

Author / Date: _____	ECRIN	Doc No: SOP-NUTR-0005
Authorised By / Date: _____	NUTRITION WP6	Date of issue:
Edition No. 00	Standard Operating Procedure (SOP)	
<i>Reviewed By/Date:</i>		



**MEASUREMENT OF BODY COMPOSITION
BY IMPEDENCEMETRY
NUTRITION CENTRES**

**MEASUREMENT OF BODY COMPOSITION
BY IMPEDENCEMETRY
NUTRITION CENTRES**



Author / Date: _____	ECRIN	Doc No: SOP-NUTR-0005
Authorised By / Date: _____	NUTRITION WP6	Date of issue:
Edition No. 00	Standard Operating Procedure (SOP)	
<i>Reviewed By/Date:</i>		



MEASUREMENT OF BODY COMPOSITION BY IMPEDENCEMETRY NUTRITION CENTRES

1. Scope

This procedure is to be followed by the ECRIN Nutrition Centres when performing measurements of body composition by impedencemetry

This procedure describes the steps necessary to achieve impedance measurements by using Bodystat QUADSCAN 4000

2. Responsibilities

It is the responsibility of the Management team in the Nutrition Centres to ensure that this procedure is adapted and followed.

3. References

- Bioimpedence SOP - Physiology Laboratories - University of Nottingham Medical School.
- Procédure d'utilisation de l'impédancemètre Bodystat Quadscan 4000- Unité d'Exploration en Nutrition - Centre de Recherche en Nutrition Humaine CRNH Auvergne
- Impédancemètre Bodystat Quadscan 4000 - Centre de Recherche en Nutrition Humaine CRNH Rhône-Alpes.

4. Terms, definitions, abbreviations

ECRIN: European Clinical Research Infrastructures Network

SOP: Standard Operation Procedure

5. Documentation

6. General

The impedancemeter can determine body composition by multifrequency bio-electrical impedance. This technique consists of an alternating current of low intensity (50 to 800 μ A) that go with different frequencies (5, 50, 100 and 200 kHz) between the hand and the foot

Author / Date: _____	ECRIN	Doc No: SOP-NUTR-0005
Authorised By / Date: _____	NUTRITION WP6	Date of issue:
Edition No. 00	Standard Operating Procedure (SOP)	
<i>Reviewed By/Date:</i>		



MEASUREMENT OF BODY COMPOSITION BY IMPEDENCEMETRY NUTRITION CENTRES

by means of electrodes. The impedances to the 4 different frequencies are measured. These measures are used to assess total body water, extracellular water and deduce, using equations, lean mass and fat mass.

The device allows for measures "whole body" and segmental measures "upper limb", "leg" and "trunk".

This measurement technique is completely painless, safe, simple, non-invasive, and feasible to bed of voluntary or patient.

The purpose of this Standard Operation Procedure is to ensure that the process of impedance measurements using impedancemeter Bodystat QUADSCAN 4000 for Nutrition Centres is performed under standardised conditions.

7. Safety Considerations

All measurements are taken from the right side to avoid the current (low voltage) of the battery passes heart side.

The impedance measurements are not recommended for subjects with pacemakers or other electronic implant as well as any intracorporeal medical device.

Subjects must remove jewelry, watches and piercing if possible

Measures in pregnant women are prohibited. Therefore, female volunteers of child-bearing age should not be measured if there is a chance that they may be pregnant.

The health and safety of the volunteer is of primary concern during the experiment.

8. Materials

impedancemeter Bodystat QUADSCAN 4000

Bodystat' Bioimpedence Analyser

4 (to 8 depending on the measurements), single use EMG Electrodes

2 cables with 2 alligator clips

Author / Date: _____	ECRIN	Doc No: SOP-NUTR-0005
Authorised By / Date: _____	NUTRITION WP6	Date of issue:
Edition No. 00	Standard Operating Procedure (SOP)	
<i>Reviewed By/Date:</i>		



MEASUREMENT OF BODY COMPOSITION BY IMPEDENCEMETRY NUTRITION CENTRES

Weighing Scales

Stadiometer

Maintenance

If nothing appears, check the batteries.

If there is bizarre results, do a calibration with the calibrator supplied with the unit. It enables verification of operation of Bodystat. One measure is done once a week or before use.

If the result is false, change the cables. The manufacturer recommends a cable change once a year.

If the problem persists, contact the customer service.

9. Patient preparation

For consistency, the measurement of body composition must be carried out in similar conditions throughout a study or a specific clinical protocol. Therefore, it is desirable that the subject is measured at the same time of day during the whole study with identical electrode positions and the same fasting condition.

Fasting condition

The subjects should be fasting from 8.00 PM the night before. No food should be allowed after 8.00 PM, but they may drink until 24.00 PM. Alcohol is not allowed the day before.

On the day of the scan subjects should stay fasted in the morning.

Volunteers should refrain from heavy exercise for the last 12 hours.

If measurement in fed condition to standardize the measure, the subjects should be fed a standardized amount of lunch + beverages.

10. Advice to patients

Advise patient that this is a simple and painless procedure, and requires very little preparation.

Author / Date: _____	ECRIN	Doc No: SOP-NUTR-0005
Authorised By / Date: _____	NUTRITION WP6	Date of issue:
Edition No. 00	Standard Operating Procedure (SOP)	
Reviewed By/Date:		



MEASUREMENT OF BODY COMPOSITION BY IMPEDENCEMETRY NUTRITION CENTRES

The volunteer should be given adequate explanation of the experimental protocol to ensure that an 'informed' consent to participate is given.

Advise female volunteers of child-bearing age that they should not be measured if there is a chance that they may be pregnant.

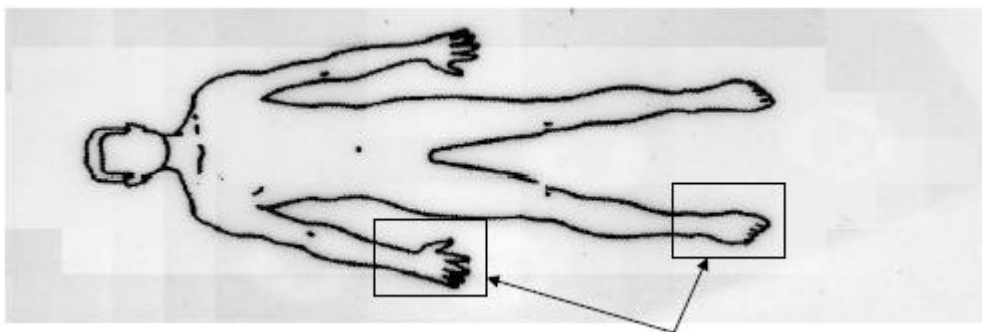
Ask volunteers to void their bladder before the scan is carried out.

During the measurement the volunteer will need to lie still on a padded table and to breathe normally.

11. Placement of the patients

Get them to lie supine on a couch / bed, with legs slightly apart and arms away from the body. The inner thighs and armpits should not be in contact if necessary, separate with a dry cloth.

The subject should not be in contact with a metal part.



Placement of the electrodes

12. Position of electrodes

Author / Date: _____	ECRIN	Doc No: SOP-NUTR-0005
Authorised By / Date: _____	NUTRITION WP6	Date of issue:
Edition No. 00	Standard Operating Procedure (SOP)	
Reviewed By/Date: _____		



MEASUREMENT OF BODY COMPOSITION BY IMPEDENCEMETRY NUTRITION CENTRES

Place two electrodes on the back of the right hand.

See diagram.



Place two electrodes on the upper aspect of the right foot.

See diagram.



Attach the leads so that the red electrode is always the one at the extremity (The distal electrode on both the hand & foot).

Right hand: red wire under the major
 Black wire on the wrist

Right foot: Red wire under the second toe
 Black wire on the ankle

Connect to the current generator by attaching the leads to the back of the Analyzer.

For segmental measures it takes 4 additional electrodes.

Refer to the instruction manual of the device

9. Parameter

View manual and local procedure for setting the impedancemeter Bodystat Quadscan 4000.

Author / Date: _____	ECRIN	Doc No: SOP-NUTR-0005
Authorised By / Date: _____	NUTRITION WP6	Date of issue:
Edition No. 00	Standard Operating Procedure (SOP)	
<i>Reviewed By/Date:</i>		



MEASUREMENT OF BODY COMPOSITION BY IMPEDENCEMETRY NUTRITION CENTRES

10. Measurement

Turn machine on.

Enter the subject's demographics as requested by the Analyser. These include, sex, age, height, weight, hip and waist circumferences, and levels of physical activity.

Once all information has been inputted into the Analyser, instruct the subject to stay very still. The subject should lie perfectly flat for at least 10 minutes before starting the measurement.

Recheck the electrodes and leads and then press 'Enter' to start the analysis.

A beep indicates the end of the measurement (wait 19-20 seconds). The values are automatically saved and stored.

The volunteer can stand up.

Once relevant results have been noted, turn the machine off, remove the leads and gently pull off the electrodes.

Remove the leads from the back of the Analyser and coil them for safe storage in the case.

11. Analysis

The stored data are transmitted to a computer for exploitation with the software dedicated to the analysis.

12. Limitations & Pitfalls of the Examination

Avoid taking measurements on a sweating subject: current conduction would then occur on surface and measures would be biased.

Lean mass is calculated from the volume of water on the basis of a constant rate of hydration of 73.2% of the lean body mass. The fat is then derived from the difference in lean body mass with weight. The weight, height, age and sex are needed to obtain these results from various predictive equations proposed.

Author / Date: _____	ECRIN	Doc No: SOP-NUTR-0005
Authorised By / Date: _____	NUTRITION WP6	Date of issue:
Edition No. 00	Standard Operating Procedure (SOP)	
<i>Reviewed By/Date:</i>		



MEASUREMENT OF BODY COMPOSITION BY IMPEDENCEMETRY NUTRITION CENTRES

So be careful and keep in mind that the equations used by the unit for the calculation of the Lean Mass and Body fat are not always adapted to the population for which the measurement is performed (lean and obese subjects).

18. Method Validation

19. Procedure Notes & Other Pertinent Information

Refer for more information: Bodystat Quadscan 4000

20. Appendices

N/A