick to confirm the PEN letter of endorsement is attached. Incomplete submissions will not be considered.**